CONTEXTUALISING THE PERFORMANCE OF OWNER-MANAGED FIRMS:

A Conceptual Framework Based on Owner-Managers' Objectives

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ABSTRACT

This thesis develops a framework within which to consider the performance of owner-managed firms, relative to the purposes for which the firm has been created, by distilling essential features of owner-manager economic motivation from established theory. This provides the basis for proposing specific concepts fundamental to our understanding of the performance of firms and the decision-making behaviour of owner-managers Implications of owner-manager objectives for lenders are analysed to demonstrate the broader relevance of the framework.

Performance is generally restricted to economic notions. Because the firm is established and maintained by the owner-manager, his or her objectives are those to which performance of the owner-managed firm should be related. It is argued that satisfaction of individual consumption preferences as the basic objective of economic activities. Owner-managers are identified as intendedly rational satisficers with minimum periodic consumption targets.

In developing the framework, unnecessary formalism is avoided. The focus is on the conceptual development of the framework rather than mathematical representations or formal prescriptions dependent on restrictive assumptions to which individual owner-managers are unlikely to conform.

The paucity of accessible data concerning owner-managed firms in Australia significantly limits the extent of testing that can be undertaken. While there are many limitations in the data which was obtained through very limited access to a bank's lending files, the tests generally support the propositions. Simple empirical techniques are employed, and are based mainly on testing group differences and multivariate linear regressions.

Traditional concepts of performance, such as growth, survival and profit seeking are considered within the context of the proposed framework. This illustrates how the concepts central to the framework can be used to contextualise the performance of owner-managed firms.

This work contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published by another person, except where due reference has been made in the text.

I give consent to this copy of my thesis, when deposited in the University Library, being available for loan and photocopying.

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CHAPTER 1
THE OBJECTIVES AND APPROACH

INTRODUCTION

The purpose of this research is to develop a conceptual framework within which to consider the performance of owner-managed firms, relative to the purposes for which the firms have been created.

As will be seen, the development of such a framework is complex and subtle. Such foundational work has rarely been considered in the literature, even at a superficial level. This thesis is an attempt to redress this deficiency and is proposed as a necessary stage in the development of a better understanding of performance measures and their application to owner-managed firms.

Developing the framework involves investigating the economic consequences of *owner-managers' objectives* for owner-managed firms and *criteria* relevant to these which can serve as a basis for others to propose performance measures. Consideration of performance measures *per se* will be limited and illustrative only, with the focus on performance criteria relevant to the owner-managers.

The framework is developed by distilling essential features of owner-manager economic motivation from established theory and testing aspects of this framework against a sample of Australian owner-managed firms. This will provide the basis for proposing specific concepts fundamental to our understanding of the performance of firms and the decision-making behaviour of owner-managers and parties with whom they contract.

THESIS OBJECTIVES

The basic objectives of this thesis can be described by the following broad elements, which are dealt with sequentially.

1. **Establish a conceptual framework within which to identify and evaluate notions of owner-managed firm performance.**

   Establishing a conceptual framework is the core of this thesis and is a necessary precursor to the remaining primary objectives. This objective is accomplished by drawing on the basic motivations for individuals commonly addressed in contemporary microeconomic and finance theory. This is pursued largely through the existing literature, with only limited reference to empirical propositions.

2. **Construct a model of owner-manager decision to operationalise the framework.**

   The construction and operationalisation of decision models based on owner-manager objectives is pursued by drawing propositions from the conceptual framework. This is tested, where possible, against a sample of Australian owner-managed firms and their owner-managers.

3. **Examine the implications of owner-managers' motives and choices for parties contracting with owner-managed firms.**

   The examination of the implications of owner-manager objectives for other decision makers demonstrates the broader relevance of the framework. Attention is restricted to institutional lenders because they are a significant and relatively homogenous group of decision makers who frequently contract with owner-managed firms and for whom data is most readily obtained.

Research into these matters is desirable because of the current deficiencies in our knowledge concerning owner-manager performance criteria and because of the economic

importance of owner-managed firms. The latter point is briefly illustrated later in this chapter, after clarifying the concepts of owner-managed firms and performance.

IMPORTANT CONCEPTS

Generally, the objectives described above are concerned with how the individual performance of 'owner-managed firms' should be described and evaluated *given* an owner-manager's economic motives. Restrictions on the subject matter are inherent in the import of three terms: What is meant by a 'firm', how 'owner-managed' differs from other delimitations and what is meant by 'performance'. These are described below.

The firm

The roles and performance of firms continue to be observed, analysed, discussed and speculated upon across as diverse a literature as any competing area of study. Few generalisations concerning 'firms' are meaningful because of the frequent failure to define precisely what is meant by a firm and because of the many features of firms that can induce substantial differences between them. Consequently, subsets or categories of firms are usually identified for discussion or investigation in the literature. Firms can be categorised according to numerous regimes and characteristics, such as size, organisational type, ownership, behavioural modes, stages of development and demographic criteria. While interest here is limited to particular firms defined by their ownership and management, it remains necessary to define the concept of the firm itself.

The firm is defined here as *an entity capable of contracting with another to acquire private property rights and incur debt.* The relevance of owner-managers *per se* is made apparent later in this section, but it is argued that the objectives of the owner-managed firm are economically inseparable from those of the owner-manager.

For unincorporated firms, this definition implies residual equity holders (the owner-managers) *are* the firm in an economic sense. As argued in Chapter 2 and tested in

Chapter 10, residual equity holders of incorporated firms may acquire private property rights and become indebted to third parties by contracts designed to circumvent the corporate veil. Thus, while the residual equity holder may be legally distinct from the corporation, when the objectives of the incorporated business are functions of the objectives of the equity holder the business cannot be separated from the equity holder for economic analysis. Consequently, the object of analysis is the consolidated[1] firm formed by combining the interests of the equity holder and the incorporated business which they own and manage. This leads to the following definition of the owner-managed firm.

The owner-managed firm

Owner-managed firms are defined here as *legally independent privately held firms in which the proprietors make all policy decisions and personally provide the primary management functions.*

The restriction on the provision of management functions eliminates any possibility that the implementation of policy decisions may be systematically corrupted by possible conflicting objectives of managers. The key technical terms in this definition are briefly explained thus:

- *'Legally independent'* means the firm is not owned or controlled by another firm, nor depends on any party other than its owner-managers for its legal identity.
- *'Privately held'* is a legalistic notion referring to the absence of publicly traded equities (see Appendix 2.1).
- *'Proprietors'* are the owners of the firm. That is, they hold the residual private property rights in assets and profits of the firm.
- *'Policy decisions'* are the decisions concerning the objectives of the firm. They are distinguished from implementation decisions, which are concerned with how policy is put into effect.

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1 Consolidation is used here in its accounting sense, where assets, liabilities and residual equity of the entities are combined, after eliminating obligations and transactions between the entities.

- *'Primary management functions'* are those functions of management which invoke the implementation of policy decisions.

- The *'personally provide'* clause restricts the provision of management functions to eliminate the possibility of policy implementation being systematically corrupted by conflicting independent objectives of management. This restriction identifies the firm as having little or no *internal* access to non-owner specialist managers, whether by choice or circumstance, and so must acquire external expertise through separate contracting arrangements as needed.

This definition closely limits the set of firms of interest in this study. It implies that an owner-managed firm is generally without internal managerial specialists, thus having little formalised management structure and little or no managerial delegation. It is likely such a firm faces an upper size or growth limit due to managerial limitations[2].

The definition also implies an owner-managed firm cannot raise equity funds from new parties unless such parties can participate in the management of the firm, while internal participants in the primary managerial processes must all directly share proprietary risks. The notion of what constitutes a firm is important, and is developed further in later chapters. The approach adopted here in defining the basic concept of an owner-managed firm identifies some significant features relative to the existing literature which should be emphasised:

- Mackintosh (1963, p.18) defined a firm as 'an individual or association which buys goods and services and converts them into other goods and services which it sells'. Addition of a profit motive yields the intuitive concept of a business. While describing an individual as a possible firm, Mackintosh claimed that regardless of the size of a firm, there is no single decision maker for a firm. It appears incongruous for Mackintosh to identify an individual as a firm, but to then suggest that the decision making unit must be a larger entity. Given the adopted definition of an owner-managed firm, one individual will often comprise the decision making unit,

2 This is considered in Part IV Chapter 15.

rather than a team or collection of individuals. While other parties may contract with the firm, and so be engaged in *relevant* decision-making, they do not form part of the governance structure of the firm *per se* under Mackintosh's definition.

- At the individual firm level, there are two broad categories of study described by the ownership and management of firms. The first is where capital providers exercise significant *direct* managerial control over the firm, while the second is where ownership and management are largely divorced[3]. Contemporary theories of the firm, finance and managerial behaviour tend to have developed around the latter category. Indeed, separation of ownership and control was pivotal in developments in the theory of the firm, and in many aspects of modern finance theory. While owner-managed firms are not entirely ignored in the literature, they have not enjoyed the same relative focus in theoretical development.

- Much of the literature which uses labels such as 'small business' or 'entrepreneur' appears relevant to owner-managed firms, although it does not specifically identify owner-managed firms as its subject. Most of this literature is empirically driven with little apparent theoretical foundation. The primary problems with such labels is the lack of agreed definition and the consequent difficulties of generalising results. These problems are examined further in Chapter 2.

- An important aspect of this thesis is the analysis of the functions and effects of organisational boundaries which addresses the difficulty of operationalising the above definition of the owner-managed firm. Some difficulties are attributed to the effect of the accounting entity concept which pervades available data bases. The approach taken here questions the extent to which legal and accounting boundaries of firms (which arise from the adopted organisational form) are meaningful in economic analyses of owner-managed firms[4].

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3 While the degree of separation between ownership and control may be better described as a continuum, this has not been the dominant approach. Generally, the prevailing literature has focussed on the *existence* of separation, rather than the *degree* of separation.

4 The concept of 'organisational boundaries' is used to identify an ascribed or organisational entity, such as a legal or accounting entity, as distinct from the economic boundaries of the firm and its owner-manager. This is discussed in Chapter 2 and empirically investigated in Chapter 10.

Performance

Performance can be considered from many subjective perspectives and at aggregate and individual firm levels. While performance is generally restricted to economic notions in the business literature, as will be seen in reviews of the relevant literature in various parts of this thesis, the focus is typically on accounting profits and related growth measures. This implicitly assumes that these measures are of paramount significance to the various decision makers. However, as will be shown in Part II, it has *not* been established that these are appropriate criteria for measuring the performance of owner-managed firms.

As any concept of performance is relative to objectives, it is necessary to identify the objectives for owner-managed firms. The approach adopted here is that, because the firm is established and maintained by the owner-manager, his or her objectives are those to which performance of the owner-managed firm should be related. It is argued in Chapter 3 that generally accepted economic theory identifies the satisfaction of individual consumption preferences as the basic objective of economic activities.

The need for a theoretical framework

The extant literature concerning small firm performance and interrelated factors is largely prescriptive, with little theoretical support. Many empirical studies have little reference to any theoretical framework, as illustrated below.

Numerous studies have 'analysed' small firm behaviour to isolate 'success' factors. Momentarily ignoring the serious limitations of most such studies, overall they suggest that many identified variables can be associated with adopted concepts of success or failure (for example, see the literature review by Berryman, 1983). As an illustration of

weaknesses in this area, Cragg and King (1988) reviewed ten studies investigating small firm 'financial performance' and concluded that[5]:

- an organisation's planning activities are related to financial performance;
- market oriented activities would seem to be related to financial performance; and
- the characteristics of the 'owner/manager' are related to financial performance.

In the absence of a theoretical framework, such descriptive findings offer little insight into performance criteria or evaluation. The use of accounting profits and revenues as performance criteria was not justified by the various authors. The simple associations identified are speculative only, given the naive analyses. The associations are not generally attributed to relationships (despite the conclusion that they are 'related'), with little or no reference to causation.

An often stated aim of the assorted research was to obtain a greater understanding of small firm performance. However, as noted, no consideration was given to theoretical foundations for the development of performance criteria or evaluative techniques. Cragg and King (1988) focussed on financial performance in their evaluation and retesting of 'associated variables', but failed to take account of major deficiencies in the studies they reviewed. For example, they employed naive financial performance measures such as annual sales revenue change, profit as a percentage of sales revenue and the direction of any annual change in net profit before tax. Their selection of such criteria was apparently based on Robinson (1983) - a strategic planning study. The authors offered no other justification for using such criteria for measuring financial performance. Information exists as to differences in the validity of such measures (Keats and Bracker, 1988, p.53), with no body of evidence indicating them to be applicable to this purpose.

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5 Cragg and King (1988, p.50). The concept of financial performance pertained to reported accounting profits or revenues.

Focussing on the Cragg and King study in this manner is not to suggest it contained any greater deficiencies than others in the same field. Indeed, in many respects it improved on the various studies it evaluated. It does, however, highlight a need for fundamental work in establishing theoretical constructs and models of owner-managed firm performance. While it has not been established that choices of performance such as the above accounting measures are inappropriate, there is no evidence that they capture the purpose of the firm - the starting point in establishing performance criteria.

Dess and Robinson (1984), amongst others, also argued that organisational performance research should address the selection of a conceptual framework from which to define performance, and the identification of sufficiently accurate and available measures that operationalise performance concepts. While they provided some motivation for pursuing such work, they did not undertake such an exercise. Wortman (1985) also recognised such deficiencies in small firm research, and urged the development of a comprehensive theoretical framework for small firms .

An attempt at developing a conceptual model in line with these arguments was offered by Keats and Bracker (1988). However, the arguments developed and presented in their paper lacked cohesion, and as a conceptual model suffered from some operational difficulties. Nonetheless, their efforts provided tacit recognition of the need for theoretical frameworks in small or owner-managed firm performance research.

Specifically, Keats and Bracker (1988) proposed what they believed to be the principal factors affecting small firm performance in a behavioural context. They suggested small firm performance is substantially influenced by the individual characteristics and behaviour of the owner, and task environment characteristics. To do so, they drew heavily on theories in strategy, entrepreneurship and organisation. They criticised earlier efforts which tended to relate small firm performance to planning practices, due to their emphasis on financial performance. A related sustainable criticism is the apparent lack of

consistency in the financial definitions of performance. While Keats and Bracker may have adopted a reasonable approach, they failed to rigorously pursue the theoretical analysis necessary to establish a cohesive framework for performance evaluation. In particular, they did not look to the foundations of the diverse theories on which they drew. Other than concluding that the performance outcomes of small firms are likely to be idiosyncratic, the authors did not provide a basis for establishing performance criteria.

THE IMPORTANCE OF OWNER-MANAGED FIRMS

The importance of owner-managed firms may be viewed from numerous aspects, including those of the equity holders, debt holders and the broader 'general community' in which the firm exists and operates (including the tiers of government). The interests of various parties frequently conflict and so it may be necessary to vary the way firms are viewed, to accord with factors deemed relevant for the various interest groups.

Within neoclassical economic theory, individuals will generally view the firm according to some notion of self-interest. Equity and debt holders are each typically modelled as homogenous, with an objective of wealth maximisation. These views are considered further in Part II. The 'general community' is the least homogeneous group and is not considered further in this thesis.

An overview of the economic significance of owner-managed firms is given below, indicating some of these interest perspectives. Perspectives of equity and debt holders and the general implications of these for this thesis are than specifically discussed.

Economic significance of owner-managed firms

It is stated frequently in the literature that 'small businesses' constitute a significant proportion of the economy. What is less apparent from the cited statistics is that most small firms captured in the statistics are owner-managed and that many owner-managed firms are not trapped by the statistical base used. This is exemplified by the Australian

Bureau of Statistics' (ABS) Enterprise Statistics, in which several major deficiencies cause it to understate the numbers of 'small' firms. For many years, the available ABS data excluded manufacturing enterprises with fewer than four employees and retail and service enterprises with less than $50,000 turnover. ABS estimate that 59,104 enterprises were knowingly omitted in 1980 under these criteria[6]. This was in addition to the undisclosed number of omitted retailing businesses such as bread and milk vendors, stall holders and door to door salespeople.

Such omissions are additional to ABS' difficulties in actually identifying enterprises to include on its register. While in recent years data from the Australian Taxation Office has been accessed by the ABS[7] to identify businesses registered as tax-stamp book applicants or group employers (that is, businesses with paid employees), non-employer entities are not captured by this mechanism. Therefore, many unincorporated businesses employing proprietors only may not be on the register.

It is not known how many businesses are thus omitted from the register, but Bott (1989) reported that for a sample of new firms surveyed by the Small Business Development Corporation of Queensland, 73 per cent employed two or less persons (34 per cent had only one person) including the 'owner-operators'. As this related to new firms, it does not provide a generalisable exclusion rate in the absence of other data. It is likely that the retail industry has the most non-employing entities, although on a proportionate basis, owner-managed trade services enterprises also have few (frequently none) paid employees. ABS (1988) estimated that an average of 608,900 private sector non-agricultural enterprises operated in Australia in 1986-7, of which 95 per cent (580,900) had fewer than 20 employees. In each of the retail and construction industries, small

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6 *Enterprise Statistics Details by Industry Class, Australia 1979-80*, Australian Bureau of Statistics Catalogue No. 8103.0, paragraphs 15-17, page v.

7 The improvements were introduced in 1991, so most statistics published to date do not reflect any extensions to the data base.

firms constituted 98 per cent of all enterprises, with 90 per cent of all retail and construction enterprises having fewer than 10 employees.

Broad interest in owner-managed firms is likely to encompass many concerns. Effects on local economies in terms of wealth creation or loss, employment, contributions to general revenues, effective resource utilisation (including provision of goods and services) and effect on physical environments are all likely to be frequent and serious concerns to community groups and policy-makers. There are persistent difficulties in evaluating any of these concerns. Even the least subjective of them, say those that are largely statistically determined, remain elusive in effects and importance. Employment generation by owner-managed firms provides a useful illustrative focus. While this was not an area of specific study in earlier literature, employment generation by the 'small business sector' is now a popular area for research.

The Australian Bureau of Statistics (1988) estimated that for 1986-87, some 580,900 non-agricultural private sector enterprises in Australia with less than 20 employees employed in excess of two million people (including self-employed), representing 44 percent of non-agricultural private sector employment. The same enterprises comprised in excess of 95 per cent of all non-agricultural private sector enterprises[8], distributed across industries and States or Territories as described in Table 1.1. The extent to which these small enterprises represent owner-managed firms is uncertain.

The number of partnerships not owner-managed but included in this total are likely to be insignificant. Incorporated firms with publicly traded shares are not owner-managed, by definition. The Bureau of Industry and Economics (BIE) (1988) indicated that in 1987 only 139 companies with fewer than 20 employees were listed on the (then existing)

8 Enterprises with fewer than 10 employees comprised 90 per cent of all non-agricultural private sector enterprises.

Table 1.1

Australian enterprises with less than 20 employees by industry and State or Territory: 1986-1987 ('000)[a]

Industry classification	Aust.	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Mining	2.6	0.8	0.3	0.6	0.1	0.6	0.1	na	na
Manufacturing	43.0	15.9	12.0	6.0	3.2	4.6	0.8	na	na
Construction	80.3	26.1	19.9	15.7	6.5	7.9	2.1	na	na
Wholesale trade	45.2	17.0	11.1	7.0	3.9	4.4	1.0	na	na
Retail trade	159.6	57.8	41.4	24.3	13.5	14.9	4.6	na	na
Transport and storage	36.1	13.6	8.2	6.5	2.7	3.3	1.0	na	na
Finance, property and business services	107.0	47.8	26.4	13.3	6.9	8.5	1.5	na	na
Community services	44.7	15.9	12.6	6.1	3.7	4.2	1.1	na	na
Recreation, personal and other services[b]	61.8	23.0	15.1	9.9	4.9	5.8	1.7	na	na
Total[c]	580.9	218.1	147.0	89.3	45.7	54.3	13.8	4.9	7.8

a Adapted from ABS(1988) Tables 3.1 to 3.9. ABS defines an 'enterprise' to be the unit comprising all operations in Australia of a single operating legal entity which could be a sole proprietor, partnership, company, co-operative society, trust, or government authority or department. It is possible that, in some cases, an enterprise is a component of a larger conglomerate.
b Excludes private households employing staff.
c Includes the Electricity, gas and water and Communication industries.
na Not available.

Australian second board stock exchanges. The most likely inclusion of non owner-managed firms is in the form of unlisted public companies. The National Companies and Securities Commission (NCSC) (1987, p.18) reported that 705,932 companies were registered in Australia at 30 June 1987, of which 687,148 were proprietary (and therefore likely to be owner-managed) and 9,823 were public[9]. BIE identified 289 second board companies and NCSC identified 1,382 main board companies, leaving 8,152 potential unlisted public companies. If these were distributed between small (<20 employees) and medium (20-99 employees) enterprises in line with the total, around 7,900 could be classified as small. Therefore, approximately 8,000 non owner-managed companies may be included in the small enterprise total of 580,900. It is possible that many firms with more than 20 employees are also owner-managed. However, the available data does not

9 The balance were comprised of 7,187 limited by guarantee, 1,009 no liability, and 765 unlimited. The various forms of corporation are described in Appendix 2.1.

allow this to be pursued further. Table 1.1 thus provides a reasonable estimate of the minimum number of owner-managed firms.

Other measures of economic significance are vague. For example, in the mid eighties, firms with less than 20 employees may have contributed 16 per cent of turnover and 11-12 per cent of value added by the private sector (Shailer, 1986). The same statistics indicated that these firms comprised only 82 percent of the non-agricultural private sector, in contrast to the 95 per cent indicated in the enhanced data base used by the ABS. Extrapolation suggests such firms contributed 18-19 per cent of turnover and 13-14 per cent of value added. The lesser importance of such firms in respect of adding value may be attributed to their concentration in the Retail Trade and Finance, Property and Business Services industries, which in Table 1.1 account for nearly 46 per cent of the small enterprises; this contrasts with only 26 per cent of other (medium and large) enterprises. While they are imprecise, these statistics indicate the general economic importance of small owner-managed firms.

Interest perspectives of equity and debt holders in owner-managed firms

Equity holders

The nature of residual claims in owner-managed firms provides an important distinguishing feature in comparison to publicly held or agent-managed firms[10]. For owner-managed firms, residual claims are generally restricted to the main decision makers, thus avoiding some contracting costs associated with separation of decision making and risk bearing (this is discussed in Chapter 13). However, such cost avoidance is not without tradeoffs; for example, the proprietary risk bearers are more 'locked-into' investments, less able to diversify and more vulnerable to residual losses, while availability of additional management skills may be determined largely by potential investors'

10 The term 'agent-managed firms' is used to indicate firms that are managed by employed individuals who do not hold residual (proprietary) interests.

willingness to bear proprietary risks and ability to provide capital, with access to equity funds accordingly diminished.

While one may expect some differentiation in vulnerability to residual losses for incorporated owner-managed firms in comparison to soletraders and partnerships, there is far less difference between the various forms of owner-managed firms than the limited liability concept may lead one to anticipate. The irrelevance of the organisational forms of owner-managed firms is argued in Chapter 2 and tested in Chapter 10. The essential proposition is that organisational forms are frequently irrelevant given the economic inseparability of the firm and its owner-manager and the relationship between the owner-manager and parties such as institutional lenders contracting with the firm.

Multiple owner-managers (*effective* partnerships[11]) are likely to induce the most defined separation of owner-managers and their firm. Joint owner-managers often have differing degrees of control and investment, by either design or effect, which may give them a more distinct perception of the firm than for effective soletrader owner-managers. This raises important contracting (agency) considerations, which may lead to substantially different attitudes and concerns regarding the owner-manager relationship and firm performance. These issues are considered in Part IV (particularly Chapters 13 and 14).

Debt holders

As discussed later (Part IV), debt holders are the most substantial group external to owner-managed firms that are likely to have significantly homogeneous interests. They are the only non-managerial providers of financial capital and so their relationship with owner-managed firms is important in understanding or evaluating performance. Debt holders do not share the proprietary risks, but remain concerned for the security of their

11 The term 'effective partnerships' is used to capture all owner-manager associations, regardless of organisational form, as distinct from 'notional partnerships', which are firms organised as partnerships regardless of the number of participating owner-managers.

investment and returns. The use of debt will pervade much of the analysis and discussion in this thesis and the role of debt holders are explicitly examined in subsequent tests of performance criteria (they are the main subject of Chapters 14 and 15).

METHODOLOGICAL APPROACH

The basic approach used is to formulate a theoretical framework, generate hypotheses and test the hypotheses against data collected specifically for that purpose. To implement this approach, hypotheses pertaining to aspects of the framework itself are first developed and tested. The framework is then used in developing hypotheses regarding concepts of performance, which are then tested.

A central tenet of the theoretical framework is that performance can be considered only in relation to individual objectives. Identification of the objectives of owners of owner-managed firms is therefore a critical phase in developing this study.

The core objective of the theoretical framework is to formulate models of owner-manager decision making that allow the selection of performance criteria. The traditional entrepreneurial hypothesis suggests that owner-managed firms seek to maximise only the owners' welfare (Vickers,1968). This view provides a basis for the framework, which is further developed using a simplified view of 'personal welfare' within a hierarchy of needs. As is suggested in Chapter 7, this has some parallel with the human hierarchy of needs proposed by Maslow (1954), although it does not rely on this work.

The development of the framework and models is based on existing financial theories, modified to reflect the owner-manager behaviour embodied in the conceptual framework. An important initial phase in developing the framework and models, and pursuing empirical aspects of this thesis, is to determine how the various organisational forms should be interpreted in the owner-manager context.

Hypotheses generated by the models will be tested using data for owner-managed firms operating during the 1980s who had debt facilities with a particular Australian bank . Data for owner-managed Australian firms is not generally available publicly. While the data obtained for this study has some limitations, it is a relatively rich database that affords an excellent opportunity to empirically study some aspects of the behaviour of owner-managers and an institutional lender. The data is described in detail in Chapter 9.

THESIS OVERVIEW

This thesis is organised in five parts, with Parts II-IV reflecting the broad elements of the objectives described at the start of this chapter. Parts I and V are essentially an introduction and conclusion. To assist reading through this necessarily more complex structure the parts include introductory overviews and summary conclusions outside the chapter structure.

Part I: The nature and boundaries of owner-managed firms

Building on some of the propositions of this chapter, Chapter 2 overviews key differences between owner-managed and other types of firms, addressing the extent of firm and owner divisibility, reduced accountability, scale of activity and scope of management resources. These matters are pertinent to understanding how owner-managed firms are dealt with in the existing literature. (The discussion generates propositions regarding the boundaries of owner-managed firms; in Part III these are presented as formal hypotheses in Chapter 8 and empirically tested in Chapter 10).

Part II: A conceptual framework of owner-manager motives and decisions

Part II is comprised of Chapters 3-7 and considers selected theories and evidence of behaviour relevant to owner-managed firms. This draws on the literature concerning decision making under uncertainty and owner-manager motivation to identify those aspects of existing microeconomic and finance theory that are applicable to the narrower objectives of this thesis. Attention focuses on those behavioural or decision aspects that

may be relevant to owner-managed firms, namely the applicability of expected utility theory, bounded rationality, and the nature and relevance of risk and uncertainty. The development emphasises the basic role of individual consumption preferences. The propositions developed are then used to describe a general framework within which to consider the decisions and performance of owner-managed firms.

Part III: Empirical tests of the proposed framework

Part III is comprised of Chapters 8-12. Testable hypotheses are generated in Chapter 8 from the discussion and model development in Parts I and II. Sources of owner-managed firm data are considered and the data base used in the empirical tests is described in Chapter 9. From Part I, assumptions regarding the organisational boundaries of firms are tested (Chapter 10), followed by tests of hypotheses generated from Part II to identify the extent of support for assumptions and direct implications of the conceptual framework (Chapters 11 and 12).

Part IV: Implications of the framework and lenders' behaviour for the performance of owner-managed firms

Part IV is comprised of Chapters 13-17 and has two main purposes. It considers the relationship between owner-managed firms and lenders. It also considers the implications of the framework for a firm's growth and profit seeking as performance criteria, and how lenders may influence an owner-managed firm's behaviour and performance with respect to growth and profit seeking.

Part V: Summary and conclusions

Chapter 18 presents a summary of the thesis, its limitations and implications for future research in owner-managed firm performance.

CHAPTER 2
DISTINGUISHING OWNER-MANAGERS AND THEIR FIRMS

INTRODUCTION

This chapter overviews the nature of owner-managed firms and how they differ from variously labelled firms of similar scale and agent-managed[1] firms. Similarities and distinctions between owner-managed firms and related areas of literature (small business and entrepreneurs) are discussed, to establish the relative significance of this area of study and its constructive and exegetic concerns. The relationship between owner-managed firms and owner-managers, and the relevance of organisational boundaries, are then considered. This highlights some problematic differences between owner-managed and agent-managed firms.

OWNER-MANAGED FIRMS, SMALL BUSINESS AND ENTREPRENEURS

The literature most closely associated with owner-managed firms is that dealing with 'small business/firm/enterprises' and 'entrepreneurs/entrepreneurship'. The following discussion briefly compares these with owner-managed firms to show that, while there is often considerable overlap in subject matter, owner-managed firms should be specified as a separate category of study and that care must be taken in utilising the existing literature.

Small businesses and owner-managed firms

While most owner-managed firms can be described as small businesses, there is little justification for accepting the small business literature as automatically and immediately relevant to owner-managed firms. 'Small' does not differentiate between firms managed by non-proprietary agents and those managed directly by their proprietors.

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1 As noted in Chapter 1, the term 'agent-managed firms' is used to indicate firms that are managed by employed individuals who do not hold residual (proprietary) interests.

Given this view, it may be surprising that the concept of owner-managed firms defined in Chapter 1 corresponds substantially to the definition of 'small business' in the Australian *Report of the Committee on Small Business, June 1971* (the *Wiltshire Report*)[2]:

> A business in which one or two persons are required to make all of the critical management decisions: finance, accounting, personnel, purchasing, processing or servicing, marketing, selling, without the aid of internal specialists, and with specific knowledge in only one or two functional areas.

With the addition of the ownership specification, the definition also approaches that of the U.K.'s *Small Firms: Report of the Committee of Inquiry on Small Firms*, (the *Bolton Report*) which was also prepared in 1971[3]:

> Firstly, in economic terms, a small firm is one that has a relatively small share of its market. Secondly, an essential characteristic of a small firm is that it is managed by its owners or part-owners in a personalised way, and not through the medium of a formalised management structure. Thirdly, it is also independent in the sense that it does not form part of a larger enterprise and that the owner-managers should be free from outside control in taking their principal decisions.

However, in twenty years, there was little refinement or application of such definitions. If anything, the 'small business' label has become increasingly vague. Despite the appeal of the above definitions, they have not been effectively employed in small business research. Most studies found it necessary to adopt surrogate size measures, such as revenues or employee numbers. The latter surrogate was employed extensively in both the *Wiltshire* and *Bolton Reports.* Most subsequent studies also used employee numbers to denote size, leading to considerable difficulty in generalising from their results. The reasons given all related to the lack of available data to operationalise the definitions.

A brief review of some of the literature concerning small firm financial performance indicates some of the problems of generalisability. Cragg and King (1988) reviewed

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2 Wiltshire (1974, p.16, para 3.1).

3 Bolton (1971, p. 1, para 1.4).

selected aspects of ten such studies published in 1985-86. The employee size range described across the selected studies was very large. The smallest was unknown, but apparently fell between zero and five. The largest, Miller and Toulouse (1986a, 1986b), used firms with up to 500 employees. It is unlikely that such firms satisfy the definitions of small or owner-managed. However, small firms were the nominated subjects in all the studies. Cragg and King (1988) cited these various studies as analyses of 'owner/manager' characteristics. Generalising across owner-managers and agent-managers is inappropriate for most purposes, given the agency relationships and different likely motivational aspects applicable to each group. Such research practices only contribute to the blurry problem of subject definition.

Further confusion is lent by numerous studies of small firms or companies that are listed public companies. While such studies identify small companies as their subject matter, they are typically concerned with firms that have substantial proportions of equity held by entities not directly involved in the management of the firm. Their label 'small' is merely relative to other listed public companies, with size usually described by gross revenues, market capitalisation or total assets.

Entrepreneurs and owner-managers

The label 'entrepreneurs' also appears frequently in the relevant literature and presents many problems of definition and scope. Some aspects of the 'entrepreneurial' literature are discussed below.

The introduction of the 'entrepreneur' or 'undertaker' into the economic literature has been accredited to John Stuart Mill in 1848 by Schumpeter (1934) and many subsequent authors. Both Say (in 1803) and Smith (also in the early nineteenth century) also have been accredited with the term (for example, Bygrave, 1989). However, Cantillon (1755) extensively employed the term in a relevant context. Cantillon frequently referred to 'Entrepreneurs' in conjunction with 'Marchands' (merchants) and 'Artisans'. He appears

to have used the term initially in substitution for merchants, but later in his essay introduced a chapter titled '*The circulation and exchange of goods and merchandise as well as their production are carried on in Europe by Undertakers, and at risk*'[4]. This chapter considered farmers, wholesalers, manufacturers, 'shopkeepers and retailers of every kind', and numerous specific tradesman and artisans in the role of 'entrepreneur', and central to this role was some aspect of business or enterprise involving risk or uncertainty of reward. The nature of this uncertainty or risk generally placed Cantillon's entrepreneur in the role of a speculator (in exchange), although aspects of co-ordination and to a lesser extent capitalist, also appeared or were implied at times.

This early use of the term may be of little consequence, given the contemporary lack of agreement on a definition. It is equally unclear how purists or traditionalists may interpret the term. 'Entrepreneur' is a widely used label, with considerable contemporary diversity in meaning associated with the intended interests of its users. Frequently it is used to refer to all risk-takers, to include majority or controlling equity holders of very large businesses, owner-managers of small businesses, managers of businesses they do not own and so on. Owner-managers do not necessarily fit any currently popular definition of 'entrepreneurs' and 'entrepreneurial' firms need not be owner-managed. Very large firms sometimes perceived as owner-managed are unlikely to fit the definition of owner-managed due to the existence of other substantial equity holders, complex management structures, use of professional managers and corresponding extensive delegation.

In its narrowest sense, the term entrepreneur has been used to refer only to individuals that facilitate the establishment of a business or creation of an organisation. This view was adopted by many writers across the last three decades. The list is extensive, but includes frequently cited papers such as Cole (1959), Davids (1963), Collins and Moore

4 Cantillon (1755), *Chapitre XIII 'La circulation & le troc des denrees & des marchandises, de meme que leur production, se conduisent en Europe par des Entrepreneurs, & au hazard'.*

(1970), Hornaday and Bunker (1970), Draheim (1972), Mescon and Montanari (1981), and Gartner (1988). Unfortunately, such citations to not indicate consensus. There are at least as many authors employing alternate definitions of 'entrepreneur' as may happen to agree on any one notion. Relatively recent reviews of the entrepreneurship literature only reinforce this perception. The general conclusion appears to be that there is no generic definition of the entrepreneur (see, for example, Brockhaus and Horwitz, 1985; Carsud, Olm and Edy, 1985; Sexton and Smilor, 1985; Wortman, 1985; and Gartner, 1988). Much of the entrepreneurship literature is further impaired by the failure of many individual papers to specify any particular definition of 'entrepreneur' used in particular studies (as examples of this deficiency, see Gould, 1969; Durand, 1975; DeCarlo and Lyons, 1979; and Welsch and Young, 1982).

Attempts to distinguish entrepreneurs from small business owner-managers have only added further confusion. For example, Carland, Hoy, Boulton and Carland (1984) concluded that an entrepreneur is an individual who establishes and manages a business for the principal purpose of profit and growth, characterised by innovative behaviour and employment of strategic management practices. They described a small business owner as an individual who establishes and manages a business to further personal goals. A nonsensical position is reached through such artifices, as reconciliation assumes profit and growth are impersonal goals and that entrepreneurs do not pursue personal goals through their business activities.

Gartner (1988) suggested such dilemmas result from asking the wrong question: 'Who is an entrepreneur?'. He suggested that entrepreneurship is a role that individuals undertake to create organisations. Viewing entrepreneurship as a process rather than an undiscovered set of personality traits may help focus some of the research. That is, entrepreneurs are merely an unspecified subset of the total business sector. In reference to small owner-managed businesses, at best the term refers to a stage of development of the firm or a role assumed by the owner-manager.

This thesis does not examine entrepreneurial traits and characteristics. However, some consideration is given to the general findings of entrepreneurial trait and character research, insomuch as it suggests appreciable differences between entrepreneurial types (for example, craft versus opportunistic) and consequentially differing expectations of investment decision behaviour and resultant performance. Such considerations may be largely definitional. Should theoretical entrepreneurial differences be invalid, the general structure of any models developed here need not be affected.

The relevance of the meanings of 'entrepreneurship' to understanding and evaluating performance is explained, at least in part, when we consider the different concepts that have been utilised or proposed in microeconomic theory. Historically, the entrepreneur was the focus in explaining many aspects of economic thought. References cited in the following commentary are merely illustrative of the authors' works. In most cases the cited works are not the primary publications of the authors, but they provide a broader view of the theorists' works than one may derive from earlier more specific writings.

The *speculator* role (in exchange) began with Cantillon (1755) and frequently reappeared in various guises. In contrast, the classical theory of production and distribution by Say (1803) depended on a *co-ordination* role for the entrepreneur. Kirzner (1973, 1979) depended on an *arbitrageur* role which appears similar to Cantillon's speculator. Apparently influenced by Say, Walras (1954) employed elements of co-ordination and arbitrage jointly, as had Clark (1922), although Clark pursued a more pure mercantile function. Dobb (1926) and Schumpeter (1934, 1947) saw entrepreneurs as *innovators*. The *owner* or *capitalist* role was prominent in Hawley (1927) and Fisher (1910).

Much of the concern with owner-managers later in this study is with their behaviour under uncertainty. The entrepreneurial role in this regard was fundamental to the theories of Cantillon (1755), Hawley (1927) and Knight (1921). Concepts explored by these early theorists are revisited in later chapters.

THE OWNER-MANAGER AND THE OWNER-MANAGED FIRM

As suggested in Chapter 1, a complicating factor in studying owner-managed firms is identifying the economic unit. While this also may apply to agent-managed companies, it is especially so when there is a general lack of separation between the resources and behaviour of owners as individuals and as business operators.

Complications caused by the blurring of economic boundaries can be extensive for both incorporated and more informally structured firms. It can, in turn, cause breakdowns in traditional distinctions between debt and equity. For example, uncertainty or risk aversion of owners possibly encourages the contribution of funds for incorporated owner-managed businesses through shareholders' loans, rather than equity issues. This possibly reduces the owner-manager's risk and certainly retains flexibility in funding not available through typical non-redeemable share structures. This effect could be greater with perceived riskier ventures. When an incorporated business fails, the owner-managers may have a greater expectation of recovering loans than share capital. This may be confused by the countervailing demands by lenders for owner-managers to issue personal guarantees for external debt and the demand for secured collateral. Investment decisions under such arrangements are also functions of the individual's attitudes to risk. Some owner-managers may prefer to forgo otherwise desirable investment opportunities to reduce or limit the risk attached to their aggregate (but especially personally held) wealth. Thus, risk attitudes directly affect notions of performance.

Risk control and taxation planning may corrupt many aspects of reported structures in owner-managed firms. For example, family trusts, partnerships or companies may lease assets to an incorporated business entity. Contrarily, assets essentially for personal use may be included in balance sheets. Additional to debt-equity distinction problems, retained accounting profits are even less likely to reflect internal financing decisions. They may be mere residuals of taxation planning and personal consumption decisions. This additional confusion further detracts from traditional performance measures that

employ accounting data pertaining to various organisational entities, if they are applied in the same manner as for public companies.

The relevance of organisational boundaries

The functions and effects of organisational boundaries are of particular concern in operationalising the definition of owner-managed firms as an economic entity. Organisational form refers to the nature of the adopted legal structure used to identify the firm[5]. Of the many questions regarding organisational form, at least two are of importance in the context of this thesis:

- What prompts an owner-manager's selection of organisational form?
- What is the relevance of organisational form to behaviour and performance?

The first of these is important in understanding any economic substance of the various forms and any subsequent attempt at modelling behaviour and performance. The second is relevant to attempts at operationalising decision models for owner-managed firms. In this chapter, it is argued that organisational form has little implication for constucting a conceptual framework within which to view the performance of owner-managed firms.

The absence of positive theoretical support

The absence of positive theoretical support in economics for specifying the boundaries of the firm has been long recognised in the established literature on the nature of the firm; for example Coase (1937), Alchian and Demsetz (1972) and Jensen and Meckling (1976). Jensen and Meckling (1976, p.311) argued that the company structure merely

> 'serves as a nexus for contracting relationships and ... is also characterised by the existence of divisible claims on the assets and cash flows of the organization which can generally be sold without permission of the other contracting individuals.'

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5 It does not pertain to the research concerning organisation form or structure which is concerned with the separation of ownership and control (see Fama and Jensen, 1983), which, as previously discussed, is largely irrelevant to owner-managed firms.

The suggestion that incorporation is merely a legal nicety is particularly significant for owner-managed firms which by definition have no significant external proprietary equity. While owner-managed firms are not subject to the same range of agency problems as agent-managed firms, numerous agency problems exist nonetheless. Owner contracting exists in a limited form in partnerships and incorporated firms where there are multiple effective owner-managers. Where owner-managers have incorporated, greater agency costs also arise with debt contracting. Institutional debt holders may largely avoid the limited liability barrier by contracting around it in the form of personal guarantees. This subjugation of organisational limits may be extended when the behaviour of the owner-manager in relation to consumption and business decisions is considered. Essentially, the historical suggestion that the firm is not an individual (for example Jensen and Meckling, 1976) is entirely inappropriate in the context of many owner-managed firms.

The organisational structures adopted by owner-managers often may be products of taxation planning, rather than some concept of entity separation. For incorporated firms, the attraction of limited liability is also usually offered as a motive, particularly in practice oriented texts. However, the value of limited liability does not appear to have been tested. While the more sophisticated literature is less likely to explicitly identify limited liability and the corporate veil as a reason for the incorporation of owner-managed firms, the use of data and models that implicitly recognise the corporate boundaries as limits of resources and debt are commonplace. Indeed, much of the empirically driven literature has not deviated from the early notions that the adaptation of limited liability companies to private business destroyed the connection between the extent and nature of a firm's operations and the personal financial position of the owners (e.g. Penrose, 1959, p.6). The organisational boundaries of owner-managed firms are assumed appropriate in much of the empirical literature. The acceptance of traditional financial statements based on these organisational forms is commonplace; for example, see Cooley and Edwards (1983), DeThomas (1985) and McIntyre and Icerman (1985).

If focus is on the behaviour of the individual *per se*, the firm may be largely irrelevant. If interest is with the behaviour of the business entity, the firm and the individual essentially are indivisible. If merely the legal or accounting entities are considered, presumably the most easily separable from individuals and purportedly described by traditional financial statements, organisational boundaries generally may be inappropriate. While this is easily observed for unincorporated businesses, it is plausible that the typical behaviour and management of the small owner-managed company are much the same as for unincorporated firms. A key aspect of this lack of separability is non-distinction in *effect* (although distinctions may be formally attributed), of individual and business capital.

Some aspects of boundaries between firms and individuals

The blurring of economic boundaries may cause a partial breakdown in the traditionally attributed distinction between debt and equity. The risk aversion of owners can encourage the contribution of funds for incorporated firms through shareholders' loans, rather than share issues and retained earnings. This may reduce an owner-manager's direct risk and retains flexibility in funding not available through typical non-redeemable share structures. Should the business fail, the owner-manager or related parties of an incorporated small firm have a greater chance of recovering loans than share capital.

There are countervailing pressures from external lenders for owner-managers to issue personal guarantees for debt. Investment decisions under such arrangements are also functions of the risk attitudes of individuals rather than a firm. Owner-managers may prefer to forgo otherwise desirable investment opportunities to reduce or limit the risk attached to their aggregate (but especially personally held) wealth.

Such risk attitudes and taxation planning may 'corrupt' innumerable aspects of reported structures in owner-managed firms. For example, family trusts or partnerships, or related companies, may hold various assets and lease them to the nominated business entity. Such activities have escaped the consolidation practices that are required for

public companies and so there is likely to be a greater degree of off-balance sheet activity. Various resources employed in the business, but which the owner does not wish to attribute to the business entity, may simply remain undisclosed. Contrarily, personal-use assets or debts may be included in the balance sheet. Also, as mere residuals of taxation planning and personal consumption decisions, retained profits will not reflect previous profitability and internal financing decisions.

Relevance to performance measures

Such events also reduce the meaningfulness of reported periodic income numbers. Many means can be employed to distribute funds, further distorting 'profit' as a measure of the firm's periodic performance. Personal consumption concealed in expenditure, payments above market rates for services from related parties, interest on debt used primarily for personal consumption and various taxation minimisation contrivances; or with opposite effects, the absence of reported interest (if loans employed in the business are accounted for privately for taxation reasons), payments below market rates for services from related parties and so on, distort reported income numbers beyond the confusion traditionally attributed to such numbers.

In whichever direction the confusion tends, it significantly detracts from traditional performance measures that employ assets, equity, or income measures if they are applied in the same manner as for public companies. Thus, it may be necessary to go beyond the financial statements of the business entity and view the firm and the individual singly, or at least extend the concept of what is traditionally accepted as an appropriate description of the firm. However, mere aggregation is unlikely to be appropriate. While this may obviate some aspects of the problem, it includes many variables pertaining to resources and activities that are not associated with the business activities of the firm.

CONCLUSIONS

Contrary to the view expressed in Jensen and Meckling (1976), it is argued here that a firm *can* be an individual. It is likely that the behaviour of owner-managed firms is dominated by the interests of proprietorship and the purposes of the firm are determined by the objectives of the owner-manager.

This view is utilised in the development of the conceptual framework in Part II of this thesis. Other than to the extent that organisational form affects available data (see Part III), there is little need to consider organisational form in ensuing analyses. While form might reflect some aspect of management sophistication, this notion of sophistication is yet to be related to performance. References to owner-managed firms in the remainder of this thesis generally apply to any adopted form.

Economic theorists relied on single owner-manager or entrepreneur descriptions of the firm throughout the nineteenth and early twentieth centuries. However, the rise of corporations and corresponding separation of ownership and management caused a rapid departure from such notions in the 1940's and 50's. While this probably had little relative significance for the broad aspects of economic theory, its effects on the development of managerial economics were potent. Virtually all such developments of the past forty years have relied on owner-manager separation, and the consequent agency or contracting problems. However, there cannot be contracting between a soletrader firm and its owner-manager, given their inseparability. The interests of proprietorship will dominate the firm's contracting with other parties.

PART I - CONCLUSION

Chapter 1 defines the overall objectives of this study and important concepts. Chapter 2 proposes the nature and boundaries of owner-managed firms. In particular, it describes how owner-managed firms differ from other categories of firms. The economic relevance of organisational boundaries is questioned in two respects:

- What prompts an owner-manager's selection of organisational form?
- What is the relevance of organisational form to behaviour and performance?

It is proposed that an owner-manager's choice of organisational form is largely irrelevant in terms of investment choices and consumption decisions, although it may reflect some aspect of management sophistication and either a life-cycle or commencement date effect. These remain largely empirical concerns.

With the clearer understanding of the nature of owner-managed firms and the likely irrelevance of organisational forms and their notional boundaries afforded by this section, attention can now turn to the core objective of this thesis, the description of a conceptual framework of owner-manager motives and choices. This is presented as Part II. The majority of empirical concerns are deferred until Part III.

PART II

A CONCEPTUAL FRAMEWORK OF OWNER-MANAGER MOTIVES AND DECISIONS

This part considers elements of existing economic theories of motivation and choice for firms and individuals in the context of owner-managers and their firms. The principal purpose is to identify the basis for a theoretical framework within which to identify both *objectives* and *decision elements* of an owner-managed firm and to specify consequent performance criteria.

Fundamental to the adopted approach is the assumption that a descriptive microanalytic theory of individual behaviour is more relevant to the objectives of the thesis than the more orthodox neoclassical theories of aggregate behaviour. The reasons for this are made apparent in the following chapters. Some degree of methodological pluralism is inevitable. Neither the process nor outcome constitutes a synthesis of existing microanalytic theory of individual behaviour and neoclassical economic theory. At best it is a modification of some aspects of existing microanalytic theories, with selected compatible concepts from neoclassical economics.

The purpose is to suggest how owner-managers, through their firms, may make economic or financial decisions and how the motives for such decisions are relevant to business performance. To do so, the proposed model or theory must embody rules or assumptions regarding resource allocation. Propositions regarding the economic behaviour of individual owner-managers should allow prediction of choices and performance. This approach incorporates two assumptions:

- The firm, defined as including its owner-managers as individuals, is the relevant unit for investigation. This is empirically tested in Part III.

- It is possible to generalise about the decision making of *individual* owner-managers, or groups thereof, to the extent that a theory can focus on their decision outcomes, including the impact on their firms.

This part of the thesis proceeds as follows. The potential contributions of selected theories of economic behaviour, including expected utility maximisation and profit maximisation is considered in Chapter 3. Concepts of risk and uncertainty relevant to owner-managers' objectives and decisions are reviewed in Chapter 4. Various aspects of bounded rationality and satisficing are introduced in Chapter 5 under an assumption of behavioural relevance. The interconnected nature of risk and behaviour prevents complete separation of these discussions. An overview of the empirical evidence from the existing literature pertaining to the propositions derived from this discussion is given in Chapter 6. The proposed concepts concerning the motivation and decisions of individual economic agents derived from this discussion[1] is incorporated in a general framework to be introduced in Chapter 7.

Aspects of the framework and hypotheses arising from it are empirically tested in Part III.

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1 The breadth of the subject matter means that such a discussion will have to be somewhat brief, and so reader familiarity with the general theory areas is assumed. As the formalism of the various theories will not be relevant to the later development of this thesis, they will not be described or examined in depth here.

CHAPTER 3

NEOCLASSICAL MOTIVATION AND CHOICE: INCOME AND CONSUMPTION

INTRODUCTION

This chapter considers fundamental aspects of neoclassical theories of choice made by individuals and firms applicable to owner-managed firms. The main purpose is to identify *concepts* to be incorporated into the framework being developed[1]. Focussing on what have become the *orthodox* theories will help identify the degree of acceptance of and agreement on the importance of the relevant concepts.

Most neoclassical theories of the behaviour of individuals and firms have been developed for policy purposes or for predicting aggregate or average behaviour. There has been little interest in the internal conditions and mechanics of firms relative to the focus on aggregate or average behaviour (and virtually no attention to owner-managed firms) in neoclassical economics. Nonetheless, neoclassical theories have been at the centre of most contemporary theoretical developments. Many of the attempts at microanalytic (intra firm) theory have been described as either modifications to neoclassical theory or ignored in the mainstream literature.

Orthodox theory

Neoclassical economic theory in general has focussed on various notions of *optimisation*. For individuals, this is primarily expressed in terms of *utility maximisation*. For an individual's interests in a profit making organisation, there has been a tendency to interpret utility as the individual's share of expected dollar profits. Consequently, *profit*

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1 This is not a comprehensive explanation or review of the theories. There is discussion of why it has been concluded that some elements central to the cited theories are not applicable in the current context. The *formalism* of the theories is not relevant to the development of this thesis.

maximisation became the owners' objective for the firm, with pursuit of this objective the ascribed function of management. The literature relating profit maximisation to utility maximisation is relatively limited, but some earlier attempts were made by Scitovsky (1943), Simon (1957, 1959) and Ladd (1969)[2]. However, the notion of the owners' objectives was largely ignored in the subsequent literature. In general, profit maximisation has been taken as the objective for the firm *per se* which has been increasingly viewed as an entity quite divorced from equity holders.

The remainder of this chapter briefly describes some central features and criticisms of utility maximisation for individuals and profit maximisation for firms, before addressing some application problems of this approach for owner-managed firms. The link between income and consumption, as typified by the permanent income - life cycle consumption hypothesis, is then be considered in relation to owner-managed firms.

INDIVIDUALS: (SUBJECTIVE) EXPECTED UTILITY MAXIMISATION

Utility can be a nebulous concept, but the basic hypotheses of utility theory are invariably introduced to economics students in terms of the value an individual or household attaches to *consumption* and *leisure*[3]. Neoclassical theory has often focussed on decisions regarding consumption choices in relation to income. However, there seems to have been no attempt to link consumption to the choices made by owner-managers when investing in their firms. This has mitigated many attempts to identify the primary objectives of such firms.

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2 A basic difficulty in such approaches is the (implied) casting of the owner-manager in two roles; one as the manager of the firm and the other as a consuming individual. As already argued in this thesis, such an approach is fallacious. The utility function of the owner-manager should contain all consumption, be it within or outside the business arena, including leisure. This suggests that the owner-manager's utility could be considered a function of income and leisure in a traditional analysis ignoring the organisational boundaries of the firm.

3 Typical introductory text book treatments of utility theory over the years are Gallagher and Burkhardt (1968, pp.196-201), Mansfield (1975, pp.30-35; 1991, pp.49-76), Lipsey (1971, pp.155-180; 1989, pp.124-144), and Samuelson (1973, pp.431-436). All describe utility as a value function for consumption and leisure.

The general perspective of utility theory

Neoclassical economic theory is dominated by the assumption that individuals act under uncertainty *as if* they are maximising expected utility. Expected utility models predict or prescribe that individuals, on average, maximise a function of the utilities they each associate with potential outcomes weighted by their associated probabilities.

The axiomatic approach to utility theory of von Neumann and Morgenstern (1947) relied on objectively measured probabilities of events being available to individuals making decisions. The more general version following Savage (1954) and others allows the assigned probabilities to be subjective and is accordingly labelled the subjective expected utility model. The general model requires a holistic evaluation of alternatives, separable transformations on probabilities and outcomes, and an expectation-type operation that combines probabilities and outcomes multiplicatively after particular transformations (see Schoemaker, 1982, p. 530). Many variants of expected utility models have been proposed, mostly depending on how utility functions are defined, what types of probability transformations are allowed and how the outcomes are measured[4].

The earlier version of utility theory was formulated with utility determining the preferences of individuals. This had its origins in the attempts of very early theorists such as Bernoulli (1738) to explain the so-called Petersburg paradox. The von Neumann and Morgenstern (1944) axioms viewed utility as determined *by* preferences. While elements of the literature variously incorporate either view, the theoretical consequences and application concerns have tended to be the same. The point to be emphasised here is that both versions of the theory are centred on *an individual's consumption preferences,* which are idiosyncratic.

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4 As indicated in the introduction, utility theory is not fully described or critiqued; the discussion focuses on the immediately relevant concepts. Useful overviews of utility theory are offered by Mack (1971), Marschak and Radner (1972) or Hey (1979) amongst others. Useful critiques, by which discussion here is influenced, are Kahneman and Tversky (1979) and Schoemaker (1982).

Expected utility theory and individuals

Schoemaker (1982) reviewed the empirical literature and catalogued many problems with the expected utility approach in describing the behaviour of individuals. For example, preferences are not necessarily stable (Mosteller and Nogee, 1951), preferences may be non-transitive (Tversky, 1969) and individuals routinely over-weight certainty depending on whether outcomes consisted of gains or losses (Kahneman and Tversky, 1979)[5].

The concept of rational decision makers that has persisted through neoclassical and much of contemporary economics tends to embody Bayesian decision makers with boundless cognition. While acknowledging this to be an idealisation not fully met in the real world, defenders argue that without representing any individual it may appropriately represent *average* behaviour. Friedman (1953) and many others since have asserted that it does not matter whether individuals satisfy the assumptions of utility theory, if the *aggregated* effects are compatible with such behaviour. While this view may be appropriate for some aspects of policy, it is unsupported for individuals. Its appropriateness for policy purposes is also questionable. Schoemaker (1982, p.553) argued that the connection between micro and macro behaviour is too complex to claim that individual biases generally wash out at higher levels of social aggregation. Samuelson (1963) suggested that while a model based on wrong assumptions may predict reasonably well, the notion that only prediction matters is epistemologically unsound.

From his review of empirical studies of expected utility theory, Schoemaker (1982) concluded that, at the *individual level,* expected utility maximisation is 'more the exception than the rule' (p.552). As a descriptive model for how decisions are made, he concluded expected utility theory fails on at least three counts (p.552):

> First, people do not structure problems as holistically and comprehensively as EU theory suggests. Second they do not process information, especially probabilities, according to the EU rule.

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5 The separation of gains and losses in decision models is considered in Chapters 4 and 5.

> Finally, EU theory, as an "as if" model, poorly predicts choice behavior in laboratory situations. Hence it is doubtful if EU theory should or could be used as a general descriptive model.

In keeping with Schoemaker's empirical criticisms, others have suggested that expected utility theory is conceptually wrong in its ascription of paradigms too sophisticated for human decision-makers. For example, Simon (1982, pp.13-14) argued that:

> ... human beings have neither the facts nor the consistent structure of values nor the reasoning power at their disposal that would be required ... to apply (expected utility model) principles.

Similarly, Thaler (1980) argued that people cannot be assumed to act according to a complex theoretical model that requires extensive detailed knowledge of the theory itself when they do not have sufficient expertise in economic matters. Einhorn (1980) argued that uncertainty, environmental instability, improper assessment frameworks and lack of knowledge of one's own decision rules all pose serious obstacles to the decision making process espoused in some variants of expected utility theory. As a related criticism of expected utility, March (1978) claimed that it is difficult to assess the optimality of economic behaviour without specific knowledge of individuals' utility functions, how a particular problem is perceived by individuals and the rationality criteria being pursued.

Using expected utility theory to understand owner-managed firms, therefore, encounters the same problems as for individuals, because the firms include their owner-managers .

There has been considerable argument and empirical evidence testing the validity of the axioms of expected utility theory and consequent predictions concerning individual behaviour under uncertainty. Most such evidence fails to support the theory; nonetheless, it continues to have widespread acceptance and use. A plausible explanation for this continuing appeal was offered by Machina (1982, pp.277-8):

> ... the expected utility model is characterised by the simplicity and normative appeal of its axioms, the familiarity of the notions it employs (utility functions and mathematical expectation), the elegance of its characterisations of various types of behaviour in terms of

properties of the utility function (risk aversion by concavity, the degree of risk aversion by the Arrow-Pratt measure, etc.), and the large number of results it has produced.

However, Machina's defence does not contain any effective refutation of the empirical or conceptual criticisms.

Problems in operationalising expected utility theory

Operationalising the concept of utility for an individual is also problematic, due to assumptions regarding the nature of utility and the generalisability of individual behaviour. As noted earlier, an individual's preferences may be inconsistent or unstable, and their ascribed utility functions cannot be solved numerically. Thus, utility for an individual under different states cannot be evaluated on any consistent or reliable basis. This is aggravated for *expectations* of utility. Comparisons of individuals' utilities are not possible at any practical level. These problems are in addition to practicalities such as consideration of the marginal elasticity of owner-manager time (leisure) and income, determining boundaries between the firm and the individual and income and wealth measurement problems that also impact on profit concepts. Individual consumption and leisure 'choices' should be identifiable but cannot be related to unknown utility maximising choice sets.

An attraction of subjective expected utility is that the decision rules may represent how individuals *wish* to make decisions. However, difficulties still arise when probabilities and values are not independent, options are evaluated by non-compensatory rules (see Einhorn, 1974), consequences are not evaluated independently of each other, options are not evaluated simultaneously and utility model axioms are explicitly rejected[6].

Thus, even if utility theory did conceptually apply to individuals, non-operationalisation precludes usefulness in developing performance criteria for owner-managed firms.

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6 The prospect theory of Kahneman and Tversky (1979) is an attempt to systematically capture violations of subjective expected utility axioms and is described briefly in Chapter 5.

The relevance of expected utility theory to owner-managers

While the weight of evidence and argument is against the application of expected utility theory to individuals, and hence owner-managed firms, the same need not apply to all of the general concepts underlying its restrictive formalism.

As noted at the start of this section, an individual's utility is invariably described as a function of consumption and leisure. This recognition of the importance of consumption to an individual's decisions also appears in many of the related theories that have been developed within the neoclassical framework. The role of individuals' consumption preferences and associated behaviour dominate orthodox aggregate demand and pricing theories, income and savings models, and leisure and income choices.

That an individual's economic actions are dominated by his or her consumption (and leisure) preferences should hold some intuitive appeal. However, it seems largely ignored in the literature relevant to owner-managed firms. In particular, there does not appear have been any attention to the connection between the consumption preferences of owner-managers and the perceived behaviour and performance of their firms.

This provides a starting point for the conceptual framework to be developed here. An owner-manager's consumption preferences should be important in the context of decisions regarding risking of capital and expending of effort in a businesses. To operationalise this, consumption needs to be considered without reference to the restrictive formalism of expected utility.

THE FIRM: PROFIT MAXIMISATION

Regardless of attendant variations, the broader neoclassical theory of firm behaviour can be summarised as assuming that profit maximising firms derive optimal input and output decisions for a given technology from markets which price each input and output. Competitive behaviour leads the firm to choose investments that maximise the market

value of capital invested in the firm. The market value of a firm is the aggregate value of outstanding equity and debt, each component of which is priced commensurate with the risk assumed by its holder[7]. However, in the presence of restricted markets or entry barriers, firms may not be obliged to behave as profit maximisers. We can also conjecture that such an obligation diminishes with incomplete and asymmetric information and the transaction costs induced by these and other market frictions.

Measuring profit

Most theories of firm performance are linked to profit and many consider the part played by management in explanations of profit. However, periodically measured 'profit' is not necessarily an objectively given datum.

The individual's approach

Profit measurement involves the subjective influences of individuals' attitudes and motives. While it is common to refer to the net present value of expected or anticipated profit in various decision models, individuals' time perceptions and preferences are dissimilar, and may vary over time and under different states. The role of individual perceptions and preferences focuses attention on the proposition that consumption preferences affect an individual's evaluation of income flows over time.

The market approach

Obtaining a more *objective* measure of (realisable) profit for evaluating the performance of firms has been dependent largely on measuring the market value of the firm. The less effective the firm (relative to otherwise identical firms) in identifying and allocating resources to highest value investments, the higher the cost of new capital. There are two particular problems in this approach: it considers mainly exogenous conditions and requires access to market prices for a firm's capital components. The first (that is,

7 This pricing is problematic for owner-managed firms and is discussed later in this chapter.

ignoring many conditions or events internal to the firm) is a problem in contemplating performance for all firms. The second is a less general problem, but is of particular relevance if there are no market mechanisms to provide objective valuations of capital. This is the case with owner-managed firms which by definition cannot have solicited external equity successfully and are unlikely to be able to issue tradeable debt securities. While these circumstances indicate the absence of many agency costs[8] and so suggest that the owner-manager approaches the quintessential self-interested agent assumed in neoclassical theory, the lack of objective cost of capital and risk measurements is obstructive. It is likely that the only *obtainable* measure of the cost of capital for the typical owner-managed firm is the cost of formal debt facilities obtained through lending institutions. This is examined empirically in Part III.

The relevance of profit to owner-managers

Not yet addressed is how profit, as an objective for a firm, is related to consumption, an objective for the owner-manager. This depends partly on the correspondence between 'profit' as it is usually related to firms and income for an individual. Both questions are partly addressed in the review of the permanent income - life cycle consumption hypothesis later in this chapter as part of a broader examination of how income and consumption are related. Essential to the adopted approach is the view that the firm exists to satisfy the owner-manager's consumption (and leisure) objectives.

THE FAILURE OF MAXIMISING BEHAVIOUR

Maximisation of utility as a description of behaviour may fail because individuals are not sufficiently sensitive to total (or marginal changes in) utility under uncertainty. More generally, the concept of utility or profit *maximisation under uncertainty* is exceedingly vague, because there can be no uniquely appropriate method of maximising utility or profits under uncertainty. Alchian (1950) summarised the situation thus:

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8 The relevance of agency (and contracting theory in general) is discussed in Chapter 13.

> Attacks on [profit maximisation] are widespread, but only one attack has been really damaging, that of G. Tintner. He denies that profit maximization even makes sense where there is uncertainty. Uncertainty arises from at least two sources: imperfect foresight and human inability to solve complex problems containing a host of variables even when an optimum is definable. Tintner's proof is simple. Under uncertainty, by definition, each action that may be chosen is identified with a *distribution* of potential outcomes, not with a unique outcome. Implicit in uncertainty is the consequence that these distributions of potential outcomes are overlapping. It is worth emphasis that each possible action has a distribution of potential outcomes, only one of which will materialize if the action is taken, and that one outcome cannot be foreseen. Essentially the task is converted into making a decision (selecting an action) whose potential outcome distribution is preferable, that is, choosing the action with the *optimum distribution*, since there is no such thing as a maximizing distribution[9].

Baumol and Stewart (1964) suggested that individuals have developed behavioural 'rules of thumb' for making decisions with incomplete information under uncertainty[10]. Such rules *may* lead to a result compatible with profit maximisation, but the lack of unique operational solutions for profit maximisation means that this cannot be ascertained. The notions of profit and utility maximisation are also problematic in that the value of an owner-managed firm may be dependent largely on the owner-manager's labour capital. Investment choices of the firm thus have implications for the owner-manager's leisure-effort decisions and so profit maximisation for the owner-managed firm can be brought into further conflict with a utility maximisation objective of the owner-manager.

In developing a framework within which to consider the decisions of individual owner-managers, objectives based on the maximisation of either utility or profit are rejected. An alternative to maximising is *satisficing* behaviour, as empirically inferred by Simon (1955)[11]. This and other aspects of bounded rationality are considered in Chapter 5.

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9 Alchian's reference to Tintner pertains to Tintner (1941).

10 The search for or use of behavioural rules by managers is evidenced in various experimental studies, notably Kahneman and Tversky (1979) and Hey (1982). Hey identified several rules that could account for a high proportion of observed behaviour by purchasers. While not optimal, the rules seem robust in explaining and predicting the behaviour of the study's price searchers.

11 Also see Simon (1947, 1957, 1959).

RELATING INCOME AND CONSUMPTION

Recognising that consumption is an objective of individual owner-managers, its connection with the activities of the owner-managed firm remains unexplained. Given the principal assertions in most areas of study of economic behaviour, it is accepted that *a* primary purpose of a firm is to return income to its owners. A current objective, therefore, is to identify the nature of the behavioural connections between income of the owner-managed firm and consumption by an individual owner-manager.

The main body of theory and knowledge in this area (as accepted within the neoclassical paradigm) is reflected in the *permanent income - life cycle consumption hypothesis*. The development and general nature of the empirical evidence is briefly described below, with its possible import for owner-managed firms. While the permanent income - life cycle consumption hypothesis was developed using expected utility theory, the evidence focuses on the empirical associations of income and consumption and is independent of the assumptions of expected utility theory for both its determination and relevance.

The permanent income - life cycle consumption hypothesis

This section briefly describes the concepts underlying the permanent income - life cycle consumption hypothesis, the evidence concerning this hypothesis that is applicable to Australia, and published evidence that is applicable to owner-managers. The main objective is to identify the basic propositions from this body of literature that are pertinent to the development of a conceptual framework within which to consider the decisions of owner-managers and the implications for the performance of their firms.

Studies of aggregate consumer expenditure and its relation to income[12] led to the permanent income - life cycle consumption hypothesis. This was essentially an amalgam

12 This relation was identified as the 'consumption function' by Keynes (1936) and developed further by Modigliani and Brumberg (1954), Friedman (1957), Hall (1978) and Flavin (1981).

of the Modigliani and Brumberg (1954) lifetime consumption model in which individuals made decisions to allocate consumption over their expected lifetime, and the permanent income hypothesis of Friedman (1957) which addressed the relationship between consumption decisions and income uncertainty. More recent literature, such as Hayashi (1985) and Zeldes (1989), suggests that *liquidity constraints* strongly influence consumption and explain some empirical rejections of the hypothesis, and so the role of debt and attitudes of lenders also need to be considered.

The basic tenant of the combined permanent income - life cycle consumption hypothesis is that individuals or households behave as if they maximise a lifetime utility function, subject only to the lifetime budget constraint with perfect capital markets (see, for example, Hall, 1978). Rather than adjusting consumption[13] in response to every change in income, consumers are modelled as adjusting consumption in response to the perceived permanence of income changes.

Consuming from income

Since the late 1970s, there has been much study of the empirical consumption-income relations for wage and salary earners (and in some cases for investors) in many countries based on the permanent income - life cycle hypothesis. There is relatively little evidence of the behaviour of owner-managers or self-employed individuals in this regard.

There is some evidence that the behaviour of wage and salary earners accords with the general thrust of the permanent income - life cycle consumption hypothesis. For example, Hall and Mishkin (1982) found that about 80 per cent of US consumption (of food and

13 Note that the empirical studies and most models really address consumption *expenditure*, rather than some flow of consumption services from resources. With non-durables such a distinction is irrelevant, as consumption and expenditure coincide within most measured time intervals. It may be relevant in examining consumption and expenditure on durables, because expenditure is dependent on income and liquidity positions, while derived consumption values (or services) need not be thus dependent.

some non-durables) obeyed the hypothesis in that it did not adjust automatically to all income changes, but seemed to identify and react to major shifts in economic well being.

Australian evidence

Australian evidence testing the aggregate response in consumption expenditure to income changes is fairly scarce. Anstie, Gray and Pagan (1983) refer to a dramatic fall in the Australian consumption ratio in the 1970s which was initially perceived to be a product of the 'well-known lags in the growth of consumption behind income' (p.322). Attention eventually turned to a 'real wealth' effect which considered the positive impact of inflation on savings propensities, leading to a negative correlation with consumption. When the consumption ratio formula was adjusted to allow for any inflation-induced *capital* gains and losses on non-equity financial wealth, Anstie Gray and Pagan (1983) reported non-farm consumption ratios for Australia that were actually fairly stable during the 1970s, ranging from 90.8 to 95.7 per cent compared to the Treasury measures of 84 to 91 per cent during the same period (p.333). When an equity adjustment (proxying investment income) was introduced, the ratio became much more variable, ranging from 88.5 to 113.2 per cent. The variability in the equity-adjusted figures were attributed to the 'very erratic performance of equity prices in the 1970s' (p.334), revealing a reluctance for consumers to increase aggregate consumption with increases in risky income.

The actual measures for these various ratios are irrelevant to the purpose of this thesis. What is of interest here is the argument that individuals (at least in aggregate) vary their consumption and savings behaviour in response to real changes in income in a manner that takes account of the perceived stability of those changes. Based on Dewhurst (1989), this behaviour appears reasonably uniform across the country.

Dewhurst looked for variations in consumption functions between Australian states. Using data based on inflation-adjusted consumer expenditure on non-durables and disposable income disclosed in National Income and Expenditure Accounts for the

financial years 1951-1984, Dewhurst found similar propensities to consume from income across all states except Western Australia and that the long-run propensity to consume non-durables was constant for five of the states. This suggests that predicting the impact of an income change on an owner-manager's consumption expenditure requires knowledge of an owner-manager's perception of its permanence.

These studies did not distinguish wage and salary earners from the self-employed and the former probably dominated the data set. The main concern with this limitation here is that the self-employed, or owner-managers, *may* have a more discretionary earnings capacity. If this is so, they would be less likely to make decisions in accordance with a model that assumes periodic income is exogenously determined by a wage rate which is known at the time periodic consumption decisions are made.

The source of income matters

The indirect evidence from Anstie, Gray and Pagan (1983), in using equity prices to impute the adjustment for risky income, indicated a possible difference in behaviour where consumption is from riskier non-labour income.

