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Essays on Labor Market in Indonesia

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A thesis submitted in partial fulfillment of the requirements for the degree in Doctor of Philosophy

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by

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Abstract

This thesis analyzes labor market issues in Indonesia. The first chapter analyzes the insurance role of self-employment during the Asian Financial Crisis. Difference in difference estimation is used to estimate the effect of having self-employed business before the crisis on household consumption and labor supply during the crisis. I find that households with self-employed business before the crisis could increase labor supply by a much lesser amount to maintain the same level of consumption compared with households without self-employed business before the crisis. The second chapter looks at the effect of women's work hours on their intra-household bargaining power. I utilize direct information on household decision-making from the Indonesian Family Life Survey to construct direct measures of women's intra-household bargaining power. I also use regional price increase during the Asian Financial Crisis as an instrumental variable that positively affects women's work hours but does not affect women's bargaining power directly. I find evidence for a positive relationship between women's work hours and their intra-household bargaining power. The third chapter compares the Indonesian Family Life Survey and the Indonesian Labor Force Survey and tries to reconcile the inconsistencies between the two surveys in employment measures. After documenting and testing potential causes of the inconsistencies, I find that the inconsistencies are by large not reconcilable. The design of questions on working status in the survey and the treatment of unpaid family work, however, does seem to be a factor causing inconsistencies between the two surveys.

Keywords: Developing countries, risk and insurance, self-employment, informal sector, financial crisis, intra-household decision making, women's bargaining power, data inconsistency, unpaid family work, survey design

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Chapter 1

Introduction

This thesis attempts to add to our understanding of labor markets in developing countries. It analyzes three issues in the context of Indonesia: the insurance role of self-employment during aggregate economic shocks, the relationship between women's working status and their intra-household bargaining power, and the comparability of labor force data.

Indonesia is relatively understudied in the development literature although it is the world's fourth most populous country. Being an archipelago with over 13,000 islands, Indonesia is diverse in geography, ethnicity, and culture. This diversity makes the nation an ideal setting for economic research. Furthermore, Indonesia has undergone various policy phases and economic fluctuations since the founding of the nation in the 1940s. Inter-temporal variations in policy and the macro economy are of interest from the perspective of both policy research and analysis of microeconomic responses to changes in the economic environment.

The 1998 Asian financial crisis is a common thread through this thesis. Being the hardest hit country by this crisis, Indonesia went through a period of turmoil in terms of exchange rate, prices, and productivity. Each chapter makes use of this event to shed light on the empirics of household behavior.

The first chapter studies the insurance role of self-employment for households coping with the Asian financial crisis in urban Indonesia. Using data from the Indonesian Family Life Survey, it analyzes change in household labor supply before and after the crisis, and reveals that one of the coping strategies households used was to increase labor supply. The self-employed sector played a significant safety net role during the crisis as workers laid-off from the wage sector and new workers who entered the labor force during the crisis could find employment in the self-employed sector. Furthermore, having prior self-employment before the crisis may have had an insurance value for households; households with such activity prior to the crisis increased their labor supply less than those who did not.

The second chapter investigates the relationship between women's working status and their bargaining power within the household. The fact that women's working status and bargaining power are simultaneously decided and the fact that bargaining power is not observed have hampered research on this topic. This chapter utilizes unique information on household decision-making from the Indonesian Family Life Survey to construct indices of women's intra-household bargaining power. It also uses the Asian financial crisis as an exogenous event that increased women's work without directly affecting their bargaining power. Exploring the fact that one major impact of the crisis was high inflation, that inflation varied significantly across regions during the crisis, and that inflation reduced real wages and thus affected household labor supply, this analysis uses regional inflation as an instrument for the change in women's work hours during the crisis. It finds evidence of a positive relationship between women's work hours and the bargaining power indices.

The third chapter compares two widely used survey datasets from Indonesia: the Indonesian Family Life Survey (IFLS) and the Indonesian Labor Force Survey (Sakernas), and tries to reconcile the differences in measures of labor market outcomes (the total employment rate, the wage employment rate, and the non-wage

employment rate) between these two surveys.[1] Inconsistency between these two surveys in all of the above three measures, both in levels and in changes over time, is significant. This chapter documents the key differences between the two surveys that could cause these inconsistencies. It also tests whether differences in sampling structure, age and education distribution, and questionnaire design contribute to the inconsistencies. Differences in sampling structure and age and education distributions do not seem to explain the inconsistencies. Accounting for the difference in questionnaire design reconciles a small portion of the gaps, especially in rural areas. This study concludes that the two surveys are not easily reconcilable using information available. Questionnaire design is important for measure of employment, especially for measure of family work in rural areas.

[1] Non-wage employment includes self-employed workers and unpaid family workers.

Chapter 2

Household Risk Coping Strategies: The Role of Self-Employment during the Asian Financial Crisis in Indonesia

2.1 Introduction

In this chapter, I study the role of self-employment as a way for households to cope with economic shocks in developing countries. By looking at the episode of the 1998 Asian financial crisis (AFC) in urban Indonesia, I provide evidence that the self-employment sector played a safety net role in terms of absorbing labor.[1] Also, my findings indicate that having self-employment before the crisis may have had insurance value for households during the crisis. Households with prior self-employment experienced a smaller increase in labor supply compared to households without prior self-employment.

[1] In this chapter individuals who report themselves as self-employed workers or unpaid family workers are both defined to be employed in the self-employed sector.

Being the hardest hit country by the Asian financial crisis (AFC), Indonesia underwent a sharp depreciation of the local currency, an 80% inflation and a 14% decrease in real GDP in 1998. During such crises or shocks, households typically adopt coping mechanisms to mitigate the impact of the crisis on their standard of living. As will be detailed in this chapter, data from the Indonesian Family Life Survey (IFLS) and the Indonesian Labor Force Survey reveal that during the crisis Indonesian households sold assets, increased the rate of household composition change, and increased labor supply. Furthermore, the increased labor supply was mainly in the self-employed sector. As a result, the increase in total employment was associated with a shift of labor from the wage- to the self-employed sector.[2]

The fact that labor shifted from the wage employment sector into the self-employment sector without a decrease in total employment suggests that the self-employment sector may have played a safety net role during the crisis. The self-employment sector appeared to have absorbed the labor laid off from the wage sector. Also, it was able to absorb the additional labor that entered the labor force during the crisis when households increased labor supply as a crisis-coping strategy. In this chapter I pursue the safety net role of the self-employment sector by asking the following question: Did self-employment act as a form of insurance for households in urban Indonesia during the crisis, in the sense that a household with self-employment before the crisis would fare better during the crisis than an identical household without self-employment before the crisis?

As self-employment is strongly correlated with informal activities in developing countries, the analysis in this chapter contributes another explanation for the existence of a large informal sector in developing countries.[3] Traditionally, the

[2]The increase of labor supply in the self-employment sector during recent economic crisis episodes has been widely observed in developing countries, for example, Mexico during the 1982 crisis(de la Rocha (1988)), Mexico during the 1995 crisis (Martin (2000)), and Costa Rica during the 1982 crisis (Gindling (1993)).

[3]I will show in the descriptive analysis that most of the non-farm self-employed businesses in urban Indonesia are of small scale and under-regulated, and utilize less advanced technology and unskilled labor. All these characteristics are associated with informal activities in developing countries. Also, the definition of informal employment as self-employment is widely used in the development literature (Fiess et al. (2010), Loayza and Rigolini (2011)) and by the International

development literature contains two strands of thoughts on why the informal sector exists when there is an earning gap between the formal and the informal sector. The first strand originates from the dual sector model of Harris and Todaro (1970). Their view is that the informal sector contains workers rationed out of the formal sector due to formal sector entry barriers and rigidities such as a minimum wage. Such factors lead to labor market segmentation, which causes informal workers to earn less than identical workers in the formal sector.

A second, emerging strand of literature (Gindling (1991); Maloney (1999); Maloney (2004)), more in the spirit of a Roy model, considers informal employment as a voluntary choice based on people's comparative advantage. Although workers in the informal sector on average may earn less than workers in the formal sector, those who work in the informal sector earn more in that sector than they would in the formal sector.

This chapter adds a third rationale for informal employment, which is that informal employment provides insurance against economic shocks in the formal sector. If households anticipate that having informal employment will help them fare better in future economic shocks, they may choose to engage in some informal employment currently, even though they receive a lower return with informal employment currently. If informal employment does, in fact, play an insurance role, this would have policy implications. Policies aimed at modernizing the economy by reducing the informal sector may need to be accompanied by measures that provide households with better access to insurance, for example, unemployment insurance.[4] Otherwise, reductions in informal activities may make households worse off by increasing their consumption volatility.

The insurance role of self-employment will only arise if the return to self-employment is not perfectly correlated with the economic shocks that the households encounter. Traditionally the development literature viewed the

Labor Organization.

[4]Unemployment insurance does not exist in many developing countries including Indonesia.

self-employment sector as a risky sector with big variation in profits or earnings over time (Perry et al. (2007); Gunther and Launov (2012); Bennet et al. (2012)). With respect to rural areas, much research has been done on the riskiness of crop production and the various non-market strategies households use to insure against this risk (Rosenzweig and Bingswanger (1993); Rosenzweig and Wolpin (1993); Besley et al. (1993); Fafchamps et al. (1998)). With respect to urban areas, little research exists that measures the riskiness of self-employment. It is commonly believed, however, that self-employment is riskier than wage employment, as self-employment is in the form of micro-entrepreneurship that may result in variable profit or loss. Wage employment, in contrast, may generate more stable income (Perry et al. (2007); Gunther and Launov (2012)). Nevertheless, self-employment may have an insurance value if the other kinds of risk that the households face are not perfectly correlated with the returns to self-employment. One such risk is unemployment from wage jobs. Another such risk is inflation. Inflation may be less correlated with changes in real earnings from self-employment, because self-employment often involves production of in-kind services and goods, the value of which is more insulated from inflation shocks. Also, self-employment does not involve long-term employment contracts with fixed nominal pay, which can make wages in the wage sector less flexible and unable to adjust with inflation. These considerations are relevant to the AFC in Indonesia, which was accompanied by surging inflation and a drop in formal sector productivity (Soesastro (1998), Evans (1998)).

If entry into self-employment is costless, then households would not have an incentive to hold prior self-employment as buffer against future shocks. They can switch into self-employment after the shocks are realized without paying a cost. Is entry into self-employment costless? In most developing countries, self-employment is in small household businesses that employ only, or mainly, family labor (Fiess et al. (2010); Loayza and Rigolini (2011)). In order for households to enter self-employment, they need to start their own businesses, which

may require some initial investment in capital. As discussed in Balan et al. (1973) and Fiess et al. (2010), although the initial starting capital is modest for these businesses, the amount may be substantial relative to household resources and can take some time to accumulate. As I will show using Indonesian data, the starting capital for self-employed businesses in urban Indonesia is non-trivial relative to the level of household consumption. Another cost of entry into self-employment may be lower return in the initial period of operation due to lack of experience.

This chapter will add to the literature on risk and self-insurance in developing countries by studying a risk-managing strategy used by urban households in Indonesia: diversification between wage employment and self-employment. Diversification of income generating activities has been one of the self-insurance or risk management strategies discussed in the development literature. The strategies that have been studied include diversification between farm and non-farm activities (Reardon (1997), Townsend (1994), Dercon (2002)) and diversification in location of land plots and types of crop grown (Morduch (1990), Dercon (1996)). The literature on risk and self-insurance in developing countries mainly concentrates on households in rural areas; income smoothing strategies of households in urban areas are understudied. Similar to households in rural areas, households in urban areas can face considerable risk at both the individual and aggregate levels. This chapter concentrates on households in urban areas in Indonesia and studies their income diversification strategies.

The main questions posed in the literature on income diversification strategies include: 1. How big is the scope for income diversification? 2. To what extent do households use these strategies? 3. To what extent do these strategies smooth household's income? 4. What are the constraints and costs of using these strategies?(Dercon (2002)) In this chapter, when analyzing diversification between wage employment and self-employment by urban households, I provide some evidence on the first question by exploring household data on economic shocks in urban Indonesia. I find that during the AFC households with

mostly wage employment experienced more economic shocks than households with mostly self-employment, while in a non-crisis period, households with mostly self-employment experienced more economic shocks. Regarding the second question, this chapter describes household labor allocation between wage employment and self-employment in urban Indonesia. Around half of households in urban Indonesia have self-employed businesses. I also provide some evidence on the fourth question by examining the amount of starting capital for self-employed businesses. I find this starting capital is substantial compared to household monthly consumption. The main empirical task of this chapter is to provide evidence on the third question: I conduct an empirical analysis to test the existence and the magnitude of the insurance value of prior self-employment with respect to household consumption and labor during the crisis.

To carry out such a test, ideally I would want to compare two households that are identical except the fact that one household had self-employment before the crisis and the other did not. Comparison of these two households during the crisis would provide evidence of whether and by how much the household with prior self-employment fared better than the household without prior self-employment. Of course, it is impossible to observe two such households. Nevertheless, if I observe all the household characteristics that determine whether the household would have prior self-employment before the crisis, I can obtain a consistent estimate of the insurance value of prior self-employment during the crisis by comparing households with and without self-employment before the crisis. As shown in my analytical model, however, the decision to have self-employment before the crisis may depend on household unobserved characteristics that also affect household consumption and labor during the crisis. Therefore, having self-employment before the crisis is an endogenous decision.

To address this endogeneity problem, I utilize the panel data nature of the IFLS and carry out difference in difference estimations. I use households that did not have prior self-employment either in the pre-crisis period or in the during-crisis period

as the control group. I use households that did not have prior self-employment in the pre-crisis period but had prior self-employment in the during-crisis period as treatment group. The difference in the changes in household consumption and labor during the crisis between these two groups will provide a consistent estimate of the treatment effect of prior self-employment. Using this approach, I find the average effect of the crisis on household consumption and labor is a decrease in consumption and an increase in household labor. Having prior self-employment has no effect on household consumption, but has a negative effect on one measure of household labor: the percentage of adult members who work. I conclude that the evidence regarding the insurance value of prior self-employment is mixed.

The rest of the chapter proceeds as follows: Section 2.2 describes the Indonesian context and the changes in the Indonesian economy during the AFC. Section 2.3 introduces the two datasets (the Indonesian Family Life Survey and the Indonesian Labor Force Survey) used in this chapter and talks about various issues in using these two datasets to analyze households' and individuals' responses to the AFC. In section 2.4 I provide descriptive statistics regarding the magnitudes of various coping mechanisms that urban households used to mitigate the impact of the crisis. In section 2.5 I include some descriptive analysis on the frequency of economic shocks encountered by urban households and on the nature of self-employed businesses. I then examine differences between households that held prior self-employment before the crisis and households that did not in terms of pre-crisis characteristics as well as changes during the crisis. Section 2.6 introduces a simple analytical model that captures households' consumption and labor allocation choice during the crisis and derives testable implications. Section 2.7 explains the empirical strategy. Section 2.8 reports the results and provides some discussions. Section 2.9 concludes.

2.2 The Indonesian Context and the Asian Financial Crisis

2.2.1 The Indonesian Context

Indonesia is the fourth most populous nation in the world with a population of 238 million in 2010. Being an archipelago with 13000 islands, the country has around 300 ethnic groups and 742 different languages and dialects. Population density varies significantly across regions, and 58% of the population lives on the island of Java. Despite the growth of a number of urban centers, Indonesia remains a largely rural country, with two-thirds of the population living in rural areas in 1997. Jakarta, the capital and economic and financial center of the country, has been a major destination for migrants.

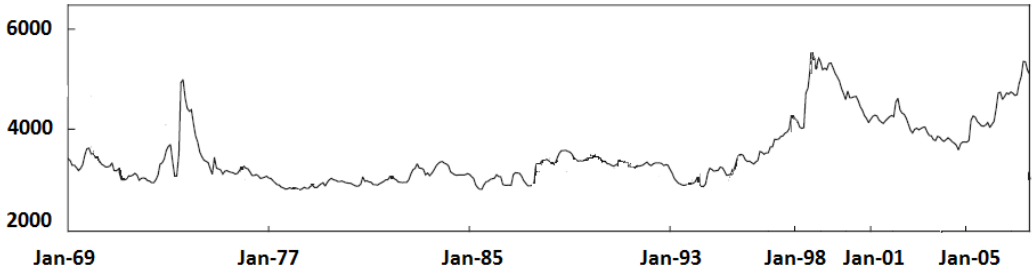
Before the Asian financial crisis (AFC), Indonesia was undergoing a period of rapid economic growth and structural change, transforming from a traditional agricultural based economy into a modern economy based on industry and service. From 1976 to 1997, non-oil and gas GDP grew on average by 7.5% per year (Dhanani et al. (2009)).[5] During the same period, agriculture's share of non-oil/gas GDP decreased from 37% to 16%, and agricultural employment's share of total employment decreased from 62% to 41% (Dhanani et al. (2009)). From 1986 to 1997, wage employment rose from a quarter to one-third of total employment (Dhanani et al. (2009)). Human capital had also improved significantly: primary school enrollment rose from 75% in 1970 to universal enrollment by 1995, and secondary school enrollment rose from 13% to 55% over the same period (World Bank Databank).

[5]Oil and gas sector has been an important sector of the Indonesian economy, especially during the 1970s and 1980s when Indonesia was a significant oil-exporting country. Indonesia became an oil-importing country recently due to its decreasing oil production and increasing domestic demand. Although an important sector, employment in oil and gas is a small fraction of total employment in Indonesia.

Rice and fuel subsidies have been a feature of the Indonesian economy since its independence in the 1940s. As shown in Figure 2.2, with the exception of a brief period in 1974 and 1975, from the late 1960s until 1997 the price of rice was maintained at a subsidized level. The subsidies were financed using the influx of oil revenue and foreign investment (Beaton and Lontoh (2010);Timmer (2004)). The government used subsidies primarily to support macroeconomic policies aimed at maintaining social and political stability (Beaton and Lontoh (2010)). In this regard, rice price stability was especially important because rice is the staple food for most Indonesian households. As of 1997, the share of rice consumption in total household consumption ranged from 5% to 20%, depending on the household's income level (calculated using data from the Indonesian Family Life Survey). The removal of rice and fuel subsidies during the AFC is one of the leading causes of price surge during the AFC.

Figure 2.1: Map of Indonesia

Figure 2.2: Real Rice Price 1969 - 2007, Rp/Kg, Monthly Data



Source: Dawe (2008)

2.2.2 The Asian Financial Crisis in Indonesia and Its Impacts

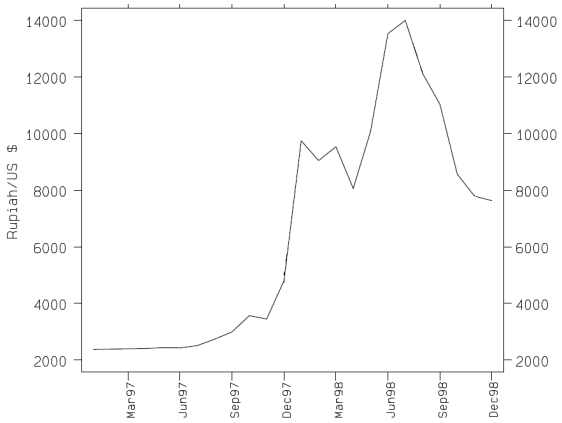
The Asian financial crisis started in May, 1997, when the Thai baht came under speculative attacks. Indonesia began to be affected in July 1997, when the local currency, Rupiah, also came under attack due to a contagion effect. The Indonesian government first tried to defend the Rupiah within a trading band and then allowed the currency to float freely on August 14, 1997. A 30% depreciation followed in the next two months (Figure 2.3). The sharp depreciation of the Rupiah made many banks and corporations insolvent, because they had borrowed heavily in foreign currency denominated short-term debts (Soesastro (1998)). In October, 1997, the Indonesian government closed 16 insolvent banks.

The credit crunch had a significant impact on the modern sector, bringing production to halt in many firms (Manning (2000)). Several studies reported large-scale layoffs in construction and manufacturing (Hartono and Ehrmann (2001); Soesastro (1998)). In January, 1998, after the announcement of the state budget plan, the Rupiah collapsed. Under pressure from the IMF to cut government expenditures and foreign debt, the Indonesian government removed subsidies on rice and fuel in January, 1998. The removal of subsidies lead to a surge in food and other prices (Figure 2.2 ; Figure 2.4). Inflation in 1998 was 80%, partly the result of the removal of subsidies and partly due to the increase in the relative prices of tradable goods including rice and other cash crops. The surge in the prices of basic necessities lead to nation-wide protests and riots against the government, which eventually lead to the resignation of Suharto in May, 1998 and the ending of 32 years of Suharto's regime. Real GDP decreased by 14% in 1998, and GNI per capita did not recover to the 1997 level until 2003 (Figure 2.5).

Strauss et al. (2004) explain that for Indonesian households, the major crisis during the AFC was the surge in prices, which caused a sharp, rapid reduction in households' real income. Losses and firm closings in the modern sector also had a significant impact on the household sector through layoffs and wage cuts. The

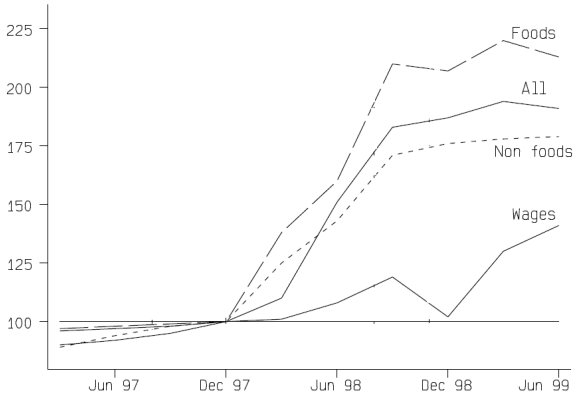
result was a substantial decline in living standards. Frankenberg et al. (1999) found that from 1997 to 1998 mean household per capita consumption decreased by 34% in urban areas, and median household per capita consumption decreased by 5%. At the same time, enrollment rates for urban children aged 13 to 19 years old fell from 67% to 62% (Poppele et al. (1999)).

Figure 2.3: Exchange Rate Fluctuation During Crisis



Source: Frankenberg et al. (2003)

Figure 2.4: Change of Price and Nominal Wage



Source:Frankenberg et al. (2003)

Figure 2.5: GNI Trend

Source: tradingeconomics.com

2.3 Data

2.3.1 The Indonesian Family Life Survey

The IFLS is a household level longitudinal survey conducted by RAND Corporation in 1993, 1997, 1998, 2000 and 2007. All rounds of the survey are publicly available except the 1998 round. In the first wave conducted in the second half of 1993, over 30,000 individuals in 7,224 households were sampled. The sampling scheme was stratified on provinces and rural-urban areas within provinces. Enumeration areas (EAs) were randomly sampled within these strata, and households were randomly sampled within the enumeration areas. The documentation for the IFLS states that EAs in the urban areas and in smaller provinces were oversampled to facilitate urban-rural and Java/non-Java comparisons. The sample covered 13 out of the 27 provinces in Indonesia, including all provinces on Java and provinces on Sumatra, Bali, Kalimantan, Sulawesi, and Nusa Tenggara (Figure 2.1). As a result, the sample covered about 83% of the Indonesian population.

In each of the succeeding rounds, the survey team tried to re-contact all of the households interviewed in 1993 ("original households"). Members who moved out of their original households were also tracked and their new households were added to the sample ("split-off" households).[6] The resulting sample size and the recontact rate for each round is listed in Table 2.1. Attrition for original households was 7% from 1993 to 1997 and 3% from 1997 to 2000. If we only want to compare changes between 1997 and 2000 for the original households, then attrition is rather low.

The IFLS collected rich information on many aspects of household and individual life, including household consumption, business and assets, and individual education, working status and work history.

In this chapter, I treat the IFLS2 as the survey round before the crisis and the IFLS3 as the survey round during the crisis, and derive the changes during the

[6] A more detailed description of the IFLS re-contact procedure is provided in Appendix A.

Table 2.1: Sample Size and Attrition of the IFLS 1993, 1997, 1998 and 2000

	Household Type			
	Original	1997 Splits	1998 Splits	2000 Splits
1993 households	**7224**			
1997 households	**6742**	878		
1993-1997 recontact rate	**93%**			
1997 HHs to be tracked in 1998	1911	264		
1993 HHs to be tracked in 1998	2063			
1998 households	1990		344	
1993-1998 recontact rate	96%			
1997 households that are also in 1998	1893	241		
1997-1998 recontact rate	99%	91%		
2000 households	6758			2646
1993-2000 recontact rate	94%			
1997 households that are also in 2000	**6564**	751		
1997-2000 recontact rates	**97%**	86%		
1998 households that are also in 2000	1935	220	279	
1998-2000 recontact rates	97%	91%	81%	

crisis by comparing the IFLS3 with the IFLS2. As noted already, in Indonesia the AFC started in July, 1997. The IFLS2 was conducted mainly between June and November of 1997. Therefore, when the IFLS2 field work took place, the crisis had already begun to unfold. The currency collapse and the hyperinflation, however, both occurred in January, 1998, which was after the IFLS2 fieldwork. I, therefore, have some confidence in treating the IFLS2 as representing the pre-crisis situation.

To analyze the impact of the crisis, ideally one should use the IFLS2+, which was administered in 1998 at the deepest point of the crisis. This round, however, is not publicly available. Therefore, I can only use the IFLS3, which was conducted in 2000, to represent the situation during the crisis. By 2000, the economy would have recovered to some extent from the deepest of the crisis, but as shown in Figure 2.5, per capita GNI did not recover to the 1997 level until 2003. As a result, it should be possible to capture part of the effects of the AFC using the IFLS3. One should keep in mind that the changes observed by comparing the IFLS2 and the IFLS3 may understate the full impact of the crisis on Indonesian households.

2.3.2 The Indonesian Labor Force Survey

The Indonesian Labor Force Survey is a household level repeated cross section survey. The Indonesian Bureau of Statistics has been conducting it since 1976. This chapter uses the period from 1986 to 2011.[7] The survey design stratifies on urban-rural status and randomly samples enumeration areas within urban and rural areas. Then segment groups are randomly sampled within enumeration areas, and all households within segment groups are interviewed. The sample of the Labor Force Survey each year is much bigger than that of the IFLS, ranging from 155,000 to 950,000 individuals and covering all provinces of Indonesia.[8] Therefore, the Labor Force Survey should be more representative of the population distribution across regions and across urban-rural status than the IFLS. Its questionnaire is much shorter than the IFLS, only asking for information about education and work for household members older than 15 years.

The advantage of using the Labor Force Survey to analyze the effects of the AFC is that data are available annually. As a result, one can obtain the long-run trend in labor market outcomes and observe the deviation from the trend during the AFC. Another advantage is that the Labor Force Survey in 1997 was conducted in August only, while the field work for the IFLS2 extended from June until November. Therefore, the 1997 round of Labor Force Survey can be treated as pre-crisis with more confidence than the IFLS2. Also, the Labor Force Survey's 1997 round can be compared with the 1998 round, so that one can observe the changes in labor market outcomes between those two years. One can also see whether the crisis impact continued to deepen or whether outcomes had begun to recover in 1999 and 2000. In these respects, the Labor Force Survey should complement the observations one can make from comparing labor market outcomes between the IFLS2 and the IFLS3.

[7] From 1986 to 1993, the survey was conducted quarterly. Starting in 1994, the survey was conducted annually.

[8] In 1995, the Labor Force Survey was administered as part of the Inter-Census Population Survey, resulting in a bigger sample size and different sampling frame.

The main advantage of the IFLS is that it contains information on household consumption, which is a key variable in my analysis. Therefore, this chapter mainly uses the IFLS in the empirical analysis. In addition, the panel data nature of the IFLS allows me to control for household fixed effects and thus deal with the problem that self-employment is an endogenous decision.

2.4 Descriptive Statistics on Different Coping Mechanisms

2.4.1 Impact of Crisis on Consumption

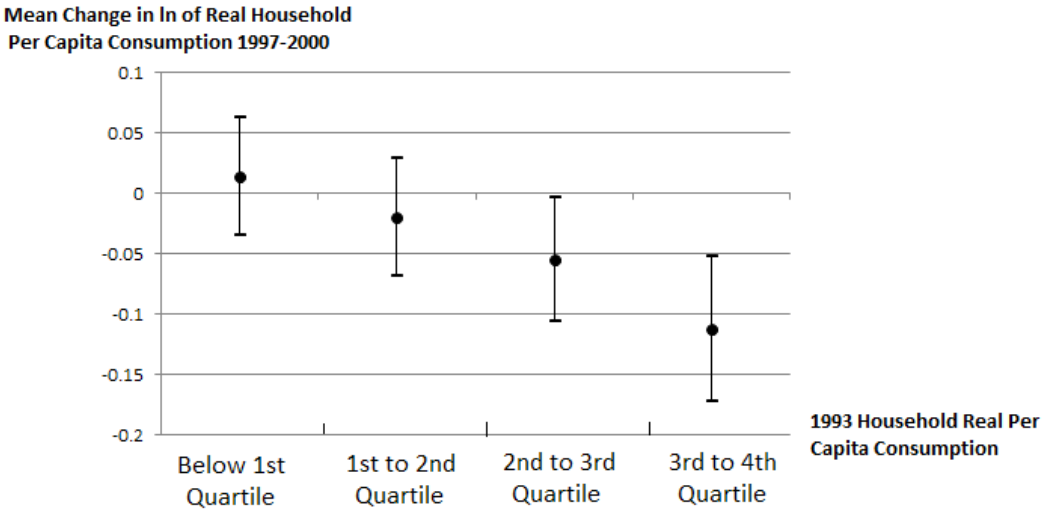
Table 2.2: Change in Household Per Capita Consumption in Urban Indonesia

Mean of Real Per Capita Consumption 1997	135699
Median of Real Per Capia Consumption 1997	75940
Mean of Change in Real Per Capita Consumption 1997-2000	-27185
Median of Change in Real Per Capita Consumption 1997-2000	-1372
Mean of Change in Ln of Real Per Capita Consumption 1997-2000	-0.0434
Median of Change in Ln of Real Per Capita Consumption 1997-2000	-0.0211
Change of Mean Real Per Capita Consumption 1997-2000	-19.91%
Change of Median Real Per Capita Consumption 1997-2000	-5.95%
Change of Mean Real Per Capita Consumption 1993-1997	67.73%
Change of Median Real Per Capita Consumption 1993-1997	35.49%

Data source: IFLS1 IFLS2 IFLS3, original panel households

As discussed in Section 2.2.2, Frankenberg et al. (1999) find that household per capita consumption decreased by 34% in mean and 5% in median comparing the IFLS2 and the IFLS2+ (1997 and 1998). I compute the change of household per capita consumption between the IFLS2 and the IFLS3 (1997 and 2000). Table 2.2 shows that from 1997 to 2000 the change in mean of household real per capita consumption is -19.91%, and the change in median of household real per capita consumption is -5.95%. This change is similar to what Frankenberg et al. (1999) have found using the IFLS2+. Table 2.2 also shows that before the crisis average household consumption was increasing fast, and the crisis has reversed this trend.

Figure 2.6: Mean of Change in Ln of Real Household Per Capita Consumption from 1997 to 2000 in Urban Indonesia by Real Household Per Capita Consumption in 1993 (with 95% C.I. bars)



Source: IFLS1 IFLS2 IFLS3

The fact that mean of household per capita consumption decreased more than median indicates that the crisis hit richer households more. Figure 2.6 confirms that this might be the case. One can see that the richer households in 1993 in terms of household per capita consumption had a bigger percentage decrease in per capita consumption from 1997 to 2000.[9] For the richest group of households, mean percentage decrease in household per capita consumption was more than ten percentage points.

One can see that the impact of the crisis on consumption was quite large. To mitigate the effect of the crisis, households could use various coping strategies, such as increasing labor supply, spending savings, selling assets or sending members to live or work in areas less hit by the crisis. In this section, I will show the magnitudes of each of these mechanisms.

[9] I use 1993 consumption to categorize households into richer and poorer groups because by 1997 household consumption may have already been affected by the crisis.

2.4.2 Increase in Labor Supply and Shift from Wage Employment to Self-employment

One coping strategy households could use during the crisis was to increase labor supply in order to generate additional income. Using around 4400 urban panel respondents who were tracked in the IFLS1, the IFLS2 and the IFLS3, in Table 2.3 I show the change in percentages of individuals who are employed in the wage sector, in the self-employed sector, and not working. From 1993 to 1997, the distribution of individuals among different employment status did not change. From 1997 to 2000, however, wage employment decreased by 3.6 percentage points, self-employment increased by 7.7 percentage points, and total employment increased by 4 percentage points. In other words, total employment increased significantly, and at the same time, there was a shift from wage employment into self-employment.

Table 2.3: Percentage of Urban Individuals with Different Employment Status

	1993	1997	2000
Wage employment	34.83	33.8	30.21
	[33.44, 36.24]	[32.41, 35.21]	[28.87, 31.59]
Self-employment	30.34	30.7	38.42
	[29.01, 31.71]	[29.35, 32.08]	[36.99, 39.87]
Not working	34.83	35.51	31.37
	[33.44, 36.24]	[34.1, 36.93]	[30.02, 32.76]

Data source: IFLS1 IFLS2 IFLS3, panel respondents, numbers in brackets are 95% confidence intervals. All measures calculated using only the primary job of individuals.

To look at the change in labor supply at the household level, I compute the percentage of adult members (age greater or equal to 15 years) who work, who are employed in the wage sector and who are employed in the self-employed sector for each household. The sample I use are original panel households that had urban residence in 1997 and that were recontacted in 2000. Table 2.4 shows the mean of these measures. Again, the percentages show little change between 1993 and 1997, but from 1997 to 2000 the share of adult members who work on average increased by 5 percentage points for urban households. The increase was due to greater self-employment.

Table 2.4: Share of Adult Members of Urban Households who Work, who Are Employed in Wage Sector, and who Are Employed in Self-Employed Sector, Mean across Households

	1993	1997	2000
Share working	59.48	58.43	63.64
	[58.29, 60.67]	[57.22, 59.65]	[62.44, 64.84]
Share wage employment	34.99	34.73	33.76
	[33.71, 36.26]	[33.47, 35.99]	[32.50, 35.02]
Share self-employment	24.49	23.7	29.88
	[23.25, 25.74]	[22.47, 24.93]	[28.55, 31.21]

Data source: IFLS1 IFLS2 IFLS3, panel respondents, numbers in brackets are 95% confidence intervals. Adult members are older than 15. All measures calculated using only the primary job of individuals.

