Globalization and Gender gap in Indonesia

A thesis presented

by

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Abstract

This thesis contributes to the growing literature of economic development by analyzing the effects of exposure to globalization on gender gap in labour market participation in Indonesia . I combine the individual-level data of three waves (1997, 2000 and 2007) of Indonesian Family Life Survey (IFLS) , with the provincial level data on exports and imports and also use data on population size of all cities in Indonesia by calculating geodesic distance between these cities and the individual's residence. I construct the province-level Population Gravity Index (PGI) score for each individual based on the idea that cities with larger populations exert more force (or gravity) of globalization, but this force weakens as an individual is located in more remote areas. I interact the individual's PGI score with provincial exports and imports and sum over all provinces to construct two explanatory variables – export exposure (XEX) and import exposure (IEX).

The dependent variables are related to intensive and extensive measures of employment outcomes. I estimate the effects of export and import exposure on probability of paid work for females and males aged from 20 to 65 years controlling for household fixed effects and province-year fixed effects. I find significant results for gender specific effects in labour force participation in Indonesia.The main findings of the thesis provide evidence that women's work participation is positively responsive to import exposure, and negatively to export exposure. However, I find no significant effects for males working less for pay with export exposure. This means exposure to exporting activities increases household income by increasing income earned by males, and this positive household income effect, in turn, discourages women's participation in paid work. Therefore, labour supply of men is inelastic in response to export exposure and import exposure. Meanwhile, to be consistent with the income effect, I also look at the probability of paid work in a particular sector. The result shows that females likely to work less both in agriculture and manufacturing sector with an export exposure. To get a closer view of working population's income status, I observe various employment outcomes by work status. The result

is also consistent with the income effect story as I find significant evidence that females prefer to do housework than any other jobs in response to export exposure. This result is also consistent with the income effect story that exposure to exporting activities increases household income by increasing income earned by males, and this positive household income effect discourages women's participation in paid labour market exhibiting a pronounced gender gap in labour force participation in Indonesia.

Declaration

I, Jesmin Ara Rupa, certify that this work contains no material which 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 any other 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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1 Introduction

The economic and social effects of globalization are one of the most debated topics in policy circles and media. The extensive trade literature predicts that the effects of globalization indeed might be differential for some groups of agents in the country, depending on their education, industry affiliation, etc. However, the existing economic literature does not provide a definite answer how the exposure to global markets affects agents depending on their gender. In my thesis, I contribute to the literature by analyzing the effects of exposure to globalization on gender gap in labour market participation in Indonesia over the time period 1997-2007. I find that the effects of globalization are very different for males and females. In particular, males' labour supply is very inelastic with respect to exports or imports exposure. While for females, an increase in the export exposure reduces their paid labour force participation and, in turn, increases their probability of being engaged in unpaid household work. This suggests that the intensification of export exposure in Indonesia has benefited females mostly through an improvement in household income earned by their husbands, but did not create additional working opportunities specifically for women.

Indonesia is the third largest developing country and despite a very rapid economic growth, it remains a very poor country, where more than 32 million out of 234 million people live below the national poverty line. Starting in early 1970s, Indonesian economy went through a considerable change towards industrialization and urbanization. The exisiting literature finds that globalization in Indonesia had positive effects on poverty reduction during 1990s [1]. The country is also very economically and geographically diverse with its more than 13,000 islands and with huge variation in economic performance at the province level. Therefore, Indonesia is a good country case to study the differential effects of exposure to globalization on individuals

[1] See Amiti and Cameron (2012) and Kis-Katosand Sparrow (2011).

depending on their geographic location and exposure to labour market opportunities provided by exporting and importing activities.

I combine data from different sources for my empirical analysis. First, I use three waves (1997, 2000 and 2007) of Indonesian Family Life (IFLS) panel data , which is a household survey data representing 83% of total population. I combine this household data with provincial level data on exports and imports from the CEIC Indonesian Premium database. Finally, I also use data on population size of all cities in Indonesia to calculate geodesic distance between these cities and the individual's residence.

I model an individual's exposure to globalization in the following way. First, I construct the province-level *Population Gravity Index* (PGI) score for each individual. The PGI score is based on idea that cities with larger populations exert more force (or gravity) of globalization, but this force weakens as an individual is located in more remote areas. Next, I interact the individual's PGI score with provincial exports and imports and sum over all provinces to construct two explanatory variables – export exposure (XEX) and import exposure (IEX). The dependent variables are related to intensive and extensive measures of employment outcomes. I estimate the effects of export and import exposure of an unbalanced panel of individuals aged from 20 to 65 years controlling for household fixed effects and province-year fixed effects. The sample data set has 18,107 individual-year observations for females and 24,646 individual -year observations for males.

I find that an increase in export exposure leads to a decrease in the probability of work for married females. I, however, do not find any significant effects for unmarried females and for males of any marital status. In terms of sectorial employment, I find that export exposure reduces the probability of work for females in two major tradable sectors in Indonesia: agriculture and manufacturing. Again, I do not find significant effects for males. Exposure to exports also reduces the probability of salary work for females and increases their probability of being engaged in housework. Finally, I find that export exposure increases the probability of working females

to quit their paid work but increases the probability of married non-working males to start work. In my thesis it is consistent with the theoretical conjecture that globalization seems to affect females' work decision through positive household income effects, hence reducing their probability of work. I also find that males' work decisions are not responsive to income changes induced by globalization, which is consistent with general evidence found in the literature that the changes in wages have very small impact on males' labor supply.

The rest of the thesis is organized as follows. Section 2 provides a review of the most relevant literature and adresses the contribution of my thesis. Section 3 provides an overview of Indonesia. In Section 4, I describe data, key variables and methodological structure of the study. Section 5 discusses the results. Finally, section 6 concludes.

2 Related Literature

This thesis contributes to the growing literature on female empowerment and economic development[2]. It has been argued that economic development can accelerate female empowerment by expanding opportunities to the women and globalization might be one of the possible channels.

The first strand of literature uses cross-country data and looks at the effects of globalization on gender bias in the labor market and women's economic and social rights in developing countries. The evidence is mixed. Oostendorp (2009) finds significant positive effect of globalization on gender wage gap, but only for a sample of high-income countries. On the other hand, Bussman (2009) finds that globalization has increased female labor participation in developing countries, especially in industrial sector and in agriculture. In the institutional context, Potrafke and Ursprung (2012) show that globalization had a positive influence on social institutions related to gender equality and Neumayer and Soysa (2007) demonstrate that more open countries have better labor rights for women. However, Neumayer and Soysa (2011) find that spill-over effects

[2] See Duflo (2011) for a review of this literature.

of trade and FDI improved females economic and social rights only in middle-income and rich countries.

Another strand of literature uses worker-level and firm-level data and focuses on the competitive effects of globalization on gender discrimination along the lines of Becker (2010). Black and Brainerd (2004) use the U.S. data and find that trade appears to reduce the firms ability to discriminate against female workers in manufacturing industries which are more exposed to competition from imports. Similar evidence is found for Taiwan and Korea in Berik et al (2004) and for Colombia in Ederington et al (2009). Juhn et al (2014) find evidence that trade liberalization in Mexico induces the firms to adopt new technology which is less intensive in physical skills and which complements female labor, hence reducing gender gap in blue-collar occupations. The most related papers to the paper are Ozler (2000) and Başlevent and Onaran (2004) which use Turkish data and analyze the effect of export orientation on female labor participation. Ozler (2000) uses plant-level data and finds that female share of employment increases with the plant's export-output ratio. On the other hand, Baslevent and Onaran (2004) use labor survey data and show that the impact of export-oriented growth at the province level is significant only for labor force participation of nonmarried women.

This paper is most closely related to the literature which uses household panel data. Jensen (2012) uses an experimental approach and finds gender specific recruitment services for young women in rural India have a significant effect on females fertility and marriage outcomes as well as on their schooling and post-school training. Munshi and Rozenweig (2006) focus on institutional aspects of globalization. They find that with globalization in India low-caste girls switch to English schools, however low-caste boys are restricted by social institutions and do not respond to market incentives provided by globalization. Atkin (2009) uses household panel and employment data by private sector at municipality level in Mexico and looks at the effect of female empowerment, accelerated by globalization, on children's outcomes. He finds that females who had their first job in export-oriented manufacturing firms have healthier children.

In the Indonesian context, Amiti and Cameron (2012) find evidence that reduction in input tariffs has decreases the wage skill premium within firms what import intermediate inputs but no evidence on the effects of reduction in final goods tariffs on wage skill premium. However, they do not look at the gender-specific effects on wage premium.

This paper also speaks to the literature on gender bias in Indonesia. This literature focuses on finding evidence on gender bias in household's investment in children, not labor market participation. Maccini and Yang (2009) use IFLS data and find that higher early-life rainfall results in better health, schooling and socioeconomic status of adult females. As they do not find any significant impact for males, their findings suggest the existence of gender bias in the allocation of resources in times of severe weather shocks in Indonesia. Similarly, Cameron and Worswick (2001) find that rural families with girls are more likely to reduce expenditure on education than families with boys in response to crop loss. Jayachandran (2009) provides more evidence on gender bias in Indonesia and shows that negative air quality shocks from massive wildfires in 1997 have a large effect on female infant mortality.

3 Indonesia: An Overview

Indonesia is the third largest developing country after China and India. Despite a very rapid economic growth[3] which plays an important role in lowering unemployment and increasing standard of living, there are still many Indonesians (about 32 million of a population of 243 million) who live below the national poverty line ($22 per month). Indonesia is one of the most geographically diverse countries and is the world's largest archipelagic state with its 13,000 islands. There exists huge differences in economic performance at the province level. For example, in early 2000s per capita regional income in East Kalimantan (the richest province in 2000) was 16 times that in Maluku (the poorest province in 2000).[4] The economic performance at the

[3] In 2010, the growth of GDP per capita was 6.2%.