Muth (1960) demonstrated that marginal propensities to consume from current and lagged income may depend on the stochastic properties of income. This has been translated in many studies as the *source* of income (such as labour income versus investment income and windfall gains). From Klein and Goldberger (1955) through Holbrook and Stafford (1971) and probably later, it appears to have been a firmly established notion that the marginal propensity to consume from labour income[14] exceeds the marginal propensity to consume from non-labour income. Evans (1969) explained Muth's result by arguing that non-labour income has a larger transitory component than labour income. The basic proposition from Evans' reasoning is that the greater uncertainty attaching to non-labour

14 Labour income excludes income from personal exertion by self-employed individuals.

income restricts consumption and induce savings behaviour. However, non-labour income in these studies was predominantly investment income from capital markets. It did not consider the structure of owner-managers' income which can include elements of wage, return on investment and rents. The potentially important distinction with such income is that it is not fully determined externally.

An owner-manager may have more control over income from the firm than is assumed in the exogenous income models of the traditional income-consumption literature. If this is true, then consistent with neoclassical labour theory, owner-managers can adjust their effort (labour) to reduce income uncertainty rather than only adjusting consumption[15]. There is no apparent evidence to support this proposition. Such behaviour would be moderated by the accuracy with which owner-managers can identify their production function (relative to effort), which is likely to have an significant stochastic component.

Debt and savings

While the general assumption in modern growth theory of different marginal propensities to consume from different types of income have accorded with the classical perception that workers consume and capitalists save (see Graham, 1984), other explanations have considered other *recipient* differences[16]. For example, a range of studies have been based on the theory of the liquidity constrained consumer advanced by Tobin (1972). These are discussed below with other debt-related consumption issues.

Tobin argued that individuals who cannot borrow against future income and have non-liquid assets will exhibit a high propensity to consume from current income. That is, a

15 This is an important empirical proposition that cannot be tested here due to data limitations. The absence of the large set of time series data needed to test changes in consumption behaviour renders proxy tests (which is presented in Part III) noisy and relatively clumsy.

16 This originated to some extent with Burmeister and Taubman (1969) who did not actually investigate such differences but raised the possibility.

deficiency of both the collateral assets and 'certain' income which are assumed necessary to facilitate borrowing renders the individual *liquidity constrained* and dependent on current income for consumption. The borrowing restriction may describe self-employed individuals whose uncertain earnings prospects are dependent on human capital, rather than wealth[17]. An individual who holds liquid assets that provide collateral for borrowing can base consumption on lifetime income and is said to be *wealth constrained.* This condition leads to a prediction of savings behaviour which is contrary to the previously noted argument in Muth (1960) in which marginal propensities to consume from income were thought to depend on the stochastic properties of income without considering the ability to borrow.

Fisher (1956)[18] found that the self-employed in the US saved 12 percentage points more than employed managers even though the managers had a higher average income than the self-employed. Like Muth, Friedman (1957) suggested these differences were a result of differences in income risk. However, when testing Friedman's proposition across a broad range of income sources (by occupation) using US data, Skinner (1988) identified self-employed as exhibiting a *lower* average savings rate than all other tested groups, despite being classified as having riskier incomes. Their savings rate was only half that reported for most other occupational groups[19].

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17 The literature on consuming from debt largely ignores the cost of debt in the decision. In a market where lenders can fully enforce their claims, borrowing merely transfers consumption from the future. This suggests that, in the absence of time preferences, current consumption can be compared (in notional terms) to future consumption if the latter is discounted by the cost of debt. Therefore, the cost of debt is the minimum discount rate that applied by the owner-manager to forgone future consumption if current consumption is financed by borrowing.

18 As cited by Friedman (1957) and Skinner (1988).

19 'Unskilled' labourers were the only other group with a similarly low mean savings propensity. More recent empirical evidence suggests the life cycle consumption model overpredicts wealth (savings) for a significant fraction of households. For example, Venti and Wise (1990) and Berheim and Scholz (1993) indicated that, in the US, median financial assets of families nearing retirement are typically only a small fraction of current income, suggesting relatively low precautionary savings.

Both Fisher (1956) and Skinner (1988) indicated that the self-employed had consistently lower average incomes. Skinner suggested that the reduced savings behaviour may be induced by income being too near *basic consumption levels*, in terms of some minimum standard of living. This argument suggests that there is some lower limit to the current period consumption an individual requires, and that this must be satisfied regardless of future requirements. The concept of *lower bounds* to consumption is yet to be addressed here, but may have some particular importance in considering income for the self-employed. Such lower bounds may provide an appropriate initial reference level for satisficing (in place of maximising) behaviour.

Income and consumption of owner-managers

As observed by Friedman (1957, pp.74-75), income for the self-employed in income-consumption studies is usually measured as withdrawals from the business. Friedman claimed that when this is abnormally low, consumption may be financed by withdrawals in excess of current earnings. Conversely, earnings in excess of current consumption requirements may be left in the business. These propositions suggest that the average propensity of self-employed people to consume from appropriated income may appear higher than if some other measure of income was used[20]. Countering this, Skinner (1988, p.250) suggested that the self-employed may be better able to consume (durables) through their businesses. Such perquisite consumption obviously raises problems in measuring both income and consumption. Overall, the consequences of the income and consumption measurement approaches used in these studies are ambiguous.

Capital and labour

Both Friedman's and Skinner's arguments imply that the level of capital invested in the firm (including retained earnings) is partly a function of the consumption requirements of

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20 Self-employed service providers may be less affected in this way, as the reduced incidence of inventories and capital investment lessens the propensity to hold savings in the business. This indicates possible industry differences which appear to have not been considered in the literature.

the owner-manager. Extending Friedman's suggestion that the self-employed can endogenously determine *disbursed* income for consumption purposes, they also might influence the realisable earnings of the business by varying their effort (leisure)[21] and other input decisions.

The life cycle model has been extended to include work effort and labour income as choice variables, but only with known wage rates[22], which does not allow ready application to the labour input of the self-employed. The uncertainty of reward for effort for the self-employed and the extent to which they can influence earnings detracts from the general assumption in the labour-income-consumption literature that, on average, consumption decisions are made *after* the individual becomes aware of income receipts.

In studying self-employed individuals, where the return for labour is uncertain even in the short term, the most relevant aspects of the literature are those parts focussing on income uncertainty. Typically this has considered only non-labour income. The weight of evidence in this regard is that consumption behaviour is less responsive to changes in non-labour income due to the greater uncertainty of the permanence of such income changes, but that this does not necessarily result in precautionary savings and does not necessarily apply to the self-employed.

The lack of precautionary savings can reflect a lack of savings opportunity if income is low (as Fisher (1956) and Skinner (1988) found for self-employed) relative to consumption requirements. If self-employed individuals receive income *only* from uncertain sources, then they are unlikely to simply determine consumption in response to

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21 This assumes output of the firm is, in part, a function of the owner-manager's labour input.

22 See, as examples, Mortenson (1970a, 1970b), Lucas and Rapping (1970), Heckman (1974), Blinder and Weiss (1976) and Seater (1977). Later approaches varied little from these earlier papers in their treatment of wage rates as the exogenously determined return to the individual for investing more in labour and less in leisure.

income expectations. It is assumed here that some consumption decisions, at least those representing subsistence requirements which describe a lower bound for an individual's consumption, are made *prior* to determining the investment of effort needed to achieve the income to finance the minimum consumption expenditure. The labour investment decision may reflect some acceptable degree of uncertainty or risk. This would require information on the production function of the owner-managed firm and a mechanism for setting or identifying consumption targets. These are considered in Chapter 7.

Profit maximisation and owner-manager consumption

Williamson (1963) suggested that managers' abilities to consume indirect benefits or perquisites conflict with a management objective of profit maximisation. While the implications for agent-manager behaviour in Williamson's context are of little relevance here, the notion of an owner-manager's profits-perquisite mix accords with the connection between owner-managers and their firms described in Part I and the income and consumption measurement concerns in the previous section, by identifying the linkages and frictions between realised income derived from the firm and owner-manager consumption. The *intendly rational* owner-manager's appropriation of resources from the firm to consume domestically or as perquisites should merely reflect the relative cost-effectiveness of the available choices.

If the objective of the owner-manager is to satisfy consumption preferences then any profit objective might be substantially qualified. Particularly, it can be inferred from the permanent income - life cycle consumption model that profit is only a long run objective. For the traditional assumption of profit maximisation the long run view is generally the *intended* proposition in orthodox theory. For *any* profit-related motive, however, it also may be true. If the primary objective of the owner-manager as a self-employed individual is to finance consumption, then the ability to engage in the necessary transactions (in a developed exchange economy) requires cash as distinct from profit. In the long term, cumulative net cash flow (excluding consumption) and aggregated profits converge.

Profit and debt

To finance consumption expenditure in the short run, wealth realisations or borrowing may be necessary; the latter also implies expectations (at least on the part of lenders) concerning future cash flows, directing attention to the previously discussed problem of the liquidity-constrained individual. The lifecycle model allows such flows to be from wealth realisations, but the evidence of a general propensity for wealth accumulation in the literature contradicts this notion, unless this represents precautionary savings.

Lenders anticipate sufficient cash flows to repay debt from realisations of income or wealth. This gives rise to the collateral or certainty of income requirements referenced in the earlier discussion of the permanent income - life cycle hypothesis. To avoid asset liquidation to meet debt servicing obligations, the individual eventually will have to service debt from realised income. Therefore, an individual *must* seek income (regardless of how current consumption is funded) in the absence of sufficient existing convertible wealth to satisfy lifetime consumption. This corresponds to the wealth constrained individual in the permanent income - life cycle hypothesis. The permanent income - life cycle hypothesis assumes access to an otherwise perfect capital market. However, the extent to which an owner-manager's consumption expenditure and realised income from the firm can be linked by borrowing is affected by credit rationing, incomplete information and other debt market realities. This is examined further in Part IV.

CONCLUSION

While the *concept* of utility or the satisfaction of consumption preferences has application to all decision making, the axioms of subjective expected utility maximisation are too onerous in their assumptions to provide a realistic model of owner-manager behaviour. The empirical evidence indicates that expected utility and profit maximisation are poor general descriptions or predictors of the decision making behaviour or ability of individuals and firms. This does not deny the value of these models as a *prescription* for rational decisions under uncertainty, although the nature of utility and the impact of

uncertainty on the identification of maximising strategies prevents their application in assessing performance.

The conceptual relevance of variant utility and profit maximising models to owner-managed firms may appear relatively straightforward. However, even without satisfying the rigorous axioms of expected utility theory, there are substantial difficulties in the identification and measurement of profit and utility.

Studies of firms often appear to treat income or profit as an end in itself. However, the clear implication from neoclassical theory is that income or profit is sought by individuals for its benefit in financing consumption expenditure. Theories of firm or managerial behaviour seem to overlook this essential connection between profit of the firm and consumption by individuals[23]. While an individual's utility is described as a value function of consumption and leisure, an assumption of profit maximisation in the owner-managed firm context may contradict this. Notionally at least, it seems that utility and profit maximising assumptions can conflict where profit maximisation by firms ignores the utility of leisure to the owner-manager or requires the owner-manager to forgo current consumption preferences.

Consumption behaviour has been fundamental to developments in mainstream economic and financial theory. Fisher (1930) described consumption as the primitive concept in terms of which all others are defined. Time preference functions were developed on the basis of *consumption* preferences across time, whereby each individual attempts to maximise utility from consumption within a given opportunity set. Utility theory adopted consumption choices between alternative outputs and across temporal states as the basis for constructing functions and models. Choices between the utilisation of time for leisure

23 Some exceptions have arisen in the broad contracting literature. As is discussed in Chapter 13, this was in the context of self-interested actions by contracting parties, such as perquisite consumption by employees, but did not address the the individual and the owner-managed firm.

or deriving income is treated as a consumption problem, while the value of income for individuals can be explained only as a function of the consumption choices it allows.

Thus, the primacy of consumption is not novel or original. Nonetheless, it has been largely ignored by the voluminous literature that examines, contemplates and speculates upon the motives and decision criteria of owner-managers of small firms.

Where an owner-manager largely derives income by selling time and skills, the proposed consumption objective with a lower bound implies that fluctuations in the individual's income from the firm will induce negatively correlated fluctuations in effort. For decreases in income, the induced increases in effort imply a reduced effective wage rate. Therefore, increases in effort are affected by the owner-manager's opportunities to sell labour outside the firm and bounded by natural limits to effort. There are other factors affecting this sustainable consumption-effort hypothesis. For example, comparisons of individuals' behaviour patterns may be distorted by the anticipated duration of changes in income, individuals' personal consumption preferences[24], borrowing opportunities , current convertible wealth and planning horizons.

In this context, concepts underlying the life cycle - permanent income hypothesis can be adapted in three mutually supporting ways :

- Owner-managers adjust income-seeking behaviour in accordance with the perceived stability (permanence) of achieved consumption (income) levels.
- Owner-managers will not increase their consumption expenditure *targets* unless continued attainment (permanence) of the current levels or targets are perceived to be relatively assured.

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24 Consumption preferences are themselves transient. For example, where an individual owner-manager's consumption targets are, in fact, household aggregates, evolving household composition may induce relatively frequent adjustments in the lower bound for consumption.

- Owner-managers' savings behaviour and investment will be influenced by the proximity of or expectation of exceeding the lower bound to consumption.

The notion that an owner-manager's consumption preferences underlie objectives developed for an owner-managed firm is essential to the remaining analysis. This means that the desirability of profits is a function of the extent to which personal consumption and savings objectives are satisfied. Managerial effort, in turn, is a function of personal income-leisure preferences (conditioned by ability). Growth (in terms of investment of capital or effort in the firm), in turn, is a function of consumption and savings objectives and preferred levels of managerial effort, albeit subject to other limiting conditions such as the availability of capital.

Maximisation of profit is rejected as an objective in developing the current conceptual framework for owner-managed firms. The alternative concept of *satisficing* is yet to be considered here and is discussed in Chapter 5. The suggestion that individuals may wish to make decisions in accordance with subjective expected utility theory is captured in the concept of *intended rationality*, as presented by Simon (1957). This applies where the decision maker seeks or purports to act in accordance with concepts of economic rationality but is limited in doing so by physical, biological and social factors. This limitation on intendedly rational behaviour results in *bounded rationality.* This too is discussed in Chapter 5.

Nelson and Winter (1982) also argued that while firms may act rationally, the rationality with which they accord takes account of the limits on knowledge, information, computational capacity and understanding of theory. Many of the limits stem from uncertainty which is overviewed in Chapter 4.

Neoclassical theory focuses attention on consumption and income. Indeed, this may be said of the economics of behaviour in general. That there is a connection between an

individual's income and consumption activity seems almost unquestionable, yet this connection has been largely ignored in the literature relevant to owner-managed firms. That such a connection should be characterised in the manner contemplated in utility theory and the related permanent income - life cycle consumption hypothesis is more contentious. The nature of income considered in this literature seems to relate poorly to that of most owner-managers. The extent to which income can be endogenously influenced is a key question. Income uncertainty has been demonstrated to change the relationship between consumption and income. Before incorporating the hypothesised connection between income and consumption into models of owner-manager decision making, it is necessary to consider the nature of uncertainty and alternatives to maximising behaviour. These issues are broached in Chapters 4 and 5.

CHAPTER 4
DECISIONS UNDER UNCERTAINTY

INTRODUCTION

The Chapter 3 discussion of selected aspects of neoclassical decision theories and their pertinence to owner-managed firms referred to the relevance of risk and uncertainty. This chapter overviews the general treatment of risk and uncertainty (including ambiguity) in the context of the previously introduced theories. This is a necessary precursor to the discussion of bounded rationality in Chapter 5. The behaviour of owner-managed firms is considered after a general overview of the traditional treatments of uncertainty.

Risk and uncertainty are aspects of imperfect information. Generally the terms are used in the context of a decision maker's knowledge of alternative actions and outcomes. Uncertainty may be thought of as part of the human condition and it has long been appreciated as an important component of decision processes.

Uses of the terms 'risk' and 'uncertainty' in the literature have not been consistent. Knight (1921) separated degrees of knowledge into three levels of certainty: 'unmeasurable' uncertainty (which he labelled uncertainty), measurable uncertainty (risk) and certainty. The difference between Knight's risk and uncertainty concepts is that distributions of outcomes can be determined for 'risk', while such distributions are not discoverable for 'uncertainty'. However, this distinction is not common across the literature where references to uncertainty often embody both concepts. The distinction, to the extent that it has been important in the established literature, may be usefully captured in the term 'ambiguity' which is discussed below.

The terms 'risk' and 'uncertainty' have been used almost interchangeably, with two aspects of risk or uncertainty being recognised under either label. These might be

described loosely as first, where there is some statistical dispersion in a measure of (probable) outcomes; and second, where there is some doubt about a future state or outcome or failure to meet some expectation. For decision makers aspiring to meet a target, both aspects are elemental.

UNCERTAINTY AND AMBIGUITY

Traditionally, decisions under uncertainty have been defined by incomplete information regarding possible (alternative) actions, possible states (outcomes) and the probabilities of states. Attention is limited here to the general categorisation of uncertainty[1]. The uncertainty inherent in many business decisions is rarely bounded by the contemplated alternatives. The incomplete set of alternatives contemplated may be a function of choice. For example, *ambiguity* may lead agents to limit their choice set to those for which ambiguity is below some threshold. For this and other reasons explored below, ambiguity is an important aspect of decision making under uncertainty.

Ambiguity

As a simple illustration of the nature of ambiguity, consider individuals facing a perceived two state outcome with no knowledge of the probability distribution of the outcomes. They may assign, in effect, equal probabilities to each. This is different, at least in terms of the confidence with which people may act, to the situation where the probability of each outcome is known or believed to be 0.5. This view is supported by Ellsberg (1961) who observed that people often prefer to bet on known instead of ambiguous probabilities, although he did not specify the precise conditions of ambiguity[2]. Ellsberg also argued that utility theory (as presented by Savage, 1954) should be a normative

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1 If the *process* of decision making is considered, further types may be defined. Some of these were described by Hogarth (1975) and Berkeley and Humphreys (1982).

2 Ellsberg was unclear as to any distinction between subjective probabilities and ambiguity. As early as 1713, Jaques Bernoulli (see Zimmer, 1983) distinguished between 'probabilities' and subjective 'degrees of confidence' (which seems consistent with ambiguity), following one of the first mathematical treatments of 'probability' in 1660 (see Hacking, 1975).

model incorporating ambiguity. With imperfect markets some ambiguity (as a reflection of completeness or reliability) must always exist.

Aversion to ambiguity

Ambiguity aversion is widely evidenced by observed preferences for lotteries involving precise rather than vague or ambiguous probabilities. This aversion cannot be explained by conventional expected utility models, because such models are ambiguity neutral. Many decision makers prefer having additional information concerning the likelihood of events, even if the information does not change the likelihood but means less vagueness or ambiguity. This has been argued and in some cases demonstrated empirically in Ellsberg (1961), Fellner (1961), Raiffa (1961), Sherman (1974), Slovic and Tversky (1974), Yates and Zukowski (1976), and Curley, Yates and Abrams (1986).

Other empirical results (such as Einhorn and Hogarth, 1986; Kahn and Sarin, 1988) have indicated that a decision maker's ambiguity aversion increases with the mean probability of gain (or loss). Results dependent on size of outcome seem to have been anticipated by Ellsberg (1961, p.663):

> I'd back [my probability estimates] if we were betting with pennies, but I want to know other things if the stakes are important.

Kyburg (1968, p.59) displayed a similar view in his criticism of subjective probability:

> If our degree of belief is based on a good deal of information, it makes sense to take advantage of [a] positive mathematical expectation; but if our belief is based only on a small amount of information, it would be foolish to risk much, even though our expectation is quite positive.

Such views may be intuitively restated as 'more information is sought when more is at stake'. Mao (1970) in a survey of capital budgeting theory and practice, and Conrath (1973) in a critique of the operationalisation of statistical decision theory, suggested that decisions involving a large proportion of a firm's assets require greater consideration of risk, which seems consistent with arguments regarding the impact of ambiguity.

RISK

Neoclassical economic theory can be represented as considering individuals to be faced (continuously) with two basic complementary decisions: how much of immediate wealth (or income) should be consumed or saved and how to invest savings. Both questions are affected by uncertainty in relation to future states and returns. The first question was introduced in the context of the permanent income - life cycle hypothesis in Chapter 3. The investment problem mainly relates to uncertain returns, but in the context of the Chapter 3 discussion, it should also take account of uncertain future needs if the lower bound on consumption is not static. Traditionally, such concerns have been pursued in terms of probability distributions derived for the alternatives.

While investment choice opportunities theoretically can be characterised by (subjective) probability distribution functions for their returns, the concepts of bounded rationality[3] suggest that constructing and comparing these is too complex for individual decision makers. The problem has been simplified in many cases by focusing on particular distributional parameters.

Parametric approaches to risk

Single parameter decision models are unlikely to capture complex dimensions of a decision maker's choices. A variety of decision models that attempt to simplify the modelling but capture more than one concern are the various risk-return models. Libby and Fishburn (1977, pp.274-5) identified the popular parameter bases for uncertain choices, incorporating six return parameters (where larger values are usually preferred to smaller values) and five risk parameters (where smaller values are usually preferred to larger values), which cover most factors that have been suggested in the literature[4].

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3 Bounded rationality concepts are considered specifically in Chapter 5.

4 *Return parameters:*

- Mean return, expected return, or expected value, $\mu_F = E_F(x)$.
- Median return* x_m with $F(x_m -) \leq 0.5$ and $F(x_m) \geq 0.5$.

continued on the next page

The advantage of the parametric approach

Under particular conditions, parametric representations are equivalent to using the complete probability distribution. The axioms of von Neumman and Morgenstern (1944) indicate that mean-variance models can provide a complete description of a choice problem, irrespective of the particular distribution, for all agents satisfying particular consistency requirements in their preferences choices (gambles) and can be represented by a quadratic utility function[5].

The disadvantage of the two parameter approach

The variance does not distinguish between positive and negative variation. However, getting more than expected is not likely to be undesirable, say for income. Markowitz (1959) adapted the risk measure to a semi-variance measure, which captures only negative variations; that is, those less than expected[6]. Given the proposed lower bound

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continued from the previous page:

- Return* $x_{.1}$ such that there is a 10 per cent chance of doing worse than $x_{.1}$.
- Return* $x_{.9}$ such that there is a 10 per cent chance of doing better than $x_{.9}$.
- Probability 1-F(x_t -) of achieving or exceeding a target return or 'satisfactory' return x_t.
- Probability 1-F(x_b -) of exceeding best return x_b obtainable by investing in non risky securities.

Risk parameters:

- Variance $\sigma_F^2 = E_F(x-\mu_F)^2$ or standard deviation σ_F.
- Below-mean semi-variance $s_F^2 = E_F(\varphi(x))$ with $\varphi_F = (x-\mu_F)^2$ if $x \leq \mu_F$ and $\varphi(x)=0$ if $x \geq \mu_F$.
- Probability F(0-) of negative return or loss.
- Expected magnitude of loss, given that a loss occurs
- Probability $F(x_r)$ of ruin /catastrophic loss, where x_r is the point at which return is 'ruinous'.

The notation used is Libby and Fishburn's. F is the distribution function for opportunity A. $F(x)$ is the probability that A's return is $\leq x$; $1\text{-}F(x)$ is the probability the return will exceed x. $F(x^-)$ (the limiting value $F(y)$ as y approaches x from below) is the probability that $A<x$. E_F denotes expectation for F.

5 The assumption of a quadratic utility function allows an individual's perception of risk to be measured by the variance. Within orthodox expected utility theory, it is recognised that there is no particular reason to believe individuals have or act in accordance with quadratic utility functions. Other characteristics of probability distributions additional to the variance, say skewness, may be important (should the distributions *per se* be considered in decision making).

6 A logical development from this were the risk of ruin models, such as in Vinso (1979). This approach considers expected returns subject to a threshold probability of failure. This, together with the regret and prospect-type theories will be discussed in Chapter 5.

on consumption expenditure and the need for income to finance consumption expenditure, the semi-variance approach in evaluating income risk has some intuitive appeal given the primacy of targets or aspiration levels in such decisions.

Classifying parametric approaches to risk

Most decision models for comparing distributions of returns can be classified according to two dichotomies. One distinguishes between parametric and expected utility models, while the other distinguishes between partial-order (dominance) and weak-order models. Because weak-order models give a more complete description of preference, they have been emphasised in the behavioural research. Parametric weak-order models can be classified according to whether the model is based on one or multiple parameters. Models with multiple parameters can be divided into compensatory and non-compensatory. Compensating models are generally those that allow for tradeoffs among parameters. That is, a lower or higher value on one parameter can be compensated for by the value of another. Non-compensating models impose a strict ordering on parameters, prohibiting tradeoffs. Libby and Fishburn (1977) illustrated this scheme for classifying weak-order models as depicted in Table 4.1. The multiple parameter models are all two parameter (risk and return) models. While other models exist, these are sufficiently illustrative of the differences between multiple parameter models. The right side column identifies models that account for individual differences, focussing on the choices and targets of individual decision makers.

Compensating weak-order models assume a decision maker's preferences can be represented completely by a numerical utility function $U(\mu_F,r_F)>U(\mu_G,r_G)$. It is usually assumed that U increases in μ and decreases in r. Most of the compensating models in Table 4.1 associate risk with loss or a failure to attain a *target* return.

The approach broached in Chapter 3, where owner-managers have lower bounds to their consumption levels which require owner-managers to set minimum targets for income

Table 4.1
Parametric weak-order models*

Classification	Models that do not account for individual differences	Models that account for individual differences
Single parameter models	Maximum expected return Minimum loss probability	Maximum probability of target return
Multiple parameter models		
• Compensatory		Mean-variance tradeoff Mean-semivariance tradeoff Mean-probability of loss tradeoff Mean-confidence limit tradeoff Mean-target semivariance tradeoff Mean-probability of below target return tradeoff
• Non-compensatory	Ruin probability-mean lexicographic Other lexicographic models	Constrained expected return maximisation

* Based on Libby and Fishburn (1977, p.276) Figure 1.

and make appropriate labour and financial capital investment decisions, accords with compensating models that allow for individual differences. If owner-manager decisions are directed to achieving income to satisfy some minimum consumption level, then compensating models with target returns may provide an appropriate basis for developing decision models.

UNCERTAINTY, INDIVIDUALS AND OWNER-MANAGED FIRMS

As noted earlier, risk has been conceptualised in many ways but usually involves either a measure of *outcome dispersion* or the *failure to obtain a specified outcome*. Slovic (1967) found that *perceived* risk was most highly correlated with the probability of loss and that variance had little effect on perceived risk. Conrath (1973) reported that the actions of executives making decisions regarding investment in a new product were consistent with a model based on setting a target rate of return and the probability of satisfying the target. In particular, alternatives with a probability (of achieving the target) below a particular level were rejected, indicating both a target return and a target assurance level. The evidence in Payne and Braunstein (1971), Slovic (1972) and Payne

(1973, 1975) also supported models in which risk was conceptualised as the failure to obtain a particular level of returns[7].

Slovic (1972) argued that individual differences reflect differences in the specific nature of the decision situation. A variety of evidence relating choices and risk perceptions appears in the psychology literature. Earlier literature indicative of this area was comprehensively reviewed by Payne (1973) and Barron (1974). The fewer but more realistic studies (in terms of business decisions) were reviewed in Libby and Fishburn (1977). All these reviews concluded that the concept of risk is highly idiosyncratic, and no evidence has been identified since that detracts from that view.

Risk aversion

The finance literature usually assumes that individuals are risk averse in their financial decisions (Haley and Schall, 1979, p.95). An individual is risk averse if a *certain* outcome is preferred to a situation with an equal expected utility (or personal value) that is the product of a probability distribution across more than one possible state; that is, an *uncertain* outcome[8]. A more general expression is that individuals prefer less risk to more risk, rather than this over-simplified case or 'no risk' being preferred to 'some risk'.

Risk aversion of owner-managers and their firms

The transferability of the behaviour of individuals to the owner-managed firm is supported by at least two types of results:

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7 The empirical aspects of this literature are considered further in Chapter 6.

8 If $E[U(A)] = E[U(B)]$ where $E[U(x)] = \sum_{i=1}^{n} p_i U(x_i)$ and $\sum_{i=1}^{n} p_i = 1$, a risk averse individual prefers A to B where $n = 1$ for A and $n > 1$ for B. If the condition that the probabilities sum to unity is not met, the conclusion *may* remain the same, but the individual would be said to ambiguity averse rather than risk averse. No general algebraic expression of this condition is possible without ascribing preference or utility functions for the probability distributions. Thus, a formal expression of risk aversion could be described as an attempt to combine the (dis)utility of uncertainty with the utility of outcomes. This appears contrary to the assumed or required separability of probabilities and utilities in expected utility theory.

- Sandmo (1971) demonstrated that the level of output of an owner-managed firm depends on the *owner's* attitude towards risk. This accords with the general argument underlying this thesis.

- The agricultural economics literature has provided strong evidence that households are risk averse; for example, Moscardi and de Janvry (1977), Dillon and Scandizzo (1978) and Binswanger (1980). These results pertained to farming households that had to make decisions regarding investing in uncertain farm production. This is comparable with the general nature owner-managed firms in the current context[9].

Two related areas of literature have developed since 1970 that are relevant to the current context. These examine the effects of output price uncertainty on the production decisions of firms classified as *owner-managed* and *labour-managed.* Despite the nomenclature, it is the latter that is most closely related to the owner-managed firms being considered here. A labour-managed firm in this particular literature is owned, organised and managed by worker-members. In contrast, owner-managed firms in this particular literature are described similarly except that they purchase labour and the owners' labour or effort appears irrelevant or is treated as equal to zero. To avoid confusion with the use of the term in this thesis, the owner-managed firms referenced in this literature is labelled as *capitalist* owner-managed firms in the short discussion that follows.

For the two different classes of firms, different conclusions regarding risk-related behaviour have developed.

Sandmo (1971) demonstrated that for capitalist owner-managed firms, the risk-averse firm produces less than the risk-neutral firm which produces less than the risk-seeking firm. Because Sandmo defined certainty as the firm facing the mean of the probability

9 Because this literature provides some evidence of the relevance of consumption targets *per se*, it will be considered more fully in Chapter 6.

distribution of prices with certainty (that is, the certain price is the mean price) then the level of output under certainty equals the level of output for the risk-neutral firm under price uncertainty. Thus, Sandmo's conclusion can be restated as the risk-averse capitalist owner-manager produces less under uncertainty (than under certainty) and the risk-seeker produces more.

Muzondo (1979) and Ramachandran *et al.* (1979) demonstrated how a labour-managed firm has the same individual risk dependence, but that the risk averse labour-managed firm produces *more* under uncertainty while the risk-seeking firm produces less, where uncertainty is defined as per Sandmo (1971). This traditional approach assumes the firm to be a price-taker making single period *ex ante* production investment decisions with all output sold at a price that is revealed after production is determined[10]. Increased production by the risk averse firm suggests that the achieved level of revenue takes priority over the investment of effort or labour (or sacrificing of leisure).

CONCLUSION

Two frequently modelled forms of risk pertain to variability in outcomes and the likelihood of attaining (or avoiding) a target outcome. Neoclassical risk theory has specifically considered minimum or target returns (in the semi-variance approaches) in a manner pertinent to satisficing behaviours in respect of lower bounds or targets. This is developed further in the context of bounded rationality in the next chapter.

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10 It has been argued that this definition is arbitrary (although it has been widely used in the price uncertainty literature) and that a more objective definition can vary conclusions regarding production decisions under price uncertainty. Hawawini (1984) presented a case where risk-neutral capitalist owner-managed and labour-managed firms both produce more under uncertainty, the risk-averse capitalist owner-managed firm and the risk-seeker labour-managed firm may produce more or less and the risk-seeker capitalist owner-managed firm and the risk-averse labour-managed firm continue to produce more. Unlike the previous assumption of *ex ante* production decisions, Hawawini assumed that firms delayed production decisions until the output price was revealed in a multi period framework, which seems less realistic.

Aversion to both ambiguity and risk by individuals and their owner-managed firms is supported by a diverse literature. Ambiguity aversion appears to change with the scale of outcomes, which has important implications for behaviour where anticipated outcomes are close to minimum thresholds. The diverse risk-related literature generally attests to the need to separate outcomes with respect to 'good' and 'bad', equating to above and below a target outcome. Aspects of this are considered in greater detail in the next chapter, in a review of models of decision making that have been proposed within the 'bounded rationality' framework.

At this stage the main implications for owner-managers is that, where individuals identify minimum consumption requirements to be satisfied from their investment of capital or effort in the firm, their responses to risk and ambiguity are dependent on the anticipated or possible outcomes relative to their targets. The evidence indicates that owner-managers are most likely to be both ambiguity averse and risk averse, with aversion increasing with increased anticipation that their consumption targets will be satisfied. Where owner-managers become less certain that targets will be satisfied, they choose to increase effort (output).

Further explanation of such behaviour and its implications is offered in the next chapter.

CHAPTER 5
BOUNDED RATIONALITY

INTRODUCTION

This chapter reviews investment decision models that have been proposed within the bounded rationality framework. These are designed to obviate difficulties with utility theory's assumptions of decision-makers' knowledge and abilities and the attendant implications for maximising behaviour. The selected models take account of satisficing behaviour (which developed as an alternative to maximisation in explaining the behaviour of individuals) and consider the existence of targets or lower bounds for decision outcomes. The notion of lower bounds was raised in the context of consumption in Chapter 3. Both aspects accord with the attitudes to risk identified in Chapter 4.

It was concluded in Chapter 3 that, while the formalism of expected utility theory does not provide an appropriate framework within which to develop models of individual owner-manager decision making and performance under uncertainty, the underlying concepts concerning consumption and related tradeoffs are critical. Many of these concepts re-appear in the context of bounded rationality.

Key concepts in bounded rationality

The basic elements of limited or bounded rationality are the *imperfect information* and *limited processing capabilities* that constrain otherwise rational individuals. A seminal paper in this area was Simon (1955), whose 'satisficing' theory will be considered in more detail later. Cyert and March (1963) similarly presented a behavioural theory of the firm that inspired various computer simulation studies[1].

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1 It has been suggested that such simulation studies combined with analytical models may represent a major tool in future development, as the reliability of casual empirical observation of decision making presents some possibly insurmountable difficulties. Simulations, however, offer particular risks in regard to model parameters and their values. Because such simulation

continued on the next page.

The Cyert and March (1963) approach was based on three concepts: *bounded rationality* (see Simon, 1955), *imperfect environmental matching* and *unresolved conflict.* Imperfect environmental matching refers to decision makers not employing rules or practices uniquely determined from their operating environment. Cyert and March suggested that firms in imperfect markets have difficulty in or are slow to match their decision rules to changed environments. Unresolved conflict arises when firms have multiple actors with conflicting interests (with each other and the firm) that cannot be resolved entirely through contracting[2] processes (see Marschak, 1955; Marschak and Radner, 1972).

Cyert and March (1963) were not the originators of each of these notions, but their *joint* consideration was in marked contrast to the dominant theory of the firm literature. There were important subsequent developments in theory as these ideas were embraced by an increasing number of writers, albeit often indirectly. An example is the Marschak and Radner (1972) theory of teams dealing with optimal organising and information processing strategies in the presence of bounded rationality constraints, although their assumption of identical preferences across agents precluded the potentially important component of contracting behaviour, *opportunism*, which will be revisited later in this thesis when extensions of the basic model are broached in Part IV. Alternative but sympathetic developments were the evolutionary control theories that focussed on incremental adaptation to environmental changes due to cognitive limitations.

The incremental adaptation in this context was largely prescribed according to the traditional rationality assumptions by employing sequential Bayesian estimation (March, 1991). Important examples of this latter approach appear in Nelson and Winter (1974, 1975, 1978, 1982), who pursued an evolutionary approach in which search and selection

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models are often single cases and not constrained by a more general model, consistency with models can only be determined *ex post* (Baumol and Stewart, 1971).

2 Contracting theory is considered in Chapter 13 in Part IV.

replaced profit-maximising assumptions[3]. Numerous authors before Simon (1955), for example Hicks (1935) and Higgins (1939), and since, have argued that profit as a motive does not necessarily infer maximisation, and that the properly attributable motive is profit satisfaction, usually termed 'satisficing'. Radner (1975) explained satisficing behaviour as a process by which a decision maker defines the criteria for a solution that will *satisfy that decision maker*. Thus the targets for satisficers are idiosyncratic.

Cohen and Cyert (1975) compared the Simon-Cyert-March[4] approach with the neoclassical utility or profit maximisation approach. They concluded that the former is more suitable when the problem entails predictions about the behaviour of specific agents or firms. The Simon-Cyert-March approach is reflected generally in a contemporary literature that considers internal firm problems, although many merely pursue specific optimisations without addressing behaviour relations. Useful examples are Stiglitz (1975) who considered internal incentives, performance information deficiency and monitoring problems, and Radner and Marschak (1972) and Radner and Rothschild (1975) who considered information aspects of teamwork, with the latter focussing on allocation of effort. The basis for these contributions was Simon's satisficing theory, the development of which is briefly explained in the next section.

SATISFICING AS DECISION MAKING

This section reviews the development of satisficing theory as the principal alternative to maximising behaviour.

Satisficing as decision making was proposed in Simon (1947) as a theoretical response to observed bounded rationality. The second and third editions of this work (1957a, 1976)

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3 Such behavioural approaches did not displace the primary focus of extant mainstream theory on subjective expected utility maximisation. A contributing factor may have been the assertion by some authors, such as Nelson and Winter, that their theories were fundamentally orthodox in holding the pursuit of profit as the basic objective.

4 This approach is sometimes referred to as the 'Carnegie approach'.

and various other publications such as Simon (1955, 1957, 1959) further argued that decision making is a satisficing activity driven by heuristic targeting techniques, made necessary by uncertainty, complexity and information costs that prevent optimising strategies. Evidence from information processing, psychology and computer simulation studies supports most features of this theory (Simon, 1969; Newell and Simon, 1972). The potential application of the satisficing approach in the context of owner-managed firms will be more apparent if it is related directly to the notion of consumption targets.

Satisficing and aspirations

Satisficing is a concept more meaningfully related to psychological notions of *aspiration levels* than maximisation (Simon, 1959, p.262). More particularly, Simon's satisficing arguments were dependent on the prominent notion of satiation in treatments of motivation in psychology. For example:

> In most psychological theories, the motive to act stems from *drives* and action terminates when the drive is satisfied. Moreover, the conditions for satisfying a drive are not necessarily fixed, but may be specified by an aspiration level that itself adjusts upward or downward on the basis of experience. (Simon, 1959, pp.262-263).

To explain business behaviour in terms of such theory, profit goals will pertain to the attainment of a profit target, rather than maximisation. The distinction between satisficing and maximising behaviour is important. As identified in Chapter 3, an owner-manager's consumption aspirations are likely to influence the owner-managed firm's profit targets.

Applications of satisficing levels to economics were discussed in Siegel (1957) and March and Simon (1958). These early references indicated that psychological studies of aspiration levels support propositions such as:

- Performance below an aspiration level induces search behaviour, particularly search for new alternative actions.
- Performance below an aspiration level induces re-assessment of aspiration levels that may result in downward adjustments towards more attainable goals.

- If the preceding mechanisms fail or are too slow, emotional behaviour may replace rational adaptive behaviour.
- If a firm has known alternatives that satisfy or exceed its aspiration level, it will choose the 'best'[5].

In support of his theory, Simon cited various studies that provided empirical evidence of business goals stated in satisficing terms (1959, p.264). Prominent among these was Cyert and March (1956)[6] who provided evidence that firms with declining market shares acted more vigorously to increase their sales than firms whose market shares were stable or increasing, implying that the latter were 'satisfied' with current performance.

Consumption satisficing

Satisficing cannot arise with unguided behaviour. For satisficing to occur, individuals must be able to identify goals or targets which reflect their aspirations. Thus owner-managers set personalised targets for the firm based on their consumption preferences (see Chapter 3). The lower bounds for consumption, described in the study of the permanent income - life cycle hypothesis by Skinner (1988), denote the minimum targets in this context. The proposition of consumption-driven investment also finds some support in the safety-first decision models of investment behaviour.

Safety-first , ruin and other minimum return models

Roy (1952) was possibly the first to suggest that investors seek to minimise the probability of disaster, relative to some perceived disaster level of returns. Disaster rates of return have been introduced also as modifications to expected utility theory. For example, Hicks (1977) argued that they should be prominent in asset-choice models, and

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5 This notion of 'best' appears to relate to utility. For example, Simon (1959, p.264) argued that an aspiration level defines a natural zero in a utility scale, unlike most utility scales in orthodox theory where zero is arbitrary. However, elements of regret theory, to be discussed below, and other uncertainty-oriented theories may detract from this view of 'best'. It may, for example, be related to confidence levels rather than expected values.

6 No recent studies in this regard have been identified.

that the possible return on each asset should be scaled down by the disaster rate of return. The investor would then select the portfolio of assets that maximises expected utility derived from returns above the disaster level.

While Roy (1952) and others who considered ruinous outcomes (Shackle, 1961; Ford, 1987) 'explained' some of the general collection of laboratory evidence concerning simple gambling propositions[7], it is not clear that this is the most likely approach for investment decisions that necessarily risk substantial proportions of an individual's wealth and where the investor has an identified minimum required rate of return which may indicate a target consumption level[8].

Similar to the minimum required return models are various 'regret' and 'surprise' theories. Savage (1954) suggested that individuals minimise regret rather than maximising utility, where regret is the difference between the obtained reward and that obtainable with perfect information or in hindsight. Extending such notions, Shackle (1958, p.66), in a discussion of his 'potential surprise' model, argued that:

> Rather than *minimax* our losses, is it not more reasonable to fix them for some *maximum tolerable* numerical size, to avoid any action scheme which would bring losses larger than this within the range of possible or 'too possible' outcomes, and *subject to this constraint* choose that action scheme which brings within the range of possible or 'sufficiently possible' outcomes as high a positive success as we can find.

Such arguments appear to accord closely with satisficing concepts. A valuable extension developed by Savage and Shackle is attitude to risk. Not only might individuals satisfice with respect to *targets* for levels of return, but they can also satisfice with respect to the perceived *likelihood* of achieving such targets while restricting downside risk. Various aspects of Shackle's theory and other *risk-limiting* theories are considered below.

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7 For examples see Edwards (1955) and Kahneman and Tversky (1973, 1979).

8 Minimum required rates of return and consumption levels are reconciled if, in addition to the minimum required rate of return , an investment level is specified, such that the required rate of return applied to the specified investment level yields a minimum or 'base' target consumption level. However, specifying intended investment levels seems unnecessarily clumsy.

RISK AVERSION AND SAFETY FIRST

Risk aversion can be considered in the context of risk concepts other than the complete probability distribution of returns (see Chapter 4). For example, risk attitudes may pertain to the possibility of catastrophic losses, failure to obtain a target return, and best and worst outcomes. While these have been included in various treatments within the formal expected utility framework, they also permit incomplete specifications of outcomes empathetic to bounded rationality. Roy (1952) suggested that investors seek to minimise the probability of disaster, *relative to a perceived disaster level of returns.*[9].

Others also rejected the moments of complete probability distributions as measures of uncertainty, notably Shackle (1952, 1961) in his 'potential surprise' theory, Ford (1983, 1987) in the closely related 'perspective' theory, Savage (1954) and Loomes and Sugden (1982) with 'regret' theory, and Kahneman and Tversky (1979) in their 'prospect' theory. These various approaches are summarised in Appendix 2[10].

Generally, these models support the proposition that an owner-manager judges the value of an outcome by reference to a personal target, and that gains and losses are treated

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9 A disaster level of returns can be equated to a minimum consumption level. This safety first criteria was further developed by Telser (1955-6) who argued that individuals maximise the mean value of the outcome of a given strategy subject to Roy's constraint. The various safety-first criteria also led to optimisation of mean and standard deviation expressions. Pyle and Turnovsky (1970) compared the justification of the safety-first mean-standard deviation portfolio analysis with that based on expected utility maximisation, to demonstrate that (in the absence of riskless assets) a correspondence between the safety-first criterion and expected utility maximisation (when that maximisation results in concave indifference curves in the mean-standard deviation space). Tobin (1958) originally proved that the utility function was concave under the Pyle and Turnovsky (1970) conditions of positive diminishing marginal utility of wealth and a multivariate normal distribution of returns to the available assets. However, as Fama (1968) indicated, Tobin's proof based on any two parameter distribution is valid only for the normal. Feldstein (1969) was able to provide a two parameter distribution for which the utility function was not concave. Pyle and Turnovsky (1970) showed that the expected utility function will generally depend on higher moments, not only the mean and standard deviation.

10 These theories focussed on experimental gambling choices, and have not been verified by reference to any evidence of individual decisions in investing capital and effort in realistic settings affecting an individual's or firm's survival. While they rejected the expected utility theory approach, they nonetheless drew heavily on the underlying concepts of utility, although their concepts of utility *per se* were not explained.

differently in evaluating the risks of competing propositions. Ford (1987) particularly considered the labour (effort) investment decision in a manner relevant to an owner-manager, modelling a minimum aspiration level or return on effort below which the individual will not invest any labour.

CONCLUSION

It is widely accepted in both neoclassical and bounded rationality frameworks that:

- a possibility of losses or below target outcomes is of particular significance in investment decisions; and
- some degree of risk-aversion is dominant in the behaviour of individuals under uncertainty.

Gains and losses and targets

Numerous considerations are possible[11] consisting of comparing perceived outcomes, where 'good' and 'bad' results may be weighted differently. From the safety-first approach of Roy (1952) , good and bad need not necessarily relate to gains and losses. Satisficing theories indicate they will be determined by reference to some *target* rate of return or income level. This is sympathetic to the regret theory of Loomes and Sugden (1982) and the Kahneman and Tversky (1979) focus on the *subjective desirability of particular outcomes.* A generalised view concordant with these approaches, therefore, is to consider each outcome in relation to the owner-manager's target. Good outcomes are those expected to satisfy the target while 'bad' outcomes are those that fall short.

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11 It may be plausible, for example, to vary Ford's model so that the 'best' outcome is replaced by the 'most likely' outcome. Thus, an individual's investment decision might depend on a comparison of Ford's ψ and the perceived most likely 'good' outcome, replacing Ford's ϕ. Of course, such a ranking of identified outcomes will be complex, especially when more than one outcome is perceived as having a reasonable likelihood of transpiring. The 'most likely' bad outcome also may be a determinant. This scenario is illustrative only, and is not being proposed as an alternative to Ford's approach.

Probabilities and risks

A decision matrix has alternative actions with possible consequences having measurable utility under alternative events or states having specified probabilities of obtaining. The appropriate decision rule is to choose the action having the highest expected value, which is the sum of the probabilistically weighted potential consequences. In this context, probability measures the confidence that a particular individual has in the truth of a particular proposition. Savage explained the implications for individuals as follows (1954, p.3):

> [This] postulate(s) that the individual concerned is in some way 'reasonable', but [does] not deny the possibility that two reasonable individuals faced with the same evidence may have different degrees of confidence in the truth of the same proposition.

Ambiguity

Even when the assessments of probabilities are considered poor, the approach embodied in subjective expected utility theory implies that the 'correct' assessment must still focus on expected value, regardless of how poorly expectations can be formulated. With unbiased probability estimates, the divergence of actual outcomes from the expected value will be wider with poorer information. If uncertainty is so great that belief becomes vague or inconsistent, then the logic of probability theory is violated. At the extreme end of the uncertainty spectrum, averseness for unstable or unreliable judgements (ambiguity) may lead to discounting of expected utility or its probability.

Averaged outcomes

Of similar consequence are situations where the *average* of possible results is of no interest. In some circumstances, an individual may require that *any* possible outcome should be tolerable, such that each outcome cannot be treated merely as elements in a probabilistic series. That is, despite a situation offering a positive expected value, there may be an unacceptable chance of an entirely unacceptable outcome. An obvious example is bankruptcy, any serious likelihood of which is unlikely to be tolerable from an owner-

manager's view, which means that an average outcome which includes an unacceptable probability of bankruptcy is meaningless. This problem is one of seriability[12].

Bounded rationality

In the orthodox neoclassical literature behaviour that violates expected utility axioms and Bayesian decision processes is typically labelled as suboptimal. The concept of bounded rationality takes a *functional* view of behaviour, to adapt a more general, psychological view of rationality. The numerous decision-making situations that have to be assimilated by individual agents should not be expected *a priori* to be explicable by reference to one paradigm. Even for a given action-choice problem, the processes used by decision-makers can differ.

Recognition of bounded rationality provides a means of adapting concepts from utility theory while building on the seemingly more realistic foundations of incomplete information, satisfactory rather than ideal outcomes and heterogenous aspirations. Particular features of bounded rationality to be noted include:

- The limited information processing ability of individuals induces minimal information search and simplistic solutions. Progress usually depends on the modification of previous solutions which requires only a largely local search. This contributes to satisficing behaviour, whereby search ceases if an acceptable solution is found.

- The search for a better solution is prompted by a failure to obtain goals. Goals are aspirations which are dynamic and may be modified if failure persists. Both goal setting and search strategies are products of adaptive learning.

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12 It is possible that large firms with teams of managerial specialists and sophisticated structures can deal with particular decisions on a serial basis, when they would be non seriable for a small number of individuals, as in an owner-managed firm. Non seriable problems require attention to individual outcomes, which complicates decision rules. If relevant states are complex and numerous (rather than simply survive or fail, profit or loss), and if acts are various and subject to modulation, decision matrices take on elements additional to those identified above.

The next step

While concepts of risk and uncertainty were identified separately in Chapter 4 from the other areas of theory, they are inherent in both orthodox subjective expectations theory and bounded rationality approaches. Indeed, uncertainty concepts are fundamental to the latter. The uncertainty concept embodied in ambiguity may have important implications for individual behaviour[13].

Behavioural theories have contributed to a structured practical view of owner-manager behaviour that includes satisficing as a basic part of owner-manager behaviour in relation targets or intended lower bounds for outcomes. The usefulness of the variously developed concepts may remain somewhat obtuse until they are formalised (in Chapter 7) for owner-managers and their firms in terms of their purposes and opportunities given the behavioural limits and preferences of their owner-managers. Before formalising the framework for investment decisions in owner-managed firms, a brief review of empirical evidence from the existing literature that supports the propositions to be incorporated into the model is given in Chapter 6. The formalism is presented in Chapter 7 and selected aspects of the model are tested in Part III.

13 No particular approach to the treatment of this ambiguity is advocated here, but for illustrative purposes the belief function formalism developed by Dempster (1968) and Shafer (1976, 1982) is described in the appendix to Chapter 7.

CHAPTER 6

EVIDENCE FROM EXISTING LITERATURE SUPPORTING THE TARGET CONSUMPTION FRAMEWORK

INTRODUCTION

The exploration of economic theories in Chapters 3, 4 and 5 identifies several principles and elements appropriate to a framework within which to model objectives and decision elements of owner-managed firms. While the target consumption hypothesis for owner-managers has a strong basis in elements of existing theory, its exposition thus far has depended more on proposition than evidence. This chapter looks to the existing literature for empirical evidence of the hypothesised role of consumption targets in the labour and investment choices of individuals.

The main elements for which support is sought are:

- consumption objectives are the basis for owner-manager decisions;
- objectives are pursued on a satisficing basis;
- satisficing is with respect to individual consumption targets with an effective lower bound or base target;
- consumption target satisficing has implications for the pursuit of income, savings behaviour and use of debt; and
- an owner-manager is able to modify personal effort and other productive inputs to increase or stabilise income.

The hypothesised role of consumption targets

Fundamental is the proposed existence of lower bounds or minimum targets for consumption and income. Preceding discussion suggested that if an individual's consumption is near the lower bound then income fluctuations should be positively related to changes in effort and investment (limits permitting). Consumption behaviour itself is affected by the anticipated permanence of changes in income, borrowing opportunities and convertible wealth. In this context, concepts underlying the life cycle - permanent income hypothesis are adapted in Chapter 3 thus:

- An owner-manager adjusts income-seeking behaviour in accordance with the perceived stability (permanence) of achieved consumption (income) levels.
- An owner-manager does not increase consumption expenditure targets unless permanence of the current level or target is perceived to be relatively assured.
- An owner-manager's savings behaviour and investment is influenced by the proximity of or expectation of exceeding the lower bound to consumption.

As a consequence it is expected that investment, denoting income seeking behaviour, in owner-managed firms is strongly influenced by consumption and savings objectives and preferred owner-manager effort (leisure).

While income seeking behaviour (including effort) is also a function of an individual's risk aversion, risk aversion itself may well vary according to the individual's achieved consumption (income) position. In particular, risk aversion is expected to increase when expected outcomes are near (above) targets. It may decrease when expected outcomes are below the minimum target because if the risky behaviour pays off, the individual will achieve the minimum target. If it does not, the individual might not be much worse off[1].

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1 Similarly, observers' sometimes express concern that firms near bankruptcy may take excessive risks. The intention is that if the risky investment pays off, the firm will be saved from

continued on the next page.

The discussion of bounded rationality in Chapter 5 reinforces the satisficing hypothesis and also indicates that individuals undertake minimum search and adopt simplistic solutions, with search prompted mainly by the expected failure to obtain goals.

The existing literature provides some support for these target consumption propositions as indicated by the studies which are reviewed in the next section. Studies supporting the notion of a base consumption target are first considered, followed by reviews of selected evidence pertaining to the investment decisions and risk taking behaviour.

CONSUMPTION TARGETS

Empirical studies impinging on consumption behaviour occur in diverse areas, including those concerned with the permanent income - life cycle consumption hypothesis, household behaviour, debt behaviour, demand for money and co-operatives. Selected studies from these areas are considered below, grouped according to the framework element to which they are most relevant.

Base consumption targets

Hall and Mishkin (1982) undertook a time series study of individual household income and consumption using the expenditure data from the University of Michigan's "Panel Study of Income Dynamics". These data recorded weekly expenditures on food, derived from an annual average, for about 2300 households over 1969-75. Although their results were sensitive to the certainty of income, they revealed a propensity to acquire "needs" (proxied by expenditure on food) that was not unduly sensitive to fluctuations in income. Overall, they found that around 80 per cent of consumption followed the permanent income - life cycle hypothesis. For the 20 per cent that did not, Hall and Mishkin

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bankruptcy; if not, creditors will bear the loss (Golbe, 1988, pp.75). This, however, is dependent on limited liability maintaining the lower bound of zero for contributed equity beyond the initial contribution.

interpreted this as evidence of liquidity constraints. However, such results are also in keeping with the hypothesis that a particular (base) level of consumption will be pursued despite fluctuations in income. The non-conforming 20 per cent attributed to liquidity constraints can be explained also by consumption levels exceeding the base target and which therefore can be revised more readily as aspirations and income vary. The study did not control for source of income. Its main contribution in the current context is its support of the existence of individual base consumption targets[2].

Income-seeking labour responses

As suggested in Chapter 3, some aspects of studies of household behaviour are relevant to owner-managed firms. Generally, the household production model highlights the interdependence of consumption and production decisions in the household. The main approach has been to model labour investment decisions where consumption can be satisfied from both household output and market acquisitions.

Increasing labour to achieve consumption

Mincer (1960) examined family income that was separated into fulltime and less-than-fulltime income of the "head of the unit" and other family income which was attributed to the "sporadic" work activity of other family members. Data for the study was from the US Bureau of Labour Statistics' "1950 Survey of Consumer expenditure" for about 7000 "husband-wife families". Despite the study excluding data where the "head" was self-employed, the results provide some evidence that supports the notion of increased effort to achieve consumption targets. On average, "other family income" (the difference

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2 In the Australian context, the evidence provided by Anstie, Gray and Pagan (1983), while supportive of this notion, did not add any detail and did not distinguish owner-managers (self-employed) from wage and salary earners. Anstie, Gray and Pagan did consider non-labour income in the form of capital gains, but their treatment allows little interpretation beyond the proposition that such riskier income is associated with different behaviour to that attributed to wage and salary earners. There does not appear to be any basis for generalising this to the riskier income from self-employment as distinct from merely investing capital.

between family income and earnings of the "head") constituted 21 per cent of family income before tax.

The analysis contained two relevant results. First, other family income was greatest when the income of the "head" was lowest relative to its "long run level". Second, other family income increased when "head's" income was below its "current" full employment level. Mincer's results were entirely consistent with the expectation that the family unit will increase labour activity to derive transitory income when the "permanent" income of the principal worker was lower than that required to maintain a particular level of consumption expenditure.

Savings and consumption

Skinner (1988) argued that the self-employed (who he indicated had consistently lower average incomes than other groups in his study) displayed reduced savings behaviour because their income was too near basic consumption levels in terms of some minimum standard of living. Skinner's used the US Consumer Expenditure Survey 1972-73 to measure savings rates for a cross-section sample of families with incomes of $2,000-$35,000 (in 1972-73 dollars). Savings (the difference between net income and consumption expenditure) was measured in two ways. The first excluded household durables and simply adjusted consumption expenditure by subtracting mortgage payments and adding the imputed value of the house. The second measure added 90 per cent of household durables to household savings. The reported average ratio of savings to net income for the self-employed (0.071) was half that of other groups (0.140). While other factors may explain this difference (such as problems with measuring income) it does suggest a relationship between income and consumption for the self-employed which is different to that predicted by a model of precautionary savings in response to riskier income. It also supports the argument that there is some level of short-term consumption that may be satisfied in preference to satisfying future needs through savings.

The different savings behaviour of owner-managers was empirically demonastrated stronlgy much earlier in Friend and Kravis (1957). Using a large database derived from the 1950 Bureau of Labor Statistics' survey of US consumer expenditures and the Surveys of Consumer Finances made by the University of Michigan Survey Reseacrh Center for the Federal Reserve Board, Friend and Kravis identified significant propensities of unincorporated owner-managers (whom they labelled 'entrpreneurs') towards above average negative savings at low incomes and above average positive savings at high incomes. At the average entrepreneur income level they found larger savings for entrepreneurs than nonentrepreneurs. Overall they reported that self-employed consumed 89 per cent of after tax income compared to 97 per cent for all urban units. The results suggest that owner-managers have a larger propensity to save, consistent with greater uncertainty of income, but this propensity is transferred to dissavings behaviour as incomes move into the lower ranges, consistent with threatening base consumption targets.

Risks and targets

Individual risk taking propensities

The agricultural economics literature has provided strong evidence that households are risk averse; for example, Moscardi and de Janvry (1977), Dillon and Scandizzo (1978) and Binswanger (1980). Binswanger found little evidence of idiosyncratic behaviour, Dillon and Scandizzo were unable to generalise across their sample while Moscardi and de Janvry reported that risk was strongly associated with individual socioeconomic variables. These results pertained to farming households that had to make decisions regarding investing in uncertain farm production. This is weakly comparable with the general nature owner-managed firms in the current context. It is not, however, sufficiently comparable to warrant further review here.

Schwer and Yucelt (1984) investigated the risk-taking propensities of a sample of small business "entrepreneurs and managers' using twelve hypothetical risk-taking situations.

Based on ANOVA tests, the authors reported some significant associations between each of age, education, years of owning the business, number of employees and retail industries, and responses to three particular questions classified by the authors as 'business related risk-taking'[3]. They reported that risk-taking increased with age, owner-managers for 2-3 years and greater than 10 years were less conservative, and retail industries were more conservative. They also reported significant relationships between each of education and 'retail' with risk-taking for job choice, and 'industrial'[4] with risk-taking for occupational decisions[5]. The study did not consider the financial needs of the respondents and allowed little interpretation or generalisation. The main import of the study is that the risk attitudes of owner-managers are circumstantial and that the circumstances considered in the study may have been strongly associated with the needs of individual owner-managers on a life cycle basis.

Target based risk

Conrath (1973) reported that the actions of executives making investment decisions were consistent with a model based on setting a target rate of return and the probability of satisfying the target. In particular, alternatives with a probability of achieving the target below a particular level were rejected, indicating both a target return and a target assurance level. Conrath tested nine business executives in making hypothetical business investments regarding in a new product. He reported that their approach was consistent with Cyert and March (1963). Each project was dealt with sequentially and compared to a perceived standard of acceptability. The executives were not prepared to accept projects that had more than ten per cent risk of not meeting the target return, regardless of the expected rate of return. They demonstrated no concern for probability distributions,

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3 These related to risk-taking for an 'investment decision', 'foreign investment' and 'research decision'. The study used survey responses for 71 businesses in Vermont. The sample was not random but the nature of any bias is not apparent.

4 The other industry classifications were 'commercial' and 'service'.

5 The suggestion that there may be associations between risk attitudes and such factors (or other conditions they may proxy) warrants further consideration but is beyond the scope of this thesis.

focusing instead on point estimates. This behaviour by relatively sophisticated agent-managers lends some support to the view that owner-managers would also be target oriented in their decision making.

The evidence in gamble based studies also supports models in which risk was conceptualised as the failure to obtain a particular level of returns[6]. Typical of these are Payne and Braunstein (1971), Slovic (1967, 1972) and Payne (1973, 1975). As these studies used students as subjects in laboratory studies, they are not fully analogous to owner-manager decision making. They do, however, reinforce the results of studies such as Conrath's and lend some weight to the notion of safety-first investment models.

CONCLUSION

While far from conclusive, the evidence from studies such as those described above indicate that the proposed consumption target satisficing behaviour of owner-managers as a basic influence on their business investment decisions may have empirical support.

In particular, there is superficial evidence that the consumption behaviour of self-employed individuals may differ from wage earners in terms of it being less responsive to income variations (Hall and Mishkin, 1982) resulting more responsive savings behaviour (Friend and Kravis, 1957). There is some evidence that the self-employed may seek to increase income to achieve consumption objectives, rather than moderating consumption choices (Mincer, 1960). Where income was inadequate, there is evidence of a tendency to utilise savings (Skinner, 1988, Friend and Kravis, 1957).

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6 Risk notions inherent in the safety-first and target based models summarised in Appendix 5.1 may offer particularly relevant avenues for future research in the owner-manager context.

Individual risk taking behaviour is not obvious, other than being circumstantial (Schwer and Yucelt, 1984) but there is evidence that the concept of risk pertains to not achieving targets (Conrath, 1973).

While evidence has not been cited to support all the main elements listed in the introduction, the general tenor of the evidence described indicates the propositions warrant more formal consideration and direct testing. A formal presentation of a consumption based decision model for owner-mangers is developed in the next chapter. Testing of the model and its implications is pursued in the next section.

CHAPTER 7
THE OWNER-MANAGER'S OBJECTIVES AND DECISIONS

INTRODUCTION

This chapter formalises the proposed framework within which to consider the actions and performance of individual owner-managers and their firms. For clarity of exposition and subsequent reference, it is necessary to use some mathematical notation to state objectives, conditions and constraints.

First, the model proposed thus far is described. The owner-manager's objectives for the firm is identified in terms of hierarchical or ordered preferences for consumption and survival. The next section explains the underlying structure of the model and applies it to owner-managed firms' objectives. The effect of external claims is then incorporated.

AN OVERVIEW OF THE MODEL

Owner-managed firms are established to provide income to owner-managers who invest labour (effort) and financial capital. Effort is naturally constrained and capital is constrained by the owner-manager's existing wealth and borrowing capacity.

The owner-manager seeks income to satisfy consumption aspirations. The owner-manager also has leisure aspirations. Increased effort reduces leisure. Aspirations can be specified as both short and long term periodic targets. Consumption can be financed by income, wealth realisation or debt. Financing consumption from debt implies future income or wealth realisations. Future consumption aspirations require permanent income, wealth or savings. Permanent income implies survival of the firm over the planning horizon which depends, in part, on satisfying external claimants who can enforce claims through liquidation. Savings objectives translate as income targets.

The owner-manager thus decides what effort and capital to invest to achieve leisure, savings and consumption aspirations while satisfying external claims. This requires knowledge of the firm's production function, which is observed periodically as realised income, so that investment decisions can be reviewed. Aspects of this framework are expanded below with definitions of some terms and concepts.

Consumption

Consumption expenditure is any *non-redeemable* disposition of resources for the benefit of the individual. Irreversible expenditure which is not consumption is negative income. Redeemable expenditure on resources that are used *only* in production or that results in wealth accretion is investment[1].

This means that asset values which decline in production are negative income. Because interest is in realised income this may be treated as lost savings. Asset values which decline because of personal use are consumption[2]. Changes in asset values that merely reflect shifts in relative real market prices are *unrealised* income[3] (or increased savings). These definitions accord with the conventional interpretations of the economic concepts of consumption, income and assets.

Hierarchical aspirations

Tests of the permanent income - life cycle hypothesis, as reviewed in Chapter 3, have generated strong evidence that the extent to which consumers increase consumption

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1 The only exception to this classification scheme for expenditures is income tax. This will be treated as systemic leakage of resource flows to an external claimant and included as a mechanistic driver in determining (required) returns.

2 This refines the definition used in many studies of consumption behaviour, such as the life cycle permanent income hypothesis tests discussed in Chapter 3, which distinguished between expenditure on non-durables and durables, but did not consider the *redeemability* of expenditure on non-durables. It is unlikely that this can be operationalised to measure *perquisite consumption.*

3 Unrealised income may be 'utilised' through debt.

expenditure depends on the extent to which it has been established that an increase in income is 'permanent', which also means that the relationship between consumption and income is weaker for the riskier income of the self employed. There is evidence of the existence of lower bounds to consumption where proximity to lower bounds affects the consumption expenditure - income relation. This has been interpreted to mean individuals near the lower bound tend to spend all available income on consumption regardless of the perceived permanence of changes in income.

This led to the conclusion that an owner-manager seeks to increase income by investing more effort or capital until some minimum consumption level is satisfied. This implies that there is a preferential ordering of combinations of leisure, risked capital and consumption with some *base* consumption level dominating the ordering.

Some support for this view can be obtained outside the economics literature. For example, Maslow's (1954) seminal theory on individuals' hierarchy of needs[4] in the psychology literature. This identified the foundation for such a hierarchy as survival.

The elements in and structure of an individual's hierarchy of consumption aspirations are complex, and beyond the scope of this thesis. However, the general theme of economic and psychological theory based on Maslow suggests individuals have a hierarchy that first requires satisfaction of particular short term consumption needs. There is then some contribution to expected longer term needs for the same consumption, then concern for higher level consumption needs, reflecting the individuals' time preferences and planning

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4 Maslow's (1954, pp.80-98) modified hierarchy of needs (1= most important) was presented as:
1. Physiological needs essential to biological functions.
2. Safety needs, such as freedom from pain and discomfort.
3. Love and acceptance needs.
4. Esteem needs, such as prestige, fame and recognition.
5. Self-expression and fulfilment needs.
6. Needs to 'know' and 'understand'.
7. Aesthetic needs.

horizons given bounded rationality. Current satisfaction is usually ranked higher than future attainment for the same periodic consumption elements, but short term satisfaction of higher level consumption needs *may* be subservient to assuring the future satisfaction of base consumption needs. Thus, an individual's consumption behaviour may include base and threshold consumption levels with varying associated time preferences.

Future consumption targets

Satisfaction of consumption objectives over time requires commensurate income or savings. Applying the survival hypothesis and precautionary savings models to the longer term suggests that, under uncertainty, an intently rational individual should prefer current consumption to be satisfied from current income rather than from previous savings, as reduced savings (wealth) reduces the expectation of satisfying future consumption targets. However, this is dependent on the extent to which the individual discounts the value of future consumption. The planning period indicated by the discount rate may be remarkably short. For example, Freidman (1957) estimated the discount rate of consumers to be between .33 and .40, implying a planning horizon of 2.5 to 3 years. While the contemporary relevance of such dated US results is questionable, its implied relatively short planning horizons lends further credence to the adopted bounded rationality concepts[5].

Consumption and survival of the firm

The intendedly rational owner-manager maintains the firm as the means of attaining the income necessary to support a desired consumption level only if the prospects of attainment are at least equal to those for other income deriving opportunities[6]. In these

5 This result also could be used to suggest that individuals will be more protective of existing savings, because they do not or cannot plan for consumption beyond this relatively short time frame and so need a greater savings buffer to protect future consumption beyond the implied planning period.

6 This does not preclude the owner-manager maintaining the firm for other reasons (although this implies that consumption preferences can be satisfied from other sources), nor does it require the

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circumstances, there is a base target consumption level which determines the level of return necessary for the owner-manager to invest the effort and invest or leave intact the capital needed for the firm to survive. Satisfaction of this base consumption target is a necessary but not sufficient condition for firm survival[7].

If currently available wealth or expected 'current' income is insufficient to meet the notional short run consumption target, an owner-manager's behaviour may *appear* consistent with that of a risk-seeker (without implying negative risk premiums) in terms of neoclassical theory. For example, if existing convertible wealth and expected income are insufficient to satisfy the 'survival' or base consumption target, it could be argued (in the extreme) that the individual is no worse off if all wealth is invested in an extremely risky project (in the absence of other, less risky, opportunities to satisfy target consumption), if it offers a possible timely payoff that will satisfy target consumption[8].

It is assumed that survival of the firm is necessary to derive future income. This ignores an owner-manager's opportunity to sell labour externally. This is reasonable if the decisions repeated in the short run and the relevant labour markets offer poor mobility. Survival of the firm provides a logical connection between the desire for income stability inferred from the permanent income - life cycle hypothesis (where the firm is the source of income) and the safety-first and survival models described in Chapter 5.

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target consumption to be 'rational'. An owner-manager could specify a consumption level that provides a very high (perceived) standard of living in the short term, with a high probability of financial failure in the future. This merely reflects the individual's time preferences and the particular hierarchy of aspirations that has been adopted.

7 Exogenous demands (such as taxes and debt servicing) and catastrophic events also affect firm survival.

8 Of course, there are a number of practical difficulties attached to such an argument. For instance, the individual will survive the failure of the firm, and so the owner-manager's behaviour is affected by expected post-failure conditions. Individuals are unlikely to pursue 'go-for-broke' options if they can sell labour in the absence of their firms and there are reasonable prospects of superior future states that require some existing wealth to be preserved. Arguments for 'go-for-broke' strategies are also inhibited by any ability to modify consumption targets.

THE MODELLING APPROACH

This section first identifies the adopted conventions for indexing for time and changes in relation to variables. It then outlines the underlying model without reference to any particular objectives or decisions. The underlying model is then applied to the owner-manager's objectives and decisions in the next section.

Time

The current point in time is designated *t*, such that *t-i* is *ex post* and *t+i* is *ex ante*. For convenience, time is assumed to evolve discretely, so that *t* and any interval $[t,t+i)$ is taken from a finite set of integers.

When indexing for time ${}_{t-i}z_t$ is the value or event *z* that transpired during the period $[t-i,t)$, z_t is the value or event *z* observed or determined at time *t* and ${}_{t-i}\Delta z_t$ indicates the change in *z* between *t-i* and *t*. Contextually this can be the difference between z_{t-i} and z_t or ${}_{t-i-1}z_{t-i}$ and ${}_{t-i}z_t$.

The underlying model

The underlying model describes the *general* relationships between an objective and decisions and proposes a simple linear process by which an individual can relate outcomes to decisions. While the objectives and decisions are described *generally* here, they are be interpreted later in keeping with the proposition of previous chapters.

