An Economic Analysis of Dietary Diversification in the Developing World

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THESIS
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Table of Contents

Abstract ................................................................................................................IV
Declaration ............................................................................................................VIII
Dedication ............................................................................................................IX
Acknowledgements ..........................................................................................X
Statement of Contributions ............................................................................XIII
List of Tables .....................................................................................................XIX
List of Figures ..................................................................................................XXI

Chapter 1: Introduction ................................................................................... 1
  1.1 Literature Review ..................................................................................... 3
  1.2 Research questions ................................................................................ 13
  1.3 Thesis outline ........................................................................................ 14
References ....................................................................................................... 16

Chapter 2: What drives Diversification of National Food Supplies?
A Cross-Country Analysis .............................................................................. 28
  Abstract ....................................................................................................... 29
  2.1 Introduction ............................................................................................ 30
  2.2 Literature review ................................................................................... 33
  2.3 Data and methods .................................................................................. 48
  2.4 Descriptive results ................................................................................ 54
  2.5 Regression results ................................................................................ 59
  2.6 Robustness tests ................................................................................... 63
  2.7 Conclusions ........................................................................................... 68
References ....................................................................................................... 71
Appendix: Supplementary Table .................................................................... 86
Abstract

Child undernutrition, including micronutrient deficiency, is widespread in many parts of the developing world. Low dietary diversity is a major source of this problem. This occurs where diets are predominantly based on starchy staples with few fruits, vegetables and animal-sourced foods. Improving children’s diets is therefore an important step towards solving the nutrition problem in low-income settings and reducing its debilitating symptoms such as stunting.

Despite the importance that nutritionists attach to early childhood dietary diversification, very little research has focused on the key question of how dietary diversification can be accelerated. Chapter 1 reviews an extensive multi-disciplinary literature on dietary diversification that nevertheless fails to systematically address the multidimensional drivers of diversification, particularly in low-income settings. This thesis aims to fill this knowledge gap by investigating factors that drive dietary diversification at a national level (Chapter 2) and at an individual child level (Chapter 3). Chapter 4 sheds light on the nutritional impacts of dietary diversification specifically in the context of dairy, a food group widely perceived to be especially critical for child growth (Chapter 4).

Chapter 2 of the thesis investigates the economic, social and agro-ecological indicators that drive dietary diversification of national food supplies (DFS) over time across countries and regions. The traditional economic view, stemming from Bennett (1944), is that economic growth is the major driver of the diversification of food supplies, but meso- and micro-level work point to many other drivers, and to potential agro-ecological constraints to diversification. This chapter addresses those questions through a cross-country analysis linking a simple measure of diversity of food supply (the share of calories supplied by non-staple foods) with various economic, social
and agro-ecological indicators. Using panel regression models, the analysis shows that while economic growth and other indicators of structural transformation (urbanisation and demographic change) explain changes in DFS within countries, time-invariant agro-ecological indicators also are significantly associated with DFS. In short, broader structural transformation processes do appear to drive diversification, but some countries face retarded diversification because of specific agro-ecological constraints as well.

In contrast to the global view on diversification in Chapter 2, Chapter 3 investigates the determinants of child dietary diversity specifically among pre-school children. Pre-schoolers are a crucial demographic, because most growth faltering occurs between 6 and 23 months of age. This chapter tests the various hypotheses emerging from the economics and nutrition literature by linking Demographic and Health Survey (DHS) data on child dietary diversity to household socioeconomic characteristics with community level indicators of climate and infrastructure. Using non-parametric and parametric regression models, the findings uncover strong support for linear effects of household wealth (again, in keeping with Bennett’s Law) but also large and nonlinear associations with parental education, access to health services, infrastructure and climate, and modest associations with an indicator of women’s empowerment.