Since self-employment is mostly in small household businesses, we should see an increase in the number of household businesses during the crisis. This is indeed the case, as demonstrated in Table 2.5. The change in percentage of households with either farm or non-farm business was small from 1993 and 1997. Between 1997 and 2000, however, there was a surge (17 percentage points) in the percentage of urban households with non-farm businesses. This increase adds more confidence to the claim that self-employment increased significantly during the crisis. The expansion of self-employment was accompanied by the creation of household businesses.

Table 2.5: Percentage of Urban Households with Farm and Nonfarm Businesses

	1993	1997	2000
% with farm	11.63	9.92	13.52
% with non-farm	38.4	37.86	54.56

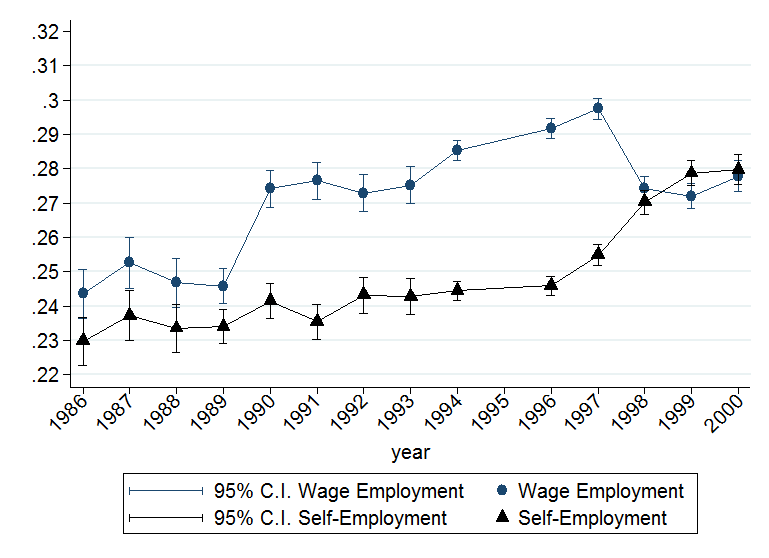
Data source: IFLS1 IFLS2 IFLS3, panel original households

To confirm the stylized fact that total employment increased during the crisis with a shift from wage employment sector into self-employment sector, I use the Labor Force Survey to construct the trend of wage employment vs. self-employment at the individual level for the period from 1986 to 2011.[10] 1995 was taken out as it was part of the Inter-Census Population Survey with

[10]wage employment is percent of adults employed in the wage sector, self-employment is percent of adults employed in the self-employed sector.

a different sampling frame. The trend is shown in two separate graphs because in 2001 the definition of working had changed in the Labor Force Survey, resulting in non-comparability of the data before and after 2000.[11] As shown in Figure 2.7, before 1997, there was a trend of increasing wage employment and stable self-employment. In 1998 this trend was reversed, and we see a two percentage points drop in wage employment and 1.5 percentage point increase in self-employment. As a result, from 1997 to 1998 total employment decreased by 0.5 percentage point and labor shifted from the wage employment sector to the self-employment sector. We can also see that from 1998 to 2000 wage employment did not drop further, and self-employment increased by another 1.0 percentage point. Therefore, the pattern of a shift from wage employment to self-employment during the crisis is also observed in the Labor Force Survey.

Figure 2.7: Percentage of Urban Adults Employed in the Wage Sector vs. Percentage of Urban Adults Employed in the Self-Employed Sector, 1986-2000

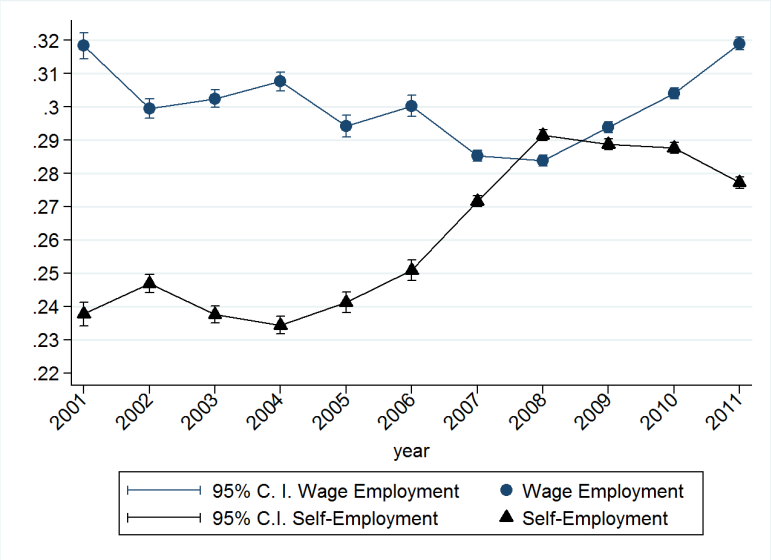


Data: Indonesian Labor Force Survey 1986-2000. Adults are older than 15. Self-employed sector includes self-employed and family workers. All measures calculated using only the primary job of individuals.

The magnitude of the decrease in wage employment is similar between

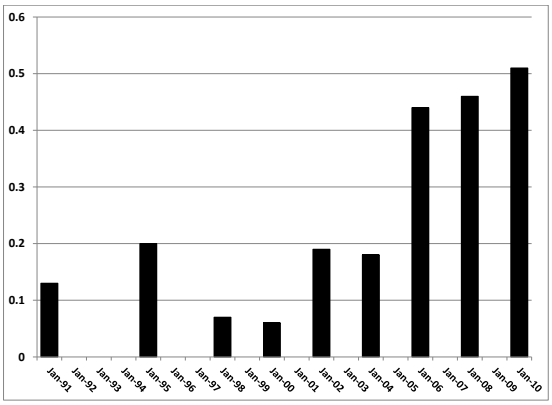
[11] According to Dhanani et al. (2009), it took the survey team several years to adjust to the change in definitions of various labor market outcomes, and there was considerable noise in the Labor Force Survey data between 2000 and 2003.

Figure 2.8: Percentage of Urban Adults Employed in the Wage Sector vs. Percentage of Urban Adults Employed in the Self-Employed Sector, 2001-2011



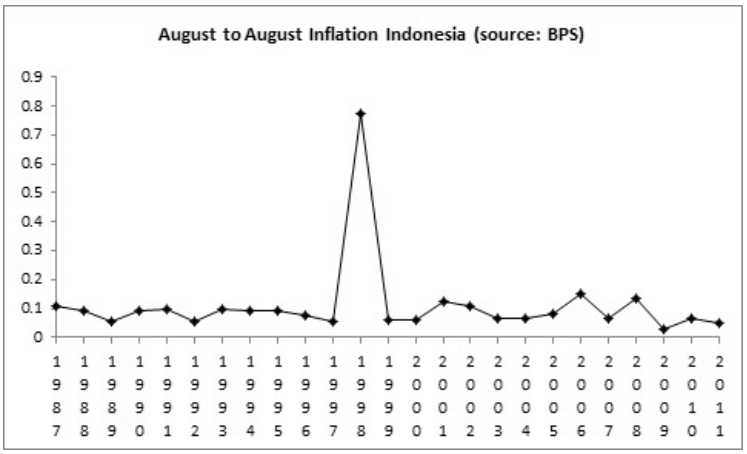
Data: Indonesian Labor Force Survey 2001-2011. Adults are older than 15. Self-employed sector includes self-employed and family workers. All measures calculated using only the primary job of individuals.

Figure 2.9: Pump Price for Diesel Fuel (US dollar per Liter)



Source: tradingeconomics.com

Figure 2.10: August to August Inflation from 1987 to 2011



Source: Indonesia Statistics Bureau

the Labor Force Survey and the IFLS, while the magnitude of the increase in self-employment is much bigger according to the IFLS than according to the Labor Force Survey. A potential reason for this discrepancy is that the IFLS has one more follow up question than the Labor Force Survey when trying to elicit information on employment status. More specifically, in the IFLS respondents were asked whether they worked in a family business in the previous week as the last follow-up question to decide whether the respondent was working. This question was not asked in the Labor Force Survey. Therefore, the IFLS should pick up more accurately than the Labor Force Survey the increase in self-employment during the crisis.

One interesting observation from Figure 2.8 is that another episode of increased self-employment occurred from 2005 to 2008. Interestingly, this period coincides with another episode of rice and fuel price surge following an import ban on rice and the removal of subsidies on fuel (Figures 2.2, 2.9). Inflation doubled in 2006 and 2008 compared with 2005 (Figure 2.10). Thus, it appears that rising prices are associated with increases in self-employment, implying that increases in self-employment seemed to be a coping strategy that urban households used to combat inflation.

2.4.3 Change in Savings and Other Assets

Using the IFLS, Table 2.6 looks at the change in ownership and value of assets in different categories for urban households from 1997 to 2000.

Table 2.6: Change in Ownership and Value of Assets for Urban Households 1997-2000

Asset type	Change of ownership				Know value	Change in value
	Sold all	New owner	Kept some	Never own		
House	6.03	6.55	72.23	15.20	86.46	-1186650 [310932]
Building*	8.37	9.03	7.68	74.91	94.31	-149796 [96123]
Land	16.06	10.51	8.55	64.89	93.63	-429843 [88814]
Vehicles	16.06	13.03	41.39	29.53	95.62	39197 [46623]
Appliances	5.66	5.86	82.59	5.90	92.28	98013 [12246]
Savings	13.51	17.13	19.06	50.31	87.84	57472 [18316]
Receivables	8.24	9.03	3.00	79.74	96.55	10269 [5849]
Jewelry	16.07	17.28	46.34	20.31	88.22	9796 [8051]
Furniture	1.00	3.00	95.55	0.45	87.94	61606 [11794]

IFLS2 and IFLS3 panel households. *Building not occupied by the household. Numbers in brackets are standard deviations. Change in asset value is change in real value adjusted for inflation. Inflation data from Indonesian Bureau of Statistics.

One can see that in terms of change in ownership of assets, fewer households own land and vehicles in 2000 than in 1997. Selling land and vehicles may have been one of the coping strategies used by urban households. In terms of change in value, the mean change in asset value was negative only for the categories houses, buildings, and land. We do not know whether the drop in value for these groups is caused by a decrease in quantity or a reduction in price. For liquid assets such as savings, receivables and jewelry, Table 2.6 shows no decrease either in ownership or in value. There are two potential explanations why we do not observe a drop in liquid assets between 1997 and 2000. The first is that there was, in fact, no drop. The second is that there was a decrease at the depth of the crisis (1998), but by 2000

households had re-invested in these assets while recovering from the crisis. As a result, we do not observe a change. We can still observe a decrease in the ownership of non-liquid assets such as land and vehicles by 2000 perhaps because they take longer to restock. As shown in Frankenberg et al. (2003), using the IFLS2 and the IFLS2+, they found that the percentage of urban households that owned jewelry decreased from 64% to 50% between 1997 and 1998. They argue that jewelry was a major type of household asset in Indonesia, and that selling jewelry was one of the coping strategies used during the crisis. If we compare 1997 and 2000, however, we do not see a decrease in ownership in jewelry for urban households. This suggests that selling assets may have played a bigger role during the crisis than one can observe by comparing the IFLS2 and the IFLS3.

2.4.4 Change in Household Composition

Another coping mechanism households could use is to send members to live or work in areas less hit by the crisis. For example, it is suggested in Manning (2000) that during the AFC urban households in Indonesia with ties to rural areas sent members to live/work in rural areas. Because agriculture was more resilient to the crisis, there were more employment opportunities in rural areas than in urban areas.

To investigate whether such changes in household composition were an important mechanism that urban households in Indonesia used during the crisis, I compare the annual hazard rate of a household having at least one member moving in/out due to various reasons between the period 1993-1997 and the period 1997-2000. For example, as shown in Table 2.7, from 1993 to 1997, on average each year 2.61% of urban households had at least one member die.

Table 2.7 shows that the hazard rates during the crisis period were not higher than during the pre-crisis period for all reasons except for the reason “needing place”. Also, the aggregate hazard rate of having member move in or move out is about 2.5 percentage points higher for the crisis period. This finding suggests

Table 2.7: Annual Hazard Rate (%) of Having at Least One Member Moving by Moving Reasons, Urban Households

Reason	Move In		Move Out	
	1993-1997	1997-2000	1993-1997	1997-2000
Death			2.61	2.99
Birth	6.65	5.45		
Follow spouse/parent	1.13	2.81	2.52	4.18
Work	0.91	1.48	4.04	4.30
Marriage	1.98	1.91	3.69	3.49
School	0.60	0.95	1.79	2.08
Need place	1.03	2.08	0.73	2.04
Other	2.00	1.95	2.01	2.31
Total*	7.09	9.42	12.59	15.05

Data source: IFLS1, IFLS2 and IFLS3. * Total includes all reasons except death and birth. Annual hazard rates are calculated as annual growth rates that produce the observed changes during the 1993-1997 and the 1997-2000 intervals.

more movement in household composition during the crisis than before the crisis.

2.5 Descriptive Statistics on the Insurance Function of Self-Employment

From the last section, one can see that shift of labor from wage employment sector to self-employment sector appears to have been a mechanism Indonesian urban households used to cope with the AFC. It seems that self-employed sector was more resilient to the crisis than the wage sector, and that it served as a safety net. In this section, I take a first look at whether self-employment functioned as a form of insurance.

As explained in the introduction, for self-employment to function as insurance against shocks in the wage sector, the return to self-employment should not be perfectly correlated with the return to wage employment. In this section, I use the IFLS data to describe the nature of self-employed businesses. Then I show that the frequency of economic shocks differs between households that only had self-employment and households that only had wage employment. Then I compare characteristics between households that had self-employment before the crisis and

households that did not have self-employment before the crisis. I also compare changes in characteristics during the crisis between these two groups of households, to see if one group fared better during the crisis than the other group.

2.5.1 Nature of Self-Employed Businesses and Amount of Starting Capital

In each round of the IFLS, a module on household farm and non-farm businesses was administered. The IFLS4 had the richest information on household business, because in this round questions on the number of paid and unpaid employees and the amount of starting capital were added. Therefore, I use the IFLS4 to describe the nature of urban self-employed non-farm businesses.[12]

From Table 2.8, one can see that 95% of urban non-farm businesses in Indonesia have fewer than five workers, and 40% are operated by only one person. Only 16% have paid employees. 24% of these businesses are operated inside home. Most of these businesses do not have a permit. All these characteristics indicate that the household businesses are mostly informal activities.

One important observation to note is that urban non-farm businesses require a substantial amount of starting capital. I divide the amount of each business's starting capital by monthly per capita consumption of the same household to obtain a relative value of starting capital. Median starting capital is 1.26 times household monthly per capita consumption, and mean starting capital is 8.57 times household monthly per capita consumption. This evidence supports the argument that entry into self-employed sector is not free. Therefore, households have an incentive to

[12]In this chapter self-employment is defined to be equivalent to household business, and self-employed workers work in household businesses while reporting themselves to be either self-employed or family workers. I concentrate on non-farm businesses in this chapter for the following reasons. First, farm businesses are different from non-farm businesses in nature, so grouping the two may not make sense. Second, only a small percentage (about 10%) of urban households have farm businesses, and this group of households are significantly poorer than the rest of urban households. Conversely, households with non-farm businesses are not significantly different from households without non-farm businesses in terms of consumption and wealth.

Table 2.8: Main Characteristics of Urban Self-Employed Non-Farm Businesses in Indonesia

Location of Business	Outside home	52%
	Partially outside home	23%
	At home	24%
Whether Have Permit	With permit	11%
	Without permit	89%
Industry	Restaurants and food sales	29%
	Non-food sales	30.5%
	Tailor and hairdressing	12%
	Other	28.5%
Number of Workers	1	40%
	2-5	55%
	> 5	5%
Number of Paid Employees	0	84%
	>0	16%
Starting Capital	Median	1.26*
	Mean	8.57*

*In terms of household monthly per capita consumption
Calculated using the IFLS4

establish self-employed businesses before the realization of shocks.

With respect to the line of business, 30% are in restaurants and food sales, and another 30% are in non-food sales. Tailor and hairdressing accounts for 12%. Will these kinds of businesses be more resilient during economic downturns? One can imagine that these small retail and service businesses mostly provide inexpensive products and services related to daily needs, the demand for which would not decrease so much during economic downturns. The formal sector, in contrast, provides more luxury goods and services that consumers can substitute away from during economic downturns, and therefore the formal sector can be more pro-cyclical. Also, small scale businesses would tend to use fewer imported inputs than formal sector businesses, and as a result they would be less affected by exchange rate swings that accompany financial crises in developing countries. Lastly, self-employed businesses borrow little in the formal financial sector, and would not be affected by fluctuations in the formal financial sector during financial

crises.

2.5.2 Frequency of Economic Shocks for Households with and without Self-Employment

In the IFLS2 (1997) and the IFLS3 (2000) households were asked whether they had experienced various kinds of economic shocks in the last five years. The types of shocks include: 1. death of a householder or other family member, 2. sickness of a householder that necessitated hospitalization or continuous medical treatment, 3. crop loss, 4. household/business loss due to fire, earthquake, or other disasters, 5. unemployment of a householder or a business failure, 6. decrease of household income due to decrease in production or low price of products. I concentrate on the last two kinds of shocks, which are relevant to this analysis. For the original panel urban households, I calculate the percentage of households that had a particular kind of shock in either 1994 or 1995 based on what type of households they were in 1993. I distinguish among three types of households: households that only had wage employment, households that had only self-employment, and households that had both wage employment and self-employment.[13] Similarly, I calculate the percentage of households that had a particular kind of shock in either 1998 or 1999 based on what type of households they were in 1997. Since 1994-1995 was a non-crisis period and 1998-1999 was a crisis period, I can compare these two periods to see whether the frequency of shocks for different kinds of households changed between the two periods. In this way I provide very preliminary evidence on whether shocks to wage-employment and self-employment are perfectly correlated over time.

Unfortunately, the fifth category of shock in the survey question does not allow me to distinguish shocks that occur due to unemployment and ones that occur due to the failure of a business. I can, however, distinguish between shocks experienced

[13]Only primary job of household members are considered. The households that have both self-employment and wage employment are households that have members working in the self-employed sector and also members who work in the wage sector.

by households with only wage employment and shocks experienced by households with only self-employment. For the households with only wage employment, most shocks in this category should be associated with unemployment; for the households with only self-employment, most shocks in this category should be associated with the failure of a business. It is possible that households with only wage employment faced a lower risk of unemployment than an average household, and that households with only self-employment faced a lower risk of business failure than an average household. If we assume that there was no selection of employment status based on risk in the two sectors, however, we can get an approximation of how often unemployment and failure of business happened for urban households by looking at households with only wage employment and households with only self-employment separately.

Table 2.9: Percent of Households that Had an Economic Shock by Period and Household Employment Status

	Wage Emp. Only	Self-Emp. Only	Wage & Self-Emp.
Lost a job or failed a business			
Period 1994 and 1995	1.51	2.82	2.19
	[1.02, 2.25]	[1.85, 4.29]	[1.34, 3.57]
Period 1998 and 1999	5.17	1.7	4.38
	[4.14, 6.43]	[0.95, 3.02]	[3.12, 6.11]
Decrease of household income*			
Period 1994 and 1995	0.44	1.88	1.39
	[0.21, 0.91]	[1.12, 3.15]	[0.75, 2.58]
Period 1998 and 1999	0.78	3.83	2.67
	[0.44, 1.39]	[2.61, 5.59]	[1.72, 4.11]

1. Data Source: IFLS2 and IFLS3
2. Employment status is the status a year before the period
3.* Decrease of household income due to decrease in production or low price of products.
4.The numbers in brackets are 90% confidence intervals

Table 2.9 shows that compared to the preceding non-crisis period (1994-1995), the risk of unemployment increased significantly in the crisis period (1998-1999), from 1.51% to 5.17%. The risk of business failure decreased, although the decrease was not statistically significant. Risk of a decrease in household income, however,

increased more for households with only self-employment than households with only wage employment during the crisis. This table provides evidence that for serious risks such as unemployment and failure of business, the risk in wage and self-employed sectors were not perfectly correlated if we compare the crisis period with the pre-crisis period.

2.5.3 Characteristics of Households with and without Self-Employment

In this section, I will first compare characteristics of urban households with and without self-employment before the crisis. The characteristics I compare are age and education composition, ownership and value of non-business assets, per capita consumption, and share of adults who work. The households with farms (about 10% of urban households in 1997) in urban areas are excluded from this analysis, as I found these households were significantly poorer than the rest of the households. Also, my analysis examines the role of self-employment (household business) in urban areas, and farming may be qualitatively different from non-farm businesses in urban areas.

Table 2.10 gives a comparison of household characteristics for the two groups of households. Prior to the crisis, households with and without self-employment were different in terms of household size, age composition, education composition, ownership of assets, and labor allocation. More specifically, households with self-employment on average were larger, had more members in the 15-24 age group, had lower education, had less savings, and worked much more. With respect to per capita consumption, ownership of other assets and total asset value, however, in 1997 these two groups looked the same.

It should be noted that around 25% of the households in both groups did not know the value of their assets. Also, many households did not report full working hours information, and the percentage of households without hours information

Table 2.10: Mean Characteristics of Urban Households with and without Self-Employment in 1997

Type of Characteristics	No Self-Emp.	With Self-Emp.
Num. of Obs.	1185	995
Household Size	**4.27**	**4.85**
Age Composition		
% of members under 15	25.08	24.20
% of members 15-24	**16.81**	**19.14**
% of members 25-34	**17.46**	**13.97**
% of members 35-44	13.83	15.10
% of members 45-54	8.97	10.11
% of members 55-64	9.13	10.36
% of members 65+	7.36	5.84
Education Composition		
% of households not reporting all member's education	0.42	1.11
% of members with no school	9.79	10.98
% of members with elementary school	**33.89**	**41.24**
% of members with jr. secondary school	16.81	16.95
% of members with sr. secondary school	**29.33**	**25.27**
% of members with post-sec school	**10.18**	**5.57**
Asset Ownership		
% own building	16.54	15.08
% own land	21.77	25.53
% own vehicles	57.38	56.58
% own savings	**34.68**	**29.65**
% own receivables	**8.27**	**13.37**
% own jewelry	62.87	61.81
Asset Value		
% of households not reporting values of all assets	23.46	25.23
Real value of assets	3414935	3095478
Per Capita Consumption		
Mean	142744	131254
Median	80150	73486
Labor Allocation		
% of adult members who work	**48.89**	**67.49**
% of adult members with wage employment	**48.89**	**20.51**
% of adult members with self-employment	**0.00**	**46.98**
% of households without full hours information	**21.10**	**9.38**
Total hours worked per week	**73.47**	**95.06**
Hours worked per week per adult	**26.23**	**29.46**
Total weeks worked per year	**69.00**	**92.18**

1. Data source: IFLS2
2. Sample include panel original households with employment information for all members older and equal to 15 in both 1997 and 2000
3. Numbers in bold are different at 90% significance level
4. Hours worked per week is hours worked in a normal week

Table 2.11: Change in Mean Characteristics of Urban Households between 1997 and 2000 for Households with and without Self-Employment in 1997

Type of Characteristics	No Self-Emp.	With Self-Emp.
Num of Obs.	1185	995
Household Size	**0.0565**	**-0.2362**
Age Composition		
% of members under 15	-1.86	-3.48
% of members 15-24	0.83	0.91
% of members 25-34	-2.58	-2.15
% of members 35-44	**1.99**	**-0.32**
% of members 45-54	1.15	2.67
% of members 55-64	0.10	0.70
% of members 65+	1.09	2.37
Education Composition		
% of households not reporting change in members' education	2.03	3.42
% of members with no school	-1.76	-1.26
% of members with elementary school	-1.95	-2.40
% of members with Jr. secondary school	-0.42	0.97
% of members with Sr. secondary school	2.57	1.33
% of members with post-sec school	1.56	1.36
Asset Ownership		
% own building	-0.76	-0.90
% own land	3.21	7.44
% own vehicles	2.87	5.33
% own savings	-2.62	-2.71
% own receivables	-1.01	-1.01
% own jewelry	-1.27	-1.71
Asset Value		
% of households not reporting change in asset value	28.86	30.65
Real Value of assets	-9943279	-8559010
Per Capita Consumption		
% of households not reporting change in per capita consumption	1.18	2.01
Real Per capita consumption (mean)	-27863	-25765
Real Per capita consumption (median)	-1997	-1862
Ln of real per capita consumption	-0.0509	-0.0513
Labor Allocation		
% of adult members who work	**8.83**	**1.03**
% of adult members with formal employment	**-5.40**	**4.16**
% of adult members with self-employment	**14.23**	**-3.13**
% of households without full information on change in hours	**25.44**	**14.17**
Total hours worked per week	17.56	15.74
Hours worked per week per adult	3.56	3.51
Total weeks worked per year	**11.46**	**5.50**

1. Data source: IFLS2
2. Sample include panel original households with employment information for all members older and equal to 15 in both 1997 and 2000
3. Numbers in bold are different at 90% significance level
4. Hours worked per week is hours worked in a normal week

is significantly higher for households without self-employment than households with self-employment. This is puzzling, as intuitively one would imagine that workers with wage work would be more likely to report hours. An explanation can be found by looking at the occupations of the wage workers who do not report hours in 1997. Most of these workers are transport equipment workers, construction workers, shop assistants, or maids. These occupations tend to have more frequent turnover and tend to be without regular work hours. Therefore, the households without self-employment in 1997 and also without full hours information were the households with more wage workers in these unstable (in terms of hours and job security) occupations.

Table 2.11 shows the mean change in the same characteristics for these two groups of households during the crisis. One can see a difference between these two groups in terms of change in household size, change in age composition, and change in the percentage of adult members who work. The households with self-employment in 1997 had a decrease in household size, while the households without self-employment in 1997 had an increase in household size. The households with self-employment in 1997 had a decrease in the percentage of members in the 35-44 age group, while the households without self-employment in 1997 had an increase in the percentage of members in the 35-44 age group. Both groups of households had an increase in the percentage of adult members who work, but the households without self-employment in 1997 had a much bigger increase. With respect to hours worked, one can see an increase in weeks worked per year but not in hours worked per week; moreover, households without self-employment in 1997 had a larger increase in weeks worked per year.

The fact that the larger increase in the percentage of adult members who work in households without self-employment in 1997 is not reflected in hours worked per week may be due to two reasons. First, measurement error in hours is substantial. Second, the households who report hours are a selected group for which there is less increase in household work. As discussed above, the households who did not

report hours and who were also in the group without self-employment in 1997 tend to have more workers who hold more insecure jobs with more volatile hours. These households may also be poorer and with more frequent change in labor allocation compared to the rest of households without self-employment. As a result, this sub-group of households would be likely to increase their labor supply more during a crisis.

2.6 Model

The goal of the empirical analysis in this chapter is to test the existence and magnitude of the insurance value of prior self-employment during the Asian financial crisis. In this section I outline a model that illustrates why households would have an incentive to diversify between wage employment and self-employment to minimize consumption risk. The model also provides predictions that can be tested using the IFLS data. As discussed in the introduction, for households to have an incentive to diversify between wage employment and self-employment, the returns to wage employment and to self-employment need to be not perfectly correlated. Also I will assume that there is an entry cost into self-employment, so that households would have an incentive to hold self-employment in anticipation of future shocks.

The standard household labor supply model usually only has two agents, husband and wife. In the IFLS data, however, households are usually larger than a nuclear household and contain more than two members who are at working age. Therefore, in my model there are $N_t + M_t$ members in the household in period t, M_t members younger than 15 (not of working age), and N_t members older than 15 (of working age). Different households do not have to have the same size and age composition in each period.

I assume there are T decision periods, and that the household maximizes its

expected utility over these periods, so that its utility is given by

$$\mathrm{E}\sum_{t=1}^{t=T}\beta^t U(c_t, L_t^1, L_t^2, ..., L_t^{N_t}) \,. \tag{2.1}$$

c_t is household per capita consumption for period t, and L_t^i is leisure for individual i in period t. β is household discount rate. I assume that the utility function is time separable and additively separable between consumption and leisure. Households are risk averse to consumption variation so that

$$U(c_t, L_t^1, L_t^2, ..., L_t^{N_t}) = \frac{1}{1-\gamma}(c_t)^{1-\gamma} + \Pi(L_t^1, L_t^2, ..., L_t^{N_t}) \,. \tag{2.2}$$

Therefore, in this formation households have an incentive to smooth consumption over time.

The household faces a budget constraint, a time constraint, and a borrowing constraint in each period:

$$\text{Budget constraint:} \quad c_t(N_t+M_t)+a_{t-1} = \sum_{i=1}^{N_t} w_t^{i,F} F_t^i + \sum_{i=1}^{N_t} w_t^{i,IF} IF_t^i + a_t - (1-I_{t-1}^{Bus}) I_t^{Bus} E_{Bus} \,, \tag{2.3}$$

$$\text{Labor constraint:} \quad F_t^i = 0,1 \quad IF_t^i = 0,1 \quad L_t^i = 0,1 \quad L_t^i + F_t^i + IF_t^i = 1 \quad i = 1, 2, ..., N_t \,, \tag{2.4}$$

$$\text{Borrowing constraint:} \quad a_t \geq 0 \,, \tag{2.5}$$

$$\text{Non-negativity of consumption:} \quad c_t > 0 \,. \tag{2.6}$$

a_{t-1} is the amount of asset at the beginning of period t or end of period $t-1$. The household is subject to a borrowing constraint so that the asset level cannot be negative. In each period, each working age individual i chooses between three discreet labor choices: not working (L_t^i=1), working in the wage sector (F_t^i=1), or working in the self-employed sector (IF_t^i=1). The household chooses how much to consume, c_t, in each period. If the household does not have self-employment at the beginning of the period ($I_{t-1}^{Bus} = 0$) and the household chooses to start a self-employed business in period t, which means having at least one member working in the self-employed sector (I_t^{Bus}=1), then the household needs to pay a start-up cost for the business, E_{Bus}. The choices that households make in period t, c_t, F_t^i, IF_t^i, leaves the household with an asset level of a_t and a self-employment status I_t^{Bus} at the end of the period t and beginning of period $t+1$.

The start-up cost E_{bus} includes two kinds of cost that a household may incur if they want to start a new self-employed business. The first kind is a lump-sum amount of starting capital for the new business. As I have shown in section 2.5, this amount is substantial for urban Indonesian households. The second kind of start-up cost is lower profit in the initial periods of business operation. In this model I assume that each household only has one self-employed business, and the start-up cost is not related to how many people are employed in the business. The assumption that each household only has one household business is not far from the reality in Indonesia. The IFLS data shows that the majority of households that own a household business only have one business. The assumption that business start-up cost is not related to the number of workers in the business may be arguable. I will use this assumption, however, as a start point to bring in the start-up cost of self-employed businesses into a standard household labor supply model.

As mentioned before, for households to have an incentive to use self-employment as insurance against shocks to returns to wage employment, returns to wage- and self-employment should not be perfectly correlated. Therefore, I assume that returns to wage- and self-employment not only depend on individual

characteristics such as education and experience, but also depend on aggregate shocks to wage- and self-employed sectors, which are not perfectly correlated. Then

$$w_t^{i,j} = \psi_t^j W^j(age^i, edu^i, X^{i,j}, Z^j, V^j) \qquad i = 1, 2, ..., N_t \quad j = F, IF\ , \tag{2.7}$$

where $w_t^{i,j}$ is return in sector j for individual i in period t. j can be wage sector (F) or self-employed sector(IF). ψ_t^j is the aggregate shock to returns in sector j. age^i is i's age at the beginning of the period, which is a proxy for i's work experience. edu^i is i's education level. $X^{i,j}$ represents a vector of unobserved individual characteristics that affect his/her return in sector j. For example, individuals with greater entrepreneurship skills will have a higher return in the self-employed sector. Z^j represents a vector of unobserved household characteristics that would affect the individual's return in sector j, and V_j is a vector of unobserved local labor market characteristics that determine the demand for labor in sector j.

For simplicity, I assume that the shocks to wage employment and the shocks to self-employment are independent, and shocks are also independently distributed over time. Then

$$\psi_t^F, \psi_t^{IF} \sim N(\mu, \Sigma), \qquad \mu = (1, 1), \qquad \Sigma = \begin{bmatrix} \sigma_F^2 & 0 \\ 0 & \sigma_{IF}^2 \end{bmatrix}. \tag{2.8}$$

Another issue the model has to deal with in order to make it applicable to the IFLS data is modeling the change in household composition. As shown in section 2.4 and 2.5, the panel households in the IFLS data are not intact overtime. Each year, around 10% of households would have at least one new member (including birth), and around 15% of households would lose at least one member (including death). As a result, in order to apply this model to the data, I need to propose a way to model household composition change. It is shown in section 2.4 that the

movement in household composition is not significantly higher during the Asian Financial Crisis than before the crisis. Since I am mainly interested in changes during the crisis, I will not model household composition decisions including fertility and migration. Instead I will treat the change in household composition as an exogenous shock embodied in Φ_t. When Φ_t is realized, the household may have a new set of members with new age, education, and ability composition compared with the last period. I assume that Φ_t is independent from ψ_t^F and ψ_t^{IF} and independent over time. Based on all the assumptions made above, the Bellman equation for the household is

$$V(s_t) = \max_{c_t, L_t^1, L_t^2, ..., L_t^{N_t}} \left(u(c_t, L_t^1, L_t^2, ..., L_t^{N_t}) + \beta \int V(s_{t+1}) f(\psi_{t+1}^F, \psi_{t+1}^{IF}, \Phi_{t+1}) \right) , \quad (2.9)$$

where the state vector is

$$s_t = (a_{t-1}, I_{t-1}^{Bus}, \psi_t^F, \psi_t^{IF}, \Phi_t) ,$$

and the transition of the state vector from s_{t-1} to s_t is shown by the following equations:

$$I_t^{Bus} = \begin{cases} 1 & \text{if } \sum_{i=1}^{N_t} IF_t^i \geq 1 \\ 0 & \text{if } \sum_{i=1}^{N_t} IF_t^i = 0 \end{cases} \quad (2.10a)$$

$$i = 1, 2, ..., N_t ,$$

$$a_t = a_{t-1} - c_t(N_t + M_t) + \sum_{i=1}^{N_t} w_t^{i,F} F_t^i + \sum_{i=1}^{N_t} w_t^{i,IF} IF_t^i - (1 - I_{t-1}^{Bus}) I_t^{Bus} E_{Bus} . \quad (2.10b)$$

If any member of the household works in the self-employed sector in period t, the household will have a household business at the end of period t ($I_t^{Bus} = 1$). a_t is updated from the budget constraint. Note that in each period, the members (is) may change because of household composition change, resulting in changes in age, education and ability composition. The timing of the model works as follows: at the end of period $t-1$, the household get an endowment of state variables a_{t-1}, I_{t-1}^{Bus} from the choices in period $t-1$. Then at the beginning of period t, the shocks to wage- and self-employment returns, ψ_F and ψ_{IF}, and the shock to household composition, Φ_t, are realized. Then the household makes labor and consumption choices in period t based on their expectations of shocks to wage- and self-employment returns and of shock to household composition in the future. These choices will leave the household with a new set of state variables at the end of period t. The value function depends on $f(\psi_{t+1}^F, \psi_{t+1}^{IF}, \Phi_{t+1})$ instead of on $f((\psi_{t+1}^F, \psi_{t+1}^{IF}, \Phi_{t+1})/(\psi_t^F, \psi_t^{IF}, \Phi_t))$ because I assume that shocks are independent over time.