Objective functions

The underlying decision problem for an individual is to select values of various decision variables instantaneously after time *t* to obtain some desired value ${}_ta_{t+i}$ for some objective function *f* to be satisfied in $[t,t+i)$. The decision variables can be represented by the N-vector x_t. The objective function for the period $[t,t+i)$ is written as a function of x_t in the form $f_{t+i}(x_t)$. The choice of x_t is constrained so that the owner-manager chooses x_t from a perceived set of feasible alternatives X_t.

Under bounded rationality, this is a satisficing problem in which the owner-manager determines x_t subject to $x_t \subset X_t$ such that

$$f_{t+i}(x_t) \geq_t a_{t+i} \tag{7.1}$$

The decision variables are continuously valued, so x_t takes values in $\Re^N$. The objective function f is a continuously differentiable mapping $\Re^N$ to $\Re^1$.

Decisions

Changes in the decision variables can be described relative to previous values:

$$x_t = x_{t-i} +_{t-i} \Delta x_t \tag{7.2}$$

where $_{t-i}\Delta x_t$ describes the change in the decision variables chosen on the basis of the information set $\Im_t$:

$$_{t-i}\Delta x_t = \phi(\Im_t) \tag{7.3}$$

The owner-manager's choice of $_{t-i}\Delta x_t$ is dependent on $_t a_{t+i}$, $f_{t+i}(x_t)$ and $\Im_t$. The function ϕ reflects the owner-manager's perception of how $f(x)$ behaves.

Because the owner-manager holds aspiration level $_t a_{t+i}$ at time t, then ideally the owner-manager continues searching for a new choice set for x_t if the current solution yields $f_{t+i}(x_t) <_t a_{t+i}$. If $f_{t+i}(x_t) \geq_t a_{t+i}$ then searching ceases.

It is assumed that $\Im_t$ is fully described by observations on current and past values of f and x for the firm's history of N time periods:

$$\Im_t = \left[x_{t-1}, f_t(x_{t-1}); \ldots; x_{t-N}, f_{t-N+1}(x_{t-N})\right]$$

$$\Im_t = \left[\Im_{t-1}, x_{t-1}, f_t(x_{t-1})\right] \tag{7.4}$$

That is, the information set $\Im_t$ is updated from $\Im_{t-i}$ simply by observing decision values at *t–i* and associated outcomes for the period $[t-i,t)$.

In keeping with the concepts of bounded rationality, the decision described in equation (7.3) based on (7.4) can be replaced, as set out below, with a simple linear function in which $\Im_t$ does not include the functional form of f, but only historical values[9] observed to time *t*. On this basis, the owner-manager estimates the function f for each time period, denoted $\hat{f}_{t+1}$, so that x_t can be chosen to satisfy (7.1), thus:

$$\hat{f}_{t+1}(x_t) = {}_t a_{t+1} \tag{7.5}$$

The linear adjustment of the owner-manager's estimate of f is described by:

$$\hat{f}_{t+1}(x_t) = f_t(x_t) + \mathrm{v}_t^{\mathrm{T}}({}_{t-1}\Delta x_t) \tag{7.6}$$

where $\mathrm{v}_t^{\mathrm{T}}$ is the transpose of the vector v_t which is the owner-manager's estimate of the sensitivity of f_t to changes in x_t. This is assumed to be comprised of simple finite first differences[10] derived from $\Im_t$.

Note that ${}_{t-1}\Delta x_t$ represents the desired increments to x_{t-1} which can be obtained by computing the norm (or length) of the constraint in equation (7.6). Substituting (7.5) into (7.6) and making ${}_{t-1}\Delta x_t$ the objective, the decision is obtained as:

$${}_{t-1}\Delta x_t = \frac{{}_t a_{t+1} - f_t(x_t)}{\mathrm{v}_t^{\mathrm{T}}} \tag{7.7}$$

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9 This contrasts dramatically with neoclassical optimising approaches where it assumed the agent has complete information regarding f.

10 This follows Cyert and March (1962) and Day (1967) who argued that individuals use finite first difference approximations when dealing with derivative and gradient concepts. Some aspects of the decision formulation presented here are similar to Wall (1993).

where the minimum norm solution is

$$ {}_{t-1}\Delta x_t = \frac{{}_t a_{t+1} - f_t(x_t)}{\|\mathrm{v}_t\|} \tag{7.8} $$

where $\|\mathrm{v}_t\| = \sqrt{|\mathrm{v}_t|^2}$.

OWNER-MANAGER OBJECTIVES AND DECISIONS

In this section, the general model is applied to the specific constructs described earlier in this chapter. The inputs or decision variables are interpreted as effort (e) and financial capital (I)[11]. Both the objective function and aspirations are stated in terms of income *before tax and debt servicing*, denoted by y_t.

Realised income can be applied only to consumption expenditure, savings or satisfaction of external claims so that income seeking activity reflects the extent to which consumption and savings targets are being satisfied and the enforceability of external claims. Income seeking activity for a time period is described by choices of the inputs of effort and financial capital at the start of the period. The information set for this decision, from (7.4), is described by $\Im_t = \left[\Im_{t-1}, (I_{t-1,t-1}e_t), y_t = f_t(I_{t-1,t-1}e_t)\right]$.

The inputs

From (7.2) the values for effort and capital inputs chosen at time t for $[t, t+i)$ are:

$$ {}_t e_{t+i} = {}_{t-i}e_t + {}_t\Delta e_{t+i} $$

$$ I_t = I_{t-i} + {}_{t-i}\Delta I_t $$

11 There may be a large number of inputs to be decided in many businesses. However, most of these can be captured in e and I. An increased number of variables would not change the structure of the model, but would increase the complexity of $f(x)$ and make it much more difficult to solve (7.8).

The different subscripting of effort and invested capital indicate that capital (I_t) is decided at t to remain constant through $[t,t+i)$ while effort $({}_te_{t+i})$, because it cannot be stored, is decided at t to be used during $[t,t+i)$. The choice of both inputs can be revised at any point $t+m$ during $[t,t+i)$, $(m \geq 1,\ i > 1)$ for any subsequent interval $[t+m,t+m+i)$.

Effort (e) is a quantifiable labour input that, for convenience, is assumed to be measured as time, implying constant intensity and ability. While e initially may be unknown, it has an upper limit e' which is specified by the owner-manager for any particular time period. There is a natural limit due say to the number of hours in a day, but e' typically is less than this natural limit. Because $e \leq 0$ is meaningless for an owner-managed firm then $0 < {}_{t-1}e_t \leq e'$. Unused effort $e' - {}_{t-1}e_t$ is leisure.

Depending on the extent to which aspirations are satisfied, an owner-manager may vary the input of personal time and capital, with implications for future debt servicing, savings and disposition of wealth. An owner-managed firm's income objectives thus reflect the interdependent consumption-savings and income-leisure choices of the owner-manager.

The remainder of this section is divided into three subsections. The first subsection considers the income from the firm. This is used in the second subsection in the context of individual consumption and survival aspirations. The third subsection proposes how an owner-manager may revise input values based on the process described in (7.4) through (7.8) to pursue income targets. The target setting process is then reconsidered to take savings and external claims into account.

Income

The process by which realised income before tax and debt servicing (y_t) was generated in the period $[t-1,t)$ is an uncertain output function (O_t) of the capital invested at the beginning of the period (I_{t-1}) and the owner-manager's effort for the period $({}_{t-1}e_t)$.

$$y_t = \mathrm{O}_t(I_{t-1}, e_t) \tag{7.9}$$

where y_t is the observed value for O which is uncertain in relation to I and e.

Income uncertainty

The uncertainty in the realised income function can be treated as a stochastic element ε, so that (7.9) thus can be restated as

$$y_{t+1} = (1+\varepsilon)\mathrm{O}_{t+1}(I_t, e_{t+1}) \tag{7.10}$$

where ε is some stochastic multiplier. The stochastic nature of observed output prompts the frequent re-estimation of the output function described by (7.6). Because projects extend over many periods with some continuity of capital and effort, periodic income also can be considered as a stochastic function of past performance:

$$y_{t+1} = y_t(1+g_t)(1+\varepsilon) \tag{7.11}$$

where g denotes the percentage change in income expected as a result of any trend and changes in invested capital and effort, thus:

$$g_t = \frac{\mathrm{O}_t(I_{t-1}, e_t) - \mathrm{O}_{t-1}(I_{t-2}, e_{t-1})}{\mathrm{O}_{t-1}(I_{t-2}, e_{t-1})} \tag{7.12}$$

This provides an *ex post* view of realised income and updates $\Im_t$ in accordance with (7.4). The owner-manager's estimate of O can be reviewed according to (7.6).

In the expectational or predictive form, g would then replace v_t in equation (7.8) and the owner-manager cannot explicitly incorporate the stochastic term ε, thus the linear revision in (7.6) would imply restatement of (7.11) thus:

$$\hat{y}_{t+1} = O_t(I_t, {}_te_{t+1})\left(1 + \frac{y_t - y_{t-1}}{y_{t-1}}\right) \qquad (7.13)$$

where I_t and ${}_te_{t+1}$ are selected in accordance with equation (7.8). This approach treats changes in the output function as a trend. To do otherwise requires a basis for estimating the 'sensitivity' of O to changes in I and e described by v_t in (7.6) through (7.8). A simple linear model for estimating this sensitivity is considered later in this section.

The preceding representation of inter-period relationships indicates how the owner-manager might pursue income stability in making investment decisions relevant to aspirations. Consumption targets are now considered in the context of these input-output relations.

In addition to consumption, income can be applied to savings and retirement of debt. Periodic consumption can also be funded from savings or debt as well as income. Savings and debt are considered at various stages below in the modelling of consumption and investment decisions.

Consumption

The general proposition is that an owner-manager has a preferred consumption hierarchy from which targets are set to be satisfied from the firm's realised earnings stream[12]. The hierarchy is not necessarily stable over time nor externally observable, but is known to (determined by) the owner-manager.

12 This assumes that the owner-manager has no other source of income. While convenient, the assumption is not necessary for the general relationships being described. An alternate approach is to view any other (more certain) income as reducing the consumption to be satisfied from the firm. Ideally, all sources of income should be consolidated into the owner-manager defined firm.

At any point in time, t, the individual owner-manager's *achieved* position in the hierarchy is described by immediate past consumption expenditure ${}_{t-1}c_t$ and leisure, which may be less than the aspiration levels. Given ${}_{t-1}c_t$, there is a consumption target ${}_tc_{t+1}^{\tau}$ that can be described as a function of past consumption and beliefs regarding future outcomes that are not independent of targets.

Beliefs

At any time t there is a desired minimum consumption expenditure level ${}_tc_{t+1}^{0}$ which is pursued 'at any cost'[13], including failure of the firm. Based on inferences drawn from the permanent income-life cycle hypothesis, if an owner-manager believes ${}_tc_{t+1}^{0}$ is acceptably assured, then the consumption target ${}_tc_{t+1}^{\tau}$ set by the owner-manager may be greater than ${}_tc_{t+1}^{0}$. 'Acceptably assured' indicates a *target level of belief or assurance* with respect to an event or outcome z, denoted $\mathrm{B}^{\tau}(z)$. This implies the existence of a belief function $\mathrm{B}(z)$ which is discussed below.

Survival aspirations

For ${}_tc_{t+1}^{\tau} > {}_tc_{t+1}^{0}$ the owner-manager's aspirations includes the survival of the firm, subject to $\mathrm{B}^{\tau}\left({}_tc_{t+1} = {}_tc_{t+1}^{0}\right)$. The ordered objectives of satisfying a base consumption target and firm survival can be formalised as follows in equations (7.14) through (7.16).

If $\mathrm{B}\left({}_tc_{t+1} \geq {}_tc_{t+1}^{0}\right) \leq \mathrm{B}^{\tau}\left({}_tc_{t+1} = {}_tc_{t+1}^{0}\right)$ then

$$\text{maximise } \mathrm{B} = \mathrm{B}\left({}_tc_{t+1} \geq {}_tc_{t+1}^{0}\right) \tag{7.14}$$

That is, maximise the perceived likelihood (belief) of achieving (at least) the base consumption target in $[t, t+1)$ while belief is less than the level of assurance required.

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13 There are prescribed limits to such costs, including available effort and the consequences for future states as noted in footnote 8.

If the target assurance level is achieved, the owner-manager's aspirations include survival of the firm, thus:

$$\max \mathrm{B}(\text{survival}) = \mathrm{B}\left[\left(\mathrm{O}_{t+1}\left(I_t, {}_te_{t+1}\right) \succeq {}_tc^0_{t+1} + \sum_{k=1}^{K} {}_td_{k,t+1}\right) \,\middle|\, \mathrm{B}\left({}_tc_{t+1} \succeq {}_tc^0_{t+1}\right) \geq \mathrm{B}^{\tau}\left({}_tc_{t+1} = {}_tc^0_{t+1}\right)\right] \quad (7.15)$$

where $\sum_{t}^{K} d_{k,t+1}$ denotes the sum of K external claims against the firm, including tax and debt servicing, required to be realised in $[t, t+1)$.

Equation (7.15) implies that all consumption expenditure is from realised income. As an *intention*, this is reasonable. However, for particular choices, it is incomplete. Consumption also may be financed from current wealth or debt. The assumption is relaxed later to give a superior view of B(survival) and choices when borrowing and investment decisions are considered[14].

The existence of ambiguity means that B(survival) cannot be assumed to be the complement of B(failure); in particular, B(survival)≤1-B(failure)[15]. While equation (7.15) describes B(survival), a survival aspiration may focus on B(failure), thus:

If B(failure)>B$^{\tau}$(failure), then

$$\min \mathrm{B}(\text{failure}) = \mathrm{B}\left[\left(\mathrm{O}_{t+1}\left(I_t, {}_te_{t+1}\right) \prec {}_tc^0_{t+1} + \sum_{k=1}^{K} {}_td_{k,t+1}\right) \,\middle|\, \mathrm{B}\left({}_tc_{t+1} \succeq {}_tc^0_{t+1}\right) \geq \mathrm{B}^{\tau}\left({}_tc_{t+1} = {}_tc^0_{t+1}\right)\right] \quad (7.16)$$

That is, the owner-manager's survival orientation may be described as failure aversion in keeping with the safety-first criterion discussed in Chapter 5.

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14 As described previously, aspirations are more complex and variable than these statements suggest. The intention here is to identify *threshold* effects.

15 An example of how the belief functions may be operationalised is introduced in the appendix to this chapter. A convenient approach is to think of the belief functions as subjective probabilities, although to incorporate the effects of ignorance and ambiguity, the more usual complementarity of such probabilities cannot be assumed.

The unbounded maximisation of B(survival) or minimisation of B(failure) implies a failure aversion too extreme to be the general case. There may be sufficiently high aspiration levels for which the owner-manager risks relatively small deviations below B^{τ}(survival)[16]. However, it is suggested that the *predominant* aim is to seek satisfactory assurance that income and wealth will exceed failure inducing levels. In this context, B^{τ}(survival) could be interpreted as a *saturation* level of belief in keeping with Telser (1955)[17]. This same notion of saturation could be applied to the target belief functions for consumption. It is argued that, for any owner-manager, there must exist a belief function and ${}_{t}c^{0}_{t+1}$ that satisfies equations (7.15) or (7.16).

Because ${}_{t}c^{0}_{t+1}$ is a minimum by definition, the owner-manager's strategy must consider the impact of external claims on the amount available for consumption, specifically $[O_{t+1}(I_t, e_{t+1}) - \sum_{t}^{K} d_{k,t+1}]$. Because the various ${}_{t}d_{k,t+1}$ are exogenously specified at time t (such as taxes and interest and principle repayments on debt which are the legacies of previous periods), choices are constrained. Key aspects of these external claims are considered below and in the subsequent subsection.

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16 The conditionality in equations (7.13 and 7.14) may not be sufficiently realistic, as an individual might not pursue an absolute 'survival of the firm' criteria regardless of potential gains. However, business failure often embodies much more than failure of the firm. As illustrated in Chapter 3, failure can result in the catastrophic loss of personal assets. This suggests that the level of failure aversion may be dependent on the potential threat to wealth or particular assets. It may also depend on the extent too which individuals will risk catastrophic loss for a sufficiently large potential gain.

17 Following Telser (1955), the owner-manager does not want the probability of $y_{t+1} <_{t} c^{\tau}_{t+1}$ to exceed α (substituting α for B^{τ}). Hence the owner-manager takes actions such that $P(y_{t+1} <_{t} c^{\tau}_{t+1}; \alpha) = p > \alpha$. Thus the only admissible choices of (I,e) are those where $P(y_{t+1} <_{t} c^{\tau}_{t+1}; I_t, e_{t+1}) \leq \alpha$. Telser's approach uses the Tchebbycheff inequality to set an upper bound to $P(y_{t+1} <_{t} c^{\tau}_{t+1}; I_t, e_{t+1})$, even when the probability distribution of y_t is not known, to be:

$$\frac{\sigma^2}{\bar{y} - c} \leq \alpha$$

where σ^2 is the variance and $\bar{y}$ is the mean of y. This, however, assumes $\bar{y}$ and σ^2 are known for each choice of (I,e). This is too unrealistic and so the mathematically unspecified (generalised) belief function has been adopted in preference to the Telser approach.

Revising the output function and inputs

From (7.13) the estimate $\hat{y}_{t+1}$ requires some basis for determining the sensitivity of O to changes in I and e rather than treating ${}_t\Delta y_{t+1}$ merely as trend. Where financial capital and the owner-manager's effort describe the vector of x_t, the solution to the input problem described in (7.6) is two dimensional[18].

If either labour or capital is held constant, such as when one reaches an upper limit for one variable but seeks to increase output, the decision regarding the other is greatly simplified. If x_t is scalar (the one-dimensional case), $\|\mathrm{v}_t\|$ in (7.8) is obtained thus:

$$\|\mathrm{v}_t\| = \frac{f_t(x_{t-1}) - f_{t-1}(x_{t-2})}{x_{t-1} - x_{t-2}} \tag{7.17}$$

If either input is at its limit or otherwise held constant, then an owner-manager seeking to increase income would merely substitute the decision input as the scalar in the denominator in (7.17) and y for the values of the function in the numerator. For example, if the owner-manager has exhausted all available capital such that it remains constant in updates to the owner-manager's information set in equation (7.4), that is $(I_t = I_{t-1} = I_{t-2})$, then the effect on income of varying effort is estimated by (7.17) thus:

$$\|v_t\| = \frac{O_t(I_{t-2,t-1}e_t) - O_{t-1}(I_{t-2,t-2}e_{t-1})}{{}_{t-1}e_t - {}_{t-2}e_{t-1}}$$

18 Day and Tinney (1968) presented a two-dimensional model in which a firm sort to maximise profits by manipulating its 'capital/labour' ratio and production level. At the end of each period the firm updated its information set by observing the periodic profit as a function (the form of which was unknown) of the two variables. A new value for the decision variables would then be chosen for the next period. While this earlier model does not translate precisely to the model developed here, the empathy is obvious.

For the owner-manager, labour and capital form two dimensions and are not combined in the manner of Day and Tinney. Production is subsumed in the profit or output function, realised values of which (y_t) can be described as a function of the two decision variables.

$$= \frac{y_t - y_{t-1}}{{}_{t-1}e_t - {}_{t-2}e_{t-1}}$$

$$= \frac{{}_{t-1}\Delta y_t}{{}_{t-1}\Delta e_t} \tag{7.18}$$

Substituting (7.18) into (7.8) yields the change in invested effort to be implemented for $[t,t+1)$ appropriate to the owner-manager's income aspirations for $[t,t+1)$ as

$${}_t\Delta e_{t+1} = \left[a_{t+1} - O_t\left({}_{t-1}e_t + {}_t\Delta e_{t+1}\right)\right]\left(\frac{{}_{t-1}\Delta y_t}{{}_{t-1}\Delta e_t}\right)$$

$$= \left[y^{\tau}_{t+1} - y_t - O_t\left({}_t\Delta e_{t+1}\right)\right]\left(\frac{{}_{t-1}\Delta y_t}{{}_{t-1}\Delta e_t}\right)$$

$$= \left[{}_t\Delta y^{\tau}_{t+1} - O_t\left({}_t\Delta e_{t+1}\right)\right]\left(\frac{{}_{t-1}\Delta y_t}{{}_{t-1}\Delta e_t}\right) \tag{7.19}$$

where ${}_t\Delta y^{\tau}_{t+1} = y^{\tau}_{t+1} - y_t$

The function $O_t\left({}_t\Delta e_{t+1}\right)$ in (7.19) indicates that the choice of ${}_t\Delta e_{t+1}$ requires an approximation of what income would have been earned previously for this proportion of effort. If we assume a simple linear profit function, then this can be determined as

$$O_t\left({}_t\Delta e_{t+1}\right) = \frac{{}_t\Delta e_{t+1}}{{}_{t-1}e_t}\left(y_t\right) \tag{7.20}$$

Substituting this approximation into (7.19) yields

$${}_t\Delta e_{t+1} = \left({}_t\Delta y^{\tau}_{t+1} - \frac{{}_t\Delta e_{t+1}}{{}_{t-1}e_t}\left(y_t\right)\right)\left(\frac{{}_{t-1}\Delta y_t}{{}_{t-1}\Delta e_t}\right) \tag{7.21}$$

which can be restated as

$$ {}_{t}\Delta e_{t+1} = \frac{{}_{t}\Delta y^{\tau}_{t+1}}{\left(\frac{y_t}{{}_{t-1}e_t}\right) + \left(\frac{{}_{t-1}\Delta y_t}{{}_{t-1}\Delta e_t}\right)} \tag{7.22} $$

In essence, this describes the amount of change in owner-manager effort as the desired change in income weighted by the previous aggregate return on effort and the previously experienced change in income attributed to the previous change in effort.

Similarly, if the input of effort is held constant, the change in invested capital at time t appropriate to the owner-manager's income aspirations for $[t, t+1)$ is be described by

$$ {}_{t-1}\Delta I_t = \frac{{}_{t}\Delta y^{\tau}_{t+1}}{\left(\frac{y_t}{I_{t-1}}\right) + \left(\frac{{}_{t-1}\Delta y_t}{{}_{t-2}\Delta I_{t-1}}\right)} \tag{7.23} $$

Without interaction between capital and effort, then the scalar results in (7.22) and (7.23) are simultaneously true without necessarily holding the other input constant. With interaction, solutions would be determined interatively and generally are not unique.

Stability in consumption

The level of ${}_{t}c^{\tau}_{t+1}$ is not independent of targets for periods after t+1. It was proposed earlier that, in keeping with the permanent income hypothesis, the owner-manager will resist advancement in the consumption hierarchy unless the current level is sustainable in future periods using future income. That is, the owner-manager does not increase aspirations unless

$$ \mathrm{B}\left\{ y_{t+n} \geq \left[y_t, \left({}_{t+n-1}c^{\tau}_{t+n} + \sum_{k=1}^{K} {}_{t+n-1}d_{k,t+n} \right) \right] \right\} \geq \mathrm{B}^{\tau}(\text{survival}) \Big|_{n=1 \text{ to } N} \tag{7.24} $$

where N is the number of time periods in the owner-manager's planning horizon[19]. From equation (7.15) say, this implies that the owner-manager's decision set yields

$$\mathrm{B}\left[\mathrm{O}_{t+n}\left(I_{t+n-1}, {}_{t+n-1}e_{t+n}\right) \cong y^{\tau}_{t+n}\right] \geq \mathrm{B}^{\tau}(\text{survival}) \Big|_{n=1 \text{ to } N} \tag{7.25}$$

If an owner-manager's expectation described by $\mathrm{O}_{t+1}\left(I_t, {}_te_{t+1}\right)$ satisfies $\mathrm{B}^{\tau}(\text{survival})$, then the owner-manager's consumption aspirations may be revised to reflect an upward shift in the individual's consumption hierarchy[20]:

$${}_tc^{\tau}_{t+1} > \left({}_tc^{0}_{t+1}, {}_{t-1}c_t\right) \;\Big|\; \mathrm{B}(\text{survival}) \geq \mathrm{B}^{\tau}(\text{survival}) \tag{7.26}$$

External claims

The term $\sum^{K}_{t} d_{k,t+1}$ is comprised potentially of many various claimants. For convenience, they are classified as follows. Assuming that there is only one interest-charging lender who is labelled the Kth claimant, then ${}_td_{K,t+1}$ is the required servicing of interest bearing debt L_t with an interest rate for the period $[t, t+1)$ of ${}_tr^{L}_{t+1}$.

Given that debt-servicing payments are contractually prescribed and the current interest rate is known at t, the expected required servicing of interest bearing debt for $[t,t+1)$ can be described as

$${}_td_{K,t+1} = \left(1+{}_tr^{L}_{t+1}\right)L_t - L^{\tau}_{t+1} \tag{7.27}$$

where L^{τ}_{t+1} indicates that the outstanding principal for $t+1$ is specified as a target at t.

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19 Evidence cited earlier indicates a planning horizon of about 3 years for some individuals, although neither the value of N nor the duration of n are considered here.

20 Note that $\mathcal{E}$ in equation (7.10) has not been eliminated, but rather it is inherent in the solution to the belief function. An adopted belief formalism (see Appendix 7.1 for an example) should also incorporate the owner-manager's aversion to ambiguity in $\Im_t$.

Consequently

$$\sum_{k=1}^{K} {}_{t}d_{k,t+1} = L_t\left(1+{}_{t}r_{t+1}^{L}\right) - L^{\tau}{}_{t+1} + \sum_{k=1}^{K-1} {}_{t}d_{k,t+1} \tag{7.28}$$

$\sum^{K-1} {}_{t}d_{k,t+1}$ therefore describes total interest-free claims in $[t,t+1)$ at time t. It is assumed, for convenience, that interest free claims known at t will not extend beyond t+1, although this is not a necessary condition. Claims that both arise and are satisfied in $[t,t+1)$ are captured in y_{t+1} or ${}_{t}c_{t+1}$. Interest-free claims arising in $[t,t+1)$ that are to be satisfied after t+1 are assumed to arise in $[t,t+1)$ and comprise the claims at t+1 of $\left(\sum^{K-1} {}_{t+1}d_{k,t+2} + L_{t+1}\right)$.

Because all claimants can threaten liquidation, satisfaction of $\sum^{K} {}_{t}d_{k,t+1}$ is a necessary but not sufficient condition for survival beyond t+1. It is plausible that the only effectively influenced ${}_{t}d_{k,t+1}$ are obtained by changing the structure of debt. Borrowing decisions are not discretionary; the owner-manager seeks debt, but faces an institutional market that rations debt and writes the contracts. Therefore, an owner-manager's attention is directed to both $O_{t+1}(I_t, {}_{t}e_{t+1})$ and lender behaviour. The nature of debt and lender behaviour is developed further in Part IV.

Savings

Under the proposed model, an individual's savings behaviour reflects the degree of satisfaction of the current consumption target and expectations of future income in relation to future consumption targets. Savings at time t $(s_t = {}_{t-1}\Delta w_t > 0)$ cannot eventuate unless ${}_{t-1}c_t^{\tau}$ was satisfied from y_t. Particularly, $s_t > 0$ implies $\left(y_t - {}_{t-1}c_t\right) > \sum^{K} {}_{t-1}d_{k,1}$. In terms of aspirations,

$$s_{t+1}^{\tau} = 0 \quad \text{if } \mathrm{B}\left({}_{t}c_{t+1} \geq_t c_{t+1}^{0}\right) < \mathrm{B}^{\tau}\left({}_{t}c_{t+1}^{0}\right) \tag{7.29}$$

Savings or wealth aspirations that essentially pertain to future consumption are higher order aspirations than current consumption targets of the same type. Savings targets may relate also to demand for cash or other liquid assets for defensive purposes in response to uncertainty. This is addressed later in this thesis. Target income now can be described as

$$y^{\tau}_{t+1} = {}_{t}c^{\tau}_{t+1} + \sum_{k=1}^{K} {}_{t}d_{k,t+1} + s^{\tau}_{t+1} \tag{7.30}$$

The permanent income hypothesis predicts that owner-managers are less likely to increase ${}_{t}c^{\tau}_{t+1}$ (increasing the likelihood of $s^{\tau}_{t+1} > 0$) as future income $(y_{t+n} - \sum^{K}_{t+n-1} d_{k,t+n}) \big|_{n=1 \text{ to } N}$ is perceived as more unstable or uncertain.

SUMMARY OF THE MODEL

The model developed here identifies the owner-manager's decision problem as selecting inputs (effort and capital) to an uncertain income function to achieve an income target to satisfy consumption aspirations.

Uncertain income in its simplest version is described in (7.13) in which the output function O is considered only in terms of trend. The more sophisticated treatment proffered in the general model of (7.6) through (7.8) considers the sensitivity of the income function to changes in inputs, although this also is treated as a simple linear extrapolation of previous changes. When this approach is incorporated into the owner-manager's decision model for inputs, a generally unique set of solutions can be obtained only if there is no interaction effect between the inputs, or if only one of the inputs is variable. The solutions for inputs then can be described by (7.22) and (7.23).

The intendly rational owner-manager sets a periodic income target that satisfies a consumption target, savings target and external claims, as in (7.30). The owner-manager has a consumption target with a base objective per (7.14) which can be revised in

accordance with (7.26). Savings may in effect appear to be residual as implied by (7.29), although it is hypothesised that targets are set to meet future consumption needs, and so are intended to be included in aspirations, as in (7.30).

Current external claims are contractually specified and so in effect are not currently determined by the owner-manager, although they may reflect previous decisions as in (7.28). This is an incomplete view of debt. The decisions of lenders are specifically considered in the context of owner-manager choices and preferences in Section IV. Section III generally considers evidence in support of the consumption focus of owner-manager decisions and tests hypotheses generated from the model presented thus far.

PART II - CONCLUSION

Chapter 3 considers some fundamental aspects of neoclassical theories of individual and firm behaviour, to develop the notion that with the inseparability of owner-managers and their firms, the consumption objectives of owner-managers will provide the objectives for the firm. Chapter 4 reviews the treatment of uncertainty in neoclassical theory and proposes that owner-manager responses to uncertainty will depend in part on their perceived likelihood of achieving their aspirations, with risk perceived as the likelihood of attaining some target return. The propensity for owner-managers to be risk and ambiguity averse may be a function of their information search and processing ability. Chapter 5 reviews investment decision models that have been proposed within the bounded rationality framework to take account of satisficing behaviour in the context of lower bounds or targets for consumption financed from the firm.

This exploration of the existing theoretical principles identifies several key elements for the development of a theoretical framework within which to consider the objectives and outcomes for owner-managed firms.

While the majority of empirical concerns are deferred until Part III, Chapter 6 reviews the literature to identify existing empirical support for the theoretical propositions raised from the earlier chapters.

The framework is formalised in Chapter 7. Elements of the formal model draw attention to several assumptions and propositions that can be tested empirically. Along with some propositions outstanding from Part I, these are developed and tested in Part III.

PART III
EMPIRICAL TESTS OF THE PROPOSED FRAMEWORK

This part empirically tests assertions arising from the preceding discussion. From Part I, there are outstanding questions concerning the relevance of organisational boundaries for owner-managed firms. From Part II there are various assumptions and propositions concerning the formalised theoretical framework that should be tested before the framework is used to develop performance models.

The various testable hypotheses from both Parts I and II are developed in Chapter 8. The data obtained for the tests are described in Chapter 9. The Part I (Chapter 2) proposition that an owner-manager's choice of organisational form is largely irrelevant to investment and consumption decisions is tested in Chapter 10. Hypotheses pertaining to the framework developed in Part II are tested in Chapters 11 and 12.

It is not feasible to test all aspects of the model at this time. Many of the behavioural propositions require substantial series of precise data to capture owner-managers' responses and information processing under varying conditions. This cannot be undertaken in an experimental setting and no appropriate data is currently available.

CHAPTER 8
HYPOTHESES TO TEST THE MODEL

INTRODUCTION

This chapter draws on discussion and propositions in Parts I and II to develop testable hypotheses regarding the appropriateness of the model of the objectives and choices of owner-managed firms developed here. The first area pertains to the functions and effects of organisational form. The next section develops hypotheses to specifically test both assumptions and consequences of the model. Tests of the hypotheses are presented in later chapters.

ORGANISATIONAL FORM

Discussion in Chapters 1 and 2 questioned the functions and effects of organisational boundaries. These are of concern in operationalising the definition of owner-managed firms as an economic entity[1]. Of the many questions regarding organisational form, at least two are important in the context of this thesis:

- What prompts an owner-manager's selection of organisational form?
- What is the relevance of organisational form to behaviour and performance?

These questions are important in evaluating the economic substance of the various forms that may affect any subsequent attempt at modelling behaviour and performance.

Various hypotheses could consider the economic substance of organisational form. From earlier discussion, current interest lies in whether form reflects different risk or

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1 Organisational form refers to the nature of the adopted legal structure used to identify the firm. These concerns do not pertain to the research concerning organisation form or structure which is concerned with the separation of ownership and control (see Fama and Jensen, 1983), which, as previously discussed, is largely irrelevant to owner-managed firms.

performance levels; whether it reflects the extent to which owner-managers may wish to separate themselves from the firm; or whether it reflects the needs of multiple owner-managers to contract with each other to preserve their interests in and effect efficient management of the firm.

These concerns lend themselves to particular testable hypotheses. The first and second concerns describe whether owner-managers adopt incorporated forms to protect their personal positions from the risks of the firm or simply perceive the firm as a separate entity from themselves. This gives rise to a 'separation hypothesis':

> *Adopted organisational form indicates the degree of separation of the owner–manager and the firm.* (H1)

Such separation also should be signalled by other actions, such as distinctions between firm and personal interests. These are considered when the hypothesis is operationalised and tested in Chapter 10. The relevance of this hypothesis to the proposed model lies in the earlier argument that firms exist to satisfy the aspirations of the owner-manager and thus are not distinguished from other aspirations serving actions, such as the holding of assets or leisure.

The second concern also attaches to the third to generate a general 'managerial sophistication' hypothesis and a size or 'management complexity' hypothesis:

> *The adopted organisational form of an owner-managed firm is determined by the level of management sophistication.* (H2)

> *Incorporation is a function of the number of owner-managers.* (H3)

The sophistication hypothesis (H2) is relevant to firm performance in that more sophisticated firms may better manage the complex decisions required to satisfying owner-manager aspirations. The complexity hypothesis (H3) is relevant to performance

in that more complex firms (in the context of multiple owner-managers with competing objectives) may be less able to satisfy owner-manager aspirations.

CONSUMPTION OBJECTIVES

The formalised model presented in Chapter 7 explains changes in consumption, in part, by reference to the achieved level of consumption, survival expectations and the perceived stability of income. Various hypotheses are developed in this context. These are considered initially in two parts: those pertaining to changes in consumption, and other events or actions that are associated with consumption outcomes. The possible hypotheses emanating from the proposed framework are numerous and diverse. The following formulations are mindful of what may be testable with the available data.

Changes in consumption

In this subsection, hypotheses are generated concerning the circumstances in which consumption increases, remains stable or decreases.

Increasing consumption

If consumption is below the hypothesised base level, then it is predicted that the owner-manager will consume from debt, wealth or realised assets, while pursuing income generating actions to allow future consumption to increase. If an assumption of behavioural consistency holds for consumption levels and targets, then this behaviour is most likely for owner-managers in the (relatively) lower range of estimated consumption.

Increasing consumption should occur if there are unsatisfied base targets (equation 7.14). Debt or wealth is used if consumption cannot be satisfied from income. Increasing consumption also may occur where income has increased with an expectation of sustainability or continued growth that allows movement through the hierarchy (equation 7.26). As income increases, there is an increasing likelihood of savings and a reduced propensity to consume from income.

Thus, current consumption has a naive association with immediately past consumption levels while the effect of income levels may modify this in two ways:

> *Consumption increases are more likely where previously achieved consumption is in the lower range.* *(H4)*
>
> *Consumption increases are more likely where previously achieved consumption is in the lower range and either:*
> - *current income (net of debt servicing obligations) is higher than previously achieved consumption; or* (H4A)
> - *income has an increasing trend.* (H4B)

Stable consumption

If lower order consumption targets are achieved and income is perceived as unlikely to continue to exceed current consumption, relatively high stability is expected. This expectation increases if an owner-manager's base consumption level is satisfied but survival of the firm is not sufficiently assured (see equations 7.24 through 7.26). Stable consumption levels are most likely when consumption targets are met but survival or other aspirations are not sufficiently assured for advancement to higher consumption aspirations (see equations 7.14 through 7.16).

Consumption may be stable at high achievement levels, but be more susceptible to differences in time preferences and consequential savings behaviour. Relative stability is expected where aspirations which depend on expenditure are satisfied so that other aspirations (such as increased leisure) are reached in the hierarchy. At high levels an owner-manager may decrease consumption to allow increased leisure or savings. Therefore, stable consumption is expected in two (not necessarily related) circumstances:

> *Stability in consumption levels is observed where:*
> - *the excess of income (net of debt servicing obligations) over consumption expenditure is non-negative but relatively small; or* (H5A)
> - *achieved consumption is relatively very large.* (H5B)

Decreasing consumption

The model indicates that an owner-manager usually will finance consumption targets so that consumption is stable or increasing. The consumption target is predicted to decrease if it exceeds the base target and continuing the level of current expenditure poses an unacceptable threat to the survival of the firm or future base levels. Therefore, decreasing consumption is expected where previously achieved consumption is above the base target but income is insufficient to maintain the achieved income. As with (H4) this is first considered at the naive level, then in conjunction with the modifying effects income. This argument also suggests that firms with higher achieved consumption are more likely to decrease consumption as their financial circumstances deteriorate because of the threat of liquidation should they default on debt.

> *Consumption decreases are more likely where previously achieved consumption is in the middle or upper ranges.* (H6)
>
> *Consumption decreases are more likely where previously achieved consumption is in the middle or upper ranges and:*
> - *current income (net of debt servicing obligations) is less than previously achieved consumption;* (H6A)
> - *income has a decreasing trend; or* (H6B)
> - *a firm has a higher risk of defaulting on debt.* (H6C)

The preceding hypotheses consider consumption and income changes between periods. Of potentially greater interest is the owner-manager's choice of the inputs that should influence these outcomes. This may allow some inference of *purpose* in the context of the consumption model. It is desirable to know if increases in income (consumption) are produced (made possible) by increases in investment or effort.

Consumption correlates

Trends in consumption should be correlated with trends in the postulated consumption-serving variables, such as income and wealth, and savings as a residual of consumption

activity[2]. The model indicates that income seeking activity is motivated by current consumption aspirations, survival expectations and savings aspirations. However, the success of income seeking activity is uncertain and achieved consumption need not reflect current aspirations[3]. The main focus is on the extent to which income seeking activities follow decisions to change consumption. For testing, the hypothesis is stated as:

Consumption expenditure has a lagged correlation with income. (H7)

From the method of revising inputs proposed in Chapter 7, a lagged relationship is expected for investments and consumption:

Increased income producing expenditure precedes consumption increases. (H8)

Income producing expenditures can include production inputs, labour and investment in assets. Note that (H8) does not assume such increases in income producing expenditures will necessarily be fruitful. In years where income does not increase, the model predicts that the owner-manager will finance the consumption shortfall with debt or savings, or will reduce consumption exceeding the base level. This leads to several increasingly sophisticated variations on (H8). The first indicates the use of savings to finance consumption shortfalls[4], while the latter two assume that the sacrifice of future consumption implied by the use of debt is sufficient to discourage the use of debt for current consumption at the higher aspiration levels.

---

2 Savings is difficult to interpret, due to it multiplicitous role. As well as being a consumption residual, savings may be planned to stabilise consumption over time, to finance future consumption after cessation of business, to provide a safety margin for debt servicing requirements, or in anticipation of planned or ad hoc investment opportunities.

3 Therefore, any relationship between income seeking activities, realised income and consumption is difficult to observe. The problems are increased by the time periods involved. The time required by the owner-manager to adjust or observe various aspects of the model are relatively short (possibly daily or weekly in some cases). The available data is yearly. Therefore, any detectable association between changes in the relevant variables is likely to be weak, having been 'averaged out' across the shorter planning intervals.

4 The potential roles for savings renders it ambiguous. Savings may fund the consumption-income gap, or income may be sought to fund a savings target.

Increases in consumption are funded from savings in periods where income producing expenditures increase without increases in realised income. (H8A)

Consumption does not increase in years where income producing expenditures increase without increases in realised income where prior consumption levels are in the higher ranges. (H8B)

Increases in consumption are funded from debt in years where income producing expenditures increase without increases in realised income where prior consumption levels are in the lower ranges. *(H8C)*

SAVINGS AND DEBT

While H8A considers the use of prior savings to fund current consumption shortfalls, there are several important aspects of savings behaviour arising from both the earlier discussion and formal aspects of the model in Chapter 7 that should be tested.

Savings levels will depend on both planned and achieved consumption. While savings targets are set (equations 7.29, 7.30) taking account of the estimated income generating function (see equations 7.6 and 7.13), target consumption and debt obligation, achieved savings may be largely residual in nature. Where consumption targets are above the base level then tradeoffs between achieved consumption and savings are possible, noting that savings may proxy consumption targets for future periods. This is moderated by income uncertainty. The likelihood of failure to achieve future (lower) consumption levels may be sufficient incentive to revise the current period's consumption downwards to generate larger current savings to act as a buffer for future income shortfalls relative to future consumption. Similarly, an owner-manager is expected to preserve existing savings rather then accelerate debt retirement in order to increase the expectation of satisfying future (low) consumption targets, even though doing so indicates the sacrifice of possible future higher consumption to increase the expectation of achieving the lower target. This is consistent with 7.14, 7.26 and 7.24 through 7.30. If current targets are relatively low,

savings targets will be sacrificed in order to achieve current consumption targets if current income is inadequate[5].

> *The more uncertain or volatile income, the more likely the maintenance of savings regardless of debt commitments.* (H9)

> *The incidence of savings erosion is greatest where achieved consumption is in the lower range.* (H10)

While preceding hypotheses consider income net of debt servicing obligations, other than H8C they do not consider the implied role of debt relative to consumption targets. The primacy attached to base consumption targets suggests that owner-managers will use debt to achieve the base consumption if necessary even though this means sacrificing future consumption equal to the final cost of debt. This can be taken further in that H8C implies that some increases above the base may be funded from debt. This is in keeping with earlier propositions if there is an expectation of increased future income. Where debt already exists, the owner-manager is similarly motivated to use new debt to service existing debt under similar conditions.

> *The incidence of debt substitution is greatest where achieved consumption is in the lower range.* (H11)

> *The occurrence of new debt will be less where achieved consumption is in the higher range.* (H12)

CONCLUSION

While numerous hypotheses pertaining to the model can be constructed, those developed here are the more pertinent to providing broad based validation tests of the model. The model will also be tested indirectly in Part IV when tests of firm performance are

5 These propositions ignore any perceived opportunity to increase future income or to increase the certainty of future income by increasing inputs.

developed within the constructs of the theoretical framework embodied in this model. The preceding hypotheses are tested in the next three chapters. In some cases it is necessary to devise more than one test of a particular hypothesis, and some tests provide results that pertain to more than one of the hypotheses. The next chapter describes the data collected to test these hypotheses.

The hypotheses pertaining to organisational form, H1 through H3, are tested in Chapter 10. Those concerned directly with consumption levels and changes, H4 through H8C, are tested in Chapter 11. Hypotheses H9 through H12 focus on savings and debt and are tested in Chapter 12.

CHAPTER 9
DATA FOR OWNER-MANAGED FIRMS

INTRODUCTION

The general objectives of this chapter are to:

- consider the impact of owner-managed firm characteristics on data availability; and
- describe the nature and representativeness of the data base obtained for the empirical analyses in this thesis.

Owner-managed firms and seemingly similar organisations considered in the literature (small business and entrepreneurs) were compared in Chapter 2. Discussion of the relationship between owner-managers and their firms highlighted some differences between owner-managed and agent-managed firms, some of which have implications for data availability.

Data availability problems *per se* are canvassed, before outlining the data source and collection methods used to establish a data base for this thesis. A brief analysis and summary statistics to indicate the nature and representativeness of the captured samples is then presented. The chapter concludes with a brief discussion of the important limitations of the data.

THE OWNER-MANAGER AND THE OWNER-MANAGED FIRM

As suggested in Chapter 1, a complicating factor in studying owner-managed firms is identifying the economic unit. While this also may apply to agent-managed companies, it is especially so when there is a general lack of separation between the resources and behaviour of owners as individuals and as business operators.

Complications caused by the blurring of economic boundaries can be extensive. This is equally true for incorporated and more informally structured firms. It can, in turn, cause breakdowns in the traditional distinction between debt and equity. For example, it is possible that uncertainty or risk aversion of owners may typically encourage the contribution of funds for incorporated owner-managed businesses through shareholders' loans, rather than equity issues. This may reduce the owner-manager's risk and certainly retains flexibility in funding not available through typical non-redeemable share structures. This effect could be greater with perceived riskier ventures. When an incorporated business fails, the owner-managers may have a greater expectation of recovering loans than share capital. This is confused by owner-managers issuing personal guarantees for a company's debt and their demand for secured collateral.

Investment decisions under such arrangements are also functions of the individual's risk response. Some owner-managers may prefer to forgo otherwise desirable investment opportunities to reduce or limit the risk attached to their aggregate (but especially personally held) wealth. Thus, risk attitudes directly affect notions of performance.

Risk control and taxation planning may corrupt many aspects of reported structures in owner-managed firms. For example, family trusts, partnerships or companies may lease assets to an incorporated business entity. Contrarily, assets that are essentially for personal use might be included in balance sheets. Complications also may arise from the distortion of aggregate owners' equity. Additional to debt-equity distinction problems, retained profits are even less likely to reflect internal financing decisions. They may be mere residuals of taxation planning and personal consumption decisions.

This added confusion further detracts from traditional performance measures that employ accounting data pertaining to various organisational forms, if they are applied in the same manner as for public companies.

ACCOUNTABILITY

Many factors influence the accountability of a commercial enterprise. A leading question here is 'accountability to whom?'. For owner-managed firms, there are two key differences to other firms: accountability to equity holders and accountability to the broader community. As with agent-managed firms, debt holders are likely to be the most demanding and uniform beneficiaries of owner-manager accountability. Concern here is with how established accountability patterns or behaviours affect data availability.

Owners

Equity holders of owner-managed firms typically have ready access to internal records, in contrast to the external equity providers of other firms. They also should have substantial first hand knowledge of the firm's undertakings and financial structures, reducing demand for formal accountability mechanisms. Anecdotally, owner-managers have demonstrated considerable reluctance to provide data pertaining to their operations, circumstances or decision making.

These factors effectively preclude owner-managers or their firms as direct sources of data on owner-managed firms.

The public

The public or market participants do not have ready access to reports or records concerning the activities and performance of individual owner-managed firms. Australia has no public accounting disclosure requirements for typical unincorporated firms and incorporated owner-managed firms are generally able to avoid most corporate financial disclosure requirements. This may be because the market and general community perceive little reason to demand such disclosures while societal relations and markets do not provide sufficient incentives for voluntary disclosure.

Generally, statutory public accounting disclosures for owner-managed companies apply only to non-exempt proprietary companies[1] and unaudited exempt proprietary companies. These are required to include financial statements containing specified disclosures in their statutory annual returns to the Australian Securities Commission. Non-exempt proprietary companies are a very small proportion of owner-managed companies and cannot be assumed typical. Most exempt proprietary companies are audited. As unaudited exempt proprietary companies cannot be identified without reference to their annual returns, they are uneconomic targets for owner-managed firm data.

Various statistical bases of owner-managed firms do exist in Australia. The two major ones are the Australian Bureau of Statistics (ABS) enterprise statistics and the Australian Taxation Office (ATO) statistics. While the ATO publishes annual aggregate statistics, these are not suitable for sources of financial data for firms other than at the crudest level. Data on individual entities are not available from the ATO. The ABS enterprise statistics, while more useful than the ATO statistics for many purposes, still offer only aggregated data. The ABS will provide many items of specified data on request, but the costs are prohibitive. Both ATO and ABS publications are used to derive comparative aggregate statistics in this thesis.

Lenders

Non institutional lenders, particularly unsecured short term trade creditors, face disproportionate enforcement and monitoring costs relative to the scale of debt in obtaining financial data on individual firms. Institutional lenders, when contracting to provide finance, have much greater opportunity to demand substantial financial data disclosures from owner-managed firms. It is typical bank policy, for example, to require various budgetary devices and financial histories when finance is sought, as well as annual financial statements. The success of an institution in obtaining such reports *after*

1 See Appendix 1 for explanations of these corporate forms.

financing arrangements are agreed is a function of individual loan officers' perseverance and the institution's internal control procedures. While it is reasonable to anticipate many problems regarding reliability, completeness and timeliness of such disclosures to financial institutions, they are likely to comprise a useful data source.

DATA AVAILABILITY

The data implications of the preceding discussion are twofold:

- The only publicly available financial data for individual owner-managed firms is for a limited class of proprietary companies that are unlikely to typify owner-managed firms.
- Obtainable financial data for the various organisational forms of owner-managed firms is likely to be held, in any reasonable quantity, only by institutional lenders and the Australian Bureau of Statistics, with the latter being prohibitively costly.

Consequently, several financial institutions were approached for access to their customer files. Eventually, the co-operation of a medium sized Australian bank was obtained, conditional on strict confidentiality of all client interests and not identifying the bank. This was a unique opportunity to obtain data on Australian owner-managed firms.

The remainder of this chapter presents a general description of the data thus obtained, with summary statistics to gauge the representativeness of the sample firms.

DATA COLLECTION

Sources accessed

The targeted bank business clients were those who had borrowed funds from the bank through formal loan or overdraft facilities. Limited access to loan recovery files and the

files of ongoing clients[2] of two substantial Adelaide branches was given for a short time. As will be explained later, the nature of the limited access affected the volume and type of data that could be obtained. Active and recent loan recovery files for all of South Australia were held centrally. The branches holding the ongoing files were inner city based, with clients being drawn primarily from the metropolitan area. The source and subjects of the data signal some potential biases that are addressed later in this chapter.

Data collection

The unstructured nature of the bank files and the lack of systematic accumulation of information for each client meant few structured devices could be employed in the data collection. Where available, the data collected included financial statement items, account performance, ownership, management, industry identification and limited data on the individual owner-managers. Also, items were noted from bank diary notes and loan officer's or managers' reports on matters that may aid in understanding the nature of an individual firm, its business and its owner-managers.

While it is believed that the bank routinely obtained data from loan applicants regarding their domestic expenditure (consumption) patterns, such data was not available through the files provided. This is a potentially important limiting condition in that it will require estimates of domestic consumption rather than use of known consumption expenditures in subsequent tests of the framework.

Recovery action firms

The period of data collection was March to June (inclusive) 1990. This narrow window for collection meant only recovery files then held in the central office could be accessed. These mainly consisted of those recently closed or not in use at the time. Access was gained to files for 187 businesses with recovery actions for loans and overdrafts during

2 The clients were in the 'retail' area of the bank's operations. The other primary lending division is 'corporate services' which lends primarily to large and medium companies.

1986-89[3]. Some owner-managers used multiple legal entities and so had multiple files. Consolidation of multiple files and deletion of non-trading borrowers reduced the number of recovery action firms to 177.

Surviving firms

Selection of surviving firm files at the city branches was determined by their availability at the time of data collection. With this qualification, 198 surviving firms were accessed, representing the all available small business loan clients of the two branches of the bank. The total number of such clients could not be identified, so the proportion of bank clients sampled is not known. After consolidation and deletion of non-trading borrowers, 189 cases were obtained.

Organisational forms

The 'surviving' and 'recovery action' samples consist of various organisational forms, as listed in Table 9.1. The legal nature of the organisational forms for structuring businesses available in Australia in the 1980s are described in Appendix 1.

Table 9.1
Survivor and recovery action firms by organisational forms

	Soletraders		Partnerships		Companies		Trusts		All	
Survivor firms	30	(16%)	31	(15%)	90	(48%)	38	(20%)	189	(100%)
Recovery action firms	24	(14%)	57	(32%)	75	(42%)	21	(12%)	177	(100%)
	54	(15%)	88	(24%)	165	(45%)	59	(16%)	366	(100%)

The sample profiles described in Table 9.1 suggest a difference between the samples regarding the proportions of partnerships and trusts. This is considered in Chapter 10 in a broader analysis of the relevance of organisational forms.

3 This did not include all possible cases but the nature of any induced bias caused is unknown. The sample appears to represent all closed recovery action files held for the period, with the inclusion of open files determined by their availability. Some bank files were in use by bank officers and so unavailable for data collection.

Extent and reliability of data

The extent and quality of available data varied considerably across firms. The extent seemed to vary with the scale of bank debt, age of the firms, duration of the bank-client arrangements and quality of branch management (including follow-up procedures regarding requests). There was also varying degrees of client co-operation with the bank's requests. Sets of financial statement data were obtained for 171 surviving and 98 recovery action firms.

The reliability of the firm specific data collected from bank files cannot be tested. Most financial data obtained are the unattested representations of bank clients who may have many incentives to misrepresent their circumstances and intentions. This situation is an unavoidable limitation of the data base. Similar problems are likely to arise with data collected by the ABS or through direct survey instruments.

Financial data was generally more plentiful for incorporated firms. For many firms, the data was incomplete and often unstructured. Despite bank policy, the collection of client financial data by the bank was inconsistent across firms and over time.

REPRESENTATIVENESS OF SAMPLES

The usefulness of the sample data depends on the samples' representativeness of the general population of firms. This can be inferred to some extent from organisational and demographic factors, some of which are considered below.

The relative use of the alternate forms.

The extant relative use of the various organisational forms in Australia is described in Table 9.2. This indicates a different breakdown (reversing the proportions of companies and soletraders) compared to the sample firms in Table 9.1. However, the deficiencies in the taxation statistics from which the numbers in Table 9.2 are derived mean they give only a very general indication. Note that this elementary comparison is based on the

numbers of entities lodging tax returns. It may not give an appropriate indication of the number of owner-managed firms or their overall use of organisational forms. Figures 9.1 and 9.2 illustrate some possible relationships between entities lodging tax returns and an owner-managed firm.

Table 9.2

Imputed number of Australian tax entities for each organisational form in 1987[a]

	Individuals	Partnerships[b]	Private Companies[c]	Trusts
Number of returns with business income[d]	2,995,459	484,710	265,347	295,516
Less:				
Indirect business income[e]	1,212,035	4,226	5,099	50,915
Holding companies	-	-	1,135	-
Imputed no. of firms (1)	1,783,424	480,484	259,113	244,601
% of total firms (1)	*65%*	*17%*	*9%*	*9%*
Possible overstatements	1,135,226[f]	56,014[g]	-	-
Imputed no. of firms (2)	648,198	424,470	259,113	244,601
% of total firms (2)	*41%*	*27%*	*16%*	*16%*

a Imputed from data in *Australian Taxation Statistics 1986-87.*
b Partnerships include cases where partners are companies and/or trusts.
c May include trustee companies. Beneficiaries of trusts are eliminated under e.
d Includes all returns not composed solely of salary or wage income.
e Firms with no *direct* business income or loss exceeding $399(net) or $999(gross).
f Number of partners reported for partnerships and trust beneficiaries, net of adjustments per e.
g Maximum number of partnerships that could be comprised wholly of companies and trusts.

The relative use of organisational forms in Table 9.2 suggests soletraders and partnerships account for three to four times more private firms than do companies and trusts. Such numbers may be misleading without an industry breakdown. The 'imputed number of business entities (1)' in Table 9.2 is described by industry in Table 9.3 where soletrader property based entities appear to drive the totals. These numbers may be deceptive, due to the likelihood of double counting. For example, individuals engaged in a single business may employ more than one legal form in maintaining the business' affairs. Figures 9.1 and 9.2 give examples of the use of such structures.

Table 9.3

Organisational forms of Australian tax entities in direct receipt of business income in 1987, by industry[a]

	Individuals		Partnerships[b]		Private Companies[c]		Trusts	
	Number	%[d]	Number	%	Number	%	Number	%
Primary production	105,580	41	134,546	52	7,139	3	11,395	4
Mining	966	40	495	21	727	30	219	9
Manufacturing	15,883	27	15,991	27	19,689	33	7,913	13
Electricity, gas & water	51	29	63	26	53	30	10	5
Construction	117,006	54	68,544	31	20,006	9	12,767	6
Wholesale trade	7,844	4[e]	7,852	4[e]	} 43,046	19	7,019	3[e]
Retail trade	57,332	25[e]	81,587	36[e]			19,309	12[e]
Transport, storage & communications	38,750	49	26,936	34	8,711	11	4,738	6
Finance, insurance, real estate & business services	75,315	32	33,471	14	96,721	40	34,539	14
Health, education & welfare services	37,139	51	6,609	9	26,645	37	2,325	3
Entertainment, recreation, restaurants, hotels & personal services	46,528	52	26,745	30	9,986	11	6,619	7
Unknown	12,221	29	994	2	26,390	63	2,231	5
	514,615	40	403,833	31	259,113	20	109,084	9
Property	1,268,809	86	76,651	5	-	-	135,517	9
	1,783,424	65	480,484	17	259,113	9	244,601	9

a Imputed from data in *Australian Taxation Statistics 1986-87.*
b Partnerships include cases where partners are companies and/or trusts.
c May include trustee companies. Beneficiaries of trusts are eliminated under e.
d Percentages are organisation form relative to industry grouping.
e Statistics for companies do not separate retail and wholesale trading activities. Therefore the percentages for these classifications are based on the combined total for retail and wholesale.

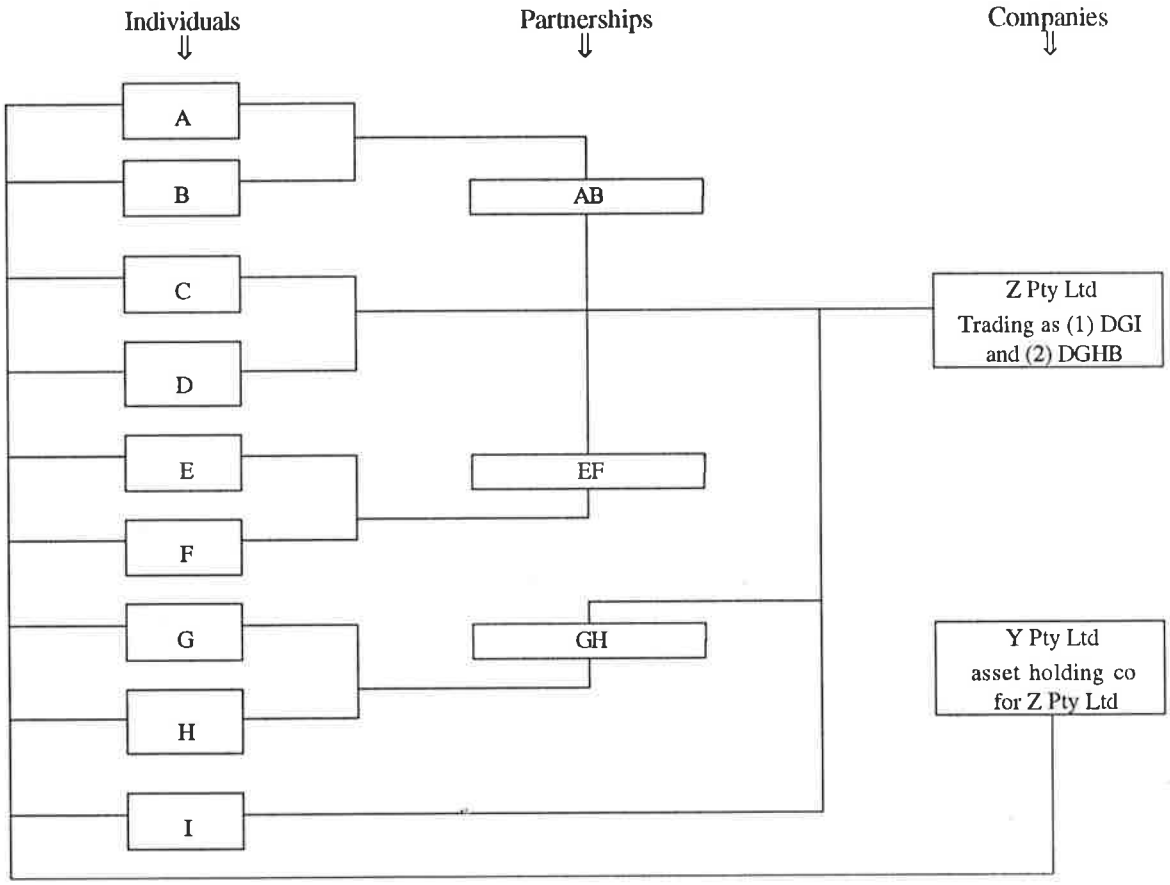
In Figure 9.1 each partnership had additional property interests, so they and both companies directly received business income and would not be eliminated in Tables 9.2 and 9.3. At least two of the individuals also had additional business interests. Because the legal practices provided the major source of income for all parties, it is likely that all entities would be classified as legal services in the taxation statistics.

Figure 9.2 describes the popular use of family trusts and trustee companies observed in the data base. Here, a family couple controls a company that acts as trustee for the family

Figure 9.1

Schematic representations of multiple entities used in a single business undertaking

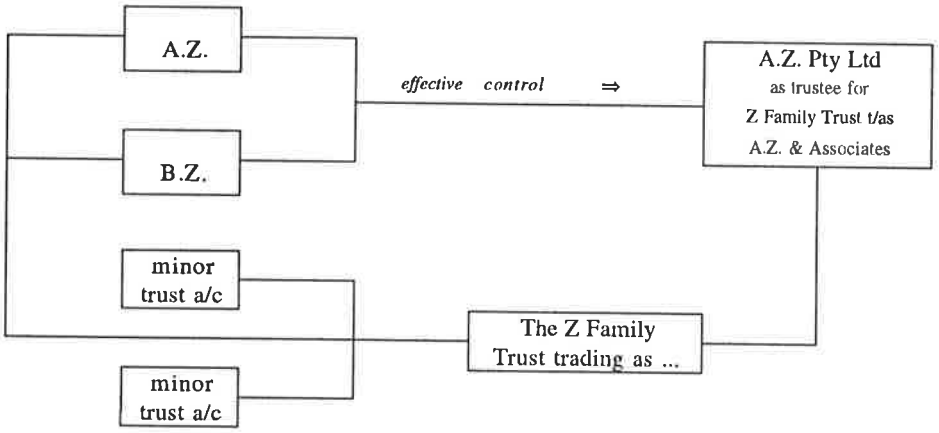
This example is based on a law practice trading under two names through a company held by family partnerships and individuals, using an asset holding company held by all legal principals and spouses.



trust. The couple and their dependent children (usually minors when the scheme was established) are the beneficiaries of the trust. Often, the business (as which the trust trades) is effectively a soletrader. Occasionally it is a genuine partnership. A variation on the structure is observed for some partnerships involving more than one family. In the two families case, two separate family trusts are the 'partners' in a business. Each of the family trusts then have a structure similar to that described in Figure 9.2.

Figure 9.2

Use of family trusts and trustee company in a single business undertaking



Another observed variation is where structures similar to those described in Figures 9.1 and 9.2 are combined. In the case of a professional practice, this was accomplished by using family trusts to hold some of the shares in the asset holding company. The possible permutations and combinations are too numerous to canvas. The cases described here are sufficient to demonstrate the difficulty of using taxation statistics to describe numbers of economic entities. However, no other statistics regarding organisational forms are publicly available. Compared to these statistics, the samples have lesser proportions of soletraders and higher proportions of partnerships.

Demographics

Generally, only industry classification, owner-manager gender, firm origin and age are the known demographics for sufficiently large proportions of the samples. These are considered briefly in turn below. Other demographic data were collected where available, but are not in sufficient quantity for describing the samples.

Firms are described by industry in Table 9.4 with State and national comparisons. Under these classifications, the surviving sample appears to under-represent Construction,

Transport and Storage, and Community Services, while over-representing Finance, Property and Business Services. The recovery action sample under-represents Wholesale and Community Services while over-representing Manufacturing, and Recreational, Personal and Other Services. This latter category is consistent with anecdotal evidence concerning higher failure propensities among restaurants, night clubs, video rental agencies and the like.

Table 9.4
Breakdown of firms by (non-agricultural) industry groupings[a]

Industry grouping[b]	Survivor firms	Recovery action firms	South Australia	Australia
	%	%	%	%
Mining	1	1	-[c]	-[c]
Manufacturing	9	15	7	7
Construction	7	11	14	14
Wholesale	6	3	9	8
Retail	31	30	30	28
Transport & storage	2	4	6	6
Finance, property & business services	27	11	15	18
Community services	3	0	8	8
Recreation, personal & other services	14	24	11	11
Total known	100%	100%	100%	100 %

a To enable comparison with the ABS statistics, the samples exclude heavily diversified, pastoral and agricultural based enterprises.
b Industry classifications as used by ABS (1988).
c Mining classification was South Australia 0.2% and Australia 0.4%.

The samples are classified by gender and industry in Table 9.5, with comparative statistics for South Australia and Australia for 1987[4]. These statistics indicate that significant differences in gender balance exists between industry groupings. However, the general proportions are reasonably consistent across the national, state and sample groups, suggesting little potential gender bias in the samples.

4 The data used for the state and national statistics is for firms employing less than 20 persons. ABS (1988, p.17) indicates these firms account for 99.5 per cent of working proprietors.

Table 9.5

Gender of owner-managers as percentages of owner-managers employed in each non-agricultural industry grouping

Industry grouping[b]	Survivor sample		Recovery action sample		South Australia[a]		Australia [a]	
	%Males	%Females	%Males	%Females	%Males	%Females	%Males	%Females
Mining	100	0	100	0	na	na	92	08
Manufacturing	73	27	70	30	68	32	68	32
Construction	86	14	90	10	81	19	85	15
Wholesale	71	29	60	40	64	36	68	32
Retail	68	32	63	37	59	41	60	40
Transport & storage	80	20	75	25	80	20	82	18
Finance, property & business services	79	21	76	24	71	29	75	25
Community services	0	0	45	55	60	40	54	46
Recreation, personal & other services	59	41	51	49	49	51	51	49
Total	71	29	66	34	67	33	69	31

a Statistics for Australia and South Australia derived from Table 4.5, ABS (1988).
b Industry classifications as used by ABS (1988).
na Self employment for mining not available for South Australia

Standard industry classifications for the sample firms are based on the dominant activity of a firm. However, some firms were engaged in activities that crossed the classification boundaries. In particular, some firms classified as either manufacturing, wholesale or retail were engaged in two or all three of these activities. The standard classifications also combine activities such as business services (including advertising, legal and accounting services, for example) with property services. It is likely that the latter have more in common with construction, especially given the tendency of some of the property management firms to also engage in property development as principals or agents.

Therefore, industry groupings were revised to those in Table 9.6. The 'leisure and tourism' grouping includes sports and recreation facilities, hotels and restaurants. Personal and other services are classified separately into 'personal and domestic' and 'commercial'. The latter describes services used by other businesses and includes transport and storage. Combining service-based firms and facility-based firms as in the

standard classifications conceals important differences between firms that are dependent alternatively on human and financial capital[5]. Table 9.6 does not reveal anything particularly different from Table 9.4 but provides the basis for industry groupings in the empirical phases of this thesis.

Table 9.6
Revised industry classifications for sample firms

Industry grouping	Surviving firms		Recovery action firms		Combined	
	n	%	n	%	n	%
1 Consumer manufacturing, wholesale, retail	64	33.9	75	42.4	139	38.0
2 Commercial manufacturing, wholesale, retail (including quarries and foundries).	18	9.5	10	5.6	28	7.7
3 Leisure and tourism	27	14.3	42	23.7	69	18.9
4 Personal and domestic services	15	7.9	5	2.8	20	5.5
5 Commercial services (including transport and storage)	29	15.3	9	5.1	38	10.4
6 Construction and property related	32	16.9	30	16.9	62	16.9
7 Pastoral and related	4	2.1	5	2.8	9	2.5
* Unknown	0	0.0	1	0.6	1	0.3
Total	189	100.0	177	100.0	366	100.0

The sample firms are further described by business origin and age in Tables 9.7 and 9.8. Comparative statistics are not available for these characteristics. Table 9.7 describes new start-ups and purchased businesses by industry groupings. Purchased businesses were acquired on the market as going concerns. New start-ups were established by the current owner-manager.

The overall proportions of purchased and new start-ups are reasonably consistent across the two samples. The surviving firm sample contains a slightly greater proportion of new start-up firms (63 per cent) compared to the recovery action sample (60 per cent). The largest relative incidence of purchased businesses occurs in the 'leisure and tourism', while the largest relative incidence of new start-ups occurs in 'commercial services'

5 For example, 'recreation, personal and other services' and 'finance, property and business services'

Table 9.7
Origins of businesses by industry groupings

Industry grouping	Survivor firms ?	N	P	All	Recovery action firms ?	N	P	All
1 Consumer manufacturing, wholesale, retail	14	29	21	64	2	41	32	75
2 Commercial manufacturing, wholesale, retail (including quarries and foundries).	9	7	2	18	1	4	5	10
3 Leisure and tourism	6	5	16	27	4	18	20	42
4 Personal and domestic services	2	7	6	15	3	1	1	5
5 Commercial services (including transport and storage)	4	22	3	29	1	8	0	9
6 Construction and property related	4	22	6	32	1	22	7	30
7 Pastoral and related	0	2	2	4	3	2	0	5
* Unknown	0	0	0	0	0	1	0	1
All industries	39	94	56	189	15	97	65	177

Percentages (%) of each industry grouping for firms of known origin

1 Consumer manufacturing, wholesale, retail	58.8	42.0	100	56.2	43.8	100
2 Commercial manufacturing, wholesale, retail (including quarries and foundries).	77.8	22.2	100	44.4	55.6	100
3 Leisure and tourism	23.8	76.2	100	47.4	52.6	100
4 Personal and domestic services	53.8	46.2	100	50.0	50.0	100
5 Commercial services (including transport and storage)	88.0	12.0	100	100.0	0.0	100
6 Construction and property related	78.6	21.4	100	75.9	24.1	100
7 Pastoral and related	50.0	50.0	100	100.0	0.0	100
* Unknown	-	-	-	100.0	0.0	100
All industries	62.7	37.3	100	59.9	40.1	100

P Businesses purchased as going-concerns by current owner-managers.
N Businesses established as new start-ups by current owner-managers.
? Origin of the business is not known. One case classified as unknown in surviving firm sample was inherited without payment of significant compensation. Others may also have been thus acquired, but available information did not allow their specific classification.

followed by 'construction' industry grouping in both samples. Rankings are consistent across the two samples, although the 'leisure and tourism' ranking for recovery-action firms is less pronounced. Overall the cell sizes may be too small for such difference to be meaningfully analysed, but the potential importance of such differences are addressed in later empirical work.

Table 9.8 describes the age profiles of sample firms by organisational form. Age is the time the business was held by the current owner-manager regardless of when the current organisational form was adopted. On average, recovery action firms are younger than surviving firms; 74 per cent of the recovery action firms (for which age is known) failed within four years while only 40 per cent of surviving firms are less than four years old.