Chapter 4 tests the importance of cow ownership for child growth in rural Bangladesh. Bangladesh is a country with unusually low levels of milk consumption by international standards and very high rates of undernutrition. Unlike previous papers in the literature, this chapter introduces a novel placebo test by distinguishing between lactating dairy cows that have produced milk over the past 12 months and those that have not. Using a rich nationally representative rural household survey,
the results show a robust positive association between ownership of lactating cows and child
growth among young children (6-23 months). The empirical analysis also reveals an unusual
positive association between ownership of lactating cows and wasting, and some evidence that
household dairy production is associated with reduced rates of breastfeeding in the first 12 months
of life. In short, the apparent linear growth benefits of increased household milk availability are
qualified by adverse breastfeeding outcomes and a disconcerting association with child wasting.
Efforts to promote increased dairy consumption arguably should be accompanied by interventions
to improve nutritional knowledge and emphasize exclusive breastfeeding in early life.

The findings of this thesis have important implications for food and nutrition strategies that aspire
to accelerate dietary diversification. Chapter 5 points to the results providing evidence that the
impact of economic growth on dietary diversification is moderately strong; growth alone would
yield only modest diversification without accompanying improvements in parental education,
health infrastructure, physical infrastructure and broader demographic transformations.
Reassuringly for the nutritionists, the results often suggest that nutritional knowledge may indeed
be a critical determinant of dietary diversity, and one partly shaped by exposure to formal education
and basic health services. However, more research is needed to determine how best to improve
nutritional knowledge cost-effectively, and at scale. The demonstrated importance of agro-climatic
and infrastructural constraints also provides support for the separability hypothesis. Resolving the
problem of poor diets, especially in rural areas, will likely require significant investments in making
markets more effective in delivering a diverse and affordable array of foods. More research is
needed to determine how much more of such specific investments are needed to improve rural diets
in particular settings.
**Key words:** Dietary diversity; Undernutrition; Child diets; Agriculture; Livestock; Dairy production; Animal-sourced foods
Declaration

I certify that this work contains no material that has been accepted for the award of any other degree or diploma in my name, in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. In addition, I certify that no part of this work will, in the future, be used in a submission in my name, for any other degree or diploma in any university or other tertiary institution without the prior approval of the University of Adelaide and, where applicable, any partner institution responsible for the joint-award of this degree.

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viii
Dedication

To my late mother, Samina Farhad Chowdhury
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This thesis would not have been possible without the support given by several people and organizations. It is certainly not easy to single out and thank everyone who matters. I genuinely hope I will not have missed anyone.

When I first started my PhD, the learning curve was much steeper than I had anticipated. All PhD candidates, more or less, go through various “crises” during their enrolled years. For me, most of the “crises” occurred early on and my external supervisor, Dr. Derek Headey, bore the brunt of it. Derek, it has been an honour to be your first PhD student and I genuinely cannot thank you enough for the time and the effort you put in (including prompt replies to my innumerable emails and providing detailed comments and suggestions on several drafts of my chapters). Thank you for believing in me because, without your guidance and positive encouragement, this thesis would not have come to fruition. Also, thank you for being a co-author in several papers.

My sincere acknowledgement goes to my principal supervisor, Professor Kym Anderson for giving me valuable advice, good guidance and constant encouragement during the development of this thesis. Professor Anderson, I would like to thank you wholeheartedly for being such a positive inspiration throughout this long journey and especially during my difficult periods. To my co-supervisor, Dr. Terence Cheng, thank you for your support and helpful comments throughout the period of writing my thesis. I would also like to thank Professor William Masters for his support and his persistent confidence in me when writing Chapter 3 of my thesis and for being a co-author in this chapter. To the post-graduate supervisor, Dr. Stephanie McWhinnie, thank you for your support and giving me the opportunity to work as a teaching assistant in your courses. I have learned so much from you. I am grateful to the
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List of Tables