From Equation 2.4, Equation 2.10 and Equation 2.9 we can derive that

$$\begin{aligned} c_t =& F^c(a_{t-1}, I_{t-1}^{Bus}, N_t, M_t, (age^i, edu^i, X^{i,j}, Z^j, V^j)_{i=1,2,...,N_t, j=F,IF}, \psi_t^F, \psi_t^{IF}, \\ & f(\psi_{t+1}^F, \psi_{t+1}^{IF}, \Phi_{t+1}), E_{bus}) , \end{aligned} \tag{2.11}$$

and

$$\begin{aligned} L_t^i =& F^L(a_{t-1}, I_{t-1}^{Bus}, N_t, M_t, (age^i, edu^i, X^{i,j}, Z^j, V^j)_{i=1,2,...,N_t, j=F,IF}, \psi_t^F, \psi_t^{IF}, \\ & f(\psi_{t+1}^F, \psi_{t+1}^{IF}, \Phi_{t+1}), E_{Bus}) , \end{aligned} \tag{2.12}$$

and

$$I_t^{Bus} = F^{Bus}(a_{t-1}, I_{t-1}^{Bus}, N_t, M_t, (age^i, edu^i, X^{i,j}, Z^j, V^j)_{i=1,2,...,N_t, j=F,IF}, \psi_t^F, \psi_t^{IF}, f(\psi_{t+1}^F, \psi_{t+1}^{IF}, \Phi_{t+1}), E_{Bus}) \ . \quad (2.13)$$

The shock to household composition for period t, Φ_t, is reflected in the formation that the set of working age household members, i=1,2,...,N_t, and under working age members, i=N_t+1,...,M_t, is updated by Φ_t from $t-1$ to t. So outcomes in period t depend on household composition in period t instead of that in period $t-1$.

If we sum all the $(1-L_t^i)$s in equation 2.12 and divide it by N_t, we will get the percentage of adult members who work. Then we can derive

$$work_t = F^{work}(a_{t-1}, I_{t-1}^{Bus}, N_t, M_t, (age^i, edu^i, X^{i,j}, Z^j, V^j)_{i=1,2,...,N_t, j=F,IF}, \psi_t^F, \psi_t^{IF}, f(\psi_{t+1}^F, \psi_{t+1}^{IF}, \Phi_{t+1}), E_{Bus}) \ , \quad (2.14)$$

$$\text{where } work_t = 1 - (\textstyle\sum_{i=1}^{i=N_t} L_t^i)/N_t \ .$$

Per capita consumption(c_t), the percentage of adult members who work($work_t$), and whether the household has self-employment in period t(I_t^{Bus}) depend on a set of variables. These variables include the household's wealth and self-employment status at the beginning of the period, the change in household composition, and the shocks to returns to wage- and self-employment. They also include unobserved characteristics at the individual, household, and regional level, the household's expectation about future shocks, and the self-employment entry cost.

2.7 Empirical Strategy

The main relationship I am interested in in this chapter is the relationship between $c_t/work_t$ and I_{t-1}^{Bus} when t is the crisis period. In other words, I want to find out whether consumption and labor during the crisis for the household depended on whether the household had self-employment before the crisis, and how much. Since I only observe household's choices in 1993, 1997 and 2000, I will treat 1997 as the period before the crisis and 2000 as the period during the crisis.[14] Assuming that households only make decisions at the time points 1993, 1997, and 2000, then according to Equation 2.11 and 2.14, I have the following relationships:

$$c_{2000} = F^c(a_{1997}, I_{1997}^{Bus}, N_{2000}, M_{2000}, (age^i, edu^i, X^{i,j}, Z^j, V^j)_{i=1,2,...,N_{2000}, j=F,IF}, \psi_{2000}^F, \psi_{2000}^{IF}, f(\psi_{2000^+}^F, \psi_{2000^+}^{IF}, \Phi_{2000^+}), E_{Bus}) , \quad (2.15)$$

and

$$work_{2000} = F^{work}(a_{1997}, I_{1997}^{Bus}, N_{2000}, M_{2000}, (age^i, edu^i, X^{i,j}, Z^j, V^j)_{i=1,2,...,N_{2000}, j=F,IF}, \psi_{2000}^F, \psi_{2000}^{IF}, f(\psi_{2000^+}^F, \psi_{2000^+}^{IF}, \Phi_{2000^+}), E_{Bus}) . \quad (2.16)$$

i includes every working age individual who was in the household in 2000. $f(\psi_{2000^+}^F, \psi_{2000^+}^{IF}, \Phi_{2000^+})$ represents the household's expectation about uncertainty in next decision period.

If I can observe all independent variables in Equation 2.15 and 2.16, I can consistently estimate the relationship between $c_{2000}/work_{2000}$ and I_{1997}^{Bus}. Only a subset of the independent variables, however, are observable. These

[14] Section 2.4 has a more extensive discussion on why I treat 1997 as pre-crisis and 2000 as during the crisis.

are a_{1997}, I^{Bus}_{1997}, age_i, and edu^i. The rest of the variables, which are $X^{i,j}, Z^{i,j}, V^{i,j}, \psi^F_{2000}, \psi^{IF}_{2000}, f(\psi^F_{2000^+}, \psi^{IF}_{2000^+}, \Phi_{t+1})$, and E_{Bus}, are unobservable. If I^{Bus}_{1997} and the unobserved variables are not correlated, I can still get consistent estimate of the relationship between $c_{2000}/work_{2000}$ and I^{Bus}_{1997}. I^{Bus}_{1997}, however, is endogenous, because according to Equation 2.13,

$$I^{Bus}_{1997} = F^{Bus}(a_{1993}, I^{Bus}_{1993}, N_{1997}, M_{1997}, (age^i, edu^i, X^{i,j}, Z^j, V^j)_{i=1,2,...,N_{1997}, j=F,IF}, f(\psi^F_{2000}, \psi^{IF}_{2000}, \Phi_{2000}), E_{Bus}) \; . \tag{2.17}$$

i includes every working age individual who was in the household in 1997, and $f(\psi^F_{2000}, \psi^{IF}_{2000}, \Phi_{2000})$ is the household's expectation about shocks in 2000. Therefore I^{Bus}_{1997} is correlated with unobserved variables $X^{i,j}, Z^j, V^j$, which are also correlated with c_{2000} and $work_{2000}$ as shown in equation 2.15 and 2.16. I need to find a way to deal with the endogeneity of I^{Bus}_{1997}. Since 1997 is a pre-crisis period, I assume there is no aggregate shock to the returns in wage and self-employment in this period, so that ψ^F_{1997} and ψ^{IF}_{1997} do not appear in equation 2.17.

Because households have different sizes, I need to propose an approach to approximate for age and education composition. I use the number of adult members by education level to approximate for education composition, and I use the number of members by age group to approximate for age composition. At the same time, I use number of working age members who are female to control for household gender composition. I use province indicator variables to approximate for Z^j, regional characteristics that affect labor demand for wage- and self-employed workers. Therefore, the regressions I estimate are the following:

$$c_{2000} = \alpha_0^c + \alpha_1^c a_{1997} + \alpha_2^c I_{1997}^{Bus} + \sum_{i=1}^{6} \beta_i^c Num_{agegroup_{i,2000}} + \sum_{i=1}^{4} \gamma_i^c Num_{edugroup_{i,2000}} + \sum_{i=1}^{12} \zeta_i^c I_{province_{i,2000}} + \theta_{2000}^c + \tau_{2000}^c + \kappa_{2000}^c + \varepsilon_{2000}^c , \tag{2.18}$$

and

$$work_{2000} = \alpha_0^w + \alpha_1^w a_{1997} + \alpha_2^w I_{1997}^{Bus} + \sum_{i=1}^{6} \beta_i^w Num_{agegroup_{i,2000}} + \sum_{i=1}^{4} \gamma_i^w Num_{edugroup_{i,2000}} + \sum_{i=1}^{12} \zeta_i^w I_{province_{i,2000}} + \theta_{2000}^w + \tau_{2000}^w + \kappa_{2000}^w + \varepsilon_{2000}^w . \tag{2.19}$$

θ_{2000}^c and θ_{2000}^w represent a function of unobserved individual, household, and regional variables in equation 2.15 and 2.16, so that

$$\theta_{2000}^c = F^{\theta^c}((X^{i,j}, Z^j, V^j)_{i=1,2,...,N_{2000}, j=F,IF}, E_{Bus}) , \tag{2.20}$$

and

$$\theta_{2000}^w = F^{\theta^w}((X^{i,j}, Z^j, V^j)_{i=1,2,...,N_{2000}, j=F,IF}, E_{Bus}) . \tag{2.21}$$

τ_{2000}^c and τ_{2000}^w represent the effect of the crisis, ψ_{2000}^F and ψ_{2000}^{IF}, on household consumption and labor. κ_{2000}^c and κ_{2000}^w are the effects of households' expectation of shocks in future periods, $f(\psi_{2000^+}^F, \psi_{2000^+}^{IF}, \phi_{2000^+})$, on current household consumption and labor. ε^c and ε^w represent measurement errors in c_{2000} and $work_{2000}$, and I assume both of them are independently distributed over time with mean zero and

independent from all variables in the rest of equations 2.18 and 2.19. The OLS estimates of these equations are presented in Appendix B.

To deal with the endogeneity problem, I use difference in difference estimations. I use the households that have no self-employment either in 1993 or in 1997 as the control group, and use households that have no self-employment in 1993 but have self-employment in 1997 as the treatment group.[15] Then the difference between these two groups in the change of household consumption and labor from 1997 to 2000 will yield a consistent estimate of the treatment effect of having self-employment in 1997 on outcomes in 2000. Here is how the difference in difference method works: Similarly to 2.18 and 2.19, for both the control and the treatment groups, we have

$$\begin{aligned} c_{1997} =& \alpha_0^c + \alpha_1^c a_{1993} + \sum_{i=1}^{6} \beta_i^c Num_{agegroup_{i,1997}} \\ &+ \sum_{i=1}^{4} \gamma_i^c Num_{edugroup_{i,1997}} + \sum_{i=1}^{12} \zeta_i^c I_{province_{i,1997}} + \theta_{1997}^c + \kappa_{1997}^c + \varepsilon_{1997}^c , \end{aligned} \quad (2.22)$$

and

$$\begin{aligned} work_{1997} =& \alpha_0^w + \alpha_1^w a_{1993} + \sum_{i=1}^{6} \beta_i^w Num_{agegroup_{i,1997}} \\ &+ \sum_{i=1}^{4} \gamma_i^w Num_{edugroup_{i,1997}} + \sum_{i=1}^{12} \zeta_i^w I_{province_{i,1997}} + \theta_{1997}^w + \kappa_{1997}^w + \varepsilon_{1997}^w , \end{aligned} \quad (2.23)$$

where

[15] Households with farm business in the urban area are excluded due to different nature of farm and non-farm businesses

$$\theta^c_{1997} = F^{\theta^c}((X^{i,j}, Z^j, V^j)_{i=1,2,...,N_{1997}, j=F,IF}, E_{Bus}) \,, \tag{2.24}$$

$$\theta^w_{1997} = F^{\theta^w}((X^{i,j}, Z^j, V^j)_{i=1,2,...,N_{1997}, j=F,IF}, E_{Bus}) \,. \tag{2.25}$$

κ^c_{1997} and κ^w_{1997} represent the effect of household expectation of shocks in next period, $f(\psi^F_{2000}, \psi^{IF}_{2000}, \phi_{2000})$, on household consumption and labor. Because all household in these two groups had no self-employment in 1993, I^{Bus}_{1993} does not appear in these two equations. If we take the difference between equation 2.18 and 2.22, and similarly take the difference between equation 2.19 and 2.23, we will have

$$\begin{aligned}\Delta c_{97-00} =& \alpha^c_1 \Delta a_{93-97} + \alpha^c_2 I^{Bus}_{1997} + \sum_{i=1}^{6} \beta^c_i \Delta Num_{agegroup_{i,97-00}} \\ &+ \sum_{i=1}^{4} \gamma^c_i \Delta Num_{edugroup_{i,97-00}} + \sum_{i=1}^{12} \zeta^c_i \Delta I_{province_{i,97-00}} \\ &+ \Delta\theta^c_{97-00} + \tau^c_{2000} + \Delta\kappa^c_{97-00} + \Delta\varepsilon^c_{97-00} \,,\end{aligned} \tag{2.26}$$

and

$$\begin{aligned}\Delta work_{97-00} =& \alpha^w_1 \Delta a_{93-97} + \alpha^w_2 I^{Bus}_{1997} + \sum_{i=1}^{6} \beta^w_i \Delta Num_{agegroup_{i,97-00}} \\ &+ \sum_{i=1}^{4} \gamma^w_i \Delta Num_{edugroup_{i,97-00}} + \sum_{i=1}^{12} \zeta^w_i \Delta I_{province_{i,97-00}} \\ &+ \Delta\theta^w_{97-00} + \tau^w_{2000} + \Delta\kappa^w_{97-00} + \Delta\varepsilon^w_{97-00} \,.\end{aligned} \tag{2.27}$$

The coefficient I am interested in are α^c_2 and α^w_2. In order to get a consistent estimate of these effects, I^{Bus}_{1997} needs to be independent from $\Delta\theta^c_{97-00}$, $\Delta\theta^w_{97-00}$, $\Delta\kappa^c_{97-00}$

and $\Delta\kappa^w_{97-00}$. If we assume that $((X^{i,j})_{i=1,2,...,N_t}, Z^j, V^j$ have not changed between 1997 and 2000, then $\Delta\theta^c_{97-00}$ and $\Delta\theta^w_{97-00}$ will difference out the household fixed effect. If we assume that household's expectation about future shocks is the same in every period, then the effect of $f(\psi^F_{t+1}, \psi^{IF}_{t+1}, \Phi_{t+1})$ is also cancelled in $\Delta\kappa^c_{97-00}$ and $\Delta\kappa^w_{97-00}$. Then equation 2.26 and 2.27 become

$$\begin{aligned}\Delta c_{97-00} =&\alpha^c_1 \Delta a_{93-97} + \alpha^c_2 I^{Bus}_{1997} \\ &+ \sum_{i=1}^{6} \beta^c_i \Delta Num_{agegroup_{i,97-00}} + \sum_{i=1}^{4} \gamma^c_i \Delta Num_{edugroup_{i,97-00}} \\ &+ \sum_{i=1}^{12} \zeta^c_i \Delta I_{province_{i,97-00}} + \tau^c_{2000} + \Delta\varepsilon^c_{97-00}\,, \end{aligned} \tag{2.28}$$

and

$$\begin{aligned}\Delta work_{97-00} =&\alpha^w_1 \Delta a_{93-97} + \alpha^w_2 I^{Bus}_{1997} \\ &+ \sum_{i=1}^{6} \beta^w_i \Delta Num_{agegroup_{i,97-00}} + \sum_{i=1}^{4} \gamma^w_i \Delta Num_{edugroup_{i,97-00}} \\ &+ \sum_{i=1}^{12} \zeta^w_i \Delta I_{province_{i,97-00}} + \tau^w_{2000} + \Delta\varepsilon^w_{97-00}\,. \end{aligned} \tag{2.29}$$

τ^c_{2000} and τ^w_{2000} are constants and represent the average effect of the crisis on household consumption and labor. Ordinary least square regressions of equation 2.28 and 2.29 will give me a consistent estimate of α^c_2 and α^w_2.

2.8 Results and Discussion

2.8.1 Results

Table 2.12 and Table 2.13 report the difference in difference estimation results. Table 2.12 shows the results for specifications that use household consumption and the percent of adult members who work as the dependent variable. In addition, I also use various measures of hours worked by household members as the dependent variable. Since around 20% of households do not have full information on hours worked for every working member, I present results for all households (Table 2.12) and again only for households with full information on hours (Table 2.13).

As shown in Table 2.12 and 2.13, the average effect of the crisis on household real per capita consumption is not significantly different from zero. The average effect of the crisis on household work is an increase in the percentage of adult members who work by 5-7 percentage points. Also, the hours worked per adult member per week increased by 4 hours. Total hours worked per week and total weeks worked per year also rose from 1997 to 2000.

From Table 2.12 one can see that having prior self-employment has a negative coefficient on per capita household consumption, but the coefficient is not significant. This indicates that prior self-employment has no significant effect on household per capita consumption during the crisis. Prior self-employment, however, does seem to affect percentage of adult members who work: the relevant coefficients are negative and significant. Having prior self-employment decreases the percentage of adult members who work in the last week by around 9.5 percentage points, and decreases the percentage of adult members who work in the last year by 5.7 percentage points. The magnitude of the effect on the percentage of members who work during last year is smaller. This difference may be caused by the fact that whether an individual worked last year is derived from a question in the household roster. Whether an individual worked last

week, conversely, is derived from a separate module that aims at eliciting work information, especially information about self-employment and family work, from more in-depth interviews with each household member. Therefore, the share of adult members who worked last week should be a better measure of household work, and should pick up the increase in self-employed work more accurately.

From Table 2.13, one can see that when the sample is restricted to households who have hours information, the effect of prior self-employment on household consumption is still not significant. The effect of prior self-employment on the percentage of adult members who worked last week becomes smaller, while remaining significant. The effect of prior self-employment on various measures of hours worked by the household are all negative, although only significant for hours worked per week.

From these two tables, we can see that the effect of prior self-employment on percent of adult members who work is much stronger in the full sample than the sample with hours information. This is confirming the hypothesis that the households that do not have prior self-employment and report hours may have had a smaller increase in work than the households that do not have prior self-employment and do not report hours. As mentioned in the descriptive analysis, households that do not have prior self-employment and do not report hours are more likely to have workers in occupations with less job security and more volatile hours. Therefore, they may also be the ones who needed to increase labor supply more to cope with the impact of the crisis compared to households that do not have prior self-employment and do report hours.

The fact that we see an effect of prior self-employment on household work during the crisis but not on consumption may be because work takes more time to adjust than consumption. It could be the case that prior self-employment had a positive effect on household consumption at the deepest point of the crisis (1998, 1999). By 2000, we may no longer observe this effect as households were already recovering from the crisis. Whether an individual works or not and the

Table 2.12: Difference in Difference - Equation 2.28 and 2.29

	(1) Real Per Capita Consumption	(2) Ln of Real Per Capita Consumption	(3) Percent of Adults Who Work Last Week	(4) Percent of Adults Who Work Last Year
Have Prior Self-employment	-4879.7	-0.0576	-9.501***	-5.660*
	(6388.8)	(0.0503)	(2.534)	(2.535)
Prior Wealth	-0.000115	4.24e-11	-3.46e-09	-2.96e-08
	(0.000122)	(9.60e-10)	(4.76e-08)	(4.75e-08)
Number 0-14	-13953.6***	-0.155***	0.356	1.366
	(3068.9)	(0.0242)	(1.219)	(1.216)
Number 15-24	-6086.8	-0.0979*	-0.908	-3.265
	(5984.3)	(0.0471)	(2.408)	(2.403)
Number 25-34	-4888.7	-0.0556	6.931**	6.925**
	(6449.2)	(0.0508)	(2.591)	(2.585)
Number 35-44	-4907.6	-0.0628	4.025	3.781
	(7161.1)	(0.0564)	(2.862)	(2.855)
Number 45-54	-11268.6	-0.121	1.233	1.425
	(8042.6)	(0.0633)	(3.167)	(3.160)
Number 55-64	-11956.3	-0.208**	4.973	4.361
	(9513.2)	(0.0749)	(3.671)	(3.662)
Number 65+	2627.6	-0.107	-2.872	-0.760
	(10506.0)	(0.0827)	(4.061)	(4.052)

Number no sch.	-10535.2	-0.0489	1.747	-2.747
	(8178.2)	(0.0644)	(3.252)	(3.246)
Number elementary	-652.0	-0.00821	-0.000172	-0.0772
	(5498.7)	(0.0433)	(2.219)	(2.216)
Number jr. secondary	6172.3	0.0548	3.129	2.267
	(5383.4)	(0.0424)	(2.172)	(2.167)
Number sr. secondary	3756.4	0.0309	1.319	2.106
	(5203.9)	(0.0410)	(2.090)	(2.087)
Number post secondary	10345.3	0.0902	2.683	3.401
	(7239.6)	(0.0570)	(2.888)	(2.881)
Number female	-13884.3**	-0.106*	-7.004***	-6.198**
	(5308.2)	(0.0418)	(2.074)	(2.070)
Constant	-5855.3	-0.0469	6.721***	5.079***
	(3390.6)	(0.0267)	(1.347)	(1.345)
Observations	736	735	759	758
R^2	0.071	0.119	0.076	0.086

1. Real Per Capita Consumption is calculated using inflation data from Indonesian Bureau of Statistics.
2. Percent of Adults Who Work Last Week is the percentage of adult members (older than 15) who worked in the last week.
3. Percent of Adults Who Work Last Year is the percentage of adult members (older than 15) who worked in the last year.
4. The education and gender composition are of adult members.
5. Standard errors in parentheses.
6. $^{*}\ p < 0.05$, $^{**}\ p < 0.01$, $^{***}\ p < 0.001$

Table 2.13: Difference in Difference - Equation 2.28 and 2.29, Households with Full Information on Hours

	(1) Real Per Capita Consumption	(2) Ln of Real Per Capita Consumption	(3) Perc. Work Last Week	(4) Perc. Work Last Year	(5) Hours Per Week Per Adult	(6) Hours Per Week	(7) Weeks Last Year
Have Prior Self-employment	-4116.2	-0.0631	-4.970*	-2.169	-2.523	-12.99*	-6.771
	(6661.9)	(0.0528)	(2.424)	(2.448)	(1.924)	(5.500)	(4.117)
Prior Wealth	-0.0000584	-2.85e-10	1.12e-08	-2.37e-08	-1.26e-08	-3.08e-08	-3.83e-08
	(0.000139)	(1.10e-09)	(4.95e-08)	(4.99e-08)	(3.93e-08)	(0.000000112)	(8.36e-08)
Number 0-14	-14894.2***	-0.161***	0.493	1.269	-0.650	-1.344	0.748
	(3334.7)	(0.0264)	(1.212)	(1.220)	(0.962)	(2.750)	(2.044)
Number 15-24	-7080.1	-0.0982*	-1.706	-3.933	-1.669	20.05***	17.73***
	(6091.8)	(0.0483)	(2.254)	(2.270)	(1.789)	(5.115)	(3.803)
Number 25-34	-5536.9	-0.0464	1.247	2.937	-1.136	26.49***	31.21***
	(6825.0)	(0.0541)	(2.509)	(2.527)	(1.992)	(5.694)	(4.231)
Number 35-44	-2116.8	-0.00901	-2.035	-0.558	-3.490	17.59**	25.41***
	(7741.7)	(0.0613)	(2.818)	(2.838)	(2.237)	(6.394)	(4.748)
Number 45-54	-8634.1	-0.0882	-4.160	-2.249	-4.508	12.63	18.18***
	(8570.8)	(0.0679)	(3.071)	(3.093)	(2.438)	(6.969)	(5.190)
Number 55-64	-8647.4	-0.198*	-3.854	-2.823	-1.341	22.36*	16.62*
	(10964.1)	(0.0869)	(3.924)	(3.952)	(3.115)	(8.905)	(6.618)
Number 65+	1153.2	-0.113	-8.942*	-7.883	-2.982	11.22	8.764
	(11759.9)	(0.0932)	(4.205)	(4.235)	(3.338)	(9.543)	(7.098)

Number no sch.	-7594.0	-0.0125	2.948	-1.444	-0.985	2.860	-5.524
	(8863.8)	(0.0702)	(3.237)	(3.262)	(2.570)	(7.346)	(5.489)
Number elementary	-1959.3	-0.0287	0.629	0.654	-0.259	6.605	2.111
	(5731.3)	(0.0454)	(2.123)	(2.142)	(1.686)	(4.818)	(3.586)
Number jr. secondary	5170.4	0.0385	2.248	2.204	2.419	12.55**	7.251*
	(5475.1)	(0.0434)	(2.028)	(2.042)	(1.610)	(4.602)	(3.418)
Number sr. secondary	487.4	-0.000540	0.609	1.386	1.580	8.061	4.667
	(5199.9)	(0.0412)	(1.922)	(1.938)	(1.526)	(4.362)	(3.250)
Number post secondary	6421.0	0.0664	2.104	3.049	2.457	11.85	9.152*
	(7426.9)	(0.0588)	(2.719)	(2.738)	(2.158)	(6.170)	(4.584)
Number female	-10028.0	-0.0812	-5.573**	-5.378**	-2.639	-8.175	-10.66**
	(5644.4)	(0.0447)	(2.021)	(2.037)	(1.604)	(4.587)	(3.417)
Constant	-5805.7	-0.0417	6.368***	5.461***	3.621***	14.28***	7.805***
	(3730.2)	(0.0296)	(1.362)	(1.373)	(1.081)	(3.090)	(2.298)
Observations	583	582	602	601	602	602	598
R^2	0.072	0.122	0.068	0.094	0.042	0.231	0.272

1. Real Per Capita Consumption is calculated using inflation data from Indonesian Bureau of Statistics.
2. Perc. Work Last Week is the percentage of adult members (older than 15) who worked in the last week.
3. Perc. Work Last Year is the percentage of adult members (older than 15) who worked in the last year.
4. Hours Per Week Per Adult is hours worked per adult member in a normal week.
5. Hours Per Week is total hours worked by household members in a normal week.
6. Weeks Last Year is total weeks worked by household members in last year.
7. Education and gender composition is of adult members (older than 15)
8. Standard errors in parentheses.
9. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

sector in which an individual works, however, may take longer to adjust to the pre-crisis levels. As a result, the estimates can pick up the insurance value of prior self-employment on work better than on consumption. By the same logic, since it is easier to adjust labor supply along the intensive margin than along the extensive margin, we may observe a more significant effect of prior self-employment on the percentage of members who work than on hours.

2.8.2 Discussion

The result that having self-employment in 1997 decreases household work in 2000 shown in Table 2.12 and 2.13 may reflect a secular trend of modernization of households in Indonesia. As shown in Table 2.10, households without self-employment are smaller, more educated and work less, all of which suggest that the households without self-employment are more modernized than the households with self-employment. If there is a secular trend of modernization so that households with self-employment are becoming more like the households without self-employment, then households with self-employment will work less over time, which would give the results shown in Table 2.12 and 2.13.

This argument is unlikely to apply to my difference in difference analysis, because neither the control group nor the treatment group had self-employment in 1993. In other words, all households were already "modern households" in 1993. The fact that the treatment group experienced a smaller increase in labor supply during the crisis because they established self-employed businesses in 1997 gives some credibility to the insurance story.

Another possible confounding factor is that many households changed composition between 1993 and 2000. Therefore, the difference in difference approach may not entirely control for household fixed effects. To check whether this is an important problem, I estimated equation 2.28 and 2.29 for households that did not have any change in adult members (although they might have had some

Table 2.14: Difference in Difference - Equation 2.28 and 2.29, Intact Households

	(1) Real Per Capita Consumption	(2) Ln of Real Per Capita Consumption	(3) Percent of Adults Who Work Last Week	(4) Percent of Adults Who Work Last Year
Have Prior Self-employment	-2277.8	-0.0267	-10.11*	-9.707*
	(9197.1)	(0.0786)	(4.114)	(3.952)
Prior Wealth	0.0000508	1.01e-09	-4.00e-08	-3.43e-08
	(0.000253)	(2.16e-09)	(0.000000112)	(0.000000107)
Number 0-14	-4158.6	-0.0397	1.840	3.352
	(4307.9)	(0.0368)	(1.949)	(1.872)
Number 65+	4322.6	-0.0284	-10.17*	-12.11*
	(10978.3)	(0.0938)	(4.892)	(4.700)
Constant	-4925.2	-0.0558	2.394	2.509
	(4192.9)	(0.0358)	(1.885)	(1.811)
Observations	277	277	283	283
R^2	0.005	0.006	0.043	0.059

1. Intact households are households whose only composition change between 1993 and 2000 was in the 0-14 or 65+ age groups
2. Percent of Adults who Work Last Week is the percentage of adult members (older than 15) who worked in the last week
3. Percent of Adults who Work Last Year is the percentage of adult members (older than 15) who worked in the last year
5. Standard errors in parentheses
6. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2.15: Difference in Difference - Equation 2.28 and 2.29, Intact Households with Hours Information

	(1) Real Per Capita Consumption	(2) Ln of Real Per Capita Consumption	(3) Perc. Work Last Week	(4) Perc. Work Last Year	(5) Hours Per Week Per Adult	(6) Hours Per Week	(7) Weeks Last Year
Have Prior Self-employment	-2592.8	-0.0510	-2.597	-4.272	-0.516	-5.978	1.553
	(10183.5)	(0.0888)	(4.126)	(3.964)	(3.066)	(7.858)	(5.845)
Prior Wealth	0.000150	1.81e-09	1.43e-08	4.33e-10	-1.24e-08	-0.000000242	-0.000000170
	(0.000263)	(2.30e-09)	(0.000000107)	(0.000000103)	(7.94e-08)	(0.000000203)	(0.000000151)
Number 0-14	-4216.4	-0.0331	3.199	3.345	1.371	-9.046*	-5.364
	(4737.6)	(0.0413)	(1.951)	(1.874)	(1.450)	(3.715)	(2.764)
Number 65+	-6683.6	-0.133	-16.37**	-17.83***	-6.775	-6.087	-14.19
	(13135.4)	(0.115)	(5.425)	(5.212)	(4.032)	(10.33)	(7.684)
Constant	-5857.4	-0.0497	1.038	1.225	-0.279	9.933**	6.673*
	(4696.2)	(0.0409)	(1.924)	(1.849)	(1.430)	(3.664)	(2.726)
Observations	219	219	224	224	224	224	224
R^2	0.007	0.013	0.055	0.073	0.018	0.037	0.039

1. Intact households are households whose only composition change between 1993 and 2000 was in the 0-14 or 60+ age groups
2. Perc. Work Last Week is the percentage of adult members (older than 15) who worked in the last week
3. Perc. Work Last Year is the percentage of adult members (older than 15) who worked in the last year
4. Hours Per Week Per Adult is hours worked per adult member in a normal week
5. Hours Per Week is total hours worked by household members in a normal week
6. Weeks Last Year is total weeks worked by household members in last year
7. Standard errors in parentheses
8. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

change in the 0-14 age group or in the 65+ age group) between 1993 and 2000. For these households, which I refer to as "intact" households, the working age members were the same in 1993, 1997 and 2000. Table 2.14 and 2.15 present the results for this restricted sample.

We can see that if we do not exclude households without hours information, the results are similar between Table 2.12 and 2.14. The negative effect of prior self-employment on the percent of adults who work is even bigger for the intact households than for all households. When we only look at intact households with hours information, however, the effect of prior self-employment on the percentage of adult members who work is no longer significant. The effect of prior self-employment on hours is not significant, either. This again indicates that households who report hours may be a selected group in terms of change in household work. In general the results for the intact households are not very different from the results for all households.

2.9 Conclusions and Future Work

This chapter has analyzed various mechanisms that households used to cope with the Asian Financial Crisis (AFC) in urban Indonesia, and found that one important mechanism was to increase labor supply in the self-employed sector. I proposed that self-employment plays an insurance role against wage sector shocks and tested the existence and magnitude of this insurance role for urban Indonesian households during the AFC. I found that the treatment effect of prior self-employment on household consumption during the crisis is not significant, but the treatment effect of prior self-employment on the percentage of adult members who work is significant. Having prior self-employment decreases the percentage of adult members who work during the crisis by around 9 percentage points.

Does this mean that households with prior self-employment were better off

during the crisis? We can see in the descriptive analysis and the results from difference in difference estimations that all households, no matter with prior self-employment or not, increased the percentage of adult members who work during the crisis. This means that the household members who were previously not working started to work during the crisis. The fact that households with prior self-employment experienced a smaller increase in the percentage members who work is some indication that prior self-employment did increase household welfare during the crisis.

This chapter has only tested the insurance role of prior self-employment in terms of consumption and labor supply during the crisis. Other household outcomes could have been affected by the crisis, such as children's school enrollment and household members' health. Therefore, one interesting extension of the analysis in this chapter would be to test whether prior self-employment has a positive effect on these other variables during the crisis. Also, I could potentially use other measures of prior self-employment, such as the size of the self-employed business or the amount of business capital, to test the insurance value of prior self-employment. This approach may pick up the insurance value of self-employment better than a simple dummy variable.

This chapter has analyzed the insurance role of prior self-employment for households during aggregate economic downturns. It would also be interesting to look at the insurance role of self-employment during non-crisis times. To answer this question, ideally one would need longitudinal household level data on household labor allocation and household consumption for a long period of time with frequent observations. Then it would be possible to analyze whether diversification between self-employment and wage employment has helped households smooth consumption over time.

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Chapter 3

Do Working Women Have More Intra-Household Bargaining Power? - A Natural Experiment Approach Using Direct Measures of Intra-Household Bargaining Power

3.1 Introduction

This chapter attempts to answer the question: What determines women's intra-household bargaining power? This is an important question because higher intra-household bargaining power improves women's status and welfare. In developing countries, where women usually have lower status than men, improving the status and welfare of women is one of the fundamental goals of development.[1] In addition, higher bargaining power of women within the household may result

[1]The 1995 Beijing Women's conference set achieving gender equality as one of the fundamental goals of development.

in more desirable household outcomes. Literature on household decision making reveals that potential determinants of women's bargaining power, such as women's income share wages, positively affect household investment in children's education and health, household saving rates, and household repayment of loans (de Aghion and Morduch (2004), Duflo (2003), Case and Ardington (2006), Qian (2008)).

The theoretical and empirical literature on household decision making proposes various factors that may affect women's intra-household bargaining power. According to standard intra-household bargaining theory (McElroy and Horney (1981), Manser and Brown (1980), Lundberg and Pollak (1993)), women's intra-household bargaining power depends on women's welfare in the event that bargaining breaks down. This welfare depends on women's wage rates, and other resources women control when bargaining breaks down, such as non-labor income and assets. Therefore, economic factors, such as wages, non-labor income, and assets, are potential determinants of women's intra-household bargaining power. Besides these economic factors, other studies on intra-household decision making, such as Frankenberg and Thomas (2001) and Bertocchi et al. (2012), propose that cultural factors may also affect women's intra-household bargaining power, as cultural factors are correlated with traditions that may govern the way household decisions are made. Bertocchi et al. (2012) proposes that religion may relate to women's bargaining power within the household, and Frankenberg and Thomas (2001) proposes that ethnicity may also affect this power.