Table 9.8
Age profiles of sample by organisational forms

Age[a]	Surviving firms							Recovery action firms							Combined		
(years)	S	P	C	T	All	%	cum%	S	P	C	T	All	%	cum%	n	%	cum%
(0-1]	1	2	3	2	8	4.8	4.8	3	7	13	1	24	18.6	18.6	32	10.8	10.8
(1-2]	4	5	4	2	15	9.0	13.8	6	9	10	3	28	21.7	40.3	43	14.5	25.3
(2-3]	3	2	6	2	13	7.8	21.6	2	14	9	1	26	20.2	60.5	39	13.2	38.5
(3-4]	4	6	16	4	30	18.0	39.5	3	6	6	3	18	14.0	74.4	48	16.2	54.7
(4-5]	5	7	11	5	28	16.8	56.3	1	3	5	0	9	7.0	81.4	37	12.5	67.2
(5-6]	2	2	9	5	18	10.8	67.1	0	1	1	1	3	2.3	83.7	21	7.1	74.3
(6-7]	1	2	9	6	18	10.8	77.8	0	1	2	0	3	2.3	86.0	21	7.1	81.4
(7-8]	2	0	11	5	18	10.8	88.6	0	0	1	1	2	1.6	87.6	20	6.8	88.2
(8-9]	1	0	2	0	3	1.8	90.4	1	1	0	1	3	2.3	89.9	6	2.0	90.2
(9-10]	0	0	1	0	1	0.6	91.0	0	2	2	2	6	4.7	94.6	7	2.4	92.6
10+	1	0	13	1	15	9.0	100.0	0	0	4	3	7	5.4	100.0	22	7.4	100.0
	24	26	85	32	167	100.0		16	44	53	16	129	100.0		296	100.0	
Unknown	6	5	5	6	22			8	13	22	5	48			70		
Total	30	31	90	38	189			24	57	75	21	177			366		

S=soletrader, P=partnership, C=company, T=trust.

a Surviving firm age is at June 1989. Recovery action firm age is to commencement of some form of recovery action by the bank, other creditors, or recognition by parties that the firm is failing.

Recovery action businesses are, disproportionately, soletraders and companies under two years old and partnerships under three years old. Fifty six per cent of recovery action

(compared to 21 per cent of surviving) soletraders are under two years old, 68 per cent of recovery action (35 per cent of surviving) partnerships are under three years and 43 per cent of recovery action (8 per cent of surviving) companies are under two years.

Many unknown ages are for incorporated firms. While incorporation dates are easily identified, many of the companies and trusts represent businesses that existed prior to incorporation. It is not possible to determine the nature of any bias induced in these profiles by missing age data. As there are no available comparative statistics, it is not possible to relate the sample profiles to any broader population. The ages of many firms are approximations[6]. For some firms in existence for several years, the assigned age category denotes its minimum age. For example, it may be known that a firm has been in existence for at least five years, but it could be much older. For consistency and conservatism, such cases are assigned to the shortest period known with certainty. This mostly affects firms categorised as four years or older. The age profiles seem reasonable, suggesting the averaging out of the possible measurement errors.

LIMITATIONS

Both the source and quality of the data will impose a number of limitations on subsequent analyses. All sampled firms had obtained debt finance from a particular bank. Even if it is accepted that a sample comprised solely of the clients of a particular bank do no necessarily induce any bias, there is still reduced confidence in the absence of sample bias relative to firms that are all equity financed. While the proportion of owner-managed firms in the economy that do not have some form of bank debt may be quite small, the will remain a limit on the generalisability of any empirical findings based on the sampled

6 In some cases it could not be determined whether the years an owner-manager had been 'in business' according to the bank file related only to the existing business or included earlier undertakings. While a commencement dates may be identifiable for a particular business, but it is not always known if the owner-manager reinvested from another business or was undertaking a first-time enterprise. Thus, ages of individual firms must be treated with caution.

firms. Given, however, that some of the tests will apply to the use of debt, the source bias rather than the capital mix bias will sometimes be the greater concern.

While the samples are potentially biased by source, the industry and gender representations reasonably approximates state and national profiles. There is good representation of the various organisational forms with a strong diversity in origins and ages; nonetheless, there is possible biased representation of organisational forms. State or national profiles are not available to compare origin or age. Any geographic and source bias induced by drawing all sample firms from the South Australian operations of a single bank is unknown, but must be considered when interpreting results. Some demographics are considered in the various tests in following chapters.

The quality of the data obtained may present a greater limitation. Bank retail loan clients were targeted as a data source partly because of the general practice of banks to collect consumption data in loan applications from individuals. Regrettably, this data was not available. All data was drawn from the branch files (or equivalent) which contained almost no direct references to the composition of owner-manager's consumption expenditure. Based on the financial data available for a substantial number of firms it is possible to estimate consumption expenditure (based on individual drawings). This may pose some approximation problems which are discussed in Chapter 11 when the consumption estimates are first utilised.

Despite the possible limitations that attach to the data, it remains a valuable and unique data base. No other data base is currently available in Australia for academic research that provides such data for owner-managed firms. In addition to the relatively rich data obtained, the sample sizes are substantial, demographic representativeness appears good and financial data for unincorporated Australian businesses is probably unique.

CHAPTER 10
THE RELEVANCE OF ORGANISATIONAL FORM

INTRODUCTION

This chapter tests the hypotheses developed in Chapter 8 to address concerns raised in Chapters 1 and 2 regarding the functions and effects of organisational boundaries.

Operationalising the adopted definition of an owner-managed firm requires knowledge of the relevant economic limits of firms, and the manner in which owner-managers are included in the firm. This knowledge is also necessary to understand the application of an owner-manager's objectives. This is accomplished by examining the adopted forms of owner-managed firms and by analysing owner-managers' behaviour when contracting with institutional lenders through the firm, to test hypotheses H1 through H3.

The 'separation' hypothesis:

> *Adopted organisational form indicates the degree of separation of the owner-manager and the firm.* (H1)

The 'managerial sophistication' hypothesis:

> *The adopted organisational form of an owner-managed firm is determined by the level of management sophistication.* (H2)

The 'management complexity' hypothesis:

> *Incorporation is a function of the number of owner-managers.* (H3)

Testing any one of these hypotheses has consequences for the other hypotheses. For this reason, some of the following tests apply jointly to more than one hypothesis.

DATA

The data base described in Chapter 9 provides data for 177 owner-managed firms that were a subject to debt recovery actions by the bank during 1986-88 and 189 surviving firms in existence in June 1988. Table 10.1 describes the number of effective owner-managers for the recovery action and surviving firms by organisational form[1]. Panel A describes all firms in the samples. Panel B provides the same descriptions for firms organised as associations (partnerships, companies and trusts).

'Effective' versus 'nominal' associations

Adopting of a form of association does not necessarily indicate the existence of multiple owner-managers. Firms with multiple owner-managers do not necessarily incorporate. Therefore, it is possible to distinguish *effective* associations (with multiple owner-managers) from *nominal* associations (organised as partnerships, companies or trusts regardless of the number of owner-managers).

Many firms organised as non-soletraders (46 per cent of recovery action and 40 per cent of surviving firms) had only one effective owner-manager[2]. These cases included nominal equity holders or silent partners who were immediate family members. While firms claiming to be soletraders may have more than one effective owner-manager, the no such cases were detected. For both *effective partnerships* (firms with multiple effective owner-managers) and *nominal associations* (that is, firms claiming to be non-soletraders), most effective and nominal partners tended to be close relatives.

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1 The descriptions in Chapter 9 indicate the complexity of some organisational forms. The few consolidated entities are classified as the most elaborate structure used (ranking trusts as the most complex, followed by companies). As all trusts in the samples used incorporated trustees, trusts and companies are often referred to collectively as incorporated forms.

2 Where it was not explicitly stated in the bank files, the roles of the notional owner-managers were determined from references in bank diary notes, finance reviews and from correspondence between the bank and the firm. If this evidence indicated that only one person was involved in decision-making and negotiation, it was concluded that the firm was *effectively* a soletrader.

Table 10.1

Number of effective owner-managers by nominal organisational form

	OM=1			OM=2			OM>2			Unknown	Total	
	n	%[1]	%[2]	n	%[1]	%[2]	n	%[1]	%[2]	n	*n*	%
Panel A: All firms												
Survivor firms:												
Soletraders	30	32	100	0	0	0	0	0	0	0	30	16
Partnerships	10	11	32	18	27	58	3	11	10	0	31	16
Companies	37	40	42	35	52	39	17	63	19	1	90	48
Trusts	16	17	43	14	21	38	7	26	19	1	38	20
Overall	93	100	50	67	100	36	27	100	14	2	189	100
Recovery action firms:												
Soletraders	24	26	100	0	0	0	0	0	0	0	24	14
Partnerships	22	23	39	34	49	60	1	10	2	0	57	32
Companies	38	40	53	27	39	38	7	70	10	3	75	42
Trusts	10	11	48	9	13	43	2	20	10	0	21	12
Overall	94	100	54	70	100	40	10	100	6	3	177	100
Combined:												
Soletraders	54	29	100	0	0	0	0	0	0	0	54	15
Partnerships	32	17	36	52	38	59	4	11	5	0	88	24
Companies	75	40	47	62	45	39	24	65	15	4	165	45
Trusts	26	14	45	23	17	40	9	24	16	1	59	16
Overall	187	100	52	137	100	38	37	100	10	5	366	100
Panel B: Firms organised as associations												
Survivor firms:												
Partnerships	10	16	32	18	27	58	3	11	10	0	31	19
Companies	37	59	42	35	52	39	17	63	19	1	90	57
Trusts	16	25	43	14	21	38	7	26	19	1	38	24
Overall	63	100	40	67	100	43	27	100	17	2	159	100
Recovery action firms:												
Partnerships	22	31	39	34	49	60	1	10	2	0	57	37
Companies	38	54	53	27	39	38	7	70	10	3	75	49
Trusts	10	14	48	9	13	43	2	20	10	0	21	14
Overall	70	100	47	70	100	47	10	100	7	3	153	100
Combined:												
Partnerships	32	24	36	52	38	59	4	11	5	0	88	28
Companies	75	56	47	62	45	39	24	65	15	4	165	53
Trusts	26	20	45	23	17	40	9	24	16	1	59	19
Overall	133	100	43	137	100	45	37	100	12	5	312	100

OM = number of owner-managers.

%[1] = Percentage is for organisational form of total of known owner-manager categories.

%[2] = Percentage is for known owner-manager categories of total of particular organisational form.

OWNERSHIP AND THE CHOICE OF ORGANISATIONAL FORM

Table 10.1 does not reveal any obvious differences between the samples in respect of the number of owner-managers or chosen organisational form. Comparing the samples using the relevant percentage columns in either panel, about half of both samples are firms with one owner-manager. The second column in Panel B (OM=1) indicates disproportionate representation of partnerships and trusts between the samples. This is repeated for associations with two owner-managers, but mostly disappears for the small number of firms with more than two owner-managers.

Incorporation and number of owner-managers

With 43 per cent of all incorporated firms having only one effective owner-manager, it seems incorporation is motivated by factors other than raising equity or managing partnerships. Incorporated[3] firms comprise 72 per cent[4] of *nominal* associations and 68 per cent[5] of *effective* partnerships. Generally, the choice of organisational form appears significant, with an increasing shift to incorporation as the number of owner-managers increases. Considering only *nominal* associations, this effect is diminished.

When OM is categorised by (1, 2, >2) the resultant 2x3 chi-square test of organisational form (S/P v C/T) is significant at P=0.000 (χ^2= 16.059, 2*df*). The choice of form is significant for both recovery action (P= 0.055, χ^2= 5.788, 2*df*) and surviving firms (P=0.004, χ^2= 11.077, 2*df*). However, the number of soletraders appears to drive this result, and so no conclusion should be drawn at this stage.

Incorporation by 'surviving' and 'recovery-action' firms

Considering each sample and limiting attention to *effective* associations (that is, where OM>1), the significance of the increased proportion of firms with more than two owner-

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3 Companies and trusts.

4 81 per cent for surviving and 63 per cent for recovery action firms.

5 78 per cent for surviving and 56 per cent for recovery action firms.

managers, compared to those with exactly two owner-managers, in selecting an incorporated structure over a partnership structure [(P v C/T) x (OM=2 v OM>2)] is P=0.019 (χ^2= 5.482, 1*df*) for recovery action firms and P=0.091 (χ^2= 2.863, 1*df*) for surviving firms. This difference in significance levels reflects the greater proportion of incorporated firms in the surviving sample. While this may offer intuitive appeal by suggesting that the propensity to incorporate is related to the number of effective owner-managers (supporting H3), the remaining analysis does not fully support this argument.

It can be inferred from this result that owner-managers of surviving firms have more managerial sophistication, which may be a function of time, thus supporting H2. The selection of incorporation by associations across the two samples (RA v S) x (P v C/T) of P= 0.001 (χ^2=11.950, 1*df*) suggests the *difference* in levels of significance between the two samples for these comparisons is itself important. Table 9.8 indicates considerable sample difference regarding the age profiles of incorporated firms.

Firms with one effective owner-manager

The different frequencies of organisational forms between the surviving and recovery action firms provides some scope for analysis. For firms with only one effective owner-manager (OM=1), the differences between the samples in the selection of organisational form is marginally significant at P=0.087 (χ^2= 6.559, 3*df*) across the four choices (SvPvCvT) and insignificant (P=0.416., χ^2= 0.661, 1*df*) for incorporated versus unincorporated (S/PvC/T). The main difference between the samples is the greater use of trusts (17 per cent) and lesser use of partnerships (11 per cent) by surviving firms compared to recovery action firms (11 per cent trusts and 23 per cent partnerships) in cases where there is only one effective owner-manager. The proportionate use of soletrader and company structures is reasonably consistent. This partially supports H2 (the sophistication hypothesis) and tends to counter H3.

Firms with multiple effective owner-managers

For firms with multiple owner-managers (OM>1), the much greater use of incorporation (companies and trusts) by the surviving firms sample is significantly different . This may support the separation hypothesis (H1), or may reflect sample age bias if propensity to incorporate is a function of time (this proposition does not refute either H2 or H3).

The proportion of recovery action firms with more than 2 owner-managers (OM>2) is much less than for surviving firms (6 compared to 15 per cent). However, the small cell counts increases the probability of the results being due to sample fluctuation reduces the persuasiveness of insignificant chi-square test results, which are very conservative with small samples, so no conclusion is drawn from this comparison.

Conclusions regarding number of owner-managers

The only conclusions that can be drawn from these rudimentary statistics are as follows.

- For firms with 1-2 owner-managers, surviving firms are more likely to incorporate and less likely to use partnership structures than recovery action firms, possibly indicating management sophistication (H2)[6]. Incorporation propensities may reflect sample differences such as age or origin [7], as considered further below.

- The use of incorporation increases with the number of owner-managers in the surviving firms. This effect is observed only for an increase from 2 to >2 owner-managers for recovery action firms. This generally supports H3.

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6 Speculatively, it also could reflect taxation considerations, which also may signal managerial sophistication. Owner-managers of recovery action firms may decide incorporation costs are too high if they can derive sufficient taxation relief through the use of partnership structures (this is a naive attribution of cost based on dollar outlays for establishment and maintenance of a particular organisational form. It does not consider agency costs or the like). Possibly the taxable earnings of such firms are not sufficient to warrant the pursuit of tax reducing structures. This in itself is an interesting proposition warranting further investigation elsewhere.

7 Little variation in origins was observed between the samples (Table 9.7) and substantially different age profiles were observed (Table 9.8).

Business age profiles

Table 10.2 describes the age profiles of the categories from Table 10.1. Differences in age profiles between the samples are observed from the 'All firms' column in each panel and from Table 9.8. Firms aged less than four years account for 74 per cent of recovery action firms and 40 per cent of surviving firms. The different age distributions for the two samples are significantly different[8] (P=0.001, χ^2=30.474, 10*df*).

From Table 10.2, the different frequencies of trusts and partnerships between the samples appears to be age related. The association of form and age within each sample differs in significance. For example, the propensity for multiple owner-manager firms (OM>1) to choose incorporation as they age is of little or no significance in either sample, whereas the same comparison for one owner-manager firms (OM=1) is significant for surviving firms (P=0.055, χ^2=17.992, 10*df*), but not for recovery action firms (P=0.480, χ^2=9.551, 10*df*). This difference is accentuated when age profiles for one owner-manager firms is considered for all four forms. For recovery action firms it remains insignificant (P=0.344, χ^2= 32.506, 30*df*) while for surviving firms it appears very significant (P=0.000, χ^2= 90.460, 30*df*)[9].

For recovery action firms, there is not any apparent association between age at time of default and number of owner-managers. Table 10.3 describes similar proportions of single and multiple owner-manager firms failing within 3-4 years. The aggregated age profiles of single and multiple owner-manager surviving firms also are similar.

The main conclusions to be drawn from these descriptions areas are threefold:

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8 If the ages are banded into 0-2, 3-5 and 6+ strata, the frequency differences between the samples is highly significant (P=0.000, χ^2=29.098, 2*df*). As such stratification is arbitrary, this outcome is illustrative only. Given the overall age profiles, any banding that captures a major proportion of the younger firms in the recovery action sample should produce a significant chi square statistic.

9 These tests assume that no bias is caused by firms for which age is unknown.

Table 10.2

Number of owner-managers and organisational form by age

AGE (years)	Sole-traders	Partnerships				Companies					Trusts					All firms
		OM =1	OM =2	OM >2	Total	OM =1	OM =2	OM >2	Total		OM =1	OM =2	OM >2	Total		
Surviving firms:																
(0-1]	1	1	1	0	2	1	1	1	3		1	1	0	2		8
(1-2]	4	2	2	1	5	2	2	0	4		1	1	0	2		15
(2-3]	3	0	2	0	2	3	0	3	6		1	1	0	2		13
(3-4]	4	3	3	0	6	7	7	2	16		2	1	1	4		30
(4-5]	5	2	4	1	7	7	3	1	11		1	2	2	5		28
(5-6]	2	1	1	0	2	4	3	2	9		0	3	2	5		18
(6-7]	1	1	0	1	2	3	2	4	9		5	0	1	6		18
(7-8]	2	0	0	0	0	3	6	2	11		3	2	0	5		18
(8-9]	1	0	0	0	0	1	1	0	2		0	0	0	0		3
(9-10]	0	0	0	0	0	1	0	0	1		0	0	0	0		1
10+	1	0	0	0	0	3	9	1	13		0	1	0	1		15
	24	10	13	3	26	35	34	16	85		14	12	6	32		167
									missing					missing		
Unknown	6	0	5	0	5	2	1	1	4 (+1)		2	2	1	5 (+1)		22
Total	30	10	18	3	31	37	35	17	89	1	16	14	7	37	1	189
Recovery action firms:																
(0-1]	3	2	4	1	7	8	4	1	13		1	0	0	1		24
(1-2]	6	5	4	0	9	3	4	2	10		0	2	1	3		28
(2-3]	2	5	9	0	14	4	4	1	9		1	0	0	1		26
(3-4]	3	4	2	0	6	3	3	0	6		1	2	0	3		18
(4-5]	1	1	2	0	3	4	1	0	5		0	0	0	0		9
(5-6]	0	1	0	0	1	1	0	0	1		0	1	0	1		3
(6-7]	0	0	1	0	1	2	0	0	2		0	0	0	0		3
(7-8]	0	0	0	0	0	0	1	0	1		0	1	0	1		2
(8-9]	1	1	0	0	1	0	0	0	0		1	0	0	1		3
(9-10]	0	1	1	0	2	1	0	1	2		2	0	0	2		6
10+	0	0	0	0	0	2	2	0	4		2	1	0	3		7
									missing							
	16	20	23	1	44	28	19	5	52 (+1)		8	7	1	16		129
									missing							
Unknown	8	2	11	0	13	10	8	2	20 (+2)		2	2	1	5		48
Total	24	22	34	1	57	38	27	7	72	3	10	9	2	21		177
Overall	54	32	52	4	88	75	62	24	161	4	26	23	9	58	1	366

Table 10.3

Proportions of single v. multiple owner-manager firms by age

	Surviving firms						Recovery action firms					
AGE (years)	OM=1		OM>1		Total		OM=1		OM>1		Total	
	%	Cum %	%	Cum %	%	Cum %	%	Cum %	%	Cum %	%	Cum %
(0-1]	4.8	4.8	4.8	4.8	4.8	4.8	19.4	19.4	17.9	17.9	18.6	18.6
(1-2]	10.8	15.7	7.1	11.9	9.0	13.8	19.4	38.9	23.2	41.1	21.7	40.3
(2-3]	8.4	24.1	7.1	19.0	7.8	21.6	16.7	55.6	25.0	66.1	20.2	60.5
(3-4]	19.3	43.4	16.7	35.7	18.0	39.5	15.3	70.8	12.5	78.6	14.0	74.4
(4-5]	18.1	61.4	15.5	51.2	16.8	56.3	8.3	79.2	5.4	83.9	7.0	81.4
(5-6]	8.4	69.9	13.1	64.3	10.8	67.1	2.8	81.9	1.8	85.7	2.3	83.7
(6-7]	12.0	81.9	9.5	73.8	10.8	77.8	2.8	84.7	1.8	87.5	2.3	86.0
(7-8]	9.6	91.6	11.9	85.7	10.8	88.6	0.0	84.7	3.6	91.1	1.6	87.6
(8-9]	2.4	94.0	1.2	86.9	1.8	90.4	4.2	88.9	0.0	91.1	2.3	89.9
(9-10]	1.2	95.2	0.0	86.9	0.6	91.0	5.6	94.4	3.6	94.6	4.7	94.6
10+	4.8	100.0	13.1	100.0	9.0	100.0	5.6	100.0	5.4	100.0	5.4	100.0
	100.0		100.0		100.0		100.0		100.0		100.0	

- The *within* sample age profiles are similar but differ with respect to the adoption of incorporation, supporting H2 if recovery action firms are deemed to have less sophisticated management.

- The use of incorporated forms may be a function of age, although this may reflect the era in which a firm was established. This could indicate tax planning criteria rather than governance concerns in the choice of organisational form. To this extent, H2 is only weakly supported, as the tax plan argument is then an exogenous influence, rather than managerial sophistication.

- There is a low likelihood that the number of owner-managers is a product of the age of the firm, strengthening the suggested association between number of owner-managers and use of incorporation, supporting H3.

Limited liability and personal guarantees

The argument that incorporation is more likely related to limiting liability than other purposes is tested by examining how often it succeeds or fails as a liability barrier. To judge the effectiveness of incorporation in limiting liability, consider how often incorporated individuals risk or sacrifice personal assets in their business. This is partly indicated[10] by the extent of personal guarantees that circumvent limited liability barriers and the instances where an owner-manager's private residence was sold[11] to satisfy the debts of the incorporated firm, relative to other business types.

Personal guarantees for recovery action firms

The incidence of owner-managers losing their private residence as a result of debt recovery-actions by the bank is described in Table 10.4. Overall, about two thirds of known outcomes involved the loss of a house (this could be as low as one third on the total sample)[12]. For known outcomes where there was a house to lose, there is no significant difference between incorporated and unincorporated firms, indicating that incorporation does *not* significantly reduce the risk to personal assets under bank finance.

For the 96 recovery action incorporated firms, the bank held personal guarantees for 63 (81 per cent of known cases)[13]. There were 15 cases where the bank appeared to not hold personal guarantees. For six cases, the bank held registered mortgages over real estate held by the corporation so that the bank did not seek collateral outside the firm.

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10 Although there is some evidence that individuals sell personal assets to preserve their equity in their private residence, data on this activity are incomplete.

11 Note that not all guarantees are secured and those that are secured are not necessarily secured on a residence or other real estate.

12 Nine cases of personal guarantees of debt were noted for recovery action incorporated firms where there was no house to lose. There were instances where guarantees did not refer to a particular security. In some cases, recovery actions were continuing or information was inadequate for this purpose, requiring the additional groupings in Table 10.4.

13 These proportions were the same for both trusts and companies.

Table 10.4

Incidence of owner-managers of recovery action firms losing private residence

	soletrader		partnership		total unincorporated		trusts & companies		overall	
	n	%	n	%	n	%	n	%	n	%
Known outcome:										
Lost house	7	64	26	79	33	75	28	62	61	69
Retained house	4	36	7	21	11	25	17	38	28	31
	11	100	33	100	44	100	45	100	89	100
No house to lose	8		7		15		9		24	
	19		40		59		54		113	
Unknown outcome:										
Insufficient data or case continuing	5		17		22		42		64	
	24		57		81		96		177	

Three others were attributed to procedural errors by bank employees. Some others were subsequently criticised by the bank's case-review officers as poor decisions.

Personal guarantees for surviving firms

The above result could be induced by bias if recovery action firms were identified *ex ante* as riskier and a different treatment was accorded to a trust or company perceived as less risky. The securities held by the bank for surviving incorporated clients is described in Table 10.5. Personal guarantees were held in 75 per cent of known cases of surviving incorporated firms and 81 per cent of recovery action incorporated firms (61 per cent and 65 per cent overall respectively) . This suggests little likelihood of risk related bias in the prevalence of personal guarantees for recovery action firms relative to surviving firms.

Conclusions regarding the prevalence of personal guarantees

H1 is not supported if separation of the owner-manager and the firm is to obtain the protection of limited liability. Three qualifications attach to this conclusion. First, losses sustained by the *unsecured* creditors of recovery action firms are not known. Second, the existence of a directors' guarantee for a surviving firm does not necessarily mean that

Table 10.5
Incidence of personal guarantees for incorporated firms

	Recovery action firms		Survivor firms		Combined	
	n	%	n	%	n	%
Personal guarantees included in security	63	81	78	75	141	77
No guarantees held	15	19	26	25	41	23
	78	100	104	100	182	100
Data incomplete for securities	18		23		42	
	96		128		224	

the owner-manager has any significant personal assets at risk (details of securities could not be obtained for these firms). Third, all guarantees were for a specified maximum amount and debts exceeding that limit are not covered, although the bank files indicated that the bank sought to eliminate such exposure.

If separation is for reasons other than limited liability, such as preserving the identity of the firm as distinct from the owner, then owner-managers might be expected to carefully distinguish business and personal transactions and holdings.

Disclosure of assets and debts in the owner-managed firm

To test if owner-managers try to preserve the entity boundaries in their accounting treatments, the financial statements of sample firms were examined for evidence of:

- 'personal' assets or debts used in the business but not attributed to the firm; and
- attributing assets or liabilities to the firm that pertain to personal consumption.

Attributing/disclosing assets

Assets might not be attributed to the firm if the owner-manager does not associate them with the firm's operations. This happens, for example, when the owner-manager of a company provides a personal guarantee secured over personal assets. While the collateral is not employed operationally in the business, it is at risk as a result of the firm's

activities. In such cases, neither the security arrangement nor the asset providing the security for the firm's debt is disclosed in the company's accounts; however, the debt is described as secured. The risk to an aggregate asset base at any one time is, of course, dependent on the level of debt[14].

Of greater relevance are undisclosed assets, additional to those supporting guarantees, risked by the owner-manager or used in the business. Most cases where such information was available involved loan defaults by unincorporated firms that resulted in bankruptcy petitions, allowing such assets to be identified from the statements of position and liquidators' reports. The data is too erratic and incomplete for any structured analysis. Anecdotally, instances of assets employed in businesses not appearing in the business' balance sheet for at least some failed businesses included:

- A bank file note indicated a surviving company's negative net asset figure was inappropriate for loan analysis because the business' major asset (a nursing home) was held privately by the two owner-managers.
- A storage facility constructed on the owner-manager's residential property was omitted from the company's balance sheet (disclosed in a liquidator's report).
- Two instances of delivery vehicles used extensively in businesses not in the balance sheets of unincorporated firms (disclosed in a refinancing application and a receiver's report).
- Land held for future commercial development was not disclosed in the balance sheet of the unincorporated firm (eventually disclosed in a loan application to finance the development, made necessary by the business' expansion.)

Attributing/disclosing liabilities

Two debt attribution problems are relevant. One is debts incurred by individuals as a direct result of the business undertaking, but treated as private and omitted from the

14 This also applies to unincorporated firms. In such cases, however, the situation is more apparent as the owner-manager is not merely guaranteeing the debt, but is the formal borrower. Thus, all assets of the owner-manager of an unincorporated firm are potentially at risk.

financial statements. The other is personal debts, included in the financial accounts of a business, that do not relate specifically to a business' operations.

The difficult problem is identifying the true purpose of borrowings. For example, in establishing a business, individuals frequently borrow against their residence. As discussed, this is usually through a personally guaranteed business loan in cases where the business is operated through a company structure, which appropriately attributes the debt to the firm, but not the total collateral. Where the firm is not incorporated, such loans might be omitted from the business' accounts. The repayment schedule of a housing mortgage loan may be modified to extend the term of the remaining debt (as a result of the business). Repaid capital may be re-borrowed under the original instrument to finance the business undertaking to avoid new loan fees and security registration costs. The interest rate charged is dependent on the bank's attitude, but may also provide incentive for this arrangement. For unincorporated firms, the borrowings may be undisclosed, introduced through the owners' capital accounts or included in the business' accounts (but without the collateral asset) for the re-borrowed sum or for the total debt, including the component that may be considered to be private. Such situations may also arise with incorporated businesses, with the additional treatment where loan funds are channelled through unsecured loan accounts of shareholders or directors.

In the sample data, mortgage loans and the related interest on owner-managers' residence are typically treated as private - at least in relation to the financial statements in the bank files. Such treatment of privately derived debt is inevitable for incorporated firms given the legal boundaries, but may be more discretionary for other organisational forms. The reasons for such elections may be several, but could reasonably include:

- the owner-manager or preparer of the accounts believed it inappropriate, due to either accepted accounting practices or perceived economic reality, to include such debts in the firm's accounts; or

- did not *want* the debt attributed to the firm.

In the case of debt established directly to fund the firm, the latter of these possible explanations is the more likely. There are at least two possible motives for such a choice. It may relate to some aspect of tax planning, such as taking advantage of differing marginal tax rates between individuals comprising a partnership or who are trust beneficiaries, or individuals and a company. It may indicate a desire to minimise disclosed debt. However, arguments for minimising debt disclosures by private (non tradeable debt or equity) firms are not apparent in the prevailing literature.

Alternatively, individuals may endeavour to represent loans effectively borrowed for personal consumption as business loans. The primary incentive for such a scheme is to capture tax relief on interest[15]. Disregard for the organisational boundaries of the firm thus may be incidental to the owner-manager's purpose. Again, the available data permits few conclusions. However, several observed instances of questionable debt attribution by both failed and healthy firms were noted[16]:

- Four instances where personal loans were used to purchase assets (mostly motor vehicles) which were later introduced into the (unincorporated) business as assets, but without the associated debt.
- Two cases in which debts, secured by mortgages on residences but borrowed in earlier businesses since sold by the owner-managers, later appeared in the financial statements of a 'new' (unincorporated) business[17].
- Five instances in which funds were borrowed through the business (both incorporated and unincorporated) to refinance existing debts, where the latter included housing loans or previously attributed personal loans.

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15 Interest on personal residential loans does not attract any tax relief in Australia.

16 A detailed search for such problems could not be performed and so all instances are merely anecdotal.

17 The implication of this concerns consistency in the treatment of the business unit. While the new business was not associated with the cause of the debt, it was attributed to the 'new' firm. In unrelated cases where there appeared to be a much stronger causal link between the business and various debts, the debts did not appear in the firms' financial statements.

Other possible differences between owner-managed firms

Comparing firms or generalising about investment choices or behaviour is confounded by possible life cycle or stage of development effects , cohort effects and new start-ups versus acquired businesses. These are considered below.

Life cycle or stage of development

Previous discussion indicated differences between the sample age profiles, with considerable similarity in age profiles for single versus multiple owner-manager firms aggregated across organisational forms within each sample (see Table 10.2). Differences in the choice of organisational form by single owner-manager surviving firms, according to age is significant for comparisons of all four forms (P=0.000), but less so for comparisons of incorporated versus unincorporated forms (P=0.055).

The results could imply a 'stage of development' or 'life cycle' effect for surviving firms. However, the cross-sectional data instead may indicate a temporal effect. The age of a surviving firm is at 30 June 1989, so firms of similar age commenced around the same time. Thus surviving firms described as (3-8] years old commenced in the period 1982-87. These account for 78 per cent of trusts, in contrast to only 66 per cent of companies and 65 per cent of partnerships, for the surviving firm sample[18].

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18 This may be contrary to expectations that most trusts would have been established during the mid 1970's to mid 1980's, when tax legislation provided most incentive for this choice. There at least two possible explanations for this situation:

1. The calculated period does not necessarily indicate when the trusts were established. They may have been held dormant or previously employed by the owner-managers in an earlier business, being 'reused' for the business included in the current data base. Available data sources do not contain many previous business histories. If an owner-manager disposed of one business and acquired or started another while also changing banks, the commencement of the new business might have been identified as the commencement date of the 'new' firm.
2. While larger numbers of trusts may have been established in the earlier time period, they might not have survived.

New versus acquired businesses

It is possible that characteristics of firms, including organisational form, are related to whether the owner-manager acquired the business as a going-concern or established the business as a new start-up. Table 10.6 describes the samples by origin of the business (purchased versus new start-ups) and organisational form.

Table 10.6

Use of organisational forms for purchased and new start-up businesses

	Soletraders		Partnerships		Companies		Trusts		Overall	
	n	%	n	%	n	%	n	%	n	%
Surviving firms										
Purchased	11	39	15	52	20	31	10	34	56	37
New start-ups	17	61	14	48	44	69	19	66	94	63
	28	100	29	100	64	100	29	100	150	100
Unknown	2		2		26		9		39	
Total	30		31		90		38		189	
Recovery action firms										
Purchased	6	30	20	40	32	44	7	37	65	40
New start-ups	14	70	30	60	41	56	12	63	97	60
	20	100	50	100	73	100	19	100	162	100
Unknown	4		7		2		2		15	
Total	24		57		75		21		177	

The proportions of purchased and new start-up businesses across the two samples are similar. The samples exhibit equivalent propensities for businesses to be new start-ups (63 versus 60 per cent), with similar distributions across organisational forms. Chi-square tests indicate that none of the differences are statistically significant. It is concluded that the observed minor differences are not of any import in understanding the use of particular organisational forms, or differences between the samples.

CONCLUSIONS

The main objectives of this chapter were to determine if any factors that are relevant to modelling performance prompt owner-managers' choices of organisational form and whether there is any relevance of organisational form to performance.

There is some support for the management sophistication hypothesis (H2) in that recovery action firms may have less sophisticated management and so exhibit less propensity to use trust or company structures. There is weak support for either a life cycle, age or commencement date effect with surviving firm selection of organisational form which weakens support for H2. There is no support for any connection between business origin and organisational form, thus avoiding such a confounding influence.

There is empirical support for doubting the meaningfulness of selected organisational forms as indicators of economic boundaries and hence the performance of owner-managed firms in the context of both H2 and H3. It is reasonable to question the relevance of organisational boundaries for owner-managed firms on at least three points, providing a sufficient basis for rejecting H1 and substantially weakening support for H3:

- The limited liability of incorporated owner-managed businesses is largely eroded with the subversion of the legal barrier by personal guarantees for company debt. Two caveats to this conclusion are the extent to which a debt exceeds the agreed amount of any guarantee and the position of unsecured creditors. The former rarely occurs by design and the latter warrants further investigation elsewhere.

- Owner-managers appear to discount or ignore organisational boundaries in their disposition of assets and debts between personal consumption and the business.

- The proposition that incorporated structures generally are employed to manage complex associations or as equity raising vehicles are unlikely, given the extensive use of such structures in businesses that are effectively soletraders.

These results have important implications for analyses employing traditional accounting disclosures individually or in aggregate (for example, performance and debt analysis and statistical aggregation employing debt or asset measures) and fundamental studies that view the firm to be defined by some formal organisational structure. The weak support for H2 indicates that some firms (particularly incorporated surviving firms) may have more sophisticated management and so may be better able to manage the necessary decision processes to satisfy owner-manager objectives. The confounding possible age effect indicates that this is likely to be a minor influence at most.

These results are important in establishing whether owner-managed firms can be described as inseparable from their owner-managers. The propensity of owner-managers to transact across the notional boundaries of organisational forms (relative to domestic activities) allows rejection of H1 and reinforces the argument heralded in Chapter 1 that the behaviour of owner-managed firms is dominated by the interests of proprietorship. This supports the assumption in the theoretical framework developed here that the purposes of the firm are determined by the objectives of the owner-manager.

CHAPTER 11

TESTS OF CHANGES IN CONSUMPTION

INTRODUCTION

This chapter tests changes in consumption expenditures relative to other events and decisions for hypotheses H4 through H8C (see Chapter 8). The underlying purpose is to test for base consumption targets and the responsiveness of consumption to income and debt. First, the available consumption data and its main deficiencies are described. Then the first set of empirical tests focuses attention on consumption changes across time periods. The third section considers consumption as a decision variable in a linear model with owner-manager input choices.

CONSUMPTION DATA

Data concerning consumption elements for the samples of owner-managed firms are scant (data access limitations were noted in Chapter 9) and are not sufficient for any analysis of individual consumption items or planned consumption. The data offer some opportunity to study *achieved* consumption levels and relationships with other variables, using estimates of consumption funded by withdrawals from the firm.

Estimating consumption expenditure

Periodic *ex post* estimations of consumption expenditures derived from the database are the net composite results of estimated realised (cash) earnings and changes in equity accounts. For incorporated firms, the measure takes account of proprietors' wages and changes in their loan accounts. For unincorporated firms, the estimate was reconciled with disclosed drawings to check the validity of the estimation procedure. If drawings are disclosed for unincorporated firms, successive years of data are not needed to estimate consumption.

Income tax

Personal and entity tax obligations are estimated so that withdrawals are net of income tax. The relevant tax regime for the financial year is applied on the assumption that any profit distributions were in equal proportions to multiple owner-managers and all individuals qualified for the general rebate only. Distributions include net accounting profits accruing to owner-managers of unincorporated firms and all payments for services and dividends to the shareholders of incorporated firms. This is a noisy estimate of taxable income. The probable bias is to overstate tax liabilities, thus understating consumption expenditure. However, it is necessary to attempt to control for tax obligations given the potential for otherwise overstating consumption expenditure and the possible impact of tax obligations on consumption behaviour and firm survival.

Understatements and Overstatements

It is possible that the measures understate consumption for some owner-managers regardless of the tax effect described above. Consumption that might not be captured in the estimates includes that from personal savings, off-balance sheet asset liquidations and the raising of personal debt. Similarly, but less likely, investment in other firms, loans to other parties and redeemable expenditure on assets may induce overstatements in consumption expenditure measures for some owner-managers. Because the available data does not identify the purposes of withdrawals, it is assumed that all removals of funds from the business entity by the owner-managers are consumption. This increases the possibility of overstatements of consumption expenditures.

A potentially important cause of understatements is where an owner-manager's consumption is partly funded from other sources of income, such as external wages or salary earned by other household members. The main concern regarding such understatements is the effect on the estimated level of consumption. This is unlikely to establish spurious statistical relationships; rather, it may prevent the identification of relationships that do exist. In this sense it adds to the conservatism of some of the tests

that follow by reducing the likelihood of significant associations being identified. This effect will arise because understated consumption may cause an owner-manager to be incorrectly assigned to lower consumption groups. This is of particular concern in the tests that consider effects relative to an owner-manager's consumption group; these are mostly based on quartile or median groupings.

The external income of a spouse reduces the amount of household consumption to be financed from the earnings of the firm. Owner-managers in such circumstances should behave differently from those totally dependent on the firm for satisfying consumption because of their different levels of income-consumption uncertainty and the possibly different relative consumption targets they have achieved. Because most of the relevant hypotheses identify those in the lower consumption ranges as having the more volatile consumption responses, the effect of the possible understatements will be to dampen the measured effects and so act against confirmation of the hypothesised relationships.

The possible incidence of such problems is relatively low. Of the 366 consumption observations described in Table 11.1, 15 (4 per cent) apply to seven owner-managers who have spouses who are known to be receive other income and another 16 owner-managers whose status is unknown. The nature of the other income being received made it difficult to justify excluding such cases from the analysis. The seven cases are described as follows:

- A partnership of three people where two of the partners held other business interests for which details were not held.
- A partnership of two people where one partner's spouse was employed elsewhere.
- A partnership of two people, both of whom had spouses employed elsewhere.
- A husband-wife partnership where one spouse maintained a part time job for the first of the two years for which data is held.

- A husband-wife partnership where one spouse had been in a professional partnership but left it (while retaining a capital interest) to work full time in the family business during the second of the three years for which data is held.
- A soletrader whose spouse earned an income from what appeared to be another business.
- A sole trader whose spouse lost a job during the second of the two years for which data is held. The business subsequently failed.

In most of these cases there is no basis for determining which sources of income the owner-managers would view as the more uncertain. While wages and salaries are often viewed as more certain the incidence of such income here (four of the seven cases) seems very low[1]. Where the supplementary income is from another business, it is not clear which should be treated as the focus of decision making. Ideally, details of all household income should be included in the data, but the details of such income in the bank files was mostly cursory and incomplete.

What is not known is the capacity of or opportunity for either proprietors or members of their households to supplement household income by obtaining additional employment. There is not *a priori* basis for identifying which firms are most likely to be thus affected. Consequently, while noting the possible limitation caused by the potential consumption understatement, the impact on the following tests is unlikely to be severe. Where such an impact may be significant, it is believed that it will increase the conservatism of the tests by suppressing the hypothesised relationships.

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1 While it cannot be tested here, it is possible that the low incidence of owner-managers with access to any significant external income (and particularly the apparent absence of salaried spouses) is because, being in a more secure financial position, they have greater capital and so are less likely to have sought bank financing for their business. The absence of such firms does not represent a bias in the testing because the framework is intended to apply to owner-managers who have established a business as the principal means of satisfying their consumption aspirations.

Overall data set

A case-wise listing of 377 available consumption estimates classified by financial year is presented in Appendix 4. As expected from Chapter 9, the data is concentrated in the three years 1986-88. The volume of available cases is described in Table 11.1.

Table 11.1
Sample sizes for consumption estimates

form	survivor firms		recovery action firms		Combined	
	number of firms	number of observations	number of firms	number of observations	number of firms	number of observations
Soletraders	13	32	4	6	17	38
Partnerships	18	31	16	26	34	57
Companies	64	156	30	48	94	204
Trusts	26	54	8	13	34	67
Total	121	273	58	93	179	366

Eleven observations (10 incorporated and one unincorporated) are not used because of difficulties in estimating tax for some cases, leaving 366 consumption estimates. Incorporated survivor firms dominate the sample, despite the data required to calculate 'withdrawals' from such firms. This is attributed to their superior financial statement data. Partnerships are equally represented across the two samples, despite their disproportionate numbers in the complete samples described in Chapter 9. Many observations reported in Table 11.1 are not consecutive (see Appendix 4), reducing the sample sizes for tests involving changes in consumption expenditures[2]. The number of consecutive consumption estimates[3] are summarised in Table 11.2, which indicates a very rapid decline in sample size as the number of periods increases.

2 Consumption is estimated from data concerning available surpluses and distributions (including 'withdrawals' through loan accounts). Financial statement data at two consecutive balance dates are required to estimate the funds drawn from an incorporated firm during the period so that changes in consumption thus requires three consecutive balance dates.

3 The 203 cases of two consecutive estimates includes the cases where there are more than two consecutive estimates, so that each other column is a subset of any column to its left.

Table 11.2
Sample sizes for consecutive consumption estimates

	Number of consecutive consumption estimates			
	2	3	4	5
Surviving cases	162	85	35	9
Recovery action cases	41	13	1	0
	203	98	36	9

Relating aspirations to available data

To relate owner-manager aspirations to the available data, it is necessary to assume some degree of behavioural consistency in terms of relative levels of consumption expenditure. The means and medians for the consumption measure are reported separately in Table 11.3 for surviving and recovery action firms. The disparate levels for recovery action companies and trusts are peculiar, highlighting the need to control for possible differences attaching to such cases in subsequent analyses.

Table 11.3
Means and medians of consumption estimates

	n	mean $	median $
Surviving firms:			
Soletraders	32	28565	15127
Partnerships	31	10012	6080
Companies	156	20538	12401
Trusts	54	23411	17184
Total	273	20852	12967
Recovery action firms:			
Soletraders	6	16755	16975
Partnerships	26	16413	15200
Companies	48	6161	7801
Trusts	13	29362	22910
Total	93	12954	12807
Combined sample:			
Soletraders	38	26700	15127
Partnerships	57	12932	10606
Companies	204	17155	11218
Trusts	36	60602	29141
Total	366	18845	12850

These indicate the distributions of consumption measures are skewed to the right for surviving firms, with recovery action firms varying with organisational form. The small sample sizes prevent meaningful comparisons of consumption between the recovery action and surviving firms by organisational form. Overall, mean consumption is larger for surviving firms than for recovery action firms and the medians are similar. Little can be concluded from this without further analysis.

CONSUMPTION CHANGES

This section reports tests of hypotheses concerning the direction of changes and stability in observed consumption expenditures. Because of the previously noted data limitations, the tests for hypothesised behaviour are indirect.

Hypotheses regarding changes in consumption

The model presented in Chapter 7 indicates that changes in consumption can be explained, in part, by reference to the achieved level of consumption, survival expectations and the perceived stability of income. Chapter 8 identifies several hypotheses in this context to test the circumstances in which consumption increases, remains stable or decreases. These hypotheses are restated below.

Increasing consumption:

Consumption increases are more likely where previously achieved consumption is in the lower range. (H4)

Consumption increases are more likely where previously achieved consumption is in the lower range and either:

- *current income (net of debt servicing obligations) is higher than previously achieved consumption; or* (H4A)
- *income has an increasing trend.* (H4B)

Stable consumption:

Stability in consumption levels is observed where:

- *the excess of income (net of debt servicing obligations) over achieved consumption is non-negative but relatively small; or* *(H5A)*
- *achieved consumption is relatively very large.* *(H5B)*

Decreasing consumption:

Consumption decreases are more likely where previously achieved consumption is in the middle or upper ranges. *(H6)*

Consumption decreases are more likely where previously achieved consumption is in the middle or upper ranges and:

- *current income (net of debt servicing obligations) is less than previously achieved consumption ; or* *(H6A)*
- *income has a decreasing trend.* *(H6B)*

Testing difficulties

Three difficulties in testing the consumption hypotheses with the available data are:

- Aspirations, and thus base consumption and other thresholds, are not known.

- Relevant decisions by owner-managers and outcomes occur on a frequent basis, such as daily or weekly, while the available data is yearly.

- Consecutive periodic observations for individuals are relatively few, with very few firms having more than three years of data. Table 11.4 describes the sample data by organisational form.

Table 11.4

Sample sizes for two consecutive annual consumption measures

Organisational form	survivor firms		recovery action firms		Combined	
	number of firms	number of observations	number of firms	number of observations	number of firms	number of observations
Soletraders	10	20	2	2	12	22
Partnerships	10	15	10	13	20	28
Companies	47	98	14	20	61	118
Trusts	16	29	4	6	20	35
Total	83	162	30	41	113	203

Incorporated firms with less than three years of data are precluded from analyses of changes in consumption by the nature of the calculations for estimating two consecutive consumption measures. The survivorship bias in this data may be strong, given the large number of firms that failed in their first three years. As expected, the recovery-action firms provide comparatively fewer observations. Consecutive consumption estimates were obtained for 113 of the 179 firms identified in Table 11.1. Of these, only 32 are unincorporated (partnerships and soletraders) and provide only 50 of the 203 consumption comparisons.

A test of changes in consumption based on ranks

Given the limited number of observations available for each owner-managed firm, the consumption change hypotheses are tested first using the non-parametric Kruskal-Wallis ranks test. This treats the firms as forming multiple independent populations. For this purpose, it is assumed that 'population' membership is determined by the consumption level in the first year of a two year period. Table 11.5 identifies the number of observations of net consumption available for each two year period. These are detailed on a case-wise basis in Appendix 4.

Table 11.5
Consumption changes between years

	Consumption changes over 2 years		
	Increased	Decreased	Total
1987-88	37	29	66
1986-87	36	25	61
1985-86	24	21	45
1984-85	18	6	24
1983-84	2	4	6
1982-83	1	0	1
	118	85	203

The first year of each two year period gives the initial consumption level to which the second observation is compared. Testing periods separately avoids time dependent

variations and ensures the necessary independence of the sample sets. As expected, most observations are for increased consumption, but in a surprising proportion (42 per cent) of cases consumption decreased. The small number of cases for the two year comparisons prior to 1985-86 are omitted from the ranks tests.

The ranks test

The rank of any observation is $R(X_{ij})$, where i denotes the population within which the observation occurred and j identifies the element within the population of size n_i. The average rank for the relevant number of observations is assigned for ties. R_i denotes the sum of ranks assigned to observations in the ith population:

$$R_i = \sum_{j=1}^{n_i} R(X_{ij}) \quad for\ i = 1 \text{ to } k \text{ samples}$$

The random variable being tested is the change in consumption across the two consecutive years. Using the quartiles for the first years' consumption to group the firms, four 'populations' are obtained for each year. Across the combined set of 'populations', rank 1 is assigned to the smallest observed change (including any negative changes) in consumption from year 1 to year 2, rank 2 to the second smallest and so on. Therefore, in 1987-88 the largest change has a rank of 66.

The Kruskal-Wallis test is designed to be sensitive against differences among means in the k populations. The operational hypotheses can be stated therefore in the null and alternative as:

H_0 : The quartile groupings of initial net consumption levels have, on average, equivalent changes in consumption.

H_1 : Some of the groupings have larger net consumption changes than others.

This pertains directly to H4, H5B and H6. The conditions in H4A, H4B, H5A, H6A and H6B are considered later. The test statistic, as described in Conover (1980, p. 230) is

$$T = \frac{1}{S^2}\left(\sum_{i=1}^{k}\frac{R_i^2}{n_i} - \frac{N(N+1)^2}{4}\right)$$

where

$$S^2 = \frac{1}{N-1}\left(\sum_{\substack{\text{all}\\ \text{ranks}}} R\left(X_{ij}\right)^2 - N\frac{(N+1)^2}{4}\right)$$

If there are no ties, S^2 simplifies to $N(N+1)/12$ and the test statistic reduces to

$$T = \frac{1}{S^2}\left(\sum_{i=1}^{k}\frac{R_j^2}{n_i} - 3(N+1)\right)$$

Results of the ranks tests

The result for each of the sets of years for 1985-88 are given in Table 11.6[4]. Panel A1 tests the mean rank scores for *increases* in consumption levels between the two years, for 'population' memberships based on the quartiles of the *initial* (achieved) consumption levels. For example, firms with the lowest 25 per cent of consumption estimates for 1987 (of those with increased consumption in 1988) had a mean rank score of 19.44 when all firms with increased consumption in 1988 are ranked by the magnitude of their *change* in consumption. These results do not yield any consistent pattern across the years for increased consumption cases.

Panel A2 is similar to A1, but considers only *decreases* in consumption. For these cases, there is a consistent pronounced difference in ranks for the second and fourth quartile groups in all three tests; the differences are statistically significant in the 1987-88 and 1986-87 tests. Note that the smallest rank indicates the largest decrease in consumption.

4 The results were produced using the SPSSx K-W function. The chi-square statistics and corresponding significance levels are adjusted for any ties in ranks.

Table 11.6
Kruskal-Wallis tests of ranks for consumption changes

Panel A: Ranks for changes in consumption $\left({}_{t-1}\Delta c_t\right)$ with groups based on achieved consumption

A1: Increased consumption $\left({}_{t-1}\Delta c_t > 0\right)$:

	Mean rank for quartile groups						
	1	2	3	4	n	chi²	sig.
1987-88	19.44	24.7	8.11	23.11	37	13.1940	.0042
1986-87	21.89	14.78	16.78	20.56	36	2.6376	.4509
1985-86	11.17	11.33	12.83	14.67	24	.9533	.8125

A2: Decreased consumption $\left({}_{t-1}\Delta c_t < 0\right)$:

	Mean rank for quartile groups						
	1	2	3	4	n	chi²	sig.
1987-88	16.86	20.75	15.43	6.14	29	11.5734	.0090
1986-87	11.33	17.00	15.71	7.50	25	6.3829	.0944
1985-86	11.80	13.40	11.50	7.20	21	2.7455	.4326

Panel B: Ranks for achieved consumption $\left({}_{t-2}c_{t-1}\right)$ with groups based on changes in consumption

Percentage change in consumption within 10% : $\%\Delta c = \left[\left({}_{t-1}\Delta c_t\right) \div \left({}_{t-2}c_{t-1}\right)\right]$

	Decreased $\%\Delta C < -10\%$	Stable $\lvert\%\Delta c\rvert \leq 10\%$	Increased $\%\Delta C > 10\%$	n	chi²	sig.
1987-88	40.96	36.50	27.40	66	7.7127	.0211
1986-87	36.36	48.75	25.60	61	9.2451	.0098
1985-86	27.80	36.00	18.46	45	6.5208	.0384

Therefore, the low mean rank in the fourth group indicates that firms with the highest level of initial (achieved) consumption have the largest average decrease in subsequent consumption, consistent with H6.

Panel B separates the relatively stable changes in consumption by grouping separately those cases where the consumption change was within ±10 per cent of initial consumption. These are then compared to groups based on increased and decreased consumption outside the 10 per cent cutoff on the basis of mean ranks for achieved consumption. The statistically significant differences in mean ranks across the three groups each year are consistent with H4, H5B and H6. The same pattern of results occurs when the relative stability measure is increased to 30 per cent.

Conclusions based on the ranks tests

The general picture from the results in Table 11.6 is that the magnitude of decreased consumption corresponds to the relative level of initial consumption (H6), lower initial consumption levels are more likely to accompany increase consumption in the next year (H4) and firms with relatively stable consumption have ave rage achieved consumption ranks in the middle to upper ranges (H5B).

Income effect

It is hypothesised that changes in consumption depend partly on whether current income (adjusted for tax and debt servicing) exceeds previous consumption (H4, H5A, H6A) or trends in income (H4B, H6B). These are operationalised below in two stages.

Current income relative to achieved (previous) consumption

Cases are grouped according to whether current realised[5] income (adjusted for bank debt servicing and tax) exceeds previous consumption $\left(y_t \leq_{t-2} c_{t-1}; y_t >_{t-2} c_{t-1}\right)$ and compared for changes in the level of consumption $\left({}_{t-1}\Delta c_t\right)$. The results are reported in Table 11.7.

Each result is statistically significant based on a chi-square test for differences in probabilities. The chi-square statistics and associated *p*-values are reported for each test in Table 11.7. All tests show average behaviour in the predicted direction and generally support the proposition that increases in consumption are more likely to occur if there is surplus current income relative to the previous period's consumption. This behaviour is more evident if the excess of current realised income over prior consumption is adjusted for current tax (compare tests 7 to 8 in Table 11.7). While adjustments for debt generally detract from the results (compare tests 1, 3 and 5 to test 8), adjustments for the use of overdrafts to offset retirement of loans strengthens the debt results (compare 3 to 1 and 4

5 That is, before depreciation and accruals.

to 2)[6]. However, these are aggregated effects and do not consider the level of achieved consumption proposed in H4A and H6A.

Table 11.8 compares changes in consumption and current period income relative to previous period consumption, grouped by the achieved (prior period) consumption quartiles. Current period income is considered before tax and debt servicing (as per test 8 in Table 11.7) , net of tax (as per test 7 in Table 11.7) and net of current tax and changes in bank loan principal and overdraft balances (as per test 6 in Table 11.7).

Table 11.7

Current income adjusted for tax and debt relative to achieved (previous) consumption × consumption increase/decrease

	$y_t \leq_{t-2} c_{t-1}$		$y_t >_{t-2} c_{t-1}$			
Adjustments to y_t:	$\Delta c < 0$	$\Delta c > 0$	$\Delta c < 0$	$\Delta c > 0$	χ^2	*sig (p)*
1. Net of loan repayments	48	48	37	70	4.94	.02619
2. Net of loan repayments and tax	53	51	32	67	7.24	.00713
3. As per 1, adjusted for overdraft offsets	53	48	32	70	9.29	.00231
4. As per 2, adjusted for overdraft offsets	54	48	31	70	10.32	.00132
5. Net of bank debt changes, ignores tax	38	31	47	87	7.48	.00623
6. Net of bank debt changes and tax	43	33	42	85	10.80	.00102
7. Net of tax, ignores debt	51	42	34	76	11.86	.00057
8. Ignores tax and debt	46	40	39	78	8.27	.00402

Panel A compares the variously adjusted current period income, relative to previous period consumption, for groups based on initial consumption quartiles. Firms are less likely to reveal surplus current income over previously achieved consumption as their levels of achieved consumption increase, falling from 59 per cent for the first group (achieved consumption below the first quartile) to 36 cent for group 4 (achieved consumption above the 75 percentile) for unadjusted income. A similar pattern pervades the tests that take account of tax and debt. The overall differences are statistically significant for tests based on unadjusted income and income after tax.

6 Controlling for recovery action versus surviving firms provided for the same patterns of results.

Table 11.8

Comparison of relative income-consumption patterns grouped by quartiles/median of achieved consumption

Panel A: Current period income relative to achieved (previous) consumption

	1st quartile ${}_{t-1}C_t$	2nd quartile ${}_{t-1}C_t$	3rd quartile ${}_{t-1}C_t$	4th quartile ${}_{t-1}C_t$	χ^2	DF	*sig (p)*
Surplus before tax and debt servicing:							
$y_t \leq {}_{t-2}C_{t-1}$	19	19	30	32	8.86	3	.03115
$y_t > {}_{t-2}C_{t-1}$	27	25	17	18			
Surplus after tax (ignores debt servicing):							
$y_t \leq {}_{t-2}C_{t-1}$	18	17	29	29	10.97	3	.01188
$y_t > {}_{t-2}C_{t-1}$	33	34	22	21			
Surplus after tax and changes in bank debt:							
$y_t \leq {}_{t-2}C_{t-1}$	18	17	18	23	8.86	3	.54548
$y_t > {}_{t-2}C_{t-1}$	33	34	33	27			

Panel B: Income changes relative to achieved (previous) consumption

	1st quartile ${}_{t-1}C_t$	2nd quartile ${}_{t-1}C_t$	3rd quartile ${}_{t-1}C_t$	4th quartile ${}_{t-1}C_t$	χ^2	DF	*sig (p)*
${}_{t-1}\Delta C_t < 0$	10	16	27	32	25.32	3	.00001
${}_{t-1}\Delta C_t > 0$	41	35	24	18			

Panel C: Current period income relative to achieved (previous) consumption grouped by achieved consumption median

	lower 50% of achieved consumption ${}_{t-1}C_t$		upper 50% of achieved consumption ${}_{t-1}C_t$		χ^2	DF	*sig (p)*
	${}_{t-1}\Delta C_t < 0$	${}_{t-1}\Delta C_t > 0$	${}_{t-1}\Delta C_t < 0$	${}_{t-1}\Delta C_t > 0$			
Surplus before tax and debt servicing:							
$y_t \leq {}_{t-2}C_{t-1}$	12	22	34	18	7.48	1	.00623
$y_t > {}_{t-2}C_{t-1}$	14	54	25	24	11.89	1	.00057
Surplus after tax (ignores debt servicing):							
$y_t \leq {}_{t-2}C_{t-1}$	13	22	38	20	7.10	1	.00773
$y_t > {}_{t-2}C_{t-1}$	13	54	21	22	10.63	1	.00112
Surplus after tax and changes in bank debt:							
$y_t \leq {}_{t-2}C_{t-1}$	13	22	30	11	9.98	1	.00159
$y_t > {}_{t-2}C_{t-1}$	13	54	29	31	11.97	1	.00054

Panel B indicates that the proportion of cases with increased consumption has a significantly different incidence (compared to those with decreased consumption) across the groups. Eighty per cent of the first quartile group and 69 per cent of the second quartile group showed increased consumption, while 53 per cent of third quartile group and 64 per cent of fourth quartile group showed decreased consumption. This is consistent with hypothesised behaviour (H4, H6).

Panel C reports the comparison of the variously adjusted income (relative to previous period consumption) by consumption changes, for cases grouped as above or below median initial consumption. Firms with low initial consumption tend to increase subsequent consumption, with the effect being most pronounced where there is a subsequent surplus of current income over initial consumption. Firms with high initial consumption tend to decrease subsequent consumption if income is less than previous consumption and are equally likely to increase or decrease subsequent consumption if there is a surplus. The differences across the groups are statistically significant for all the tests and provide strong support for H4A and H6A.

Increasing income

Cases are grouped to separate any trend in income over a three year period $(y_t > y_{t-1})$. and compared for changes in the level of consumption $({}_{t-1}\Delta c_t)$. The results are reported in Table 11.9. Trend in income and consumption changes were considered with various inflation levels; only the results for zero and ten per cent are reported.

The hypothesis that decreases in consumption most likely emanate from cases of higher achieved consumption and a downward income trend is supported more if the data is adjusted for an inflation of 10 per cent[7], but the result is insignificant and so H6B is not

7 The data applies to the financial years 1987 to 1989, for which the CPI-based inflation measure ranged between 7-9 per cent. Any adjustment assumes individuals are affected uniformly by inflation. The CPI contains a substantial durable goods component but is likely that individuals'

continued on the next page

adequately supported. The reciprocal hypothesis (H4B) that increases in consumption most likely emanate from firms with the lower level of achieved consumption and an increasing trend in income is not supported by this test.

Table 11.9
Income trends and changes in consumption

Decreased consumption:						
Trend in y_t: $y_{t-2} \rightarrow y_{t-1} \rightarrow y_t$	Decreasing		Not decreasing			
Achieved consumption $_{t-1}c_t$	lower 50%	upper 50%	lower 50%	upper 50%	χ^2	*sig (p)*
Inflation ignored	8	3	17	16	1.51298	.21868
Inflationary factor of 10%	5	2	17	17	1.07194	.30051
Increased consumption :						
Trend in y_t: $y_{t-2} \rightarrow y_{t-1} \rightarrow y_t$	Increasing		Not increasing			
Achieved consumption $_{t-1}c_t$	lower 50%	upper 50%	lower 50%	upper 50%	χ^2	*sig (p)*
Inflation ignored	6	3	18	16	.54360	.46094
Inflationary factor of 10%	11	4	16	15	1.96712	.16075

A test of changes in consumption using a linear model

Positive changes in consumption reflect either a shift in aspiration levels or continued pursuit of lower level (base) target consumption (see Chapter 8). While this was partially tested above, a more sophisticated approach is to view consumption changes as the result of a linear combination of potential determinants.

The model

In keeping with the propositions in earlier chapters, changes in consumption can be posited as functions of previously achieved consumption, earnings history (realised periodic income and variability of income), prior period savings, the industry classification of the firm (*IND*) and known contracted expenditures for the period (rent, leases and accrued tax liability). The industry of the firm may reflect more than one

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purchasing patterns vary substantially from the CPI basket of goods in the short term. Any such inflation adjustment assumes expenditure patterns are uniform both within and across time periods. Rates between 5 and 15 per cent were tested, but did not yield results any stronger than those reported for the 10 per cent adjustment.

relevant influence: it may proxy the anticipated earnings prospects of the individual, but could also reflect different opportunities for consumption of perquisites or otherwise concealing domestic consumption within the firm. Given the inclusion of the short earnings history (given by y_{t-1} and y_{t-2}), the additional earnings relevance of *IND* may be more a measure of confidence, than simple variability.

Rent and lease may be relevant other than as commitments. Low or zero rent indicates a higher degree of ownership of premises. While this may involve correspondingly larger debt, it can also provide more certainty (or security) to the owner-manager. This also leads to an expectation of a negative coefficient for rent. Leases may signal perquisite consumption, such as leased motor vehicles that are also used privately. This also leads to an expectation of a negative coefficient for leases as the ability to consume perquisites should reduce the demand for other forms of consumption. The initial model can be described thus:

$$
\begin{aligned}
{}_{t-1}\Delta c_t = {} & b_0 + b_1\left({}_{t-2}c_{t-1}\right) + b_2\left({}_{t-2}\Delta c_{t-1}\right) + b_3\left(y_{t-1}\right) + b_4\left(y_{t-2}\right) + b_5\left(\sigma_y^2\right) \\
& + b_6\left(s_{t-1}\right) + b_{7,i}\left(IND_j\right) + b_{8,k}\left(COMMIT_{k,t}\right)
\end{aligned}
$$

where ${}_{t-1}\Delta c_t$ = the change in observed consumption expenditure between $(t-2, t-1]$ and $(t-1, t]$.

${}_{t-2}c_{t-1}$ = observed consumption expenditure for $(t-2, t-1]$.

y_{t-i} = income for $(t-i-1, t-i]$ reported at $t-i$.

$$\sigma_y^2 = \text{variance of } y \text{ during } [t-2, t] = \sum_{i=0}^{2}\left(y_{t-i} - \frac{\sum_{i=0}^{2} y_{t-i}}{3}\right)^2 \div 3$$

s_{t-1} = savings for $(t-2, t-1]$ estimated at $t-1$.

IND_j = industry classifications
- j=1: consumer manufacturing, wholesale and retail
- j=2: commercial manufacturing, wholesale and retail
- j=3: leisure and tourism
- j=4: personal and domestic services
- j=5: commercial services
- j=6: construction and property related

$COMMIT_{k,t}$ = selected pre-commitments for expenditure in $(t-1, t]$
- k=1: $RENT_t$
- k=2: $LEASES_t$
- k=3: TAX_{t-1}

The correlation coefficients for the explanatory variables are reported in Table 11.10. These reveal several significant associations which may induce collinearity problems with models that include the highly correlated variables. This will be considered in the discussion of the regression results.

Table 11.10
Correlation coefficients for explanatory variables

	$_{t-2}c_{t-1}$	$_{t-3}c_{t-2}$	$_{t-2}\Delta c_{t-1}$	y_{t-2}	y_{t-1}
$_{t-2}c_{t-1}$	1.0000	.2695**	.8799**	-.0482	.6795**
$_{t-3}c_{t-2}$	.2695**	1.0000	-.2204*	.2359	.2578*
$_{t-2}\Delta c_{t-1}$	.8799**	-.2204*	1.0000	-.1652	.5610**
y_{t-2}	-.0482	.2359*	-.1652	1.0000	.1138
y_{t-1}	.6795**	.2578*	.5610**	.1138	1.0000
σ_y^2	.6480**	.2066*	.5518**	-.3978**	.6313**
$LEASES_t$	-.1562	-.0259	-.1524	.1543	.2173*
$RENT_t$	.2223*	.2561*	.1045	.2867**	.2650**
TAX_t	.6088**	.3284**	.4559**	.2165*	.9235**
s_{t-1}	.0578	.0597	.0288	.1428	.7095**
	σ_y^2	$LEASES_t$	$RENT_t$	TAX_t	s_t
$_{t-2}c_{t-1}$	.6480**	-.1562	.2223*	.6088**	.0578
$_{t-3}c_{t-2}$	.2066*	-.0259	.2561*	.3284**	.0597
$_{t-2}\Delta c_{t-1}$	.5518**	-.1524	.1045	.4559**	.0288
y_{t-2}	-.3978**	.1543	.2867**	.2165	.1428
y_{t-1}	.6313**	.2173*	.2650**	.9235**	.7095**
σ_y^2	1.0000	.1115	.0973	.5883**	.3097**
$LEASES_t$	.1115	1.0000	.2066*	.1795	.3859**
$RENT_t$	.0973	.2066*	1.0000	.2612**	.1996
TAX_t	.5883**	.1795	.2612**	1.0000	.6639**
s_{t-1}	.3097**	.3859**	.1996	.6639**	1.0000

* - Significant at $p \leq .05$ ** - Significant at $p \leq .01$ (2-tailed)

Testing revealed that the only industry effects are attributable to personal and domestic services (IND_4) and commercial services (IND_5). With near identical effects these could be combined as a single control variable. The results are described in Table 11.11.

Table 11.11
Multiple regression tests of changes in consumption

Model 1

Variable	B	SE B	Beta	T	Sig T
${}_{t-3}c_{t-2}$	-.244876	.314087	-.105601	-.780	.4380
${}_{t-2}\Delta c_{t-1}$	-.885590	.228667	-.779460	-3.873	.0002
y_{t-1}	.277341	.226523	.401916	1.224	.2246
y_{t-2}	.310530	.108261	.322027	2.868	.0053
σ_y^2	.969244	.138277	.993592	7.009	.0000
s_{t-1}	.084840	.148761	.107863	.570	.5701
$IND_{4\&5}$	-39018.76033	16315.91626	-.193116	-2.391	.0193
$RENT_t$	-.023522	.261539	-.007633	-.090	.9286
$LEASES_t$	-.361073	.156060	-.215679	-2.314	.0234
TAX_t	-.756612	.359798	-.456869	-2.103	.0388
Constant	10902.792513	11095.91043		.983	.3289

Variable not in the equation :

Variable	Beta In	Partial	Min Toler	T	Sig T
${}_{t-2}c_{t-1}$	1.000000	1.000000	-6.744E-16		

Multiple R	.76057
R Square	.57846
Adjusted R Square	.52300
Standard Error	60060.40285

Model 2

Variable	B	SE B	Beta	T	Sig T
${}_{t-3}c_{t-2}$	-.104326	.223571	-.044990	-.467	.6421
${}_{t-2}\Delta c_{t-1}$	-.758489	.130071	-.667591	-5.831	.0000
y_{t-1}	.022590	.084390	.032737	.268	.7896
y_{t-2}	.169694	.097517	.175977	1.740	.0858
σ_y^2	.854903	.126212	.876378	6.774	.0000
s_{t-1}	1663.799328	671.368365	.190962	2.478	.0154
$IND_{4\&5}$	-29525.48836	16170.65396	-.146131	-1.826	.0717
$COMSALE_t$	-70776.42557	36295.35568	-.154646	-1.950	.0548
Constant	15245.237416	12254.45439		1.244	.2172

Variable not in the equation :

Variable	Beta In	Partial	Min Toler	T	Sig T
${}_{t-2}c_{t-1}$	.219872	.000000	6.057E-16	.000	1.0000

Multiple R	.76266
R Square	.58164
Adjusted R Square	.53874
Standard Error	59061.17348

Table continued on the next page

Table 11.11 continued

Model 3

Variable	B	SE B	Beta	T	Sig T
$_{t-2}\Delta c_{t-1}$	-.718828	.100144	-.632683	-7.178	.0000
y_{t-2}	.168604	.079273	.174846	2.127	.0365
σ_y^2	.848219	.092422	.869527	9.178	.0000
s_{t-1}	1745.872397	642.165490	.200382	2.719	.0080
$IND_{4\&5}$	-27625.35375	15531.14059	-.136727	-1.779	.0791
$COMSALE_t$	-68721.23109	35570.97630	-.150155	-1.932	.0569
Constant	12822.787833	11091.33141		1.156	.2511

Multiple R	.76180
R Square	.58034
Adjusted R Square	.54886
Standard Error	58409.39777

Analysis of Variance:	DF	Sum of Squares	Mean Square
Regression	6	377426476943.33200	62904412823.8887
Residual	80	272932619810.25100	3411657747.62815
		F = 18.43808	Signif F = .0000

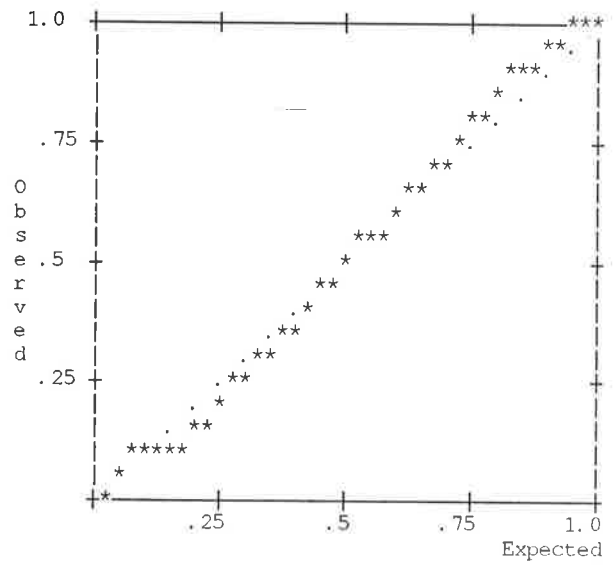
Residuals Statistics:	Min	Max	Mean	Std Dev	N
PRED	-116932.5859	289683.0938	20709.5783	66247.1129	87
RESID	-195754.6250	193283.8125	.0000	56335.0256	87
ZPRED	-2.0777	4.0602	.0000	1.0000	87
ZRESID	-3.3514	3.3091	.0000	.9645	87

Total Cases	105
Durbin-Watson Test	1.71442

Histogram - Standardised Residuals

```
N  Exp N   * = 1 Case,
           .: = Normal Curve
1   .07   Out *
0   .13  3.00
0   .34  2.67
1   .78  2.33 :
0  1.59  2.00  .
0  2.91  1.67   .
6  4.77  1.33 ****:*
6  7.02  1.00 ******.
11 9.24   .67 ********:**
13 10.90  .33 **********:**
12 11.52  .00 ***********:
13 10.90 -.33 **********:**
12  9.24 -.67 ********:***
 4  7.02 -1.00 ****  .
 3  4.77 -1.33 *** .
 2  2.91 -1.67 **.
 2  1.59 -2.00 *:
 0   .78 -2.33 .
 0   .34 -2.67
 0   .13 -3.00
 1   .07   Out *
```

Normal Probability (P-P) Plot Standardised Residuals



While the model offers substantial explanatory power in relation to changes in consumption, some hypothesised variables make little contribution. Consumption at t-1 is omitted on statistical grounds (due to its very high correlation with ${}_{t-2}\Delta c_{t-1}$ (.8799) and several other variables). The coefficients for savings estimate, consumption at t-2, rent obligations and prior income (t-1) are insignificant.