[4] The facts on provincial economic performance are from Hill et al (2008).

province level vary over time as the provinces respond differently to international and domestic economic changes. For example, in 1970s, oil boom benefited the country's four provinces which are rich in resources[5]; the rapid export-oriented industrialization in 1980s mainly affected Java and Bali; the economic crisis in 1997 mostly affected finance, construction and manufacturing industries in Jakarta and West Java.

There are five major geographic areas in Indonesia: Java-Bali, Sumatra, Kalimantan, Sulawesi and Eastern Indonesia. In 2004, Java contributed 60 % of country's GDP[6], and Jakarta alone generated one-sixth of country's GDP. In terms of GDP per capita, the two richest provinces are Jakarta and East Kalimantan, where non-mining GDP per capita in 2004 was respectively four and three times the country's average. The fastest growing provinces in terms of GDP per capita during the period 1970s-2000s are a diverse group. They include provinces that are relatively remote such as North Sulawesi or relatively smaller in size such as Bali, including non-remote provinces such as West Sumatra, Jakarta and Central Java . The provinces which are closer connected to the global economy, such as Jakarta, Bali and Riau[7] tend to grow faster.

Historically, Indonesian economy was mostly based on agriculture, with agriculture contributing more than 33% of GDP in 21 of the 26 provinces in 1970s. Starting in early 1970s, the Indonesian economy underwent a considerable change towards industrialization and urbanization. At the beginning, the government pursued import substitution policies to achieve self sufficiency in agriculture. From the mid-1980s, there was a shift towards export-oriented trade policy, with a reduction in tariffs and tarification of non-trade barriers (Basri and Hill, 2004). Some provinces, such as North, West and South Sumatra, Lampung, Sulawesi and West Java, have benefited from the export-oriented reforms in 1980s, and as a result, had weathered the 1997 economic crisis much better than other provinces. Now the economic focus on agriculture is significantly reduced: in 2004, the eight provinces where agriculture still accounts for at least

[5] This boom did not benefit the majority of population as the economic gains were appropriated by the government and oil companies.

[6] Sumatra contributed 22 %, Kalimantan - 9%, Sulawesi - 4%, and Eastern provinces - 3%.

[7] The islands adjacent to Singapore.

33% of GDP are either the country's poorest or with a very strong comparative advantage in this sector.

In 1995 Indonesia became a WTO member and committed to reduce the tariffs to 40 percent or less over a ten year period. On average, nominal tariffs were reduced from 17.2 percent in 1993 to 6.6 percent in 2002. The average tariff in manufacturing was one of the highest across sectors, and the decrease in this average tariffs was one of the strongest. For example, tariffs in wood and furniture declined from 27.2 percent to 7.9 percent, and the tariff in textiles declined from 18.9 to 6.4 percent. The average tariff in agriculture has declined from 11.5 percent in 1993 to 3.0 percent in 2003. The 1997 Asian economic crisis has a significant negative impact on Indonesian economy, similarly to all other Asian crisis affected countries. Total value of exports fell by 6% in 1997 and 12.6%[8] in 1998, with a significant reduction in non-oil primary and manufacturing products. Indonesian economy recovered within the next two years, lifting export value by 15% over the pre-crisis (1990–96) average. In figure 1 and 2, I show the values of Exports and Imports of goods and services in Indonesia over the time period used in the data set I used. the graphs show that both exports and imports play important role in the context of globalization in Indonesia.

Indonesia is a pluralistic country with multiple ethnic groups, languages, religion and cultures. The largest ethnic group in Indonesia is the Javanese,with estimated 45% of the country's total population. The Sundanese from the Western part of Java, are the country's second largest ethnic population followed by Chinese, Malay Indonesians and the Madurese. Despite the country's diversity, family is the central institution in Indonesia which provides status, security and identity. The head of the family is the eldest male and a person's ethnicity is determined by the household head's ethnic origin (Suryadarma et al, 2006).

In 1993, Indonesia introduces nine years of compulsory education. The gender gap in primary school enrolment rates has been small and almost eliminated over time: the ratio of female to

[8] Measured in USD.

male students enrolled in primary schools has increased from 86% in 1970 to 97% in 2007[9]. The enrolment rates decrease dramatically for the secondary school age children: in 2007, the secondary school enrolment rates are 72%[10]. However, the relative secondary school enrolment of female has been steadily increasing over time: from just 53% in 1970 to almost 100% in 1990s. Finally, the female-male ratio in tertiary education has also increased from just 32% in 1970 to 98% in 2007[11].

The labor participation rates however exhibit a more pronounced gender gap. According to ILO (2009), during the period 2000-2008, the female labor participation rate decrease from 60% to 54%, while the average male labor participation rate did not change significantly . During this period, labor participation rates for females fell for all age groups, while the participation rates rose for younger males but shrunk for older males. There are also gender differences in terms of sector of employment. In agriculture, the percentage of employed females and males are historically very similar and slowly decreasing over time: in 1980, 54% of working females and 57% of working males were employed in agriculture, while in 2007, the shares are 41% each[12]. In industrial sector, the trend is different. In 1980, 13% of working females and 13% of working males were employed in industry, however starting from the mid 1990s the share of males was increasing while the share of working females was fluctuating at the same initial level. In 2007, 20% of working males and 15% of working females are employed in industrial sector. In service sector, the bias was always in the direction of female workers: the percentage of working females and working males employed in services has increased from 33% and 29%, respectively, in 1980 to 43% and 38% in 2007.

[9] In 2007, primary school enrolment rate are close to 100% for both girls and boys. The data on enrolment rates are from World Bank Gender Statistics database.

[10] Jones (2013) provides the reasons for high secondary school drop-our rates, such as high transportation costs, the importance of child's earnings in household income, low recognition among parents of the significance of education, and cultural factors such as early marriage.

[11] In 2007, 18% of females and 18% of males were enrolled in tertiary education.

[12] The data on sectorial employment are from World Bank Gender Statistics database.

Table (1) : Labour Participation rates by gender and by age group in Indonesia Source: ILO(labboursta)

	1997		2000		2008	
Age group	Women	Men	Women	Men	Women	Men
15-19	33.6	44.6	34.0	37.0	30.2	40.6
20-24	50.3	81.7	57.8	76.8	53.9	83.9
25-29	51.4	94.6	59.4	92.2	54.4	95.4
30-34	55.1	97.6	60.4	96.3	54.2	97.4
35-39	58.4	98.4	62.6	97.5	58.9	98.1
40-44	61.4	98.7	63.7	96.7	61.8	97.9
45-49	60.9	97.9	68.0	97.5	63.6	97.4
50-54	56.0	95.8	67.1	96.1	60.6	95.1
55-59	54.1	88.2	65.2	92.9	55.7	88.3
60-64	34.4	67.1	60.2	88.8	45.5	78.2
Average	51.56	86.46	59.84	87.18	53.88	87.23

4 Empirical Analysis

In this Section, I describe the dataset, key variables and discuss the econometric specification.

4.1 Data

The dataset is constructed by combining data from three sources. First, I use three waves (1997, 2000 and 2007) of Indonesian Family Life Survey (IFLS) panel data[13]. IFLS is an on-going longitudinal household survey where the first wave was conducted in 1993 (IFLS1), tracking in 1997/98 (IFLS2 and IFLS2+), 2000 (IFLS3) and 2007 (IFLS4). In IFLS1, 7,224 households were interviewed, and detailed individual-level data were collected from over 22,000 individuals. The re-contact rate of IFLS1 households is 94.4% in IFLS2, 95.3% in IFLS3 and 93.6% in IFLS4 . For the individual target households (including split-off households as separate) the re-contact rate was a little lower, 90.6% (Strauss et al, 2009). The survey assembles wide-ranging information on the lives of individuals and their households in which they live. The sample represents around 83% of the Indonesian population . In my sample dataset, I use data from the individual questionnaire for adults which includes sections on education, labor supply, gender,

[13] IFLS data for 1993 is not used because of insufficient informations in constructing the variables of our sample dataset.

marital status, etc.

Second, I use data on province-level value of exports and imports (valued in Indonesian rupee) from the CEIC (Census and Economic Information Center) Indonesian premium database. Finally, to construct the measure of the individual's exposure to globalization, I use data on population size of all Indonesian cities as well as the geodesic distance between these cities and the individual's residence. Information on population size is obtained from Badan Pusan Statistik. Geodesic distance is calculated from ArcGIS, which is discussed in further detail below.

4.1.1 Key Variables

Next, I discuss the key variables used in the empirical analysis.

Exposure to Exports The main explanatory variable in this paper is related to the exposure to exports of individual i (who is in household h and located in province j), denoted by *Export Exposure*$_{ihjt}$. There are two key components in this measure of export exposure. The first component is related to how easy it is for individuals to gain access to markets, especially to labor markets. The second component is associated with exports at the province level, which reflects the linkage that the various Indonesian provinces may have with world markets. To capture information about labor market access, I construct a *Population Gravity Index* (PGI) score for each household. The PGI score is based on the idea that cities with larger populations exert more force (or gravity) of export-oriented economic activities, but this force weakens as a household is located further away from cities. Therefore, in relation to province j, the PGI score for household h is positively related to the population of cities in province j but inversely related to distance from these cities, as defined by

$$PGI_{ihj} = \sum_{k \in K_j} \frac{p_k}{(1 + D_{ihkj})^2}, \tag{1}$$

where p_k is the population of city k in province j, K_j is the total number of cities in province j, and D_{hkj} is the geodesic distance between city k in province j to household h's residence at the subdistrict level. For example, in Appendix B, figure 3, I show graphically how the index varies across different geographic regions(Provinces) for a Person living in the household in DKI Jakarta.