This chapter concentrates on current working status (work hours) as a potential determinant of women's bargaining power while controlling for other potential determinants, such as wages, non-labor income, assets, and ethnicity. This is an intriguing factor because both sociology and economics literature have proposed that working women have more intra-household bargaining power (Kantor (2003), Hoddinott and Haddad (1995), Calderon et al. (2011), Anderson and Eswaran (2009), etc.), but little empirical work has tested this hypothesis. In addition, standard household bargaining theory predicts that current earnings, or how much a

woman works, should not matter for her intra-household bargaining power once her wage rate is controlled for; however, it is intuitive to think that when women work and earn an income, they will have more say in how to use their earned income. Conversely, if a woman must depend on her husband's income for all spending, she will have less autonomy in spending according to her preferences. Therefore, it is worthwhile to examine whether empirical testing of the effect of work hours on women's intra-household bargaining power lends more credibility to standard bargaining theory or to intuition.

To test the effect of women's work hours on their intra-household bargaining power, I utilized rich information on household decision making from the Indonesian Family Life Survey (IFLS) to construct direct measures of women's intra-household bargaining power. In the IFLS, both husband and wife are asked to list the household members who participate in 17 categories of household decision making, including those regarding consumption, saving, and time allocation. The answers to these questions gave us a unique insight into how household decisions are made. Although who makes a decision about a particular category is not perfectly correlated with whose preferences influence the decision, I assume that the intensity of participation in household decision making is positively correlated with an individual's bargaining power. Based on this assumption, I constructed two indices to measure women's intra-household bargaining power. One is equal to the percentage of categories for which the wife is the sole decision maker. The other is the average of the wife's decision weight across categories, where the decision weight is equal to one divided by the number of people who participate in decision making in that particular category if the wife is one of the decision makers, and zero otherwise. I used these indices as direct measures of women's intra-household bargaining power in the empirical analysis.

To estimate the effect of women's work hours while controlling for their wages, it was necessary to address the issue that many women do not work and do not report wages. I addressed this issue by using Heckman two-step procedure (Heckman

(1979)) to correct for the possible selection of women into working based on unobserved characteristics that also affect their bargaining power. The exclusion restriction was the number of pre-school children in the household. The argument for this exclusion restriction is that young children will strongly affect women's labor force participation but may not have much effect on their intra-household bargaining power.

It was also necessary to address the empirical issue that women's bargaining power and work hours may be simultaneously decided. That is, while the causal effect of work hours on women's bargaining power may be positive, the causal effect of women's bargaining power on their work hours may be negative if women's higher bargaining power buys them more leisure time. If women in particular cultural or institutional contexts are restricted from working, then the higher bargaining power of women may increase their work hours. No matter what the direction of causal effect of bargaining power on women's work hours, the OLS estimate of the effect of hours on bargaining power will be biased if there is any effect of bargaining power on hours. To address this issue, I used instrumental variable estimation.

IFLS data span the Asian financial crisis, a time when Indonesia experienced high inflation. The sharp rise in prices caused a significant drop in households' real income. One way households coped with the decrease in real income was to increase women's work. According to IFLS data, women's employment rate jumped by more than 10 percentage points from 1997 to 2000. The crisis, however, did not affect all regions equally. In regions with higher inflation, we would expect larger increases in women's work. The inflation shock during the crisis can therefore be viewed as an exogenous event that affected women's work without directly affecting women's intra-household bargaining power. Therefore, I used regional inflation during the crisis as an instrument for the change in women's work hours during the crisis, so as to estimate the causal effect of the change in work hours on the change in women's bargaining power as measured by my

decision-making indices.

In addition to women's work hours and wages, I controlled for a rich set of individual and household characteristics available in the IFLS data. I controlled for work hours and wage of the husband. I also controlled for ethnicity, age, education, non-labor income, and business and non-business assets of both the wife and the husband. Furthermore, I controlled for the number of adults older than 15 and the number of adults older than 65 in the household, as well as urban/rural status and province.

I find that according to the OLS estimations with control for women's wages and the selection of women into working, the effect of work hours was positive and significant on one bargaining power index and positive but not significant on the other. The magnitude of the effect is small. When I used instrumental variable estimation to analyze the effect of change in women's work hours on the change in their bargaining power indices, the effect is positive and significant for one index and positive but not significant for the other. The magnitude of the effect is much larger compared with the OLS estimates. In general, there seems to be evidence that more work increases women's intra-household bargaining power.

This chapter contributes to the literature on intra-household decision making in three ways. First, this chapter provides a more direct test of the determinants of women's intra-household bargaining power than do most empirical studies in the literature. Due to the lack of direct measures of bargaining power, most empirical studies in the literature do not directly test what determines women's intra-household bargaining power. Instead, they look at the effect of potential determinants of women's bargaining power (such as women's wages or non-labor income) on household outcomes, such as children's education and health. The studies treat a positive correlation between these potential determinants and household outcomes as evidence that household members go through a bargaining process to decide on household allocations and that economic factors, such as wages and non-labor income, do affect women's bargaining power (Duflo (2003),

Hoddinott and Haddad (1995), Lundberg et al. (1997), Qian (2008)). This chapter, with direct measures of household intra-household bargaining power, provides a direct test of what determines women's intra-household bargaining power.

Second, this chapter adds to our understanding of intra-household decision making by describing the decision making patterns in the IFLS data. Whereas standard household bargaining models (McElroy and Horney (1981), Manser and Brown (1980), Lundberg and Pollak (1993)) usually treat bargaining power as one-dimensional in the sense that a household member will have equal decision power for all aspects of household decisions, this analysis reveals that household members have different levels of decision making power in different decision categories. While wives are typically in charge of decision categories such as food expenditures, husbands have more decision power in categories such as expenditure on children's education. This analysis also reveals that the decision making in some decision categories is delegated to one of the household members, whereas in other decision categories, decisions tend to be made jointly by multiple household members. These insights indicate that household decision making is a complicated process and simple household decision models may not capture many important aspects of this process.

Third, although working status is an interesting determinant of women's intra-household bargaining power, little empirical work has tested this potential determinant because working status and women's bargaining power are simultaneously determined. Empirical literature has concentrated on more exogenous determinants of women's bargaining power, such as non-labor income and wages (Duflo (2003), Hoddinott and Haddad (1995), Lundberg et al. (1997), Qian (2008)). This chapter is able to concentrate on working status as a potential determinant of women's bargaining power using instrumental variable estimation. The inflation shock during the Asian financial crisis serves as a unique exogenous event that increased women's work hours without directly affecting their bargaining power.

The remainder of the chapter is organized as follows. Section 3.2 introduces the IFLS, describes the information contained in the household decision making module in the IFLS, and shows how I constructed the bargaining power indices. Section 3.3 discusses the empirical strategy. Section 3.4 shows descriptive statistics. Section 3.5 presents the results, and Section 3.6 is the conclusion.

3.2 The Indonesian Family Life Survey, Questions on Intra-Household Decision Making, and Construction of Bargaining Power Indices

3.2.1 Indonesian Family Life Survey

The IFLS is a household level longitudinal survey conducted by RAND Corporation in 1993, 1997, 1998, 2000 and 2007. All rounds of the survey are publicly available except the 1998 round. In the first wave conducted in the second half of 1993, over 30,000 individuals in 7,224 households were sampled. The sampling scheme was stratified on provinces and rural-urban areas within provinces. Enumeration areas (EAs) were randomly sampled within these strata, and households were randomly sampled within the enumeration areas. The documentation for the IFLS states that EAs in the urban areas and in smaller provinces were oversampled to facilitate urban-rural and Java/non-Java comparisons. The sample covered 13 out of the 27 provinces in Indonesia, including all provinces on Java and provinces on Sumatra, Bali, Kalimantan, Sulawesi, and Nusa Tenggara (Figure 2.1). As a result, the sample covered about 83% of the Indonesian population.

In each of the succeeding rounds, the survey team tried to re-contact all of the households interviewed in 1993 ("original households"). Members who moved out of their original households were also tracked and their new households were added

to the sample ("split-off" households).[2] The resulting sample size and the recontact rate for each round is listed in Table 2.1. Attrition for original households was 7% from 1993 to 1997 and 3% from 1997 to 2000. If we only want to compare changes between 1997 and 2000 for the original households, then attrition is rather low.

The IFLS collected rich information on many aspects of household and individual life, including household consumption, business and assets, and individual education, working status and work history.

3.2.2 Module on Household Decision Making

A unique feature of the IFLS is that it contains a module on intra-household decision-making. This module was added to the survey in 1997. As shown in the questionnaire in Appendix D, this module included questions about 17 categories of household decision-making. For each decision category, the respondent is asked to list all the household members who participate in making the decision. Therefore, multiple decision makers for a particular category are allowed. In most households the module was administered to both the husband and wife. Thus, for most couples one can observe whether the husband and the wife agree in their answers.

The categories of decision-making and the distribution of women's participation levels within these categories are summarized in Table 3.1 and Table 3.2. In Table 3.1, columns (1) and (3) show the percentage of couples in which the wife reports that she is the sole decision maker in 1997 and 2000, respectively. Columns (2) and (4) show the percentage of couples in which both the husband and the wife report that the wife is the sole decision maker in 1997 and 2000, respectively. Table 3.2 provides similar information, but in this case reports the percentage of households in which the wife is either the sole decision maker or a joint decision maker with other household members. The sample size for each category is equal to the number of couples in which both the husband and wife gave responses for that decision

[2] A more detailed description of the IFLS re-contact procedure is provided in Appendix A.

category.

Table 3.1: Percentage of Couples in which Wife is the Sole Decision Maker

		1997		2000	
		Reported by		Reported by	
Category	Obs.	Wife (1)	Both (2)	Wife (3)	Both (4)
Expenditure on Food	4892	71.03	58.32	69.60	54.09
Expenditure on Routine Purchase	4892	69.73	57.44	67.35	52.70
Expenditure on Durables	4260	6.88	1.81	7.37	1.67
Expenditure on Husband's Clothes	4869	29.97	14.09	28.57	14.73
Expenditure on Wife's Clothes	4875	51.92	34.24	59.94	40.72
Expenditure on Children's Clothes	4287	33.05	19.27	33.78	18.33
Expenditure on Children's Education	3861	13.75	4.92	12.90	4.58
Expenditure on Children's Health	4278	17.06	6.08	16.62	5.52
Whether the Husband/Wife Works	4831	7.53	0.79	6.25	1.06
Time Husband Spends Socializing	4887	8.76	0.88	9.74	0.82
Time Wife Spends Socializing	4887	42.42	26.40	42.60	25.66
Gift to Parties/Weddings	4849	24.31	10.46	20.71	7.26
Transfer to Husband's Family	3164	8.60	2.15	9.92	2.18
Transfer to Wife's Family	3369	11.87	3.47	11.64	3.38
Contribution to Arisan*	1799	41.19	23.01	41.25	20.23
Monthly Savings	763	24.90	10.75	26.87	9.70
Whether Use Contraception	2301	18.56	8.60	36.29	21.38

* Arisan is a form of rotating savings and credit association
* Calculated from couples that both report an answer to the category

The tables reveal several interesting patterns. First, the level of women's participation in decision-making is not evenly distributed across categories. In some categories, such as expenditure on food and routine purchases, women on average have high levels of participation. In other categories, such as expenditure on durables, whether the husband/wife works, and transfers to wife's and husband's family, women have lower levels of participation.

Second, not being the sole decision maker does not necessarily mean that the wife is not involved in the decision. For example, although only around 7% of women report that they are the sole decision makers for expenditures on durables, about 73% of women report that they are a joint decision maker in this category. For some categories, decisions tend to be made by either the husband or the wife alone, while in some other categories, decisions tend to be made by the husband

Table 3.2: Percentage of Couples in which Wife is a Sole or Joint Decision Maker

		1997		2000	
		Reported by		Reported by	
Category	Obs.	Wife (1)	Both (2)	Wife (3)	Both (4)
Expenditure on Food	4892	89.47	83.85	91.74	84.69
Expenditure on Routine Purchase	4892	89.00	83.26	90.96	84.30
Expenditure on Durables	4260	76.92	65.02	80.47	68.36
Expenditure on Husband's Clothes	4869	70.63	53.05	70.24	51.86
Expenditure on Wife's Clothes	4875	86.48	78.91	91.61	85.44
Expenditure on Children's Clothes	4287	84.63	77.16	83.86	75.11
Expenditure on Children's Education	3861	86.25	76.07	85.42	75.21
Expenditure on Children's Health	4278	90.74	82.70	90.74	82.16
Whether the Husband/Wife Works	4831	75.66	60.73	71.08	55.68
Time Husband Spends Socializing	4887	54.10	34.75	53.71	30.71
Time Wife Spends Socializing	4887	90.94	84.71	89.97	82.71
Gift to Parties/Weddings	4849	93.01	86.64	92.47	83.93
Transfer to Husband's Family	3164	90.30	80.94	90.49	80.12
Transfer to Wife's Family	3369	92.46	86.41	91.75	84.86
Contribution to Arisan	1799	93.50	85.38	93.33	81.55
Monthly Savings	763	87.29	76.80	85.58	69.99
Whether Use Contraception	2301	94.31	90.09	94.48	89.61

* Arisan is a form of rotating savings and credit association
* Calculated from couples that both report an answer to the category

and the wife jointly.

Third, there is a significant amount of disagreement between husbands and wives about who makes decisions. This is shown by the fact that the percentages reported by both the husband and wife are uniformly lower than the percentages just reported by the wife. We can see that not everyone answers all questions. For some categories, the number of couples that report answers is relatively small. One explanation for variation in response rates is that some couples do not engage in some activities, and, as a result, cannot report who makes decision in those categories. For example, if a couple does not have a child, they would not report who makes decisions about children's clothes, education and health. Similarly, if a couple does not save, they would not report who makes decisions about monthly savings.

If we compare the distribution in 1997 with the distribution in 2000, we can see

that for most categories the distribution of decision making is stable between the two years.

Some changes do occur. For example, the percentage of couples where the wife is the sole decision maker about the wife's clothing expenditures and contraception use increases between 1997 and 2000. The percentage of couples in which the wife is a sole decision maker about expenditures on food, expenditures on routine purchases, and gifts to parties and weddings decreases slightly. With respect to the percentage of couples in which the wife is either the sole or a joint decision maker, one can see small increases for expenditures on durables and expenditures on wife's clothes. There are also small decreases for whether the husband/wife works, the time the husband spends socializing, contributions to Arisan, and monthly savings.

3.2.3 The Construction of Intra-Household Bargaining Power Indices

As shown in section 3.2.2, the decision-making module in IFLS contains information about who participates in making various decisions. This information is related to, but not equivalent to, information regarding who has decision-making power. I must, therefore, make some assumptions about the relationship between participation in decision-making and bargaining power. First, I will assume that if a member participates in decision-making in a category, he/she has more bargaining power in this category than members who do not participate. Second, I will assume that if a person is the sole decision maker in a category, then he/she has more bargaining power in that category than joint decision makers. Under these assumptions, I construct indices from the decision-making module to measure women's influence on decision-making or their intra-household bargaining power.

The 17 categories may not have equal importance in terms of household decision-making. One can argue that decisions such as expenditure on durables and children's education are more important than decisions such as routine purchase.

Claiming certain decision are more important and assigning more weight to them when constructing indices, however, can be subjective. Also, there is no empirical or theoretical evidence to support such claims. Therefore, as a start, I assume that all decision categories are equally important and give them the same weight when constructing indices in this chapter.

Based on the above assumptions, one can use the information in the IFLS decision-making module to construct different possible indices of bargaining power. Here I consider the following possibilities:

1. Index 1: The percentage of categories in which the wife reports that she is the sole decision maker

2. Index 2: The percentage of categories in which both the husband and the wife report that the wife is the sole decision maker

3. Index 3: The percentage of categories in which the wife reports that she is either the sole or a joint decision maker

4. Index 4: The percentage of categories in which both the husband and the wife report that the wife is a sole or joint decision maker

5. Index 5: Using only the wife's report, the average of the wife's decision weight across categories. The decision weight is one divided by the number of people who participate in the decision in that category when the wife participates, and zero otherwise.

6. Index 6: Using both the husband's and wife's report, the average of the wife's decision weight across categories. Here the decision weight is one divided by the average of the number of decision makers reported by the husband and the number of decision makers reported by the wife if both the husband and the wife agree that the wife is a sole or joint decision-maker, and zero otherwise.

As discussed above, not all couples report answers for every category. Also, in some couples only the wife or only the husband has given a response for one or

more categories. Consequently, the categories used in the calculation of the indices will affect the sample size. Indeed, when all categories are used, the sample size is fairly small. In view of sample size considerations, I calculate the bargaining power indices in three different ways, in each case using a different selection of decision-making categories. In all cases, I exclude the category whether the husband/wife works, because I am interested in the effect of working status on women's bargaining power. Including working decision may cause endogeneity issues. Specifically, I use the following three decision sets:

1. 16 decision categories: All decision categories (sample size=1120)

2. 11 decision categories: Decision categories A-H, K, N, O, i.e., all categories except those with relatively many missing answers, which are transfers to the husband's family, transfers to the wife's family, contributions to Arisan, monthly savings, use of contraception (sample size=5926)

3. 7 Categories: Decision categories A, B, C, D, K, N, O, i.e., all categories except those with many missing answers and those related to children (sample size=7565)

Table 3.3 shows values of the six indices, each calculated using the three decision sets. Several interesting observations emerge. First, wives on average have sole decision power in only a few categories, but they participate in most of the categories. Second, the indices are quite different when based on only what the wife reports versus what both the husband and the wife report in agreement. In general, wives tend to report that they have more decision-making power than both the husband and wife. Third, the more categories in the decision set, the lower is the percentage of categories in which the wife is the sole decision-maker. This pattern is not observed for percentage of categories in which wife is the sole or joint decision-maker, also not observed for the average of decision weights. Another interesting observation is that the average of decision weights is consistently at around 50% for index 6 across all decision sets. This observation is

suggesting that maybe wives and husbands in Indonesia have equal decision power in intra-household decision-making.

Table 3.3: Summary of Bargaining Power Indices, 2000 (%)

	Decision Set 1 16 Categories	Decision Set 2 11 Categories	Decision Set 3 7 Categories
1. Perc. of Categories Sole Reported by Wife	29.31	33.46	41.04
3. Perc. of Categories Some Reported by Wife	88.60	83.84	82.28
5. Average of Weights Reported by Wife	58.57	58.15	61.45
Obs.	1987	6713	8085
2. Perc. of Categories Sole Reported by Both	16.41	20.44	26.28
4. Perc. of Categories Some Reported by Both	80.31	73.38	70.95
6. Average of Weights Reported by Both	51.01	49.39	51.64
Obs.	1120	5946	7565

For the empirical analysis in this chapter, I will mainly use two indices based on 11 (Decision Set 2) and 7 categories of decision-making (Decision Set 3). The two indices are the percent of categories in which both the husband and wife agree that the wife has sole power (Index 2), and the average decision weight across categories based on both the husband's and the wife's reports (Index 6).

My choice of decision sets is based on considerations of sample size. Decision Set 3 yields the largest sample size, but excludes decisions regarding children. Decision Set 2 has a smaller sample size, but it includes decisions regarding children. The relationship between women's bargaining power and children's outcomes is a topic of interest in the literature, which contains studies finding that households in which women have more control over money tend to spend more on children. With respect to the indices, I choose to use indices based on both the husband's and the wife's reports, because this gives a more conservative measure of women's bargaining power than indices only based on the wife's reports. We can see from Table 3.3, for example, that the indices based only on the wife's reports indicate that the wife has more bargaining power than indices based on both the husband's and wife's reports. Finally, I choose as one of the indices the average decision weight, because this index takes into account how many people participate in making decision in each category, and so reflects not just whether

the wife participates but also how many others participate in the decision. As the other index, I choose the percent of categories in which the wife is the sole decision maker, to obtain a measure of a different aspect of decision-making power. The percent of categories in which the wife has sole power measures dominance, and the average decision weight measures participation. Therefore, using both of these indices should provide us with more insight into the effects of potential determinants on women's decision-making power.

3.3 Empirical Strategy

3.3.1 Equation of Interest

I want to estimate the effect of women's work hours on women's intra-household bargaining power. According to standard theoretical models of intra-household bargaining, women's wage is an important determinant of their intra-household bargaining power. As discussed in the introduction, other potential determinants of women's intra-household bargaining power include: husband's working status and wage, husband's and wife's non-labor income and assets, cultural factors such as religion and ethnicity, household demographic structure, and marriage market factors such as the sex ratio in the local marriage market, divorce laws, etc.

If we treat women's bargaining power at time t as a latent continuous unobserved variable, $Power_t^*$, it will be determined according to

$$Power_t^* = \alpha_0 + \alpha_1 Hour_t^* + \alpha_2 Wage_t + \alpha_3 H + \alpha_4 X_t + \alpha_5 W + \alpha_6 Z_t \,. \tag{3.1}$$

$Hour_t^*$ is the wife's true work hours. $Wage_t$ is wife's hourly wage. H is the vector of time-invariant observed individual and household characteristics that determine

women's bargaining power. In my analysis H include husband and wife's ethnicity, age (deterministic instead of time invariant), and education. X_t is the vector of other observed individual and household characteristics that are time-variant. X_t in my analysis include husband's work hours, hourly wage (I set husband's hourly wage to zero if the husband does not work), and an indicator variable indicating whether the husband is working. X_t also include husband's non-labor income, business assets and non-business assets, wife's non-labor income, business assets and non-business assets, as well as number of adults (older than 15) in the household, number of members older than 65 in the household, and province and urban/rural status. W is a vector of unobserved individual and household characteristics that are time-invariant, such as the wife's and husband's personality. Z_t is a vector of unobserved characteristics that are time-variant, such as local marriage market sex ratio, divorce laws, etc.

I will assume that each of the indices is a noisy measure of the wife's true bargaining power, therefore for each index, $Index_t^l$,

$$Index_t^l = \alpha_0^l + \alpha_1^l Hour_t^* + \alpha_2 Wage_t + \alpha_3^l H + \alpha_4^l X_t + \alpha_5^l W + \alpha_6^l Z_t + \epsilon_t^l \,, \qquad (3.2)$$

where ϵ_t^l is the measurement error of $Index_t^l$ when measuring the true bargaining power.

Since there is also measurement error measuring women's working hours, Equation 3.2 becomes

$$Index_t^l = \alpha_0^l + \alpha_1^l Hour_t + \alpha_2 Wage_t + \alpha_3^l H + \alpha_4^l X_t + \alpha_5^l W + \alpha_6^l Z_t + \epsilon_t^l - \alpha_1 \upsilon_t \,, \qquad (3.3)$$

where υ_t is the measurement error of $Hour_t$ when measuring $Hour_t^*$.

Assuming that current working hours is not correlated with the unobserved variables, W and Z_t, and the measurement error ϵ_t^I, I can directly estimate the effect of working hours on $Index_t^I$ using OLS regression.

3.3.2 Correcting for Selection of Women into Working

Since about half of women in my sample do not work, I do not observe an hourly wage for these women. Therefore, for about half of couples I cannot estimate Equation 3.3 directly. If women's work hours does not depend on unobserved characteristics that also affect their bargaining power conditional on H and X_t, then estimation of Equation 3.3 only using couples in which women work still provides consistent estimate of α_1 and α_2. Whether women work, however, may depend on unobserved characteristics such as their innate ability that may also affect their bargaining power.

To correct for this selection problem, I use Heckman two-step procedure. First I estimate women's labor force participation decision according to

$$U_t = \gamma_0 + \gamma_1 S_t + \gamma_2 V_t + \gamma_3 Q + u_t \,, \tag{3.4}$$

and

$$Work_t = \begin{cases} 1 & \text{if } U_t > 0 \\ 0 & \text{otherwise} \end{cases} \,. \tag{3.5}$$

S_t are observed characteristics that determine the utility of the wife if she works. These variables include wife's age, wife's education, total non-labor income of

the household, total assets of the household, number of pre-school children (0 to 6 years old) in the household, number of children between 7 and 15 in the household, number of members older than 65 in the household, number of work-age members (15 to 65) in the household, education composition of work age members in the household, and province and urban/rural status. V_t is vector of unobserved time-variant characteristics that affects women's participation decision, and Q is vector of unobserved time-invariant characteristics that affect women's participation decision. The exclusion restriction is number of pre-school children and number of children between 7 and 15. Number of children, especially number of pre-school children will strongly influence women's labor force participation decision, but may not have much effect on women's intra-household bargaining power. Assuming u_t is normally distributed, I can estimate Equation 3.4 and 3.5 using probit model.

Then I compute an Inverse Mills Ratio from estimates of Equation 3.4 and 3.5 and include this as an independent variable in Equation 3.3. The results from these estimations are presented in Section 3.5.

3.3.3 The Simultaneous Equation Problem

Estimating the effect of women's work hours on their bargaining power may be subject to a simultaneous equation problem. As suggested above, I am interested in the effect of $Hour_t^*$ on women's bargaining power $Power_t^*$ in Equation 3.1. In other words, the coefficient I am interested in is α_1. Women's bargaining power, however, may also affect their working status. This is because everything else held constant, higher bargaining power for women in the household may buy women more leisure if we treat leisure as a normal good. In contrast, if women are restricted to do market work in Indonesia, then higher bargaining power in the household for women may allow them to work more instead of working less. Regardless of the direction in which bargaining power influences women's working status, we will have the following equation for the determination of women's working hours:

$$Hour_t = \beta_0 + \beta_1 Power_t^* + \beta_2 S_t + \beta_4 V_t + \beta_5 Q + \upsilon_t \,, \tag{3.6}$$

where S_t is a vector of time-variant observed individual and household characteristics that determine the wife's working status. These variables include wife's age, education, and non-labor income. They also include the age and education composition of members in the household, total non-labor income of the household, total assets of the household, and the region in which the households reside. V_t is a vector of time-variant unobserved characteristics that determine the wife's working status such as local labor demand, social network, etc. Q is a vector of unobserved time-invariant variables that affect women's working status such as ability and preference for market work instead of housework, etc.. υ_t is the measurement error of $Hour_t$ when measuring the true hours that women work.

Since we do not observe the true $Power_t^*$ and instead use $Index_t$ to measure $Power_t^*$, equation 3.6 becomes

$$Hour_t = \beta_0 + \beta_1 Index_t + \beta_2 S_t + \beta_4 V_t + \beta_5 Q + \upsilon_t - \beta_1 \epsilon_t \,, \tag{3.7}$$

where υ_t is the measurement error when using $Hour_t$ to measure true hours $Hour_t^*$, and ϵ_t is the measurement error when using $Index_t$ to measure true bargaining power $Power_t^*$. As a result we can see that $Hour_t$ is correlated with ϵ_t, and OLS estimation of Equation 3.3 may not yield a consistent estimate of α_1.

3.3.4 Instrumental Variable Estimation

To deal with the simultaneous equation problem, I use instrumental variable estimation. In 1998 the Asian Financial Crisis hit Indonesia. One of the significant

impacts of the crisis was high inflation. National inflation from 1997 to 1998 was close to 80%. This sharp rise in the price level resulted in a sharp decrease in household's real income and wealth in a short period of time.

The IFLS data reveal that one of the coping strategies households used to combat the drop in real income due to inflation was to increase women's work. Total employment of women in the IFLS sample increased from 52% to 65% from 1997 to 2000.

One feature of the Asian Financial Crisis in Indonesia was that the crisis did not hit all regions equally. In terms of 1997-1998 inflation, provincial variation was substantial, ranging from 60% in Central Java to 90% in South Sumatra. The variation in regional inflation makes it a possible instrument, as it is correlated with the change in women's work during the crisis but was unlikely to have affected women's intra-household bargaining power directly.

Since the impact of inflation was on the change in women's work, not the level (which also differed among regions), the instrumented relationship is for change over time. Taking the first differences of Equation 3.3 and 3.7, I obtain

$$\Delta Index_t^l = \alpha_1^l \Delta Hour_t + \alpha_3^l \Delta X_t + \alpha_5^l \Delta Z_t + \Delta\epsilon_t^l - \alpha_1 \Delta\upsilon_t \,, \tag{3.8}$$

and

$$\Delta Hour_t = \beta_1 \Delta Index_t + \beta_2 \Delta S_t + \beta_4 \Delta V_t + \Delta\upsilon_t - \beta_1 \Delta\epsilon_t \,. \tag{3.9}$$

We can see that $\Delta Hour_t$ is still correlated with $\Delta\epsilon_t$ in Equation 3.8. If there is any common variables in ΔZ_t and ΔV_t, estimation of Equation 3.8 will also be subject to omitted variable problem. Therefore I am going to use provincial level

inflation from 1997 to 1998 from the Indonesian Bureau of Statistics to instrument for $\Delta Hour_t$. As the Asian financial crisis hit Indonesia by the beginning of 1998 and 1998 was the deepest point of the crisis, 1997 to 1998 inflation should accurately capture the effect of the crisis on inflation.

To use regional inflation as an instrument, I need to use households that have not migrated across provinces between 1997 and 2000. Since less than 5% of households migrated across provinces between 1997 and 2000 in IFLS, this restriction should not create a significant problem on the accuracy of my estimates.

In the instrumental variable estimation, I do not control for change in the wife's and the husband's hourly wage. This is because controlling for change in wife's hourly wage will exclude women who did not work in either 1997 or 2000 and significantly decrease sample size. The group of women who went from not-working to working or from working to not-working from 1997 to 2000 is the most interesting group in this analysis, because they had the most dramatic change in their working status. To include these women, I cannot control for change in hourly wage since they do not report a wage in 1997 or 2000. Assuming that the change in women's wage is not correlated with regional inflation from 1997 to 1998, I can still get a consistent estimate of the effect of change in women's work hours on the change in their bargaining power indices using the instrument.

3.4 Descriptive Statistics

3.4.1 Women's Employment and Inflation across Provinces during the Crisis

Table 3.4 shows the levels of and changes in women's employment rates (percent of women who work) before and after the crisis by province, as well as the 1997-1998 inflation by province. Most provinces experienced a substantial increase in

women's employment, but the magnitude of the increase varies considerably across provinces. The scale of the 1997-1998 inflation also varies across provinces. From the table, one can see evidence of a positive correlation between the 1997-1998 inflation and the change in women's employment rate.

Table 3.4: Women's Employment Rate and Inflation

	Women's Employment Rate				
Province	1997	2000	Δ 97-00	Δ in Perc. 97-00	1997-1998 Inflation
North Sumatra	52.45	69.23	16.78	31.99	0.7524
West Sumatra	52.23	65.63	13.4	25.66	0.8163
South Sumatra	44.04	66.51	22.47	51.02	0.9104
Lampung	51.74	77.11	25.37	49.03	0.7226
Jakarta	37.61	48.32	10.71	28.48	0.7263
West Java	31.92	50.36	18.44	57.77	0.6916
Central Java	70.33	74.18	3.85	5.47	0.6116
Yogyakarta	75	83.33	8.33	11.11	0.7487
East Java	49.61	67.89	18.28	36.85	0.7388
Bali	71.71	66.78	-4.93	-6.87	0.6069
West Nusa Tenggara	68.71	67.69	-1.02	-1.48	0.6899
South Kalimantan	63.08	67.76	4.68	7.42	0.6795
South Sulawesi	22.31	43.8	21.49	96.32	0.7396

Notes: Employment rate, calculated from IFLS data, is the percent of women who work. Inflation data is from the Indonesian Bureau of Statistics.

3.4.2 Summary Statistics

In the econometric analysis, I will be using the two indices of bargaining power that are based on 7 categories and 11 categories of decision-making, as discussed in section 3.2.3. Independent variables used in the analysis include husband's and wife's work hours and hourly wage, as well as other characteristics of the couple, such as ethnicity, age, education, non-labor income, non-business assets, and business assets. I also include the household size, the household's age composition, and the region of residence. Since for 90% of the couples, wife and husband have the same ethnicity, I only include wife's ethnicity in the regressions. I include a binary variable, however, indicating whether the wife and the husband have different ethnicity. In Indonesia, ethnicity and region are highly correlated.

Therefore, I am not able to include all provinces as separate independent variables. For large, regionally spread ethnic groups, I include the interaction of ethnic groups and provinces for these ethnic groups. Table 3.5 and 3.6 give summary statistics of the key variables. The sample includes couples for whom I am able to construct the two indices and for whom I have full information on all characteristics used in the OLS regression (Equation 3.3). A complete table of summary statistics is presented in Appendix E.

Table 3.5: Summary of Characteristics of Couples in 2000 Who Respond to 7 Categories of Decision Making

Sample	All Couples		With Working Wife	
	Mean	Std. Dev.	Mean	Std. Dev.
Obs.	4349		2264	
Index 1 Percent Sole	0.28	0.23	0.29	0.23
Index 2 Average Decision Weight	0.54	0.17	0.55	0.17
Work Hours per Week Wife	23.95	29.51	46.01	25.64
Work Hours per Week Husband	48.58	24.69	49.39	25.01
Age Wife	37.32	11.67	39.00	10.20
Age Husband	42.64	12.93	44.26	11.85
Years of Sch. Wife	6.41	4.33	6.32	4.61
Years of Sch. Husband	7.31	4.51	7.08	4.67
Hourly Wage Wife*	1900	5566	1900	5566
Hourly Wage Husband*	2543	12201	2023	3276
Husband Not Working	0.06	0.24	0.06	0.23
Non-labor income Wife*	99365	647332	104522	525493
Non-labor income Husband*	292948	1656376	222186	1528711
Non-business asset Wife*	10883691	31159719	11326320	28780893
Non-business asset Husband*	14137155	36093618	13952889	31907547
Business Asset Wife*	2162454	13621599	2881753	14817303
Business Asset Husband*	7935037	41739273	8150524	35295912
Number of Adults in HH	3.22	1.39	3.18	1.33
Number over 65 in HH	0.17	0.43	0.16	0.42
Urban	0.48	0.50	0.46	0.50

*In Rupiah, the exchange rate in 2000 was about 9000 Rupiah/US$
Note: Statistics are for 2000, calculated using the IFLS 2000 data. Due to the large number of ethnic groups and provinces, I do not report their summary statistics here. They can be found in Appendix E. Samples are couples who respond to 7 categories of decision making, and who have complete information on all characteristics.

One can see from Table 3.5 and Table 3.6 that wives on average have about 0.85 fewer years of school than husbands and are about 5 years younger than husbands.