Entering the various commitment variables in their current form has some hazards. The fragmentation of commitments in this way acts against the likelihood of them making individually significant contributions to the model. The similarity of their coefficients suggests that they have similar effects and so may be effectively combined. Commitments (excluding loan repayments) were considered in aggregate as a proportion of sales[8] as reported in Model 2:

$$COMSALE_t = \sum_{k=1}^{3} COMMIT_{k,t} \Big/ SALES_t$$

Model 2 shows *COMSALE* as a significant contributor in explaining changes in consumption. This adjustment also allows the contribution of the savings variable to be brought forward. The only insignificant variables left in Model 2 are the initial achieved consumption (t-2) and prior period earnings (t-1). The latter is also significantly correlated with ${}_{t-2}c_{t-1}$, ${}_{t-2}\Delta c_{t-1}$, σ_y^2, TAX_t and s_{t-1}. Dropping the inefficient ${}_{t-3}c_{t-2}$ and y_{t-1} (which also reduces the potential for collinearity problems) yields Model 3 which has good potential explanatory power of consumption changes as indicated by the R^2 and its significant F statistic.

Earnings variance and the previous consumption change make the greatest contributions to the explanatory power of the model as described by the coefficients for the standardised variables (beta). As expected, commitments and previously achieved consumption levels (and changes) have negative coefficients while income and savings

8 Dividing the aggregate by sales was to remove size effects that do not necessarily lead to income or surpluses. This may also indicate the productive efficiency of the firm where larger values indicate less output (sales) proportional to outlays.

have positive coefficients in all three models. The coefficient for the variance of earnings provides for an interesting result in that it implies consumption will increase more, in the presence of these other variables, the greater the variability of income.

The residuals for this more efficient model are also analysed in Table 11.11. The histogram and normal probability plot for the standardised residuals indicates that they are sufficiently approximately normal, although some minor skewness is evident.

A remaining problem with the model is that, if current consumption changes are strongly related to the variability of income, then so should the other major explanatory variable which is previous change in consumption. From Table 11.10, the correlation between ${}_{t-2}\Delta c_{t-1}$ and σ_y^2 is 0.55 (which is significant at 0.01)[9]. Indeed, σ_y^2 is significantly correlated with several of the other explanatory variables. It is possible that the potential for (multi)collinearity confounds the contribution from σ_y^2 and could even induce the wrong sign. To test for collinearity is well beyond the scope of this current work, however the bivariate correlation coefficient of σ_y^2 and ${}_{t-1}\Delta c_t$ is also positive, suggesting that collinearity is not the appropriate explanation for the unexpected sign on this variable in the multivariate setting[10].

Overall, the regression results provide strong evidence of the association between the various variables and the subsequent changes in consumption for the owner-managed

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9 It is often suggested that levels below 0.90 can be tolerated (Hair *et al.*, 1995). However, it is not obvious that low correlations between variates means low collinearity.

10 The variable is unlikely to proxy income growth, as there are almost as many cases of decreasing income as there are of increasing income, with more than half the firms exhibiting both increases and decreases over the two periods. As a additional check for measurement problems, the variance of y was substituted for σ_y^2 in the regression and produced a very similar but statistically weaker result. Outlier influence is also a concern. When the more extreme values of σ_y^2 were deleted (identified from a scatterplot of σ_y^2 against ${}_{t-1}\Delta c_t$), an insignificant negative bivariate correlation coefficient of σ_y^2 and ${}_{t-1}\Delta c_t$ was obtained on only 42 cases. Little can be concluded from this exercise.

firms, with all included variables[11] except the variability of earnings (as estimated by σ_y^2) acting in the hypothesised direction. The model also supports H4 and H6.

CONSUMPTION AS THE OBJECTIVE IN A LINEAR MODEL

The preceding tests were concerned with outcomes, and their changes over time. Of potentially greater interest are the owner-manager's choice of the inputs that should influence the outcomes. This may allow some inference of *purpose* in the context of the consumption model. In particular, it is desirable to know if increases in income (consumption) were produced (made possible) by increases in investment or effort.

Increased investment may be reflected in increases in assets or periodic inputs. Increased effort is difficult to proxy with the available data[12]. Effort, however, cannot be confidently proxied with the available data. To the extent that wages paid to employees signal a need for labour additional to the owner-managers' efforts, it can be assumed that the presence of such costs indicate owner-manager effort is at its maximum. This is a poor indicator, and so few conclusions regarding effort can be reasonably drawn.

Consumption correlates

Trends in consumption, in the context of the consumption-survival model, should be correlated with trends in the postulated consumption-serving variables, such as income and wealth, and savings as a residual of consumption activity[13].

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11 While not included in the hypothesised model, the age of the firm, recovery action - survivor status and number of owner-managers were also tested as control variables. None appeared relevant. Accounting income measures (before and after depreciation) were substituted for realised earnings y and were not significant as explanatory variables for changes in consumption.

12 There are problems with this approach. It will not capture increases in effort by the owner-manager either in the absence of employees, or as a consequence of increased administration and supervision of employees. The latter may also indicate reduced effort by the owner-manager in direct production as available finite effort is redirected to employee-related tasks.

13 Savings is difficult to interpret, due to it multiplicitous role. As well as being a consumption residual, savings may be planned to stabilise consumption over time, to finance future

The model formulation in Chapter 7 describes income seeking activity as driven in part by current consumption aspirations, survival expectations and savings aspirations. Achieved consumption need not reflect current aspirations and the success of income seeking activity is uncertain. Therefore, any relationship between such activities, income and consumption is difficult to observe. The problems are furthered by the time periods involved. The periods of time required to adjust or observe various aspects of the model are relatively short (possibly daily or weekly in some cases). The available data is yearly. Therefore, any detectable association between changes in the relevant variables is likely to be weak, having been 'averaged out' across the shorter planning intervals.

The primary focus here is on the extent to which income seeking activities follow decisions to increase consumption. The role of savings in this regard is ambiguous. Savings may be used to fund the consumption-income gap, or income may be sought to fund a savings target. The hypothesis was developed in Chapter 8 as:

Consumption expenditure has a lagged correlation with income. *(H7)*

This is partly supported by the regression results reported in Table 11.11 which revealed strong positive correlation coefficients for previously reported realised income relative to *changes* in consumption. On a bivariate basis the correlation coefficients of y_{t-2} and y_{t-1} with ${}_{t-1}c_t$ are 0.0492 and 0.6275 respectively, with the latter significant at $p \leq 0.01$. The limited available time series data restricts the extent to which lagged effects can be tested here; on the basis of these naive tests H7 is accepted for a one period lag.

From the method of revising of the income function contemplated in Chapter 7 (equations 7.13, 7.22 and 7.23), a lagged relationship may influence any association between investment, effort, income and consumption However, the time intervals between data

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consumption after cessation of business, to provide a safety margin for debt servicing requirements, or in anticipation of planned or ad hoc investment opportunities.

observation points are extremely long, (one year). Owner managers would reasonably rely on more frequent observations (in the general context of equations 7.9 through 7.30), suggesting any lagged effect in the data is likely to be very weak. Therefore tests of H8 through H8C are expected to be weak. H8 is addressed first:

Increased income producing expenditure precedes consumption increases. (H8)

Income producing expenditure can measured across numerous possible variables. Those considered here are employee wages and salaries, increased plant and equipment leases (not property rental), total expenses (excluding cost of goods sold and depreciation) and increased fixed assets[14]. These are reported in Table 11.12.

Table 11.12

Cases grouped by change in income producing expenditure and consumption changes

Expenditure type	Expenditure not increased		Expenditure increased		χ^2	*sig (p)*
	$_{t-1}\Delta c_t \leq 0$	$_{t-1}\Delta c_t > 0$	$_{t-1}\Delta c_t \leq 0$	$_{t-1}\Delta c_t > 0$		
Wages and salaries	20	16	17	45	7.67219	.00561
Leases	23	36	14	25	.09512	.75776
Total expenses	11	9	26	52	3.17983	.07455
Fixed assets	14	19	17	37	1.06938	.30109
Increase in either total expenses or fixed assets	No increases	Increase in one	Increase in both	Total		
$_{t-1}\Delta c_t \leq 0$	10	12	9	31	7.76497	.02060
$_{t-1}\Delta c_t > 0$	6	20	30	56		

All expenditure types yield patterns in keeping with H8, whereby the majority of cases with increased consumption had increased expenditures (except lease expenditures), while most cases with increased expenditures had increases in consumption. Only the overall results for wages/salaries and total expenses were statistically significant (based

14 It is plausible that increased income resulting from increased investment in assets is realised in later periods, but the limited number of observations prevent effective testing for such a lag effect.

on chi-square statistics). The insignificant result for fixed asset expenditures appears to reflect the sensitivity of chi-square tests to smaller sample sizes.

Groupings based increases in one or both of total expenses (excluding cost of goods sold and depreciation) and fixed assets are described in the second panel in Table 11.12. The pattern strongly accords with the hypothesis, with very few increases in consumption occurring without a preceding increase in at least one of the income producing expenditures, and the largest proportion occurring after both types of expenditure had occurred. These results are statistically significant at p=0.02. While these tests are not particularly strong, the results nonetheless support H8.

While H8A through H8C are not mutually exclusive, it is possible for any of them to be supported without the others:

> *Increases in consumption are funded from savings in periods where income producing expenditures increase without increases in realised income.* (H8A)
>
> *Consumption does not increase in years where income producing expenditures increase without increases in realised income where prior consumption levels are in the higher ranges.* (H8B)
>
> *Increases in consumption are funded from debt in years where income producing expenditures increase without increases in realised income where prior consumption levels are in the lower ranges.* (H8C)

The data has to be variously subdivided to capture the different subsets of cases described in these hypotheses. Using the same expenditure types as before, they are tested in a similar manner and reported in Tables 11.13 and 11.14.

If changes in consumption are grouped according to whether there were retained earnings (proxying savings) in the prior period (first line, first panel, Table 11.13), the frequencies indicate a significant pattern (p=0.00305) between the existence of prior

surpluses and consumption increases. If only cases with no subsequent gain are considered (second line, first panel), the pattern appears even more dramatic, albeit less significant (p=0.04842) due to the reduced sample size.

To test H8A the groups are moderated for a preceding increase in income producing expenditure. As reported in the second panel of Table 11.13, the frequencies accord with expectations but small cell counts induce insignificant chi-square statistics for some of the expenditure proxies. Overall the results are affirmative, but this is not an ideal test of H8A because magnitudes of changes and savings are ignored and the savings proxy ignores surpluses from earlier periods and possible applications of surpluses to uses such as investment or retirement of debt. With these reservations in mind, H8A is accepted.

Table 11.13

The relevance of savings to consumption changes, income producing expenditure and changes in income

	No savings at t-1		Savings at t-1			
	$_{t-1}\Delta c_t \leq 0$	$_{t-1}\Delta c_t > 0$	$_{t-1}\Delta c_t \leq 0$	$_{t-1}\Delta c_t > 0$	χ^2	*sig (p)*
Prior savings x $_{t-1}\Delta c_t$:						
Ignoring Δy_t	22	18	15	43	8.55263	.00345
$\Delta y_t \leq 0$	7	7	7	26	3.89509	.04843
No subsequent increase in income:						
Expenditures increased:						
Wages and salaries	4	6	4	16	1.36364	.24291
Leases	4	3	1	8	3.88341	.04877
Total expenses	5	6	4	22	3.79693	.05135
Fixed assets	2	5	5	13	.00157	.96835
Either FA or TE	2	6	4	9	.08077	.77626
Both FA & TE	2	1	1	6	2.74376	.09763

The proposition that consumption changes based on increased expenditures expected to produce income are dependent on achieved consumption (H8B) are tested by grouping cases according to the median cut-offs of $_{t-2}c_{t-1}$ for the larger data set used earlier (such as those reported in Table 11.6). These are reported in Table 11.14 for cases where

increased expenditure did not result in increased income. The results provide strong support for H8B. In every expenditure subset, the large majority of cases with achieved consumption in the lower range (below the median) increased consumption while half or more of cases with achieved consumption in the upper range (above the median) did not increase consumption. All results are statistically significant, therefore H8B is accepted.

Table 11.14

The relevance of previously achieved consumption to consumption changes, with increased income producing expenditure but no increase in income

	$_{t-2}c_{t-1}$ < median		$_{t-2}c_{t-1}$ > median			
Expenditure increase:	$_{t-1}\Delta c_t \leq 0$	$_{t-1}\Delta c_t > 0$	$_{t-1}\Delta c_t \leq 0$	$_{t-1}\Delta c_t > 0$	χ^2	*sig (p)*
Wages and salaries	1	15	7	7	7.30824	.00686
Leases	0	6	5	5	4.36364	.03671
Total expenses	1	20	8	8	10.09599	.00149
Fixed assets	0	14	7	4	12.37374	.00044
Either FA or TE	0	10	6	5	7.63636	.00572
Both FA & TE	0	5	3	2	4.28571	.03843

Nearly all cases with previously achieved consumption below the median increased subsequent consumption, lending further support to the earlier acceptance of H4. This also provides some guidance on H8C. Testing the debt effect in H8C is particularly problematic because of the difficulty of separating other circumstances that may induce increased use of debt and which may readily coincide with an earnings shortfall and low consumption targets. As identified in Table 11.14, most cases with established consumption below the median increased consumption in the subsequent period, while cases[15] with established consumption above the median were almost equally divided as to the direction of the subsequent change in consumption. The subsequent increased debt

15 These cases are limited to those for which expenditure data were available. Recalling the changes in consumption relative to achieved consumption reported for the larger data set (Panel B Table 11.8), a pattern similar was identified across the quartile groups.

use is now considered for cases where there was an increase in income producing expenditure but no increase in income.

Table 11.15 describes a persistent significant pattern of consumption changes that indicate increased debt use by low consumption users is associated with increased consumption although income did not increase. This pattern is not repeated for higher level consumers.

Table 11.15

Achieved consumption levels and changes with increased income producing expenditure but no increase in income for cases of increased debt

	$_{t-2}c_{t-1}$ < median		$_{t-2}c_{t-1}$ > median			
Expenditure increase:	$_{t-1}\Delta c_t \leq 0$	$_{t-1}\Delta c_t > 0$	$_{t-1}\Delta c_t \leq 0$	$_{t-1}\Delta c_t > 0$	χ^2	*sig (p)*
Wages and salaries	2	18	7	13	3.58423	.05833
Leases	1	8	4	8	1.40000	.23672
Total expenses	5	22	10	14	3.27932	.07016
Fixed assets	1	15	9	8	8.50795	.00354
Either FA or TE	2	12	3	6	1.16825	.27976
Both FA & TE	1	12	8	8	5.99829	.01432

This depiction of events may merely reflect underlying consumption behaviour independent of debt[16] use. Another view of the situation presented in Table 11.16 in which income seeking expenditures are combined and achieved consumption is grouped relative to the quartiles rather than merely the median. In the first panel where there is no increase in income despite income seeking expenditures, it is evident that the lowest level of achieved consumption (1st quartile grouping) is dominated by increased debt. This is a direct test of H8C, and the hypothesised behaviour appears to be strongly supported

16 Debt is the total of term loans, overdrafts and creditors. The composition of debt in such circumstances is considered in Chapter 12.

with chi-square based *p*-value of less than one per cent. The increased debt-consumption phenomena dissipates as previously achieved consumption levels increase.

The second panel (where income did increase with income seeking expenditures) is included as a control comparison. In this panel it is seen that the domination of the lower levels of achieved consumption by increased debt does not occur to the same extent. The significance tests appear to be driven by the frequency of consumption increases by lower quartile cases and the non-increasing consumption behaviour of the upper quartile cases.

Table 11.16

Debt and income increases relative to achieved consumption levels x consumption changes with increased income producing expenditure

Quartile grouping	Debt not increased		Debt increased			
of $_{t-2}c_{t-1}$	$_{t-1}\Delta c_t \leq 0$	$_{t-1}\Delta c_t > 0$	$_{t-1}\Delta c_t \leq 0$	$_{t-1}\Delta c_t > 0$	χ^2	*sig (p)*
No increase in income:						
1st	1	4	0	17		
2nd	0	6	2	7	26.08405	.00198
3rd	3	3	5	10		
4th	7	4	6	4		
Increased income:						
1st	4	4	2	7		
2nd	3	8	2	8	18.13132	.03368
3rd	3	6	10	2		
4th	7	3	11	6		

Comparing the two panels, while income increases are generally observed in the 2nd and 3rd quartile groups, it is more pronounced for the lower (2nd) group regardless of income or debt changes while the 3rd group exhibits a higher propensity to substitute debt for income.

CONCLUSION

The tests conducted in this chapter lend support to some important facets of the proposed role of consumption in the behaviour of owner-managed firms. In particular, consumption behaviour of the sampled firms appears to be consistent with attempts to move through a consumption hierarchy (H4, H6, H8A, H8B) by pursuing income increasing strategies (H8) to maintain previously established consumption levels (H7). Where income seeking activity is not successful, the owner-managers tend to use savings (H8A) or debt to finance consumption. In particular, the use of debt limited to pursue low level consumption target seems to be strong in the absence of successful income seeking activity (H8C).

The tendency for consumption increases and income seeking activity to ease as higher levels are achieved (H5, H6, H6A, H8B) is consistent with the hypothesised satisficing behaviour.

While extensive time series analyses, which are beyond the scope of the current work and not feasible with the currently available data, are necessary to test the proposed importance of consumption targets to objectives of owner-managed firms, the results reported here are encouraging. Potential consumption measurement problems were discussed at the start of this chapter. It was anticipated that the possibility of understating consumption lessened the likelihood of detecting its hypothesised relationship with owner-manager operating decisions and income seeking behaviour. Given the results that are obtained here, it would appear that either the relationships are stronger than the tests indicate or , as suggested in the introduction, the incidence of external income being available to satisfy owner-manager consumption aspirations is low for the sampled firms and so did not significantly influence the results. It should not be concluded, however, that such circumstances are generally true.

CHAPTER 12
TESTS OF SAVINGS AND DEBT

INTRODUCTION

This chapter tests changes in savings and debt relative to income and consumption levels for hypotheses H9 through H12 (see Chapter 8). The purpose is to test whether debt and savings behaviour are likely to be products of consumption targets. First the nature of the data and its inherent deficiencies are described. The second section tests savings behaviour and the third section considers debt substitution and increases relative to consumption levels

SAVINGS AND DEBT DATA

As noted with respect to the estimation of consumption (Chapter 11), it is assumed that all savings are retained within the business entity and all debt is negotiated by the business entity. Because this is most likely to understate savings and debt, any noise effects are likely to work against obtaining clear results. While it cannot be assured, this implies that any detected effects may be understated. The quality of the available data (see Chapter 9) does not allow identification of many individual debt transactions and all savings are imputed. As with most of the tests in Chapter 11, consecutive years of data are needed for the tests of savings and debt changes that are presented here. Given also that most tests again consider consumption estimates, the data used are for the same 203 cases described in Tables 11.4 and 11.5.

Savings estimates

Increases in net wealth (unconsumed income after debt servicing and estimated income tax) are savings. Such surpluses may be retained as cash or invested in other assets. Because savings is a cash flow concept, it is not affected by depreciation and accrual adjustments. Consumption in excess of income after debt servicing and estimated income

tax, taking into account changes in debt structure, is from savings. The possibility of overstatements or understatements in consumption and taxes (as discussed in Chapter 11) therefore flow through to savings estimates.

Debt measures

The available data distinguishes overdrafts, loans, trade creditors and other creditors. This allows some measure of changes in debt structure. Interest paid on debt is available as an aggregate only, preventing any estimate of the cost of different types of debt. In some cases details of individual new loans are available and interest rates could be estimated for these. However, these relatively few cases of loan agreements seldom fall near the end of the financial year so they do not correspond to the annual measures of income and expenditures or balance date values.

SAVINGS BEHAVIOUR

This section reports tests of hypotheses concerning the direction of changes and stability in savings levels. The use of prior savings (wealth) to fund current consumption shortfalls was considered in H8A, which was tested in the previous chapter:

> *Increases in consumption are funded from savings in periods where income producing expenditures increase without increases in realised income.* (H8A)

Data limitations mean the test carried out for this hypothesis is relatively weak (see Table 11.13) because the savings proxy ignores possible savings from periods prior to *t*-1 and possible applications of surpluses to new investment or retirement of debt. Nonetheless, it identified that where proxied income seeking activity had failed to increase income, increases in consumption were much more likely if savings had been generated (wealth increased) in the previous period.

There are several other important aspects of savings behaviour arising from formal aspects of the model presented in Chapter 7 that should be tested. As discussed in Chapter 8, an owner-manager is expected to preserve existing savings, rather then retire debt, to satisfying future low level consumption targets. If current consumption targets are still relatively low, savings targets will be sacrificed to achieve the consumption targets if current income is inadequate. These propositions are presented as hypotheses H9 and H10, which are tested below:

> *The more uncertain or volatile income, the more likely the maintenance of savings targets despite the existence of debt commitments.* (H9)

> *The incidence of savings erosion is greatest where achieved consumption is in the lower range.* (H10)

Testing difficulties and limitations

These propositions ignore any perceived opportunity to increase future income or to increase the perceived certainty of future income by increasing inputs. The previously noted data limitations limit the extent and sophistication of the tests.

Particular difficulties in analysing the savings behaviour of the sampled firms result from the previously noted data limitations. No data is available regarding savings held outside the business and so all savings related estimates are based on surpluses (retained income) held within the business. The problems described below regarding investing savings in assets or retiring debt present other testing problems that cannot be fully resolved. As with previous analyses here, the time periods to which the data pertain are unduly long relative to the likely planning and response periods of an owner-manager. Such difficulties are likely to mitigate the identification of the hypothesised effects.

Investing savings in assets

There are problems such as whether savings held as cash are distinct from savings invested in income generating assets. If savings are precautions against short term income fluctuations then short term access to the savings is necessary. Savings invested in physical assets presents particular problem in this respect. First there are the problems involved in the time it takes to realise such investments and the effect such realisations would have on future operations. There are then problems of recoverable amounts (capital losses). The available data does not allow such problems to be addressed.

Applying savings to debt

Savings applied to the early retirement of term debt or reducing trade creditors may cease to be available (that is, the debt might not be renewable). Savings applied to the reduction of overdrafts, however, continue to be accessible for as long as the unused overdraft facility remains available.

Savings behaviour

Savings behaviour can be viewed in terms of both rates and levels. Savings rates may be relative to income, consumption and existing savings. Existing rates and changes can be considered.

The regression result obtained in Chapter 11 indicated consumption increased relative to the estimated variance of income. This suggests it is unlikely that H9 will be affirmed, given that savings are a function of excess income over consumption, unless the increased consumption coincides with increased debt. As noted in Chapter 11, there are problems in estimating the uncertainty or volatility of income. While the proxy used here is the simple variance based on three annual observations of income, this cannot capture the owner-manager's view of the income stream derived from frequent observations, which may simultaneously capture the relationship of income (and its variability) to inputs and environmental factors. Table 12.1 compares the changes in savings levels by firms

claasified according to their relative earnings variance (by quartiles). Cases in the higher quartile groups (firms with the largest earnings variances) are more likely to maintain or increase their savings levels, however the overall pattern of results is not significant (χ^2=3.12080, p=0.37337) and so cannot be taken as supporting H9..

Table 12.1

Changes in savings levels for $(t-2,t-1]$ to $(t-1,t]$ x groups based on income variance

	Income variance quartile grouping				
	1st	2nd	3rd	4th	Total
$s_t < s_{t-1}$	10	3	6	8	27
$s_t \geq s_{t-1}$	13	12	19	17	61
	23	15	25	25	88

This lack of support for H9 is accentuated when attention is focussed on the higher income variance groups which show little propensity to maintain savings as shown in Table 12.2 from which cases of zero savings in $(t-2,t-1]$ are omitted. It is concluded that the data do not support H9. In most cases debt increased from *t*-1 to *t*, frustrating any consideration of behaviour relative to debt conditions.

Table 12.2

Changes in savings levels from $(t-2,t-1]>0$ x groups based on income variance

	Income variance quartile grouping				
	1st	2nd	3rd	4th	Total
$s_t < s_{t-1}$	10	3	6	8	27
$s_t \geq s_{t-1}$	3	1	4	0	8
	13	4	10	8	35

Savings erosion

Measuring savings erosion encounters the problems of identifying savings themselves. As noted above, savings estimates are based on surpluses (retained income) held within the business and there is a problem of whether stored savings are distinct from

investments. To capture the intent of H10, it is necessary to consider the erosion of net wealth held in the business after excluding negative income (losses).

The incidence of savings across two periods is described in Table 12.3 which identifies 24 per cent of known cases as saving in period one but not period two. These are noticeably concentrated (43 per cent) in the lowest achieved consumption group (1st quartile) where this group accounts for only 23 per cent of known cases. Of the 1st quartile cases that saved in period one only 18 per cent saved anything in period two. This compares to 56 per cent for 2nd, 40 per cent for the 3rd and 50 per cent for the 4th quartiles groups). These results are interpreted as generally supporting H10. With 16 cells across 88 cases it is not possible to conduct a valid chi-square significance test for this distribution of savings outcomes (over 50 per cent of cells have an expected frequency of less than five). Thus the hypothesis is accepted with caution.

Table 12.3

Incidence of savings in periods $(t-2,t-1]$ and $(t-1,t]$

Savings incidence	Achieved consumption quartile grouping					
	1st	2nd	3rd	4th	Total	%
No savings	5	13	8	11	37	*42*
Only $s_{t-1} > 0$	9	4	3	5	21	*24*
Only $s_t > 0$	5	4	2	5	16	*18*
$s_{t-1}, s_t > 0$	2	5	2	5	14	*16*
Total	21	26	15	26	88	*100*
%	*23*	*30*	*17*	*30*	*100*	

DEBT BEHAVIOUR

This section reports tests of hypotheses concerning changes in the level and composition of debt. While some hypotheses tested in the preceding chapter consider income net of debt servicing obligations, other than H8C they do not consider the implied role of debt relative to consumption targets. H8C considered the use of debt to finance consumption increases where income seeking activity had failed:

Increases in consumption are funded from debt in years where income producing expenditures increase without increases in realised income where prior consumption levels are in the lower ranges. (H8C)

As reported in Chapter 11, the tests of H8C indicate a propensity by lower consumption firms to substitute debt for income, supporting the proposition owner-managers will use debt to achieve base consumption targets even though this means sacrificing future consumption. Where debt already exists, the owner-manager may be similarly motivated to use new debt to service existing debt to maintain current consumption. Such argument is used to develop hypotheses H11 and H12, which are tested below:

The incidence of debt substitution is greatest where achieved consumption is in the lower range. (H11)

The occurrence of new debt will be less where achieved consumption is in the higher range. (H12)

Debt substitution

Analysing debt substitution relative to consumption levels is problematic due to the large number of intervening factors. If debt substitution does arise because of attempts to direct income or savings to satisfying consumption objectives, it may be largely a short term phenomena and so unlikely to be captured by the available data.

Three particular forms of debt are considered: term loans, floating overdrafts and creditors. These are the most common forms of debt in the data set. The general nature of these types of debt suggest some forms of substitution are more plausible than others. In particular, it is less likely that either term loans or creditors would be increased to reduce overdraft levels, while the contractual obligations of the secured term loans suggest some incentive for using available overdraft facilities and deferring creditors to satisfy loan servicing requirements. The likely substitution between creditors and floating

overdrafts is more contentious. While both may hold the threat of liquidation, creditors usually have the more obvious and immediate expectations of payment. If overdrafts approach their limits, owner-managers are less able to use them to substitute for other forms of debt.

The breakdown in Table 12.4 identifies the numbers of cases where creditors have been substituted for overdrafts or term loans and overdrafts have been substituted for term loans. The pattern of results do not support H11. It appears that there is no difference between groups (based on previously achieved consumption) and the frequencies of the various debt substitutions.

Table 12.4
Variation in debt components by relative consumption levels

	$_{t-2}C_{t-1}$ < median		$_{t-2}C_{t-1}$ > median			
	Yes	No	Yes	No	χ^2	sig. (p)
Creditors substituted for term loans	22	80	29	72	1.37694	.24062
Creditors substituted for overdrafts	20	0	24	0	na	na
Overdrafts substituted for term loans	32	70	30	71	0.06668	.79623

For incorporated firms, the availability of limited liability may be influential. As reported in Chapter 10, institutional lenders typically contract around the limited liability barrier by taking personal guarantees from owner-managers for both term loans and overdrafts. There was no evidence of guarantees or any form of specific security being issued to creditors. Therefore, incorporated firms are expected to prefer the substitution of unsecured creditors for guaranteed bank loans and overdrafts.

New debt

Table 12.5 describes the incidence of total debt increases, separating creditors and bank debt increases and decreases. Of particular interest are the ten cases of increased creditors (sufficient to increase total debt) where bank debt decreased for incorporated firms.

There were no such cases for unincorporated firms. Also noteworthy is the similar distribution of increases in overdrafts and loans. Compensating increases in bank debt in cases of decreased creditors have identical patterns between incorporated and unincorporated firms.

Table 12.5

Variation in debt components for cases of increased total debt x incorporation

	Bank debt decreased	Overdraft only increased	Loans only increased	Overdraft & Loans increased	χ^2	sig. (p)
Incorporated:						
Creditors decreased	0	9	9	9	5.32377	.14957
Creditors increased	10	17	16	15		
Unincorporated:						
Creditors decreased	0	4	4	4	0.81200	.66631
Creditors increased	0	7	4	3		

Note from Table 12.5 that, additional to the substitution of unsecured debt for bank debt by incorporated firms, is the greater tendency for incorporated firms to generally increase unsecured debt. Over all of the cases of increasing total debt, 68 per cent of incorporated firms increased unsecured debt compared to 54 per cent of unincorporated firms. Because incorporated firms also tended to increase total debt along with creditors the results on a 2x4 comparison in Table 12.5 are not significant.

While the differences in behaviour between incorporated and unincorporated firms regarding the use of secured and unsecured debt are not statistically significant, they may indicate a survival orientation which, while implied in several aspects of the framework, has not been specifically tested. Test of debt substitution that differentiated between eventual defaulters and surviving firms did not identify any differences in behaviour.

In the context of any pattern in consumption changes relative to increased income producing expenditure, Table 11.15 indicated that increased debt use by low consumption

users is associated with increased consumption although income did not increase. This pattern is not repeated for higher level consumers, providing some support for H12 by suggesting that new debt is less likely for high consumption achievers. To directly test H12 the occurrence of new debt relative to achieved consumption across all cases is described in Table 12.6.

Table 12.6
Increased debt relative to achieved consumption levels

	$_{t-2}C_{t-1}$ < median		$_{t-2}C_{t-1}$ > median			
	Yes	No	Yes	No	χ^2	sig. (p)
Secured debt increased	39	49	49	60	.00797	.92888
Unsecured debt increased	57	42	58	53	.59862	.43911
Total debt increased	39	49	44	65	.31178	.57659

The unambiguous conclusion from the distributions of new debt relative whether consumption was in the upper or lower range is that it does not matter. Therefore, the only support for H12 is that produced in Chapter 11 where cases were limited to those that had pursued income increasing investments.

CONCLUSION

The possible understatements of consumption, savings and debt are most serious data limitations likely to have affected these tests. It is likely that this limitation would manifest in the understatement of the tested associations between consumption, savings and debt. This may explain the lack of support for some hypotheses, such as H9 and H11, although such a conclusion is not drawn here. Indeed, the results in Chapter 11 indicate that such an effect is unlikely.

More cautiously, the evidence suggests that weaker firms (lower consumption achievers) may direct debt substitution and the use of debt for consumption towards the use of unsecured debt in the case or incorporated firms, with no obvious effect for

unincorporated firms, indicating the possible significance of limited liability not identified in tests using secured debt in Chapter 10.

In general, it appears from Chapter 11 that savings may be more significant than debt in allowing consumption in excess of income although are used extensively if an owner-manager's achieved consumption is in the lower range. There is not sufficient evidence to support the hypotheses concerning the extent to which savings or debt are deployed to support lower consumption levels (H9-H12) other than the weak evidence that debt substitution is greatest where consumption is the lower range (H11).

PART III - CONCLUSION

The empirical tests of assertions arising from Part I (focusing on the relevance of organisational boundaries) and Part II (addressing various assumptions and propositions concerning the formalised theoretical framework) provide encouraging support for the propositions contained in the general framework.

The Part I (Chapter 2) proposition that an owner-manager's choice of organisational form is largely irrelevant to investment and consumption decisions, as tested in Chapter 10, appears well supported.

Chapter 11 tests indicate that consumption behaviour is consistent with attempts to move through a consumption hierarchy by pursuing income increasing strategies to maintain previously established consumption levels. The tendency for consumption increases and income seeking activity to ease as higher levels are achieved is consistent with the hypothesised satisficing behaviour. Where income seeking is activity is not successful, savings or debt is often used to finance consumption, but with the use of debt limited to pursuit of low level consumption targets, consistent with a high priority being assigned to current consumption and greater discounting of future consumption relative to short term lower level aspirations.

Further testing of savings and debt relative to income and consumption in Chapter 12 are inconclusive but indicate that owner-managers may tend to substitute unsecured debt for secured debt when operating under an incorporated structure.

The tests must be treated with caution because of the data limitations discussed at various points in Part III. These include the following.

- There remains the possibility that sampling bias (having used only firms that have obtained debt finance from a particular bank) means the results obtained here should not be generalised to the broader population of owner-managed firms. The nature of any differences between firms sampled here are the broader population is not known. The demographic profiles of the sample suggest that the samples are similar to the population in many attributes, both at state level (South Australia) and nationally.

- Possible measurement problems with respect to consumption were discussed in Chapter 11. These may also affect savings measures. The main concern pertained to the possible existence of household income independent of the firm. While this was identified for a small number of cases, its significance remained uncertain. Although there was little evidence of non-firm earnings being available to satisfy consumption aspirations on any permanent basis, there remains considerable uncertainty as to an owner-manager's ability (either personally or through other members of the owner-manager's household) to sell labour outside the firm. However, it seems likely that should such activity be present to any significant extent, this should have suppressed the relationships identified - especially for low level consumption.

Nonetheless, data limitations exist and so results must be interpreted cautiously.

PART IV
IMPLICATIONS OF THE FRAMEWORK AND LENDERS' BEHAVIOUR FOR THE PERFORMANCE OF OWNER-MANAGED FIRMS

This part considers implications of the target consumption model and lender behaviour for the performance of owner-managed firms. Two particular aspects of performance are considered: growth and planning horizons. Growth is considered in terms of factors influencing a firm's ability and incentives for growth. Planning horizons are addressed in terms of a possible emphasis on short term results by owner-managers.

Growth often appears as a basic element in commentaries on or studies of business performance and so it is the subject of particular attention here. Some relatively extreme views as to the importance of 'growth' are evident, such as Steinmetz (1969) who argued that growth is necessary for the survival of the firm. While this view is not sustained generally throughout the literature, focus on growth as either necessary or desirable for the owner or manager is frequently implied.

The reference to planning horizons arises as a consequence of the target consumption model, observed lender behaviour and owner-manager preferences identified in relation to growth.

Because the definition of the firm adopted here is specified by reference to contracting behaviour, contracting theory is considered in the general context of owner-managed firms in Chapter 13 and used to develop and test a model of debt pricing based on information cues to lenders regarding owner-managed firms in Chapter 14. The objective of the debt pricing tests is to consider whether lenders atke account of consumption behaviour (and the implied capacity to moderate such behaviour) in pricing debt.

Chapter 15 considers the general effects of the cost and availability of debt on the growth ability and therefore performance, of owner-managed firms. Chapter 16 considers internal influences on growth performance, examining both growth willingness and growth success in the context of the consumption framework and with respect to the growth capacity of indivdual owner-maangers.

Chapter 17 provides an important focal point by drawing together various elements of the other chapters to demonstrate how lenders and consumption aspirations may exert a common influence on the performance of owner-managed firms by providing incentives for short term results.

CHAPTER 13

CONTRACTING THEORY AND OWNER-MANAGED FIRMS

INTRODUCTION

Prior to the emphasis on decision theory, sympathetic reasoning (in the context of self-interest) evolved in the transaction cost elements of contracting theory. This chapter reviews important elements of contracting theory and how they apply to owner-managed firms to provide an appropriate framework within which to consider the relationships between owner-managed firms and external parties, emphasising debt holders. This will facilitate an exploration of how these relationships may affect or be affected by the hierarchical consumption objectives of owner-managers and implications this has for understanding and evaluating the performance of owner-managed firms.

The remainder of this introduction notes the existence of transaction costs and incomplete contracts. Aspects of transaction cost theory are considered in the next section taking into account bounded rationality and consequent information asymmetry, after which particular attention is given to possible consequences of information asymmetry. A potentially important implication of this (in terms of its impact on the cost and availability of bank debt) is modelled and tested in the next chapter.

Transaction costs

The view from Coase (1937) that markets and firms are alternative means of organising economic activity was repeated by Arrow (1969, 1974), with a specific focus on transaction costs in describing the limits of each. Coase argued that firms arose because there are costs of using the price system, even though internal organisation embodies its own costs which limit the effectiveness and size of the firm. Coase argued that minimising these transaction costs is a fundamental reason for the existence of firms.

Transaction costs, or the costs of transacting, are taken here to include search, negotiation, monitoring and enforcement costs in contracting, plus the costs or hazards arising from incomplete contracts. They do not include the prices of the goods or services being exchanged.

Contractual view of the firm

The aspects of contracts of particular interest here are the behavioural assumptions imputed to contracting individuals and the attributes of transactions believed to be of economic importance.

Incomplete contracts

Outside of economic models, complete and costlessly enforceable contracts do not exist. Contracts in the real world are incomplete for two main reasons:

- there are many possible contingencies in real (uncertain) states, with prohibitive costs attached to identifying all possible contingencies, and specifying responses;
- contract performance is often prohibitively costly to measure and enforce.

Agency

Incomplete contracts generate a general agency problem. While much of the agency literature focuses on the problems induced by the separation of ownership and control, agency problems do not disappear with owner-managed firms.

Owner-managers of firms are not merely compensated as residual claimants[1]. Periodic appropriation of resources from firms such as through drawings, proprietors' wages and

1 It would be misleading to view the major contracts that effectively define the firm as comprised only of the residual claim and decision allocation structures. The intra firm contracts as discussed by Fama and Jensen (1983) are typically unwritten and employee-specific, and established at considerable cost. A significant aspect of the value of a firm may be in human assets, being the accumulated firm-specific knowledge of employees. Such an asset specificity

continued on the next page

unsecured loans on either an ongoing or periodic basis are evidence of non-residual compensation. Owner-managers of incorporated firms may transfer residual losses to unsecured creditors through corporate bankruptcy[2] if there is effective limited liability and an inability to enforceably contract for specific investment behaviour[3].

The relations between partners embody particularly strong agency concerns[4]. The extent to which conflicting objectives of partners arise and how they influence the behaviour and performance of partnerships is beyond the scope of the current work, although some further consideration is given in the next section under opportunism, along with debt. Both these areas are particularly relevant to incomplete contracts and agency costs in the owner-managed firm context.

Following Coase (1937) the ideas of agency theory developed little until Alchian and Demsetz (1972) and Jensen and Meckling (1976). Subsequent literature has redirected attention in agency theory to bounded rationality, pursuing the information asymmetry aspects into the province of game theory. This treats much of the informational problems as strategic (mis)representations by agents in conflict with their principals.

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problem also may apply to the owner-manager's knowledge and skills. Asset specificity is addressed in the next section which considers both transaction costs and bounded rationality.

2 This follows from the problem generated by pure debt financing, as discussed in Jensen and Meckling (1976), whereby an owner-manager may have an incentive to accept high-risk and suboptimal projects to effect a transfer of wealth from debt holders to the owner-manager. This and other incentives for suboptimal investment behaviour are considered in Chapter 17.

3 This raises the question of why use a limited liability structure, if it creates an agency problem? As the Chapter 10 analysis suggests, it is unlikely to be used by owner-managers to obtain the direct benefits of limited liability, unless the value of unsecured (non-guaranteed) debt is relatively large. Perceived costs may be less than the benefits of limiting unsecured liability and taxation advantages. A net benefit of limited liability for unsecured debt implies unsecured debt holders cannot fully transfer the agency costs to the owner-managed firm. Agency theory often emphasises such conflict, rather than bounded rationality, although there is some conceptual overlap between these aspects of contracting.

4 While beyond the scope of this thesis, the incentives for and costs of partnerships are currently being studied in other (joint) research projects.

TRANSACTION COSTS AND BOUNDED RATIONALITY

Transaction cost economics characterises human nature by reference to *bounded rationality* and *opportunism*. Transaction cost theory links aspects of information asymmetry and conflicting interests to drive a theory of contracting behaviour. The main focus of the economics contracting literature has been on discovering or predicting contracting behaviour that deters the inducement or exploitation of *asset specificity*[5].

Because the adopted definition of owner-managed firms focuses on individuals, perfectly rational behaviour is not a reasonable assumption. At best, only some order of *bounded rationality* can be ascribed (see Chapter 5). Also pervasive is the existence of *information asymmetry*, which allows *opportunism*, in the context of contracting. Opportunism incorporates *self interest*, or in Williamson's view, 'self-interest seeking with guile' (1985, p.30). In *ex ante* contracting decisions, opportunism is described by the risk of *adverse selection*. In *ex post* contracting decisions, it is described by *moral hazard*[6].

Asset specificity

Bounded rationality and information asymmetry are crucial aspects of transaction cost economics. A third crucial aspect of the transaction cost framework is *asset specificity*. Williamson (1985, p.30) suggested it is the most important dimension, describing it thus:

> Parties engaged in a trade that is supported by non-trivial investments in transaction-specific assets are effectively operating in a bilateral trading relation with one another. Harmonising the contractual interface that joins the parties, thereby to effect adaptability and promote continuity, becomes the source of real economic value.

Asset specificity pertains to transaction specificity of numerous types, including geographic or site specificity, human capital specificity and idiosyncratic assets. The

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5 For a review of asset specificity in the economics literature see Alchian and Woodward (1988).

6 This is a narrower meaning of moral hazard than is often employed in the agency literature, where it appears to be used more in the sense of opportunism.

latter may be viewed as single purpose (non-redeployable) assets. Two additional dimensions of specificity are *uncertainty* and *frequency*.

Uncertainty has broad implications, but in the current context mainly describes incomplete information in contracting. Uncertainty has implications for investment decisions. Simultaneously, limited human capital resulting from management functions being vested only in owner-managers constrains the firm's ability to respond to disturbances (also described by bounded rationality). This phenomena can be labelled *managerial uncertainty*, with other aspects of uncertainty categorised as *incomplete information.*

Frequency describes the volume or repetition of transactions. Its relevance can be demonstrated by considering the possibility of increased incentives for vertical integration (or perhaps complex long term contracting) that may arise with high frequency (repetition) of transactions with high specificity. The owner of an asset that is specific to the forward production of a particular product faces incentives to integrate to obtain control over distribution, or otherwise reduce uncertainty regarding demand.

As an investment problem, asset specificity is often considered only in a fungability context. It is assumed in much of the transaction cost literature that the source or suppliers of a given input are numerous and competitive. This assumption is rejected here and the notion of *resource dependence* is specifically considered; this includes *input* and *source* dependence. Source dependence applies only to repeated transactions and implies a degree of monopoly.

Resource dependence

The simple distinction between asset specificity and resource dependence is that the former refers to assets being dependent on (a source or type of) demand for value, while

the latter refers to production being dependent on the supply of a particular input. Unlike the traditional view of asset specificity, resource dependence includes non-durables where the *source* of the input is restricted such as with a monopolistic supplier or otherwise non-substitutable supply. In necessarily repeated transactions, such as with non owner-manager human capital, the identities of the suppliers can be important.

In keeping with the treatment of asset specificity, the critical dimensions of resource dependence[7] are described by *uncertainty*, *frequency* and *source*. Uncertainty has much the same context as in asset specificity. Frequency has direct implications in terms of *source*. If the transaction frequency for inputs on which a firm is dependent increases, the incentive for backward integration increases to reduce uncertainty of supply for the particular input.

Relevance to investors

The attitudes of investors, such as the owner-managers and lenders, are affected by asset specificity because it affects fungability of collateral and the employment opportunities of the owner-manager (through human capital specificity), and both resource dependence and asset specificity because they affect the redeployability of the firm's resources.

While human capital specificity is likely to be a fairly general problem, dependence on human assets may be a greater concern for small owner-managed firms. This is further considered below in a general consideration of human assets in owner-managed firms.

Human assets

For owner-managed firms, human asset specificity concerns centre on the extent to which (investment in) skill acquisition for the owner-manager and employees can be adapted to

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7 Pfeffer and Salancik (1978) discussed resource dependence in large organisations relative the ability of external parties to affect structure and operations.

other business applications. Dependence on particular human assets can be a product of the size of the firm or the inseparability of the owner-manager.

In terms of resource dependence, an owner-managed firm is dependent on a particular owner-manager by definition for the managerial functions, but a particular business activity may be similarly dependent on the knowledge or skills of the owner-manager aside from the more generic management functions. Other forms of human capital dependence also may apply. If the business is centred on selling the owner-manager's knowledge or skill, the dependency is straightforward. Similar labour dependence may apply to particular employees where skill reliance occurs, or where the firm derives rents from labour due to agreed underpricing (as may occur with family members), labour immobility or other labour market imperfections. The relative importance of these factors may depend on the scale of business activity (such as the number of employees).

The population and samples described in Table 9.4 indicate that a substantial proportion of the population of small or owner-managed firms in Australia (between one third and one half) are comprised of trade and professional services. The selling of services under an individuals' name would appear to signal significant dependence on that individual's skill and knowledge.

Where the input dependency pertains to labour, integration can be achieved only through partnership, by admitting the labour source to ownership of the owner-managed firm. It is plausible, although not empirically verified, that human capital dependence is likely to coexist with relatively high human asset specificity. Particular skills or knowledge on which the firm is somehow dependent and which are costly to replace also may be specific to the firm, and so not easily transferred. These conceptually separate conditions, if jointly occurring, prevents general conclusions as to the net incentive for long term labour contracting or partnership formation.

Fama and Jensen (1983) argued that the composition and character of a board of directors[8] will reflect the hazards to which residual claimants in each type of organisation are exposed. For example, the value of a firm constituted as a professional partnership (such as a medical, legal or public accounting practice) is highly dependent on the development and utilisation of 'specific knowledge about particular clients and circumstances' (Fama and Jensen, 1983, p.316). This knowledge is an essential aspect of the firm's assets in the form of human capital. If it is not possible to contract for the guaranteed supply of human capital of a specified quality (say intensity and ability), there is likely to be little opportunity to attract external investment on a residual claimant basis. Therefore, such firms are likely to be owner-managed[9]. While owner-managed firms were not considered by Fama and Jensen (1983), dependency on human capital is applicable to all owner-managed firms to some extent, as described above.

Where the owner-manager has skills or knowledge for which substitutes are not readily available, those contracting with the firm will place a lower value on the firm than if there

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8 These were boards of directors in corporations, professional partnerships, financial mutuals, charitable organisations and universities.

9 Fama and Jensen (1983) predicted that the 'boards' of such partnerships will be constituted entirely of partners. Seemingly contradictory to this, some boards of otherwise owner-managed companies (as described in Chapter 2) included members who are not residual claimants. The reasons for such occurrences may be multiple, but may include the need for an additional director so that the business of the board need not be frustrated by the non-availability of another member when otherwise there may be only two. There were also observed instances of a director serving as a notional second director where an individual owner-manager did not have an appropriate alternative, and where an effective partner, who otherwise would have served as a director, was prevented from doing so due to personal bankruptcy. Directorships provide an alternate means of contracting for expert advisory services. A public accountant is a typical inclusion. In such cases, the public accountant's firm provides accounting, tax and/or company secretarial services to the company, and often assisted in setting up the company.

In observed cases, the non-owner directors do not perform executive functions. Should they do so, the firm would not be definably owner-managed. Also, the presence of the residual claimant(s) on such boards substantially reduces the accountability 'risk' to the notional director. However, mitigation is not elimination. The existence of such directors warrants better explanation, but lies outside the scope of this study. It is suggested that such incidences are relatively few, and that such notional directorships do not effectively moderate the concept of the owner-managed firm. While the statutory and tortious liabilities of such directors may be of concern elsewhere, they do not represent any effective transfer of the primary management functions away from the owners of the firm.

are accessible substitutes. Such considerations could affect the firm's cost of debt and saleability as a going concern. A principal concern for debt contractors is the continuing availability of such human resources to satisfy the firm's obligations. For some firms, such concerns may extend beyond owner-managers to encompass employees of the firm, especially where the small size of the firm increases the likelihood of any one employee having a significant value to the firm[10].

It is suggested here that the fewer the number of owner-managers or employees in a firm, the greater the likelihood of human capital dependence. Both human resource dependence and human capital specificity increase with the extent to which the firm's output is a function of the owner-manager's technical skills (rather than, say, general management skills).

Financing

Williamson (1988) suggested that firms with low asset specificity are more likely to pursue debt financing. If asset specificity is high, debt holders face greater risk and so the cost of debt will be greater, increasing incentives for internal financing. Widespread capital deficiencies will impede such a simplified view. The evidence presented in Chapter 10 suggests that, for owner-managed firms, a consequence is a demand by lenders for more fungible collateral which may be off-balance sheet[11].

By securing fungible collateral, lenders avoid some asset specificity problems. They effectively invest in the non-specific assets deployed as collateral, so that the owner-manager sacrifices some rights to that asset and receives (by default) a higher residual

10 The problem is exacerbated if the firm is extracting rents from the employee, because replacements will be more costly. In such cases, the value of the firm should be affected by employee mobility.

11 As described in Chapter 10, the bank's demand for off-balance sheet collateral is substantial. For incorporated firms, personal guarantees (typically secured over the family home) were included in over three quarters of cases for which security data was available.

interest in the non-fungible asset of the firm. This may be the owner-manager's human capital which is realised only through the future earnings stream of the business.

Lending decisions may involve more than the collateral problem. Other aspects are discussed below in the context of information asymmetry.

INFORMATION ASYMMETRY

Some internal aspects of information asymmetry are captured in asset specificity. Also, some aspects of internal information asymmetry may be a lesser concern for owner-managed firms compared to agent-managed firms due to closer monitoring. Nonetheless, any firm employing non owner-manager labour faces potential problems relating to lack of employer information and discretionary actions of employees. This was examined in an information context in Stiglitz (1975). The problem substantially overlaps with notions of conflict, which is an element of moral hazard, and is more usefully considered in that context below under opportunism. Contracting between multiple owner-managers (partners) also include information asymmetry problems.

External aspects of information asymmetry occur with every contract with the firm. Two major recurring types of contract with an owner-managed firm are for labour and debt. The first was considered briefly in the previous section, and will be raised again in the context of opportunism.

The absence of market effects on information capture and capital instrument pricing suggests information asymmetry for debt holders is greater with owner-managed firms than listed companies. With owner-managed firms, debt providers must rely on the direct acquisition of information and their own evaluation of individual debt customers. While institutional debt providers will contract for the provision of particular information, enforcement is variable and quality is costly to monitor. Conventional theory indicates

this information risk is factored into the debt pricing, suggesting owner-managed firms will have higher costs of debt than firms with traded securities (holding other factors equal). The opportunism costs of information asymmetry in owner-manager firms is considered below. Debt holders' concerns are then discussed, followed by the introduction of a model of signalling incentives in the context of debt pricing by institutional lenders.

Opportunism

Jensen (1989) claimed that new private corporations resolve the central weakness of the public corporation, which is the conflict between owners and managers. Without disputing Jensen's view, it is suggested here that the remaining problems for private companies, and owner-managed firms in general, are not trivial. For the owner-manager, there are two levels of conflict, or more encapsulating, opportunism: internal, which at the interpersonal level can be divided into conflict with employees and other owner-managers in partnerships; and external, primarily with debt holders.

Employees

Many aspects of employee-manager relations in owner-managed firms are described by the early 'Tayloristic' approach to industrial relations. This suggests a relatively inflexible hierarchical structure whereby the manager sets goals and directs the actions of employees. Employees have little decision making freedom and their actions are closely monitored by the owner-manager. The evidence for this is largely anecdotal, but consistent[12]. If owner-managers value the control and oversight functions, there will be disincentives for growth if they perceive growth as inducing loss of authority or control. Growth is a substantial area of study, and is considered separately in Chapters 15 and 16.

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12 It is supported explicitly in Collins *et al.* (1964) and implicitly in Steinmetz (1969), Thain (1969), Greiner (1972), Clifford (1973), and Tuason (1973).

Much of the opportunism problem pertains to an employee's capacity to consume resources of the firm. If monitoring costs were zero, all perquisite (on-the-job) consumption by employees would be known and each employee (of known quality) would receive a market-determined wage, inclusive of the value of perquisite consumption. The employee would then choose how much of the wage would be in the form of perquisite consumption depending on personal preferences, with net wages and perquisite consumption inversely correlated. As monitoring costs increase, the inverse correlation between net wages and on-the-job consumption weakens and distortions *between* employees regarding their consumption may arise, with aggregate perquisite consumption increasing. This increase in perquisite consumption is labelled *shirking*[13]. Firms with fewer employees should have lower monitoring costs, and so should have less shirking and relative wage distortion than firms with higher monitoring costs[14]. The threat of increases in monitoring or shirking costs may be a significant deterrent for increasing employee numbers beyond that which an owner-manager believes he or she can directly control and monitor.

Owner-managers of a firm also can consume either through activities on behalf of the firm (perquisite consumption) or by expending resources withdrawn from the business for personal use (domestic consumption). Perquisite consumption by owner-managers presents several difficulties in empirical analyses. Certain forms of perquisite consumption may be obvious; for example, office accommodation and motor vehicle facilities. However, the value to the owner-manager derived from intangible factors,

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13 Thus there are two forms of perquisite consumption: known individual consumption and shirking, which is consumption by individuals which cannot be directly attributed to them. If payments to each employee in an identified quality classification is determined by the average quality of employees in that classification, distortions in relative wages may also arise as measures of employee quality become cruder as a result of increased measurement costs.

14 Labour theory suggests they should also pay higher net wages in consequence, but anecdotally, small firms typically pay lower net wages. Possible explanations for this include market inefficiencies, small firms have lower quality employees or the monitoring cost argument is fallacious. Investigation of this problem is beyond the scope of this study.

such as the enjoyment of working in a particular environment or with particular people, or the prestige of running an expanding business, cause much difficulty. If the owner-manager is economically rational, then relatively higher deployment of resources for on-the-job consumption by the owner-manager should mean that the firm's expenditure on such amenities yields higher value to the owner-manager (per dollar expended) than the domestic consumption of substitute amenities where domestic consumption is funded from the owner-manager's residual pecuniary return or savings. That is, an owner-manager cannot increase perquisite consumption without decreasing net pecuniary residuals (for a given level of capital and effort) if reasonably competitive markets or regulatory provisions prevent the funding of such amenities through discretionary increases in market derived revenues or by 'taxing' employees.

Partnerships

For soletraders, the only perquisite consumption of relevance in an agency context is that by employees. For effective partnerships, however, at least two aspects are of particular concern: *shirking* and *moral hazard* in general.

Where multiple owner-managers (effective partnerships) exist, there is likely to be the most defined separation of owner-managers and the firm. Joint owner-managers often have differing degrees of control and investment, by either design or effect. This, combined with their sharing of residual ownership of the enterprise, should give them a more distinct perception of the firm than for a soletrader owner-manager. The consequent contracting considerations may induce different attitudes or concerns regarding the owner-manager relationship and firm performance. These are discussed later. Incentives for the creation of partnerships should include incentives for the creation of firms in general. That is, creation of a partnership suggests minimisation of transaction costs, including the *ex ante* and *ex post* costs of contracting between partners,

implying desirably repeated transactions. Incentives for such transactions in the first place may be complex.

Of the various elements of transaction costs, attention has often focussed[15] on bonding costs (the *ex ante* contracting costs pertaining to the planning and construction of contracts to govern agents' actions) and *ex post* monitoring costs. The weak evidence concerning contracting between partners in the sample of owner-managed firms noted in Chapter 10 suggests that little formal contracting occurs in small partnerships. The written agreements that exist are typically devoid of specific restrictions on partners actions or reporting requirements, implying that there is reliance on direct monitoring. This is intuitively plausible given the close relations between such partners.

Debt holders

Debt holders are the most substantial contracting group external to owner-managed firms that are likely to have reasonably homogeneous interests. As the only non-managerial providers of financial capital, their relationships with owner-managed firms are important to understanding or evaluating performance and owner-manager behaviour.

To further consider the impact of debt, it is necessary to understand the relationship between the owner-manager and the lender. While this is explored in more detail in this and other chapters, it is reasonable to view the owner-manager and institutional lender relationship as typified by the situation where the lender holds all or most of the bargaining power so that financing offers are virtually non-negotiable. The financing offers are not contingent on profits and the lender may hold the threat of liquidation to enforce the contract terms. The owner-manager thus bears most of the cost if the firm is not refinanced or is liquidated; this raises the cost of owner-manager shirking.

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15 For example, Jensen and Meckling (1976).

Lenders' and borrowers' interests are unlikely to coincide for small owner-managed firms. Firms do not offer lenders risk free propositions and owner-managed firms generally offer considerably less diversification in projects than their larger counterparts. Operating environments and consequent returns are expected to be more volatile than for more diversified firms. When negotiating debt, the prospect of bankruptcy and associated costs are taken into account by both parties. If an owner-manager believes lenders may consider the prospect of failure to be too high, such that the firm will not obtain the necessary funding and so may fail 'prematurely' regardless of its potential, the owner-manager may pursue lower risk choices from the set of profitable options despite lower expected returns if they expect such options provide an acceptable assurance of satisfying the relevant current consumption target. This may result in more modest or more stable investment and profit growth than might otherwise occur; this is explored further in Chapter 16.

Owner-manager ability is generally unobservable by lenders. Lenders may consider previous returns or output to be a function of an owner-manager's ability and use them to update prior expectations. This also assumes lenders cannot directly observe operating choices and rely on *ex post* monitoring of outcomes as noted earlier under information asymmetry. By making choices that yield short-term profits, the owner-manager may improve early perceptions of ability and thus increase borrowing capacity. This is considered in greater depth in Chapter 17.

Regardless of lenders' expectations of an owner-manager's ability and the investment proposal, and because the owner-manager retains control of the firm, some investment choices can be varied after finance has been secured and projects are underway. This hazard is anticipated by lenders who contract accordingly. This may involve relatively simple means, such as setting interest rates commensurate with the risk of the owner-manager's possible discretionary actions. This risk also may be an incentive for lenders

to prefer short-term loans (relative to project duration). Safeguarding may be sought via more complex devices, such as establishing particular monitoring requirements to observe the owner-manager's compliance with agreed action-choices. From the data base described in Chapter 9, it appears the two devices are usually combined, with only modest monitoring arrangements. The secured collateral requirements identified in Chapter 10 pertain to highly fungible assets such as real estate, which also may compensate for managerial discretion.

Monitoring

There are at least three means of monitoring available to lenders to owner-managed firms. For convenience, these are labelled direct, voluntary and independent.

Direct monitoring requires a lender to directly observe events and activities pertaining to the actions and activities of the owner-managed firm and the owner-manager. This is likely to be possible only for activities that *involve* the lender. There is opportunity for this where an institutional lender provides transaction processing functions, such as a cheque account. Otherwise, opportunities for lenders to observe may be limited to lending and repayment activities.

There is no evidence of banks undertaking the first activity. That is, they do not appear to collect and collate transaction details such as cheque payees, individual sources of deposited funds, timing of transactions and the like. Based on observations while collecting the data base described in Chapter 9, the bank's data collection is intended to gauge account performance only (such as total periodic payments and deposits, balance fluctuations, comparisons to authorised overdraft, and loan limits and arrears reports), rather than to monitor particular owner-manager activities. Given that banks are relatively sophisticated lenders and seem to have considerable opportunity to collect various items

of data, their decision not to use such monitoring mechanisms is presumably a function of cost.

Voluntary monitoring mechanisms refer to owner-managers' disclosures to lenders[16]. It is assumed that individuals do not provide information regarding their business activities unless they perceive particular benefits arising from such disclosures or costs resulting from non-disclosure. Evidence of such behaviour tends to be anecdotal and in most aspects it can be merely inferred. Banks usually require budgets and financial histories from commercial finance applicants before a lending decision is made. Non-compliance means the applicants will not receive the finance they require. Loan and overdraft agreements also typically impose a reporting requirement on the owner-managed firm whereby the owner-manager is required to periodically supply financial statements of some variety to the bank.

The sample evidence on this point indicates that compliance is very weak. For the sample of 366 bank clients described in Chapter 9, less than 15 per cent of the relevant bank files contained financial statements that were received after the financing arrangement was put in place[17]. This suggests there is owner-manager resistance to voluntary disclosure and that the threat of withdrawing financing arrangements or other penalties the bank might impose are discounted by the owner-manager. Again it is assumed that the bank's lack of action in such cases is a function of the cost of enforcing the contract provisions[18].

Independent monitoring refers to attestations or special investigations by independent auditors. For owner-managed firms, independent audit activity appears to be rare. No

16 'Voluntary' may be a misleading label, in that such disclosures may be the result of contractual obligations rather than elective signalling.

17 While financial statements were on file for the majority of the sample, these were typically the result of applications for variations to existing financing arrangements rather than periodic reporting to the bank by the client.

18 The alternative, that the bank is consistently incompetent or irrational, seems too extreme.

instances of audits for unincorporated firms were observed for the sample firms. For owner-managed companies, the few cases of post-financing financial statements[19] were often 'pro-forma' and therefore without audit reports. Of the few audited financial statements that were observed, several contained disclaimers by the auditor that they were for statutory reporting purposes only and that they were not to be relied on for any other purpose, including credit assessment. Statements for previous periods, supplied with applications for new or increased debt by incorporated firms, often were audited; however, this may reflect convenience rather than intent. There is an incentive in Australia for owner-managed companies to be audited, because audited exempt proprietary companies do not have to lodge their financial statements in their statutory annual return and so the statements will not be publicly accessible[20].

Incentives to signal

Akerlof (1970) argued that where market imperfections are sufficient to prevent buyers from adequately distinguishing product quality, higher quality products are undervalued. The information asymmetry problems faced by lenders to owner-managed firms appear conducive to this argument in the context of price setting. Information asymmetry as a contributor to the cost of debt has been proposed in Barnea, Haugen and Senbet (1981), Pettit and Singer (1985), Fazzari, Hubbard and Peterson (1987), Van der Wijst (1989), Scherr, Sugrue and Ward (1990), Ang (1991, 1992) and Shailer (1994b).

Where institutional lenders cannot adequately distinguish the qualities of owner-managed firms seeking finance, all owner-managed firms are predicted to have similar costs of debt which will generally approach that applicable to lower quality firms. Firms that perceive themselves as higher quality borrowers thus have an incentive to signal their

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19 See footnote 18.

20 An exempt proprietary company is exempted from appointing an auditor, but if they choose to be audited, then they do not have to include their financial statements in their statutory annual return. See Appendix 2.1 (Chapter 2) for further details.

quality difference to the lender. Those that signal successfully should be charged lower interest rates than other owner-managed firms. There appears to have been no published empirical evidence to date regarding these effects. A possible model of such signalling behaviour and debt pricing is developed and tested in Chapter 14.

CONCLUSION

The contracting behaviour of lenders has implications for cost and availability of capital to owner-managed firms. While some empirical aspects of these for Australian owner-managed firms will be considered in Chapter 14, it is likely that they will reflect information asymmetry and opportunism, and relative business (failure) risk of owner-managed firms. Information asymmetry may reflect owner-manager behaviour or diseconomies of scale regarding signalling and monitoring costs. Failure risk is generally claimed to be disproportionately high for small firms, and variously attributed to size, owner-manager ability and capital availability. Both information asymmetries and business or failure risk pertain to risk and uncertainty, as considered in the next chapter.

It appears that debt financing embodies the essential characteristics of transaction and agency costs and may modify or provide incentives for particular owner-manager actions. Practical aspects of these arguments will be considered in subsequent chapters when the framework to be developed here is used to construct performance criteria.

CHAPTER 14

INFORMATION AND THE COST OF DEBT

INTRODUCTION

It was argued in Chapter 13 that contracting between lenders and borrowers will be substantially affected by the availability of information. Given that decisions made by owner-managers regarding the operations of their firms are a function of their consumption objectives then lenders should take account of information pertaining to the consumption levels and aspirations of owner-manager borrowers. If lender behaviour accords with this expectation then owner-manager consumption levels or aspirations should affect the availability and cost of debt.

This chapter empirically addresses the cost issue. More general aspects of cost and the availability of debt are considered in Chapter 15 but cannot be tested empirically because of data limitations. The data source available for testing includes only successful debt applicants preventing any empirical examination of issues pertaining to debt availability. The tests reported here assume that interest rates charged on different loans can be distinguished by reference to a base interest rate and explained by reference to information items, cues or proxies available to the lender. This follows the prediction presented in Chapter 13 that lenders will follow a 'lemons' pricing approach in the context of information asymmetry.

Akerlof's (1970) 'lemons' pricing arguments suggest that lenders will price loans on the assumption that a firm is of low quality if it does not have information about the quality of the firm. This is to compensate them for mistakenly funding defaulters. This suggestion is developed below to formulate a pricing model based on the availability of information regarding loan applications from owner-managed firms. The pricing model

is formulated generally, although it is intended mainly to test whether lenders take account of owner-manager consumption choices.

The essential questions being addressed here are whether lenders differentially price loans on the basis of information cues or proxies relevant to potential default on debt, and whether owner-manager consumption is included in the information set for loan pricing. Failure to take account of consumption behaviour may induce mispricing by ignoring the ability of the owner-manager to adjust consumption to meet debt servicing obligations. This is discussed further after developing the loans pricing model that forms the basis for the tests of information cues and proxies.

THE MODEL

It is assumed that a lender receives loan applications from two types of borrowers: 'good' borrowers and defaulters. Good borrowers, by definition, do not default. A defaulter fails to pay all or part of the principal and future interest obligations when due. The lender will not lend to predicted defaulters.

Where the lender cannot distinguish good borrowers and defaulters, all loans are priced at the weighted average interest rate r_p which reflects the lender's expectation of the average default risk of the loan pool. A loan pool is defined as a set of loans which the lender can not separate on the basis of quality. This implies that the lender assigns a prior probability of default equally to all of the loan dollars in the pool. The expected returns from good borrowers have to satisfy the lender's required return on total loans:

$$(1-q)(1+r_p)D=(1+r_o)D \tag{14.1}$$

q = The lender's predicted proportion of defaulted accrued debt, being the probability of default attributed to each dollar of principal and accrued interest for the pool.

$D = \sum_{i=1}^{k} d_i$, where d_i is the principal outstanding for loan i, with k loans in the pool.

r_o = The lender's required rate of return on the loan pool.

The left side term in (14.1) is the total principal and interest that the lender expects to recover from good borrowers, which is equated to the minimum total dollar collections required by the lender from the total loan pool by manipulating r_p (the rate charged for all loans in the pool). From (14.1) r_p is obtained as:

$$r_p = \frac{r_o + q}{1 - q} \tag{14.2}$$

As q (the probability of default on all and any dollar or loan in the pool) increases, so does the loan price for the pool. The difference between the lender's required rate of return r_o and r_p is labelled a default premium, ρ. All costs of enforcement and collection are included in the default premium. Subtracting r_o from (14.2) yields:

$$\rho = \lambda(1 + r_o) \tag{14.3}$$

where the default weighting $\lambda = \frac{q}{1-q}$ is the expected ratio of defaulters to good borrowers.

At the limits, if the lender predicts that there are no defaulters in the loan pool $(q = 0)$ then the default premium is zero. As the proportion of defaulters approaches 1, the premium approaches infinity.

While not the focus of the model, the incentive for signals is first considered. The model is then generalised to include other information available to the lender.

Signalling

The default premium can be avoided if the firm can credibly signal its quality and thus be differentiated from rest of the loan pool. It is assumed that borrowers have more information on their prospects than lenders. If a firm reveals that its probability of default *exceeds* that assigned to its prospective loan pool, it will be rejected by the lender as a defaulter or placed in a pool with a higher default probability and consequently a higher default premium. Firms likely to be good borrowers have an incentive to signal their quality to remove themselves from the pool and thus avoid the default premium. The more information the lender has regarding loan types in a particular pool, the fewer the proportion of defaulters in that pool, and so λ declines. Large λ thus indicates the lender has little information regarding the loan pool, increasing the expected proportion of defaulters. A risk neutral lender may have no incentive to improve its information set for the loan pool if it can charge r_p.

Initially it is assumed that a good borrower can convincingly signal its quality. If the information provided means the lender can unambiguously identify a borrower as good, the borrower is taken out of the pool and charged r_o. The number of good firms in the original pool is reduced and so the proportion of defaulters increases, increasing r_p for the remaining firms. While this stepwise determination of 'group' interest rates appears simplistic, a continuous differential ranking of loans does not accord with the observed interest rates charged to small firms. The stepped nature of the quoted rates[1] suggests groups of borrowers are priced (ranked) equally by the lender, implying the equivalent multiple loan pools.

Generalising from this 'default-no default' model, firms that effectively signal their relative quality will be assigned to different pools with different expectations of default.

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1 Quoted rates appear to move in steps of 0.25% for the period under study. Upper limits on quoted interest rates imply that there is a maximum level of default risk that a lender will accept.