I calculate the geodesic distance D_{hkj} in the following way. First, I calculate the value of the latitude and longitude of each household's centroid at subdistrict level, measured in degrees. Next, I calculate latitude and longitude of all the cities' centroid in Indonesia, also measured in degrees. Finally, I convert the geographic coordinate system to appropriate projected coordinate system using Proximity Analysis tools in ArcGIS. I use equidistant cylindrical projection as it has minimal distortion along the distance dimension, and is very useful for calculations of distances within a country. The reason of using projected coordinate system is to calculate distances in meters or kilometers not in degrees. Note that while constructing the PGI score, I use all cities, not just the largest one, in each province. This is because a province might have several population centers that plausibly have substantial market potential: for example, Java includes the capital of the country Jakarta and other large cities such as Bogor and Depok. In Figure 4 I map out the location of respondents in 1997, 2000 and 2007 waves of IFLS that are used in constructing the PGI score in the sample. Each dot represents a location under a province in which at least one respondent was interviewed.[14]

The construction of a household PGI score is similar to the measure of market potential or market access in economic geography literature. Helpman (1998) is the first to analyze the role of market access in shaping the distribution of population across space. Redding and Venables (2004) construct the market access of each exporting country by taking distance-weighted sum of the market capacities (GDPs) of all partner countries. They estimate the impact of market access of each exporting country on per capita income and find that economic geography has a

[14] Provinces, which are not represented in our sample, are not dotted on the map.

significant effect on per capita income. Redding and Sturm (2008) develop a multi-region version of Helpman's model and introduce the concept of firm market access and consumer market access. In the paper, I define and use a measure of market access at the household level which is a novel application in development economics literature.

Next, I construct the variable ($Export\ Exposure_{ihjt}$) that captures the extent to which an individual i, who is in household h and located in province j, is exposed to exports at year t. This export exposure variable is constructed by combining a household's province-specific PGI score with province-level value of exports in the previous year $(t-1)$, then aggregating over all provinces j:

$$\begin{aligned} Export\ Exposure_{ihjt} &= \sum_{j \in J} \left(\sum_{k \in K_j} \frac{p_j}{(1 + D_{ihkj})^2} \ln(Export_{jt-1}) \right) \\ &= \sum_{j \in J} PGI_{ihj} \ln(Export_{jt-1}), \end{aligned} \tag{2}$$

Note that the individual PGI score is unique for each household. Hence, an increase in export-oriented economic activities exerts individual-specific effects as the influence of those activities on households and individuals is amplified for those with greater labor market access, i.e. with higher PGI score.

The main variable of interest, *Export Exposure*, measure a household's exposure to exports. This is motivated by the existing empirical trade literature that provides evidence on the difference in wages between exporting and non-exporting firms. However, the recent papers by Amiti and Davis (2011) and Amiti and Cameron (2012) argue that it is also important to control for exposure to imports in estimating the effects on wages. Amiti and Davis (2011) find that in Indonesia, a fall in input tariffs raises wages in import-using firms relative to wages in firms that buy their inputs domestically. Amiti and Cameron (2012), on the other hand, argue that in Indonesia production of intermediate inputs is more skilled-intensive than production of final goods. They find that a reduction in input tariffs resulted a reduction in skill premium while a

reduction in final good tariffs had no impact. To control for these effects, I construct another control variable which measure a household h's exposure to imports:

$$\begin{aligned} Import\ \ Exposure_{ihjt} &= \sum_{j \in J} \left(\sum_{k \in K_j} \frac{p_j}{(1 + D_{ihkj})^2} \ln(Import_{jt-1}) \right) \\ &= \sum_{j \in J} PGI_{ihj} \ln(Import_{jt-1}). \end{aligned} \tag{3}$$

Employment I construct several variables to measure an individual's employment outcomes.

First, I investigate the extensive margin of work, that is, the probability of being engaged in any work, paid or unpaid. Iconstruct the variable $Work_{ihjt}$, which is a binary variable and is equal to 1 if individual i in household h in province j at time t reports working and 0 if otherwise. I also look at probability of working in key sectors such as agriculture, manufacturing and services. For each sector, I construct a binary variable that is equal to one if an individual reports being employed in this sector and zero if otherwise. I also use information on reported occupational status, such as being a government worker, being self-employed, being engaged in housework, etc., and create a binary variable for each reported occupational status.

Second, I also look at the intensive margin of employment and construct two dependent variables: $Hours\_usual_{ihjt}$, which is equal to reported hours of any work (paid or unpaid) that an individual normally does, and $Hours\_last\_week_{ihjt}$, which is equal to reported hours of any work done in the previous week. Table 1 provides a summary of the variables.

The base sample contains 13,149 individual-year observations for married females and 16,745 individual-year observations for married males[15]. Summary statistics are reported in Table 3. It is evident that on average, compared to males females are less likely to report to be working. In terms of sectorial affiliation, working females are less likely to be employed for in agriculture, but more likely to be employed in manufacturing and sales services. Females are also less likely to be

[15] In our empirical analysis, we focus on married individuals as our theoretical predictions are based on the household model. We perform robustness checks using unmarried females and males and report the results in the Section below.

self-employed, government-employed or be a salary employee, but more likely to be engaged in housework and unpaid family work. Working females also work less hours than working males.

Table 3: Summary Statistics

	Female		Male	
	mean	sd	mean	sd
Age	40.96433	11.24749	41.53114	10.98397
Work	.860978	.3459826	.984473	.12364
Work in agriculture	.3515096	.4774599	.3669155	.4819776
Work in manufacturing	.1429767	.3500623	.1184831	.323189
Work in services	.486729	.4998429	.344461	.4752064
Work in construction	.0076051	.0868785	.0779337	.2680753
Housework	.1942353	.3956259	.0126008	.111547
Self-employed work	.4182067	.4932832	.5005076	.5000147
Government work	.0704236	.2558693	.1022395	.302972
Salaried work	.220397	.4145301	.3324574	.471108
Unpaid family work	.2597156	.4384952	.0236489	.1519571
Hours usual	37.58607	21.03	43.82971	17.47164
Hours Last Week	33.74863	22.88576	39.77973	20.19421
Export exposure	2.852358	21.59223	3.2819	27.26081
Import exposure	2.761553	21.01643	3.175702	26.60138
Observations	13149		16745	

4.2 The Model

The main estimating equation relates information about individual i in household h in province j and time t to the measures of exposure to exports ($Export\ Exposure_{ihjt}$). I also include imports ($Import\ Exposure_{ihjt}$) as a control variable. To examine how work decisions may respond to the exposure to exports, I estimate

$$Work_{ihjt} = \mu_h + \alpha_{jt} + \beta_1\, Export\ Exposure_{ihjt} + \beta_2\, Import\ Exposure_{ihjt} + \gamma' C_{ihjt} + \epsilon_{ihjt}. \quad (4)$$

I consider two broad measures for $Work_{ihjt}$ - the extensive margin and the intensive margin of work. The extensive margin of work (i.e. entry and exit into the labor force) is modeled by letting $Work_{ihjt}$ be a binary variable indicating whether i is in the labor force or not. In this case, (4) becomes a linear probability model that relates the probability of employment to the

exposure to exports. The intensive margin of work is modeled by letting $Work_{ihjt}$ be the number of hours of work. There are two measures of reported hours of work in the data, which is usual hours of work and hours of work last week. I consider both hours of work measures for the sake of robustness. A vector of individual level controls is denoted by C_{ihjt}.

The IFLS provides further information about the extensive and intensive margins of work at the sectorial levels, namely the agricultural, manufacturing and the services sector. The IFLS also provides information about the hours spent in house related work. I will exploit these information in the study. The empirical analysis is based on a panel of married males and married females aged from 20 to 65 years for the periods 1997, 2000 and 2007. I choose the minimum age to be equal to 20 years old to exclude younger individuals who may be attending school.

4.3 Identification Issues

The main objective is to estimate the causal effect of the exposure to exports on an individual's decision to work along the extensive or intensive margin. To do so, let us consider some issues that may arise in the attempt to identify causal relationships.

One identification issue that is relevant in most empirical research is reverse causality. However, this appears to be rather unlikely as an individual's work decision should not have any reverse causal effect on exports. Nonetheless, the location of the household, which is used in constructing of the PGI score (and therefore the exposure to export measure), could respond to job opportunities. In this case, a household's location could be self selected. To the extent that households' location decisions are based on persistent, unobserved households' characteristics, I may absorb a host of these characteristics by including household fixed effect, which is represented by μ_h in Eq. (4).

The empirical analysis attempts to link up individuals' work decisions with globalization. This gives rise to a concern that the effects of globalization could be confounded by other macro-

economic factors that are correlated with employment. To eliminate the confounding effects of these macroeconomic factors without eliminating information about globalization, which I hope to pick out, I include province-year fixed effects that are represented by α_{jt} in Eq. (4). The province-year fixed effect captures all province-specific factors, regardless of whether they are observed or unobserved, time-varying or time invariant. These factors may include business cycle shocks that could affect provinces differently, as well as province specific unemployment rate and GDP growth that could affect the tightness of the labor market where an individual is located. They may also include more persistent factors such as institutions or culture at the province level, which could be correlated with information such as whether women are more likely to work. Collectively, these confounding effects can be partialled out by including province-year fixed effects, leaving behind the effect of globalization (with interacts the individual specific PGI index) that I hope to identify.

Besides macroeconomic factors, decisions to work could also be correlated with individual characteristics such as age. For instance, Jensen (2012) finds that younger women are significantly less likely to get married, to have fewer children and to work more. Correspondingly, older women are more likely to engage in unpaid home production than in market work. To allow for the relationship between work and age to have such nonlinear profile, I control for age as well and its quadratic term in the regression analysis, which are represented by the vector C_{ihjt} in Eq. (4).

Finally, another identification challenge is measurement error. The main causal variable, *Export Exposure*, is constructed using the individual's subdistrict location and the value of exports at the province level. While the location of an individual is unlikely to be mismeasured, the provincial level exports could contain measurement errors. In fact, measurement errors are not uncommon for more aggregated information, such as macroeconomic data. If the measurement errors in the provincial export data were classical, the estimated effect of *Export Exposure* could be attenuated.

Another scenario that could arise is non-classical measurement error in the *Work* variable. For example, if women are systematically less willing to report truthfully about whether they are employed and how much they are working, for example, for having a tendency of reporting that they are unemployed, then I should see a weaker link between *Export Exposure* and *Work* than it truly is, which could again lead to attenuation bias.