Wives also have lower wages, lower non-labor income, less non-business assets, and less business assets than husbands. Both work hours and wages have large standard deviations, indicating significant variation for both husbands and wives. In about 6% of couples, the husbands do not work. Comparing all couples and couples in which wives work, one can see that the average characteristics are similar between these two samples. Also, the average characteristics are similar between the sample that responds to only 7 categories of decision-making (Table 3.5) and the sample that responds to 11 categories of decision-making (Table 3.6).

Table 3.6: Summary of Characteristics of Couples in 2000 who Respond to 11 Categories of Decision Making and Who Also Live in Households with Children Between 0 and 15

Sample	All Couples		With Working Wife	
	Mean	Std. Dev.	Mean	Std. Dev.
Obs.	2857		1530	
Index 1 Percent Sole	0.29	0.23	0.29	0.23
Index 2 Average Decision Weight	0.54	0.17	0.55	0.16
Work Hours per Week Wife	24.78	29.75	46.28	25.65
Work Hours per Week Husband	50.31	23.89	50.86	24.51
Age Wife	36.1176	9.50	37.57	8.73
Age Husband	41.37	10.80	42.72	10.30
Years of Sch. Wife	6.55	4.25	6.52	4.52
Years of Sch. Husband	7.42	4.51	7.19	4.64
Hourly Wage Wife*	1911	4794	1911	4794
Hourly Wage Husband*	2687	12649	2077	3117
Husband Not Working	0.04	0.20	0.05	0.21
Non-labor income Wife*	85375	497928	114314	597843
Non-labor income Husband*	219352	1447964	160070	1395234
Non-business asset Wife*	10954890	27882225	11553372	30546909
Non-business asset Husband*	13977216	32672394	13614831	29705121
Business Asset Wife*	1999688	10505754	2588335	12268476
Business Asset Husband*	8322005	46508751	8524550	38081772
Number of Adults in HH	3.19	1.38	3.19	1.34
Number over 65 in HH	0.15	0.40	0.14	0.40
Urban	0.48	0.50	0.43	0.50

*In Rupiah, the exchange rate in 2000 was about 9000 Rupiah/US$

Note: Statistics are for 2000, calculated using the IFLS 2000 data. Due to the large number of ethnic groups and provinces, I do not report their summary statistics here. They can be found in Appendix E. Sample are couples who respond to 11 categories of decision making, who have complete information on all characteristics, and who reside in households with children younger than 15.

Table 3.7 gives summary statistics for the first differenced estimations. The sample includes couples for whom I am able to compute an index in both 1997 and 2000, and who also have full information on all the independent variables for both 1997 and 2000. One can see that the sample size has decreased significantly. To compute the change in non-labor income and assets, I use province-specific monthly inflation indices from the Indonesian Statistics Bureau. I also match the months of the index to the months in which the household was interviewed in 1997 and 2000.

Table 3.7: Change in Couple's Characteristics 1997-2000

	7 Decision Categories		11 Decision Categories	
	Mean	Std. Dev.	Mean	Std. Dev.
Obs.	3209		1689	
Index 1 (percent sole)	-0.02	0.29	-0.02	0.24
Index 2 (average decision weight)	-0.01	0.22	-0.01	0.19
Work Hours per Week Wife	6.29	29.63	7.73	30.09
Work Hours per Week Husband	1.63	28.52	1.64	28.22
Non-business Asset Wife	1632769	20126979	1624748	16452648
Non-business Asset Husband	-267224	30874311	358471	17342433
Business Asset Wife	125410	13229028	-145532	15093117
Business Asset Husband	979440	26982675	1475595	30202857
Non-labor income Wife	-164459	1873456	-228785	2504944
Non-labor income Husband	-61504	1220520	-108516	1483727
Number of adults	0.06	1.23	0.16	1.22
Number older than 65	0.05	0.37	0.01	0.31

Notes: Samples are couples who respond to 7 or 11 categories of decision making in both 1997 and 2000, and who have complete information on all characteristics in the table in both 1997 and 2000. The sample under 11 decision categories are also couples who reside in households with children under age 15 in both 1997 and 2000. Changes in non-labor income and assets are computed using province-specific monthly inflation indices from the Indonesian Statistics Bureau. I match the months of the index to the months in which the household was interviewed in 1997 and in 2000.

Table 3.7 presents summary statistics for two samples. The first sample contains couples in which both husband and wife responded to 7 categories of decision making in both 1997 and 2000, and for whom I observe the characteristics listed in Table 3.7 in both 1997 and 2000. The second sample contains couples in which both husband and wife responded to 11 categories of decision making in both 1997 and 2000, and for whom I observe the characteristics listed in Table 3.7 in both 1997 and 2000. In addition, these couples live in households with children younger than

15 in both years. One can see that the changes in characteristics are not significantly different between these two samples. The averages of both indices did not change between 1997 and 2000. Wives increased their average work time per week by 6-7 hours, and husbands increased their average work time per week by about 1.6 hours. We do not see a significant decrease in either the wife's or the husband's assets. We do see a drop in the wife's and the husband's non-labor income.

3.5 Results and Discussion

3.5.1 Effect of Women's Work Hours on Women's Bargaining Power Indices

Estimation results of Equation 3.2 are presented in Table 3.8 and Table 3.9. Table 3.8 shows the results for the bargaining power index that is based on 7 decision categories. Table 3.9 displays the results for the index that is based on 11 decision categories, and for the restricted sample that only includes couples who reside in households with children aged 15 and younger. The coefficients in the columns labeled "Basic OLS" are estimated without controlling for women's wages and without correcting for the selection of women into working. The coefficients in the columns labeled "With Selection" are estimated with controls for women's wages and correction for the selection of women into working. The results from the selection equation are presented in Appendix F.

The main coefficient of interest is the coefficient on the wife's work hours. In both Table 3.8 and Table 3.9 the estimated coefficient on wife's work hours is positive in all specifications and for both bargaining power indices. It is also statistically significant, except when I control for wages and selection and at the same time when the dependent variable is the sole power index.

The magnitude of the coefficients on wife's work hours differs a bit between

Tables 3.8 and Table 3.9. The estimates in Table 3.8 when the dependent variable is sole power index are .00036 and .0002. This means that one more hour of work per week by the wife increases the percent of categories in which wife has sole decision power by .02 to .036 percentage points. When the dependent variable is the average decision weight, one more hour of work per week by the wife increases her average decision weight by .032 to 0.44 percentage points, depending on the specification.

Also of interest is the coefficient on the wife's wage, which is positive in all specifications and significant if the dependent variable is the average decision weight. One more US dollar per hour increases her average decision weight by 1.2 (Table 3.8) or 1.7 (Table 3.9) percentage points.

Therefore, according to OLS regressions, the effect of women's work hours and women's wage on their bargaining power indices is small in magnitude. A 40-hour increase in women's work hours per week will only increase both indices by about .12 percentage points. Since women's average hourly wage is about .21 US$, a doubling of the average wage will only increase her average decision weight by about .24 percentage points.

The regressions in Table 3.8 were estimated over couples who reside in households with and without children younger than 16, and for a bargaining power index that does not include decision categories specifically related to spending on children. In contrast, the regressions in Table 3.9 include only couples who reside in households with children in this age range and for a bargaining power index that includes decision categories related to spending on children. Comparing the coefficients for wife's work hours and wages in the two tables, one can see that the estimates are quite similar. This suggests that the impacts of wife's work time and wages on bargaining power are not significantly different for couples who live in households with children and who live in households without children.

Table 3.8: Effect of Wife's Hours on Wife's Bargaining Index in 2000, 7 Decision Categories

	Percent Sole		Average Weight	
	Basic OLS	With Selection	Basic OLS	With Selection
Work hours per week wife	.00036***	.0002	.00044***	.00032**
	(3.14)	(1.11)	(5.02)	(2.31)
Hourly wage wife		.0045		.01205**
(in US dollars)		(0.58)		(2.05)
Work hours per week husband	.00036**	.00043**	.00023*	.00015
	(2.29)	(2.00)	(1.91)	(0.92)
Hourly wage husband	.00114	-.00697	.00056	-.00619
(in US dollars)	(0.47)	(-0.48)	(0.30)	(-0.56)
Husband not working	.00449	.0397*	.00782	.0336*
	(0.27)	(1.66)	(0.61)	(1.86)
Urban	.01466*	.00821	.00909	.00818
	(1.96)	(0.74)	(1.58)	(0.98)
Age wife	.00021	.00144	.0004	.00042
	(0.31)	(1.38)	(0.77)	(0.53)
Age husband	.00061	-.00038	.00022	-6.1e-05
	(0.98)	(-0.46)	(0.46)	(-0.10)
Years of school wife	-.00111	-.00249	.00029	-.00107
	(-0.95)	(-1.51)	(0.33)	(-0.86)
Years of school husband	-.00218**	-.00223	.00044	.00067
	(-2.04)	(-1.47)	(0.53)	(0.58)
Non-labor income wife	.06902	.12963	.06009*	.12224**
(in 1000 US dollars)	(1.50)	(1.64)	(1.69)	(2.04)
Non-labor income husband	.03503*	.01554	-.00359	-.02999
(in 1000 US dollars)	(1.79)	(0.49)	(-0.24)	(-1.25)
Non-business asset wife	.00057	.00173	.00303***	.0031**
(in 1000 US dollars)	(0.42)	(0.94)	(2.88)	(2.22)
Non-business asset husband	.00183	.00283*	-.00055	.00034
(in 1000 US dollars)	(1.60)	(1.80)	(-0.62)	(0.29)
Business asset wife	-.00538**	-.00417	-.00143	-.00106
(in 1000 US dollars)	(-2.26)	(-1.39)	(-0.78)	(-0.46)
Business asset husband	-.0001	.0003	-.00053	-.00082
(in 1000 US dollars)	(-0.14)	(0.23)	(-0.92)	(-0.84)

Number of adults	-.00646***	-.0044	-.00895***	-.00693**
	(-2.58)	(-1.19)	(-4.64)	(-2.48)
Number older than 65	-.0207**	-.02211*	-.01361**	-.00246
	(-2.49)	(-1.76)	(-2.12)	(-0.26)
Inverse Mills Ratio		.02512		-.01245
		(0.83)		(-0.54)
Constant	.08642***	.06314	.46677***	.48235***
	(3.71)	(1.29)	(25.98)	(12.97)
Observations	4349	2264	4349	2264
R^2	0.119		0.050	

t statistics in parentheses * p<0.10, ** p<0.05, *** p<.01. This sample are couples who both report answers to all of 7 categories of decision making. Work hours is work hours per week. Exchange rate of 9000 Rupiah/US dollar used, it is the average exchange rate in 2000. Coefficients of ethnicity variables not reported here. Ethnicity does matter for all regressions in this table. Adults are members older than 15.

Table 3.9: Effect of Wife's Hours on Wife's Bargaining Index in 2000, 11 Decision Categories, Households with Children 0-15

	Percent Sole		Average Weight	
	Basic OLS	With Selection	Basic OLS	With Selection
Work hours per week wife	.0003**	.00033	.00046***	.00048***
	(2.16)	(1.52)	(4.30)	(2.91)
Hourly wage wife		.00994		.01684**
(in US dollars)		(0.89)		(2.02)
Work hours per week husband	.0003	.00051*	.00016	.00015
	(1.55)	(1.96)	(1.09)	(0.79)
Husband not working	-.00927	.03591	.0085	.04191*
	(-0.40)	(1.16)	(0.48)	(1.82)
Hourly wage husband	.00414	.00631	.00188	.00799
(in US dollars)	(1.42)	(0.32)	(0.85)	(0.55)
Age wife	.00027	.00251*	9.3e-05	.0008
	(0.31)	(1.77)	(0.14)	(0.76)
Age husband	2.6e-05	-.0015	.00017	-.00053
	(0.03)	(-1.41)	(0.29)	(-0.67)
Years of school wife	-.0012	-.00281	.00082	-.00055
	(-0.83)	(-1.36)	(0.75)	(-0.36)
Years of school husband	-.00112	-.0006	.00019	.00025
	(-0.85)	(-0.33)	(0.19)	(0.19)

Non-labor income wife	.1617**	.13575	.13071**	.1234**
(in 1000 US dollars)	(2.17)	(1.63)	(2.30)	(1.99)
Non-labor income husband	.05213*	.069	-.00152	-.00851
(in 1000 US dollars)	(1.84)	(1.56)	(-0.07)	(-0.26)
Non-business asset wife	.00074	-.00092	.00276**	.00171
(in 1000 US dollars)	(0.42)	(-0.40)	(2.07)	(1.00)
Non-business asset husband	.0009	.0018	-.00085	-.00021
(in 1000 US dollars)	(0.63)	(0.86)	(-0.79)	(-0.13)
Business asset wife	-.00854**	-.00722*	-.00338	-.00315
(in 1000 US dollars)	(-2.37)	(-1.66)	(-1.23)	(-0.97)
Business asset husband	-.00056	-.00048	-.00062	-.0015
(in 1000 US dollars)	(-0.68)	(-0.32)	(-0.99)	(-1.36)
Number of adults	-.00805**	-.0077	-.00793***	-.00772**
	(-2.45)	(-1.63)	(-3.16)	(-2.21)
Number older than 65	-.00616	-.01037	-.00922	-.00073
	(-0.57)	(-0.68)	(-1.11)	(-0.07)
Urban	.00466	-.01004	.00319	-.0016
	(0.50)	(-0.70)	(0.45)	(-0.15)
Inverse Mills Ratio		.04519		.00156
		(1.21)		(0.06)
Constant	.10372***	.04386	.47683***	.47253***
	(3.43)	(0.70)	(20.70)	(10.22)
Observations	2857	1530	2857	1530
R^2	0.115		0.050	

t statistics in parentheses * p<0.10, ** p<0.05, *** p<.01. This sample are the couples who both report answers to all of 11 categories of decision making, and who also reside in households with children between 0-15 years. Work hours is work hours per week. Exchange rate of 9000 Rupiah/US dollar used, it is the average exchange rate in 2000. Coefficients of ethnicity variables not reported here. Ethnicity does matter for all regressions in this table. Adults are members older than 15.

3.5.2 Instrumental Variable Estimates: Effect of Change in Women's Work Hours on Change in Women's Bargaining Indices

Table 3.10 and 3.11 show the results of the instrumental variable regressions that use provincial inflation during the Asian financial crisis as an instrument. Here changes in the bargaining power indices are regressed on changes in wife's hours and other variables. For the bargaining power indices constructed using 7 decision categories (Table 3.10), the effect of wife's work hours on the percent of categories in which the wife has sole power is positive and significant. The magnitude of this effect has become much larger than the OLS estimate in the last section. One more hour of wife's work per week increases the percent of categories in which the wife has sole power by 1.5 percentage points. The IV estimate of the effect of change in work hours on change in average decision weight is positive and almost significant at 10% significance level. The magnitude of this effect has increased significantly compared with the OLS estimate in the last section as well. One more work hour per week by the wife increases her average decision weight across 7 categories by .5 percentage points. If I use 11 categories including decisions on children's expenditure to construct the indices, the effect of the change in wife's work hours on the change in her bargaining indices is no longer significant. The coefficients, however, remain positive and are of similar magnitude compared with estimates using 7 categories of decision-making.

The fact that the coefficients on women's work hours become much larger in the IV estimation suggests reverse causality. In other words, if a wife's bargaining power increases, she can reduce her work hours. When reverse causality exists, estimates that do not correct for endogeneity may be downward biased.

Table 3.10: Effect of Change in Wife's Work Hours on Change in Wife's Bargaining Index, 7 Decision Categories

	Percent Sole Power		Average Decision Weight	
	OLS	IV	OLS	IV
Work hours per week wife	1.9e-05	.01531**	.00015	.00471
	(0.11)	(2.55)	(1.15)	(1.62)
Work hours per week husband	-.00018	-.00205**	-.00015	-.00071*
	(-0.99)	(-2.54)	(-1.11)	(-1.83)
Non-business asset wife	-.00096	-.00515	.00232	.00108
(in 1000 US Dollars)	(-0.37)	(-1.02)	(1.17)	(0.44)
Non-business asset husband	-.00095	.00251	-.00246*	-.00142
(in 1000 US dollars)	(-0.57)	(0.74)	(-1.90)	(-0.87)
Business asset wife	-.00594	-.01332*	-.00063	-.00283
(in 1000 US dollars)	(-1.53)	(-1.71)	(-0.21)	(-0.75)
Business asset husband	.0021	.00892**	-3.1e-05	.002
(in 1000 US dollars)	(1.14)	(2.05)	(-0.02)	(0.95)
Non-labor income wife	-.00145	-.02471	.02096	.01402
(in 1000 US dollars)	(-0.06)	(-0.53)	(1.11)	(0.62)
Non-labor income husband	-.00221	.01477	.00631	.01137
(in 1000 US dollars)	(-0.06)	(0.21)	(0.21)	(0.33)
Number of adults	-.00622	-.00462	-.00375	-.00327
	(-1.51)	(-0.60)	(-1.18)	(-0.88)
Number over 65	-.00031	-.01673	.00272	-.00218
	(-0.02)	(-0.63)	(0.26)	(-0.17)
Constant	-.0184***	-.11093***	-.01134***	-.03892**
	(-3.50)	(-2.95)	(-2.81)	(-2.15)
Observations	3209	3209	3209	3209
R^2	0.002		0.003	
P-value of partial R-square test		0.0026		0.0026
P-value of Wu-Hausman test		0.0000		0.0655

t-statistic in parentheses, * p<0.10, ** p<0.05, *** p<.01. Sample are couples who report answers to all 7 categories in both 1997 and 2000. All the variables are in change between 1997 and 2000. Inflation data from Indonesian Bureau of Statistics used. Work hours is work hours per week. Exchange rate of 9000 Rupiah/US dollar used, it is the average exchange rate in 2000. Adults are members older than 15. Partial R-square test tests for the relevance of the instrument. Wu-Hausman test tests for the endogeneity of instrumented variable.

Table 3.11: Effect of Change in Wife's Work Hours on Change in Wife's Bargaining Index , 11 Decision Categories, Households with Children 0-15 in 1997 and 2000

	Percent Sole Power		Average Decision Weight	
	OLS	IV	OLS	IV
Work hours per week wife	-.00011	.01029	.00016	.00398
	(-0.59)	(1.44)	(1.00)	(0.98)
Work hours per week husband	-4.8e-05	-.00092	-.00013	-.00045
	(-0.24)	(-1.34)	(-0.82)	(-1.17)
Non-business asset wife	.00194	-.00839	.00294	-.00085
(in 1000 US Dollars)	(0.53)	(-0.90)	(1.00)	(-0.16)
Non-business asset husband	.00114	.00591	-.00371	-.00195
(in 1000 US dollars)	(0.37)	(0.98)	(-1.50)	(-0.57)
Business asset wife	-.00377	-.01736	-.00088	-.00587
(in 1000 US dollars)	(-0.88)	(-1.48)	(-0.25)	(-0.88)
Business asset husband	.00152	.00729	-.00072	.00139
(in 1000 US dollars)	(0.80)	(1.44)	(-0.47)	(0.49)
Non-labor income wife	.00527	-.00601	.0256	.02146
(in 1000 US dollars)	(0.25)	(-0.17)	(1.51)	(1.06)
Non-labor income husband	.00318	.00246	-.00674	-.007
(in 1000 US dollars)	(0.09)	(0.04)	(-0.23)	(-0.20)
Number of adults	-.0033	.00363	.00362	.00617
	(-0.69)	(0.39)	(0.94)	(1.18)
Number over 65	.011	-.05525	-.02613*	-.05046
	(0.58)	(-1.00)	(-1.70)	(-1.61)
Constant	-.01618***	-.09532*	-.01122**	-.04029
	(-2.67)	(-1.73)	(-2.30)	(-1.29)
Observations	1689	1689	1689	1689
R^2	0.002		0.006	
P-value of partial R-square test		0.0682		0.0682
P-value of Wu-Hausman test		0.0158		0.2712

t-statistic in parentheses, * p<0.10, ** p<0.05, *** p<.01. Sample are couples who report answers to all 11 categories in both 1997 and 2000, and who also reside in households with children between 0 and 15 in both 1997 and 2000. All the variables are in change between 1997 and 2000. Inflation data from Indonesian Bureau of Statistics used. Work hours is work hours per week. Exchange rate of 9000 Rupiah/US dollar used, it is the average exchange rate in 2000. Adults are members older than 15. Partial R-square test tests for the relevance of the instrument. Wu-Hausman test tests for the endogeneity of instrumented variable.

3.6 Conclusion and Discussion

This chapter has looked at the effect of women's work hours on their intra-household bargaining power. Bargaining power is measured by indices constructed from direct information on household decision-making in the IFLS. To address the problem that women's work hours and bargaining power may be simultaneously determined, I use regional inflation shock during the Asian Financial Crisis as an instrument for women's work hours. I found that the effect of women's work hours on their bargaining power indices is in general significant and positive in both the OLS and IV estimations. The IV estimates of the effect of women's work hours on their bargaining indices are much larger than the OLS estimates.

Whether I am able to obtain the true relationship between women's work hours and their bargaining power depends on how well I can measure women's intra-household bargaining power. As discussed before, the information on household decision-making in IFLS only tells us who participates in making various kinds of decisions. This information is not equivalent to whose preference is more reflected in the decisions. We can imagine a scenario in which the husband makes all decisions, but the husband takes the wife's preferences fully into consideration when making the decisions. In this case, the wife has high bargaining power although she does not participate in decision-making. Therefore, in this chapter I make the assumption that when the wife reports that she participates in making a decision, her preference will more likely be reflected in that decision.

The IFLS survey data contain information on 17 decision categories, and not all respondents responded to all those categories. As a result, I cannot include all the 17 decision categories in my analysis. Even if I could, using the 17 categories does not exhaust all the household decisions a family makes. In the 17 categories, there are also more routine decisions such as expenditure on daily food and more rare decisions such as large purchases. It is not entirely clear whether each of the

decisions should have equal weight when I want to measure the wife's bargaining power. For this chapter, I assume that each decision is equally important and give them equal weight when constructing my indices.

The accuracy of the results in this chapter will also depend on the validity of the instrument and whether there is indeed a simultaneous equation problem. Since inflation was about 70-80% in the first half of 1998 during the Asian financial crisis, and since inflation varied regionally during the crisis as shown in the descriptive analysis, using regional inflation as an instrument for the change in women's work hours seems to be a valid approach. The difficulty with using this instrument lies in the fact that inflation data are only available at the provincial level, and in the fact that I observe the change in women work hours two years after the depth of the crisis.

Since the analysis covers only 13 provinces, the instrumental variable has only 13 data points. The limited data points of the instrumental variable will result in large standard errors in the IV estimates. Also, 1998 was the nadir of the crisis, and I only observe post-crisis changes in 2000. Therefore, it is possible that the change in women's work hours between 1997 and 2000 is no longer driven by the inflation shock during the crisis. Nevertheless, provincial inflation is highly and positively correlated with the change in women's hours, as shown in the results section. This correlation gives me some confidence in the instrumental variable.

If there were no reverse causality, that is, if bargaining power did not affect women's work hours decisions, then OLS estimation would be appropriate and OLS results would be preferred. The test of endogeneity in the instrumental variable estimation indicates that change in women's work hours is endogenous when the dependent variable is percent of categories in which wife has sole power, but not endogenous when the dependent variable is the average decision weight. Therefore, there is no clear evidence whether work hours is endogenous. The fact that the instrumental variable estimate is much larger than the OLS estimate, in contrast, indicates that there may be downward bias if we ignore the endogeneity issue.

The large difference between the OLS estimate and the IV estimate means that there should be strong negative effect of wife's intra-household bargaining power on their work hours. It is not entirely clear whether this is true in the Indonesian context. In a poor household, where all members have to work long hours in order to make ends meet, it is possible that higher bargaining power of women increases their leisure time. Conversely, it is also possible that women, maybe in more traditional households with means to support non-working wife, are prohibited from working outside the house. Then higher bargaining power of women will increase their work hours.

It is hard to interpret the coefficient for work hours, since hours is not in monetary terms. My specification assumes that one more hour of work increases women's bargaining power by the same amount no matter how much the women's hourly wage is. It is not hard to imagine one more hour of work will increase women's bargaining power more when the hourly wage is 50 US$ than when the hourly wage is 1 US$. Including interaction terms between hours and wage may be one way to solve this problem. The problem of missing wage for non-working women, again, will complicate this approach.

The effect of work hours on bargaining power may not only pick up the effect through higher current income; there may be some non-monetary value associated with working that increases women's intra-household bargaining power. Higher social status, for example, may be a consequence of higher labor force participation, and may affect women's intra-household bargaining power.

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Chapter 4

Understanding Inconsistencies between the IFLS and the Sakernas in Measures of Labor Market Outcomes

4.1 Introduction

This chapter compares two widely used surveys from Indonesia, the Indonesian Family Life Survey (IFLS) and the Indonesian Labor Force Survey (Sakernas), and strives to reconcile their differences in employment measures. I document substantial inconsistencies between these two surveys in measuring both employment levels and changes over time. I also document the differences between the two surveys that may cause the inconsistencies, before reconciling them by exploring the differences between the two surveys in terms of sampling structure, distribution of basic characteristics, and questionnaire design.

The IFLS, conducted by the RAND Corporation, is a major Indonesian

longitudinal household survey, while the Sakernas is the official labor force survey conducted by the Indonesian Bureau of Statistics. Both surveys elicit information on individuals' employment status, hours worked, and wages. Substantial inconsistency, however, exists between these two surveys in terms of employment measures (total employment, wage employment, and non-wage employment).[1] In particular, the IFLS shows a much larger increase in total employment during the 1998 Asian financial crisis and this gap between the two surveys persists long after the crisis.

Comprehending the underlying reasons for the inconsistency between these two surveys is important because the Sakernas is used as the official survey to monitor the overall situation of and changes in the Indonesian labor market. The fact that another major survey in Indonesia reports significantly different employment levels and trends calls for further investigation. Documenting and examining the differences between the two surveys pertaining to the measurement of employment will also be an asset for researchers who are interested in using either survey to conduct labor-related research in Indonesia.

Previous studies on the Indonesian labor market have noted the inconsistency between the two surveys. In particular, when studying the impact of the Asian financial crisis on the labor market in Indonesia, Smith et al. (2002) use both the IFLS and the Sakernas, and find that the IFLS shows a greater increase in total employment during the crisis, especially for women. They postulate that the inconsistency is due to better measurement of family work in the IFLS and the fact that much of the increase in employment during the crisis was in family work. They do not, however, test this hypothesis. Other studies on the inconsistency between labor surveys have also noted that different treatment of "off-the-books" workers such as self-employed and family workers is a potential cause of inconsistency. For example, Abraham et al. (2009) have noted that while

[1] Total employment in this chapter is defined as the percentage of adults (those over 15) who are working. Wage employment is defined as percentage of adults who are wage workers. Non-wage employment is defined as the percentage of adults who are self-employed or family workers.

household data would cover more off-the-books workers such as self-employed and family workers, establishment data would cover more "marginal" workers such as part-time workers who do not consider working to be their main activity. Furthermore, in Bowler and Morisi (2006) which compares the Current Population Survey (CPS) and the Current Employment Statistics Survey (CES) in US in terms of employment measures, the authors note that different coverage of off-the-books workers, such as undocumented residents, may be one reason for the difference in employment measures. None of these papers, again, have tested directly whether different coverage of off-the-books workers actually causes differences in employment measures. Given that the employment questions in the IFLS and the Sakernas are the same except that IFLS has one additional follow-up question on whether the individual worked in a family business in the previous week, this chapter is able to test directly whether further probing about family work causes employment measurement differences.

Accounting for differences in treatment of family work, however, may explain only a small percentage of the gaps in employment measures found between the Sakernas and the IFLS; there may be many other factors. For example, when explaining the large swings in employment measures over time within the Sakernas, Korns (1987) notes that other factors, including change in sample size and design, change in concept of working, change in employment questions, change in personnel and training, change in questionnaire length and focus, and change in interviewer instruction manual can cause changes in employment measures when there is no real change in the labor market. Bowler and Morisi (2006) have also noted that potential factors causing differences in employment measures between the CPS and the CES include differences in definition of employment, geographic coverage, and response error. None of these studies, however, document systematically the differences over time within a single survey or between surveys, and Korns (1987) does not test whether the potential factors proposed actually do contribute to the swings in employment measures over time in the Sakernas. In this

chapter, I first document systematically the differences between the IFLS and the Sakernas that could cause the inconsistency in employment measures. Starting from the factors proposed in Korns (1987) and Bowler and Morisi (2006), I document differences between the IFLS and the Sakernas in sample size and sampling structure, in the concept of working, in employment questions, in personnel and training, and in questionnaire length. In addition I add tracking and interviewing procedure of the IFLS and field work length and timing as additional factors that could contribute to the inconsistency between the two surveys.

I then test whether some of these factors do explain the inconsistencies. I test whether the difference in sampling structure, in particular the difference in geographic coverage due to stratification, explains some of the gaps between the two surveys. I also compare distributions of basic characteristics, namely education and age, within geographic regions to see if differential sampling procedures in the two surveys have caused differential coverage of population in terms of education and age. I also conduct an Oaxaca decomposition to test how much of the gap in employment measures between the two surveys is caused by difference in education and age distribution.

I find that although the IFLS and the Sakernas have substantial differences in distribution by geography, age and education, accounting for difference in geographic coverage and differences in education and age distribution does little to explain the gaps under study. Dropping the question on family work in the IFLS and using same questions to define working, in contrast, does help with explaining the gap in total employment between the two surveys, especially in the rural areas. These results confirm findings in other studies that try to reconcile inconsistencies between labor surveys (Bowler and Morisi (2006), Bollinger and Hirsch (2013), Abraham et al. (2009)), i.e. that inconsistencies between labor surveys cannot be fully explained based on information available. The findings in this chapter also confirm the hypothesis that different treatment of family workers can cause significant differences in measures of employment. In developing countries where

there is usually a large informal sector with a substantial number of family workers, designing surveys to pay appropriate attention to obtain accurate coverage of self-employed and family workers is vitally important.

The chapter is structured as follows: Section 4.2 introduces the two surveys and documents discrepancies between them in employment measures. Section 4.3 documents differences between the two surveys' structures that may cause these differences. Section 4.4 tests the extent to which some of the potential factors do in fact explain the discrepancies. Section 4.5 concludes the chapter.

4.2 IFLS, Sakernas, and Discrepancy between the Two Surveys in Labor Market Outcome Measures

4.2.1 IFLS

The IFLS is a household level longitudinal survey conducted by the RAND Corporation in 1993, 1997, 1998, 2000 and 2007. All rounds of the survey are publicly available except the 1998 round. In the first wave conducted in the second half of 1993, over 30,000 individuals in 7,224 households were sampled. The sampling scheme was stratified on provinces and rural-urban areas within provinces. Enumeration areas (EAs) were randomly sampled within these strata, and households were randomly sampled within the enumeration areas. The documentation for the IFLS states that EAs in the urban areas and in smaller provinces were oversampled to facilitate urban-rural and Java/non-Java comparisons. The sample covered 13 out of the 27 provinces in Indonesia, including all provinces on Java and provinces on Sumatra, Bali, Kalimantan, Sulawesi, and Nusa Tenggara. As a result, the sample covered about 83% of the Indonesian population.

In each of the succeeding rounds, the survey team tried to re-contact all of the households interviewed in 1993 ("original households"). Members who moved out of their original households were also tracked and their new households were added to the sample ("split-off" households).[2] The resulting sample size and attrition at the individual level for each round is listed in Appendix G. Attrition for original households from 1993 to 1997 was 7% and from 1997 to 2000 was 3%. The re-contact and interview procedures described in Appendix A make clear that each IFLS survey round may not merit the description of a repeated random cross section survey.

The IFLS collected rich information at both household and individual levels on consumption, employment, health, education, etc. At the household level, modules about consumption, household business, and assets were administered in each round. At the individual level, modules about education history, work history and health were administered in each round.

4.2.2 Sakernas

The Sakernas(Indonesian Labor Force Survey) is a household level repeated cross-section survey conducted by the Indonesian Bureau of Statistics since 1976. This chapter examines the rounds from 1993 to 2007, since this is the period that is also covered by the IFLS. From 1986 to 1993, the survey was conducted quarterly. Since 1994, it was conducted in August every year.

The sample of the Sakernas is much bigger than that of the IFLS ranging from 155,000 individuals to 950,000 individuals depending on the survey year. Also, the Sakernas sample covers all provinces of Indonesia.[3] Therefore, the Sakernas should be more representative of the Indonesian population. In 1995, the Sakernas was administered as part of the Inter-Census Population Survey, resulting in a bigger sample size and different sampling frame compared with other years. The Sakernas

[2] A more detailed description of the IFLS re-contact procedure is provided in Appendix A.
[3] Sample size of Sakernas each year is presented in Appendix H

questionnaire is much shorter than the IFLS. It only elicits information on education and work from household members who are older than ten years.

4.2.3 Discrepancy in Labor Market Outcome Trends

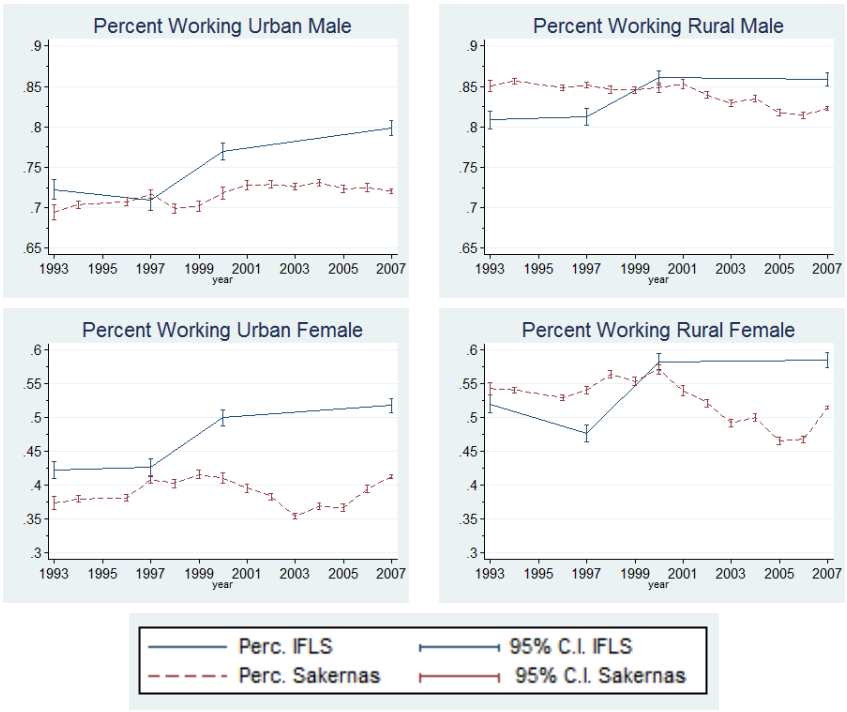
This section compares the trends in labor market outcomes constructed using the IFLS and the Sakernas when I treat both the IFLS and the Sakernas samples as random cross-section samples. For both surveys, I only use the 13 provinces that are included in the IFLS. The results for this set of comparisons are summarized in Figures 4.1,4.2, and 4.3. The labor market outcomes shown are percent of adults (older or equal to 15) who work, percent of adults who are employed in the wage sector, and percent of adults who are employed in the non-wage sector. I compare the trends in these outcomes for four groups of people: males in urban areas, females in urban areas, males in rural areas, and females in rural areas. Figures 4.1, 4.2, and 4.3 reveal significant inconsistencies in the trends of labor market outcomes between the IFLS and the Sakernas.