This is illustrated with a two pool example where it is assumed the bank's relevant loans portfolio totals m dollars of loans (D_m) and an estimated default probability of q_p. A subset of borrowers with loans totalling n dollars supply information which allows them to be grouped into *Pool A* with outstanding principal of D_n, leaving D_{m-n} as *Pool B*. Thus the initial pool of D_m with a probability of default of q_p is divided into two pools for which the lender has different expectations of default[2]:

$$q_p D_m = q_{signal} D_n + q_{nosig} D_{m-n} \tag{14.4}$$

From (14.3) the premium for the n loan dollars in *Pool A* is

$$\rho_{signal} = \lambda_{signal}(1+r_o) \qquad \left[\text{where } \lambda_{signal} = \frac{q_{signal}}{1-q_{signal}}\right]$$

Likewise the premium for the *m-n* loan dollars in *Pool B* is

$$\rho_{nosig} = \lambda_{nosig}(1+r_o) \qquad \left[\text{where } \lambda_{nosig} = \frac{q_{nosig}}{1-q_{nosig}}\right].$$

It follows that $$\frac{\rho_{signal}}{\lambda_{signal}} = \frac{\rho_{nosig}}{\lambda_{nosig}} = \frac{\rho_p}{\lambda_p} = 1+r_o$$

meaning that $$\rho_{signal} = \left(\frac{\lambda_{signal}}{\lambda_{nosig}}\right)\rho_{nosig} \tag{14.5}$$

That is, premia differences across pools are described by their ratio of default weightings. Assuming a rational firm will not signal it is a defaulter, $q_{signal} < q_p < q_{nosig}$, then:

$$\rho_{signal} < \rho_p < \rho_{nosig} \tag{14.6}$$

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2 Note that the signalling does not change the lender's beliefs concerning the default rate for the *total* loans portfolio.

That is, the premium charged to firms signalling their superior loan quality is less than the premium charged to the non-signalling firms which becomes higher than the original premium due to the increased default probability for the remaining non-signalling pool. As more firms successfully signal their relatively superior quality, the default probability for the non-signalling residual pool will approach a level of unacceptable risk to the lender, at which stage the remaining firms may be screened out of the lending portfolio[3]. Thus, loan applicants that cannot signal their quality may be rationed out of the loan market, depending on the degree of homogeneity among lenders[4]. Homogeneity is diminished if the bank applies other premiums as considered below.

Other information adjustments

The lender may have access to information for which it does not rely on the borrower. The lender then applies different premiums (effectively creating more pools) for groups of firms to compensate for other risks and costs such as loan size and industry[5]. The premium component of interest rate r_i charged for loan i can then be described as the sum of the various premia charged for all class-based factors relevant to the particular loan, including information supplied by the borrower:

$$PREMIUM_i = r_i - r_o = \sum_{j=1}^{J} \rho_{i,j} \qquad (14.7)$$

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3 As an increasing proportion of loans are identified as good, the increased premium to remaining firms provides an increasing incentive to signal their quality. If the costs of signalling are sufficiently low, then eventually only defaulters should be left in the pool. However, signalling costs and uncertainty suggest this is unlikely to be realistic and so there will always be a positive default risk for any pool of loans to owner-managed firms.

4 This accords with the suggestion of Stiglitz and Weiss (1981) that interest rates can act as a screening device. Stiglitz and Weiss proposed that banks will not always increase the interest rate they charge, even in the face of excess demand for funds, as this might lead to an unacceptably high default risk. They reasoned that higher interest rates reduce the proportion of low risk borrowers, and may induce borrowers to take riskier actions.

5 For example, firms in a similar line of business or industry are expected to have similar levels of business and financial risk (Ferri and Jones, 1979). This suggests that industry differences would exist in interest rates charged to firms.

This suggests not all non-signalling borrowers will be rationed out of the bank's portfolio if the other available information is sufficient to reduce the premium below the bank's screening value. Types of information that may be relevant are considered in the next section where this model is empirically tested. This aggregation of premia inhibits the simple comparison obtained at (14.5). As the number of factors increase, the interest rates charged by a lender appear more loan-specific. If there are relatively few factors then the pooling effect should be more observable. Observations of pools is most likely to be achieved cross-sectionally, given that the base indicator rates quoted by institutional lenders vary greatly over time.

TESTING THE MODEL FOR OWNER-MANAGED FIRMS

The test of the debt pricing model regresses the premia determined for known interest rates levied on new individual loans against possible information proxies. The main weaknesses in this approach are the limited number of observations available in the database and the relatively noisy information proxies. Original loan applications were not available for data collection and so the information collected by the bank, including any details of consumption levels or composition, cannot be modelled here.

The files for the sample firms described in Chapter 9 frequently omitted interest rates at the time loans were granted, reducing the available database. Many initial applications included overdrafts. To test the model for a reasonably homogenous debt type, only data for term loans are used. All such loans were for fixed terms at a floating interest rate[6]. Interest rate data was obtained for 124 loans to 96 firms, of which 46 were subject to recovery-actions by the bank.

6 Up to 29 April 1985, Australia had an interest rate ceiling for bank loans under $100,000. Therefore, loans granted prior to that date for amounts under the limit were excluded.

The response variable:

Separate indicator rates (determined from a survey of the major banks) are published each month by the Reserve Bank for bank finance below and above $100,000. The dependent variable, *PREMIUM,* is calculated as per equation (14.7) as the difference between the rate charged to individual firms and the nominal base rate indicated by the Reserve Bank:

$$PREMIUM_i = r_i - r_b$$

r_i = interest rate charged on loan i
r_b = base indicator rate for date nearest that on which loan was approved

The available data (N=124) yields the premia described in Table 14.1. There is reasonable variation in the level of the premia as indicated by the range and standard deviation. The general description does not suggest any problems with the magnitudes or distribution of the premia which are regressed in their raw form.

Table 14.1

Interest rate premia for term loans - descriptive statistics

Minimum	-.010
Maximum	.057
Mean	.017
Median	.015
Standard deviation	.014

Signals

While the provision of financial statements is required by the bank, the frequent absence of such statements suggests they were effectively voluntary. Therefore they are described as signals by the owner-manager. The use of an independent accountant to compile statements or advise the owner-manager may have some signalling value as described below.

Income Statements (INC) and Balance Sheets (BS): Financial statements and the effort invested in their preparation may provide the lender with a variety of information, including evidence of the veracity of a borrower's claims such as collateral adequacy and debt levels. With no *a priori* reasoning regarding the two main components of financial statement sets, the provision of complete income statements (*INC*) and balance sheets (*BS*) are coded separately. The provision of statements is expected to be negatively associated with the interest rate premium. Sixty three cases provided income statements and 60 provided balance sheets (approximately 50 per cent for each).

While a balance sheet can be constructed with relative ease at any date, the provision of income statements by owner-managed firms tends to be more an annual event. It is expected that income statements will not be available for most very young firms. This need not mitigate the significance of income statements but will likely induce some correlation with the age of the firm. Such correlations are considered on a selective basis after the test variables have been described. A full listing of correlation coefficients for all pairs of variables is provided in Appendix 5.

Accountant (ACCT): The use of an independent accountant may add credibility to the financial statements supplied, signal the willingness of the owner-manager to seek external advice or provide some other signal of quality. It is expected that if the identification of an independent accountant has any effect on the interest rate premium, it will be negative. However, this is a relatively noisy variable. The absence of an identified public accountant in the bank loan file does not necessarily mean that one is not used and existence does not indicate the role of the accountant. Such problems act against this variable having any explanatory power in relation to interest rates.

Consumption information

As noted in the introduction, failure to take account of consumption behaviour may induce mispricing by ignoring the ability of the owner-manager to adjust consumption to

meet debt servicing obligations. In the context of the model developed in Part II, owner-managers at or near their base consumption level have less capacity or willingness to modify (reduce) consumption levels to ensure they will meet debt servicing commitments. This is implied by the ordering of expressions 7.14 and 7.15. Such cases should involve a greater risk of default. Therefore, firms with relatively lower consumption levels may be riskier meaning consumption should have a negative association with interest rate premia. This may be moderated by the ability of the owner-manager to increase effort (see expression 7.22). The data does not allow for any control of effort levels. Similarly, moderation can be induced by the provision of the loan in question in the context of increased investment in income seeking expenditures. Because it is not possible to identify the bank's assessment of any relationship between investment and the financing of future consumption, the circularity of this proposition cannot be resolved.

Consumption is considered in four measures described below. Concurrent consumption is used to proxy achieved consumption at the time of the loan approval. Achieved consumption may be better reflected by consumption for the period *preceding* the granting of a new loan but, as described in Chapter 11, two consecutive years of data are required to estimate consumption. This would induce too large a survivorship or age bias in the tests. A bias is already present in that new firms are excluded in tests involving concurrent consumption because of the requirement that firms must have provided two consecutive sets of financial statements for concurrent consumption to be estimated. This also creates a potential testing problem with respect to the provision of financial statements as an information device, as described above. This is addressed below within the description of the tests and results.

Concurrent consumption (CONSUM0): Consumption in the same year that the new loan was granted in most cases includes consumption before and after the loan date. It will

therefore be a mix of past choices and current aspirations although its intended purpose is proxy achieved consumption.

Subsequent consumption (CONSUM1): Consumption in the year following the new loan is assumed to indicate aspirations that the bank could have identified at the time of the loan application. Given the likelihood of revisions to an owner-manager's aspirations and changed circumstances over the period involved, this is a weak proxy for aspirations.

Changes in consumption (CONSUMX): Changes in consumption (*CONSUM1-CONSUM0*) is used to proxy anticipated changes in consumption aspirations. This variable replicates the limitations already noted for the preceding two measures of consumption.

Consumption per owner-manager (CONSUMOM): Dividing *CONSUM0* by the number of owner-managers in the firm is intended to scale consumption to the number of individuals investing effort and to better identify consumption near base levels. This assumes that increasing the number of owner managers similarly multiplies the base level of consumption. This is least likely to be true for partnerships among domestic couples, indicating a need to control for cases involving couples. Couples are also relevant to information levels generally as explained below under other information proxies.

CONSUM0 and *CONSUMOM* are available for 54 cases, *CONSUM1* for 42 cases and *CONSUMX* for 29 cases. The low number of observations relative to the 124 cases considered is a direct consequence of the age bias induced by the method of estimating consumption, as noted above. The age profile of the sample is described below when age is identified as possible information proxy and control variable.

Potential problems with the consumption estimate were discussed in Chapter 11. The results of Chapter 11 suggest it may not have been a major concern for those tests,

although the extent to which it may have suppressed relationships between consumption and owner-manager decisions could not be evaluated. For the current analysis, the possible understatemenmt of income and consumption remain a concern.

Other information and risk proxies

With the limited number of cases available, further fragmentation by using dummy variables for particular events or circumstances is of limited feasibility. Nonetheless, age, origin, organisational form and industry of each case are considered. These control variables are introduced below.

Because the absence of financial statements is one of the key variables in this analysis, risk proxies derived from the contents of financial statements are not feasible[7]. Indeed, the proposed model suggests the absence of such measures may be the relevant import of such absences. Firm age and industry are used as proxies to control for business risk[8].

Age (AGE): A lender is likely to have access to more information on the borrower's ability the longer the firm has been in business[9]. Firm age may indicate past profitability or an owner's ability and propriety[10]. Jovanovic (1982), Dunne *et al.* (1987), Evans (1987a, 1987b), Storey *et al.* (1987) and Storey (1989) all indicated that variability in

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7 Storey (1989, p.175) suggested that factors which reflect small firm risk characteristics differ considerably from those used for large firms. Vos (1992) found that traditional risk measures applied to (larger) listed firms (such as accounting betas) did not perform well when applied to small firms. Hutchinson (1987) suggested that traditional measures of risk (such as ratios and decomposition measures) may not successfully distinguish rapidly growing small firms from 'bankrupt' firms since these firms often exhibit similar characteristics.

8 Keasey and McGuinness (1990) argued that small firms in a similar location should face some broadly similar risks, in which case the fact that all the firms are South Australian firms, and mostly metropolitan Adelaide, provides an additional control for risk.

9 Ideally, the length of the relationship between the bank and the borrower would have been a better measure of information asymmetry. Information on the length of bank-client relationships was, however, not available for enough firms to be used in the tests.

10 Ando (1985) (cited in Evans and Jovanovic, 1989) reported that the probability of a loan request being granted improved significantly the more the business experience of the entrepreneur and the older the firm.

firm growth, earnings and the probability of failure decrease with firm age. Jovanovic (1982) and Lippman and Rumelt (1982) argued that firms' efficiencies are learnt over time, inducing an owner-manager or firm 'age' or 'experience' effect. Thus age is expected to be negatively correlated with the premium. A possible diminishing curvilinear age effect suggests that a log transformation of the firm's age also be considered (*AGELOG*).

The average age of loan applicants is approximately three years. Sixty per cent are two years old or less, 31 per cent are one year old or less and 23 per cent are in their first two months of operations. The loan applicant sample is therefore much younger than the overall sample described in Table 9.8. This accords with the expectation that younger firms are more likely to be seeking debt for establishment or growth[11].

Organisational form: In Australia sole proprietors and partnerships usually are not required to prepare financial statements. Incorporated firms, including exempt proprietary companies, are statutorily required to prepare annual financial statements. The provision of financial statements to banks by sole proprietors and partnerships therefore may be relatively more costly if they are prepared especially for that purpose. This does not necessarily affect the interest rate on the loan; however, if unincorporated firms are consequently less likely to provide complete financial statements there may be a systematic distortion (understatement) of the importance of financial statements across all firms, indicating the need to control for organisational form.

The greater regulation of disclosures by incorporated firms suggests that the bank may derive a different level of information from their statements relative to unincorporated firms, although there is no *a priori* basis for predicting the nature of such differences.

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11 Issues pertaining to growth are considered in Chapters 15 and 16 with the latter focussing on the role and accessibility of debt.

The premiums therefore might differ between incorporated and unincorporated firms, or between any of the organisational forms. Consequently, dummy variables are included to distinguish incorporated (companies and trusts) and unincorporated (soletraders and partnerships) firms generally (*INCORP*) and non-company forms (*SOLETRAD*, *PARTNER* and *TRUST*). The sample of loan approvals is comprised of 20 soletraders, 38 nominal partnerships, 45 companies and 21 trusts (giving a total of 66 incorporated firms). Of the 38 firms organised as partnerships, 15 had only one owner-manager. The 23 remaining genuine partnerships are flagged by the additional dummy variable *REALPART*.

Origin (PN): Firms are distinguished in Chapter 9 according to whether they were new start-ups established by the current owner-manager or were purchased as going concerns. It is plausible that established going concerns offer less risk to lenders and that the owner-manager and lender have greater information as to the level and stability of income from the firm. The experience or age effect identified above, with reference to Jovanovic (1982) and Lippman and Rumelt (1982), may imply that, holding other factors constant, banks will charge less for debt provided to an ongoing older firm than to a new startup[12].

This effect should decline in importance the longer the firm is held by the current owner-manager and therefore it is considered in conjunction with the age of the firm. The origin variable *(PN)* is coded 0 for a purchased business and 1 for a new start-up. The composite variable *PNAGE* is used to denote the possible interactive effect of age and origin, and is denoted 1 for a new start-up business under a nominated age limit and 0 otherwise. Because the possible age limit is arbitrary, limits of one, two and three years are tested (denoted *PNAGE1*, *PNAGE2* and *PNAGE3*). Because these variables are intended to denote riskier loan propositions, the predicted sign for their impact on *PREMIUM* is positive. The origin of almost one third (40) of loan cases is not known. The remaining

12 If rationing is sufficiently tight, the bank may be more willing to finance the acquisition of a going concern or provide incremental finance to an ongoing older firm, than they would be to finance a new start-up, in addition to pricing differentials.

84 cases are comprised of 47 new start-ups and 37 businesses purchased as going concerns. As with the consumption variables, such a large number of missing observations reduces the likelihood of the variable making a significant contribution in a regression of all cases.

Number of owner-managers (OM): The greater the number of effective owner-managers in a firm[13], the greater the potential for agency problems (see Chapter 13). This may generate demand for monitoring mechanisms by partners, increasing the general flow of information. This may be mitigated by partnerships between domestic couples, warranting consideration of an additional control variable (*COUPLE*). As noted above, controlling for couples may also be relevant to proxying consumption per owner-manager. Combined with the possible risk reduction for the bank by having multiple owner-managers liable for debt and a larger human capital stock, the existence of multiple owner-managers may reduce the relative importance of financial statements or may contribute negative premiums. The loan sample is comprised of 64 cases with one owner-manager, 55 with two and five with three owner-managers.

Industry (IND_j): Firms in a single industry class are expected to have similar business risks since they produce broadly similar end products and use similar inputs and technologies (Ferri and Jones, 1979). Firms in similar industries are expected to have broadly similar business risk and volatility of earnings (Scott, 1972; Scott and Martin, 1976; Ferri and Jones, 1979). The industry classifications in Chapter 11 are used here. Most were in IND_1 (60 cases) and IND_3 (24 cases). A fuller description is provided in Table 14.2 which describes the industry concentrations by organisational form. There is reasonable representation of the various industry classifications and organisational forms as described in Table 14.3. Both the organisational form and industry profiles follow similar patterns to the overall sample set (see Tables 9.1 and 9.6). Particularly large

13 See Chapters 2 and 3.

concentrations occur for partnerships in IND_1 and IND_3(31 cases), and companies and trusts (37 cases) in IND_1 .

Table 14.2
Industry x organisational form

Industry group	SOLE-TRADERS	PARTNER-SHIPS	COMPANIES	TRUSTS	*Industry %*
IND_1	4	19	25	12	*48.4*
IND_2			1	2	*2.4*
IND_3	4	12	5	3	*19.4*
IND_4	5	1	3	2	*8.9*
IND_5	5	1	4	2	*9.7*
IND_6	2	5	7		*11.3*
Organisational form %	*16.1*	*30.6*	*36.3*	*16.9*	*100.0*

Term of the loan (TERM): The initial approved term of a loan may reflect the bank's response to information asymmetries or other risks. Alternatively, longer term loans may have a greater risk of eventual default. Most loans were for similarly short periods (usually around five years) which would reduce its likely value as a risk proxy. It is likely that the term and size of loans will be strongly correlated relative to the size of the firm in terms of revenue and capital; the latter is expected to be modified for specificity to account for the collateral value of assets. The average loan term is 7.5 years with a median of 6.5 years. Particular concentrations occur for five year terms (29 cases) and ten year terms (27 cases). There are 21 cases with terms less than five years, 32 with terms greater than five but less than ten years, and 15 cases with terms in excess of ten years. The largest term (1 case) was 30 years.

Revenue: Firm size is measured by turnover and capital. As will be seen in Chapter 15 this is keeping with the literature pertaining to small firm size and growth. Because a size effect may diminish in significance as size becomes increasingly large, a curvilinear relationship between firm size and the premium needs to be considered. This is approximated by a log transformation. Therefore, revenue size is considered in four

forms: gross sales (*SALES*), gross profit (*GP*) and the log of each (*SALESLOG* and *GPLOG*). Gross profit is included to allow for possible industry differences and possible non-profitable variations in sales which might not provide the negative relationship expected between size and *PREMIUM*. Sales and gross profits are available for 63 cases. One case reported a gross loss and so its *GPLOG* is classified as missing.

Cost factors

Lenders may incur varying search and contracting costs relative for loan applicants from different industry groups and for different scales of investment. Industry groups have been considered above in the context of risk proxies. Loan size is considered below.

Loan size (LOAN): Loan size may have a scale economy effect on the interest rate charged by spreading the relatively fixed costs of a loan (such as contracting and expected monitoring costs) over a larger principal. This suggests a negative correlation between loan size and *PREMIUM*. Because this effect may diminish in significance as loans become increasingly large, a curvilinear relationship between loan size and the premium needs to be considered. This is approximated by a log transformation (*LOANLOG*).

Note that this treatment is not entirely consistent with the aggregate premium model described in equation 14.7 in which premia are determined by reference to loan pools. This suggests that the effect of loan size should be in relation to cut-off values for loans, rather than as a continuous scaling. Without specific knowledge of the bank's size criteria, the adopted approach is preferable to any arbitrary loan size cut-offs. Data screening did not indicate any obvious clustering of interest rates by loan size. The size of the approved loan may reflect the bank's evaluation of the borrower's prospects and would thus be co-determined with *PREMIUM* by reference to other variables. The extent to which *LGLOAN* is correlated with other variables is considered below. Loan sizes (*LOAN*) are widely dispersed (minimum $4,850; maximum $2,700,000) but generally

small with a median of $44,500. It is substantially skewed, but this is remedied by the log transformation (*LOANLOG*).

Correlations among variables

Appendix 5 describes the pairwise correlations between the potential explanatory variables and with the premia. While *TERM*, *LOANLOG* and the control variable for soletraders (*SOLETRAD*) are significantly correlated with *PREMIUM*, simple Pearsonian correlations do not indicate how the variables will perform in a multivariate regression.

As discussed below, the significant correlations among several potential explanatory variables indicate potential collinearity problems. The more serious problems potentially arise with *TERM* and *LOANLOG* which have a relatively high correlation of 0.5066. From the correlations with *PREMIUM*, it is expected that *TERM* (with a correlation of -0.3054) will dominate *LOANLOG* (with a correlation of -0.2738) in a regression of *PREMIUM*, although in a multivariate regression this cannot be presumed.

Other noteworthy correlations are those between consumption (both *CONSUM0* and *CONSUM1*) and *AGE*, which as might be expected are positive, and the provision of financial statements (*BS* and *INC*) and *AGELOG* which also are expectably positive. As described below, such correlations will work against the effective inclusion of the pairs variables in regressions models of interest rate premia.

Regression technique

The two main issues in selecting the regression approach are the variables with missing observations and the potential for collinearity problems arising from the inclusion of highly correlated explanatory variables.

The options available for dealing with missing values are to either allow listwise deletion of the relevant cases, which would unacceptably reduce the sample size in the current circumstances, or to enter a nominated value for the missing values. A standard approach is to substitute the mean of the variable concerned. An important possible effect of this mean substitution is the likelihood of suppressing the information content of the variable concerned by reducing its variance (all substituted values are equal to the mean and so add nothing to the numerator in calculating the variance but increase n). While the use of mean substitution may act against the variable being identified as varying in a significant manner relative to dependent variable, this is preferred in the current circumstances to the reduced degrees of freedom that would result from listwise deletion of the cases with missing values on any of the variables.

The potential for collinearity problems arising from the inclusion of highly correlated explanatory variables in a regression can most easily be avoided by excluding one of the correlates from the regression. However, the choice of which variable should be excluded is particularly contentious in the absence of strong *a priori* reasoning. To attempt to capture interactions between such variables with composite variables would further reduce degrees of freedom an exercise with a potentially large number of variables relative to the number of cases.

The use of stepwise regression procedures will reduce the likelihood of collinearity problems due to the opportunity to specify tolerance levels for the inclusion of variables at each step. This also means it is unlikely that pairs of correlated variables will be included in any one equation giving a lesser understanding of the interactions and processes behind the interest rate premia. It also means the final choice of variables in the model is achieved on statistical basis only, but given the range of variables that can be considered and the lack of any strong theoretical basis for preferring one variable over another, no superior method is available.

The stepwise procedure used has tolerance levels for the inclusion of variables at each step set at 0.1. In addition to satisfying the tolerance limit, a variable is added (and retained) only if the coefficient is sufficiently significant. For current purposes a relatively liberal confidence level of 90 per cent ($p \leq 0.10$) is used.

It is emphasised that the regression modelling pursued here is experimental in that it searches for possible explanations of the interest rate premia, rather than testing clearly hypothesised specific models of the premia. The only strongly framed test involved is of the general model at equation (14.7) that proposes that a premium can be explained as a linear combination of premia induced by different signals or information items available to the lender.

Regression results

Because of the volume of material involved the details of each of the regression models developed here are presented in Appendix 6. The initial regression[14] considers all proposed variables and cases. It results in a two variable model:

$$PREMIUM = .024 - .98E\text{-}4(TERM) + .008(SOLETRAD) \qquad \text{(MR 14.1)}$$

The significance levels for each of the explanatory variables is very strong (0.0009 and 0.015 respectively) but the model has a modest R^2 of 0.14 (0.12 adjusted). While this leaves a substantial amount of the variation in the premia unexplained, it is an encouraging start. The variables not in the equation indicate little obvious additional contribution from such sources. The most influential of the remaining variables are *AGE* and *GPLOG*. Both are well outside acceptable significance limits. Analysis of the standardised residuals suggests some scope for further explanation of *PREMIUM*. The

14 Labelled 'Multiple regression 14.1' in Appendix 6

normal probability plot appears to be concave to the normal 45-degree line, suggesting an unexplained curvilinear influence.

The expected substitutability of *LOANLOG* for *TERM* proposed in the earlier discussion of correlations is confirmed in 'Multiple regression 14.2' for *TERM* is suppressed. The resultant two variable model is very similar to 14.1:

$$PREMIUM = .05 - .007(LOANLOG) + .007(SOLETRAD) \qquad \text{(MR 14.2)}$$

The significance levels for each of the explanatory variables is almost as strong (0.011 and 0.054 respectively) with *LOANLOG* providing similar albeit slightly reduced explanatory power of R^2 of 0.10 (0.09 adjusted). The residuals appear a little more normal, but not substantially so, than for model 14.1. Overall the results are similar.

Given the variety of potential explanatory variables, these results appear weak. The cases include a wide range of organisational forms and industry types across which loan pricing behaviour might not be easily generalised, even using control variables. A series of tests were conducted excluding the cases from each industry category then each organisational form in turn. The results each time are very close to those already reported except when partnerships are excluded. These are reported as 'Multiple regression 14.3' and 'Multiple regression 14.4'. The first again considers all potential variables (except the now redundant *PSHIP* control) while the second suppresses *TERM* which was again very significant in the lead model and replaced by *LOANLOG* in the second model.

The first model is substantially different to MR 14.1, with *TERM* now augmented by *BS*, *AGE* and *INCORP*. Note that *INCORP* is now a direct substitute for *SOLETRAD*, being its direct complement:

$$PREMIUM = .037 - .002(TERM) - .005(BS) - 7.07(AGE) - .006(INCORP) \qquad \text{(MR 14.3)}$$

As before, the organisational form control indicates that soletraders tend to pay higher premia that incorporated firms. The explanatory power has increased to R^2 of 0.26 (0.22 adjusted). The presence of BS is both interesting and somewhat surprising given the previous discussion of the consequences of missing observations and the use of mean substitution. The inclusion of *BS* indicates that firms providing balance sheets to the bank with loan application will attract lower interest rates than those that do not. Given the correlations between *BS* and other variables (see Appendix 5) it cannot be concluded that the negative premium attaches to the balance sheet provision *per se*. It may be that the provision of a balance sheet efficiently proxies other information such as the use of an accountant and the number of owner-managers, although this seems unlikely given there are 64 missing observations on *BS* (approximately half the cases)[15].

With *LOANLOG* entering multiple regression 14.4 with the suppression of *TERM*, there is a further change in the structure of the model with the industry control variables IND_5 (commercial services) displacing *AGE* and *INCORP* :

$$PREMIUM = .067 - .01(LOANLOG) - .006(BS) + .008(IND_5) \qquad \text{(MR 14.4)}$$

This three variable model has an R^2 of 0.2 (adjusted 0.17). The industry control IND_5 (commercial services) indicates that firms in this industry tended to attract higher premia.

The standardised betas reported for all variables in the models allows comparison of the relative contribution of each variable within a model. In 14.3 and 14.4 *TERM* and *LOANLOG* have similar relative sway with betas of approximately -0.35 and -0.33 respectively while all other variables in both models are in the range of ±0.17 - 0.19.

15 While the possible role of balance sheets or what they might represent in these cases warrants further investigation, it is beyond the scope of this analysis which is concerned mainly with the relevance of owner-manager consumption levels to loan pricing.

The graphical representations in the histogram of residuals shows some negative skewness for both equations and potentially bi-modality for 14.4. The normal probability plots appear to be concave to the normal 45-degree line for 14.3, suggesting a curvilinear influence; 14.4 exhibits a slight 'S' shape indicative of some skewness. When 14.4 is applied to the excluded cases for partnerships the standardised residuals conform equally as well to the normal curve and the probability plot appears to exhibit less deviation from the diagonal for 14.4 while partnerships fit poorly with 14.3.

Partnerships

The increase in multiple R (from 0.37 and 0.32 for the first two applications to .0.51 and 0.45 for 14.3 and 14.4) shows an enhanced degree of association between the model and *PREMIUM* when the partnership cases are excluded. Multiple regression 14.5 reports the stepwise regression for partnership cases only. The only variable selected is *LOANLOG*, with a size opposite to that achieved in the regressions that exclude partnerships. The explanatory power of the model is trivial with R^2 of only 0.08.

Regressions 14.6 and 14.7 report the forced regressions of the variables used in 14.3 and 14.4 to partnerships. In 14.6 the signs for *BS* and *AGE* are reversed suggesting that their effects are to moderate *TERM*. The model has little explanatory power with R^2 of only 0.08 (approximately zero when adjusted). In 14.7 the signs for both IND_5 and *BS* are also reversed and there is a very similar loss of explanatory power. In both regressions none of the variables are significant.

The available data does not allow further examination of the possible explanations for the different premia behaviour of loans to firms organised as partnerships relative to soletraders and incorporated firms. It is apparent, however, that the explanation of the premia charged to partnerships requires variables not considered here.

Consumption

An important objective of these tests is to examine the extent to which consumption behaviour or aspirations is taken into account by lenders in determining the price of debt. The preceding results provide few answers to this question. The individual consumption correlations with *PREMIUM* (see Appendix 5) show no bivariate association with all coefficients negative but insignificant. While the consumption variables are not included in any of the regression models it cannot be ascertained whether this is due to the failure of the lender to take account of such information or to data deficiencies such as measurement problems and the substantial number of missing observations.

CONCLUSION

The analysis in Chapter 12 indicates that the relationship between consumption and debt may be more complex than can be detected by analysis of the costs of term loans only. The earlier analysis suggests consumption is influential in the level and structure of debt in an owner-managed firm, meaning it is unlikely to remain constant before and after the debt restructuring exercises that are considered here. Testing for any impact on the cost of debt are frustrated by the difficulties in identifying consumption levels prior to loan approval. While it is likely that lenders have superior information regarding achieved consumption, it cannot be assumed that they have reliable information concerning the owner-manager's consumption intentions. This may induce reliance on general indicators that are applied consistently to groups of owner-managed firms. These may be included in the premia groups already identified using the various control variables or may pertain to yet unidentified variables. It is plausible that lenders observe the general status of loan applicants, such as indicated by lifestyle, family status or the like, and use these factors as indicators of likely consumption levels.

An interesting feature of the results obtained here is the provision of balance sheets as partly 'explaining' interest rate premiums initially charged on term loans. Caution must

be exercised in interpreting the role of *LOANLOG*. There is a strong argument that the size of the approved loan reflects the bank's evaluation of the borrower's prospects. It might not so much reduce interest rates through scale economy as it might obscure the role of other risk proxies[16].

It is concluded that there is no indication of consumption levels affecting the cost of debt. While this may be due to inappropriate testing methods or data limitations, it is plausible that lenders do not take account of consumption levels in the naive manner proxied here. It is known that banks collect fairly detailed consumption data from small business loan applicants[17] that may facilitate more detailed and individual specific evaluations of consumption levels and possible trends than can be tested here. There was no evidence in the loan files accessed for data collection as to how the bank utilised the data collected. As noted earlier, original loan applications were not available for data collection and so the information collected by the bank cannot be modelled here.

While it is apparent that banks collect detailed and varied information regarding debt applicants, precisely how this is used in loan approvals and pricing cannot be effectively modelled with the available data. Noting this limitation and the otherwise still tentative debt pricing results, attention is now turned to how debt pricing considerations and other evidence regarding the role of debt generated in Part III may affect the performance of owner managed firms in the context of the consumption model presented in Part II.

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16 When both *TERM* and *LOANLOG* is suppressed from the regression *AGE* and *SOLETRAD* are included as significant explanatory variables but with a much lower R^2 of 0.15. Because of the significant correlation between *AGE* and *LOANLOG* the appearance of *AGE* may be little more than a proxy substitution. It also may be the case that loan sizes, as previously discussed, are a product of the bank's use of other information including that represented by *AGE*. Because available data does not support further testing in this area, no further analysis of is pursued.

17 The loan application forms of all major Australian banks were collected in 1988 and again in 1992. In each case the banks appeared to collect the same information regarding domestic expenditure as they typically for small personal loans and owner-occupier property loans.

CHAPTER 15

COST AND AVAILABILITY OF DEBT

INTRODUCTION

As indicated in the introduction to Part IV, growth is often represented as an important view of firm performance. This chapter considers the substantial role of capital related externalities as growth constraints. This is pursued primarily by drawing on material presented in earlier chapters and by reference to previous Australian empirical studies. Of relevance from earlier chapters are some of the empirical results in Chapters 10 and 12 concerning the identified behaviour of borrowers and lenders, the discussion of contracting behaviour in Chapter 13 (especially those elements pertaining to information asymmetry and risks of moral hazard) and empirical evidence in Chapter 14 concerning information asymmetry, signals and debt pricing.

The focus for this chapter is drawn from the frequent claim by media commentators and lobbyists that a critical 'finance gap' exists which retards the growth of Australian small or owner-managed firms (Lambert, 1984). Historically, the finance gap described the situation where a 'small' firm had exhausted available short term sources of finance but could not gain access to longer term finance from lenders, venture capitalists or public share floats. For examples of such restrictions in Australia see Hutchinson (1987); for elsewhere see Tamari (1980), Fazzari, Hubbard and Peterson (1987), and Evans and Jovanovic (1989). Others, such as Beddall (1990) in Australia and Rhyne (1988) in the US, used the term more broadly to imply a general restriction on the supply of all forms of capital to small business, together with a higher cost of debt.

It is illustrated in a discussion of prior research in Chapter 16 that owner-managers are reluctant to pursue external equity financing so that financing is largely restricted to debt

and internally generated equity. The general role of equity and debt are considered briefly after noting the intended nature or concept of growth being considered here, and before focussing on the more substantial aspects of debt.

Growth

The concept of growth is explored in greater depth in Chapter 16 in the context of internal influences on firm growth. Size (and therefore growth) is often considered in the relevant literature in terms of number of employees (see Chapter 2) or gross revenues (see Chapter 16). For policy makers and observers with particular interests such as employment growth, employee numbers may be an appropriate criteria, but there is no obvious argument that small firm owner-managers would be interested in growth in employee numbers *per se*. The consumption model formalised in Chapter 7 indicates that consumption (and consequent income) aspirations may require increased capital to generate the necessary revenues. Measuring growth in terms of gross revenues may have a closer association with consumption aspirations. This is partially investigated in Chapter 11 in the context of hypotheses concerning the relationship between revenue generating investment and consumption. The results of these tests, as reported in Tables 11.12 - 11.16, generally support the proposed relationship between increased investment and increased consumption aspirations.

Equity

External equity access has little relevance in the current context. The definition of owner-managed firms precludes the use of significant external equity capital. Owner-managed firms were selected for study primarily because they dominate the small business sector, which has already been noted as rarely using external equity. A question for those concerned with finance gaps is whether this is by choice or opportunity.

The control incentives and agency concerns considered in previous chapters suggest that it may be largely a result of both but intuitively, choice must dominate. As evidenced in a survey of 1000 Australian small businesses[1] reported in Yellow Pages Australia (1995) (hereafter YPA), few owner-managers will accept equity partners because of the perceived impact this has on the nature of their firms and the attached agency costs. Growth aspirants were asked about their intention to seek external equity financing to fund growth and their willingness to share control with an external investor to obtain such capital. Nineteen per cent of high growth aspirants indicated an intention to seek external equity compared to six per cent of moderate growth aspirants[2]. Thirty four per cent of high growth aspirants were prepared to share control compared to only 22 per cent of moderate growth aspirants. Overall, 77 per cent of growth seeking owner-managers were specifically not prepared to share control of their business with an investor. Questions were not asked of non-growth proprietors and the respondents' understanding of 'sharing control' was not considered. There was no apparent industry effect in control preferences.

This lack of demand may be matched by a similar lack of supply. Information asymmetry, contracting and monitoring problems for potential providers of equity capital to owner-managed firms were discussed in Chapter 13. The identified problems provide a disincentive to accept residual equity positions in such firms. The higher risk attaching to non-tradeable (and therefore long term) residual equity (compared to debt) also infer risk premia that may encourage owner-managers to seek debt in preference to equity.

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1 The study surveyed randomly selected small business proprietors employing fewer than 20 people, drawn from all metropolitan and non-metropolitan areas of Australia with quotas set on geographical location and industry, weighted to reflect the total business population.

2 High growth aspirants comprised eight per cent and moderate growth aspirants comprised 61 per cent of all firms.

The only other available source of equity thus becomes owner-managers' savings. For new start-ups this requires existing wealth while continuing firms may have access to retained earnings. The attributed equity contributions of owner-managers in the data base indicate varying degrees of leverage. Table 12.3 indicates that the incidence of savings of any amount by sampled firms was relatively low with 42 per cent of cases failing to achieve any savings over the two year period and only 16 per cent achieving savings in both periods.

The more generally recognised limited ability of owner-managed firms to generate internal equity is considered in Chapter 16. The limited role of equity indicates that availability and cost of debt are critical concerns for owner-managed firms.

Debt

Consistent with a reluctance or inability to introduce external equity, empirical evidence indicates that small owner-managed firms have a high relative use of debt financing. Renfrew (1982, p.134) reported that approximately 75 per cent of small firms' long term finance (in 1976-78) came from banks with only 1.3 per cent coming from new equity holders. Evidence from surveys reported in Bird and Juttner (1975) and Bureau of Industry Economics (1981, 1991) provide a similar view.

It has been suggested that poorer access to finance reflects the relatively lower potential returns from small firm investments (Campbell, 1981) and higher cost of debt reflects lenders' costs in administering small firm debt (Johns, Dunlop and Sheehan, 1989). Faced with arguments that small firms should be protected from higher interest charges, (Martin, 1984) concluded that interest rate caps on loans under $100,000 (which existed until 1984) induced credit rationing for small firms because banks could not always charge rates commensurate with the perceived risk (p.309).

A recent parliamentary inquiry into small business in Australia reported that a significant obstacle to the growth and development of small business is access to finance under appropriate terms and conditions (Beddall, 1990, p.190). It qualified this finding by noting the reluctance of small firms to accept equity financing (in keeping with the above reference to the YPA (1995) study) and difficulty in satisfying the security requirements of banks. It appears that in the debt market, owner-managed firms have weak bargaining positions. They can access few substitutes and essentially are price-takers. The debt instruments used by Australian owner-managed firms are mainly floating (fluctuating) overdrafts and short term loans[3]. This generalisation ignores the extent to which leasing may substitute for debt. The possible relevance of leasing is considered later in this chapter. The prevalence of short term loans was evidenced in Chapter 14 when the term of loans was considered in the pricing regressions. The terms of loans comprising the sample had a mean of 7.5 years and a median of 6.5 years. Forty per cent of cases had terms of five years or less. Sixty six per cent had terms less than ten years while another 22 per cent had terms equal to ten years.

Intendedly rational providers of debt to owner-managed firms will be concerned with the risk to and return on such capital. As suggested in previous chapters, risk includes information risk and the business risk associated with the historically more failure-prone small firms. This may increase demand for collateral (both for security and bonding). This view is supported by the evidence presented in Chapter 10 (See tables 10.4 and 10.5) concerning the high incidence of secured personal guarantees for incorporated owner-managed firms (75 to 81 per cent) and domestic asset realisations for all forms of defaulting firms (69 per cent lost a domestic residence). Debt availability and cost for owner-managed firms as impediments to growth and as responses, in part, to the objectives of owner-managers are considered below.

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3 Based on the samples used here, there is little or no use of bank bills or other substitute devices.

AVAILABILITY AND COST OF DEBT

Johns, Dunlop and Sheehan (1989) argued that it is reasonable that small owner-managed firms pay more for debt capital for at least three reasons:

- Debt holders' administrative costs are larger relative to the size of debt when the average level of debt is smaller for owner-managed firms than for larger firms.

- Small owner-managed firms are widely recognised as having higher failure (debt default) rates than larger firms, thus warranting higher risk premiums.

- Information asymmetries[4] and deficiencies increase information risk or search costs to lenders and may induce risk premiums or the inclusion of the costs in debt pricing.

The first and last of these are supported by the empirical results reported in Chapter 14. What is yet to be shown here is that small owner-managed firms pay more for debt. Overdraft rates cited in Reserve Bank Bulletins indicate much higher ranges (and upper limits) for indicator rates on overdrafts under $100,000 relative to those over $100,000. For example, the comparative interest rate ranges for overdrafts based on Reserve Bank data following the removal of regulated interest rate ceilings in 1985 are described in Table 15.1. These indicate that generally the small firms faced minimum rates equal to larger firm's maximum rates, while the maximum rates payable on smaller loans were 1.5 to 4.25 percentage points above those for large loans.

The loans to owner-managed firms sampled in Chapter 14 paid interest rates that indicated a 1.7 per cent points average loading on the Reserve Bank indicator rates, although rates charged to individual firms varied substantially (see Table 14.1).

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4 As discussed earlier, the effect of information asymmetries may include search costs, the costs of 'generalised' screening and monitoring costs.

Table 15.1
Overdraft indicator rates: 1986-1989*

Year to 30 June	Less than $100,000	$100,000 and over
1986	16.75 - 19.50	16.75 - 18.00
1987	16.25 - 20.50	16.00 - 16.25
1988	15.00 - 18.50	15.00
1989	19.75 - 22.00	19.75

*Source: Reserve Bank Bulletins 1986-1989.

Similarly, Johns, Dunlop and Sheehan (1989) reported that small firms paid 2-2.5 per cent over the rates charged to larger borrowers during 1986-89 but this involves comparisons across debt size ranges. The differences in upper interest rate limits described in Table 15.1 indicate that this should be the result obtained. Regressions 14.2 and 14.4 reported in Chapter 14 indicate substantial reductions in interest rates could be attributed to loan size. Because the log of loan size is used, the relative relationship of 'administrative costs' to loan size (as per Johns, Dunlop and Sheehan, 1989) declines as loans become larger, implying a diminishing scale effect that is approximated by the log transformation.

As suggested in Chapter 14, the existence of quoted maximum rates implies an upper limit for risk premia consistent with the suggestion that lenders impose limits on the level of risk they are prepared to accept on a contract. Thus, owner-managed firms offering projects which are perceived as riskier than this level cannot simply offer to pay a higher interest rate; the bank will reject the proposal for exceeding the acceptable risk level. Weak support is found in Bureau of Industry Economics (1981), which reported 1978 survey results for more than 4,000 small Australian firms. Fourteen per cent reported that they could not obtain any external finance and another 40 per cent obtained less than the amounts sought [5]. This may be attributable to an inability of owner-managers to

5 As this was prior to the deregulation of interest rates, the responses may not reflect post-1985 conditions and experiences. Prior to 1986, the regulated interest rates on loans under $100,000

continued on next page

signal their quality to lenders or the riskiness of their projects taking them over the notional risk threshold.

Information asymmetry and debt

Information asymmetry as a contributor to the cost of debt has been proposed in Barnea, Haugen and Senbet (1981), Pettit and Singer (1985), Fazzari, Hubbard and Peterson (1987), Van der Wijst (1989), Scherr, Sugrue and Ward (1990), Ang (1991, 1992) and Shailer (1994b). There appears to have been no published empirical evidence to date regarding this effect. The implications of information asymmetry for the cost of debt, as evidence in Chapter 14, may be substantial.

The risk (interest) indicator range argument reiterated above suggests that the availability of debt finance to owner-managers will depend on their ability to convince a bank that the risk level they represent falls below the critical threshold. The results reported in Chapter 14 regarding debt pricing (rather than availability) suggest some successful signalling occurs[6]. Disproportionate information search and supply costs for smaller loans may increase the difficulty of signalling relatively lower risk propositions. This may increase the emphasis on collateral requirements. As argued in Chapter 2 and empirically supported in Chapter 10, the provision of personal collateral effectively transfers much of the risk-taking function to the owner-manager regardless of apparent liability barriers. Even with this transfer of risk through the guarantee mechanism, the interest rate charged on loans still appears to include significant adjustments for reductions in the information asymmetry or information deficiencies faced by the lender. Regressions 14.3 and 14.4

Continued from previous page:

further induced credit rationing because the unregulated rates on larger loans were higher. This means the riskiest small loan should have been less risky than most larger loans; an atypical situation. The BIE results are overstated insomuch as they include an unknown proportion of firms that did not receive finance because they refused to provide the required personal collateral (guarantees) on offered debt.

6 The nature of the available data, drawn from bank lending files, precludes any testing of the debt rationing propositions.

(in Chapter 14) show the availability of a balance sheet could consistently reduce the interest rate by a small margin. More generally the age of the firm could have a substantial impact on the interest rate premia. It has been argued that lenders have access to more information on the borrower's ability the longer the firm has been in business. Firm age may indicate past profitability or an owner's ability and propriety merely because of how long the firm has survived[7]. Ando (1985) (cited in Evans and Jovanovic, 1989) reported that the probability of a loan request being granted improved significantly the more the business experience of the entrepreneur and the older the firm, indicating that information availability may affect both cost and availability of debt. While the tests in Chapter 14 indicate that the provision of balance sheets has a significant effect on the interest rate charged, it is not possible to test the extent to which the provision of financial statements improve access to finance.

Owner-manager ability and debt

Lenders cannot directly observe owner-managers' operating choices and rely on *ex post* monitoring of outcomes. The evidence from Chapter 9, however, is that there is little evidence of monitoring in the form of financial statements or other contracted information provision. While the bank is able to expertly and directly monitor cash flows for most borrowers, there is no evidence that they monitor the composition or nature of such flow. The only observed monitoring was for firms already identified as potential defaulters, for which the bank routinely noted balances and total payments and receipts for accounts with overdraft facilities. It was inferred from these circumstance that the bank relied substantially on collateral to compensate for default risk. While analysis of financial statements can reveal some aspects of managements' efficiency and effectiveness, bank diary notes mostly seemed to focus on profit levels and margins only.

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7 Jovanovic (1982), Dunne *et al.* (1987), Evans (1987a, 1987b), Storey *et al.* (1987) and Storey (1989) found that variability in firm growth, earnings and the probability of failure decrease with firm age. Jovanovic (1982) and Lippman and Rumelt (1982) argued that firms' efficiencies are learnt over time, inducing an owner-manager or firm 'age' or 'experience' effect.

By making choices that yield higher short-term profits, the owner-manager may improve early perceptions of ability, and hence increase borrowing capacity. In some cases, this potential advantage may outweigh the fact that the choices do not maximise net present value or maximise the probability of achieving long term targets, or may subjugate other preferred options.

Owner-manager objectives and debt

Financing may be affected by consumption and survival aspirations. As with ability, it is likely that owner-manager objectives are initially unobservable by a lender. While the bank typically requires debt applications by small firms to include estimates of domestic expenditure or consumption most elements are not or cannot be validated and there is no assurance regarding future owner-manager behaviour. This extends the information asymmetry and moral hazard risk problems beyond the financial prospects and collateral position of the firm. The pursuit of consumption stability and survival may result in a preference for periodic income certainty over growth. This preference is reinforced by the debt holders' threat of liquidation.

Therefore, consumption and survival aspirations and debt servicing obligations may also encourage a short term profit orientation additional to that proposed for firms seeking to establish a track record to enhance borrowing opportunities.

Regardless of lenders' expectations of an owner-manager's ability and the investment proposal, and because the owner-manager retains control of the firm, it is possible that some investment choices can be varied after finance has been secured. This hazard is anticipated by lenders, who contract accordingly. Countering such potential in the debt-instrument may be by relatively simple means, such as setting interest rates commensurate with the risk of the owner-manager's possible discretionary actions or by imposing bonding mechanisms such as secured personal guarantees. It may also induce lenders'

preferences for short-term (relative to project duration) debt offers to limit the possibility of opportunistic behaviour (see Chapter 13).

Lenders are able to pursue such strategies due to the rationed debt market confronting small owner-managed firms. Not only is the number of institutional lenders small, but the set of financial instruments offered by banks is particularly limited and offer little variation. Repayment obligations generally have similar minimum requirements (such as short term instalment loans with regular equal instalments) which are independent of the firm's projects and resultant cash flows.

CONCLUSION

Debt rationing may explain or be a product of the indicator limits for interest rates. The maximum rate infers maximum acceptable risk. Lending decisions are also dependent on ability to repay, which relates to both the availability of collateral and the pattern of expected realised returns in excess of base consumption available for debt servicing. The difficulties in predicting the latter may encourage the apparent emphasis on collateral which for small firms leads to widespread demand for personal guarantees.

Institutional lenders appear to use generalised screening devices that reduce the ability of owner-managed firms to signal their quality on an *ex ante* basis. Perceptions of 'track records' as a financing criterion may provide an incentive for owner-managers to pursue short-term results. Debt servicing requirements and the desire to maintain a particular consumption level may encourage risk aversion in the sense of minimising the variability of required profit if anticipated profits will satisfy the owner-manager's current consumption aspiration and debt servicing obligations.

The track record effect may be compounded by the consumption stability-debt servicing effect over time. If owner-managers are uncertain as to the consequences of their

decisions and greater changes from the status quo imply greater uncertainty, the owner-manager has an incentive to avoid change. Thus previous input decisions which were short-term profit oriented may be repeated although the original incentive for this orientation should not continue to dominate the decision process. Thus, firms may continue to focus on short-term profitability regardless of their subsequent opportunities. The suggestion of short term oriented decision making is considered in Chapter 17. The hypothesised incentive for limiting change may also significantly deter growth. Owner-manager attitudes towards growth and internal factors limiting growth are examined in Chapter 16.

CHAPTER 16
GROWTH IN OWNER-MANAGED FIRMS

INTRODUCTION

The previous chapter reviewed evidence and argument regarding the cost and availability of debt to owner-managed firms, and in doing so noted some possible consequences for the ability of the firm to pursue growth oriented investment. This chapter more specifically considers growth as a performance criteria, in the context of the proposed framework. Generally it will be argued that growth is subject to limiting conditions within the firm and as a possible consequence of consumption satisficing.

Penrose (1959) described the impact of the 'entrepreneur' on the growth of firms in a theoretical treatise that focussed on profit objectives in growth and diversification strategies of firms. While implicitly recognising the relationship between the owner-manager entrepreneur and the firm she did not identify why entrepreneurs were interested in profit *per se* or what limits the individual entrepreneur's objectives might impose on the firm's growth. This chapter describes how owner-managers' attitudes and capacity may be important growth determinants.

For current discussion a distinction is drawn between growth aspirations or *willingness* and growth *success*. After addressing the concept of growth, this chapter considers the owner-manager's willingness and the owner-managed firm's capacity for growth in the context of the consumption framework, and then considers factors relevant to growth success.

Defining growth

The concept of growth is a consequence of how size is measured. As discussed in Chapter 2, much of the previous literature has described size in terms of gross revenues

(such as Binks, 1979, 1980; Boardman, Bartley and Ratcliff, 1981; Boyd, 1984; Davidsson, 1989, 1991; Barkham, 1994; Holmes and Zimmer, 1994) or number of employees (such as Renfrew, Sheehan and Dunlop, 1985; Evans 1987a, 1987b; Davidsson, 1989, 1991; Frank, Mugler and Roessl, 1991; Wagner, 1992; Arrighetti, 1994; Barkham, 1994; Mata, 1994; Storey, 1994). The results of such studies may have much to do with the adopted concept of size or growth and how these can be related to owner-manager aspirations.

As for all aspects of the owner-managed firm the attitude to growth is influenced by the attainment or support of income or consumption targets (see Part II). Given the consumption-survival constraints, preferences for growth must be governed by the extent to and manner in which growth affects consumption levels and (income) stability. Until a nominated target level is reached, the owner-manager is primarily interested in income growth subject to sustaining the required level of assurance of maintaining the target level; see equations 7.22-7.23 (noting that positive ${}_t\Delta y_{t+1}^{\tau} = y_{t+1}^{\tau} - y_t$ denotes intended income growth), 7.24-7.27 and 7.30 (noting that target savings are equivalent to wealth growth). An individual's preference for growth in wealth depends on the relativities of current and future consumption targets. Where these contentions risk confusion is in relation to the separate events of investment and income growth. Intended rationality implies individuals pursue only those investments with expected positive returns, implying investment growth can be described in terms of desired wealth or income growth. Consequently, an individual who owns and manages a business to generate income or accumulate wealth may view the size of a firm, and consequently growth, in terms of residual equity or income measures[1].

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1 Growth in an owner-manager's residual equity can arise only from retained earnings (including increased asset values) excluding the appropriation of debt holders' capital or injections of new equity. Given the definition of the owner-managed firm, the injection of new equity requires new partners. Admission of effective partners has implications for the nature and identity of the firm.

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Defining growth in terms such as employee numbers does not directly relate to changes in profitability, income or wealth. For policy makers and observers with particular interests such as employment growth, employee numbers may be an appropriate criteria, but there is no obvious argument that small firm owner-managers would be interested in growth in employee numbers *per se*. Such an approach implicitly assumes that all firms are similarly labour intensive and efficient. Conversely, *ex post* measurement of economic growth indicators does not indicate the growth *willingness* of the firm. This suggests that increases in employee numbers may be superior to most other adopted approaches as an *ex post* measure of growth *intentions*, but is biased in its exclusion of firms that may seek growth without increasing employee numbers, either by more efficient use of labour or because they are more capital intensive[2]. Investing capital or effort in generating increased revenues indicates a desire to increase income in the context of the consumption model (see equations 7.22 and 7.23).

Denoting size, and therefore growth, in terms of gross revenues has a closer association with income, but arguably pertains more to income growth aspirations or willingness distinct from income growth success. Income growth success depends on the efficiency with which increased revenues are generated. This was partially investigated in Chapter 11 in the context of hypotheses concerning the relationship between income producing expenditures (investment) and consumption (particularly H7 - H8C). The results of theses tests, as reported in Tables 11.12 - 11.16, generally support the proposed relationship between revenue growth aspirations and consumption aspirations.

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Legally, the admission (or retirement) of a partner means the cessation of one partnership and the commencement of another. If firms depend on their owner-managers for identity and value, the concepts of cessation and commencement also apply in an economic sense. No instances of admissions (or retirements) of effective partners were observed for any firms in the data base.

2 The latter aspect may be captured by including increased investment in assets, for example, as a measure of growth intention, while asset replacement, marketing, research and development, or other expenditures may indicate a focus on efficiency oriented growth. Increased owner-manager effort also seems a likely indicator of (profit) growth-willingness, but it is not readily observed.

GROWTH WILLINGNESS

Under the consumption framework, growth willingness is significantly influenced by consumption aspirations[3] and perceptions of environment[4]. Growth willingness may be considered from numerous perspectives. In the absence of any other particular perspective appearing more appropriate to owner-managed firms, the following discussion adopts the traditional approach of considering motivation, ability and opportunity (Katona 1975), so that growth willingness depends on owner-managers' perceptions of three factors:

- Incentives for growth (motivation).
- Capacity for growth (ability).
- Opportunities for growth.

Individual owner-manager perceptions of capacity and opportunities may largely reflect individual abilities, the more general view of which is included in the concept of bounded rationality in Chapter 5. The following examination of the above three factors largely ignores the owner-manager's search and evaluation[5] to focus on the more general limiting conditions affecting capacity and opportunity.

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3 Like much prior research, testing of this assertion is constrained by data availability. Research in the growth of owner-managed firms has been constrained by several methodological problems. Some of these are induced by prevailing data limitations, including: reliance on cross sectional data when inferences regarding firm growth implies a need for longitudinal data; aggregation of dissimilar firms (such as in terms of industry, market, size, and ownership); and the use of various data bases, the nature of which indicate high potential bias in the behaviour or attitudes of the sampled owner-managers (data bases often consist of firms involved in particular programmes for financial or expert assistance or resource sharing).

4 Factors perceived by an owner-manager to be environmental may be a function of external and internal factors. For example, the general availability of debt is at least partly dependent on the condition of the credit market and prospective lenders' views of both the internal condition of the firm and the significance of other externalities.

5 As noted in previous chapters, areas of economics based on experimental psychology are beyond the scope of this thesis.

Incentives for growth

The propositions of this thesis indicate that the primary incentives for growth are consumption and the survival of the firm as an income generator[6].

YPA (1995)[7] identified only eight per cent of small business proprietors as having high growth aspirations[8]. Sixty one per cent of respondents indicated that they wished to grow "moderately" and 28 per cent wished to remain at their current operating level. Generally, growth aspirations were higher for firms with more than ten employees and for those with large turnover ($500,000 plus).

This section explores the available literature (to identify possible reasons for such a low level of growth aspirations among owner-managed firms) where it is found that the empirical results mainly centre on concepts of control and independence. The definition of the owner-managed firm describes the owner-manager as undertaking all primary management activities (see Chapter 1). This implies a high degree of direct control. The possible importance of retaining such control, as considered empirically, is described below. The incentive of target satisficing is then considered.

Control and independence

An implication of an owner-manager's preference for retaining control is that growth is limited by the extent to which an owner-manager is prepared to relinquish control over various business activities. There is some empirical support for this growth-control

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6 It has been suggested that incentives for growth encompass non-economic psychological aspects such as a desire to appear successful, a desire for prestige or influence (Murray, 1938), optimism and self-confidence (Brockhaus, 1982; Hornaday, 1982), as well as economic aspects such as monetary gains. Any non-economic motivations that may exist are secondary to satisfying elementary economic objectives.

7 See Chapter 15 for a description of this survey.

8 While the study did not identify how growth or size was defined or scaled, responses to questions regarding growth strategies suggest respondents had interpreted growth to be either in revenue or profits. The survey did not consider motivations for growth.

hypothesis[9] as a significant non financial motivation in owner-managed firms, including surveys of owner-managers in the US (Kenny, 1982; Boyd and Gumpert, 1987) and Sweden (Davidsson, 1989, 1991) with Davidsson providing the most direct survey of attitudes.

US evidence of the control orientation of owner-managers is more circumspect. Kenny (1982) surveyed 31 owner-managers and 24 agent managers from real estate firms and reported that owner-managers perceive growth to be more risky for them due to the resultant loss of control. Boyd and Gumpert (1987) studied 450 owner-managers based in the New England region to examine how they coped with work-related stress. In doing so, they identified retaining the freedom to make decisions about the business to be a major concern.

More direct evidence is obtained from Davidsson (1989, 1991), who reported evidence of asymmetric relationships between some expected outcomes and growth willingness[10]. Resultant loss of control was indicated to have a strong growth-deterring effect, while a resultant gain in controllability appeared to have no motivational effect. The opposite pattern was observed for independence. Davidsson also found that deterring forces usually overrode incentives once firms reached a size of about 5-9 employees[11].

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9 As discussed in Chapter 13 the nature of control can be contemplated in a contracting framework where agency costs, information asymmetry and opportunism come to bear. Such problems have broad application and cannot be fully divorced from other aspects of owner-manager behaviour.

10 Davidsson interviewed over 400 Swedish small business owner-manager's and found that economic incentives for growth were rejected for over 40 per cent of his sample.

11 A result of the Davidsson study that does not particularly support a more general 'risk-control' hypothesis is the rating of 'stability', defined as ability to survive a severe crisis. This was not significant in determining 'growth willingness'. However, there may have been a problem with respondents' anticipations. There was no suggestion of how the proposed growth was to be financed; for example, whether it would require internal or external capital. Also, Davidsson's respondents had to anticipate the likely effect of 100 per cent growth (in employee numbers) on each of the factors, raising questions concerning the respondents' abilities to anticipate outcomes.

The 'independence' result reported by Davidsson appears peculiar relative to the 'control' result. However, Davidsson's notion of independence was with respect to the power of customers, suppliers and lenders; it did not refer to internal managerial autonomy. Control referred to the ability to monitor and control operations. To this extent, the opposing relationship between control and independence can be explained if one considers the likelihood that growth that is sufficient to increase a firm's independence from suppliers, customers of lenders will likely require reduced managerial control due to the more complex management structures that develop with increased size.

Davidsson attempted to model growth (measured by log changes in turnover and employee numbers) as a function of 'economic-psychological' determinants based on the Katona (1975) notions of willingness and ability. Davidsson assumed that higher firm age, manager age and firm size reduced 'need' for growth. Combined with 'ability' and 'opportunity' factors (which are discussed later in the relevant sections) Davidsson (1989) was able to explain 25 per cent of the variation in achieved growth rates, with 'need' being the most influential[12].

Frank *et al.* (1991) considered managerial, environmental and personal components of growth-oriented and non growth-oriented founders of UK firms, also measuring growth in terms of employee numbers. Generally, the results of their survey were centred on generalisations about entrepreneurial 'types' being more growth-oriented than non-entrepreneurs in a definitional sense. An interesting finding was the tendency for new firms established by 'growth-oriented entrepreneurs' to be relatively larger in terms of employees. This contradicts Davidsson's assumption that larger firms have a reduced 'need' for growth. From the Frank *et al.* results, it is possible that some of Davidsson's low growth 'need' firms may have been 'growth-oriented entrepreneurs'.

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12 A revised model (Davidsson, 1991), which was concerned more with motivation than achievement, also found 'need' to be the most influential factor.

While it is plausible that firms with increasing employee numbers are more likely to be growth-oriented than not growth-oriented (as supported by the Yellow Pages Australia (1995) aspiration results), this ignores growth in terms of wealth or income which might be achieved by more efficient utilisation of labour and does not necessarily indicate strategy[13].

Collins, Moore and Unwalla (1964) and Frank *et al.* (1991) reported that owner-managers preferred autocratic management and attached a high value to independence or autonomy. Subsequent analysis of Collins' *et al.* data by Smith (1967) indicated a greater diversity of identifiable 'types' of founding owner-managers. These findings helped promulgate the now relatively popular view of 'craft' versus 'opportunistic' types[14]. The 'craft' type are generally identified as having a narrow or specialised training, a more limited time horizon for decisions, and are possibly more prone to social marginalisation. 'Opportunistic' types are credited with qualities forming the complement. Smith (1967) concluded that craft owner-managers will probably create more 'rigid' firms, while opportunists are more likely to create 'adaptive' firms. Smith concluded that an opportunist owner-manager represents a type that will not need to yield control to a professional manager to achieve continued firm growth[15].

Complementary to the more recent interest in management attributes-growth research were the earlier suggestions by Steinmetz (1969) and Thain (1969) that most owner-managers must modify their managerial approach if they are to achieve growth.

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13 Yellow Pages Australia (1995) reported that only 15 per cent of growth aspirants intended to seek growth through capacity expansion, including increased physical assets and additional staff.

14 The 'opportunistic' type is frequently equated with the 'entrepreneurial' type in the small business literature.

15 Such research is representative of the few early attempts to develop a view of owner-managed firm growth (from small to large) in the organisational life cycle context. Only a small number of psychological studies, such as Lessner and Knapp (1974), have supported the craft-opportunist differentiation of owner-managers as meaningful, while a large number of small business empirical studies have relied on such a view. Filley and Aldag (1978) differentiated 'craft', 'promotion' and 'administrative' types in a general organisational context.

However, Greiner (1972), Clifford (1973) and Tuason (1973) among others suggested founding owner-managers do not have the requisite qualities or capacity to manage the firm in some hypothesised growth stages[16] and therefore must employ professional managers to achieve growth, with a consequent loss of control. From previous discussion, the deterrent effect of loss of control will thus limit growth opportunities[17].

Two questions from the YPA survey are relevant here. As reported in Chapter 15, all growth aspirants were asked about their intention to seek external equity financing to fund growth and their willingness to share control with an external investor to obtain such capital. Nineteen per cent of high growth aspirants indicated an intention to seek external equity compared to six per cent of moderate growth aspirants[18]. Thirty four per cent of high growth aspirants were prepared to share control compared to only 22 per cent of moderate growth aspirants. Overall, 77 per cent of growth seeking owner-managers were specifically not prepared to share control of their business with an investor. Questions were not asked of non-growth proprietors and the respondents' understanding of 'sharing control' was not considered. There was no apparent industry effect in control preferences.

Target satisficing

From Part II, an owner-manager's aspirations include leisure (unused effort) and consumption. With respect to leisure, Davidsson (1989) found that the prospect of an increased work load for the owner-manager was a significant growth deterrent. Factors equating to reduced leisure were reported in Boyd and Gumpert (1987) as major costs of being an owner-manager.

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16 Most founding owner-managers must be craft types to reconcile this view with Smith (1967).

17 In a similar vein, Penrose (1959) argued that small firms have restricted opportunities for pursuing and managing growth because of limited management capacity. The possible consequences of this will be considered later in a discussion of 'owner-manager capacity'.

18 High growth aspirants comprised eight per cent and moderate growth aspirants comprised 61 per cent of all firms.

Davidsson (1989, 1991) assumed that 'need' for growth decreased with owner-manager age, firm age and firm size. This accords with consumption target satisficing if it is accepted that older individuals are more likely to have reached a level of consumption with which they are content, or that larger or older firms are more likely to have reached a relatively stable income level sufficient to satisfy the owner-manager's consumption aspirations. The assumption has some empirical support, as described below.

Owner-manager age: The available evidence indicates that achieved growth tends to be negatively correlated with the age of the owner-manager (for example, Boswell, 1972; Begley and Boyd, 1986; and Cragg and King, 1988)[19]. The YPA survey illustrates this relationship with respect to growth aspirations, as illustrated in Table 16.1, where only 17 per cent of high growth aspirants are in the over-50 age bracket compared to 28 per cent of moderate and 35 per cent of no growth aspirants.

Table 16.1
Growth aspirations by age of owner-manager*

Age	All businesses	High growth businesses	Moderate growth businesses	No growth businesses
30-40	33	40	33	20
41-50	39	43	39	36
51+	28	17	28	35
	100%	100%	100%	100%

*Adapted from Yellow Pages Australia (1995, p.6)

Business age: The available evidence indicates that achieved growth also tends to be negatively correlated with age of the business (for example, Boswell, 1972; Evans, 1987a; and Cragg and King, 1988). The YPA survey also illustrates this relationship with respect to growth aspirations, as illustrated in Table 16.2, where only 34 per cent of

19 Studies for achieved growth are considered later in the section on growth success.

high growth aspirants are in the over-10 years business age bracket compared to 54 per cent of moderate and 61 per cent of no growth aspirants.

Table 16.2
Growth aspirations by age of business*

Age	All businesses	High growth businesses	Moderate growth businesses	No growth businesses
≤5	19	28	19	16
6-10	26	33	27	22
>10	55	34	54	61
	100%	100%	100%	100%

*Adapted from Yellow Pages Australia (1995, p.6)

Business size: Size as a proxy for growth aspirations is problematic given the conceptual similarity of size and growth. YPA reported increased growth aspirations and Davidsson indicated reduced growth aspirations as firms' numbers of employees increase. The conflicting results of Davidsson and YPA reflect the generally competing hypotheses regarding growth found in aspiration satisficing, control preference and resource limitations versus Gibrat's law. These competing views of the relationship between further explored later in this chapter in the context of growth success, where the possibility of a business age effect related to size is also introduced.

Overview of (dis)incentives for growth

Overall, the desire to retain control and owner-manager satisficing behaviour may act as significant deterrents to growth despite the possible incentives for growth attributable to income or consumption aspirations. As reported in Chapter 11, the behaviour of owner-managers appears to change substantially as higher levels of consumption are reached. For example, from Table 11.14 there is a strong tendency for lower level consumption achievers to increase investments in assets or labour prior to increasing consumption, which is consistent with an intention to achieve income growth to fund the consumption

increase. From Table 11.9 note that 33 per cent of low consumption achievers (compared to 16 per cent of high consumption achievers) reported real income growth. Similarly, from Table 11.12, 66 per cent of consumption increasing owner-managers increased investment in fixed assets and 74 per cent increased employee wages expenditure. In contrast, only 55 percent of non-increasing consumers increased investment in fixed assets and 46 per cent increased employee wages expenditure. This suggests that the lower consumption achievers, who tend to be the lower income achievers (the correlations are reported in Table 11.10), are more growth oriented[20].

Owner-managed firms most likely to have growth aspirations

From the results of YPA, it is possible to conject which sample firms are most likely to be growth oriented. From the current samples (see Chapter 9), the available industry breakdowns suggest proportions of sample firms which may have high growth aspirations, based on the YPA results, as indicated in Table 16.3.

Using the industry profiles and relying on the relative representativeness of both the YPA sample and the bank samples, extrapolation of the YPA high growth aspirant profiles to the bank samples results in similar overall percentages of expected high growth aspirants of 8.5 per cent of survivors and 8.9 per cent of recovery action firms (compared to 8 per cent overall for YPA). Tests for this expectation are reported later in this chapter after considering growth capacity and opportunities.

The YPA survey indicated that high growth firms are more likely to be in the commercial, recreational and personal services industries (at 12 and 17 per cent of these sectors respectively) and to be incorporated (62 per cent of high growth aspirants compared to 54 per cent over all). This seems to contradict the regression results reported in Chapter 11

20 Firm age effects were not tested in Chapter 11 because the number of observations needed to estimate consumption excluded most incorporated firms less than three years old.

in which the industry control variable $IND_{4\&5}$ (personal, domestic and commercial services) had a negative correlation coefficient for consumption changes (significant at p=0.08).

Table 16.3

Comparison of sample data and Yellow Pages Australia (1995) to estimate high growth aspirants

	YPA (1995) sample		Bank samples			
Industry	Overall sample profile (p.5)	% that are high growth aspirants (p.4)	Survivor -see Table 9.4	Recovery-action -see Table 9.4	Survivors x YPA %	RA x YPA %
Manufacturing (IND_2)	8	7	9	15	0.63	1.05
Building/construction (IND_6)	14	2	7	11	0.14	0.22
Wholesale/retail (IND_1)	34	6	37	33	2.00	1.98
Transport/storage (IND_5)	6	5	2	4	0.1	0.2
Commercial services (IND_5)	26	12	27	11	3.24	1.32
Recreation/Personal services ($IND_{3/4}$)	11	17	14	24	2.38	4.08
Other	-	-	6	1	-	-
Overall	100%	8%	100%	100%	8.49%	8.85%
Profile comparisons by organisational form:			see Table 9.1	see Table 9.1		
Sole proprietor	16	19	16	14		
Partnership	27	15	15	32		
Company	54	62	48	42		
Other (trusts[a])	3	3	20	12		
	100%	100%	100%	100%		

a In the absence of other information, it is assumed that the "other" category used by YPA includes trusts.

Tables 11.12 - 11.15 describe the cases where firms invested in expenditures associated with income growth aspirations but were unsuccessful. If, for example, all firms that invested in increased total expenses and fixed assets were growth aspirants, then 55 per cent of soletraders, 41 per cent of partnerships, 52 per cent of companies and 61 per cent of trusts (53 per cent over all) of the sample firms would be classified as growth aspirants compared to the eight to nine per cent identified above. This suggests, but by

no means confirms, that firms seeking to modestly increase income to satisfy consumption aspirations do not identify themselves generally as growth aspirants.

Capacity for growth

Capacity for growth can be divided into at least two categories: the owner-manager's capacity or ability, and availability of other necessary resources including financial capital.