Unfortunately, panel data regression is not a panacea to address the problem of measurement error. In the regressions, I are unlikely to be able to offer consistent point estimates of the effect of *Export Exposure* on *Work*. Nonetheless, the presence of the measurement errors described above implies that the regression estimates would be robust from a qualitative perspective, in the sense that if *Export Exposure* is statistically significant for *Work*, then the true effect of *Export Exposure* is likely to be stronger than what the estimates suggest. In the regression analysis (see Section 6), I attempt to tease out information about whether attenuation bias exists, and have some evidence that this is true.

5 Results

To organize the discussion of how globalization, through the exposure to exports, might have gender-specific effects on employment, I report the results for females in tables categorized by "A" (e.g. Tables 3A, 4A, etc.) and for males in tables categorized by "B" (e.g. Tables 3B, 4B, etc.). Standard errors have been adjusted for clusters at the household level. All the regressions control for age, the squared of age, household fixed effects, and province-year fixed effects.

A key prediction of the conceptual model, which is based on a simple collective household framework involving a couple, is that forces of globalization that produce to a larger male-female wage gap will reduce market work by the woman. To generate this result, I have assumed that the labor supply elasticity of men is inelastic. The prediction of the model as well as the latter assumption are verifiable.

5.1 Work Participation

I first examine the effect that globalization might have on the extensive margin of work, which is captured by whether an individual works or not. Tables 4A and 4B report the estimated coefficients of the model described by Eq. (4), where the dependent variable is $Work_{ihjt}$, which is a binary variable that is equal to one if an individual reports working in the past week.

In column (1) in Table 4A, I examine the effect that exposure to exports might have on the probability of work for married women. Based on the simple theoretical model, the intuition for why married women are less likely to work when exports increase is that the increase in spousal income (following an increase in exports) allows women to devote more time to home production. Unmarried women, who do not have the luxury of enjoy such spousal transfers, should in principle have more inelastic labor supply than married women. Therefore, a "test" of the conjecture is to see if the labor supply decision of married women differ from that of the unmarried. If the opposite is true, the suitability of the collective household model in describing how women's labor supply responds to globalization would be suspect. Results for unmarried females are reported in column (2) in Table 4A.

Table 4A : Work Participation (Females)

	(1) Married	(2) Unmarried
Dependent Variable:	*Work*	
Export Exposure	-0.0257***	-0.00547
	(0.00974)	(0.0256)
Import Exposure	0.0252***	0.00259
	(0.00959)	(0.0288)
Age	0.0496***	0.0564***
	(0.00277)	(0.00792)
Age Squared	-0.000572***	-0.000728***
	(3.28e-05)	(0.000104)
Constant	-1.078***	-0.477***
	(0.0772)	(0.145)
Observations	23,150	4,507
R-squared	0.050	0.070
Number of households	9,492	2,641
Household FE	Yes	Yes
Year*Province FE	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In Column (1), I find that married women work less on average when they are exposed to exports. For example, the coefficient on *Export Exposure*, which is statistically significant at the 1% level, has a value of (-0.0257). This implies that a one percent increase in exports across all provinces has an effect of reducing the probability of work by

$$-0.0257 * PGI_{ihj} \equiv -0.0257 * \sum_{k \in K_j} \frac{p_k}{(1 + D_{ihkj})^2}$$

percentage points.

Unlike in the case of married women, Column (2) shows that the extensive margin of work for unmarried women does not respond in a statistically significant manner to *Export Exposure*, which is what the collective household model would have alluded to. Importantly, the model relies on the assumption that men's labor supply is inelastic. Table 4B offers some evidence that this is true for both married and unmarried men, as *Export Exposure* is statistically insignificant

in both cases.

Table 4B : Work Participation (Males)

	(1) Married	(2) Unmarried
Dependent Variable:	*Work*	
Export Exposure	0.00110	-0.0172
	(0.0122)	(0.0190)
Import Exposure	-0.000748	0.0266
	(0.0133)	(0.0195)
Age	0.0301***	0.0812***
	(0.00246)	(0.00951)
Age Squared	-0.000388***	-0.00104***
	(2.95e-05)	(0.000133)
Constant	0.398***	-0.121
	(0.0537)	(0.268)
Observations	18,408	5,426
R-squared	0.055	0.094
Number of Households	8,424	3,277
Household FE	Yes	Yes
Year*Province FE	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The findings in Tables 4A and 4B, which show that married women have a lower probability of work when exports increases but exports have no statistically significant effect on men's propensity to work, can be cross-verified.

In Tables 5A and 5B, I examine the relationship between export exposure and earnings status for self (*Own Income*) and spouse (*Spouse Income*). *Own Income* is a binary variable that is equal to one if the person reports having earned an income. *Spouse Income* is another binary variable that is equal to one if the person reports that his/her spouse has earned an income.

Table 5A : Probability of earning own income and husband earning own income (reported by females)

	(1)	(2)
Dependent Variable:	*Own Income*	*Spouse (Husband) Income*
Export Exposure	-0.0105	-0.00679
	(0.0211)	(0.0133)
Import Exposure	0.0149	0.0185
	(0.0312)	(0.0232)
Age	0.0486***	0.0211***
	(0.00588)	(0.00418)
Age Squared	-0.000555***	-0.000328***
	(7.29e-05)	(5.32e-05)
Constant	-0.507***	0.583***
	(0.116)	(0.0826)
Observations	12,501	12,500
R-squared	0.032	0.044
Number of Households	6,881	6,881
Household FE	Yes	Yes
Year*Province FE	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Focusing on married women, Table 5A shows that *Export Exposure* does not have statistically significant effect on both *Own Income* and *Spouse (Husband) Income*, although the coefficients have signs and sizes that make sense. For instance, Column (1) of Table 5A shows that for married women, *Export Exposure* has a negative effect on *Own Income*. This implies that married women are less likely to report having worked for pay when exports increase, which is consistent with Table 5A whereby *Export Exposure* is negatively related to the probability of work for married women.

Table 5B : Probability of earning own income and wife earning own income (reported by males)

	(1)	(2)
Dependent Variable:	*Own Income*	*Spouse (Wife) Income*
Export Exposure	0.0122	-0.0709**
	(0.0126)	(0.0285)
Import Exposure	-0.0145	0.0960**
	(0.0233)	(0.0421)
Age	0.0242***	0.0257***
	(0.00469)	(0.00681)
Age Squared	-0.000301***	-0.000240***
	(5.49e-05)	(8.12e-05)
Constant	0.506***	-0.237*
	(0.0986)	(0.142)
Observations	11,242	11,234
R-squared	0.032	0.036
Number of Households	6,454	6,453
Household FE	Yes	Yes
Year*Province FE	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The statistical insignificance of *Export Exposure* could be due to measurement error in the way married women reports the earnings of themselves and of their spouse. In Table 5B, I now have the men reporting whether they earn an income (*Own Income*) and whether their spouse earns an income (*Spouse (Wife) Income*). As before, Column (1) of Table 5B offers no evidence that the work status of men is affected by the exposure to export. However, Column (2) shows that married women, as reported by their husbands, are likely to earn an income when exports increases. In other words, according to their husbands, married women are more likely to engage in paid employment when they are more exposed to exports.

The magnitude of the coefficient of *Export Exposure* in Column (2) of Table 5B offers some indication of the extent of measurement error that might be present in the way married women report their earnings and employment information. For example, the coefficient on *Export Exposure* from Column (1) of Table 4A is -0.0257. This is only about 36% of the -0.0709 coefficient

on *Export Exposure* reported in Column (2) of Table 5B. If the reporting by men is more precise, for reasons that perhaps are related to culture, then the baseline effect of *Export Exposure* for married women reported in Table 4A (see Column (1)) is likely to be significantly attenuated by more than half the true effect. However, despite such evidence of attenuation, I have seen that *Export Exposure* remains statistically significant for married women. This implies that the true effect of globalization on women is likely to be stronger (albeit in the same direction) than what the regressions are able to capture.

Finally, as a further robustness check I conduct a falsification test and evaluate the effects of export exposure in year t on one and two year lagged values of work participation[16]. I find that for both males and females, the coefficient on export exposure is insignificant. This result provides further evidence that the estimated effect of export exposure on work participation is causal.

5.2 Work Participation by Sector

Next, I estimate equation (4) for binary variables which indicate work participation by a sectorial affiliation. In particular, I look at three major employing sectors: agriculture, manufacturing and services. Agriculture and manufacturing are major export-oriented sectors in Indonesia: according to the WTO statistics, in 2006, agriculture accounted for 17% and manufacturing accounted for 43% value of Indonesian exports. Service sector, on the other hand, is a non-traded sector. From the summary statistics in Table 3, I can see that 32% of females and 35% of males report working in agriculture, while 16% of females and 13% of males report working in manufacturing. In service sector, the gender differences in employment are much more pronounced: 50% of females versus 36 % of males. I also estimate the effects of export exposure on work participation in the construction sector for males, as it is the fourth largest sector of employment for males with 8% of males reporting that their primary job is in construction. The

[16] The IFLS surveys contain information on work status in the previous years. However, they do not provide information on hours of work in the previous years. Hence, we are able to conduct such falsification test only for binary variable Work.

results are reported in Tables 6A and 6B.

I find that an increase in exposure to exports decreases the probability of work in agriculture for females: the coefficient equals to (-0.0107) and significant at 1% level. I also find that the effect of export exposure is negative and significant for work in manufacturing: the coefficient equals to (-0.0131), and significant at 1% level. I do not find significant effects for service sector. This suggests that an increase in exposure to exports results in married females leaving employment in agriculture and manufacturing.

For married males, the effect of export exposure is positive for work participation in all four sectors, but is not significant. Hence, I do not observe significant changes in sectorial work participation of males in response to increase in exports, which is consistent with the theoretical framework.