Percentage of Adults Who Work

For the percentage of urban adult males who work, we can see that the IFLS and the Sakernas start at similar levels in 1993. Both the IFLS and the Sakernas trends are flat between 1993 and 1997. Then the Sakernas level shows little change between 1997 and 2000, while the IFLS level shows a large increase between 1997 and 2000. The increase shown in the IFLS level between 1997 and 2000 persists to 2007 with a slight increase between 2000 and 2007. Conversely, the Sakernas displays a pattern of a slight decline between 2000 and 2007, which brings the gap between the IFLS and the Sakernas further to about eight percentage points in 2007.

For the percentage of urban adult females who work, the IFLS starts at a higher level (about five percentage points higher) than the Sakernas in 1993. Then the IFLS

Figure 4.1: Percent of Adults (older than 15) who Work by Urban/Rural Male/Female



shows no change between 1993 and 1997, while the Sakernas shows a substantial increase between 1996 and 1997 which brings the Sakernas level closer to the IFLS level. From 1997 to 2000, the IFLS shows a 7-8 percentage points' increase while the Sakernas displays little change except for a small decrease between 1999 and 2000. The IFLS exhibits little change between 2000 and 2007. The Sakernas shows a decline and then an increase between 2000 and 2007 which renders the 2007 Sakernas level very close to the 2000 Sakernas level. The ending gap between the IFLS and the Sakernas (IFLS being higher) is about eleven percentage points.

For the percentage of rural adult males who work, the Sakernas starts at a higher level (about four percentage points higher) than the IFLS in 1993. Then both the Sakernas and the IFLS show little change between 1993 and 1997, and the gap between the Sakernas and the IFLS is maintained in 1997. From 1997 to 2000, the IFLS displays a significant five percentage points' increase, and the Sakernas shows a small decrease. These changes bring the IFLS level about one percentage point

higher than that of the Sakernas in 2000. Then there is little change in the IFLS level between 2000 and 2007, while Sakernas shows a decline between 2000 and 2007. As a result, the IFLS level ends up to be about four percentage points higher than that of the Sakernas in 2007.

For the percentage of rural adult females who work, the Sakernas starts at a slightly higher (about two percentage points higher) level than the IFLS in 1993. The IFLS shows a significant decrease (about five percentage points) between 1993 and 1997, while the Sakernas exhibits little change between 1993 and 1997. From 1997 to 2000, the IFLS shows a significant increase (about ten percentage points), and the Sakernas displays little change, resulting in the same level between the IFLS and the Sakernas in 2000. From 2000 to 2007, there is little change in the IFLS level, while the Sakernas level decreases until 2006 and picks up from 2006 to 2007. The ending gap between the IFLS and the Sakernas (IFLS being higher) is about seven percentage points.

Percentage of Adults Employed in the Wage Sector

In terms of percentage of urban male adults employed in the wage sector, we can see that the IFLS trend is significantly higher than the Sakernas trend for the whole 1993-2007 period. The IFLS trend is almost flat between 1993 and 2000 with a four percentage points' increase between 2000 and 2007. The Sakernas trend swings around for the 1993-2007 period. There is a small increase between 1993 and 1997 and a significant drop between 1997 and 1998 that persists until 2000. In 2001, the Sakernas shows a substantial increase (around eight percentage points) followed by a decreasing trend between 2002 and 2007 which brings the Sakernas level in 2007 back to its 2000 level. As a result, the starting gap between IFLS and Sakernas in 1993 is about eight percentage points. Then the gap narrows to seven percentage points in 1997, widens to ten percentage points in 2000, and widens further to fourteen percentage points in 2007.

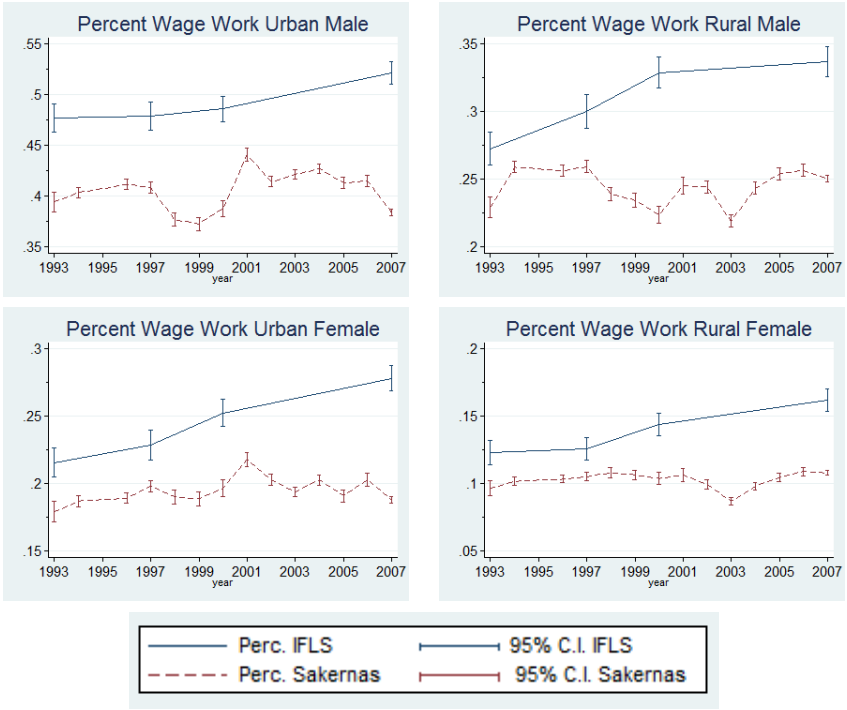
The IFLS trend of the percentage of urban adult females who are employed in the wage sector is also significantly higher than that of the Sakernas for the whole 1993-2007 period. The IFLS shows little change between 1993 and 1997, a small increase (about two percentage points) between 1997 and 2000, and a further increase (about another two percentage points) between 2000 and 2007. The Sakernas shows little change between 1993 and 2007 except a small increase (about three percentage points) between 2000 and 2001 and a gradual decline between 2001 and 2007. Therefore, the gap between the IFLS and the Sakernas is about three percentage points in both 1993 and 1997. Then the gap is widened to around seven percentage points in 2000, and further widened to around nine percentage points in 2007.

The rural IFLS trend for the percentage of adult males employed in the wage sector is also higher than the Sakernas trend for the whole 1993-2007 period. The IFLS shows a small increase from 1993 to 1997 (about one to two percentage points), a further increase of around four percentage points between 1997 and 2000, and no change between 2000 and 2007. Sakernas shows a jump of about three percentage points between 1993 and 1994 and a small decrease between 1994 and 1997. Then the Sakernas level decreases consecutively between 1997 and 2000, and the gap between the IFLS and the Sakernas is widened between 1997 and 2000. The Sakernas displays a small increase (about two percentage points) between 2000 and 2001 and little change between 2000 and 2007 except a small dip in 2003. As a result, the 2007 Sakernas level is about two percentage points higher than the 2000 level. The gap between the IFLS and the Sakernas is about four percentage points in both 1993 and 1997, and it widens to about eleven percentage points in 2000. The ending gap is about nine percentage points in 2007.

For adult females in rural areas, the IFLS trend is slightly higher than the Sakernas trend for the whole 1993-2007 period. IFLS shows no change between 1993 and 1997, a small increase (about two percentage points) between 1997 and 2000, and a further small increase (about one percentage point) between 2000 and

2007. The Sakernas trend is flat between 1993 and 2007 with a small dip (about two percentage points) in 2003. As a result, the gap between the IFLS and the Sakernas is about two percentage points in 1993 and 1997. Then it widens to about four percentage points in 2000, and further widens to about 5.5 percentage points in 2007.

Figure 4.2: Percent of Adults (older than 15) who Do Wage Work by Urban/Rural Male/Female



Percentage of Adults Employed in the Non-Wage Sector

In urban areas, the percentage of male adults employed in the non-wage sector according to the Sakernas is higher than that according to the IFLS for all years between 1993 and 2007. The IFLS shows a small decrease (about two percentage points) between 1993 and 1997, an increase of around four percentage points between 1997 and 2000, and a slight decrease (about one percentage point) between 2000 and 2007. The Sakernas shows a small increase between 1993 and 1997 and further increase (about two percentage points) between 1997 and 2000. After a

dip in 2001, the Sakernas trend stays at the same level in 2002 until it picks up in 2007 with a 2-3 percentage point increase. As a result, the starting gap between the Sakernas and the IFLS (Sakernas being higher) is about six percentage points in 1993, and the gap widens to eight percentage points in 1997. Then it narrows to about five percentage points in 2000, and ends at around six percentage points in 2007.

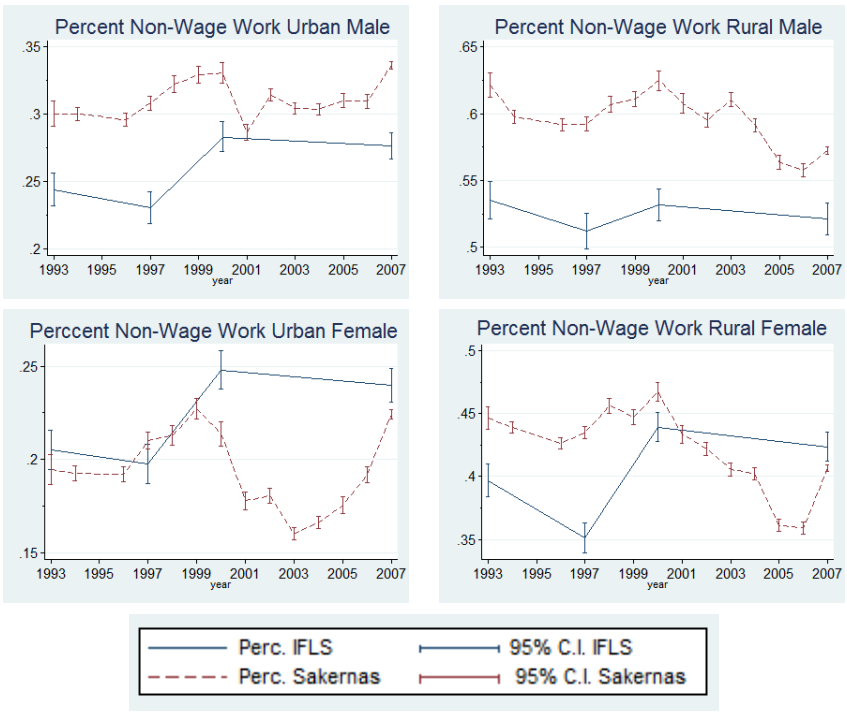
For the percentage of urban adult females employed in the non-wage sector, we can see that the IFLS trend and the Sakernas trend almost over-lap between 1993 and 1997. Then the IFLS shows a significant five percentage points' increase between 1997 and 2000, while the Sakernas displays a small increase between 1997 and 1999 and a three percentage points decrease between 1999 and 2000. Then Sakernas shows a further drop between 2000 and 2001 of about six percentage points and another drop between 2002 and 2003. The Sakernas trend starts to pick up and reaches a little more than its 2000 level in 2007. Conversely, the IFLS exhibits a slight decrease (about one percentage point) between 2000 and 2007. As a result, we see almost no gap between the IFLS and the Sakernas levels in 1993, 1997, and 2007 and a small gap of about three percentage points in 2000.

In rural areas, for adult males we can see that the Sakernas trend is much higher than the IFLS trend for the whole 1993-2007 period. The IFLS trend is mostly flat between 1993 and 2007 with a small dip in 1997. The Sakernas, in contrast, shows a gradual decrease between 1993 and 1997, a progressive increase between 1997 and 2000, and a slow decline between 2000 and 2007 (about seven percentage points in 7 years). As a result, the starting gap between the Sakernas and the IFLS is about nine percentage points, and the gap stays at the same level in 1997 and 2000. The ending gap is about five percentage points.

For rural adult females, the Sakernas also starts at a much higher (about five percentage points higher) level in 1993 compared with the IFLS. Then this gap widens to about eight percentage points in 1997 after the IFLS level declines by about three percentage points. Then a significant increase in the IFLS level

between 1997 and 2000 (about nine percentage points) narrows the gap to about two percentage points, while Sakernas only shows a small increase of about two percentage points between 1997 and 2000. There is a slight decrease in the IFLS level of about 1-2 percentage points between 2000 and 2007. The Sakernas shows a dramatic decline between 2000 and 2006 and a substantial increase (about seven percentage points) between 2006 and 2007. As a result, the ending gap between the IFLS and the Sakernas (IFLS being higher) is about two percentage points.

Figure 4.3: Percent of Adults (older than 15) who Do Non-Wage Work by Urban/Rural Male/Female



General Patterns

For males, the gap between the IFLS and the Sakernas in the percentage working is relatively small compared with the gap in the percentage employed in the wage sector and the gap in the percentage employed in the non-wage sector. It appears that the IFLS tends to put more workers in the wage sector and the Sakernas tends to put more workers in the non-wage sector. When we add together the percentages

in these two sectors, the gap between the two surveys is not so large. This pattern is less evident for females but still observable in both urban and rural areas.

Also, we can see that the Sakernas trends of percent working for all groups are flatter than the IFLS trends. The IFLS trends of percent working for all four groups share a common increase between 1997 and 2000, and this increase persists to 2007. Therefore, for all four groups the gap between the IFLS and the Sakernas is much wider in 2007 compared with 1993 (in the case of rural males, the gap flips sign between 1993 and 2007).

4.3 Potential Factors Causing Discrepancy

Several potential factors could cause these discrepancies in employment measures between the IFLS and the Sakernas. These factors include: 1). difference in sampling structure, 2). panel data nature of the IFLS and its interviewing and tracking rules, 3). difference in definition of working and questionnaire design, 4). non-randomness in selecting enumeration areas and households, 5). personnel and training of interviewers, and 6). questionnaire length and time of year in which fieldwork is conducted. I will talk about each of these factors in detail in this section.

4.3.1 Difference in Sampling Structure

The IFLS documentation states that in the initial year of the IFLS (1993), the sample was stratified on province and urban/rural areas. As a result, the IFLS strata are urban or rural areas of various provinces. In 1993, the IFLS oversampled smaller provinces and urban areas to facilitate comparison among provinces and between urban and rural areas. Within each stratum, enumeration areas are randomly selected, and within each enumeration area, households are randomly selected.

The 1996 manual of Sakernas (Ind (1996)) does not state formally but implies that the 1996 Sakernas sample was stratified on urban/rural areas. Then, within each stratum, enumeration areas were randomly selected. Within each enumeration area, a segment group (a block of households) was chosen and every household in the segment group was interviewed. Although it is not stated, I will show that the Sakernas also seems to oversample smaller provinces. This pattern indicates that the Sakernas was stratified on provinces.

The sampling structures of both surveys indicates that the Sakernas and the IFLS may not be representative samples at the national level without using proper sampling weights. Also, the Sakernas and the IFLS may not be directly comparable due to differences in regional distribution. I will explore the impact of using sampling weights in Section 4.4.

4.3.2 IFLS's Tracking and Interviewing Rules

While the Sakernas is a standard cross section household survey in which all adult members of all households are asked the same questions each year, the IFLS is a panel survey with very specific tracking and interviewing rules.

As described in Appendix A, the IFLS tries to follow the 1993 households and members of the 1993 households that have moved out of their original households since 1993. The new households that original respondents have moved into (the split-off households) are incorporated into the IFLS sample each year. The IFLS does not, however, track all members that have moved out of the original 1993 households, and only certain members according to the rules listed in Appendix A are tracked. Moreover, the tracking rules change from year to year. I will show later that due to the addition of new household members in the original and split-off households each year, the IFLS sample grows in size and does not display a pattern of aging between survey years. This feature may make the IFLS sample of later survey years more similar to a cross-section sample instead of a panel sample at the

individual level. Nonetheless, the particular tracking rules of the IFLS suggest that one should be cautious when treating the IFLS sample as a random cross-section sample each survey year. In Section 4.4 I will compare the distribution of basic characteristics of each IFLS survey year to the Census distribution to gain a sense of biases in the IFLS samples.

The IFLS questionnaire contains a particular module called the adult information module that includes detailed questions on individuals' current working information and employment histories. This module contains questions that are similar to the Sakernas employment questions, which ask for working information in the last week. In each of the IFLS survey years, however, only a portion of adults in the IFLS sample answer this module. As described in Appendix A, in 1993, only the household head and spouse, an individual aged 50 and above (randomly selected) and his/her spouse, and an individual aged between 15 and 49 (randomly selected) and his/her spouse were administered the adult information module. This rule systematically oversamples older household members as the household head is usually older than the average age in the IFLS sample. In all later rounds of the IFLS, every adult member of the 1993 original households are administered the adult information module. In split-off households, only the tracked respondents, their spouses, and their children are administered the adult information module. Therefore, we can see that among the adults that are included each year of the IFLS sample, there is a selection of who gets to answer the employment questions.

In 1993, fortunately, for the younger adult individuals that are not administered the adult information module, the household head answers, in the household economy module, whether each of them worked in the last year and their employment sector (wage or non-wage) in the last year. Since about 40% of adults in 1993 are not covered by the adult information module but covered in the household economy module, I combine the information from these two modules to form the employment measures in 1993 in this chapter. Therefore, in 1993, for about 40% of 1993 adults the reference period is last year, and they did not answer

the employment questions themselves. There is only one single question deciding whether they worked last year: "Did [...] work to earn income/wages/salary during the past 12 months?" This is an important caveat when interpreting the results later. In later rounds of the IFLS, the household head is no longer asked about working information of each member in the household economy module.

In Section 4.4 I compare the distribution of basic characteristics of all adults in the IFLS with the distribution of adults for whom I have the employment measures in the IFLS (adults who answered adult information module or who were covered by the household economy module in 1993). In this way, I can explore the selection of adults who are used to calculate the employment measures in the IFLS on observed characteristics.

4.3.3 Difference in Concept of Working and in Questions about Working

In terms of concept and definition of working, the Sakernas and the IFLS appear to be similar. The 1993 IFLS interviewer manual (Dem (1993)) states that "those who work are those who, one week before the interview, did some work with the intention to obtain or help obtain an income or profit during at least one hour last week. Working for one hour must be done continuously and must not be interrupted. The income and profit include the wage/salary comprising all allowances, bonuses and the returns of the enterprise in the form of rent, interest and profit, be it in the form of money or goods." The 1996 Sakernas interviewer manual (Ind (1996)) states that "Working is an activity to seek earnings/help seek earnings in order to obtain or help to obtain earnings or profit minimum for an hour during the past week. Working for an hour has to be done continuously. The earnings or profit covers salary/wages including all benefits and bonus for workers/ entrepreneurs and the income from lease, interest or profit, in cash or in-goods for the worker." Both the 1993 IFLS manual and the 1996 Sakernas manual also provide examples

of individuals who work. The examples, listed in Appendix I, are also very similar. The only difference is that the Sakernas states that a person who uses his own profession for their own household needs is considered as working, and a field laborer and loose laborer who is waiting for a job is considered as not working. These two examples are not written in the IFLS manual. Since these two categories of individuals are hard to identify in the Sakernas and the IFLS data, it is difficult to know if this difference causes any discrepancy in employment measures between the two surveys.

Unfortunately, I cannot find the interviewer manuals for the rest of survey years for the Sakernas and the IFLS. If the interviewer manual stayed the same for all survey years compared in this chapter (1993, 1997, 2000, 2007), then the difference in concept and definition of working should not be a cause of discrepancy between the two surveys.[4]

Similar questions deciding whether an individual is working are administered to most adults in the IFLS and to all adults in the Sakernas (See Appendix J for the questions). We can see that between 1993 and 2007 the IFLS questionnaire did not change, but the Sakernas questionnaire changed in 1997 and then changed again in 2001. Both the IFLS and the Sakernas have several questions determining whether a person is working. From 1986 to 2000, the only difference between the IFLS and the Sakernas is that in the IFLS one additional follow-up question is asked. This question is "did you work at a family-owned business during the past week". Starting from 2001, the questionnaire for the Sakernas changed significantly, and the question "were you employed for at least 1 hour during the past week?" is no longer included in the working status questions. The difference in the questions

[4] As mentioned in Section 2, Dhanani et al. (2009) states that 2001 Sakernas redefines working so that only those whose main activity is working in the last week are considered to be working. I cannot verify, however, that this change of concept and definition is written in the Sakernas interviewer manual after 2001. According to the User's Guide on Sakernas provided by the Australian National University (Aus (2001-2007)), the concept of working in years 2001-2007 is "an activity done by a person who worked for a pay or assisted others in obtaining pay or profit for the duration of at least one hour during the survey week". This guide indicates that the concept of working in the Sakernas is the same from 1996 to 2007.

determining whether an individual works may be a cause of the discrepancy in employment measures between the two surveys. I will test if this is true in Section 4.4.

With respect to the sector in which a working individual is employed, in both the IFLS and the Sakernas an individual can choose between several employment sectors if he/she is determined to be working. In the 1993 IFLS and the 2000 IFLS, an individual can choose between: 1). self-employed (without help), 2). self-employed with help of householders/temporary workers, 3). employer with help of regular workers, 4). government worker/employee, 5). private worker/employee, 6). family worker. In the 1997 IFLS, all the self-employed sectors are combined into one sector called the self-employed. In 2007, the IFLS adds two additional sectors: 7). casual worker in agriculture and 8). casual worker in non-agriculture.

From the 1993 Sakernas to the 1996 Sakernas, if an individual is determined to be working, he/she can choose between five employment sectors: 1). self-employed, 2). self-employed assisted by family worker, 3). employer with permanent workers, 4). worker/employee, 5). family worker. From 1997 to 2000, the employment sectors in Sakernas are: 1). self-employed, 2). self-employed assisted by workers/temporary workers/unpaid workers, 3). self-employed assisted by workers/permanent employees, 4). worker/employee/paid worker and 5). unpaid worker. We can see that although the sectors remain the same, the wording changed in 1997. In 2001, the sectors are the same as in 2000 but two new sectors are introduced: 6). casual employee in agriculture, and 7). casual employee in non-agriculture.

In this chapter, for both surveys I categorize all self-employed workers, family workers, and unpaid workers into the non-wage sector, and categorize government workers/employees, private workers/employees, and casual workers/employees into the wage sector.

Dhanani et al. (2009) comments that the introduction of the two new casual employee sectors in the 2001 Sakernas may have caused a re-categorization of working individuals from non-wage employment into wage employment. I do observe a shift of workers from non-wage employment into wage employment from the 2000 Sakernas to the 2001 Sakernas without a change in total employment. If what Dhanani et al. (2009) speculates is true, then the change in the IFLS sectors may also cause some shift of workers between the wage and the non-wage sectors. Total employment, in contrast, should not be affected by the introduction of new employment sectors. Also, we can see that after the two new sectors are introduced, both the 2007 Sakernas and the 2007 IFLS use the same employment sectors. Therefore, discrepancies between the 2007 IFLS and the 2007 Sakernas should not be caused by the difference in employment sectors.

4.3.4 Non-randomness in Selection of Enumeration Areas and Households

As discussed in Section 4.3.1, the sampling procedures of the IFLS and the Sakernas both involve randomly selecting enumeration areas (both based on census enumeration areas) within each stratum. The IFLS randomly selects households within each enumeration area, and the Sakernas randomly selects a segment group within each enumeration area and interviews all households within each segment group. Since only a small fraction of all the enumeration areas within a stratum can be selected, especially in IFLS which has a smaller sample size, the randomness of the enumeration area selection is crucial for the representativeness of the survey within strata. Also, as IFLS randomly selects a small percentage of households within each enumeration area, whether the selection of households is random is also very important. In comparison, the procedure in the Sakernas that interviews all households in the segment group is not prone to the problem of non-randomness of selection of households within segment groups.

As a result, one possible cause of the discrepancy between the IFLS and the Sakernas may be that the selection of enumeration areas in either or both surveys or the selection of households within enumeration areas in the IFLS is not random. This potential factor, however, is hard to verify and not pursued further in this chapter.

4.3.5 Difference in Interviewer Training and Interviewer Effort

Even if the definition of and questionnaire on employment are the same between the two surveys, the interpretation of the concept of working are subject to the interviewer's training, experience, ability and effort. These factors can also influence the extent of errors in the responses reported. Systematic differences between the Sakernas and the IFLS in terms of the experience, training, ability and effort of the interviewers could, therefore, affect the comparability of employment measures obtained from the two surveys.

The Sakernas interviewers are all local Bureau of Statistics officials. The IFLS interviewers are local people recruited and trained by the Population Institute (LD) at the University of Indonesia, an organization collaborating with RAND to conduct the IFLS. Depending on the education, experience and training of the interviewers in both surveys, there may be some systematic difference in terms of interpretation of concepts and accuracy of reports. This factor is also hard to verify and not investigated further in this chapter.

4.3.6 Questionnaire Length and Time of Year in Which Fieldwork was Conducted

A major difference between the IFLS questionnaire and the Sakernas questionnaire is length. The IFLS covers a broad range of information and has a much longer questionnaire containing multiple question books. As a result, the

IFLS questionnaire may require several interviews to complete. The Sakernas questionnaire is short and can usually be completed in one interview session. The difference in questionnaire length may affect interviewer's effort and respondent's patience and, as a result, influence the accuracy of the information collected.

Another difference between the IFLS and the Sakernas is the time of the year in which the fieldwork was carried out. According to the 1996 manual, the Sakernas fieldwork is completed in August every year. The IFLS fieldwork takes much longer to complete and usually stretches from June/July to December or January of next year. If there is seasonality in employment in Indonesia, the difference in the timing of fieldwork could cause a difference in employment measures. This factor is also not investigated further in this chapter.

4.4 Test of Potential Factors Causing Discrepancy

In this section, I explore some of the possible factors that could cause the discrepancies in employment measures between the IFLS and the Sakernas. To investigate whether the difference in sampling structure, namely, stratification on provinces and urban/rural areas, causes the inconsistencies, I construct sampling weights that match the provincial distribution of the IFLS and the Sakernas to the 2000 Census distribution. To investigate whether tracking rule and sampling of the IFLS and sampling of the Sakernas have created any bias in terms of coverage of age and education groups, I compare age and education distributions within urban/rural areas of each province with the same distributions from the census or inter-census. To analyze whether differential age and education distribution causes the inconsistency between the two surveys, I conduct Oaxaca decomposition to quantify the share of the gaps between the two surveys explained by difference in education and age distributions. To investigate whether the difference in questionnaire on working creates difference in employment measures, I drop the last follow-up question in IFLS and use the same set of questions to determine if an

individual is working.

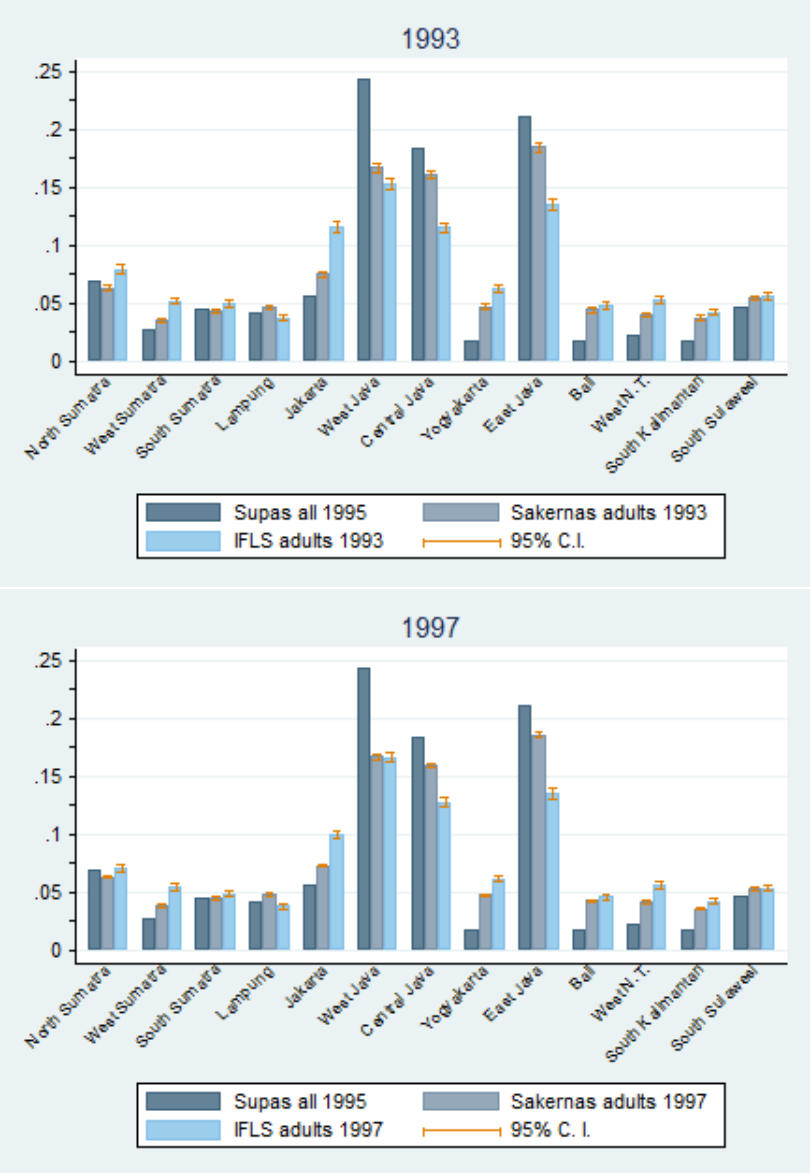
4.4.1 Using Sampling Weights

Distribution of Population across Provinces

Before constructing weights to match the regional distribution of the IFLS and the Sakernas to the Census, I compare the provincial distribution and urban/rural distribution by province among the IFLS, the Sakernas, and the Census/Inter-Census. Since Sakernas only covered adult members (older than or equal to 15), I compare the provincial distribution of adults between the IFLS and the Sakernas. I also compare the provincial distribution among different sub-samples within the IFLS. These subsamples are all respondents, adults and adults with full work information (who have answered the adult information module or are covered in 1993 by the household economy module). From Figure 4.4 we can see that the IFLS provincial distribution differs significantly from the Sakernas provincial distribution in all of the four survey years of the IFLS. In general the Sakernas provincial distribution is closer to the census and inter-census. Both the IFLS and the Sakernas under-sampled the largest provinces, namely, West Java, Central Java and East Java, and over-sampled Jakarta, Yogyakarta, Bali, West Nusa Tenggara and South Kalimantan. The provincial distribution within the Sakernas is stable over the four years. The provincial distribution within the IFLS is stable from 1993 to 2000, but in 2007, the percentage in North Sumatra, West Sumatra, South Sumatra and South Sulawesi increased significantly compared with the previous IFLS survey years.

I also checked whether the provincial distribution is similar across different sub-samples within the IFLS (everyone, adults and adults with full work information). It turns out this distribution is not significantly different across different sub-samples of the IFLS.

Figure 4.4: Distribution of Population across Provinces by Survey



Notes: All means all individuals of all ages. Adults means individuals older than or equal to 15

Distribution across Urban/Rural Status within Provinces

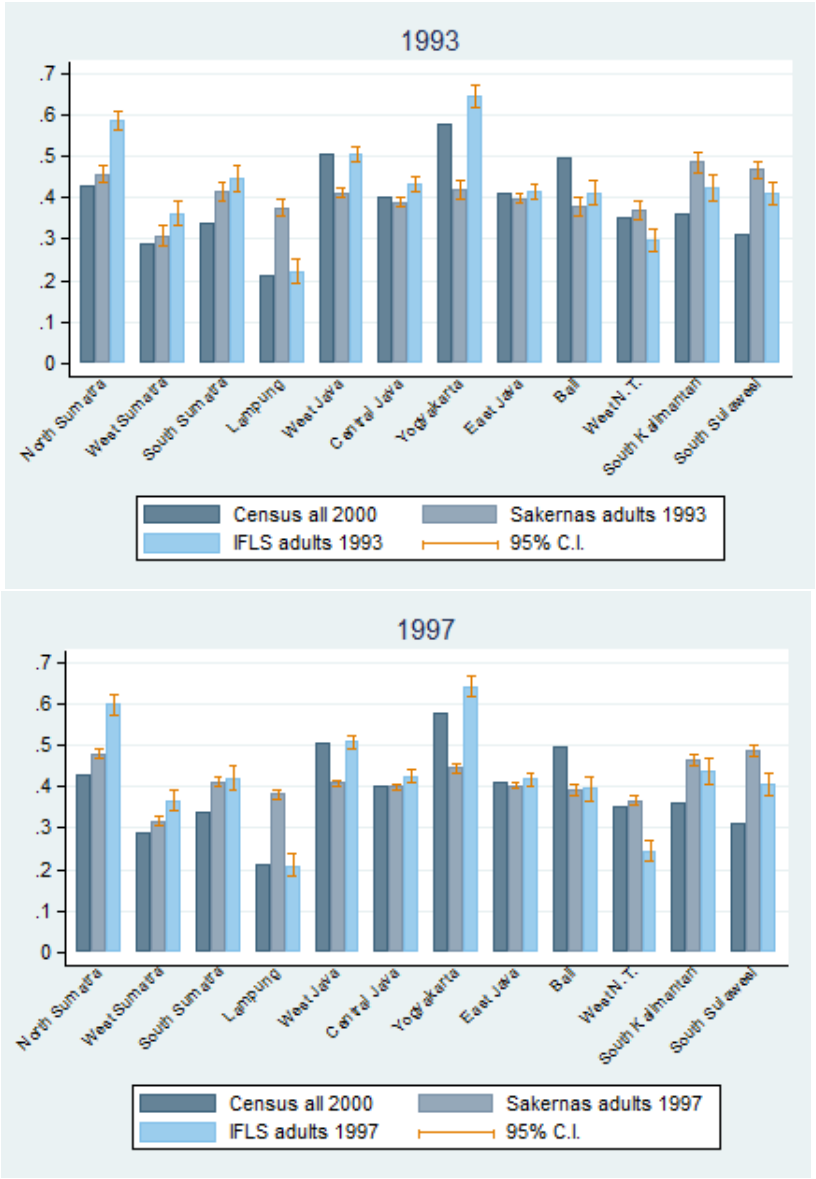
The earliest census/inter-census from which I can obtain information on urban/rural population shares by province is the 2000 census. Therefore, the Sakernas and the IFLS distributions in 1993, 1997 and 2000 are compared with the 2000 census. As shown in Figure 4.5, the urban/rural distribution is very different across provinces according to the 2000 census and the 2005 Supas (inter-census). The provinces on the Java-Bali island are more urban compared with provinces on the other islands. Also, the IFLS urban/rural shares differ significantly from the Sakernas.