Owner-manager ability can be interpreted to a large extent as managerial capacity for growth. For firms that 'sell' an owner-manager's skills or knowledge, owner-manager ability may also define operating capacity. Andersson (1987) described managerial capacity to cover "the intangible qualities of the entrepreneur" (p.174). He hypothesised that managerial capacity is positively influenced by education, training and age of the firm (p.187) although his tests of owner-managed firms in a developing economy (Cameroon) were inconclusive (p.222). Other authors who have considered these and similar factors in relation to growth achievement are discussed later in this chapter.

Resource factors, such as access to capital, have been considered in Renfrew, Sheehan and Dunlop (1985), Johns, Dunlop and Sheehan (1989) and Beddall (1990) in Australia, and in Wilson (1979), Storey *et al.* (1987), Fazzari, Hubbard and Peterson (1987), and Norton (1991) among others for other countries. Resources may be substantially affected by the financing constraints considered in Chapter 15. Resources to be considered in this section are strictly internal and focus on owner-manager capacity and equity capital.

Owner-manager capacity

Aside from the above reference to Andersson (1987) and some considered below, there has been little attention to or recognition of small business owner-managers as limited

resources. It is unavoidable, however, that individual owner-managers of small firms have finite capacity which must be divided between various uses within the firm.

An element of an owner-manager's capacity is the individual's ability to optimise the allocation of their capacity. An owner-manager's input may embody numerous factors, including labour (time and intensity), craft skills, and information acquisition and processing ability. The latter may have the greater effect on capacity. Arrow (1974, p.528) argued that an individual's limited capacity for acquiring and using information is a fixed factor in information processing that will lead to 'diminishing returns to increases in other information sources'. Organisational theory has long recognised such limits in relation to the 'span of control' (following Commons, 1934) which lends further relevance to the previous discussion of owner-managers' control preferences.

Information asymmetry may further affect the utilisation of an owner-manager's capacity. If employees hold information necessary to the owner-manager, strategic misrepresentation of that information by employees acting in their own interests is dysfunctional for the owner-manager[21]. Thus, there is an incentive for an owner-manager to avoid situations that establish such dependence on employee information, which may result from any delegation of decision making or dependence on an employee's specialised knowledge. Owner-manager resistance to loss of control or oversight functions, and hence delegation of managerial tasks, restricts opportunity to reallocate limited personal capacity, and so limits the rate and extent of firm growth by imposing diseconomies of scale. Even in the absence of resistance to delegation, the owner-manager will persist as a limiting factor given any tendency to retain authority[22].

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21 See the discussion of agency problems in Chapter 13.

22 This tendency relates to the Tayloristic management approach.

Radner and Rothschild (1975) modelled the allocation of a manager's effort among a set of projects for cost reduction, to determine the implications of various behavioural rules for allocation. However, they sought optimal solutions to recognised problems, rather than dealing with the question as to whether or not firms seek, find or use optimal solutions. Winter (1981) used a similar analysis to suggest that a manager's attention is directed to the project with the poorest performance, as this held the greatest potential for effective deployment of the manager's attention. However, if an owner-manager's capacity is exhausted by current projects or problems, there is no capacity to seek out or recognise new opportunities for the firm, thus forgoing increased profits (Kirzner, 1979). This suggests that, amongst other things, an owner-manager faced with survival-threatening problems may be least able to direct attention to new courses of action, thus contributing to a perpetuation of previous inappropriate actions. As owner-manager capacity can be viewed as another internal resource of the firm, a more classical statement of the problem is that of efficient utilisation of resources.

Given the existence of bounded rationality, managerial diseconomies must eventually arise if there is no significant change in management's knowledge, and hence no change in the quantity, quality and type of managerial service in the expanding firm. If a firm is to continue to be owner-managed and defined by its current ownership, the supply of management services has a fixed upper limit.

McGuire (1976) similarly argued that the crucial factor that causes and limits growth is 'entrepreneurial expertise'. He defined this factor (p.121) as

> ...the entrepreneur's stock of knowledge about both the operations of the firm and the present and future internal and external environments in which it exists at any moment in time...

McGuire's concept is a subset of the bounded rationality elements in Chapter 5. McGuire concluded that the managerial burden and complexity eventually restricts growth.

Owner-manager capacity or knowledge may change over time. This can be inferred from the earlier referenced age-growth effect (Jovanovic, 1982; Lippman and Rumelt, 1982; Nelson and Winter, 1982). This, combined with a consumption hierarchy model, describes *a declining rate of increase in owner-manager capacity for growth* together with a decrease in incentives for growth if higher order consumption targets require leisure. Incentives increase if higher order targets are income based. To predict an owner-managed firm's development under this scenario requires some knowledge of the nature of the owner-manager's higher order targets and his or her current consumption level and remaining capacity for effort.

Overall, the broad implications for the growth of owner-managed firms is threefold:

- There is a theoretical limit to the rate of growth for a firm which is dependent on the owner-manager's capacity.

- The rate of growth will be impaired by internal conditions which consume the owner-manager's capacity.

- There is a limit to the size of owner-managed firms due to the limit of owner-manager capacity.

Equity capital

Because savings or retained earnings only arise when after tax income exceeds consumption and debt servicing requirements firms at or near base consumption levels are unlikely to be generating significant levels of retained earnings. This impedes investment in growth strategies if the firm is dependent on internally generated capital.

As described in Table 12.3, 42 per cent of cases failed to generate any retained earnings during a two year period while another 42 per cent managed to have some savings in one of the two years, leaving 16 per cent that achieved a positive contribution to retained earnings in each of the two years. As discussed in Chapter 12, the pattern of saving over the two periods appears to be associated with the level of achieved consumption. Panel C in Table 11.8 indicates more clearly the association between consumption levels and retained earnings. The pattern of surplus income relative to income after tax and proxied debt servicing (changes to bank debt) shows that below-median consumers are more likely to use increases in income to increase consumption while above-median consumers are more likely to increase savings.

Opportunities for growth

Opportunities for growth, such as product innovation, market gaps and expansion, geographic expansion and integration, were studied by Acs and Audretsch (1988), Kleinknecht (1987, 1989), and Santarelli and Sterlacchini (1990) among others. Owner-manager ability to obtain and process information concerning growth opportunities is a limiting factor and likely to be significant in evaluating individuals' performances. The ability of owner-managers to provide information to external agencies may also have some bearing, as considered in the context of lenders in Chapters 14 and 15..

Various aspects of these factors may be largely attitudinal, a particular example is the owner-manager's control over the firm or the income stream. The extent to which this is a reaction to direct financial risk or contracting concerns (most particularly agency costs) remains speculative, but both embody notions of 'risk'.

GROWTH SUCCESS

Studies of growth success that considered internal or owner-manager characteristics often focussed on owner manager experience and the size and age of the firm.

Experience

Studies that considered previous experience in small businesses have provided mixed results in respect of growth. Doutriaux and Simyar (1987) and Sandberg and Hofer (1987) found no relationships between such experience and growth (sales). Stuart and Abetti (1988) and Chambers, Hart and Denison (1988) reported a positive association, while Van de Ven, Hudson and Schroeder (1984) and Dunkelberg *et al.* (1987) reported negative relationships. No obvious differences in the design of these studies would explain such diverse results. Overall, the research to date does not indicate any particular association between previous small business experience and achieved growth in an owner-managed firm. Experience data is not available to test the sampled firms in this respect.

Size and age

Early discussion of firm growth rates and firm size (for example, Simon and Bonini, 1958) adopted Gibrat's law, which assumes that an individual firm's profit growth rate is independent of its size. Lucas (1967, 1968) was influential in perpetuating this assumption. While the findings of some early studies such as Pashigian and Hymer (1962) also supported this view, evidence generally has been mixed. For small firms, the evidence tends to reject Gibrat's law. Segal and Spivak (1989) proposed a theoretical model which indicated that, only for very large firms, Gibrat's law is appropriate. Some evidence in keeping with this view was offered in Jovanovic (1982)[23]. The Mansfield (1962) study of mostly small firms found that smaller firms tended to grow faster than larger firms[24]. Jovanovic (1982) also associated larger and more variable growth rates with smaller firms, and conjectured that they learn their true efficiencies over time, thus inducing an 'age' effect. Support for this can be found in Lippman and Rumelt (1982),

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23 However, the Jovanovic (1982) support for Gibrat's law for large companies was a special case dependent on debatable assumptions concerning technology and the distribution of ability.

24 Mansfield conjectured that the inverse size-growth relationship might have been induced by slow-growing firms exiting studies by failing. However, Kumar (1985) and Hall (1986) supported the inverse size-growth result for publicly traded companies, after correcting for failure bias.

who examined the notion that firms learn of their efficiencies from realisations of costs, and Nelson and Winter (1982), who modelled the search for innovation or opportunities by firms under bounded rationality[25].

Jovanovic's prediction that growth rates decrease with firm age (with size held constant) supports Davidsson's notion that 'age' proxies lower growth 'need'. This version of Jovanovic's model assumed that output is a decreasing convex function of managerial efficiency[26]. Although less persuasive, Leonard (1986) argued that the inverse size-growth relationship arises from the lagged adjustment of firms to their optimal sizes, further discounting the relevance of Gibrat's law to the complete size distribution of firms. It is now reasonably well accepted that the growth-size relationship is inverse for smaller firms (Scherer, 1980), although the Mansfield (1962) concern is often employed by authors wishing to utilise Gibrat's law.

The expectation that a firm's rate of growth is inversely related to firm age and size is supported by the empirical literature and accords with the proposed consumption motive. It can be inferred from the literature that larger and better established firms are most likely to provide stable (permanent) income levels that satisfy owner-manager consumption targets, and that the owner-managers of such firms will be less likely to increase effort in pursuit of additional income growth.

While effort cannot be observed for the sampled firms, the evidence presented in Chapter 11 indicates that firms generating surplus income and higher consumption levels are less likely to pursue income increasing investments.

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25 See Chapter 5.

26 The later Gort and Klepper (1982) finding that industry price typically declines over time also seems to support Jovanovic's prediction.

CONCLUSION

The view that an owner-manager's pursuit of income is consumption driven recognises time preferences, savings needs and some requirement for a sustainable minimum or base-target consumption level. However, it may simultaneously impose short-term objectives that are 'survival' driven. Thus the approach recognises both objectives and constraints.

An owner-manager invests financial capital and effort in a 'business' that remains under his or her direct control. This is a rational[27] action if the owner-manager believes it offers an acceptable assurance of meeting currently held consumption and savings targets. The 'acceptable assurance' describes the risk[28] attitude of the owner-manager. Currently held consumption and savings targets are a mix of short and long term consumption targets, which can vary according to the owner-manager's perception of the stability and permanence of existing levels and the 'base' consumption target. The base consumption target includes maximum investment of owner-manager effort and the desired expenditure level for the owner-manager. These levels describe the consumption target the owner-manager requires to be satisfied from the business if the owner-manager is to continue investing capital and effort in it. Thus, the base consumption target describes a survival criteria for the business or firm. Other survival criteria may also apply, such as those imposed by debt holders.

There are two critical sets of restrictions attributable to an owner-manager. These are capital availability (wealth), and limits on the owner-manager's effort and ability as a resource. These factors will limit both the opportunity and capacity for an owner-

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27 It is important to note that 'rational' applies only to actions, not objectives. That is, an individual's objectives exist as truths that cannot be questioned in terms of rationality. Rationality applies only to means (actions) by which objectives are pursued. Confusion can arise when 'objectives' is used to describe some interim target that is merely indicative or part of the larger process by which the true objectives are being pursued.

28 Risk is used here in a non-technical sense, capturing ambiguity, uncertainty, and variability.

managed firm to identify and undertake new projects or expand existing activities; that is, they will limit growth. In brief:

- Every owner-manager has known limited wealth available for investment.

- Every owner-manager has limited capacity, although limits are not observable. Capacity may be further limited by choice. Capacity affects both an owner-manager's effort and perception.

The suggestion that these may provide an incentive for the pursuit of short term results is considered further in Chapter 17. Their implications for growth performance are twofold in that they influence both willingness and capacity.

An owner-manager near his or her base consumption level may have greater incentive to pursue profit growth than owner-managers already satisfying relatively high consumption targets. However, if internal conditions consume much of the owner-manager's capacity, his or her ability to pursue growth strategies may be more limited.

Where limits are capital based, the availability of affordable debt may be sufficient to void the limiting condition. Limitations in ability, however, may lead to restrictions on capital; for example the owner-manager may be less able to attract debt, or a potential lender's appraisal of the firm may be influenced by the extent to which potential owner-manager capacity is being used.

CHAPTER 17
INCENTIVES FOR SHORT TERM RESULTS

INTRODUCTION

This chapter briefly considers circumstances under which owner-managers may choose actions that result in short-term gains over actions that are expected to yield larger gains over the longer term. Following suggestions in Chapters 15 and 16, it is demonstrated that there are possible incentives for owner-managers to pursue short term income while reducing longer term gains due to their risk aversion or the anticipated greater likelihood of obtaining finance.

The risk averse response may be triggered by short term debt servicing requirements, current consumption targets or consumption stability preferences. These may cause the owner-manager of the small firm to pursue the lower 'risk' choices from the set of profitable options regardless of expected longer term returns, where risk pertains to the belief that a target will or will not be achieved.

As noted in earlier chapters, regardless of lenders' expectations of an owner-manager's ability and the investment proposal, and because the owner-manager retains control of the firm, some investment choices can be varied after finance has been secured and projects are underway. The potential for such undermining of the interests of debtholders is reasonably anticipated by lenders who determine the financing conditions accordingly. Countering such potential in the debt contract may be by relatively simple means, such as setting short term (relative to project duration) repayment periods for the debt.

Maintaining an existing consumption level and satisfying debt servicing requirements may encourage risk aversion in the sense of minimising the variability of profit. As proposed in Part II, hierarchical consumption targets drive income seeking behaviour.

Specifically, lower order targets encourage the investment of effort and capital appropriate to satisfactorily assuring achievement of the consumption target. This may induce a stable income target in keeping with the permanent income hypothesis. This, and the ambiguity aversion argument raised in Chapter 4 suggest income stabilising behaviour may extend beyond the lower order consumption range.

Alternatively, an intention to influence lender evaluation of owner-manager ability also may encourage short term oriented behaviour by owner-managers. By making choices that yield short-term profits, an owner-manager may expect to improve early perceptions of ability and hence increase borrowing capacity.

These various incentives for owner-managers to seek short term profits are considered here in a more formal context.

ILLUSTRATION OF INCENTIVES FOR SHORT TERM GAINS

The output of the firm is described by equation 7.10:

$$y_{t+1} = (1+\varepsilon)\mathrm{O}_{t+1}(I_t, e_{t+1})$$

where ε is the realisation of stochastic disturbances. An owner-manager's ability attaching to effort (e) is initially unknown to observers (who are limited here to prospective lenders).

Assume the owner-manager has a choice of two actions at time t: A and B. The outcomes under either action are forecast with equal levels of belief and are stated in real terms discounted to current time. The affect of choices on earnings differ as follows:

$$y_{t+1}|A = y_{t+1}|B + l$$
$$y_{t+2}|A = y_{t+2}|B - k$$
$$y_{t+n|n>2}|A = y_{t+n|n>2}|B$$

That is, choice A results in l additional dollars in period 1 and B results in k additional dollars in period 2. The choices produce identical realised income in periods after t+2. If $k > l > 0$, choice A results in higher realised income in period 1 but less overall so that in a long term wealth or income maximisation context, it is inferior to B. The following discussion considers circumstances where such a choice may be preferred by an intendedly rational owner-manager.

This is done first in the context of survival constraints by reference to the existence of base consumption targets and to debt servicing, and then with respect to establishing a 'track record' in order to influence the evaluation of the owner-manager's ability or prospects by potential issuers of new debt. The problem is then considered with respect to consumption or income stability preferences.

Survival constraints

Two necessary but not sufficient conditions for the survival of the firm are satisfaction of a base consumption target, without which the owner-manager may liquidate the firm, and satisfaction of debt servicing obligations, without which debt holders may liquidate the firm.

Minimum consumption targets

The owner-manager is risk averse due to the objective of expecting to meet a minimum level of consumption with some specified level of assurance or belief (equation 7.14):

$$\text{If } \mathrm{B}\left({}_{t}c_{t+1} \geq {}_{t}c^{0}_{t+1}\right) \leq \mathrm{B}^{\tau}\left({}_{t}c_{t+1} = {}_{t}c^{0}_{t+1}\right) \text{ then maximise } \mathrm{B} = \mathrm{B}\left({}_{t}c_{t+1} \geq {}_{t}c^{0}_{t+1}\right)$$

In the absence of convertible wealth or available new debt, the owner-manager requires income in $[t,t+1)$ sufficient to satisfy current base consumption target; that is ${}_{t}y_{t+1} \geq {}_{t}c^{0}_{t+1}$.

If the owner-manager sufficiently believes that income under *B* satisfies this criteria then the owner-manager will not choose *A*. If, however, ${}_{t}y_{t+1}|B < {}_{t}c^{0}_{t+1}$ at the target belief level[1] then the owner-manager will prefer *A* regardless of circumstances subsequent to $t+1$ because if ${}_{t}c^{0}_{t+1}$ is not satisfied the firm will not survive beyond $t+1$. Assuming equal assignments of belief within each option, it is plausible that even if ${}_{t}y_{t+1}|A < {}_{t}c^{0}_{t+1}$ at the target belief level, *A* is preferred because it offers a greater cumulative belief level as to the satisfaction of base consumption (or the owner-manager believes a greater proportion of base consumption will be satisfied).

Debt servicing requirements

The analysis in the context of debt servicing parallels that for base consumption. Because lenders hold the threat of liquidation, survival of the firm is dependent on meeting debt servicing obligations. Therefore debt servicing requirements are incorporated into the aversion described by equation 7.14 to produce equation 7.15.

$$\max \mathrm{B}(\text{survival}) = \mathrm{B}\left[\left(\mathrm{O}_{t+1}\left(I_t, {}_{t}e_{t+1}\right) \geq {}_{t}c^{0}_{t+1} + \sum_{k=1}^{K} {}_{t}d_{k,t+1}\right) \,\middle|\, \mathrm{B}\left({}_{t}c_{t+1} \geq {}_{t}c^{0}_{t+1}\right) \geq \mathrm{B}^{\tau}\left({}_{t}c_{t+1} = {}_{t}c^{0}_{t+1}\right)\right]$$

or equation 7.16:

$$\min \mathrm{B}(\text{failure}) = \mathrm{B}\left[\left(\mathrm{O}_{t+1}\left(I_t, {}_{t}e_{t+1}\right) < {}_{t}c^{0}_{t+1} + \sum_{k=1}^{K} {}_{t}d_{k,t+1}\right) \,\middle|\, \mathrm{B}\left({}_{t}c_{t+1} \geq {}_{t}c^{0}_{t+1}\right) \geq \mathrm{B}^{\tau}\left({}_{t}c_{t+1} = {}_{t}c^{0}_{t+1}\right)\right]$$

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1 Target belief levels are contemplated in Chapter 7. While no particular approach is nominated, the belief function formalism of Dempster (1968) and Shafer (1976, 1982) is described in Appendix 3 for illustrative purposes.

until the required level of assurance regarding survival or failure is reached. These indicate that the owner-manager requires some notional level of assurance of satisfying both base consumption and debt servicing obligations to avoid liquidation of the firm. If the owner-manager's target level of belief in the survival of the firm (as per equation 7.15 or 7.16) is not satisfied by $y_{t+1}|B$ the owner-manager is induced to choose A.

The shorter the term of a loan (holding the principal and interest rate constant) the greater the inducement because a more rapid retirement of principal is required than would arise with longer term debt, requiring larger debt servicing payments per period. As evidenced in Chapter 14, institutional lenders may tend to impose relatively short lending terms.

Combined base consumption and debt effects

There is some evidence in the multiple regressions discussed in Chapter 14 that lenders have less information for younger firms and so may impose tighter loan conditions, including both higher interest rate premiums and shorter terms. Both the age of the firm and term of the loan appear as significant variables in explaining interest rate premia in regression 14.3, the details of which are provided in Appendix 6.

The evidence generated in Chapters 11 and 12 indicates that owner-managers of new or very young firms typically have the lowest levels of consumption and so are likely to be nearer the owner-managers' base consumption targets. Most firms were subject to relatively short term loans. In such cases owner-managers may experience relatively greater incentives for choosing the short term option, as they seek assurance of satisfying their base consumption targets and satisfying their debt obligations.

The combined effect of higher interest rates, shorter loan terms and proximity of base consumption levels present the strongest inducement for the affected firms to pursue the short term option.

Influencing prospective lenders

In the case of existing firms seeking new debt, lenders may make decisions based on knowledge of the owner-manager's ability. If the owner-manager's ability is generally unknown, past and present returns or output can be assumed to be a function of the owner-manager's ability. Using the earnings history, lenders construct their prior expectations of the owner-manager's ability.

The situation where the owner-manager is trying to establish a 'track record' to signal ability (or the quality of the firm's prospects) to a prospective lender assumes information asymmetry. In particular it is assumed that the prospective lender is uncertain of the owner-manager's ability and cannot observe the opportunity set of operating choices. The lender relies on *ex post* monitoring of chosen actions and outcomes as discussed in Chapter 13. Within the limits identified in Chapter 14, the prospective lender is assumed to be risk neutral.

The lender requires some basis for comparing firms' outcomes. Assume that the lender's knowledge is based on either A or B but not both In the first instance, if it is expected that the lender knows the individual firm's results for $[t,t+1)$ for a lone application at $t+1$, then the owner-manager will perceive A to be superior to B. The owner-manager does not 'lose' (as a prospective borrower at $t+1$) with strategy A regardless of whether the lender evaluates the owner-manager against expectations based on A or B. If the lender's knowledge or expectations are such that the owner-manager is evaluated at $t+1$ on the basis of B then the owner-manager's ability is evaluated as superior by reference to l.. If the lender's knowledge is such that the owner-manager is evaluated on the basis of A then the owner-manager does not appear superior but would have appeared inferior (by reference to the opportunity loss of l) if he or she had chosen B.

If the earnings history includes the results for $[t,t+2)$ then the lender's process of belief revision may be important. If the initial period's results anchor beliefs in a quasi-

Bayesian manner such that subsequent variations are attributed at least in part to stochastic fluctuations then the relative deficiency of k in the second period may be attributed at least partly to 'chance', while the relative superiority of l in the first period is attributed largely to the owner-manager's ability. The extent to which this would encourage an owner-manager to choose A over B (other factors being equal) would depend on the importance the owner-manager places on attracting new debt (assuming both A and B satisfy ${}_{t}c^{0}_{t+1}$). Note, however, that the survival orientation described above by reference to equation 7.15 will dominate.

Consumption stability

An owner-manager's preference for stable consumption (inferred from the permanent income life-cycle consumption hypothesis in Part II) may also provide an incentive for shorter term gains that then can be directed to savings. This does not require the assumption that the belief levels attached to the outcomes of A and B be the same but is dependent on risk aversion. Although the longer term earnings prospects of a competing action may be superior the uncertainty the owner-manager attaches to the longer time period may induce a preference for higher shorter term gains that will provide a savings buffer and so reduce future threats to consumption levels inherent in an uncertain earnings stream.

If $y_{t+1}|A>{}_{t}c^{\tau}_{t+1}$ then $y_{t+1}-{}_{t}c^{\tau}_{t+1}$ can be saved against the possibility that $y_{t+1+n}<{}_{t+n}c^{\tau}_{t+1+n}$. If the possible threat is to base consumption then the incentive may be greater. This accords with the view presented in Chapter 7 that the permanent income hypothesis predicts that $s^{\tau}_{t+1}>0$ becomes more likely as future income $(y_{t+n}-\overset{K}{\Sigma}_{t+n-1}d_{k,t+n})\,\big|_{n=1\text{ to }N}$ is perceived as more unstable or uncertain.

This scenario is dependent on a more complex understanding of time and risk preferences than can be developed here. This is therefore a more conjectural scenario that the

preceding considerations of base consumption and debt servicing obligations and is included only to indicate how incentives for short term gain orientations may extend to consumption levels beyond the base target.

CONCLUSION

The propositions developed here are intended to be illustrative rather than conclusive. The main purpose is to demonstrate that the consumption orientation inherent in the framework developed in Part II may provide incentives for owner-managers to pursue short term income while reducing longer term gains. The extent to which the incentives may prevail over other forces influencing owner-manager choices is an empirical question not addressed here.

The simple illustration presented here shows how an owner-manager's consumption constraints and survival orientation can increase need for short term income, thus inducing the owner-manager to make choices that offer higher short term income at the expense of greater long term gains. This may be augmented by lender behaviour and the owner-manager who may wish to enhance his or her reputation to improve access to finance. While this may be labelled suboptimal in a naive profit maximising context, it not necessarily suboptimal in the context of meeting the owner-manager's consumption based objectives for the firm.

Whether the hypothesised effects are limited to young firms or may apply over extended time periods is a matter for conjecture. It is possible that owner-managers who are uncertain as to the consequences of their decisions may perceive greater changes from the status quo as increasing uncertainty. Such an owner-manager may continue with previously 'successful' actions and in doing so perpetuate decisions which were short-term profit oriented although the initial incentives may no longer exist or be sufficient to induce such behaviour.

If owner-managers of new or young firms typically are near their base consumption targets and are subject to relatively costly shorter term loans, they may experience relatively greater incentives for choosing the short term option, as they seek assurance of satisfying their base consumption targets and satisfying their debt obligations. It is likely that the longer the firm survives, the less such incentives will prevail. If the owner-manager has been able to establish sufficient savings as a buffer against short term deficiencies of income relative to consumption targets or debt servicing obligations, then the need to forego strategies which are superior in the long term to assure immediate survival is reduced.

As a longer earnings history is established the information deficiency of the lender is reduced. A prospective lender is better able to take account of the extent of fluctuations in earnings and should be less anchored to an evaluation of the owner-manager's ability or the firm's prospects based on the higher initial short term gains. If the incentive to choose the action that resulted in the higher short term gains was to enhance perceived ability then the incentive for the owner-manager to choose such an option is again reduced with time. Consequently, the incentive for short term results may decline with the age of the firm.

PART IV - CONCLUSION

This part considered some consequences of the target consumption model and lender behaviour relevant to the growth performance of owner-managed firms and the possible incentives for focussing on short term results.

The effects of information asymmetry in debt contracting, which should be considered in the context of bounded rationality, prompted a model of debt pricing based on information cues for owner-managed firms as reported in Chapter 14. The evidence from these tests suggests that, while lenders consider various information items in pricing debt, they might not heed the implications of relatively low consumption levels with respect to a borrower's reduced ability or willingness to modify consumption levels if funds are insufficient for debt servicing.

The possible effects of the cost and availability of debt on the growth opportunities, and therefore performance, of owner-managed firms was considered in Chapter 15 and internal influences on growth performance were considered in Chapter 16. The reviews indicated potentially significant limitations on both growth willingness and ability. This implies that growth is not an appropriate criterion for considering the performance of owner-managed firms relative to the owner-manager's objectives for the firm. Growth as a performance indicator relative to the interests of others, such as policy makers, is unlikely to allow predictions without due consideration of owner-manager objectives and other limiting conditions.

Chapter 17 considered various elements of preceding chapters to demonstrate how they may influence the performance of owner-managed firms by providing incentives for short term profit results. In particular, it was demonstrated that the owner-manager's minimum consumption aspirations, debt servicing obligations and the perceived or actual behaviour

of lenders may all provide such an incentive, with possibly the greater affect being for new or young firms.

Recognition of such influences on firm performance, both in terms of objectives and ability, may significantly influence how the performance of owner-managed firms is evaluated, both at the individual firm level and in aggregate.

The arguments considered here are placed in a broader context in Chapter 18, which reviews the main elements of this thesis and its implications for research concerning the performance of owner-managed firms.

CHAPTER 18
SUMMARY AND CONCLUSIONS

INTRODUCTION

This chapter summarises the research and its main features. It examines the limitations of the research and discusses its implications for how the performance of owner-managed firms might be categorised and interpreted by lenders, policy makers and researchers.

The chapter proceeds as follows. First the research objectives and method are summarised. Next is an overview of the framework and the key elements. The third section reviews the empirical evidence supporting the framework. The fourth section reviews the implications of the framework for studying the performance of owner-managed firms. The fifth section discusses the limitations of the research and implications for the validity and generality of the findings. The final section addresses the implications of the results of this research.

RESEARCH OBJECTIVES AND METHOD

The main objective of this thesis was to develop a conceptual framework within which to consider the performance of owner-managed firms relative to the purposes for which the owner-manager established the firm.

In pursuing this objective, essential features of owner-manager economic motivation, based on the motivations for individuals commonly addressed in contemporary microeconomic and finance theory, were used to identify specific concepts fundamental to our understanding of the performance of firms and the decision-making behaviour of owner-managers. Decision models that help contextualise performance relative to owner-manager objectives were developed from propositions in the conceptual framework. To a

lesser extent, lenders, as representatives of parties with whom owner-managers contract and as the only non owner-manager suppliers of financial capital to the firm, were considered in terms of the impact they may have on owner-manager objectives and the possible relevance of the framework to lenders.

The essential features of owner-manager motivation (in establishing and maintaining their firms) were identified on the basis of a wide ranging review of the literature dealing with the economic motivations of individuals, relationships between decisions and economic objectives and individual economic decision making. These features were collated as a conceptual framework, which was then used to propose a simple model of owner-manager decisions pertaining to their firms. In developing the framework, unnecessary formalism was avoided. The focus was on the conceptual development of the framework rather than mathematical representations or formal prescriptions dependent on restrictive assumptions to which individual owner-managers are unlikely to conform.

While the literature review drew on empirical results where available, the limited existing evidence was augmented with empirical tests of propositions inherent in the framework and model using a sample of small owner-managed Australian firms. Data limitations meant that the empirical testing of propositions in support of the framework was necessarily elementary. While some aspects of the framework cannot be unambiguously tested using such limited empirics, the general support for the framework from the combined evidence in the existing literature and the tests performed here suggest the proposals have some merit and justify advocating further investigation of these matters in future work.

Following the empirical testing, the implications of the framework for investigating the performance of owner-managed firms were explored. The focus was on three main

aspects: implications for lenders, performance based on the growth of firms and profit seeking in the context of planning horizons.

MAIN ELEMENTS OF THE FRAMEWORK

As described below, the features highlighted by the review of the literature dealing with the economic motivations of individuals, relationships between decisions and economic objectives and individual economic decision making in Part II were the role of consumption relative to income and effort, and the consequences of satisficing behaviour when achieving aspirations is uncertain and rationality is bounded.

The framework

The main elements of the framework are:

- an owner-manager's consumption objectives are the primary basis for his or her investment decisions;
- objectives are pursued on a satisficing basis;
- an individual's consumption aspirations are hierarchical with an effective lower bound or base target; and
- individuals seek to act rationally, but their rationality is bounded by physical, biological and social factors.

Consumption

Consumption behaviour has been fundamental to developments in mainstream economic and financial theory; consumption has been described as the primitive concept in terms of which all others are defined (Fisher, 1930). Despite the primacy of consumption in economic theory, it has been largely ignored by the literature concerned with the motives and decision criteria applicable to small owner-managed firms.

The implication from neoclassical theory is that income or profit is sought by individuals for its benefit in financing consumption expenditure. An assumption of profit maximisation in the owner-managed firm context may contradict this. Notionally at least, it seems that utility and profit maximising assumptions can conflict where profit maximisation by firms ignores the utility of leisure to the owner-manager or requires the owner-manager to forgo current consumption preferences. The notion that an owner-manager's consumption preferences underlie the objectives of an owner-managed firm means that the desirability of profits is a function of the extent to which personal consumption and savings objectives are satisfied. Managerial effort, in turn, is a function of personal income-leisure preferences (conditioned by ability).

Income and effort

Consumption is financed by income, wealth realisation or debt. Using debt implies future income or wealth realisations. Future consumption aspirations require permanent income, wealth or savings. Permanent (or stable) income implies survival of the firm over some planning horizon which depends, in part, on satisfying external claimants who can enforce claims through liquidation. Savings objectives contribute to income targets.

Where an owner-manager largely derives income by selling time and skills, the proposed lower consumption bound implies that fluctuations in the individual's income will induce negatively correlated fluctuations in effort. There are other factors affecting this sustainable consumption-effort hypothesis. In particular, the following concepts pertaining to income and consumption behaviour were adapted from the literature :

- Owner-managers adjust income-seeking behaviour in accordance with the perceived stability (permanence) of achieved consumption (income) levels.

- Owner-managers do not increase their consumption expenditure targets unless continued attainment (permanence) of the current levels or targets are perceived to be relatively assured.
- An owner-manager's savings behaviour and investment is influenced by the proximity or expectation of exceeding the lower bound to consumption.

Uncertainty and satisficing

Neoclassical risk theory has specifically considered minimum or target returns in a manner pertinent to satisficing behaviours in respect of lower bounds or targets. It is widely accepted in both neoclassical and bounded rationality frameworks that a possibility of losses or below target outcomes is of particular significance in investment decisions, and that some degree of risk-aversion is dominant in the behaviour of individuals under uncertainty.

Numerous considerations are possible in comparing perceived outcomes, where 'good' and 'bad' results may be weighted differently. A generalised view concordant with approaches identified from the diverse literature is to consider each outcome in relation to the owner-manager's target. Good outcomes are those expected to satisfy the target while bad outcomes are those that fall short.

The main implications for owner-managers who have minimum consumption requirements to be satisfied from their investment of capital and effort in the firm, is that their responses to risk and ambiguity are dependent on the anticipated or possible outcomes relative to their set of consumption targets. The evidence from the surveyed literature indicates that owner-managers are most likely to be both ambiguity averse and risk averse, with aversion increasing with increased anticipation that their consumption targets will be satisfied. Where owner-managers become less certain that targets will be

satisfied, they choose to increase effort (output) and may take greater 'risks' in an attempt to achieve the targets.

Bounded rationality

The suggestion that individuals may wish to make decisions in accordance with subjective expected utility theory is captured in the concept of intended rationality, where a decision maker seeks to act in accordance with concepts of economic rationality but whose rationality is bounded by physical, biological and social factors.

The limited information processing ability of individuals induces minimal information search and simplistic solutions. Progress usually depends on the modification of previous solutions which requires only a largely local search. This contributes to satisficing behaviour, whereby search ceases if an acceptable solution is found.

Hierarchical aspirations and income

The permanent income - life cycle hypothesis has generated strong evidence that the extent to which individuals increase consumption expenditure depends on the extent to which they believe that an increase in income is 'permanent'; this means that the relationship between consumption and income in the permanent income - life cycle hypothesis may be weaker for the riskier income of the self employed. There is evidence of the existence of lower bounds to consumption where proximity to lower bounds affects the consumption expenditure - income relation. This has been interpreted to mean individuals near the lower bound tend to spend all available income on consumption regardless of the perceived permanence of changes in income. Individuals will, if able, try to increase income by investing more effort or capital until some particular consumption level is satisfied. This implies that there is a preferential ordering of combinations of leisure, risked capital and consumption with some *base* consumption level dominating the ordering.

The elements in and structure of an individual's hierarchy of consumption aspirations are complex and beyond the scope of this thesis. The general theme of economic and psychological theory based on Maslow's (1954) theory on individuals' hierarchy of needs suggests individuals first require satisfaction of particular short term consumption needs. There is then some contribution to expected longer term needs for the same consumption, then concern for higher level consumption needs, reflecting the individuals' time preferences and planning horizons given bounded rationality. Current satisfaction is usually ranked higher than future attainment for the same periodic consumption elements, but short term satisfaction of higher level consumption needs *may* be subservient to assuring the future satisfaction of base consumption needs. Thus, an individual's consumption behaviour may include base and threshold consumption levels with varying associated time preferences. No generalisation of such an ordering of consumption targets was attempted.

Future consumption targets

Satisfaction of consumption objectives over time requires commensurate income or savings. Applying the survival hypothesis and precautionary savings models to the longer term suggests that, under uncertainty, an intently rational individual should prefer current consumption to be satisfied from current income rather than from previous savings, as reduced savings (wealth) reduces the expectation of satisfying future consumption targets. However, this is dependent on the extent to which the individual discounts the value of future consumption and the certainty of future income.

Consumption and survival of the firm

It was assumed that the intendedly rational owner-manager continues investing effort and risking financial capital in the firm to obtain the income necessary to support the base consumption level only if the prospects of attainment are at least equal to those for other income deriving opportunities. This does not preclude the owner-manager maintaining

the firm for other reasons. In these circumstances, there is a base target consumption level which determines the level of return necessary for the owner-manager to invest the effort and invest or leave intact the capital needed for the firm to survive. Satisfaction of this base consumption target is a necessary but not sufficient condition for firm survival.

The decision models

The intently rational owner-manager was modelled as setting a periodic income target that satisfies a consumption target, savings target and external claims. The owner-manager's consumption target may be revised for levels above a base objective subject to the owner-manager's target belief levels for firm survival.

The general model considers the owner-manager's revisions of the sensitivity of the income function to changes in inputs as a simple linear extrapolation of previous changes. When this approach is incorporated into the owner-manager's decision model for inputs, a generally unique set of solutions can be obtained only if there is no interaction effect between the inputs, or if only one of the inputs is variable.

Savings may in effect appear to be residual although it is hypothesised that targets are set to meet future consumption needs and so are intended to be included in aspirations. Current external claims are contractually specified and so in effect are not currently determined by the owner-manager, although they may reflect previous decisions. This necessarily incomplete view of debt was extended in the empirical testing and discussion of implications for performance, but these extensions were not formally incorporated into the model.

EMPIRICAL EVIDENCE PERTAINING TO THE FRAMEWORK

Evidence in the literature surveyed in Part II that supports the consumption-oriented framework mostly concerned the importance of consumption objectives or targets and satisficing behaviour in individual decision making, and differences in owner-manager behaviour (relative to wage and salary earners) regarding the degree of association between earnings changes and consumption changes, savings propensities and income seeking activity.

Direct empirical tests were undertaken in Part III. The integration of owner-manager interests and the identity of the firm was examined in Chapter 10. In essence, there was strong evidence that the economic identity of the firm is inseparable from the owner-manager for many purposes.

While numerous hypotheses pertaining to the model could be constructed, those developed were the more pertinent to providing broad based validation tests. The data base used for directly testing propositions developed here was not ideal for testing all important aspects of the framework. Some behavioural propositions would require substantial series of detailed and precise data to capture owner-managers' responses and information processing under varying conditions. No appropriate archival data was available. Data regarding individual owner-managers' consumption elements or aspirations was not available.

The available data offered some opportunity to study achieved consumption levels and relationships with other variables, using estimates of consumption funded by withdrawals from the firm. Test were conducted with respect to base consumption targets and the responsiveness of consumption to income and debt. Tests focused on consumption changes across time periods as well as considering consumption as a decision variable in a linear model with owner-manager input choices.

The tests conducted in Chapter 11 supported some facets of the proposed role of consumption in the behaviour of owner-managed firms. In particular, consumption behaviour appeared consistent with owner-managers attempting to maintain previously established consumption levels and to move through a consumption hierarchy by pursuing income increasing strategies. The tendency for consumption increases and income seeking activity to ease as higher levels were achieved was consistent with the hypothesised satisficing behaviour. Unsuccessful income seeking activity was associated with selective use of savings or debt to finance consumption. The use of debt was mostly associated with the maintenance of low level consumption targets.

IMPLICATIONS FOR STUDYING PERFORMANCE

Some implications of the framework were examined in Part I. Two particular aspects of performance were considered. The first addressed individual firm growth, which has featured frequently in studies of small and owner-managed firms, and the second considered short term profit seeking behaviour.

These issues were approached from two directions. First, the potential relevance owner-manager consumption behaviour to lenders was explored and the possible effects of lender attitudes on the two aspects of performance were considered. Second, the relevance of the framework to owner-manager attitudes and decisions regarding growth and planning horizons for profit seeking were considered. These are reviewed below.

Lender behaviour

It was argued in Chapter 13 that contracting between lenders and borrowers is substantially affected by the availability of information. Given that decisions made by owner-managers regarding the operations of their firms are a function of their consumption objectives then lenders should take account of information pertaining to the

consumption levels and aspirations of owner-manager borrowers. If lender behaviour accords with this expectation then owner-manager consumption levels or aspirations should affect the availability and cost of debt. Failure to take account of consumption behaviour may induce mispricing by ignoring the varying ability of owner-managers to adjust consumption to meet debt servicing obligations.

The data included only successful debt applicants, preventing any empirical examination of issues pertaining to debt availability. The main questions addressed in Chapter 14 were whether lenders differentially price loans on the basis of information cues or proxies relevant to potential default on debt, and whether owner-manager consumption was included in the information set for loan pricing.

There is no direct evidence of consumption levels affecting the cost of debt. While this may be due to inappropriate testing methods or data limitations, it is plausible that lenders do not take account of consumption levels in the manner proxied here. It is known that banks collect fairly detailed consumption data from small business loan applicants[1] that may facilitate more detailed and individual specific evaluations of consumption levels and possible trends than can be tested here.

The relationship between consumption and debt may be more complex than can be detected here. If consumption is influential in the level and structure of debt in an owner-managed firm, it is unlikely to remain constant before and after the debt restructuring. While it is likely that lenders have superior information regarding achieved consumption, it cannot be assumed that they have a reliable information concerning the owner-manager's consumption intentions. This may induce reliance on general indicators that

1 The loan application forms of all major Australian banks were collected in 1988 and again in 1992. In each case the banks appeared to collect the same information regarding domestic expenditure as they typically collect for small personal loans and owner-occupier property loans.

are applied consistently to groups of owner-managed firms. The lender behaviour and pricing issues raised here all warrant further investigation, but are beyond the intended scope of this thesis. The purpose in raising them here was to illustrate the potential relevance of the proposed framework.

A review of available evidence concerning the cost and availability of debt in Chapter 15 raised the prospect that debt rationing will limit a firm's growth ability, and perhaps more importantly, may provide incentives for owner-managed firms to signal their quality by pursuing short term gains to establish a 'track record'. This effect may be further encouraged by lending practices which increase periodic debt servicing obligations.

Owner-managers and growth

Chapter 16 considered growth as a performance criteria, while examining possible growth limiting conditions that are inherent in owner-managed firms or are consequences of the consumption satisficing framework. It was argued that concepts of growth, as employed in the literature, are largely irrelevant to an owner-manager's basic objectives, and that the owner-manager's attributes naturally limit growth capacity.

There are two critical sets of restrictions attributable to an owner-manager. These are equity and limits on the owner-manager's effort and ability as a resource. These factors limit both the opportunity and capacity for an owner-managed firm to identify and undertake new projects or expand existing activities.

The consumption satisficing framework does not lead to growth objectives other than in the limited sense of advancing through hierarchical aspirations. Owner-managers near or below base consumption targets may direct their attention to short term income gains regardless of long term consequences.

Short term gains

The debt and consumption incentives for short term results were illustrated in Chapter 17. The simple illustration showed how an owner-manager's consumption constraints and survival orientation can increase need for short term income, thus inducing the owner-manager to make choices that offer higher short term income at the expense of greater long term gains. This may be augmented by lender behaviour and the owner-manager who may wish to enhance his or her reputation to improve access to finance. While this may be labelled suboptimal in a naive profit maximising context, it not necessarily suboptimal in the context of meeting the owner-manager's consumption based objectives for the firm.

LIMITATIONS OF THE RESEARCH

There are a number of potential limitations of this research which influence how it is interpreted in the current context and what future work may be appropriate. These are separated below into possible limitations of the proposed framework and limitations of the empirical testing.

Limitations of the framework

There are several possible limitations associated with the framework. These are discussed in the context of generalisability, the development approach and completeness of the framework.

Generalisability of the framework

The applicability of the framework to different circumstances is intentionally limited by the definition used for an owner-managed firm and by restricting performance to economic concepts. These were discussed in Chapter 1. Firms to which the framework can be applied may be further limited by the restriction that the firm or business was established primarily to provide income to the owner-manager. It is possible that some

firms which satisfy the definition of an owner-managed firm were not established with the provision of income to the owner-manager as the primary motive. The framework is not appropriate to such firms.

While it was a measurement issue in the empirical testing in Chapters 11, 12 and 14, the applicability of the framework is not necessarily impaired if owner-managers have other sources of income. Such circumstances may affect an owner-manager's aspirations for income from the firm and the required levels of assurance of target satisfaction, but the framework should still be applicable if the owner-manager maintains the firm to provide income for funding consumption aspirations.

Development approach

While positive inductive approaches have been used in many motivation and performance studies of small and owner-managed businesses, they have not led to the development of any theoretical foundations or framework applicable across the various owner-managed firms outside of the particular studies' samples. A more deductive approach was chosen to allow the focus to be on more fundamental concepts rather than mere empirical associations. However, this approach also has its limitations. It is possible that the existing theories and assumptions on which the deduced framework is based are unnecessarily limiting or flawed. This is a larger question than can be addressed here.

The possibly more serious limitation of the adopted approach was the decision to not fully consider the experimental or psychological literature. As an area of specialised study it would have taken the scope and scale of this thesis well beyond reasonable limits. Such practical considerations to not mitigate the potential limitation of the approach. The research concerning the determinants of human behaviour and individual decision making are likely to have considerable relevance to the study of choices of

owner-managers. The extent to which theories of decision making that were not considered here may affect the framework cannot be anticipated with any confidence.

Completeness

Following the above limitation with regard to the possible relevance of the excluded literatures, confidence in the extent to which all necessary elements have been considered is similarly limited. By considering only the basic economic incentives for individuals' financial and labour investment decisions, it is possible that some significant element or concept has been omitted from the framework. Omission *per se* is a lesser issue than whether the omission affects the validity of the concepts or constructs that were included. It is an important assumption of the adopted approach that criteria by which economic performance should be evaluated can be adequately described by reference to the economic objectives of owner-managed firms. It is likely that only considerable testing for different firms over an extended period will adequately determine the appropriateness of this assumption.

Limitations of the empirical testing

The limitations of the empirical testing are discussed in the context of threats to the validity of statistical conclusions, internal validity, construct validity and external validity.

Threats to the validity of statistical conclusions

The validity of statistical conclusions is concerned with the statistical evidence that a presumed cause and effect co-vary. This is a function of the reliability of the measures and other sources of error, and how they may affect conclusions drawn from the statistical tests.

Direct testing of the reliability of measures was not possible. As discussed in Chapter 11, possible noise in the consumption estimates is a particular concern in this regard.

Given that the threats are themselves largely conjectural, reassurance is drawn primarily from the results themselves on the basis that the conjectured threat was to increase the conservatism of the test and so suppress the hypothesised effects. The extent of any error in the consumption estimation procedures can be assessed only through further testing of the framework against other data bases.

Threats to internal validity

Internal validity refers to whether the inferred relationships are causal. The main threat in this regard is the framework itself. While based on diverse sources of theory and empirical evidence, the development of the framework, as noted above, has some limitations. The acceptance of causality for the relationships argued to comprise the framework is dependent on the acceptance of the model constructs and *a priori* reasoning.

Threats to construct validity

Construct validity is concerned with whether operational measures are the most appropriate mappings of the theoretical constructs. The main threat in this respect lies in the development of the hypotheses in Chapter 8. The extent to which the hypotheses rely on assumed associations between framework elements and the test variables utilised presents some weakness in the testing. The principal test that may be employed here is to assess the strength of the a priori reasoning and the logical deductivism applied in hypothesis formulation.

Threats to external validity

External validity concerns the generalisability of the results or relationships to cases and circumstances not used in deriving the results. The main threat is that the test sample may not be representative of the population. It is possible that biases in the source of the data will bias the test results. A second threat is that the sample was drawn solely from the period 1980-89 and the causal relationships hypothesised and tested may no longer

apply. These threats should be substantially mitigated on two bases. The first mitigating factor is the apparent similarity of the sample profile to that of both the state and national profiles of small firms across several attributes. While not conclusively tested because of the lack of some attribute data the apparent representativeness is reassuring.

The second mitigating factor is the design of the research itself. Because the hypotheses were generally derived from propositions that were formulated without reference to the sample data, but rather by reference to the framework, then the data was not used to infer relationships. The relationships were deductively formulated and then tested against the sample data. Consequently the relationships in question were obtained independently of the data and in this sense no threat to external validity should arise.

In drawing this conclusion, as noted above in the review or the limitations of the framework, the relationships were hypothesised for a particular class of owner-managers and the firms and it is not intended that the results of this research be generalised to individuals or firms that may differ on various key attributes.

IMPLICATIONS OF THE RESEARCH

The framework and decision model provide a simple set of concepts and constructs that should influence the ways in which various parties consider the performance or performance criteria for owner-managed firms. The simplicity of the constructs arises from the small number of elements present in the framework. This makes the framework relatively easy to comprehend.

The view that an owner-manager's pursuit of income is consumption driven recognises time preferences, savings needs and some requirement for a sustainable minimum or base-target consumption level. It may also lead provide short-term objectives that are

survival driven as highlighted in Chapter 17. Thus the approach recognises both objectives and constraints.

Currently held consumption and savings targets are a mix of short and long term consumption targets, which may vary according to the owner-manager's perception of the stability and permanence of existing levels and the 'base' consumption target. These levels describe the consumption target the owner-manager requires to be satisfied from the business if the owner-manager is to continue investing capital and effort in it. Thus, the base consumption target describes a survival criteria for the business or firm. Other survival criteria may also apply, such as those imposed by debt holders.

Implications for business

The framework should be useful to parties dealing with owner-managed firms by directing their attention to potentially important influences on owner-manager responses under different circumstances, based on their likely consumption aspirations and current income position. Likewise, such parties might assess how their dealings with an owner-managed firm may affect the achievement of the owner-manager's objectives.

For example, the contracting behaviour of lenders has implications for the cost and availability of capital to owner-managed firms. Lender behaviour appears to reflect information asymmetry and opportunism, and relative business (failure) risk of owner-managed firms. Information asymmetry may reflect owner-manager behaviour or diseconomies of scale regarding firms' signalling costs and lenders' monitoring costs. Failure risk is generally claimed to be disproportionately high for small firms, and variously attributed to size, owner-manager ability and capital availability. Just as lending decisions should take account of owner-manager objectives and capacity, it appears that debt financing may modify or provide incentives for particular owner-manager actions. Institutional lenders appear to use generalised screening devices that

reduce the ability of owner-managed firms to signal their quality on an *ex ante* basis. Perceptions of 'track records' as a financing criterion may provide an incentive for owner-managers to pursue short-term results. Debt servicing requirements and the desire to maintain a particular consumption level may encourage risk aversion in the sense of minimising the variability of required profit if anticipated profits will satisfy the owner-manager's current consumption aspiration and debt servicing obligations.

Because only bank debt was specifically examined, the relevance of the framework to other parties dealing with owner-managed firms remains more speculative. However, for parties providing either formal or informal debt financing, the implications may be similar to those for the institutional lender. The growth effects and owner-manager preferences may be relevant to those contracting to sell inputs to the owner-managed firm[2].

Policy implications

It continues to be popular in Australia for politicians, 'small business' lobbyists and some commentators to identify the 'small business' sector as a particularly valuable source of economic development, often with a focus on employment. The implicit assumption behind some policies and many public statements appears to be that most small firms wish to grow (in terms of capital or employees) and are often prevented from doing so factors that can be influenced by governments and their agencies. The implications of this research for policies directed at encouraging or enabling firms to pursue growth may be important if, as argued in Part I, most small businesses are owner-managed.

Two particular but related policy implications can be noted. First, the assumption that all or many owner-managed firms wish to grow significantly and will therefore respond to the supposed growth-facilitating policies appears fallacious in the context of this research.

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2 For example, the interests of suppliers of labour may be affected by expected business growth and its consequences for continuing employment or advancement.

Individual owner-managers that do wish to grow are likely to face internal limits which, in the larger scheme of government policy, may soon be reached. Even if owner-managers can be persuaded to yield their apparent preference for 'independence' and 'control', their ability to attract equity partners may be substantially limited - although this conjecture should be addressed empirically.

Second, policies supposedly pertaining to owner-managed firms should take account of the owner-manager's objectives. The general nature of owner-manager objectives proposed here indicate that consumption levels and stability are prevailing influences on firm behaviour, and so policies that purport to provide benefits or incentives to such firms, but which are developed without reference to such influences, may fail through their perceived irrelevance.

Research implications

This thesis has two main implications for future research. First it provides a frame of reference for research concerned with the performance of owner-managed firms and second, it raises many conceptual and empirical issues that require further research.

Frame of reference

As discussed in Chapter 1, few empirical studies of the performance of owner-managed firms have reference to any theoretical framework. Most studies of growth performance, which typically express size in terms of turnover or employee numbers, have been conducted without regard to the likelihood idiosyncratic growth opportunities or capacity of owner-managed firms, and have implicitly assumed that such growth is desirable, if not specifically sought by owner-managers. The disincentives for growth and limits on growth capacity considered in Part IV indicate the inappropriateness of such an assumption. The use of employee numbers to measure size appears to have little relevance to owner-managers' primary objectives. Utilisation of a relevant conceptual

framework should enable researchers to more appropriately design performance oriented studies and in particular to contextualise growth willingness or success studies.

Further research

Particular issues regarding the role of consumption in the framework that need to be empirically addressed include the existence and nature of lower consumption bounds and the extent to which owner-managers revise inputs (including their effort) in response to changes in consumption objectives and uncertainty. To better operationalise the framework, research into how individuals formulate and revise consumption objectives is desirable.

Further investigation of the mechanics of interactions between owner-managed firms and others, in the context of or affects on owner-manager objectives, may significantly contribute to our understanding of behaviour of owner-managed firms and factors influencing their performance. The proposed framework may assist such research by identifying the relevance of owner-manager consumption aspirations in analyses of contracting behaviour and by similarly contextualising performance criteria.

APPENDIX 1: ORGANISATIONAL FORMS

Traditionally, there are four basic legal forms available in Australia for structuring firms:

- soletrader
- partnership
- company
- trust

The relative popularity of these forms has changed over time, partly due to commercial and management needs, but largely in response to income tax planning. The latter particularly encouraged the promotion and use of various trust structures in the 1970's and 1980's. Legal specifications for the various forms have changed little over time, although very recent developments in Australia (see Shailer, 1990) may have significant implications for future choices of organisational form by owner-managers.

Soletraders

An individual operating without any intervening commercial, legal or taxation structure is known as a soletrader. Typically, the only general administrative demands on soletraders are licensing requirements and registration of business names where appropriate.

Partnerships

Historically, partnership legislation in Australia has not allowed impediments to the joint and several liability concepts that apply to partners. Several Australian states have introduced legislation for limited liability partnerships. However, this is so recent and so far sufficiently unpopular that it can be ignored here. Administrative demands on owner-managers using partnership structures are similar to soletraders, with the addition of occasional pressure from the Australian Taxation Office, institutional lenders or partners for formal partnership agreements. Except for gazetted exceptions for certain professions, partnerships in Australia have been prevented (by companies legislation) from having more than 20 members.

Companies

Australian company legislation traditionally has permitted the following corporate forms:

- an unlimited company
- a company limited by shares, encompassing
    - a public company
    - a proprietary company, being
        - exempt
        - non-exempt
- a company limited by guarantee
- a company limited by shares and guarantee
- a no liability company

Of these, only the *proprietary* company is generally used for owner-managed firms. For completeness, all are described briefly below.

Unlimited liability company

Members of an unlimited liability company are liable fully for debts of the company. While this may seem to be a form of registered partnership, a corporate veil still exists and confers the legal rights of other forms of companies. Such companies are unlikely to be used for ventures with significant risks. A benefit of unlimited liability to a proprietary company is it can avoid appointing an auditor. This a rarely used form.

Company limited by shares

Shareholders in a limited liability company can be required to contribute to satisfy the company's debts up to the amount remaining unpaid on the issue price of their shareholding. Therefore, if shares are 'fully paid', it is immaterial to shareholders (at law) whether or not a company can satisfy its obligations. It is this facility that supposedly makes such companies so attractive for structuring businesses.

A company limited by shares may be either a *public* or *proprietary* (i.e. private) company. It is the latter which is most likely to be of relevance to owner-managed firms. Proprietary companies cannot invite public subscription of funds, cannot have fewer than two or more

than fifty members and must restrict the right to transfer its shares (such as 'only with the permission of directors')[1].

Private or proprietary companies occur in two forms: *exempt* and *non-exempt*. Differences between these forms mainly relate to accounting and audit requirements. Non-exempt proprietary companies are subject to similar disclosure and audit requirements as public companies. The more popular[2] exempt proprietary companies need not appoint auditors. If they do, they need not include financial statements in their statutory annual return.

Incentives for owner-managed firms to incorporate have varied over time. Changing administrative burdens, taxation benefits and burdens, reporting requirements and business sophistication have all had varying interactive effects. Some recent changes in this regard were discussed briefly in Shailer (1990).

Company limited by guarantee

There are no shares in guarantee companies. Members' liability is limited to an amount specified in the memorandum of association. This form effectively prevents the transfer of interests in the company between individuals because guarantors, unlike shareholders, do not hold separable interests. A company limited by guarantee must be a public company. Members rarely have a residual claim on the company. It is a popular structure for clubs and societies which determine membership by fee or subscription.

No liability company

No liability companies must be public and can be used only by mining companies. Members cannot be sued for unpaid calls, but may elect to surrender their shares.

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1 See sections 114 and 116 of the *Corporations Act 1989*.

2 Based on NSW Corporate Affairs Commission data from the 1980's, exempt proprietaries typically account for approximately eighty per cent of local companies.

Trusts

Trusts may be express, implied or constructive. Only express trusts are generally relevant to owner-managed firms. These are mainly *discretionary* and *unit* trusts. A discretionary trust allows the trustee to choose beneficiaries from a specified set of individuals. These were popular in the 1970's and 80's for tax planning. While administratively complex, they allowed some discretionary tax advantages which were substantially eroded in the 1980's. Nonetheless, their flexibility for varying the distribution of income or capital still provides advantages in organising commercial affairs. Unit trusts divide 'ownership' into equal units that have many of the properties of shares. Combining unit and discretionary trusts was common to obtain the benefits of a discretionary trust while preserving equal interests between the 'partners'; trust units were held by trustees of discretionary trusts. It was also common to use a family company as the trustee. This was mainly because a trustee is encumbered by various duties and liabilities. For example, a trustee who commits a breach of trust by failing to properly discharge his or her relevant duties is answerable to the beneficiaries for any resultant loss. More importantly, a trustee can be liable for debts of the trust.

APPENDIX 2: TARGET AND SAFETY MODELS OF INVESTMENT

Regret theory[1]

Assume that, for any given individual, there is a *choiceless utility function* $C(.)$, unique up to an increasing linear transformation, which assigns a real-valued utility index to every conceivable consequence[2]. An individual experiences a particular consequence as the result of their choice between actions A_1 and A_2 under uncertainty. A_1 is chosen and then the jth state occurs. The individual experiences the consequence $x_{.1j}$. It is then known that, had A_2 been chosen instead, the individual would have experienced $x_{.2j}$ Loomes and Sugden argued that the psychological experience of pleasure associated with having the consequence $x_{.1j}$ in these circumstances will depend on the nature of both $x_{.1j}$ and $x_{.2j}$. If $x_{.2j}$ is a more desirable consequence than $x_{.1j}$, the individual may experience *regret*, reducing the pleasure derived from $x_{.1j}$. Conversely, if $x_{.1j}$ was the more desirable consequence, the individual may experience *rejoicing*.

Loomes and Sugden incorporated these concepts of regret and rejoicing into their theory using a *modified utility function*. Suppose that an individual chooses action A_i in preference to action A_k and that the jth state of the world occurs. The actual consequence is $x_{.ij}$ while, had the individual chosen differently, $x_{.kj}$ would have occurred. Writing $C(x_{.ij})$ as c_{ij}, Loomes and Sugden said that the individual experiences the *modified utility* $m_{ij}^k = M(c_{ij}, c_{kj})$. The function $M(.)$ assigns a real-valued index to every ordered pair of choiceless utility indices. The difference between m_{ij}^k and c_{ij} may be interpreted as an increment or decrement of utility corresponding with the sensations of rejoicing or regret. If $c_{ij} = c_{kj}$ then $m_{ij}^k = c_{ij}$. If what occurs is exactly as pleasurable as what might have occurred, there is neither regret nor rejoicing. Loomes and Sugden then assumed $\delta m_{ij}^k / \delta c_{ij} \leq 0$ and $\delta m_{ij}^k / \delta c_{kj} > 0$; that is, other things being equal, modified utility increases with choiceless utility. Loomes and Sugden theorised that the individual chooses between actions so as to maximise the mathematical expectation of modified

1 This explanation of regret theory is largely attributed to Loomes and Sugden (1982).

2 'Choiceless' utility is that derived from an *imposed* consequence. In contrast to the Von Neumann-Morgenstern concept of utility, this concept of utility is defined independently of choice. Loomes and Sugden argued this is utilitarian in the classical sense.

utility. They defined the *expected modified utility* E_i^k of action A_i evaluated with respect to action A_k, by $E_i^k = \sum_{j=1}^{n} p_j m_{ij}^k$. Faced with a choice between A_i and A_k, the individual 's preferential ranking of A_i and A_k depends on the value of E_i^k relative to E_k^i.

The expectations element in this model combines gains and losses which, as noted in Chapter 4, is an implausible treatment for an owner-manager contemplating satisfaction of consumption preferences. The relevance of regret theory in the current context is that it endorsed the notion that an owner-manager judges the value of an outcome by reference to a target. However, in regret theory the 'target' is defined *ex post* and so is not useful for modelling decision making. The model could be adapted to *ex ante* target setting by modifying A_k to be the target outcome, but this would remain an evaluative rather than a decision-making model because it relies on the comparison of an actual outcome to a hypothetical outcome.

Prospect theory

Kahneman and Tversky (1979) proposed a relatively complex subjectively weighted utility model that has much in common with bounded rationality approaches. This 'prospect' theory replaces the probabilities in expected utility theory with decision weights that reflect the impact of the outcome on the desirability of the outcome. The value function in prospect theory does not measure attitudes towards risk, but rather it measures the subjective value of outcomes relative to some reference point that may vary with different presentations of a problem. This is consistent with reported context effects in insurance preferences (for example, Slovic *et al.*, 1977). Unlike the traditional interpretation of expected utility theory, prospect theory emphasises changes in wealth, rather than final wealth positions.

Choices, or prospects, in expected utility theory can be written as $\sum_j u(a_{ij})\pi_j$, where $u(.)$ is the von Neumann-Morgenstern utility function over outcome, a_{ij} is the outcome in the jth state for action-choice i, and π_j is the probability of occurrence of state j.

Prospect theory[3] replaces π_j with weights w which depend on π_j: $w_j = w(\pi_j)$, $\sum w_j < 1$. The precise form of the resulting index depends on whether any prospect confronting the individual consists of either 'gains' or 'losses', and whether, for a prospect that does not promise losses, the outcomes are non-positive or strictly positive. The utility index $E(U)$ is replaced by $V(.)$, with the $u(.)$ constituent of $E(U)$ defined as $v(.)$.

The $v(.)$, utility of outcomes, or what Kahneman and Tversky called the *value* function, was described initially as deriving from outcomes that are known to be obtainable under certainty. However, during their exposition of $v(.)$ Kahneman and Tversky (1979, p.278). stated that:

> (The) hypothesis regarding the shape of the value function was based on responses [of subjects in their laboratory experiments] to gains and losses in a riskless context. We propose that the value function which is derived from risky choices shares the same characteristics...

Kahneman and Tversky concluded that, in the positive domain, the certainty effect contributes to a risk-averse preference for a sure gain over a larger gain that is merely probable. In the negative domain, the same effect leads to a risk seeking preference for a loss that is merely probable over a smaller loss that is certain. This psychological principle also favours risk aversion for gains and risk seeking in the domain of losses.

Both the prospect and regret theories rely on the use of probability distributions, and merge gains and losses through 'averaging' processes. While prospect theory appears to be the more versatile paradigm, Ford (1987, p.129) suggested it may be less acceptable to intuition than regret theory.

Neither directly allows for satisficing in respect of targets, but they move away from the notion that risk or uncertainty is only incorporated in decisions by reference to the moments of complete probability distributions.

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3 Shoemaker (1982) stated that the Kahneman and Tversky (1979) specification of prospect theory is identical to the choice-index posited in Edwards (1955). Ford (1987, p.126) suggested that, pedagogically, this may not be so. The point is introduced here for interest only, in the context of the relative timing of the development of various approaches.

Potential surprise theory

Shackle (1952, 1961) was another to specifically reject moments of probability distributions as a measure of uncertainty. Shackle argued this is due to the non-seriability (uniqueness) of decisions, and to probability being a distributable variable. This latter point refers to a paradox whereby the introduction of a previously unconsidered hypothesis requires a revision of assigned probabilities; however, individuals do not always alter their beliefs concerning the other recognised hypotheses.

Shackle replaced probability with non-distributable degrees of 'potential surprise'. This has a lower limit of zero for all individuals, but an upper limit which may vary between individuals. The decision maker assigns degrees of potential surprise (y) to the series of outcomes for a particular action, separated for gains and losses. Shackle argued that some gain and loss expectations will assume ascendancy in the mind of the decision-maker, who will maximise an ascendancy stimulus, represented by a ϕ-function, which simplifies expectations. The expectational elements are reduced into one for gains and one for losses, both of which generally consist of an outcome and an associated potential-surprise. These pairs are 'standardised' for potential-surprise, such that pairs of monetary outcomes are compared across alternative choices. The standardised values are ranked according to a 'gambler indifference-map', which appears to have much in common with a utility map.

The potential-surprise function $y(.)$ can have any form. The ascendancy function $\phi(.)$ (which describes the trade-off of rival outcomes in the individual's decision processes) may vary for gains and losses, depending on attitudes to risk of loss. To differentiate, Shackle introduced ψ for the loss ascendancy function. This approach was adopted by Ford (1983), whose model has many commonalities to Shackle's, in a more sophisticated development. The potential-surprise propositions were persuasively challenged, as described by Dorfman (1955, p.315):

> Carter also questions Shackle's attitude toward the relationships between ... 'degree of surprise' and 'degree of belief'. The problem is that while both of these concepts are intuitively appealing substitutes for mathematical probability, they are almost indefinable; reasoning based on the one contradicts reasoning based on the other ...

Shackle's propositions regarding his degrees of surprise appear somewhat paradoxical, whereby an individual can experience both a low degree of belief about a particular outcome and a low degree of surprise when it occurs. The principle contributions of potential surprise theory in the current context are the explicit separation of potential gains and losses and the apparent inclusion of ambiguity in the treatment of expectations.

Perspective theory

A similar schema to the 'potential-surprise' model is presented as 'perspective theory' in Ford (1987), which in many respects is merely a refinement of Shackle's propositions. However, Ford's proposed degree of belief and degree of credibility concepts appear to circumvent Shackle's ambiguities. Ford offered his theory as a 'rationalisation of the empirical evidence that has vitiated Expected Utility Theory'. The basis of Ford's perspective theory were presented as four postulates:

1. As with Shackle's model, the gain and loss elements of a prospect are segregated.
2. The segregated gain and loss outcomes are encapsulated separately in a number or index, which Ford called an ascendancy index. The index is, in effect, the maximum (real) number that the individual assigns to the ascendancy function; this measures the attractiveness to an individual of the gain aspects of any prospect, and the maximum unattractiveness of its loss aspects. The two ascendancy functions have as their arguments a monetary outcome and an associated "probability of occurrence". Like Shackle, Ford labelled the ascendancy function for gains as $\phi(.)$ and for losses as $\psi(.)$ to allow for potential differences between the functions.
3. The choice of action is accomplished by an action choice-index which Ford called a Perspective Index (*PI*). This index trades off the individually perceived 'best' on the gain side and the 'worst' on the loss side for a prospect. This seems to be utility indicator which is the value of the function $PI = P(\phi^*,\psi^*)$ where the asterisks denote a weighing up of the highest values of $\phi(.)$ and $\psi(.)$, giving it much in common with orthodox choice theory under certainty.
4. Ford hypothesised that an individual evaluates a *PI* for each available prospect that depends on the highest and a lowest value of whichever ascendancy function is appropriate. For a risky prospect which promises only gains, the index is transformed thus: *PI* is the maximum of $P(\phi^*,\phi_{min})$. Hence ϕ_{min} replaces ψ^*. thus, all prospects can be modified to consist of all gains or all losses,

Ford's ϕ is defined over gains and the uncertainty variable. If the latter is probability *p*, then he argued that it should be the probability that the associated monetary gain (at least) will be attained. Ford developed a degree of belief, denoted θ, which was bounded by zero and $\bar{\theta}$. The upper limit $\bar{\theta}$ indicated an individual's perception of certainty.

Ford demonstrated his model with a one-period labour choice problem that seems particularly appropriate to the owner-managed firm (pp.80-4). This is reconstructed here to highlight the relevance. Assume that an owner-manager must decide how much labour or effort (*e)* to invest in the firm where the return (*w*) is stochastic with an unknown distribution, but the individual anticipates that it will lie in the range *ab*. Income will be *we*, with each *we* possessing a different θ-function of $\theta(w)$ scaled up by *e*. The lowest and highest values of ϕ will be associated with the highest value of *e*. In this case there are no possibilities of losses. The individual seeks to maximise $\phi = \phi(e, we, \theta_{we})$.

The ascendancy of any choice of *e* depends on *e* itself, the anticipated income it will produce and the degree of credibility attached to the occurrence of that income. The fact that increasing *e* will produce higher values of ϕ through *we* and θ will be countered by the negative effect on ϕ of the higher *e*. Ford argued that there may be a Simon-like aspiration level of ϕ below which the individual will not invest labour, preferring leisure. In terms of an owner-managed firm, the owner-manager would choose to liquidate the firm. An increase in the return prospects will not necessarily lead to an increase in *e*.

APPENDIX 3: BELIEF FUNCTIONS

The belief functions identified in the owner-manager's decision making will not be confined to any particular formalism. The decision literature currently presents numerous competing formalisms that are alternatives to the subjective probability approach used in most economics and finance developments. The approach adopted in prospect theory (see Chapter 6) and related models, rank order probabilities (Kmietowicz and Pearman, 1981), and 'Baconian' probabilities (Cohen, 1979) are all axiomatic alternatives. The choice of axioms is largely ungrounded at this stage, in that tradeoffs and choices cannot be assessed at this point in the relevant research. The following introduction to the belief function formalism is provided largely for illustrative purposes. It is based on mathematical probability, but provides a sufficiently indirect use to demonstrate the extent to which decision models may be distanced from the subjective expected utility approach.

Belief functions, as developed by Dempster (1968) and Shafer (1976, 1982) relate to decision-making where the decision maker is unable to reach a definite conclusion using the available information. The belief function formalism is a generalisation of the Bayesian formalism. Based on antecedent work by Hooper and Bernoulli in the seventeenth century (see Shafer 1976), the Dempster-Shafer belief-function formalism is differentiated from probability theory by the assignment of uncertainties to a set θ of n mutually exclusive and exhaustive states.