5.3 Work by Occupational Status

In the previous sub-sections I estimated the effect of export exposure on work participation in general and by sector. The survey information on work participation does not allow us to identify individuals working for pay versus unpaid working individuals. In this sub-section I use information on individual's reported work status to further identify effects on different types of work. I use the survey questions to create binary variables which indicate whether an individual is being self-employed, engaged in housework (doing housekeeping), working for the government, working for a salary, or being an unpaid family worker. I estimate the equation(4) for these variables and report the results in Tables 7A and 7B.

In Table 3 It is evident that 42% of females and 50% of males report being self-employed. However, the sectorial affiliations of self-employed females and males are very different. For females who report being self-employed, 20% report working in agriculture, 13 % in manufacturing and 67% in services. For self-employed males, the shares are 52% in agriculture, 6% in manufacturing, 31% in services and 3% in construction. Hence, the majority of self-employed

Table 6A : Work Participation by sector (Females)

	(1) Agriculture	(2) Manufacturing	(3) Services
Dependent Variable:	Work		
Export Exposure	-0.0107***	-0.0131***	-0.0110
	(0.00268)	(0.00488)	(0.00930)
Import Exposure	0.00946***	0.0128***	0.0130
	(0.00295)	(0.00477)	(0.00929)
Age	0.0171***	0.00228	0.0337***
	(0.00187)	(0.00152)	(0.00234)
Age Squared	-0.000157***	-5.41e-05***	-0.000402***
	(2.21e-05)	(1.76e-05)	(2.77e-05)
Constant	-0.143**	0.110***	-0.855***
	(0.0723)	(0.0372)	(0.0877)
Observations	23,150	23,150	23,150
R-squared	0.046	0.014	0.036
Number of Households	9,492	9,492	9,492
Household FE	Yes	Yes	Yes
Year*Province FE	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6B : Work Participation by sector (Males)

	(1) Agriculture	(2) Manufacturing	(3) Services	(4) Construction
Dependent variable		Work		
Export Exposure	0.00367	0.000859	0.00265	0.00584
	(0.00344)	(0.00571)	(0.00765)	(0.00372)
Import Exposure	-0.00476	-0.00259	-0.00133	-0.00719*
	(0.00374)	(0.00615)	(0.00812)	(0.00433)
Age	0.00255	-0.00203	0.0189***	0.00509***
	(0.00294)	(0.00237)	(0.00328)	(0.00177)
Age Squared	3.22e-05	-1.20e-05	-0.000235***	-7.66e-05***
	(3.40e-05)	(2.71e-05)	(3.76e-05)	(2.02e-05)
Constant	0.188***	0.213***	-0.0833	0.00842
	(0.0715)	(0.0547)	(0.0772)	(0.0391)
Observations	18,408	18,408	18,408	18,408
R-squared	0.026	0.021	0.013	0.010
Number of Households	8,424	8,424	8,424	8,424
year#province FE	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7A : Probability of work by occupational status (Females)

	(1)	(2)	(3)	(4)	(5)
Dependent Variable:	*Self Work*	*House Work*	*Government Work*	*Salaried Work*	*Unpaid Family Work*
Export Exposure	-0.00956	0.0192*	0.00360	-0.0241***	-0.00563
	(0.00799)	(0.00987)	(0.00235)	(0.00651)	(0.00836)
Import Exposure	0.0101	-0.0181*	-0.00354	0.0238***	0.00604
	(0.00810)	(0.00957)	(0.00251)	(0.00639)	(0.00912)
Age	0.0328***	-0.0299***	0.00584***	0.00567***	0.00683***
	(0.00231)	(0.00280)	(0.000947)	(0.00191)	(0.00184)
Age Squared	-0.000331***	0.000284***	-8.02e-05***	-0.000113***	-7.43e-05***
	(2.75e-05)	(3.33e-05)	(1.18e-05)	(2.21e-05)	(2.17e-05)
Constant	-0.455***	1.698***	-0.0403	-0.374***	0.191**
	(0.0597)	(0.0770)	(0.0958)	(0.0543)	(0.0907)
Observations	23,150	23,150	23,150	23,150	23,150
R-squared	0.036	0.035	0.017	0.031	0.030
Number of	9,492	9,492	9,492	9,492	9,492
Household FE	Yes	Yes	Yes	Yes	Yes
Year*Province FE	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

females work in service sector while the majority of self-employed males work in agriculture. In columns (1) in tables 4A and 4B it is evident that export exposure has no significant effect on self-employed work for both females and males. This is consistent with out previous results where I found no significant results for work in services for females and for work in agriculture for males.

Next, I look at the effects on the probability of housework. In Table 3 it is evident that there are significant gender differences: 19% of females report being engaged in housework as primary activity, while the figure for males is only 1%. In columns (2) in Tables 7A and 7B, I report that an exposure to export increases the probability of being engaged in housework for females: the coefficient equals to (0.0192) and significant at 10%. For males, the effect is insignificant.

In columns (3) I report the effects on probability of being a government worker. I do not find significant effects for both males and females, even though 7% of females and 10% of males report working for government. This suggests that the decision to work in governmental position is not responsive to household income changes for females. One possible explanation is that these governmental positions do not generate a significant income stream.

Next, I look at probability of being a salaried worker. In Table 3 It is shown that 22% of females and 33% of males report working for a salary or a wage. In terms of sectorial affiliation, 20% of females report working in agriculture, 31% in manufacturing, and 44% in services. For males, the shares are 17% in agriculture, 24% in manufacturing, 33% in services and 13% in construction. In column (2) in Table 7A I can see that an exposure to exports reduces the probability of female's salaried work: the coefficient equals to (-0.0241) and significant at 1% level. However, for males there is no evidence of significant effect. I investigate this further and create a binary variable for each sector which is equal to 1 if an individual reports working for salary and reports working in a given sector. I estimate (4) for these binary variables and find that export exposure reduces the probability of females working for salary in each of three sectors: agriculture, manufacturing and services, and the coefficients for each sector are significant at 5%

Table 7B : Probability of work by occupational status (Males)

	(1)	(2)	(3)	(4)	(5)
Dependent Variable:	*Self Work*	*House Work*	*Government Work*	*Salaried Work*	*Unpaid Family Work*
Export Exposure	0.000320	0.000990	8.00e-05	0.00518	-0.00204
	(0.00640)	(0.00124)	(0.00363)	(0.00705)	(0.00254)
Import Exposure	0.00211	-0.000800	-0.000857	-0.00645	0.00148
	(0.00684)	(0.00140)	(0.00390)	(0.00782)	(0.00256)
Age	0.0185***	-0.00240*	0.0203***	-0.00993***	-0.00864***
	(0.00355)	(0.00127)	(0.00173)	(0.00314)	(0.00161)
Age Squared	-0.000125***	3.02e-05**	-0.000231***	7.44e-06	7.65e-05***
	(4.09e-05)	(1.52e-05)	(2.02e-05)	(3.58e-05)	(1.78e-05)
Constant	0.0134	0.0626**	-0.329***	0.652***	0.178***
	(0.0765)	(0.0282)	(0.0367)	(0.0741)	(0.0507)
Observations	18,408	18,408	18,408	18,408	18,408
R-squared	0.037	0.019	0.034	0.098	0.022
Number of HH	8,424	8,424	8,424	8,424	8,424
Household FE	Yes	Yes	Yes	Yes	Yes
Year*Province FE	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

level[17]. For males, the coefficients by sector of work remain insignificant.

Finally, I look at the effects of export exposure on probability of being an unpaid family worker. In Table 3 I can see that there are significant gender difference: 25% of females and only 2% of males report being an unpaid family worker,where most of those females work in agriculture in services: 71% and 22% correspondingly. In column (5) in Tables 7A and 7B I do not find significant effect of export exposure on probability if being an unpaid family worker for both males and females.

To summarize, the results in Tables 7A and 7B suggest that an increase in export exposure increases the probability of housework and decreases the probability of salaried work in all sectors for females and has no significant effect on males occupation status.

5.4 Probability of Work by Previous Year Work Status

Next, I use information on the previous year work status and estimate the effect on exit and entry work decisions. I estimate equation (4) for two sub-samples of males/females: those who report not working in the previous year and those who report working in the previous year. For females who report working in the current year, 93% report working in the previous year as well, while for currently non-working females this share equals to 58%. For males, the shares are 98% and 63% correspondingly. The results are reported in Tables 8A and 8B.

I do not find any significant effects of an increase in export exposure for females who report not working previous year. That is an increase in export exposure does not seem to induce nonworking females to start working. However, for married females who report working in the previous year an increase in export exposure decreases their probability of work in the current year. That is, an increase in exposure to exports forces these females to quit work. The coefficient is equal to (-0.0277) and significant at 5% level.

The results for males are very different. For married males who report not working in the

[17] Results are not reported in the paper.

Table 8A : Probability of work conditional on previous year work status (Females)

	(1)	(2)
Worked for pay in the previous year?	No	Yes
Dependent Variable:	*Work*	
Export Exposure	0.0181	-0.0277**
	(0.138)	(0.0117)
Import Exposure	-0.0364	0.0305***
	(0.142)	(0.0112)
Age	0.0343*	0.0301***
	(0.0189)	(0.00380)
Age Squared	-0.000452**	-0.000309***
	(0.000225)	(4.43e-05)
Constant	-0.244	-0.462***
	(0.369)	(0.0878)
Observations	2,426	13,432
R-squared	0.120	0.049
Number of Households	2,166	6,903
Household FE	Yes	Yes
Year*Province FE	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8B : Probability of work conditional on previous year work status (Males)

	(1)	(2)
Worked for pay in the previous year?	No	Yes
Dependent Variable:	*Work*	
Export Exposure	0.226***	-0.00602
	(0.0867)	(0.0107)
Import Exposure	-0.307*	0.00630
	(0.168)	(0.0117)
Age	0.0791	0.00993***
	(0.0584)	(0.00189)
Age Squared	-0.000954	-0.000123***
	(0.000647)	(2.22e-05)
Constant	-0.429	0.785***
	(1.134)	(0.0413)
Observations	659	17,121
R-squared	0.568	0.014
Number of Households	616	8,101
Household FE	Yes	Yes
Year*Province FE	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

previous year, an increase in export exposure increases their probability of work in the current year: the coefficient equals to 0.226 and is significant at 1% level. I do not observe any significant effects for males who report being working in the previous year, that is in increase in export exposure does not force them to quit their jobs.