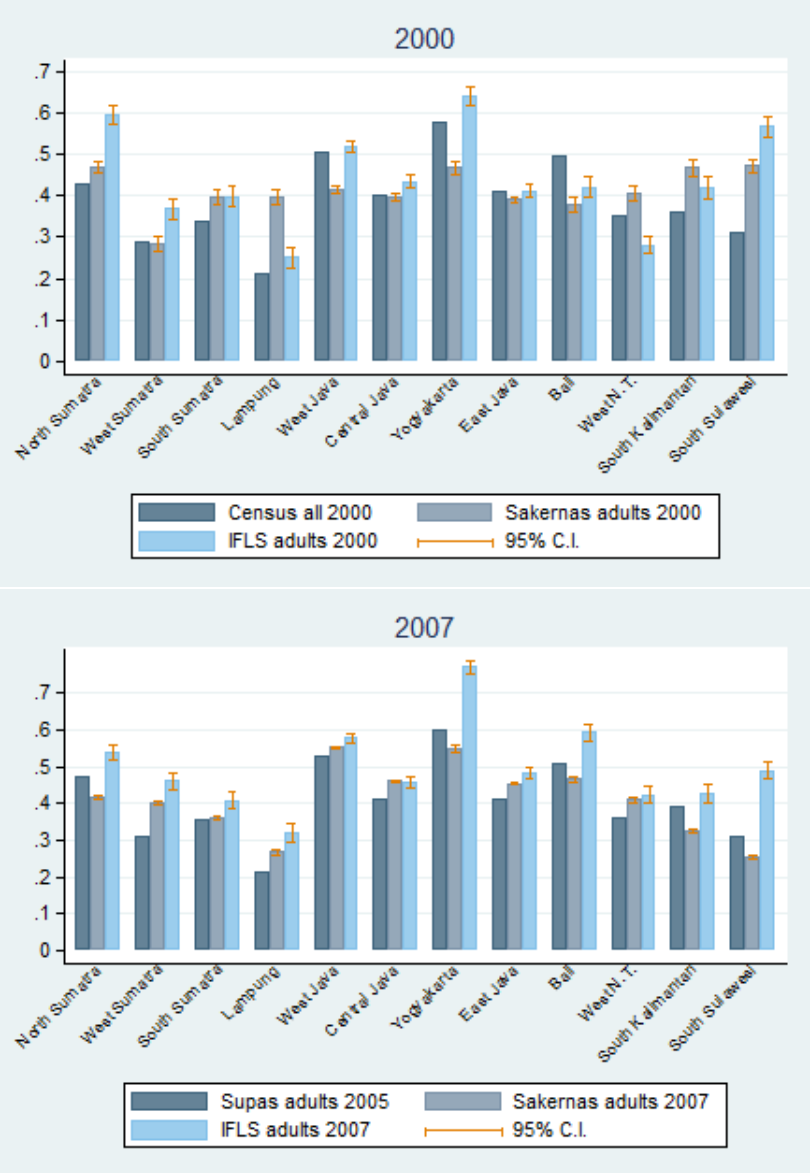
We can see from Figure 4.5 that in 1993, 1997 and 2000, the Sakernas tends to oversample urban areas in provinces outside Java-Bali island. Especially it oversampled Lampung, South Kalimantan and South Sulawesi. At the same time, it under samples urban areas in provinces on Java-Bali for the same three years. In 2007, the Sakernas urban/rural distribution by province is more similar to the 2005 Supas compared with earlier Sakernas years, even though the differences are still significant.

The 1993 IFLS urban/rural distribution is more similar to the 2000 census than the 1993 Sakernas for all provinces except North Sumatra, West Sumatra, South Sumatra and West Nusa Tenggara. For Lampung, West Java, Central Java and East Java, the 1993 IFLS distribution is very similar to the 2000 census. For Bali and West Nusa Tenggara, the 1993 IFLS has a lower urban percentage than the 2000 census. For the rest of the provinces, the 1993 IFLS has a higher urban share than the 2000 census. This same pattern persisted for the IFLS until 2000. In 2007, the IFLS has a greater urban share for all provinces compared with the 2005 Supas. The 2007 Sakernas distribution seems to be closer to the 2005 Supas distribution than the 2007 IFLS distribution.

I also checked the urban/rural distribution by province for different sub-samples within the IFLS, and I found that the urban/rural distribution by province is not very different across different sub-samples within the IFLS.

Figure 4.5: Percent Urban by Survey





Notes: All means all individuals of all ages. Adults means individuals older than or equal to 15

Employment Measures after Using Sampling Weights

Figure 4.6: Percent of Adults (older than 15) who Work without and with Sampling Weights

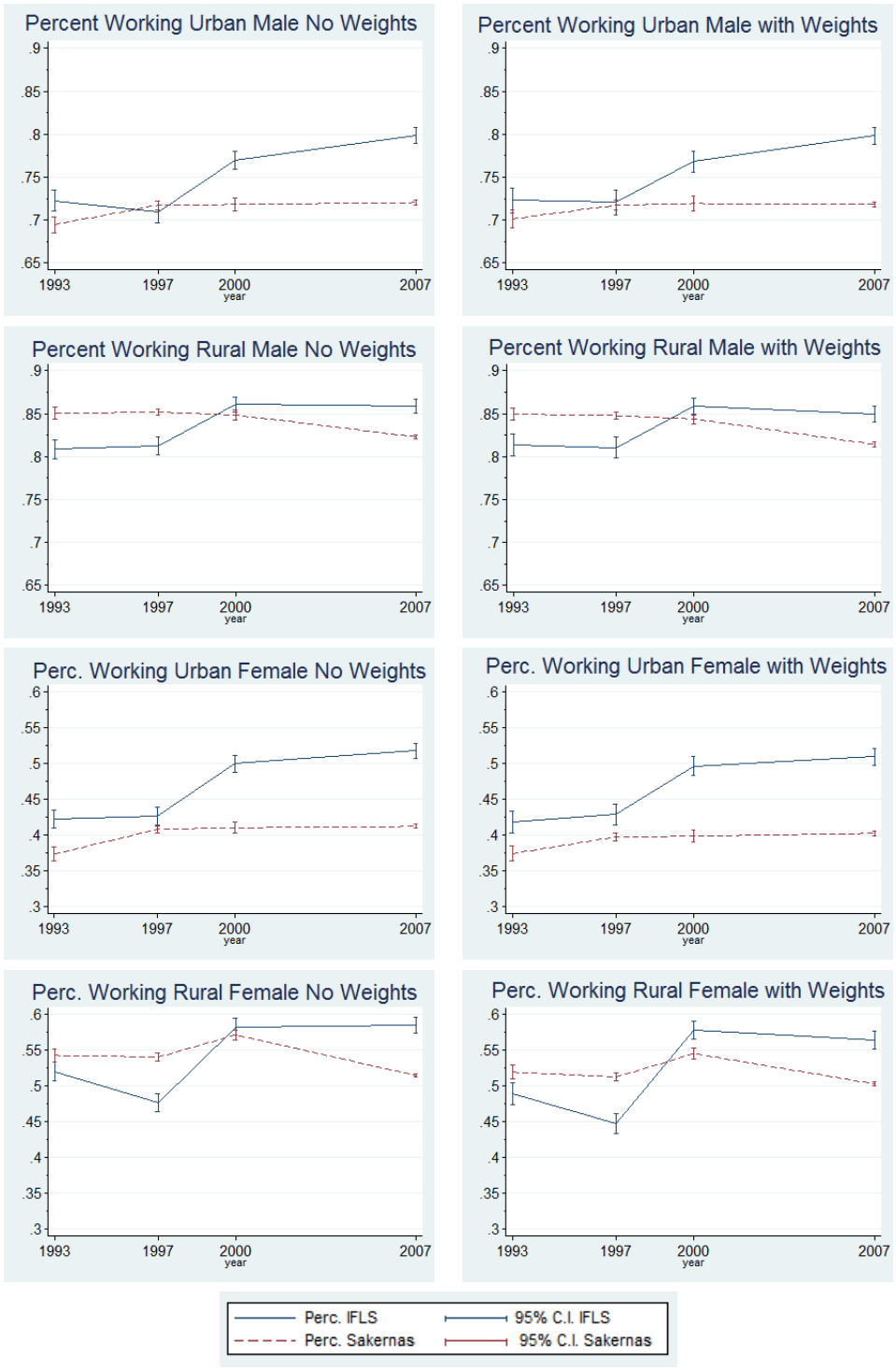


Figure 4.7: Percent of Adults (older than 15) who Do Wage Work without and with Sampling Weights

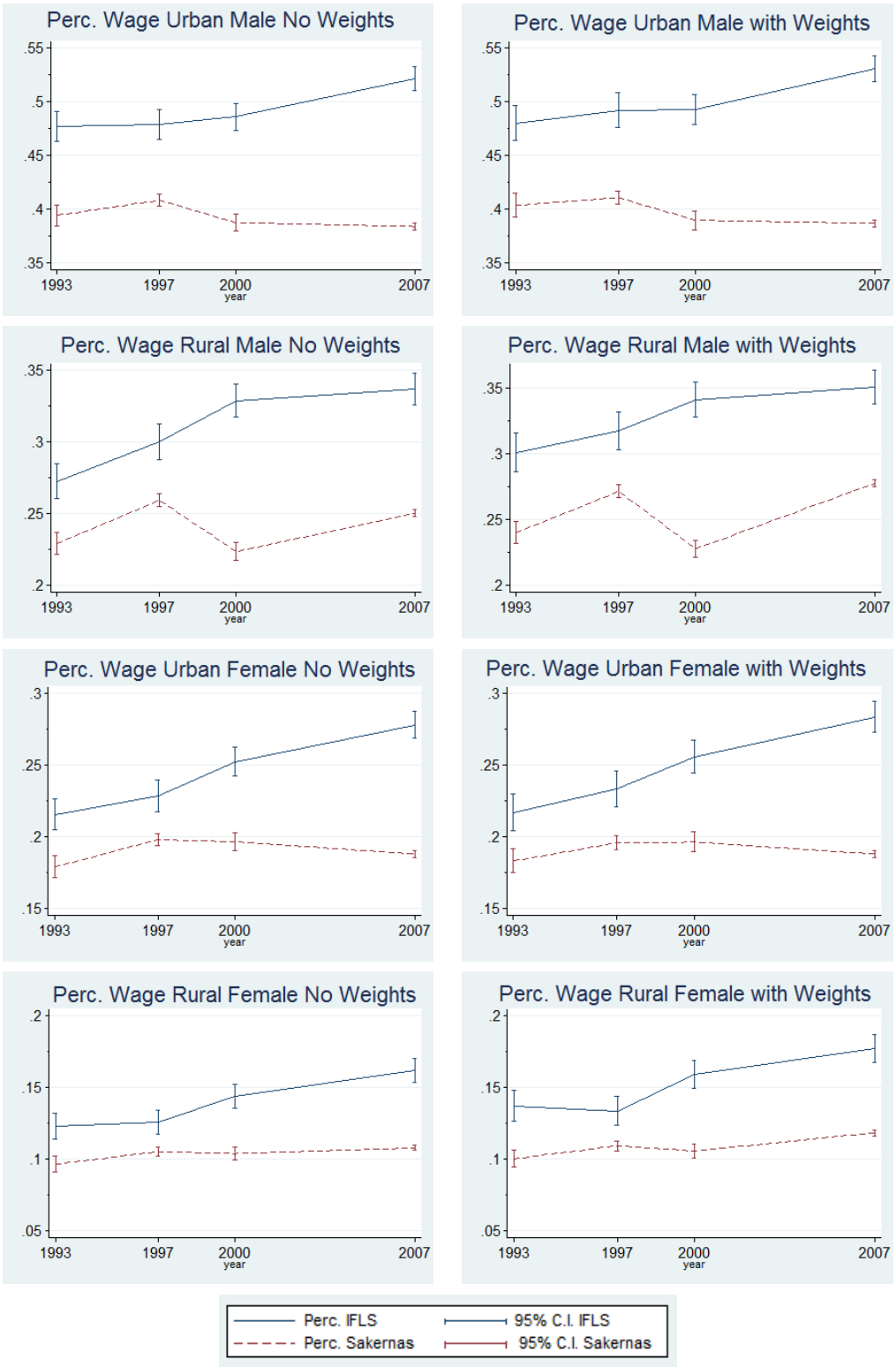
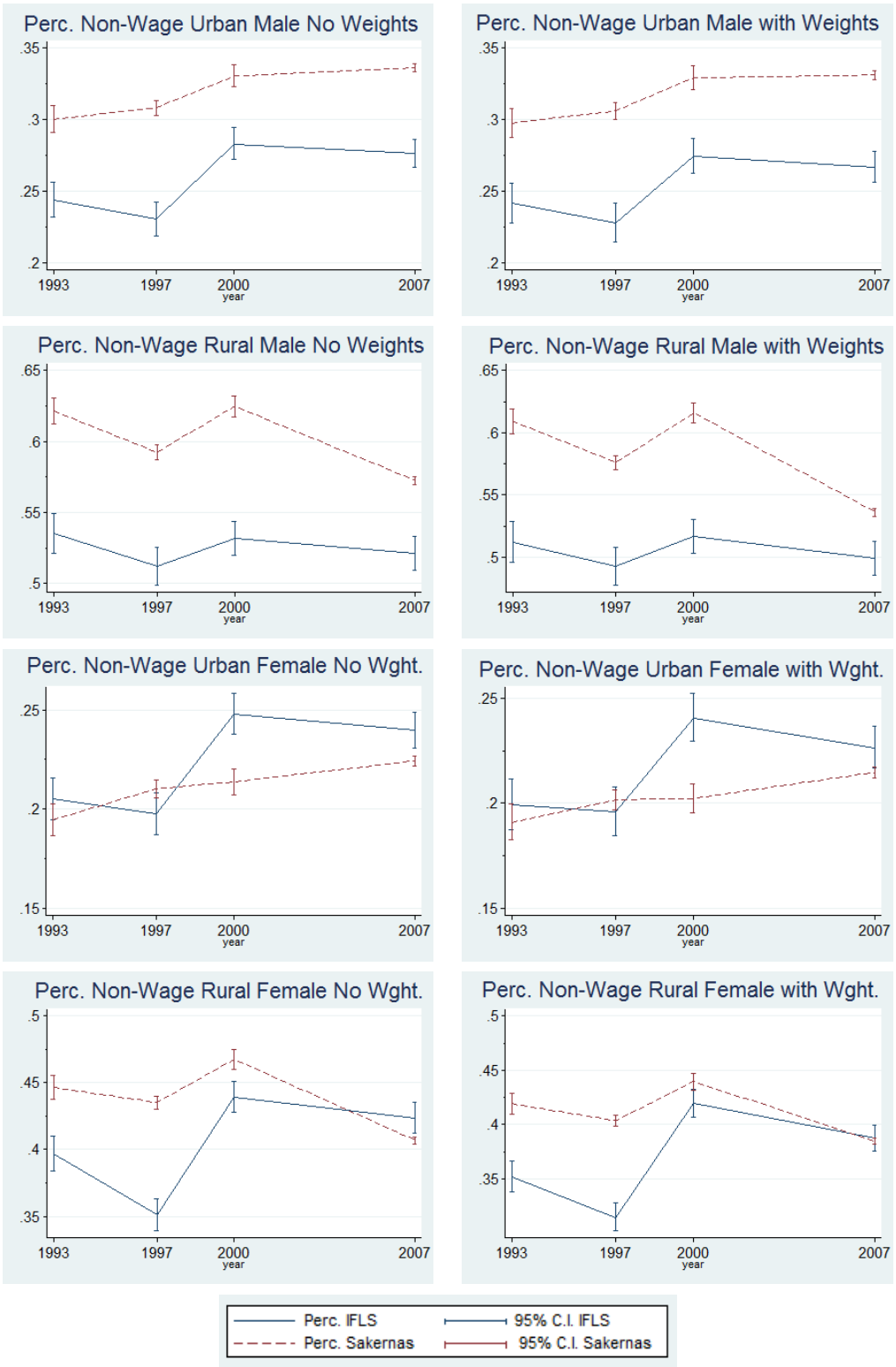


Figure 4.8: Percent of Adults (older than 15) who Do Non-Wage Work without and with Sampling Weights



As explained in Section 4.2, the 1993 IFLS stratified on province and urban/rural status. Also, as shown above, the provincial distributions in the IFLS and the Sakernas differ significantly from each other and also from the Census distribution. In a country with massive regional diversity, samples with very different provincial distributions may not be directly comparable. Therefore, for each year (1993, 1997, 2000, 2007) of the IFLS and each year (1993, 1997, 2000, 2007) of the Sakernas, I compute sampling weights that match the provincial distribution by urban/rural status to the 2000 census. Then I can find out whether the difference in the provincial distribution is one of the causes of the gaps between the IFLS and the Sakernas by recalculating the employment measures using the sampling weights. In the IFLS, I match the distributions of everyone (all ages) included in the survey to the census. In the Sakernas, I match the distribution of adults (equal and over 15) to the census. The weights are shown in Appendix K. Figure 4.6 to Figure 4.8 compare the trends without using weights with the trends using weights. We can see that using provincial weights does not narrow the gaps between the IFLS and the Sakernas in percent working. In fact, the trends with and without the provincial weights are very similar.

4.4.2 Comparison of Basic Characteristics Distributions between IFLS, Sakernas, Census, and Inter-Census

In this section, I will show that the age and education distributions differ significantly between the IFLS and the Sakernas at the province interacted with urban/rural status level. I also compare these distributions of the IFLS and the Sakernas to the distributions from the Census and the Inter-Census (Supas).

Age Distribution

All years of the IFLS and the Sakernas are compared with the 2005 Supas. This is because the 2005 Supas is the only Census/Inter-Census for which I can get the age

distribution at the province interacted with urban/rural status level. Since 2007 is the closest year to 2005, I compare distributions in 2007 first. Figure L.1 to Figure L.8 in Appendix L show that in urban areas, the 2007 age distribution is similar between the IFLS and the Sakernas. Compared with the 2007 Sakernas, the 2007 IFLS has a higher percentage in the 25-34 group and the 65+ group and a lower percentage in the 15-24 group, the 35-44 group and the 45-54 group. Both of the 2007 Sakernas and the 2007 IFLS seem to have under-sampled the 15-24 group compared with the 2005 Supas. There is some variation in age distribution across provinces evident in all three surveys. The 2000 IFLS has a much higher percentage in the 15-24 age group in urban areas compared with both the 2000 Sakernas and the 2005 Supas. In 1993 and 1997, the IFLS age distribution and the Sakernas age distribution are not significantly different from each other.

In rural areas, we see a bigger variation in the age distribution across provinces. Also, there is more difference between the Sakernas and the IFLS in the age distribution. In general, the IFLS seems to have a higher percentage in the younger groups (15-34) and the older groups (55+) and have a lower portion in the middle groups (35-54).

The age distributions for different sub-samples within IFLS are very similar, so I do not show details here.

Education Distribution

All years of the IFLS and the Sakernas are compared with the 2005 Supas. This is because the 2005 Supas is the only Census/Inter-Census for which I can get the education distribution at the province interacted with urban/rural status level.[5] Figure L.9 to Figure L.16 in Appendix L show that in 2007, urban education distribution varies significantly across provinces for the education group "no school" and the group "senior secondary and higher". In 2007, the IFLS education

[5]Education levels are increasing over time in Indonesia, and as a result earlier rounds of the IFLS and the Sakernas may not be comparable to the 2005 Supas in terms of education distribution.

distribution is significantly different from the Sakernas education distribution. The IFLS has a higher percentage in the "no school", "elementary incomplete" and the "senior secondary and higher" groups and a lower percentage in the "elementary" and "junior secondary" groups. Both the 2007 Sakernas and the 2007 IFLS are significantly different from the 2005 Supas in terms of education distribution. In 2000, the education distribution is similar between the IFLS and the Sakernas, except that the IFLS has a higher percentage of the "elementary incomplete" group and a lower percentage in the "elementary complete" group. The share of the "senior secondary and higher" group is different between the IFLS and the Sakernas, too, but which one is bigger depends on the province. In 1997, the IFLS has higher percentages in the lower education groups ("no school", "elementary incomplete" and "elementary complete") and a much lower share of the highest education group ("senior secondary and higher") in urban areas compared with the 1997 Sakernas. In 1993, the IFLS has a higher percentage in the "no school" and "elementary incomplete" groups and a lower share of the rest of the education groups. It seems that in 1993 and 1997, the IFLS sample has lower education compared with the Sakernas sample in urban areas, but in 2000 and 2007, we cannot tell which survey sample has lower education any more.

In 2007, the same pattern in terms of education distribution in urban areas is also observed in rural areas. In 2000, 1997 and 1993, IFLS has a higher percentage in the "no school" and "elementary incomplete" groups and a lower share in the "elementary complete" group. Therefore, it seems like in rural areas the IFLS sample has lower education compared with the Sakernas in 1993, 1997 and 2000, but not in 2007.

The education distribution for different sub-samples within the IFLS (adults and adults with work information) are similar, so I do not show the details here.

4.4.3 Oaxaca Decomposition

The distribution of basic characteristics (province, urban/rural residence, age, education) differ significantly between the IFLS and the Sakernas for all four survey years covered by the IFLS. Do these differences explain differences in employment measures? To answer this question, I conduct an Oaxaca decomposition of the gaps which gives estimates of the share explained by differences in characteristics and the share explained by difference in coefficients. In view of differences in the regional distributions of the two survey samples, I conduct the decomposition first with province dummies as independent variables and then with provincial sampling weights. Table 4.1 displays the key results from the Oaxaca decomposition for all groups and for all outcomes using age and education and province dummies as independent variables. Table 4.2 displays key results with age and education as independent variables and with provincial weights. Both tables show the share of the gap explained by difference in distribution of independent variables. The shares under IFLS are computed using the coefficients from the IFLS estimation. The shares under Sakernas are calculated using the coefficients from the Sakernas estimation.

Table 4.1 reveals that in general the difference in characteristics (age, education, province) help little with explaining the gaps between the IFLS and the Sakernas in percent working for all years and all groups. For the share employed in the wage sector the differences in characteristics do not explain the gaps for 1993, 1997 and 2000, but it does explain a significant share of the gaps for all four groups in 2007. For the share employed in the non-wage sector, again the differences in characteristics do not explain the gaps except for both urban and rural males in 2007. For these two groups a large percentage of the gap is explained by the difference in characteristics in 2007.

By comparing Table 4.1 and Table 4.2 we can see that only including age and education as independent variables does not change the results much. This

Table 4.1: Oaxaca Decomposition Results, Share of Gap Explained by Difference in Province, Age, Education, in %

	Urban Male		Urban Female		Rural Male		Rural Female	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Share of gap in total employment explained by education and age distribution								
1993	25.81	4.93	15.24	-2.16	-21.54	1.52	-71.69	-17.41
1997	37.81	-26.74	-30.74	-27.54	-6.59	2.74	-10.41	-12.86
2000	5.35	-2.21	-3.56	-2.08	8.61	-12.06	-0.62	0.75
2007	12.72	-5.17	15.16	4.97	-12.68	-25.7	1.14	-6.41
Share of gap in wage employment explained by education and age distribution								
1993	-4.26	-20	3.69	-15.85	-33.01	-34.95	-33.15	-33.29
1997	-7.87	-23.46	-28.7	-37.36	-31.88	-38.7	-11.81	-25.03
2000	2.13	-4.69	-5.02	-7.45	-1.38	-2.24	-5.06	2.75
2007	12.45	8.02	18.59	13.24	17.17	22.57	29.63	21.09
Share of gap in non-wage employment explained by education and age distribution								
1993	-21.3	-31.99	56.71	38.94	-26.64	-16.64	-48.72	-26.05
1997	-5.32	-24.82	-19.5	-43.59	-20.16	-19.1	-11.05	-16.05
2000	-2.64	-8.38	0.92	7.15	-3.58	-2.42	-7.52	2.37
2007	12.11	26.17	-3.71	-39.32	39.18	58.11	-92.66	-92.48

Notes: Decomposition (1) use estimated coefficients from the IFLS sample to compute the share contributed by difference in characteristics. Decomposition (2) use estimated coefficients from the Sakernas sample to compute the share contributed by difference in characteristics.

Table 4.2: Oaxaca Decomposition Results, Share of Gap Explained by Difference in Education and Age, with Provincial Weights, in %

	Urban Male		Urban Female		Rural Male		Rural Female	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Share of gap in total employment explained by education and age distribution								
1993	46.29	24.51	14.71	13.41	-30.21	-1.6	-16.35	5.6
1997	90.78	88.44	-3.4	-0.81	-0.45	-4.92	-10.41	-12.86
2000	9.01	2.69	-0.7	3.92	11.84	-34.73	11.64	-13.66
2007	11.6	-6.46	7.59	0.37	-2.04	-26.59	-1.04	-13.54
Share of gap in wage employment explained by education and age distribution								
1993	-9.01	-19.99	-11.43	-21.48	-4.19	-8.14	4.61	-4.8
1997	-8.77	-13.1	-31.31	-28.84	-14	-17.47	10.45	-9.89
2000	2.29	-0.23	-6.76	-4.7	0.05	0.58	9.87	7.57
2007	10.21	5.46	12.76	7.97	12.1	4.77	13.08	7.62
Share of gap in non-wage employment explained by education and age distribution								
1993	-31.2	-37.8	134.85	166.17	-14.05	-5.58	-4.9	-0.62
1997	-12.9	-20.76	-131.74	-167.24	-13.58	-7.9	2.34	-6.26
2000	-4.66	-3.9	9.36	19.19	-2.09	5.71	5.19	41.92
2007	8.32	21.85	-35.46	-62.01	26.85	39.04	-361.81	-232.71

Notes: Decomposition (1) use estimated coefficients from the IFLS sample to compute the share contributed by difference in characteristics. Decomposition (2) use estimated coefficients from the Sakernas sample to compute the share contributed by difference in characteristics.

result again confirms that the difference in provincial distribution does not explain the gaps, but the difference in education and age distribution may explain part of the gaps for certain outcomes/groups in certain years. In general, however, the difference in observable characteristics helps little with explaining the gaps between the IFLS and the Sakernas.

4.4.4 Using Same Questions Deciding whether Working

As shown in Section 4.3, the questions used to decide if a person is working differ between the IFLS and the Sakernas and differ from year to year within the Sakernas. This section tries to use the Sakernas questions to re-determine whether individuals are working in the IFLS sample. Then I can find out whether the difference in questionnaire explains part of the gaps in employment measures between the two surveys.

As shown in Appendix J, the main difference between the IFLS and the Sakernas when deciding if an individual is working is that the IFLS has one more follow-up question. This question is "Did you work in a family business in the last week?" Therefore, I re-determine whether a person is working in the IFLS sample without using the last follow-up question. If a person is re-determined to be not working, she/he is also not employed in the wage or the non-wage sector. As explained in Section 4.3, in 1993, about 40% of adults are not interviewed individually and, as a result, do not answer the questions in the individual information modules on working. Therefore, for this section I do not re-determine working status for 1993 individuals in the IFLS sample. We will only see if using the same questions narrows the gaps between the IFLS and the Sakernas in 1997, 2000, and 2007. Figure 4.9 to Figure 4.11 show the comparison between trends without using the same questions and with using the same questions. I use the provincial sampling weights to compute all trends.

We can see that using same questions does seem to close the gaps in the percent

working by a small amount, especially in rural areas in 2000 and 2007. In terms of the percent doing wage work, using the same questions does not seem to help with closing the gaps. This is not surprising as the extra follow-up question in the IFLS is about work in family businesses, which is categorized as non-wage work in my analysis. In terms of the percent doing non-wage work, we can see that using same questions widens the gaps between the IFLS and the Sakernas but lowers the levels for IFLS. The IFLS has a higher percentage doing wage work than the Sakernas and has a lower percentage doing non-wage work. When we use same questions, lowering the IFLS percentage doing non-wage work brings the total percent working in the IFLS closer to that in the Sakernas.

There is also inconsistency in employment questions within the Sakernas over years, as explained in detail in Appendix J. In particular, there is a significant change in questionnaire starting from 2001. Although the questionnaire has changed, I find using the 2001 Sakernas questionnaire on the 2000 Sakernas sample does not change who is working at all. Therefore, the change of questionnaire since 2001 in the Sakernas should not have any effect on total employment rate. This is in contrary to what is claimed in Dhanani et al. (2009). The introduction of two casual employment sectors, however, does seem to cause a shift of workers from the non-wage sector into the wage sector from the 2000 Sakernas to the 2001 Sakernas. Nevertheless, as mentioned in Section 4.4, since both the 2007 IFLS and the 2007 Sakernas have the two new sectors, this should not be a cause of the discrepancy between the IFLS and the Sakernas.

Figure 4.9: Percent of Adults (older than 15) who Work without and with Same Questions

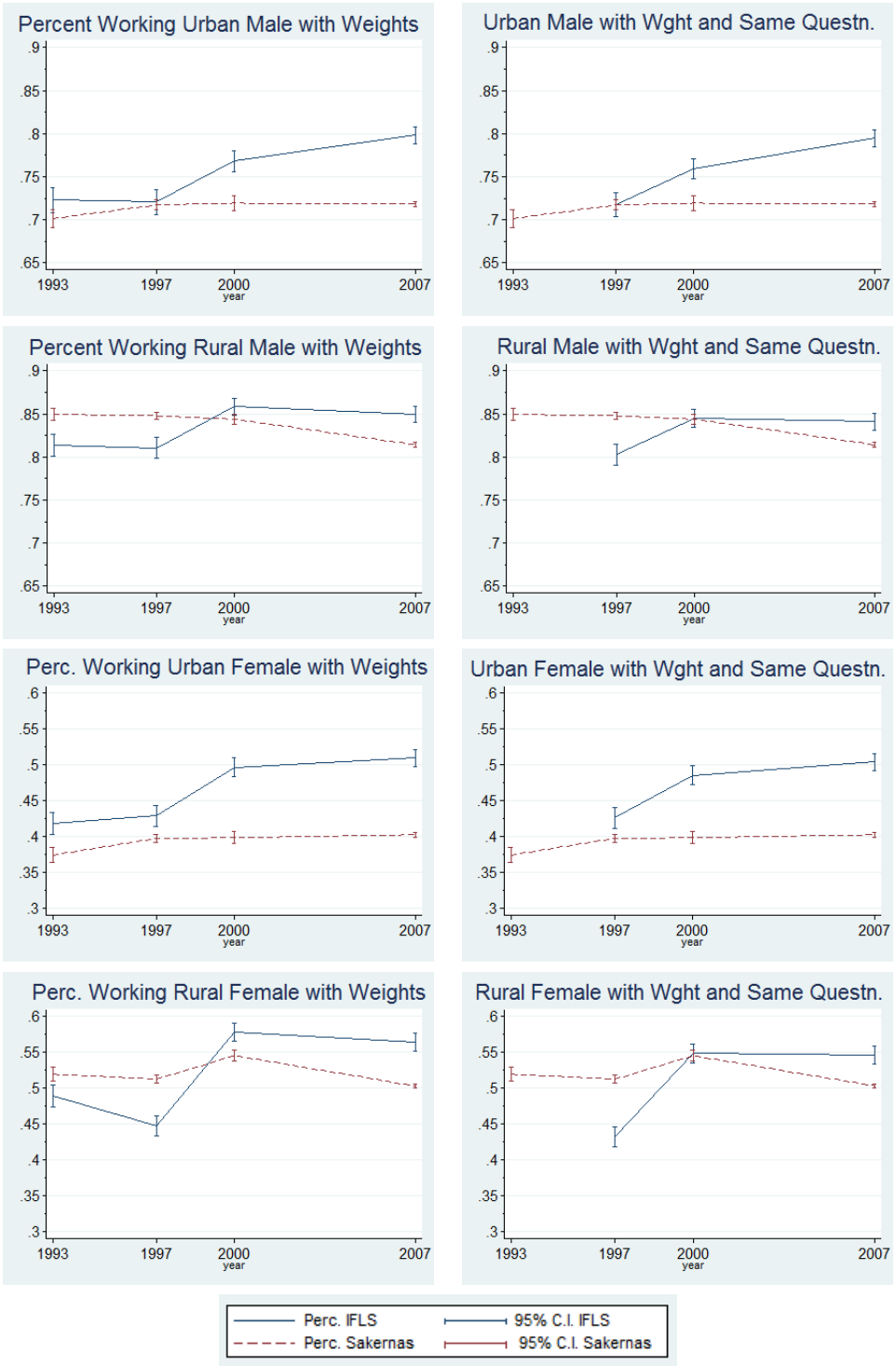


Figure 4.10: Percent of Adults (older than 15) who Do Wage Work without and with Same Questions