Probability theory requires the assignment of measures of uncertainty to each individual element as a probability of occurrence, P, which then sum to unity; that is:

$$\sum_{i=1}^{n} \mathrm{P}(z_i) = 1, \quad z_i \in \theta$$

The belief-function formalism assigns uncertainty measures, b, to the individual elements of θ and all other proper subsets of θ, including θ, i.e. $m \subseteq \theta$. Note that:

$$\sum_{m\subseteq\theta} b(m) = 1,\ \ b\{\varnothing\} = 0$$

To illustrate, consider the two state set where $\left({}_tc_{t+1} \geq {}_tc^{\tau}_{t+1}, {}_tc_{t+1} < {}_tc^{\tau}_{t+1}\right)$. The owner-manager has weak confidence in the target consumption being satisfied, so assigns (say) 0.4. He or she has a very weak belief in the likelihood of target consumption not being satisfied, say 0.1. The individual does not consider there to be sufficient grounds for assigning any of the remaining 0.5 measure of belief to either outcome. This combination can be expressed as:

$$b\left({}_tc_{t+1} \geq {}_tc^{\tau}_{t+1}\right) = 0.4$$
$$b\left({}_tc_{t+1} < {}_tc^{\tau}_{t+1}\right) = 0.1$$
$$b\left({}_tc_{t+1} \geq {}_tc^{\tau}_{t+1}, {}_tc_{t+1} < {}_tc^{\tau}_{t+1}\right) = 0.5$$

The belief *function*, $B(m)$ represents the *total* belief in m. $B(m) \geq b(m)$ because:

$$B(m) = \sum_{z\subseteq m} b(z)$$

Consider this in terms of an owner-manager's belief in the output function $O(I, e)$ where the only observations are historic y, and the owner-manager wishes to determine the belief that $y_{t+1} = O\left(I_t, e_{t+1}\right) \geq y^{\tau}_{t+1}$. Based on historical evidence, 10 per cent of (I, e) imply O^1, 20 per cent imply O^2, and 15 per cent O^3. Thirty per cent suggest either O^1 or O^2, and the remaining 25 per cent cannot be interpreted. The belief that the appropriate function is either O^1 or O^2 is $b(O^1) + b(O^2) + b(O^1, O^2) = 60$. Assuming O^1 to O^3 are the only perceived production relations, then $\sum_{i=1}^{3} B\left(O^i\right) = 0.75$, which is less than unity.

If only $O^3\left(I_t, e_{t+1}\right)$ satisfies y^{τ}_{t+1}, then $B\left(y_{t+1} \geq y^{\tau}_{t+1}\right) + B\left(y_{t+1} < y^{\tau}_{t+1}\right) = 0.75$. It is always plausible that $B(z) + B(\sim z) \leq 1$ (where $\sim z$ denotes 'not z'), whereas $P(z) + P(\sim z) = 1$.

Thus, belief functions allow the representation of ignorance. This function is strictly Bayesian if all non-zero b-values exist only for single elements of θ (Shafer, 1976). The

complementarity of probabilities, whereby P(z) = 1 - P(~z) is 'replicated' in the belief-function formalism by the plausibility function Pl(.), where Pl(z) = 1 - B(~z) where ~z is the negation of z. That is, the plausibility of an event occurring is the extent to which we do not believe in it not occurring.

The means by which beliefs can be revised has some relevance in the context of the revision process in equations (7.3) to (7.6). Assume the owner-manager has formed a view of the income generating function, such that she or he weakly believes it to be $O^a(t)$. No other type of function has been considered.

Let us say the current beliefs are $\left[b_{t-1}\left(O_1^a\right)=0.2,\ b_{t-1}\left(\sim O_1^a\right)=0,\ b_{t-1}\left(O_1^a,\sim O_1^a\right)=0.8\right]$.

The owner-manager then receives a signal $\left(y_t|I_{t-1},_{t-1}e_t\right)$, say, that strongly enforces belief in O^a.

Let us say that the beliefs formed from the signal independent of earlier beliefs are weighted as $\left[b_t'\left(O_2^a\right)=0.7,\ b_t'\left(\sim O_2^a\right)=0,\ b_t'\left(O_2^a,\sim O_2^a\right)=0.3\right]$. The sets of beliefs are affirmative of O^a in that none are supportive of its negation, $\sim O^a$.

Dempster's rule for combining these beliefs can be expressed as:

$$b(m)=K^{-1}\sum\left[b_1(z_1)b_2(z_2)\mid z_1\cap z_2=m_1,\ m\neq\varnothing\right]$$

where $b(m)$ is the resultant b-value for the subset m of θ, b_1 and b_2 are the b-values for the independent signals, and K is the (re)normalisation constant given as:

$$K=1-\sum\left[b_1(z_1)b_2(z_2)\mid z_1\cap z_2=m_1,\ m=\varnothing\right]$$

The second term in K represents the conflict between the two signals. When such conflict is absolute (K=0), the signals cannot be combined.

Because $\left[b_{t-1}(O_1^a)=0.2,\ b_{t-1}(\sim O_1^a)=0,\ b_{t-1}(O_1^a,\sim O_1^a)=0.8\right]$ and $\left[b_t^{'}(O_2^a)=0.7, b_t^{'}(\sim O_2^a)=0, b_t^{'}(O_2^a,\sim O_2^a)=0.3\right]$ the combined b - values are

$$b_t[O^a=(0.2\times0.7)+(0.2\times0.3)+(0.8\times0.7)]=0.76$$
$$b_t(\sim O^a)=0$$
$$b_t(O^a,\sim O^a)=\underline{0.24}$$
$$\underline{\underline{1.00}}$$

where no normalisation is necessary as the signals were not conflicting.

If instead the owner-manager received a conflicting signal, with $b_t^{'}$ replaced by $b_t^{''}$ such that $\left[b_t^{''}(O_2^a)=0, b_t^{''}(\sim O_2^a)=0.3, b_t^{''}(O_2^a,\sim O_2^a)=0.7\right]$, then the conflicting value is $(0.2\times0.3)=0.06$

The normalising constant is $K=1-b_{t-1.}(O^a)b_t^{''}(\sim O^a)=1-0.06=0.94$

Therefore,
$$b_t(O^a)K^{-1}=(0.2\times0.7)\div0.94=0.149$$
$$b_t(\sim O^a)K^{-1}=(0.8\times0.3)\div0.94=0.255$$
$$b_t(O^a,\sim O^a)K^{-1}=(0.8\times0.7)\div0.94=\underline{0.596}$$
$$\underline{\underline{1.000}}$$

With $\left[B_t(O^a)=0.149,\ B_t(\sim O^a)=0.255,\ B_t(O^a,\sim O^a)=0.596\right]$, the total plausibility of O^a is $1-B_t(\sim O^a)=0.745$, while the plausibility of $\sim O^a$ is $1-B_t(\sim O^a)=0.851$.

The main attraction of the belief function formalism may be its ability to accommodate ignorance and ambiguity. However, despite it attraction, no particular formalism for dealing with information will be adopted in the models in this thesis.

APPENDIX 4: CASE-WISE FREQUENCIES OF CONSUMPTION ESTIMATES BY FINANCIAL YEAR

Case	Year ended 30 June								Case
ID	1981	1982	1983	1984	1985	1986	1987	1988	Total
10020				1	1	1	1	1	5
10030							1	1	2
10031								1	1
10040								1	1
10041						1	1	1	3
10042					1	1			2
10043							1	1	2
10050						1			1
10051								1	1
10052							1	1	2
10060						1			1
10061							1	1	2
10070						1	1	1	3
10071								1	1
10080			1	1	1	1			4
10090					1	1			2
10130								1	1
10150						1			1
10151				1		1			2
10152						1			1
10160								1	1
10170								1	1
10200						1	1	1	3
10201							1	1	2
10220					1				1
10230					1	1	1		3
10240					1	1	1		3
10250			1	1	1	1	1	1	6
10260						1	1		2
10270						1	1		2
10320						1			1
10330							1	1	2
10331							1	1	2
10340						1	1	1	3
10360								1	1
10370							1	1	2
10371				1					1
10381								1	1
10390								1	1
10430			1	1		1			3
10431			1		1		1		3
10440						1	1	1	3
10460					1	1	1	1	4
10470								1	1
10490							1		1
10500					1	1	1	1	4
10501				1	1	1	1	1	5
10502				1	1	1	1	1	5
10503				1	1	1	1	1	5
10530			1	1	1	1			4
10531			1	1	1	1			4
10540				1	1				2
10550								1	1
10560								1	1
10580								1	1

ID	1981	1982	1983	1984	1985	1986	1987	1988	Total
10590					1	1	1		3
10600						1	1	1	3
10610						1	1		2
10630				1	1	1	1		4
10660					1	1	1	1	4
10670						1	1		2
10690					1	1	1	1	4
10700					1	1	1	1	4
10710							1	1	2
10730								1	1
10760						1	1	1	3
20010					1	1	1	1	4
20020							1	1	2
20030						1	1	1	3
20040							1	1	2
20050								1	1
20060				1	1	1		1	4
20070								1	1
20080						1	1	1	3
20090					1	1	1	1	4
20100							1	1	2
20110							1	1	2
20120				1	1	1	1	1	5
20130							1	1	2
20140							1	1	2
20180							1		1
20181							1	1	2
20190							1	1	2
20200								1	1
20201								1	1
20210							1	1	2
20211						1	1	1	3
20220								1	1
20230								1	1
20240					1	1	1	1	4
20260							1	1	2
20270					1	1			2
20271					1	1	1	1	4
20280					1	1	1	1	4
20290						1	1	1	3
20300								1	1
20320					1	1			2
20321					1	1			2
20330					1	1	1	1	4
20350				1	1	1			3
20370							1	1	2
20400					1	1	1	1	4
20420						1	1	1	3
20430							1	1	2
20440						1			1
20470						1	1	1	3
20480								1	1
20490								1	1
20500				1	1	1	1		4
20510							1	1	2
20530						1	1		2
20531							1		1
20550						1	1	1	3
20560				1	1	1	1	1	5
20561							1	1	2
20570						1			1
20580								1	1
20590				1	1	1	1		4
20600								1	1

ID	1981	1982	1983	1984	1985	1986	1987	1988	Total
30010							1	1	2
30020						1	1		2
30030							1		1
30040					1	1			2
30060								1	1
30070								1	1
30080			1	1	1	4			
30110					1	1			2
30130								1	1
30140							1	1	2
30150						1			1
30170						1	1		2
30200					1				1
30210				1	1	1			3
30220					1				1
30240				1	1	1			3
30270				1	1	1			3
30280						1	1		2
30281							1		1
30290				1	1	1			3
30300			1	1					2
30340						1			1
30360							1		1
30380						1			1
30390							1	1	2
30430					1				1
30440								1	1
30450					1	1			2
30460							1	1	2
30470							1	1	2
30480			1	1					2
30501					1				1
30510						1			1
30520					1				1
30530						1	1	1	3
30540						1	1		2
30570					1	1			2
30580					1				1
30600					1				1
30610						1			1
30630						1	1	1	3
30640						1			1
30642						1			1
30650					1				1
30660					1				1
30670			1	1	1				3
30680						1	1		2
30690							1		1
30691								1	1
30692							1	1	2
30700						1	1		2
30710				1	1				2
30730						1			1
39150	1	1	1	1					4
39220			1						1
39440					1	1	1		3
Year Total	1	1	12	29	59	89	90	96	377
%	.3	.3	3.2	7.7	15.6	23.6	23.9	25.5	100

Note: Case IDs greater than 30000 indicate recovery-action firms.

APPENDIX 5: CORRELATION COEFFICIENTS

This appendix reports the correlation coefficients between all pairs of variables considered in the regressions of the interest rate premia in Chapter 14

Correlation Coefficients

	PREMIUM	*INC*	*BS*	*ACCT*	*CONSUM0*	*CONSUM1*	*CONSUMX*	*CONSUMOM*	*AGE*	*AGELOG*
PREMIUM	1.0000	-.1020	-.1335	-.0753	-.1616	-.1151	-.0090	-.1550	-.1353	-.0468
INC	-.1020	1.0000	.7437**	.2324**	.1939	.2475	.0027	.1753	.2439**	.4359**
BS	-.1335	.7437**	1.0000	.2538**	.1512	.3023	.0506	.1358	.2010*	.3853**
ACCT	-.0753	.2324**	.2538**	1.0000	.0695	-.0581	-.0359	.1197	-.1591	-.0440
CONSUM0	-.1616	.1939	.1512	.0695	1.0000	.2089	-.7455**	.9460**	.3480**	.2437
CONSUM1	-.1151	.2475	.3023	-.0581	.2089	1.0000	.4961**	.1809	.3093*	.2744
CONSUMX	-.0090	.0027	.0506	-.0359	-.7455**	.4961**	1.0000	-.7432**	-.0209	-.0022
CONSUMOM	-.1550	.1753	.1358	.1197	.9460**	.1809	-.7432**	1.0000	.2862*	.2033
AGE	-.1353	.2439**	.2010*	-.1591	.3480**	.3093*	-.0209	.2862*	1.0000	.7870**
AGELOG	-.0468	.4359**	.3853**	-.0440	.2437	.2744	-.0022	.2033	.7870**	1.0000
INCORP	-.1478	.3061**	.1811*	.2580**	.1561	.0630	.0446	.0368	.1742	.1741
SOLETRAD	.2326**	-.0948	-.1105	-.0101	-.0748	-.0314	-.0329	.0029	-.0884	-.0629
PSHIP	-.0256	-.2557**	-.1079	-.2712**	-.1163	-.0487	-.0227	-.0431	-.1179	-.1383
TRUST	-.1652	.1863*	.0434	-.0278	.3518**	.0864	-.2538	.2229	.2418**	.1703
PARTOM	-.0967	.1135	.1762	.0106	.1720	.0527	-.0384	-.0211	.2005*	.1204
OM	-.1407	.1397	.1988*	.0076	.1138	.0551	-.0280	-.0687	.1897*	.1234
TERM	-.3054**	.0986	.0525	.1441	.3076*	-.1862	-.2221	.4122**	-.0311	-.0680
PN	-.0692	.0719	.1305	.0627	-.1306	.2817	.4080*	-.2381	.1989	.1984
PNAGE1	-.0540	-.2036*	-.1837*	.1427	-.0220	-.2129	-.0295	.0464	-.2780**	-.4717**
PNAGE2	-.0579	-.1188	-.0466	.0539	-.0124	-.1756	-.0396	.0751	-.3075**	-.3660**
PNAGE3	-.0401	-.0479	-.0544	.0123	-.0278	-.2018	-.0909	.0729	-.2917**	-.2677**
IND_1	-.0738	.0812	.0146	.0106	.3578**	.2022	-.2200	.4271**	-.1277	-.0336
IND_2	-.0734	.0500	.0602	-.0249	.0181	.	.	-.0041	.1777*	.1395
IND_3	.0427	-.2072*	-.1311	-.1964*	-.1026	-.1231	.2388	-.1850	-.0080	-.1200
IND_4	-.0640	.1935*	.1571	.2580**	-.1431	-.0131	.0423	-.1029	.0837	.1302
IND_5	.1448	.0493	.0159	.1144	-.2199	-.1214	.0000	-.2515	.0955	.0764
SALES	-.2360	.0608	-.0606	-.1322	.2607	.2088	.4267*	.1930	.6042**	.3773**
GP	-.1291	.1290	.0181	-.1331	.1403	.0458	.3868	.0764	.4267**	.2842*
SALESLOG	-.1665	.1969	.0887	-.0647	.2663	.1796	.1898	.2202	.4669**	.3475**
GPLOG	-.2288	.3027*	.1824	-.0552	.1713	.0949	.2162	.0803	.4765**	.3534**
LOAN	-.0836	.1066	.1116	-.0666	.0031	-.0815	.0771	-.0146	.2358**	.1182
LOANLOG	-.2738**	.1968*	.1841*	.0362	.1803	-.1373	-.1598	.1755	.2022*	.0670

Correlation Coefficients

	INCORP	*SOLETRAD*	*PSHIP*	*TRUST*	*PARTOM*	*OM*	*T*	*PN*	*PNAGE1*	*PNAGE2*	*PNAGE3*
PREMIUM	-.1478	.2326**	-.0256	-.1652	-.0967	-.1407	-.3054**	-.0692	-.0540	-.0579	-.0401
INC	.3061**	-.0948	-.2557**	.1863*	.1135	.1397	.0986	.0719	-.2036*	-.1188	-.0479
BS	.1811*	-.1105	-.1079	.0434	.1762	.1988*	.0525	.1305	-.1837*	-.0466	-.0544
ACCT	.2580**	-.0101	-.2712**	-.0278	.0106	.0076	.1441	.0627	.1427	.0539	.0123
CONSUM0	.1561	-.0748	-.1163	.3518**	.1720	.1138	.3076*	-.1306	-.0220	-.0124	-.0278
CONSUM1	.0630	-.0314	-.0487	.0864	.0527	.0551	-.1862	.2817	-.2129	-.1756	-.2018
CONSUMX	.0446	-.0329	-.0227	-.2538	-.0384	-.0280	-.2221	.4080*	-.0295	-.0396	-.0909
CONSUMOM	.0368	.0029	-.0431	.2229	-.0211	-.0687	.4122**	-.2381	.0464	.0751	.0729
AGE	.1742	-.0884	-.1179	.2418**	.2005*	.1897*	-.0311	.1989	-.2780**	-.3075**	-.2917**
AGELOG	.1741	-.0629	-.1383	.1703	.1204	.1234	-.0680	.1984	-.4717**	-.3660**	-.2677**
INCORP	1.0000	-.4678**	-.7091**	.4233**	.1315	.1801*	.0557	.2053	.0651	-.0948	-.1524
SOLETRAD	-.4678**	1.0000	-.2915**	-.1980*	-.3807**	-.3620**	-.0811	.0380	.0174	.0569	.0434
PSHIP	-.7091**	-.2915**	1.0000	-.3001**	.1615	.0938	.0045	-.2618*	-.0843	.0572	.1303
TRUST	.4233**	-.1980*	-.3001**	1.0000	.2082*	.2991**	.1191	.1632	.0104	-.0727	-.0741
PARTOM	.1315	-.3807**	.1615	.2082*	1.0000	.9423**	-.0380	.1528	-.1886*	-.1431	-.1816*
OM	.1801*	-.3620**	.0938	.2991**	.9423**	1.0000	-.0553	.2126	-.1859*	-.1543	-.1941*
TERM	.0557	-.0811	.0045	.1191	-.0380	-.0553	1.0000	-.1589	.0972	.1189	.1972*
PN	.2053	.0380	-.2618*	.1632	.1528	.2126	-.1589	1.0000	-.4375**	-.6094**	-.7546**
PNAGE1	.0651	.0174	-.0843	.0104	-.1886*	-.1859*	.0972	-.4375**	1.0000	.7335**	.6057**
PNAGE2	-.0948	.0569	.0572	-.0727	-.1431	-.1543	.1189	-.6094**	.7335**	1.0000	.8259**
PNAGE3	-.1524	.0434	.1303	-.0741	-.1816*	-.1941*	.1972*	-.7546**	.6057**	.8259**	1.0000
IND_1	.1638	-.2491**	.0215	.0791	-.1625	-.1812*	.0375	-.2584*	.0952	.1705	.1752
IND_2	.1476	-.0691	-.1047	.2088*	.1626	.1304	-.0575	-.1237	-.0491	.0787	.0478
IND_3	-.1303	.0173	.1272	-.1398	.1816*	.1763	-.0585	.0303	-.0066	-.0678	-.0149
IND_4	-.0486	.2488**	-.1459	.0104	-.1318	-.0378	.0495	.1040	.0024	-.0540	-.0910
IND_5	-.0212	.2273*	-.1584	-.0023	.0106	-.0138	-.1064	.2879**	-.1021	-.1392	-.1686
SALES	.3580**	-.2062	-.2496*	.1772	.1830	.0898	.0905	.1402	-.1179	-.2199	-.2613*
GP	.3271**	-.1509	-.2597*	.0797	.1162	.0573	-.0167	.2032	-.0978	-.1961	-.2298
SALESLOG	.3936**	-.2493*	-.2552*	.0096	.0928	.0239	.0346	.0931	-.1014	-.2365	-.2545*
GPLOG	.4491**	-.2323	-.3381**	.0577	.1932	.1205	-.0007	.1812	-.1364	-.2338	-.2814*
LOAN	.1535	-.0927	-.0922	.0002	.1249	.1191	.1557	.1065	-.0059	-.0352	-.0385
LOANLOG	.2853**	-.2577**	-.1031	.1788*	.1149	.1298	.5066**	-.0060	.1100	.0543	.1012

Correlation Coefficients

	IND5	*DSERV*	*RETAIL*	*WSALE*	*TOUR*	*SALES0*	*GP*	*SALESLOG*	*GPLOG*	*LOAN*	*LOANLOG*
PREMIUM	.1448	-.0640	-.0738	-.0734	.0427	-.2360	-.1291	-.1665	-.2288	-.0836	-.2738**
INC	.0493	.1935*	.0812	.0500	-.2072*	.0608	.1290	.1969	.3027*	.1066	.1968*
BS	.0159	.1571	.0146	.0602	-.1311	-.0606	.0181	.0887	.1824	.1116	.1841*
ACCT	.1144	.2580**	.0106	-.0249	-.1964*	-.1322	-.1331	-.0647	-.0552	-.0666	.0362
CONSUM0	-.2199	-.1431	.3578**	.0181	-.1026	.2607	.1403	.2663	.1713	.0031	.1803
CONSUM1	-.1214	-.0131	.2022	.	-.1231	.2088	.0458	.1796	.0949	-.0815	-.1373
CONSUMX	.0000	.0423	-.2200	.	.2388	.4267*	.3868	.1898	.2162	.0771	-.1598
CONSUMOM	-.2515	-.1029	.4271**	-.0041	-.1850	.1930	.0764	.2202	.0803	-.0146	.1755
AGE	.0955	.0837	-.1277	.1777*	-.0080	.6042**	.4267**	.4669**	.4765**	.2358**	.2022*
AGELOG	.0764	.1302	-.0336	.1395	-.1200	.3773**	.2842*	.3475**	.3534**	.1182	.0670
INCORP	-.0212	-.0486	.1638	.1476	-.1303	.3580**	.3271**	.3936**	.4491**	.1535	.2853**
SOLETRAD	.2273*	.2488**	-.2491**	-.0691	.0173	-.2062	-.1509	-.2493*	-.2323	-.0927	-.2577**
PSHIP	-.1584	-.1459	.0215	-.1047	.1272	-.2496*	-.2597*	-.2552*	-.3381**	-.0922	-.1031
TRUST	-.0023	.0104	.0791	.2088*	-.1398	.1772	.0797	.0096	.0577	.0002	.1788*
PARTOM	.0106	-.1318	-.1625	.1626	.1816*	.1830	.1162	.0928	.1932	.1249	.1149
OM	-.0138	-.0378	-.1812*	.1304	.1763	.0898	.0573	.0239	.1205	.1191	.1298
TERM	-.1064	.0495	.0375	-.0575	-.0585	.0905	-.0167	.0346	-.0007	.1557	.5066**
PN	.2879**	.1040	-.2584*	-.1237	.0303	.1402	.2032	.0931	.1812	.1065	-.0060
PNAGE1	-.1021	.0024	.0952	-.0491	-.0066	-.1179	-.0978	-.1014	-.1364	-.0059	.1100
PNAGE2	-.1392	-.0540	.1705	.0787	-.0678	-.2199	-.1961	-.2365	-.2338	-.0352	.0543
PNAGE3	-.1686	-.0910	.1752	.0478	-.0149	-.2613*	-.2298	-.2545*	-.2814*	-.0385	.1012
IND_1	-.3169**	-.3021**	1.0000	-.1525	-.6072**	.2455	.0795	.1800	.0431	-.0583	.1190
IND_2	-.0515	-.0491	-.1525	1.0000	-.0987	-.0222	.0086	.0417	.0808	-.0328	-.0459
IND_3	-.2053*	-.1957*	-.6072**	-.0987	1.0000	-.0629	-.0705	.0530	.0086	-.0677	-.1091
IND_4	-.1021	1.0000	-.3021**	-.0491	-.1957*	-.2537*	-.1466	-.3259**	-.1833	-.0310	-.0689
IND_5	1.0000	-.1021	-.3169**	-.0515	-.2053*	-.0091	.1333	-.0141	.0919	.2323**	-.0317
SALES	-.0091	-.2537*	.2455	-.0222	-.0629	1.0000	.8272**	.8276**	.8006**	.3468**	.4313**
GP	.1333	-.1466	.0795	.0086	-.0705	.8272**	1.0000	.6573**	.7781**	.5435**	.4248**
SALESLOG	-.0141	-.3259**	.1800	.0417	.0530	.8276**	.6573**	1.0000	.8974**	.2698*	.3640**
GPLOG	.0919	-.1833	.0431	.0808	.0086	.8006**	.7781**	.8974**	1.0000	.3630**	.4106**
LOAN	.2323**	-.0310	-.0583	-.0328	-.0677	.3468**	.5435**	.2698*	.3630**	1.0000	.5516**
LOANLOG	-.0317	-.0689	.1190	-.0459	-.1091	.4313**	.4248**	.3640**	.4106**	.5516**	1.0000

* - Significant ≤.05** - Significant ≤.01 (2-tailed)
" . " is printed if a coefficient cannot be computed

APPENDIX 6: MULTIPLE REGRESSIONS FOR DEBT PRICING MODEL

This appendix reports the multiple regressions used for testing the debt pricing model developed and investigated in Chapter 14.

MULTIPLE REGRESSION 14.1

All variables and all cases considered.
Mean substituted for missing data
Method: Stepwise

Multiple R	.36979
R Square	.13674
Adjusted R Square	.12248
Standard Error	.01337

Analysis of Variance	DF	Sum of Squares	Mean Square
Regression	2	.00343	.00171
Residual	121	.02162	.00018

F = 9.58354 Signif F = .0001

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T
TERM	-9.84291E-04	2.8920E-04	-.288428	-3.404	.0009
SOLETRAD	.008084	.003275	.209198	2.469	.0150
(Constant)	.023560	.002576		9.145	.0000

Variables not in the Equation

Variable	Beta In	Partial	Min Toler	T	Sig T
INC	-.054662	-.058321	.982694	-.640	.5234
BS	-.096623	-.103259	.982107	-1.137	.2577
ACCT	-.032324	-.034427	.972880	-.377	.7066
CONSUM0	-.038202	-.040305	.956529	-.442	.6594
CONSUMOM	-.024863	-.025818	.924705	-.283	.7777
CONSUM1					
CONSUMX					
AGE	-.126907	-.135953	.985138	-1.503	.1354
AGELOG	-.053748	-.057578	.988056	-.632	.5287
INCORP	-.043346	-.041226	.778124	-.452	.6521
TRUST	-.094097	-.098717	.950105	-1.087	.2793
PSHIP	.040050	.041226	.908655	.452	.6521
REALPART	.089497	.093748	.946675	1.032	.3044
OM	-.093938	-.093857	.858725	-1.033	.3038
PN	-.097747	-.104224	.976018	-1.148	.2533
PNAGE1	-.029935	-.032056	.983689	-.351	.7260
PNAGE2	-.036216	-.038615	.978122	-.423	.6728
PNAGE3	.008010	.008436	.953035	.092	.9265
SALES0	-.113632	-.121060	.976936	-1.336	.1841
GP	-.069251	-.074166	.983754	-.815	.4169
SALESLOG	-.072094	-.076580	.968132	-.841	.4018
GPLOG	-.122417	-.130261	.970988	-1.439	.1527
IND_5	.070802	.073905	.940558	.812	.4185
IND_4	-.109041	-.113374	.929361	-1.250	.2137
IND_1	-.011553	-.012041	.932790	-.132	.8953
IND_2	-.076231	-.081686	.987967	-.898	.3711
IND_3	.022270	.023926	.990158	.262	.7936
LOAN	-.019971	-.021162	.969313	-.232	.8170
LOANLOG	-.105948	-.095137	.696079	-1.047	.2972

Residuals Statistics:

	Min	Max	Mean	Std Dev	N
*PRED	-.0060	.0287	.0175	.0053124	124
*RESID	-.0266	.0389	.0000	.0133124	124
*ZPRED	-4.4399	2.1280	.0000	1.0000124	124
*ZRESID	-1.9891	2.9070	.0000	.9918124	124

Durbin-Watson Test =1.74571

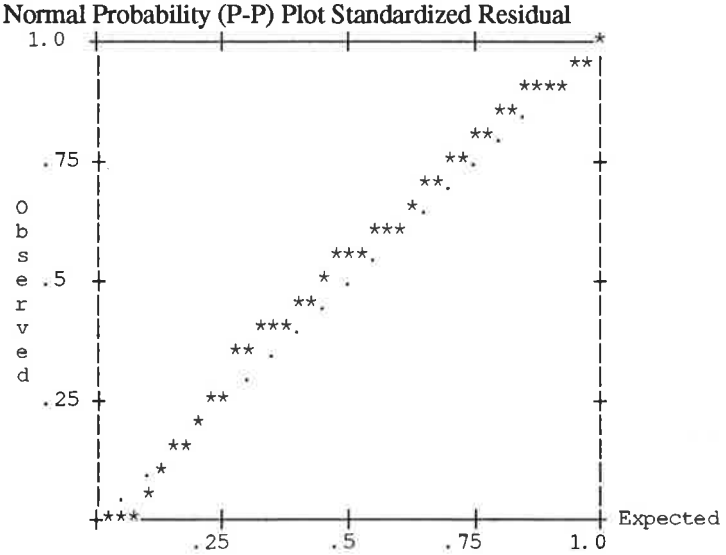
Outliers - Standardized Residual

Case #	*ZRESID
43	2.90698
81	2.83336
8	2.79360
44	2.20164
114	2.00187
14	-1.98910
120	1.97194
12	1.97194
52	-1.95918
105	1.92824

Histogram - Standardized Residual

```
 N Exp N      (* = 1 Cases,    . : = Normal Curve)
 0   .10   Out
 2   .19  3.00 **
 1   .48  2.67 *
 1  1.11  2.33 :
 4  2.26  2.00 *:**
 2  4.15  1.67 ** .
 4  6.80  1.33 ****  .
 8 10.00  1.00 ******** .
11 13.17   .67 *********** .
18 15.53   .33 ****************:**
14 16.41   .00 ************** .
17 15.53  -.33 ****************:*
15 13.17  -.67 ************:**
17 10.00 -1.00 *********:*******
 7  6.80 -1.33 ******:
 1  4.15 -1.67 *  .
 2  2.26 -2.00 *:
 0  1.11 -2.33 .
 0   .48 -2.67
 0   .19 -3.00
 0   .10   Out
```

Normal Probability (P-P) Plot Standardized Residual



MULTIPLE REGRESSION 14.2

TERM suppressed, all cases considered.
Mean substituted for missing data
Method:Stepwise

Multiple R	.32107
R Square	.10308
Adjusted R Square	.08826
Standard Error	.01363

Analysis of Variance	DF	Sum of Squares	Mean Square
Regression	2	.00258	.00129
Residual	121	.02247	.00019

F = 6.95340 Signif F = .0014

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T
LOANLOG	-.007367	.002866	-.229061	-2.571	.0114
SOLETRAD	.006707	.003443	.173557	1.948	.0538
(Constant)	.050383	.013437		3.749	.0003

Variables not in the Equation

Variable	Beta In	Partial	Min Toler	T	Sig T
INC	-.042167	-.043605	.903570	-.478	.6334
BS	-.075038	-.077708	.909057	-.854	.3949
ACCT	-.065383	-.068993	.932440	-.758	.4502
CONSUM0	-.065065	-.068073	.918410	-.747	.4563
CONSUMOM	-.069917	-.073138	.916267	-.803	.4234
CONSUM1					
CONSUMX					
AGE	-.076861	-.079423	.901131	-.873	.3845
AGELOG	-.020678	-.021761	.930980	-.238	.8120
INCORP	-.001637	-.001499	.752105	-.016	.9869
TRUST	-.095255	-.097687	.909724	-1.075	.2844
PSHIP	.001512	.001499	.831302	.016	.9869
REALPART	.082221	.083744	.877618	.921	.3591
OM	-.055511	-.054595	.823810	-.599	.5503
PN	-.057157	-.060320	.932586	-.662	.5093
PNAGE1	-.032329	-.033891	.920467	-.371	.7109
PNAGE2	-.055818	-.058692	.928519	-.644	.5208
PNAGE3	-.024882	-.026070	.920918	-.286	.7756
SALES0	-.064465	-.064086	.842413	-.703	.4831
GP	.007210	.007190	.840649	.079	.9373
SALESLOG	-.019884	-.020055	.874407	-.220	.8265
GPLOG	-.058284	-.058197	.853990	-.639	.5243
IND_5	.103552	.106436	.885511	1.173	.2433
IND_4	-.131081	-.134056	.879948	-1.482	.1410
IND_1	-.003504	-.003577	.885174	-.039	.9688
IND_2	-.072614	-.076323	.927012	-.839	.4034
IND_3	.014871	.015608	.922618	.171	.8645
LOAN	.084825	.074566	.652639	.819	.4143

Residuals Statistics:

	Min	Max	Mean	Std Dev	N
*PRED	.0030	.0283	.0175	.0046124	124
*RESID	-.0271	.0435	.0000	.0135124	124
*ZPRED	-3.1550	2.3736	.0000	1.0000124	124
*ZRESID	-1.9856	3.1940	.0000	.9918124	124

Durbin-Watson Test =1.74872

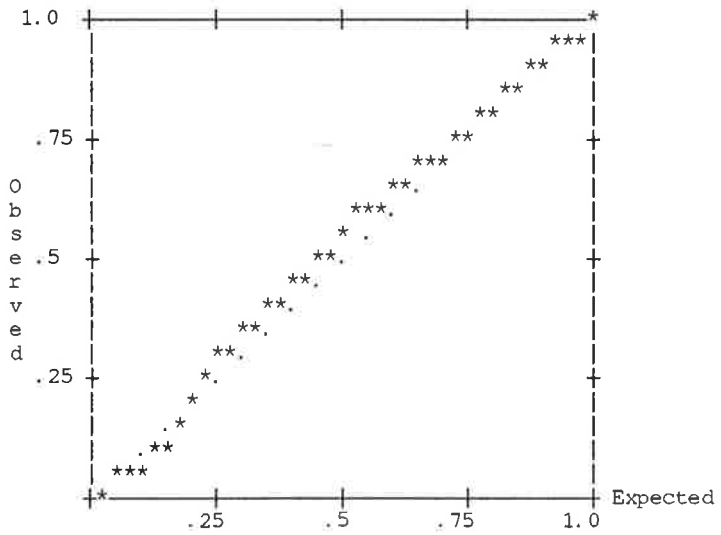
Outliers - Standardized Residual

Case #	*ZRESID
43	3.19399
8	2.87914
81	2.68474
12	2.20688
44	2.19788
14	-1.98564
105	1.93596
114	1.86842
52	-1.84370
108	-1.74275

Histogram - Standardized Residual

```
 N Exp N      (* = 1 Cases.    . : = Normal Curve)
 1   .10   Out *
 1   .19  3.00 *
 1   .48  2.67 *
 2  1.11  2.33 :*
 2  2.26  2.00 *:
 1  4.15  1.67 *  .
 5  6.80  1.33 ***** .
11 10.00  1.00 *********:*
12 13.17   .67 ************.
12 15.53   .33 ************   .
17 16.41   .00 ***************:*
15 15.53  -.33 ***************.
19 13.17  -.67 ************:******
15 10.00 -1.00 *********:*****
 5  6.80 -1.33 ***** .
 3  4.15 -1.67 ***.
 2  2.26 -2.00 *:
 0  1.11 -2.33 .
 0   .48 -2.67
 0   .19 -3.00
 0   .10   Out
```

Normal Probability (P-P) Plot - Standardized Residual



MULTIPLE REGRESSION 14.3

Excludes all partnership cases
Mean substituted for missing data
Method: Stepwise

Multiple R			.50719		
R Square			.25724		
Adjusted R Square			.22056		
Standard Error			.01310		
Analysis of Variance	DF		Sum of Squares	Mean Square	
Regression	4		.00481	.00120	
Residual	81		.01389	.00017	
F =7.01327 Signif F = .0001					

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T
TERM	-.001173	3.2731E-04	-.345560	-3.585	.0006
BS	-.005013	.002932	-.169932	-1.710	.0912
AGE	-7.07023E-05	3.7173E-05	-.188484	-1.902	.0607
INCORP	-.006307	.003438	-.180693	-1.834	.0703
(Constant)	.036632	.003931		9.318	.0000

Variables not in the Equation

Variable	Beta In	Partial	Min Toler	T	Sig T
INC	.172055	.128352	.413348	1.158	.2505
ACCT	.008308	.008824	.837957	.079	.9373
CONSUM0	.013129	.014286	.861816	.128	.8986
CONSUMOM	.016333	.017603	.860285	.157	.8753
CONSUM1					
CONSUMX					
AGELOG	.029177	.020192	.355734	.181	.8571
SOLETRAD	1.000000	1.000000	.000000	.	.
TRUST	-.063539	-.067366	.834930	-.604	.5476
OM	-.108418	-.109151	.752840	-.982	.3290
PN	.036837	.040179	.852068	.360	.7200
PNAGE1	-.086277	-.093435	.853653	-.839	.4038
PNAGE2	-.114087	-.124199	.846051	-1.120	.2663
PNAGE3	-.123905	-.131164	.832343	-1.183	.2402
SALES0	-.048476	-.047664	.698012	-.427	.6707
GP	-.011677	-.012716	.839375	-.114	.9097
SALESLOG	-.019943	-.021007	.810376	-.188	.8514
GPLOG	-.036862	-.039061	.825323	-.350	.7275
IND_5	.133508	.149666	.908934	1.354	.1796
IND_4	-.087175	-.094123	.865141	-.846	.4003
IND_1	-.010407	-.011384	.851345	-.102	.9191
IND_2	-.048197	-.054573	.905796	-.489	.6263
IND_3	-.010471	-.011993	.923077	-.107	.9148
LOAN	.053669	.058868	.874890	.527	.5993
LOANLOG	-.112711	-.104195	.634760	-.937	.3516

Residuals Statistics:

Selected	Min	Max	Mean	Std Dev	N
*PRED	-.0068	.0330	.0177	.007586	86
*RESID	-.0279	.0384	.0000	.012886	86
*ZPRED	-3.2547	2.0320	.0000	1.000086	86
*ZRESID	-2.1317	2.9335	.0000	.976286	86
Unselected	Min	Max	Mean	Std Dev	N
*PRED	.0067	.0334	.0238	.006238	38
*RESID	-.0384	.0209	-.0069	.014538	38
*ZPRED	-1.4576	2.0913	.8068	.822338	38
*ZRESID	-2.9351	1.5943	-.5239	1.105238	38

Multiple R for Unselected Cases =-.00070; Selected Cases = .50719
Durbin-Watson Test For Unselected Cases =1.57199 Selected Cases =1.88224

Outliers - Standardized Residual - Selected Cases

Case #	*ZRESID
81	2.93345
8	2.89637
43	2.65265
52	-2.13166
44	1.84142
115	-1.83954
114	1.77082
105	1.65964
103	-1.56472
19	-1.38754

Outliers - Standardized Residual - Unselected Cases

Case #	*ZRESID
14	-2.93506
100	-2.45107
110	-2.27753
122	-1.96765
101	1.59434
64	-1.51951
99	-1.51863
11	-1.51412
95	-1.45336
109	-1.40649

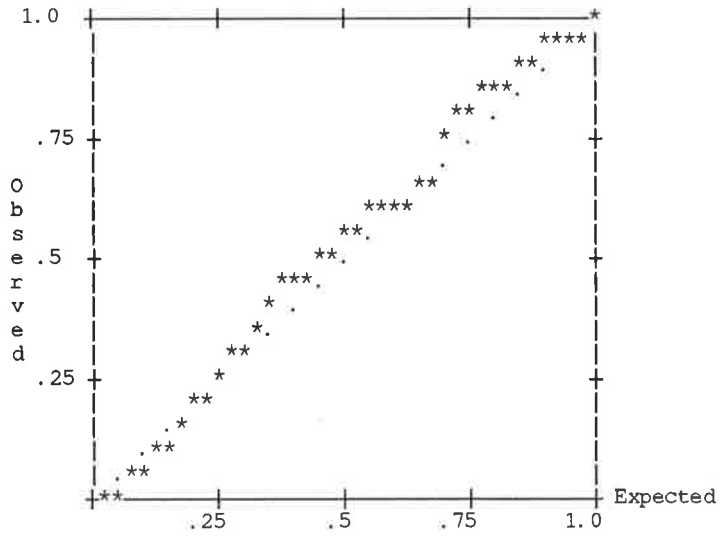
Histogram - Standardized Residual - Selected Cases

```
 N Exp N   (* = 1 Cases, .: = Normal Curve)
 0   .07   Out
 2   .13  3.00 **
 1   .34  2.67 *
 0   .77  2.33 .
 1  1.57  2.00 *.
 2  2.88  1.67 **.
 3  4.72  1.33 *** .
 4  6.94  1.00 ****  .
12  9.13   .67 ********:***
 9 10.77   .33 ********* .
12 11.38   .00 **********:*
13 10.77  -.33 **********:**
10  9.13  -.67 ********:*
10  6.94 -1.00 ******:***
 4  4.72 -1.33 ****.
 1  2.88 -1.67 * .
 2  1.57 -2.00 *:
 0   .77 -2.33 .
 0   .34 -2.67
 0   .13 -3.00
 0   .07   Out
```

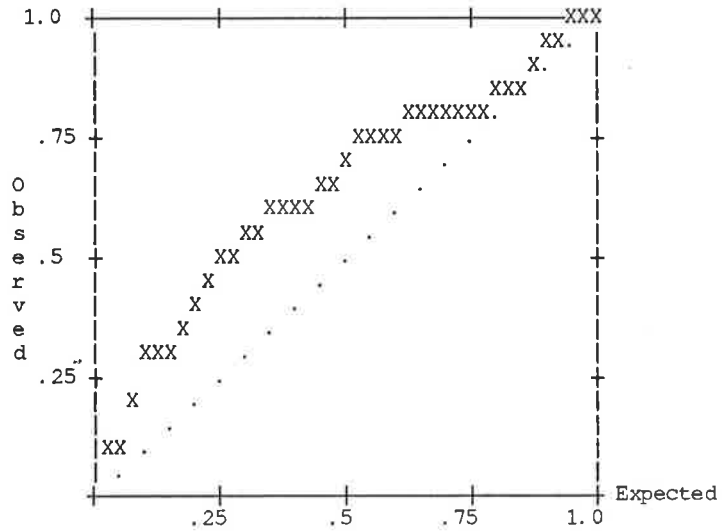
Histogram - Standardized Residual - Unselected Cases

```
NExp N   (X = 1 Cases, .: = Normal Curve)
0  .03   Out
0  .06  3.00
0  .15  2.67
0  .34  2.33
0  .69  2.00 .
1 1.27  1.67 :
2 2.08  1.33 X:
2 3.06  1.00 XX.
3 4.04   .67 XXX.
1 4.76   .33 X    .
6 5.03   .00 XXXX:X
3 4.76  -.33 XXX .
4 4.04  -.67 XXX:
4 3.06 -1.00 XX:X
5 2.08 -1.33 X:XXX
3 1.27 -1.67 :XX
1  .69 -2.00 :
2  .34 -2.33 XX
0  .15 -2.67
1  .06 -3.00 X
0  .03   Out
```

Normal Probability (P-P) Plot - Selected Cases -Standardized Residual



Normal Probability (P-P) Plot - Unselected Cases -Standardized Residual



MULTIPLE REGRESSION 14.4

Excludes all partnership cases and suppresses *TERM*
Mean substituted for missing data
Method: Stepwise

Multiple R	.45051
R Square	.20296
Adjusted R Square	.17380
Standard Error	.01348

Analysis of Variance	DF	Sum of Squares	Mean Square
Regression	3	.00380	.00127
Residual	82	.01491	.00018

F =6.96003 Signif F = .0003

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T
LOANLOG	-.010224	.003107	-.327852	-3.291	.0015
BS	-.005680	.002935	-.192523	-1.935	.0564
IND_5	.007805	.004366	.176756	1.788	.0775
(Constant)	.067114	.014442		4.647	.0000

Variables not in the Equation

Variable	Beta In	Partial	Min Toler	T	Sig T
INC	.082167	.060255	.428619	.543	.5884
ACCT	-.034970	-.038415	.945845	-.346	.7302
CONSUM0	-.038676	-.042098	.944322	-.379	.7055
CONSUMOM	-.031315	-.033916	.934918	-.305	.7608
CONSUM1					
CONSUMX					
AGE	-.147477	-.157051	.903884	-1.431	.1562
AGELOG	-.131939	-.138861	.869554	-1.262	.2106
INCORP	-.109671	-.112408	.837316	-1.018	.3117
SOLETRAD	.109671	.112408	.837316	1.018	.3117
TRUST	-.144898	-.159658	.950765	-1.456	.1494
OM	-.153642	-.159911	.863415	-1.458	.1487
PN	.023610	.024439	.854003	.220	.8264
PNAGE1	.012471	.013424	.923526	.121	.9041
PNAGE2	-2.413E-06	-.000003	.951558	.000	1.0000
PNAGE3	-.043005	-.045819	.904748	-.413	.6808
SALES0	-.072683	-.075208	.836817	-.679	.4992
GP	.013444	.013837	.836732	.125	.9012
SALESLOG	-.027611	-.029216	.879640	-.263	.7932
GPLOG	-.032151	-.033071	.843355	-.298	.7666
IND_4	-.068610	-.074128	.930403	-.669	.5054
IND_1	.055525	.056091	.813362	.506	.6145
IND_2	-.086554	-.096253	.973518	-.870	.3867
IND_3	.034389	.036904	.917875	.332	.7405
LOAN	.119583	.103205	.593669	.934	.3532

Residuals Statistics

Selected	Min	Max	Mean	Std Dev	N
*PRED	.0035	.0371	.0177	.006786	86
*RESID	-.0315	.0409	.0000	.013286	86
*ZPRED	-2.1279	2.9025	.0000	1.000086	86
*ZRESID	-2.3379	3.0345	.0000	.982286	86
Unselected	Min	Max	Mean	Std Dev	N
*PRED	.0103	.0285	.0186	.005238	38
*RESID	-.0328	.0271	-.0017	.014738	38
*ZPRED	-1.1058	1.6135	.1320	.783638	38
*ZRESID	-2.4328	2.0095	-.1240	1.092438	38

Multiple R for Unselected Cases =-.13438; Selected Cases = .45051
Durbin-Watson Test For Unselected Cases =2.02421; Selected Cases =1.91232

Outliers - Standardized Residual - Selected Cases

Case #	*ZRESID
43	3.03446
81	2.74140
8	2.50716
52	-2.33792
114	2.00935
44	1.78108
115	-1.62554
108	-1.52699
105	1.52524
57	-1.52323

Outliers - Standardized Residual - Unselected Cases

Case #	*ZRESID
14	-2.43279
100	-2.12991
12	2.00948
110	-1.74300
101	1.52805
122	-1.44012
75	1.41171
48	-1.40008
83	1.29978
99	-1.27190

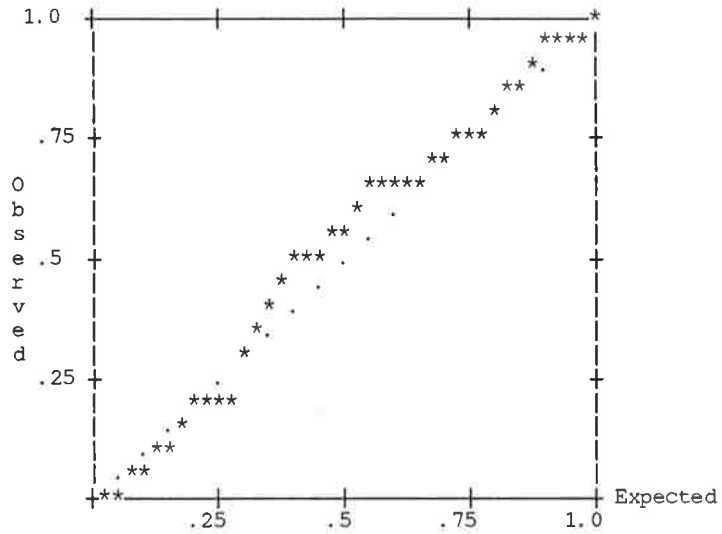
Histogram - Standardized Residual - Selected Cases

```
 N Exp N     (* = 1 Cases, .: = Normal Curve)
 0   .07   Out
 1   .13  3.00 *
 2   .34  2.67 **
 0   .77  2.33 .
 1  1.57  2.00 *.
 2  2.88  1.67 **.
 2  4.72  1.33 **  .
10  6.94  1.00 ******:***
 7  9.13   .67 ******* .
 6 10.77   .33 ******     .
10 11.38   .00 **********.
15 10.77  -.33 **********:****
14  9.13  -.67 ********:*****
 8  6.94 -1.00 ******:*
 4  4.72 -1.33 ****.
 3  2.88 -1.67 **:
 0  1.57 -2.00  .
 1   .77 -2.33 :
 0   .34 -2.67
 0   .13 -3.00
 0   .07   Out
```

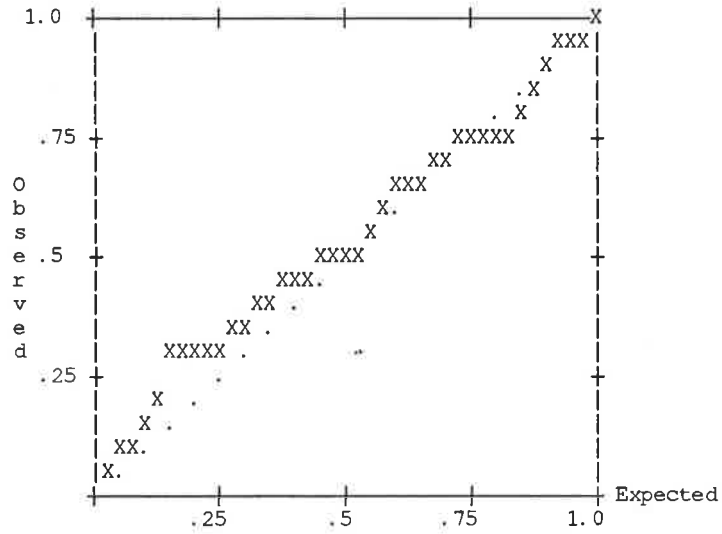
Histogram - Standardized Residual - Unselected Cases

```
NExp N     (X = 1 Cases, .: = Normal Curve)
0  .03   Out
0  .06  3.00
0  .15  2.67
0  .34  2.33
1  .69  2.00 :
1 1.27  1.67 :
3 2.08  1.33 X:X
4 3.06  1.00 XX:X
2 4.04   .67 XX .
5 4.76   .33 XXXX:
4 5.03   .00 XXXX.
4 4.76  -.33 XXXX.
3 4.04  -.67 XXX.
5 3.06 -1.00 XX:XX
3 2.08 -1.33 X:X
1 1.27 -1.67 :
1  .69 -2.00 :
1  .34 -2.33 X
0  .15 -2.67
0  .06 -3.00
0  .03   Out
```

Normal Probability (P-P) Plot - Selected Cases -Standardized Residual



Normal Probability (P-P) Plot - Unselected Cases -Standardized Residual



MULTIPLE REGRESSION 14.5

Applied to partnership cases only
Mean substituted for missing data
The following variables are constants or have missing correlations: WSALE
Method: Stepwise

Multiple R	.28253
R Square	.07982
Adjusted R Square	.05426
Standard Error	.01272

Analysis of Variance	DF	Sum of Squares	Mean Square
Regression	1	.00051	.00051
Residual	36	.00583	.00016

F =3.12282 Signif F = .0857

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T
AGELOG	.005140	.002909	.282526	1.767	.0857
(Constant)	.011418	.003732		3.060	.0042

Variables not in the Equation

Variable	Beta In	Partial	Min Toler	T	Sig T
INC	-.053725	-.053029	.896494	-.314	.7553
BS	.015672	.014522	.790069	.086	.9320
ACCT	-.186471	-.194253	.998581	-1.172	.2493
CONSUM0	.017487	.018119	.987873	.107	.9152
CONSUMOM	.041237	.042644	.984032	.253	.8021
CONSUM1					
CONSUMX					
AGE	-.205253	-.129900	.368565	-.775	.4435
REALPART	.217652	.226501	.996514	1.376	.1776
OM	.217652	.226501	.996514	1.376	.1776
TERM	-.154805	-.161332	.999414	-.967	.3401
PN	-.226109	-.235697	.999871	-1.435	.1602
PNAGE1	-.144820	-.143770	.906881	-.859	.3959
PNAGE2	-.134510	-.139460	.989155	-.833	.4104
PNAGE3	-.016914	-.017614	.997857	-.104	.9176
SALES0	.001640	.001708	.998882	.010	.9920
GP	.162903	.169180	.992455	1.016	.3168
SALESLOG	.067466	.070296	.999016	.417	.6793
GPLOG	-.054401	-.055672	.963674	-.330	.7435
IND_5	-.237010	-.243648	.972444	-1.486	.1462
IND_4	.081161	.082869	.959318	.492	.6258
IND_1	.025083	.025567	.956017	.151	.8806
IND_3	-.023373	-.024161	.983242	-.143	.8871
LOAN	-.030976	-.032283	.999483	-.191	.8496
LOANLOG	-.005898	-.006123	.991778	-.036	.9713

Residuals Statistics:

Selected	Min	Max	Mean	Std Dev	N
*PRED	.0113	.0223	.0169	.003738	38
*RESID	-.0221	.0276	.0000	.012538	38
*ZPRED	-1.5071	1.4470	.0000	1.000038	38
*ZRESID	-1.7408	2.1681	.0000	.986438	38

Unselected	Min	Max	Mean	Std Dev	N
*PRED	.0114	.0230	.0180	.003486	86
*RESID	-.0271	.0411	-.0003	.015886	86
*ZPRED	-1.4869	1.6534	.2854	.927086	86
*ZRESID	-2.1339	3.2295	-.0208	1.245486	86

Multiple R for Unselected Cases =-.18919; Selected Cases = .28253
Durbin-Watson Test For Unselected Cases =1.91756; Selected Cases =2.12945

Outliers - Standardized Residual - Selected Cases

Case #	*ZRESID
120	2.16812
12	2.01503
14	-1.74080
100	-1.59648
63	1.46074
48	-1.42251
75	1.38677
80	-1.35690
112	1.26421
25	-1.14964

Outliers - Standardized Residual - Unselected Cases

Case #	*ZRESID
105	3.22951
81	3.07464
43	3.05769
114	2.94707
8	2.91881
44	2.70262
108	-2.13386
113	1.87551
53	1.85260
47	1.82221

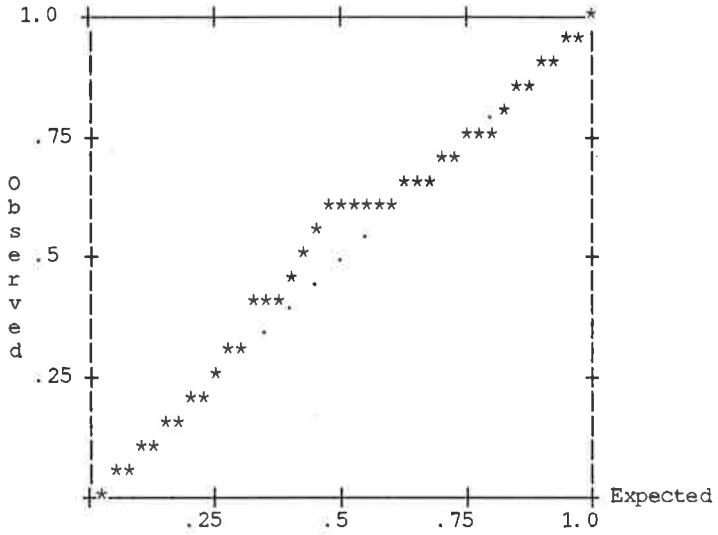
Histogram - Standardized Residual - Selected Cases

```
NExp N   (* = 1 Cases, .: = Normal Curve)
0  .03   Out
0  .06  3.00
0  .15  2.67
1  .34  2.33 *
1  .69  2.00 :
0 1.27  1.67 .
3 2.08  1.33 *:*
4 3.06  1.00 **:*
3 4.04   .67 ***.
4 4.76   .33 ****.
2 5.03   .00 **  .
7 4.76  -.33 ****:**
5 4.04  -.67 ***:*
4 3.06 -1.00 **:*
2 2.08 -1.33 *:
2 1.27 -1.67 :*
0  .69 -2.00 .
0  .34 -2.33
0  .15 -2.67
0  .06 -3.00
0  .03   Out
```

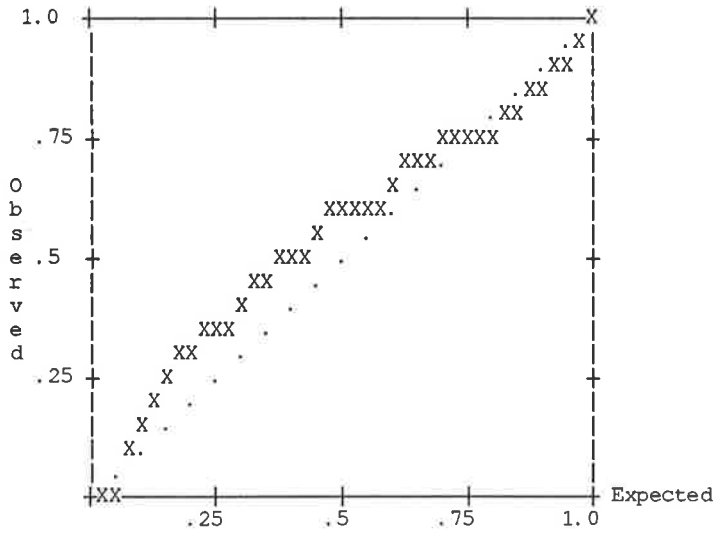
Histogram - Standardized Residual - Unselected Cases

```
 N Exp N  (X = 1 Cases, .: = Normal Curve)
 1   .07   Out X
 4   .13  3.00 XXXX
 1   .34  2.67 X
 0   .77  2.33 .
 2  1.57  2.00 X:
 2  2.88  1.67 XX.
 3  4.72  1.33 XXX .
 7  6.94  1.00 XXXXXX:
 4  9.13   .67 XXXX    .
 9 10.77   .33 XXXXXXXXX .
 8 11.38   .00 XXXXXXXX  .
 9 10.77  -.33 XXXXXXXXX .
12  9.13  -.67 XXXXXXXX:XXX
 8  6.94 -1.00 XXXXXX:X
12  4.72 -1.33 XXXX:XXXXXXX
 3  2.88 -1.67 XX:
 1  1.57 -2.00 X.
 0   .77 -2.33 .
 0   .34 -2.67
 0   .13 -3.00
 0   .07   Out
```

Normal Probability (P-P) Plot - Selected Cases -Standardized Residual



Normal Probability (P-P) Plot - Unselected Cases -Standardized Residual



MULTIPLE REGRESSION 14.6

Applied to partnership cases only
Mean substituted for missing data
Method: Forced Enter

Multiple R	.27667
R Square	.07655
Adjusted R Square	-.00494
Standard Error	.01311

Analysis of Variance	DF	Sum of Squares	Mean Square
Regression	3	.00048	.00016
Residual	34	.00585	.00017

F = .93943 Signif F = .4324

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T
TERM	-6.91712E-04	5.8333E-04	-.199865	-1.186	.2439
AGE	5.05993E-05	6.1889E-05	.135451	.818	.4193
BS	.004486	.004473	.169880	1.003	.3230
(Constant)	.018916	.005130		3.687	.0008

Residuals Statistics:

Selected	Min	Max	Mean	Std Dev	N
*PRED	.0085	.0246	.0169	.003638	38
*RESID	-.0231	.0288	.0000	.012638	38
*ZPRED	-2.3137	2.1315	.0000	1.000038	38
*ZRESID	-1.7647	2.2001	.0000	.958638	38
Unselected	**Min**	**Max**	**Mean**	**Std Dev**	**N**
*PRED	-.0005	.0288	.0180	.004686	86
*RESID	-.0238	.0408	-.0003	.015586	86
*ZPRED	-4.8032	3.2890	.2892	1.262986	86
*ZRESID	-1.8163	3.1136	-.0195	1.180486	86

Multiple R for Unselected Cases = .00980; Selected Cases = .27667
Durbin-Watson Test For Unselected Cases =1.82414; Selected Cases =2.08565

Outliers - Standardized Residual - Selected Cases

Case #	*ZRESID
120	2.20008
12	2.12104
14	-1.76466
100	-1.43313
101	1.35420
48	-1.29801
104	1.12190
63	1.10906
73	-1.10678
75	1.09688

Outliers - Standardized Residual - Unselected Cases

Case #	*ZRESID
43	3.11364
114	2.86226
105	2.82494
81	2.72767
8	2.66065
44	2.51373
113	1.84351
85	-1.81625
108	-1.80230
53	1.79611

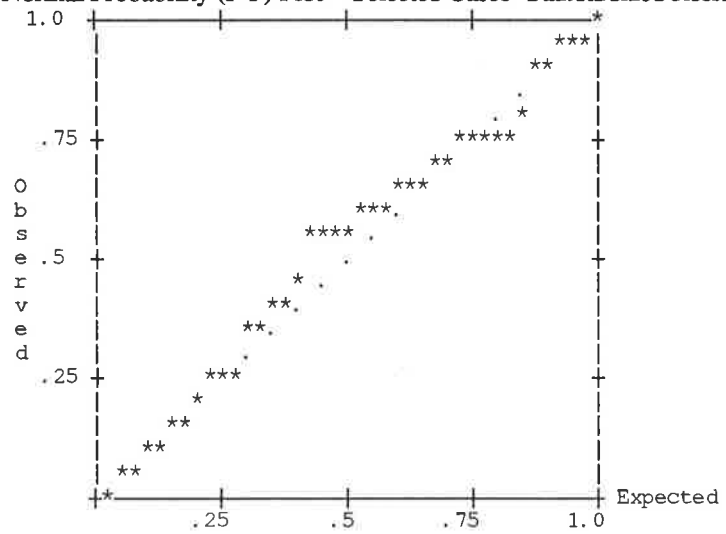
Histogram - Standardized Residual - Selected Cases

```
NExp N   (* = 1 Cases, .: = Normal Curve)
0  .03   Out
0  .06  3.00
0  .15  2.67
1  .34  2.33 *
1  .69  2.00 :
0 1.27  1.67 .
1 2.08  1.33 *.
6 3.06  1.00 **:***
2 4.04   .67 ** .
4 4.76   .33 ****.
3 5.03   .00 *** .
7 4.76  -.33 ****:**
6 4.04  -.67 ***:**
4 3.06 -1.00 **:*
2 2.08 -1.33 *:
1 1.27 -1.67 :
0  .69 -2.00 .
0  .34 -2.33
0  .15 -2.67
0  .06 -3.00
0  .03   Out
```

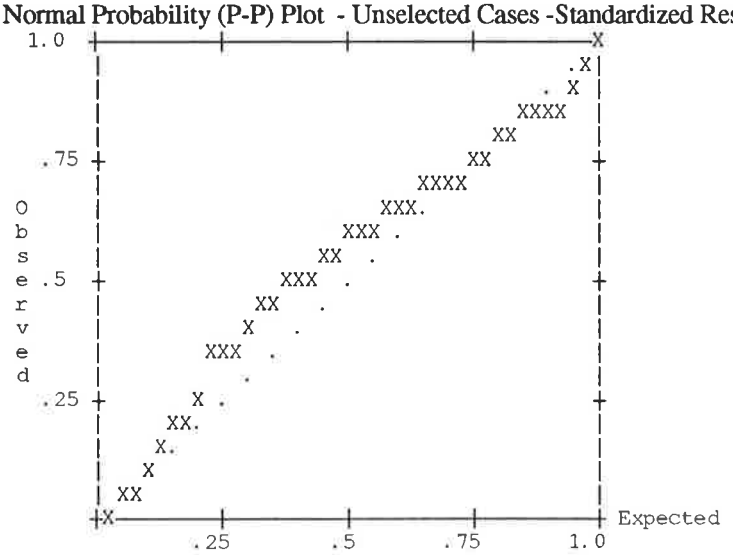
Histogram - Standardized Residual - Unselected Cases

```
 N Exp N  (X = 1 Cases, .: = Normal Curve)
 0   .07   Out
 2   .13  3.00 XX
 4   .34  2.67 XXXX
 0   .77  2.33 .
 1  1.57  2.00 X.
 2  2.88  1.67 XX.
 3  4.72  1.33 XXX .
 7  6.94  1.00 XXXXXX:
 5  9.13   .67 XXXXX   .
 5 10.77   .33 XXXXX     .
13 11.38   .00 XXXXXXXXXX:XX
 9 10.77  -.33 XXXXXXXXX .
12  9.13  -.67 XXXXXXXX:XXX
10  6.94 -1.00 XXXXXX:XXX
 7  4.72 -1.33 XXXX:XX
 6  2.88 -1.67 XX:XXX
 0  1.57 -2.00  .
 0   .77 -2.33 .
 0   .34 -2.67
 0   .13 -3.00
 0   .07   Out
```

Normal Probability (P-P) Plot - Selected Cases -Standardized Residual



Normal Probability (P-P) Plot - Unselected Cases -Standardized Residual



MULTIPLE REGRESSION 14.7

Mean substituted for missing data
Selecting only Cases for whichBT EQ2
Method: Forced Enter

Multiple R			.26069		
R Square			.06796		
Adjusted R Square			-.01428		
Standard Error			.01317		
Analysis of Variance	DF		Sum of Squares	Mean Square	
Regression	3		.00043	.00014	
Residual	34		.00590	.00017	
F = .82638 Signif F = .4885					
Variables in the Equation					
Variable	B	SE B	Beta	T	Sig T
LOANLOG	-.001062	.006391	-.029034	-.166	.8690
IND_5	-.017878	.013636	-.221715	-1.311	.1986
BS	.005182	.004703	.196233	1.102	.2783
(Constant)	.020168	.028612		.705	.4857
Residuals Statistics:					
Selected	Min	Max	Mean	Std Dev	N
*PRED	.0025	.0207	.0169	.003438	38
*RESID	-.0211	.0299	.0000	.012638	38
*ZPRED	-4.2268	1.1042	.0000	1.000038	38
*ZRESID	-1.6005	2.2730	.0000	.958638	38
Unselected	Min	Max	Mean	Std Dev	N
*PRED	-.0027	.0214	.0156	.006686	86
*RESID	-.0301	.0547	.0021	.017786	86
*ZPRED	-5.7519	1.3261	-.3858	1.939386	86
*ZRESID	-2.2824	4.1504	.1599	1.345186	86

Multiple R for Unselected Cases =-.25598; Selected Cases = .26069
Durbin-Watson Test For Unselected Cases =1.75375; Selected Cases =1.94684

Outliers - Standardized Residual - Selected Cases

Case #	*ZRESID
12	2.27303
120	2.18961
14	-1.60047
24	1.49694
100	-1.39821
73	-1.16588
95	-1.11362
63	1.10093
75	1.09110
110	-1.01695

Outliers - Standardized Residual - Unselected Cases

Case #	*ZRESID
105	4.15036
8	3.98668
53	3.35054
43	3.23231
114	2.78320
81	2.76301
44	2.75893
7	2.29252
56	2.29139
108	-2.28242

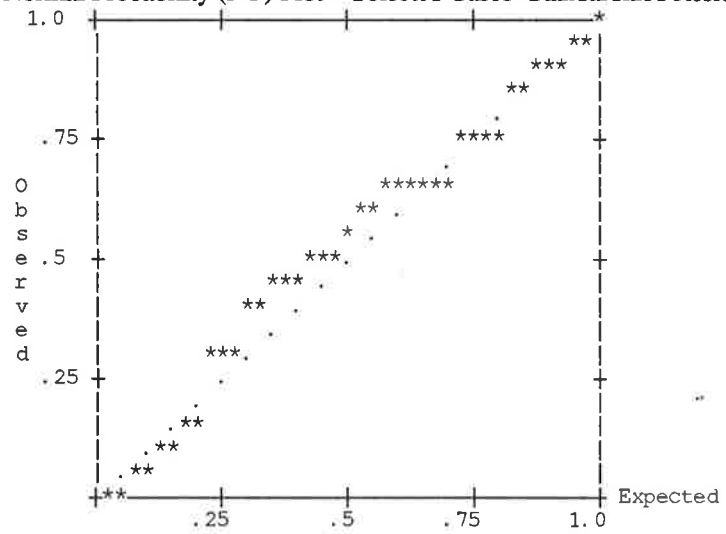
Histogram - Standardized Residual - Selected Cases

```
NExp N   (* = 1 Cases, .: = Normal Curve)
0  .03   Out
0  .06  3.00
0  .15  2.67
2  .34  2.33 **
0  .69  2.00 .
0 1.27  1.67 .
1 2.08  1.33 *.
7 3.06  1.00 **:****
3 4.04   .67 ***.
1 4.76   .33 *   .
5 5.03   .00 ****:
4 4.76  -.33 ****.
9 4.04  -.67 ***:*****
4 3.06 -1.00 **:*
1 2.08 -1.33 *.
1 1.27 -1.67 :
0  .69 -2.00 .
0  .34 -2.33
0  .15 -2.67
0  .06 -3.00
0  .03   Out
```

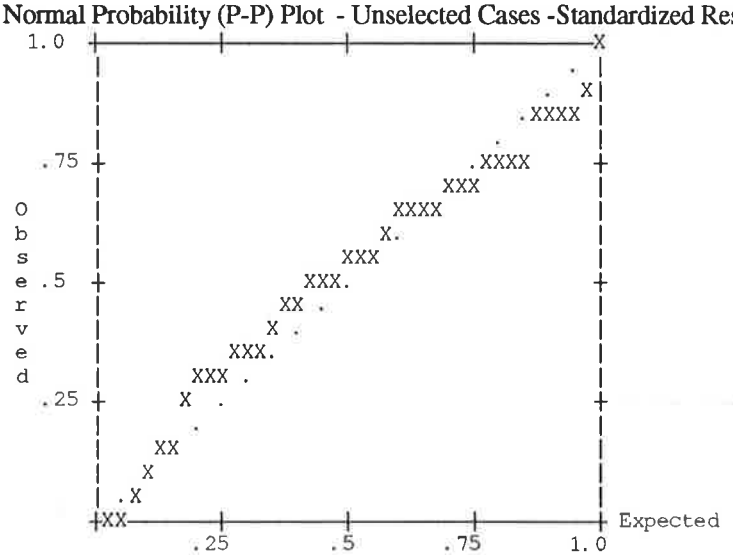
Histogram - Standardized Residual - Unselected Cases

```
 N Exp N  (X = 1 Cases, .: = Normal Curve)
 0   .00   Out
 0   .00  4.50
 2   .01  4.00 XX
 1   .04  3.50 X
 4   .21  3.00 XXXX
 2   .80  2.50 :X
 1  2.39  2.00 X.
 4  5.64  1.50 XXXX .
11 10.40  1.00 XXXXXXXXX:X
 7 15.02   .50 XXXXXXX       .
15 16.98   .00 XXXXXXXXXXXXXXX .
13 15.02  -.50 XXXXXXXXXXXXX .
19 10.40 -1.00 XXXXXXXXX:XXXXXXXXX
 6  5.64 -1.50 XXXXX:
 0  2.39 -2.00  .
 1   .80 -2.50 :
 0   .21 -3.00
 0   .04 -3.50
 0   .01 -4.00
 0   .00 -4.50
 0   .00   Out
```

Normal Probability (P-P) Plot - Selected Cases -Standardized Residual



Normal Probability (P-P) Plot - Unselected Cases -Standardized Residual



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