5.5 Hours of Work

Finally, I estimate equation (4) for hours of work, that is the effect of export exposure on the intensive margin of work. I report the results for Hours Last Week in Tables 9A and 9B, and the results for Usual Hours in Tables 10A and 10B. For females, I find that export exposure reduces hours of any work, work for salary and work in services, while increases hours of work as unpaid family worker, for both measures of work hours. For males, I find that export exposure reduces hours of work for salary and work in services if I use Hours Last Week. However, if I use Usual Hours, then I find negative and significant effect on hours of work in agriculture.

Table 9A : Hours of work in the last week (Females)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Hour of work in the last week							
Dependent Variable	*any work*	*salary work*	*housework*	*self work*	*unpaid family work*	*agriculture*	*manufacturing*	*service*
Export Exposure	-1.802*	-4.156*	13.40	-2.697	7.831***	24.31	1.541	-2.711**
	(1.031)	(2.431)	(20.98)	(1.989)	(1.520)	(22.41)	(2.353)	(1.139)
Import Exposure	1.870*	4.089*	-12.81	3.163	-7.288***	-15.73	-2.336	2.686**
	(1.025)	(2.353)	(18.97)	(2.104)	(1.622)	(24.58)	(2.533)	(1.132)
Age	0.603***	-0.210	-0.0133	0.820*	0.413	0.847***	-0.384	1.034***
	(0.221)	(0.509)	(0.618)	(0.457)	(0.440)	(0.286)	(0.650)	(0.364)
Age squared	-0.00768***	-0.000359	-0.000886	-0.00905*	-0.00561	-0.00970***	0.00527	-0.0110**
	(0.00258)	(0.00638)	(0.00695)	(0.00506)	(0.00501)	(0.00329)	(0.00785)	(0.00431)
Constant	22.33***	45.64***	17.62	18.49*	20.34**	4.254	42.02***	31.16***
	(4.591)	(10.30)	(16.65)	(10.33)	(9.383)	(6.387)	(12.87)	(7.569)
Observations	11,355	2,904	2,576	5,531	3,422	4,630	1,886	6,433
R-squared	0.018	0.058	0.159	0.018	0.104	0.103	0.063	0.022
Number of Households	6,216	2,085	2,242	3,544	2,350	2,743	1,388	3,923
year#province FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9B : Hours of work in the last week (Males)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Hour of work in the last week						
Dependent Variable	*any work*	*salary work*	*self work*	*construction*	*agriculture*	*manufacturing*	*service*
Export Exposure	-0.331	-1.239*	-0.717	0.130	2.266	-0.289	-1.336*
	(0.459)	(0.738)	(2.071)	(1.893)	(10.96)	(1.040)	(0.724)
Imports Exposure	0.459	1.298*	0.950	0.851	-1.018	0.323	1.402**
	(0.496)	(0.730)	(2.083)	(1.865)	(10.17)	(1.291)	(0.710)
Age	0.531***	0.613	0.787***	-0.369	0.740**	0.0217	0.775*
	(0.167)	(0.386)	(0.264)	(0.712)	(0.288)	(0.625)	(0.399)
Age squared	-0.00815***	-0.00974**	-0.0112***	0.00303	-0.00989***	-0.00227	-0.00873*
	(0.00197)	(0.00483)	(0.00300)	(0.00891)	(0.00329)	(0.00755)	(0.00476)
Constant	35.88***	36.00***	26.56***	48.81***	19.89***	46.74***	26.03***
	(3.555)	(7.677)	(5.813)	(14.61)	(6.361)	(12.49)	(8.222)
Observations	16,559	5,604	8,410	1,308	6,169	1,991	5,798
R-squared	0.024	0.035	0.040	0.120	0.051	0.070	0.020
Number of Households	8,006	3,778	4,700	960	3,430	1,509	3,707
year#province FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 10A : Usual hours of work (Females)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Usual Hours of Work							
Dependent Variable	any work	salary work	housework	self work	unpaid family work	agriculture	manufacturing	service
Export Exposure	-2.064**	-4.709**	14.73	-2.218	7.222***	-10.61	-0.600	-2.314**
	(0.976)	(2.284)	(24.51)	(1.708)	(1.946)	(16.99)	(2.439)	(1.103)
Import Exposure	2.190**	4.554**	-14.57	2.748	-6.763***	14.93	-1.152	2.303**
	(0.974)	(2.191)	(22.75)	(1.821)	(2.061)	(17.92)	(2.745)	(1.095)
Age	0.654***	0.136	0.493	0.725*	0.706*	0.690***	-0.252	1.124***
	(0.206)	(0.480)	(0.619)	(0.435)	(0.406)	(0.264)	(0.609)	(0.345)
Age squared	-0.00847***	-0.00461	-0.00892	-0.00859*	-0.00954**	-0.00857***	0.00331	-0.0122***
	(0.00239)	(0.00598)	(0.00722)	(0.00479)	(0.00458)	(0.00302)	(0.00738)	(0.00411)
Constant	24.20***	42.52***	22.27	23.88**	20.01**	18.46***	45.01***	27.60***
	(4.281)	(9.738)	(16.06)	(9.839)	(8.648)	(5.853)	(12.11)	(7.148)
Observations	11,331	2,900	2,558	5,507	3,418	4,623	1,883	6,410
R-squared	0.014	0.058	0.139	0.015	0.065	0.049	0.062	0.023
Number of Households	6,208	2,082	2,231	3,536	2,349	2,740	1,385	3,917
year#province FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 10B : Usual hours of work (Males)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Usual Hours of Work						
Dependent Variable	*any work*	*salary work*	*self work*	*construction*	*agriculture*	*manufacturing*	*service*
Export Exposure	-0.104	-0.181	-0.616	2.144	-10.02**	0.807	-0.298
	(0.402)	(0.447)	(1.927)	(2.100)	(4.109)	(1.096)	(0.478)
Import Exposure	0.141	0.0871	0.911	-1.529	10.25***	-0.871	0.221
	(0.424)	(0.482)	(1.957)	(2.003)	(3.737)	(1.314)	(0.526)
Age	0.515***	0.770**	0.846***	0.771	0.822***	-0.417	0.672*
	(0.146)	(0.325)	(0.233)	(0.610)	(0.236)	(0.511)	(0.368)
Age squared	-0.00735***	-0.0111***	-0.0110***	-0.00902	-0.0100***	0.00378	-0.00791*
	(0.00171)	(0.00410)	(0.00267)	(0.00757)	(0.00275)	(0.00611)	(0.00437)
Constant	31.83***	42.08***	26.54***	31.88**	31.16***	58.37***	31.82***
	(3.129)	(6.439)	(5.028)	(12.67)	(5.063)	(10.48)	(7.536)
Observations	16,529	5,589	8,397	1,307	6,154	1,989	5,789
R-squared	0.013	0.034	0.016	0.127	0.024	0.091	0.014
Number of Households	7,993	3,768	4,692	959	3,421	1,507	3,700
year#province FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

6 Conclusions

This thesis examines an important feature of growing economic development literature: how the exposure to globalization affects probability of working of males and females in Indonesia. In my thesis, I formally examine these effects by constructing and scoring Population Gravity Index for each individual based on the idea that cities with larger populations exert more force (or gravity) of globalization, but this force weakens as an individual is located further away from cities.The PGI score allows to capture the effect that globalization might have on each individual through provinces. To capture this individual-specific effect of globalization (if it exists), I combine the individual's PGI score with provincial exports and imports to construct two variables – export exposure (XEX) and import exposure (IEX). Finally, to estimate the employment outcomes of males and females by industry and by work status, I combine data of export exposure and import exposure with Indonesian Family Life Survey(IFLS) data.

I estimate the effects of exposure to exports/imports on probability of paid work for males and females. The main findings of the thesis provide evidence that women's work participation is positively responsive to import exposure, and negatively to export exposure. I also find significant results for married females whose labour supply of paid work response negatively with export exposure and positively with import exposure. However, I do not find significant effects of export exposure on males' work decisions. It is also evident in the results that the only significant effect on work participation of males who were not working in the previous year - export exposure induces such males to start working. The results further suggest that male's work participation in general, or by sectorial affiliation or by occupational status, is not responsive to export exposure.

However, females work decisions respond to export exposure both along extensive and intensive margins - their probability of work increases, especially in agriculture, manufacturing and in salaried occupations and they reduce their hours of any work and work in services. Females also

engage in more housework and increase their hours of work as unpaid family worker. Hence, we observe that in response to export exposure, females change their time allocation: they reduce hours of paid market work and increase hours of unpaid house or family work.

This result is also consistent with the income effect story that exposure to exporting activities increases household income by increasing income earned by males, and this positive household income effect discourages women's participation in paid labour market exhibiting a pronounced gender gap in labour force participation in Indonesia.