Table 2.1 Definitions of variables .......................................................... 50
Table 2.2 Descriptive statistics for key variables ........................................ 52
Table 2.3 Trends in calories supply from non-staples for income groups, major regions and countries, 1961-2010 ........................................................................... 57
Table 2.4 CRE and fixed effects regressions of the semi-log DFS model ............... 61
Table 2.5 Decomposing sources of DFS change for the full sample, 1961–2010 ............ 63
Table 2.6 CRE and fixed effects regressions of the semi-log DFS model using alternative indicator of diversity of food supply: protein share of ASF ................................................................. 65
Table 2.7 Fixed effects regressions of the semi-log DFS model using an alternative indicator of education ........................................................................................................... 66
Table 2.9 Fixed effects regressions of the semi-log DFS model using alternative indicators of agricultural and trade policies .......................................................... 68

Table 3.1 Descriptive statistics ........................................................................ 106
Table 3.2 Dietary diversity by child age (6-23 months, 6-11 months and 12-23 months) .... 126
Table 3.3 Wealth interactions for children 12-23 months of age ................................. 128
Table 3.4 Extensions to the use of a 7 food group indicator and a dummy variable of 4 or more of the 7 food groups rather than a 12-group indicator for children 6-23 months ......................... 129
Table 3.5 Dietary diversity (12 food groups) for children 12-23 months with disaggregated health variables .................................................................................................................. 131
Table 3.6 Dietary diversity (12 food groups) for children 12-23 months excluding GIS indicators ............................................................................................................................... 133
Table 3.7 Dietary diversity (12 food groups) for children 12-23 months excluding socio-economic determinants .......................................................... 134

Table 3.8 Testing heterogeneity of Dietary diversity (12 food groups) results for children 12-23 months across major regions.......................................................... 135

Table 4.1 Descriptive statistics of key variables for children 6–59 months ...................... 184

Table 4.2 Prevalence and levels of 24-hour recall of cow milk consumption by cow ownership and milk production status, with t-tests of differences in group means^l ............................................. 186

Table 4.3 Association between HAZ scores and livestock ownership, by age groups 6–23 and 24–59 months.......................................................................................................................... 190

Table 4.4 Association between HAZ scores and livestock ownership, by age groups 6–23 and 24–59 months.......................................................................................................................... 192

Table 4.5 Association between WHZ scores and livestock ownership, by age groups 6–23 and 24–59 months.......................................................................................................................... 194

Table 4.6 Association between WHZ scores and livestock ownership, by age groups 6–23 and 24-59 months .......................................................................................................................... 195

Table 4.7 Association between livestock ownership and dairy consumption in the last 24 hours among children 6-59 months .......................................................................................................................... 197
List of Figures

Figure 2.1 Calories supplied from non-staples across countries, 2010 ........................................ 55
Figure 2.2 Calories per capita and household income per capita .................................................. 58
Figure 2.3 Calories supplied from non-staples and household consumption per capita ............ 59

Figure 3.1 Distribution of the dietary diversity indicator (12 food groups) ................................. 108
Figure 3.2 Patterns of growth faltering and anemia by child’s age (months) ............................... 112
Figure 3.3 Nonparametric estimates of the relationship between child dietary diversity score (12 food groups) and the raw wealth index scores ................................................................. 113
Figure 3.4 Nonparametric estimates of the relationship between child dietary diversity score (12 food groups) and years of education (mothers) ................................................................. 114
Figure 3.5 Nonparametric estimates of the relationship between child dietary diversity score (12 food groups) and years of education (fathers) ................................................................. 115
Figure 3.6 Nonparametric estimates of the relationship between child dietary diversity score (12 food groups) and GIS indicators .................................................................................. 117
Figure 3.7 Nonparametric estimates of the relationship between child dietary diversity score (12 food groups) and child’s age (months) by wealth quintiles ......................................................... 122

Figure 4.1 T-tests for differences in mean HAZ (Panel A) and WHZ (Panel B) scores associated with household milk production in the past 12 months, for pre-school children ...................... 188
Figure 4.2 An lpoly graph of breastfeeding status by child age for households that have and have not produced dairy ........................................................................................................... 202
Figure 4.3 An lpoly graph of individual calorie intake (kcal) in past 24 hours by child age for households that have and have not produced dairy ................................................................. 203