7 Appendix

7.1 List of Variables

Table 2: List of Variables

Paid/Unpaid Work (Extensive Margin)	
Work	= 1 if the individual reports that working was a primary activity (at least one hour) during the past week
Self Work	= 1 if the individual is self-employed in his/her primary job
House Work	= 1 if the individual reports that housekeeping as a primary activity during the past week
Government Work	= 1 if the individual is a government worker in his/her primary job
Salaried Work	= 1 if the individual is a salaried employee in his/her primary job
Unpaid Family Work	= 1 if the individual reports working for family without pay in his/her primary job
Own Income	= 1 if an individual reports earning his or her own income
Spouse Income	= 1 if an individual reports that his or her spouse earns her or his own income.
Hours of Paid Work (Intensive Margin)	
Hours Usual	hours of work that the individual usually does
Hours Last Week	total number of hours of work that the individual did in the last week

7.2 Map and Figures

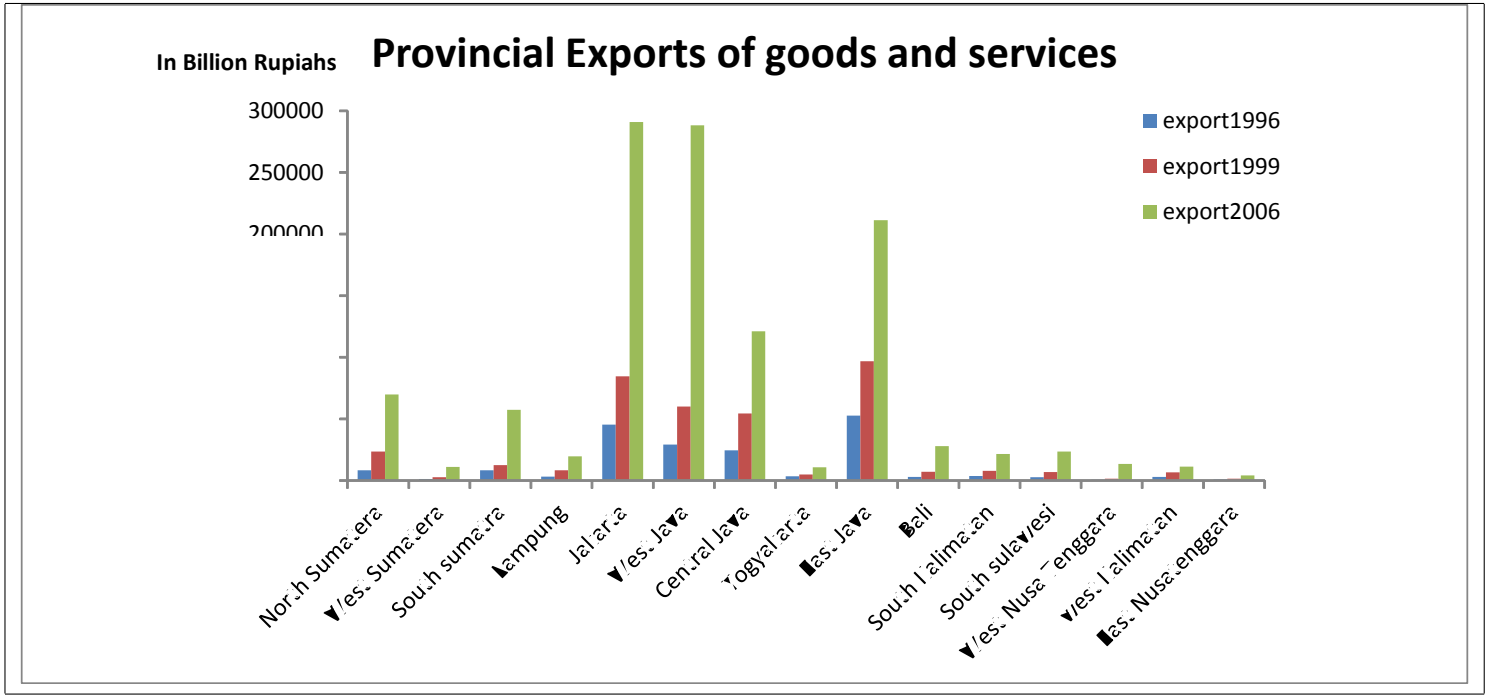

Figure 1: Provincial Exports of Goods and Services overtime(Author's calculation from CEIC Data)

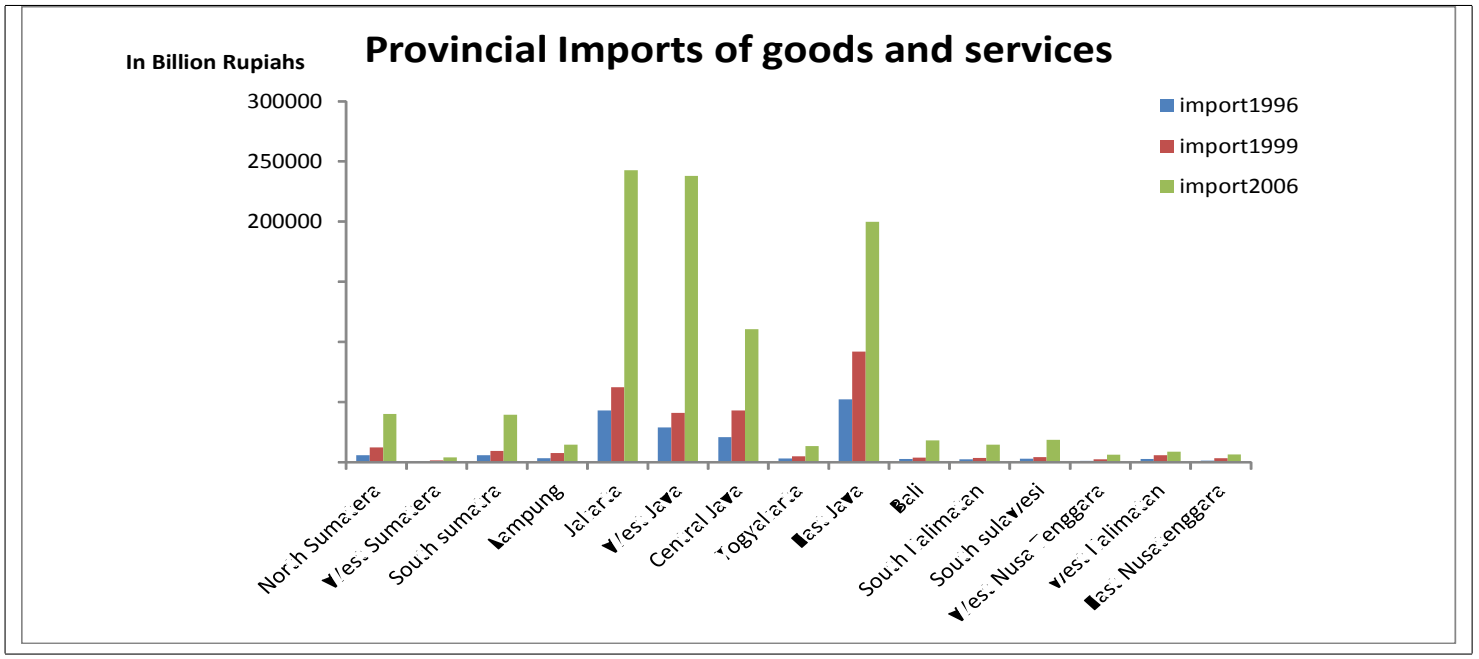

Figure 2: Provincial Imports of Goods and Services overtime(Author's calculation from CEIC Data)

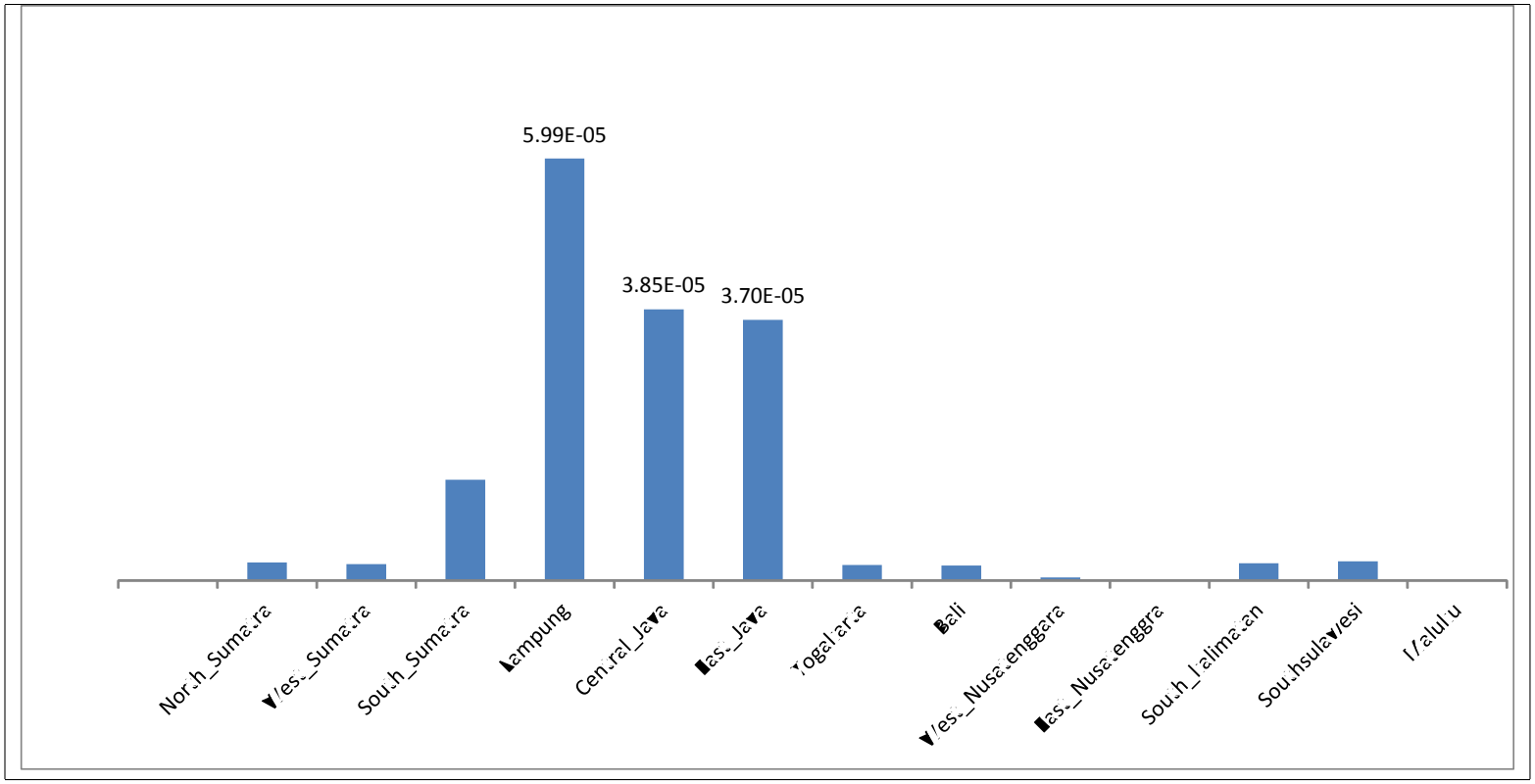

Figure 3: Provincial Variation of Population Gravity Index for a person living in a Household in DKI JAKARTA(Author's calculation from IFLS Data)

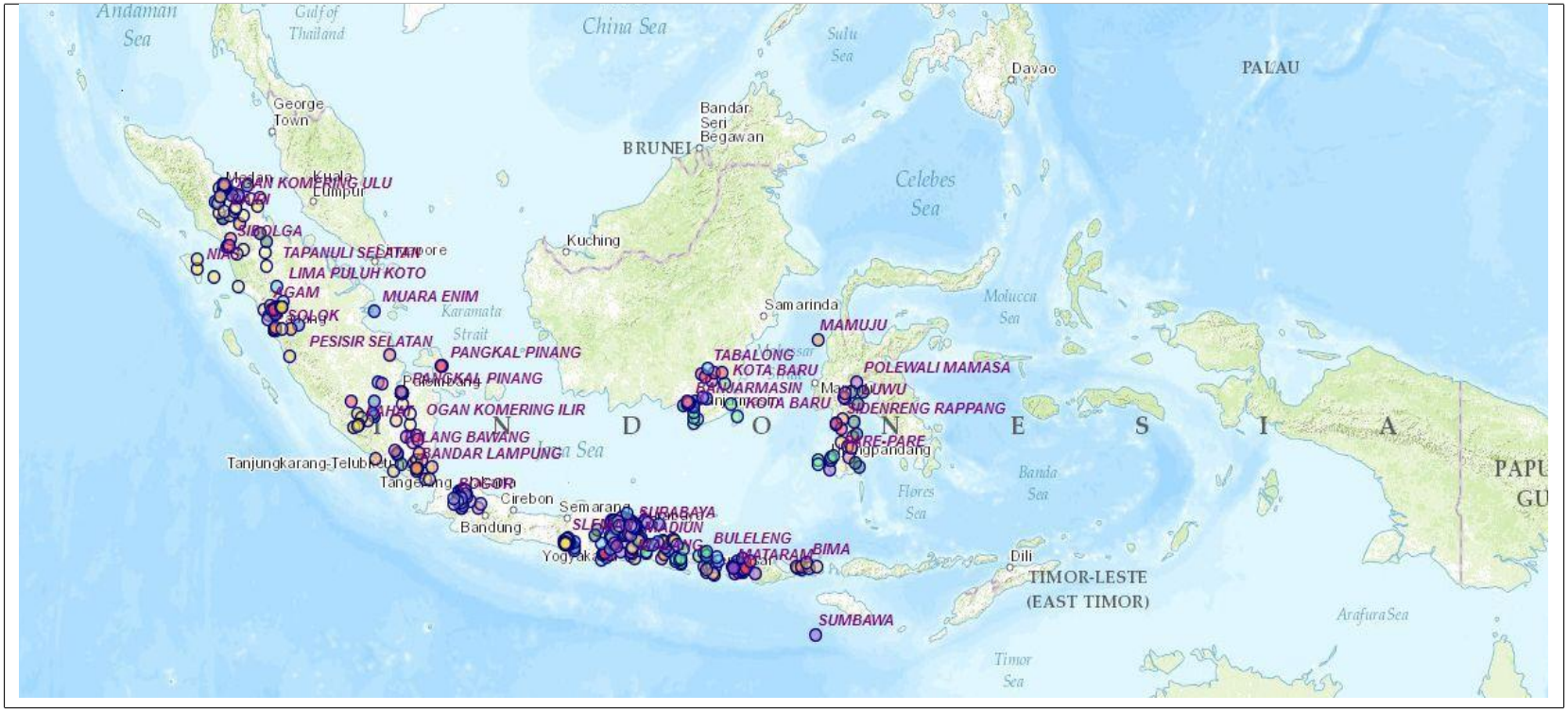

Figure 4: Location of IFLS household Living across Provinces

References

Amiti, M., & Cameron, L. 2012. "Trade liberalization and the wage skill premium: Evidence from Indonesia." Journal of International Economics, 87(2), 277-287.

Amiti, M., & Davis, D. R. 2012. Trade, firms, and wages: Theory and evidence. The Review of economic studies, 79(1), 1-36.

Amiti , M., Konings Joep. 2007. "Trade Liberalization, Intermediate Inputs and Productivity: Evidence from Indonesia." American Economic Review,97(5):1611–38.

Atkin, D. 2009. "Working for the future: Female factory work and child health in Mexico." Unpublished Manuscript, Yale University.

Başlevent,C., & Onaran, Ö. 2004. "The effect of export-oriented growth on female labor market outcomes in Turkey." World Development, 32(8), 1375-1393.

Becker, G. S. 2010. "The economics of discrimination." University of Chicago press.

Berik, G., Rodgers, Y. V. D. M., & Zveglich, J. E. 2004. "International trade and gender wage discrimination: Evidence from East Asia." Review of Development Economics, 8(2), 237-254.

Black,S. E., & Brainerd, E. 2004. "Importing Equality? The Impact of Globalization on Gender Discrimination." Industrial and Labor Relations Review, 540-559.

Bussmann, M. 2009. "The effect of trade openness on women's welfare and work life." World Development, 37(6), 1027-1038.

Cameron, L. A., & Worswick, C. 2001. "Education expenditure responses to crop loss in Indonesia: A gender bias." Economic development and cultural change, 49(2), 351-363.

Cameron, L.A., Dowling, J.M., and Worswick, C. 2001. "Education and Labor Market Participation of Women in Asia: Evidence from Five Countries." Economic Development and Cultural Change, Vol. 49, No. 3, pp.459-477.

Duflo, E. 2012."Women Empowerment and Economic."Development. Journal of Economic Literature, vol. 50(4), pages 1051-1079.

Ederington, Josh & Minier, Jenny & Troske, Kenneth. 2009. "Where the Girls Are: Trade and Labor Market Segregation in Colombia," IZA Discussion Papers 4131, Institute for the Study of Labor (IZA).

Frankenberg, Elizabeth, Duncan Thomas and Kathleen Beegle. 1999. "The Real Costs of Indonesia's Economic Crisis: Preliminary Findings from the Indonesia Family Life Surveys." DRU-2064-NIA/NICHD,Santa Monica, CA: RAND.

Goldin, Claudia.1990."Understanding the Gender Gap: An Economic History of American Women." New York: Oxford University Press.

Gordon,H. Hanson. 2005. "Market potential, increasing returns and geographic concentration" Journal of International Economics, 67(1)

Head, K. Mayer, T. 2002."Illusory Border Effects: Distance mismeasurement inflates estimates of home bias in trade". CEPII working paper

Jayachandran,Seema.2009. "Air Quality and Early-Life Mortality:Evidence from Indonesia's Wildfires." J. Human Resources , vol. 44 no. 4 916-954

Jensen, R. 2012. "Do Labor Market Opportunities Affect Young Women's Work and Family Decisions? Experimental Evidence from India." The Quarterly Journal of Economics, 127(2)

Jones, GW., Suryadarma,D. 2013. "Education in Indonesia.ISEAS Publishing." Institute of Southeast Asian Studies

Juhn, Chinhui , Gergely, Ujhelyi and Carolina ,Villegas-Sanchez. 2014. " Men, Women, and Machines: How Trade Impacts Gender Inequalit." Journal of Development Economics, Volume 106

Kis-Katos Krisztina, Sparrow Robert. 2011. “Child Labor and Trade Liberalization in Indonesia.” J. Human Resources.,vol. 46 no. 4 pages 722-749

Maccini, S., & Yang, D. 2009. "Under the weather: Health, schooling, and economic consequences of early-life rainfall." The American Economic Review, 1006-1026.

Munshi, K., & Rosenzweig, M. 2006. "Traditional institutions meet the modern world: Caste, gender, and schooling choice in a globalizing economy." The American Economic Review, 1225-1252.

Neumayer, E., & De Soysa, I. 2007. "Globalization, women's economic rights and forced labour." The World Economy, 30(10), 1510-1535.

Neumayer, E., & De Soysa, I. 2011. "Globalization and the empowerment of women: an analysis of spatial dependence via trade and foreign direct investment." World Development, 39(7), 1065-1075.

Oostendorp, R. H. 2009. "Globalization and the gender wage gap." The World Bank Economic Review, 23 (1): 141-161

Ozler, S. 2000. "Export orientation and female share of employment: Evidence from Turkey." World Development, 28(7), 1239-1248.

Potrafke, N., & Ursprung, H. W. 2012. "Globalization and gender equality in the course of development." European Journal of Political Economy, 28(4), 399-413.

Redding, S., & Venables, A. J.2004. "Economic geography and international inequality." Journal of international Economics, 62(1), 53-82.

Redding, S. J., & Sturm, D. M. 2008. "The costs of remoteness: Evidence from German division and reunification." American Economic Review, 98:5, 1766–1797 .

Revenga,Ana.1997." Employment and Wage Effects of Trade Liberalization: The Case of Mexican Manufacturing." Journal of Labor Economics, Vol. 15, No. S3,The University of Chicago Press

Strauss, J., Witoeler, .F, Sikoki ,B.,Wattie, M. 2009. "The Fourth Wave of the Indonesia Family Life Survey: Overview and Field Report Volume 1." Rand Labour and Population working paper

Suryadarma,D. Monitoring,S.2006 . "From Access to Income: Regional and Ethnic Inequality in Indonesia." Working Paper.SMERU Research Institute.

Thomas,D., Witoelar,F., Frankenberg,E.,Sikoki,B., Strauss,J.,Sumantri,C Suriastini,W. 2012. "Cutting the costs of attrition: Results from the Indonesia Family Life Survey" Journal of Development Economics, (98) 108–123.