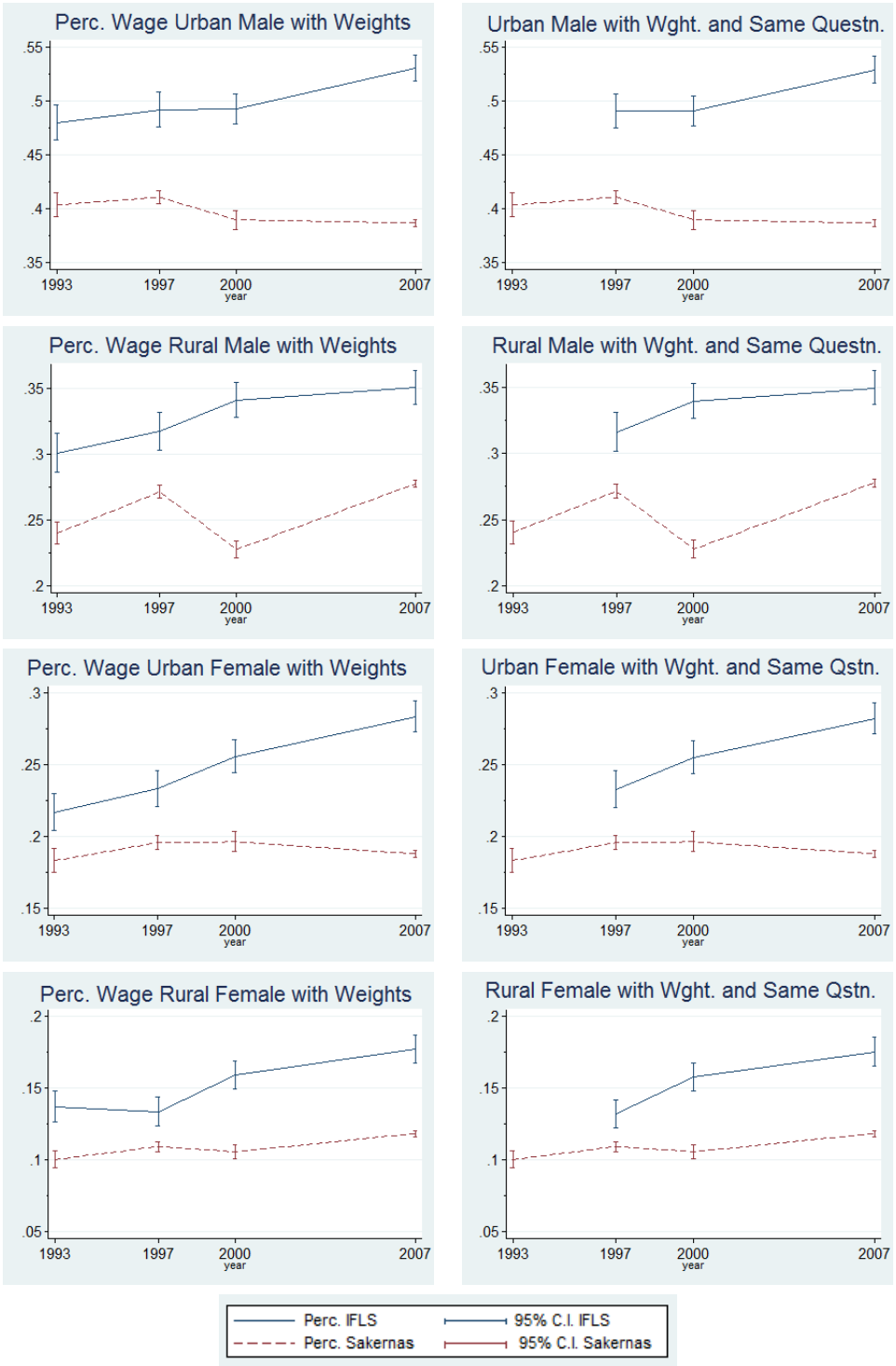
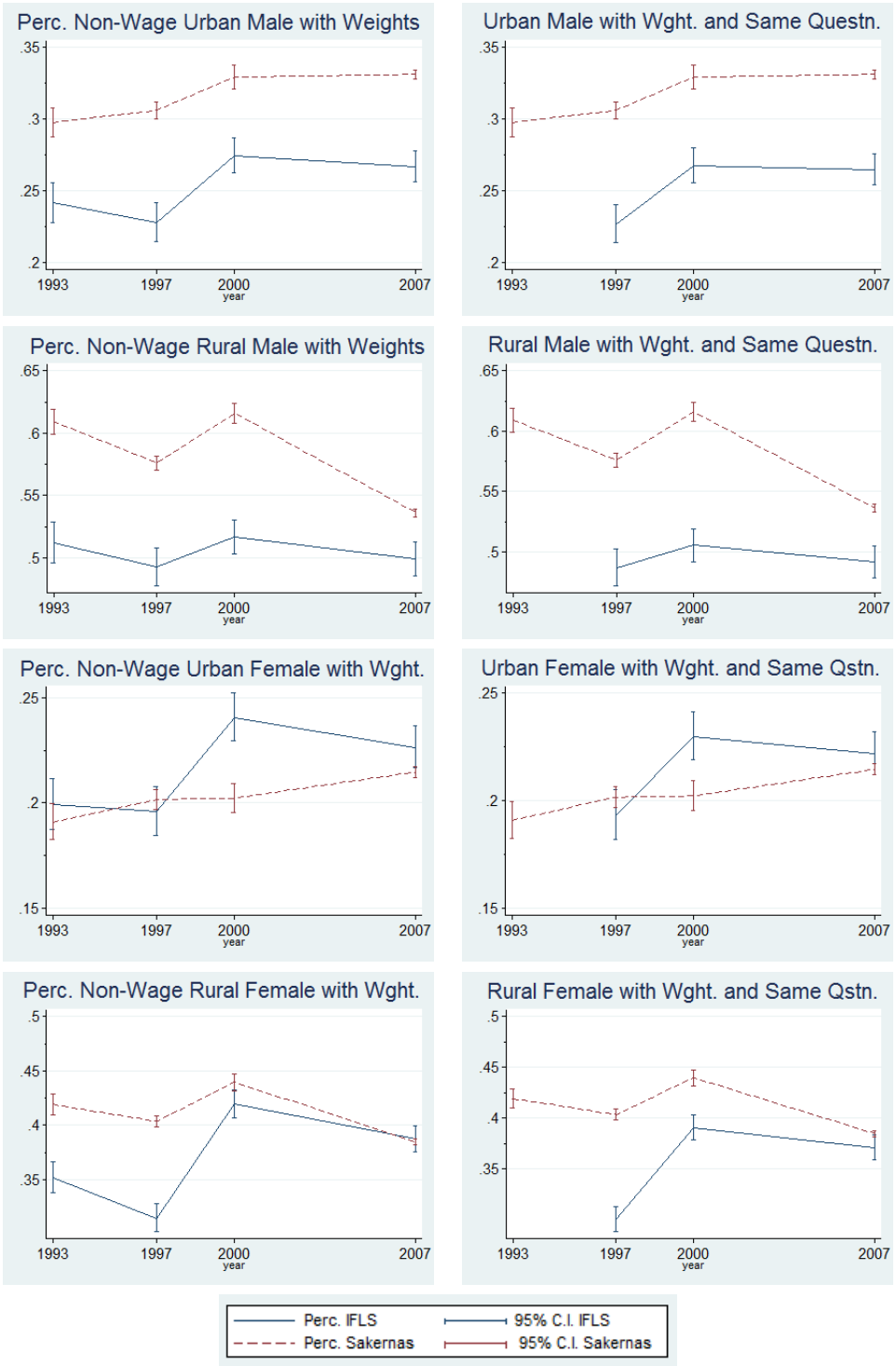


Figure 4.11: Percent of Adults (older than 15) who Do Non-Wage Work without and with Same Questions



4.5 Conclusion and Discussion

This chapter has compared two widely used large-scale household surveys from Indonesia, the Indonesian Labor Force Survey (Sakernas) and the Indonesian Family Life Survey (IFLS), and tries to reconcile the significant discrepancy between these two surveys in terms of employment measures (total employment rate, wage employment rate, and non-wage employment rate). I discussed the potential factors that may cause the discrepancy, including sampling structure, the panel nature of IFLS, questionnaire design, selection of enumeration areas and households, interviewer training, questionnaire length, and fieldwork timing. Then I test how well some of the factors can explain the discrepancy. I find that using sampling weights (correcting for the stratification on provinces in both surveys) so that the two surveys have the same regional distribution does not help with narrowing the gaps. I also find that although the two surveys have different age and education distributions, this difference does not explain the gaps between the two surveys. The only factor that seems to help with explaining the gaps is the difference in questions on working status. Using the Sakernas questions to re-determine whether a person is working in the IFLS sample does narrow the gap in total employment in rural areas. By large, however, much of the discrepancy between the two surveys in employment measures remains unexplained.

The fact that the IFLS and the Sakernas have different age and education distributions even at the provincial level implies possible differences in the selection of enumeration areas and/or households within strata. Also, the fact that both the IFLS and the Sakernas age and education distributions differ significantly from the Census distribution provides some evidence of non-random selection of enumeration areas and/or households within strata in the surveys. Although I find that the difference in education and age distribution in general does not explain the discrepancies, selection of enumeration areas and/or households on unobserved characteristics may exist. For example, one survey may have over-looked poorer

enumeration areas or slums in a particular sampling stratum. Other unverifiable factors, such as differences in interviewer quality, in questionnaire length, and in fieldwork timing of the year may also contribute to the discrepancy in employment measures.

Dropping the question "did you work in a family business last week?" in the IFLS helps with narrowing the gap in total employment in rural areas. This result indicates that measuring unpaid family work, especially in rural areas, is hard and highly depends on the formation of questions in the interview. This confirms the argument in many other labor studies in Indonesia such as Dhanani et al. (2009) and Korns (1987) that the measurement of unpaid family work is important for the accuracy of employment measures in Indonesia. Surveys that aim to measure employment in developing countries, especially informal employment that includes unpaid family work, should pay particular attention to the measurement of unpaid family work. Asking explicitly "whether you worked in a family business" may help with getting more accurate information about family work in low-income countries.

As to which survey researchers should use to analyze labor issues in Indonesia, this chapter does not provide a clear conclusion. Nonetheless, I have compared systematically the differences between the two surveys pertaining to the measurement of labor market outcomes. I have also shown that the distribution of basic characteristics (provincial, urban/rural, age, education) of both surveys differ from the Census. Furthermore, I have shown that using sampling weights that correct for differential regional coverage does not explain the gap in employment measures, nor does accounting for the differences in age and education distributions. The descriptions and findings in this chapter can be used as important caveats when using either survey to analyze labor issues in Indonesia. I have shown that the measurement of unpaid family work depends on the questionnaire and that the IFLS seems to measure unpaid family work better due to more explicit question on family work. Therefore, researchers may benefit more from using the IFLS than

from using the Sakernas if their focus is on informal work, especially unpaid family work in household businesses.

Another lesson learnt from this chapter is that many surveys from Indonesia such as the Census, the Inter-Census, the Sakernas and the IFLS may not be directly comparable. Particular attention should be paid to the difference in sampling structure, distribution of basic characteristics, questionnaire design, etc. between surveys when one uses two or more surveys at the same time. Also, what is claimed about the representativeness of the sample, the consistency of definition and questionnaire, the quality of the interviewers, etc. should be checked and documented before using the data.

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Chapter 5

Conclusion

This thesis has analyzed labor market issues in Indonesia. The first chapter analyzes the insurance role of self-employment during the Asian financial crisis. Difference in difference estimation is used to estimate the effect of having self-employed business before the crisis on household consumption and labor supply during the crisis. I find that households with self-employed business before the crisis could increase labor supply by a much lesser amount to maintain the same level of consumption compared to households without self-employed business before the crisis. The second chapter looks at the effect of women's work hours on their intra-household bargaining power. I utilize direct information on household decision-making from the Indonesian Family Life Survey to construct direct measures of women's intra-household bargaining power. I also utilize the price increase during the Asian Financial Crisis as an instrumental variable that positively affects women's work hours but does not affect women's bargaining power directly. I find evidence of a positive relationship between women's work hours and their intra-household bargaining power. The third chapter compares the Indonesian Family Life Survey and the Indonesian Labor Force Survey and tries to reconcile the inconsistency between the two surveys in terms of employment measures. After documenting and testing potential causes of the inconsistencies, I find that the

inconsistencies are by large not reconcilable. The design of questions on working status in the survey and the treatment of unpaid family work, however, does seem to be a factor causing inconsistencies between the two surveys.

This thesis will add to our knowledge of labor market in developing countries. In particular, it adds to our understanding of the informal sector in developing countries. In a country where there are frequent shocks to the formal economy and where there is little formal insurance institutions, the informal sector functions as a safety net for individuals to fall back into during shocks to the formal economy. Also, having self-employed business in the informal sector may serve as a form of insurance for households against shocks in the formal sector.

This thesis also adds to our understanding of intra-household decision-making by describing decision-making patterns using unique data in the Indonesian Family Life Survey. It also contributes to the literature on intra-household decision making by testing the effect of economic factors such as women's working status and wage on direct measures of their decision-making power. My analysis shows that household members may have different influence on different aspects of household decisions. Also, it shows that in addition to wage, how much a woman works may also affect their intra-household bargaining power.

This thesis will also add to our understanding of two important surveys from Indonesia, the Indonesian Family Life Survey and the Indonesian Labor Force Survey, and provide important implications for the design of labor force surveys in developing countries. The findings in this thesis indicate that researchers should pay special attention to differences in sampling structure, distribution of basic characteristics, questionnaire design, etc. between surveys when they use two or more surveys at the same time. Also, my analysis shows that accurate measure of unpaid family work is crucial in obtaining accurate measures of employment in developing countries.

Appendices

Appendix A

Re-contact and Interview Procedure of IFLS

A.1 IFLS1

In 1993, IFLS1 was conducted. IFLS1 stratified on provinces and urban/rural residence, and households were randomly sampled within these strata. 7730 households were sampled and among them 7224 households were interviewed. In the households that were interviewed, detailed individual interview that contains the working questions (the adult information module) was only conducted on the following of these households:

- The household head and spouse
- Two randomly selected children of the head and spouse aged between 0 and 14 (interviewed by proxy)
- An individual aged 50 and above and his/her spouse, randomly selected from remaining members
- For a randomly selected 25% of households, an individual aged between 15 and 49 and his/her spouse, randomly selected from remaining members.

The maximum number of members interviewed with detailed questions in each household was limited to 4. As a result, for 1% of households, some members that fit the criteria above had to be dropped.

A.2 IFLS2

The goal of IFLS2 was to relocate and re-interview IFLS1 households. Field work for IFLS2 was conducted mostly between August, 1997 and December, 1997, with 5% of households interviewed in January, 1998. If an IFLS1 household was found intact in 1997, it would be treated as an original household. If the household had split up between 1993 and 1997, then when the first respondent from that household was re-contacted in IFLS2, that respondent's household was designated as the original household. Among people that have moved out of the original households, two kinds of people are tracked: 1. Individuals who answered detailed individual questions in 1993, 2. IFLS1 household members who were 26 or older in 1993. These people are called the target respondents, and the households they resided in 1997 are called split off households. Individual level interviews which include the adult information module are conducted on selected people according to the following two rules:

- In original households, everyone in the household was interviewed individually
- In split-off households, only the target respondents, their spouses, and their children were interviewed individually.

Note that the rule for conducting conducting individual interviews in original households has changed from 1993 to 1997. In 1993, mostly it was only the household heads and their spouses that were interviewed individually. In 1997, everyone in the original households was interviewed. This has changed the demographic distribution of people who are interviewed individually from 1993 to 1997.

A.3 IFLS2+

IFLS2+ was a survey round that was specifically aimed at capturing the effect of the Asian Financial Crisis. In this round, only a sub-sample of the IFLS1 households from 7 out of the 13 original provinces were tracked and interviewed. For the 25% sub-sample, tracking rules were similar to IFLS2. Namely, if an individual had

moved out of his her original household, he/she was tracked if he/she was a target respondent. In original households, everyone was interviewed individually. In split off households, everyone was interviewed individually as well. Since I do not have access to IFLS2+ data, I cannot find out detailed sampling procedure of IFLS2+.

A.4 IFLS3

IFLS3 was conducted in 2000. Households that have moved from 1997 were tracked. The following individuals who moved out of original households were followed:

- 1993 main respondents (the respondents that answered the individual level questions)
- 1993 household members born before 1968
- Individuals born since 1993 in original 1993 households
- Individuals born after 1988 if they were residents in an original household in 1993.
- 1993 household members who were born between 1968 and 1988 if they were interviewed in 1997
- 20% random sample of 1993 household members who were born between 1968 and 1988 if they were not interviewed in 1997

The households that these individuals resided in 2000 were the split-off households in 2000. In original households in 2000, everyone who could be was interviewed or had a proxy interview, even if they were not IFLS1 members. In split-off households, all IFLS1 members, their spouses and biological children were interviewed, but not others.

A.5 IFLS4

IFLS4 was conducted in 2007. The target households were original IFLS1 households, minus all of those households whose member had died by 2000, plus

split-off households from 1997, 1998 and 2000. Field work was conducted between November, 2007 and May, 2008. In IFLS4, 6596 original IFLS1 households were re-contacted, 3366 old split-off households were re-contacted, and 4033 new split-off households were contacted.

Rules for tracking individuals who had moved are the following, which are similar to 2000:

- 1993 main respondents
- 1993 household members born before 1968
- Individuals born since 1993 in original 1993 households, also in split-off households if they were children of 1993 IFLS household members
- Individuals born after 1988 if they were residents in an original household in 1993
- 1993 household members who were born between 1968 and 1988 if they were interviewed in 2000
- 20% random sample of 1993 household members who were born between 1968 and 1988 if they were not interviewed in 2000.

The households that the target respondents above resided in were designated as split-off households. In original households, everyone that could be interviewed was interviewed individually. In split-off households, only the target respondent, their spouses, and biological children were interviewed.

Appendix B

OLS Regression Results, Chapter 2

B: OLS regression results

As shown in table B.1 and B.2, if we assume that self-employment status is not endogenous and estimate equation 2.18 and 2.19 using ordinary least squares, we will get that having self-employment in 1997 increases per capita consumption by around 7%. In terms of work, we can see that having self-employment in 1997 also increases the percentage of adult members who work by around 10 percentage points. If we look at hours, we can see that having prior self-employment also increases hours by various measures. Therefore from the OLS regressions, having prior self-employment has no insurance value during the crisis in terms of work, and it seems like having prior self-employment has some insurance value during the crisis in terms of consumption.

Table B.1: OLS Results - Equation 2.18 and 2.19

	(1) Per Capita Consumption	(2) Ln of Per Capita Consumption	(3) Percent of Adults who Work Last Week	(4) Percent of Adults who Work Last Year
Have Self-employment in 1997	7573.9	0.0689*	10.12***	7.927***
	(5593.5)	(0.0298)	(1.308)	(1.285)
Wealth 1997	0.000423***	2.18e-09***	-6.28e-09	-4.37e-09
	(0.0000480)	(2.55e-10)	(1.11e-08)	(1.09e-08)
Number 0-14 2000	-17071.4***	-0.157***	-1.191	-1.077
	(2614.7)	(0.0139)	(0.611)	(0.601)
Number 15-24 2000	-17054.8***	-0.136***	-1.589	-3.239**
	(4978.0)	(0.0265)	(1.165)	(1.144)
Number 25-34 2000	-23743.9***	-0.158***	4.609***	4.432***
	(5522.6)	(0.0294)	(1.289)	(1.266)
Number 35-44 2000	-14342.2*	-0.0712*	4.155**	4.163**
	(6335.9)	(0.0337)	(1.483)	(1.456)
Number 45-54 2000	-16589.5*	-0.0926**	3.942*	3.606*
	(6575.1)	(0.0350)	(1.539)	(1.512)
Number 55-64 2000	-18965.2**	-0.0993**	-3.449*	-3.029
	(6946.1)	(0.0370)	(1.626)	(1.597)
Number 65+ 2000	-12230.7	-0.0893*	-14.99***	-14.27***
	(7302.7)	(0.0389)	(1.710)	(1.679)

Number no sch. 2000	-20505.0**	-0.227***	1.388	1.423
	(6946.7)	(0.0370)	(1.627)	(1.598)
Number elementary. 2000	-5541.3	-0.0992***	0.878	0.558
	(4350.4)	(0.0232)	(1.019)	(1.000)
Number jr. sec. 2000	-1188.7	0.0138	-0.749	-1.492
	(4966.1)	(0.0264)	(1.163)	(1.142)
Number sr. sec. 2000	3391.9	0.0581*	-2.868**	-3.103**
	(4340.7)	(0.0231)	(1.016)	(0.998)
Number post sec. 2000	31817.9***	0.241***	0.0836	-0.130
	(5300.6)	(0.0282)	(1.241)	(1.218)
Number female 2000	1920.5	0.00545	-2.814**	-2.472*
	(4453.2)	(0.0237)	(1.043)	(1.024)
Constant	176875.0***	11.81***	60.56***	63.00***
	(10786.1)	(0.0574)	(2.524)	(2.479)
Observations	1822	1822	1825	1825
R^2	0.230	0.396	0.174	0.166

1. Percent of Adults who Work Last Week is the percentage of adult members (older than 15) who worked in the last week
2. Percent of Adults who Work Last Year is the percentage of adult members (older than 15) who worked in the last year
3. The education and gender composition are of adult members
4. Province and interview month in 1997 are controlled for
5. Standard errors in parentheses
6. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table B.2: OLS Results - Equation 2.18 and 2.19, Households with Full Information on Hours

	(1) Per Capita Consumption	(2) Ln of Per Capita Consumption	(3) Perc. Work Last Week	(4) Perc. Work Last Year	(5) Hours Per Week Per Adult	(6) Hours Per Week	(7) Weeks Last Year
total_hr_nw	total_week						
Have Self-employment in 1997	7710.6	0.0688*	7.326***	5.422***	4.276***	14.00***	12.63***
	(5851.0)	(0.0309)	(1.157)	(1.165)	(0.880)	(2.695)	(1.984)
Wealth 1997	0.000443***	2.21e-09***	6.88e-09	8.11e-09	-7.16e-10	2.24e-08	2.98e-08
	(0.0000504)	(2.66e-10)	(9.90e-09)	(9.96e-09)	(7.53e-09)	(2.30e-08)	(1.70e-08)
Number 0-14 2000	-17079.4***	-0.155***	-1.940***	-1.924***	-0.728	-0.827	-2.298*
	(2716.4)	(0.0143)	(0.537)	(0.541)	(0.409)	(1.251)	(0.921)
Number 15-24 2000	-16431.9**	-0.133***	-3.274**	-4.659***	-1.300	29.07***	16.76***
	(5127.5)	(0.0271)	(1.015)	(1.022)	(0.772)	(2.363)	(1.740)
Number 25-34 2000	-23749.6***	-0.157***	0.147	0.608	0.205	33.71***	27.16***
	(5749.5)	(0.0303)	(1.135)	(1.142)	(0.863)	(2.642)	(1.945)
Number 35-44 2000	-14983.0*	-0.0730*	-1.307	-0.716	-0.829	29.25***	26.45***
	(6648.6)	(0.0351)	(1.315)	(1.324)	(1.001)	(3.063)	(2.255)
Number 45-54 2000	-16907.6*	-0.0960**	-0.596	-0.314	-0.816	30.18***	28.20***
	(6851.9)	(0.0362)	(1.356)	(1.365)	(1.032)	(3.158)	(2.325)
Number 55-64 2000	-19316.0**	-0.100**	-4.273**	-3.956**	-2.511*	27.06***	22.21***
	(7279.3)	(0.0384)	(1.441)	(1.451)	(1.096)	(3.356)	(2.470)
Number 65+ 2000	-15846.7*	-0.103*	-14.70***	-14.12***	-9.176***	1.465	4.200
	(7849.9)	(0.0414)	(1.554)	(1.565)	(1.183)	(3.619)	(2.664)

Number no sch. 2000	-17479.8*	-0.204***	1.749	1.592	2.021	4.392	-2.222
	(7318.1)	(0.0386)	(1.449)	(1.459)	(1.102)	(3.374)	(2.484)
Number elementary. 2000	-5599.9	-0.0980***	0.523	0.232	0.964	5.293*	2.046
	(4493.6)	(0.0237)	(0.890)	(0.896)	(0.677)	(2.072)	(1.525)
Number jr. sec. 2000	-2989.5	0.0135	-0.657	-1.486	0.476	3.186	-0.279
	(5138.7)	(0.0271)	(1.017)	(1.024)	(0.774)	(2.369)	(1.744)
Number sr. sec. 2000	3119.0	0.0591*	-2.727**	-2.966***	-1.148	-3.892	-2.160
	(4480.1)	(0.0236)	(0.886)	(0.892)	(0.674)	(2.064)	(1.519)
Number post sec. 2000	30839.6***	0.238***	-0.807	-1.172	-0.759	-3.865	-0.317
	(5469.1)	(0.0289)	(1.082)	(1.090)	(0.823)	(2.520)	(1.856)
Number female 2000	1860.6	-0.000610	-2.170*	-1.817*	-2.159**	-8.659***	-0.712
	(4622.6)	(0.0244)	(0.915)	(0.921)	(0.696)	(2.131)	(1.569)
Constant	181573.7***	11.83***	76.09***	76.88***	34.81***	-1.579	5.661
	(11597.9)	(0.0612)	(2.294)	(2.310)	(1.746)	(5.343)	(3.933)
Observations	1668	1668	1671	1671	1671	1671	1670
R^2	0.234	0.397	0.201	0.205	0.136	0.410	0.435

1. Perc. Work Last Week is the percentage of adult members (older than 15) who worked in the last week
2. Perc. Work Last Year is the percentage of adult members (older than 15) who worked in the last year
3. Hours Per Week Per Adult is hours worked per adult member in a normal week
4. Hours Per Week is total hours worked by household members in a normal week
5. Weeks Last Year is total weeks worked by household members in last year
6. The education and gender composition are of adult members
7. Province and interview month in 1997 are controlled for
8. Standard errors in parentheses
9. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Appendix C

Sample Size and Attrition at the Household Level IFLS

Table C.1: Sample Size and Attrition of IFLS 1993, 1997, 1998 and 2000

	Household Type			
	Original	1997 Splits	1998 Splits	2000 Splits
1993 households	**7224**			
1997 households	**6742**	878		
1993-1997 recontact rate	**93%**			
1997 HHs to be tracked in 1998	1911	264		
1993 HHs to be tracked in 1998	2063			
1998 households	1990		344	
1993-1998 recontact rate	96%			
1997 households that are also in 1998	1893	241		
1997-1998 recontact rate	99%	91%		
2000 households	6758			2646
1993-2000 recontact rate	94%			
1997 households that are also in 2000	**6564**	751		
1997-2000 recontact rates	**97%**	86%		
1998 households that are also in 2000	1935	220	279	
1998-2000 recontact rates	97%	91%	81%	

Appendix D

Household Decision Making Module from IFLS

Figure D.1: Module on Household Decision Making IFLS

SECTION PK (HOUSEHOLD DECISION-MAKING)

We would like to know how your family makes decisions about expenditures and use of time.

PK18 TYPE: EXPENDITURES AND USE OF TIME	PK18 In your household, who makes decisions about: (CIRCLE ALL THAT APPLY ON EACH LINE)																	
	Respondent	Spouse	Male Child	Female Child	Mother	Father	Mother in law	Father in law	Brother	Sister	Brother in law	Sister in law	Grandparent	Other, specify_____	Son/Daughter in law	Grandchild	X/W/Y/V	Can't Answer
A. Food eaten at home	A	B	C	D	E	F	G	H	I	J	K	L	M	N _____	O	P		Z
B. Routine Purchases for the household of items such as cleaning supplies	A	B	C	D	E	F	G	H	I	J	K	L	M	N _____	O	P		Z
C. Your clothes	A	B	C	D	E	F	G	H	I	J	K	L	M	N _____	O	P		Z
D. Your spouse's clothes	A	B	C	D	E	F	G	H	I	J	K	L	M	N _____	O	P		Z
E. Your children's clothes	A	B	C	D	E	F	G	H	I	J	K	L	M	N _____	O	P	W	Z
F. Your children's education	A	B	C	D	E	F	G	H	I	J	K	L	M	N _____	O	P	W	Z
G. Your children's health	A	B	C	D	E	F	G	H	I	J	K	L	M	N _____	O	P	W	Z
H. Large expensive purchases for the household (i.e., refrigerator or TV)	A	B	C	D	E	F	G	H	I	J	K	L	M	N _____	O	P		Z
I. Giving money to your parents/family	A	B	C	D	E	F	G	H	I	J	K	L	M	N _____	O	P	X	Z
J. Giving money to your spouse's parents/family	A	B	C	D	E	F	G	H	I	J	K	L	M	N _____	O	P	X	Z
K. Gifts for parties/weddings	A	B	C	D	E	F	G	H	I	J	K	L	M	N _____	O	P		Z
L. Money for monthly arisan (savings lottery)	A	B	C	D	E	F	G	H	I	J	K	L	M	N _____	O	P	X	Z
M. Money for monthly savings	A	B	C	D	E	F	G	H	I	J	K	L	M	N _____	O	P	X	Z
N. Time the husband spends socializing	A	B	C	D	E	F	G	H	I	J	K	L	M	N _____	O	P		Z
O. Time the wife spends socializing	A	B	C	D	E	F	G	H	I	J	K	L	M	N _____	O	P		Z
P. Whether you/your spouse works?	A	B	C	D	E	F	G	H	I	J	K	L	M	N _____	O	P	V	Z
Q. Whether you and your spouse use contraception?	A	B	C	D	E	F	G	H	I	J	K	L	M	N _____	O	P	Y	Z

Code PK18:
V. Don't work
W. No children
X. Never used money for this purpose
Y. Never used contraception

Source: IFLS 1997 Questionnaire

Appendix E

Summary Characteristics of OLS Regressions, Chapter 3

Table E.1: Summary of Characteristics 2000, 7 Categories of Decisions

Sample	All Couples		With Working Wife	
	Mean	Std. Dev.	Mean	Std. Dev.
Obs.	4349		2264	
Index 1 Percent Sole	0.2824	0.2272	0.2901	0.2285
Index 2 Average Decision Weight	0.5371	0.1687	0.5494	0.1659
Hours Wife	23.9496	29.5053	46.0057	25.6418
Hours Husband	48.5777	24.6861	49.3929	25.0140
Age Wife	37.3233	11.6695	39.0031	10.2021
Age Husband	42.6420	12.9283	44.2566	11.8453
Years of Sch. Wife	6.4077	4.3297	6.3220	4.6119
Years of Sch. Husband	7.3102	4.5147	7.0769	4.6711
Hourly Wage Wife	1900	5566	1900	5566
Hourly Wage Husband	2543	12201	2023	3276
Husband Not Working	0.0607	0.2388	0.0565	0.2310
Non-labor income Wife	99365	647332	104522	525493
Non-labor income Husband	292948	1656376	222186	1528711
Non-business asset Wife	10883691	31159719	11326320	28780893
Non-business asset Husband	14137155	36093618	13952889	31907547
Business Asset Wife	2162454	13621599	2881753	14817303
Business Asset Husband	7935037	41739273	8150524	35295912
Number of Adults in HH	3.2212	1.3942	3.1793	1.3307
Number over 65 in HH	0.1692	0.4336	0.1617	0.4198
Urban	0.4838	0.4998	0.4554	0.4981
Javanese	0.4353	0.4958	0.4916	0.5000
Sundanese	0.1347	0.3415	0.1082	0.3107
Balinese	0.0644	0.2455	0.0707	0.2563
Sasak	0.0391	0.1938	0.0402	0.1965
Minang	0.0350	0.1837	0.0371	0.1891
Batak	0.0299	0.1703	0.0371	0.1891
Bugis	0.0416	0.1997	0.0283	0.1658
Banjar	0.0322	0.1765	0.0300	0.1707
Betawi	0.0352	0.1843	0.0252	0.1567
South Sumatran	0.0246	0.1549	0.0212	0.1441
Madura	0.0260	0.1591	0.0278	0.1645
Cirebon	0.0225	0.1484	0.0239	0.1526
Bima	0.0166	0.1276	0.0124	0.1105
Makasar	0.0147	0.1204	0.0066	0.0811
Other Ethnicity	0.0538	0.2257	0.0451	0.2075
Javanese in North Smtr.	0.0267	0.1611	0.0234	0.1512
Javanese in South Smtr.	0.0108	0.1034	0.0119	0.1086
Javanese in Lampung	0.0193	0.1376	0.0239	0.1526
Javanese in Jakarta	0.0237	0.1521	0.0225	0.1484
Javanese in West Java	0.0333	0.1795	0.0225	0.1484
Javanese in Yogyakarta	0.0556	0.2293	0.0773	0.2671
Javanese in Central Java	0.1262	0.3322	0.1595	0.3662
Javanese in East Java	0.1258	0.3316	0.1391	0.3462
Javanese in South Kalimtn.	0.0069	0.0828	0.0066	0.0811
Sundanese in Lampung	0.0090	0.0943	0.0093	0.0959
Sundanese in Jakarta	0.0133	0.1147	0.0115	0.1066
Sundanese in West Java	0.1074	0.3096	0.0830	0.2760
Betawi in Jakarta	0.0228	0.1492	0.0168	0.1285
Betawi in West Java	0.0124	0.1107	0.0084	0.0912
Couple Ethn. Differ	0.1223	0.3277	0.1078	0.3102

Table E.2: Summary of Characteristics 2000, 11 Categories of Decisions, Households with Children between 0 and 15

Sample	All Couple		With Wife Working	
	Mean	Std. Dev.	Mean	Std. Dev.
Obs.	2857		1530	
Index 1 Percent Sole	0.2933	0.2269	0.2948	0.2265
Index 2 Average Decision Weight	0.5431	0.1667	0.5528	0.1617
Work Hours Wife	24.7825	29.7520	46.2768	25.6530
Work Hours Husband	50.3078	23.8865	50.8631	24.5140
Age Wife	36.1176	9.4980	37.5752	8.7307
Age Husband	41.3668	10.7959	42.7235	10.3008
Years of Sch. Wife	6.5506	4.2467	6.5150	4.5199
Years of Sch. Husband	7.4158	4.5065	7.1922	4.6426
Hourly Wage Wife	1911	4794	1911	4794
Hourly Wage Husband	2687	12649	2077	3117
Husband Not Working	0.0427	0.2022	0.0464	0.2104
Non-labor income Wife	85375	497928	114314	597843
Non-labor income Husband	219352	1447964	160070	1395234
Non-business asset Wife	10954890	27882225	11553372	30546909
Non-business asset Husband	13977216	32672394	13614831	29705121
Business Asset Wife	1999688	10505754	2588335	12268476
Business Asset Husband	8322005	46508751	8524550	38081772
Number of Adults in HH	3.1943	1.3803	3.1889	1.3427
Number over 65 in HH	0.1456	0.4002	0.1444	0.4004
Urban	0.4795	0.4997	0.4314	0.4954
Javanese	0.4382	0.4963	0.4902	0.5001
Sundanese	0.1369	0.3438	0.1026	0.3036
Balinese	0.0602	0.2379	0.0667	0.2495
Sasak	0.0294	0.1690	0.0327	0.1779
Minang	0.0371	0.1890	0.0386	0.1926
Batak	0.0333	0.1793	0.0425	0.2018
Bugis	0.0385	0.1924	0.0301	0.1708
Banjar	0.0343	0.1820	0.0340	0.1813
Betawi	0.0336	0.1802	0.0222	0.1475
South Sumatran	0.0294	0.1690	0.0261	0.1596
Madura	0.0259	0.1589	0.0268	0.1615
Cirebon	0.0238	0.1525	0.0248	0.1557
Bima	0.0168	0.1285	0.0137	0.1164
Makasar	0.0140	0.1175	0.0065	0.0806
Other Ethnicity	0.0557	0.2293	0.0503	0.2187
Javanese in North Smtr.	0.0312	0.1738	0.0248	0.1557
Javanese in South Smtr.	0.0116	0.1069	0.0131	0.1136
Javanese in Lampung	0.0210	0.1434	0.0261	0.1596
Javanese in Jakarta	0.0207	0.1422	0.0203	0.1409
Javanese in West Java	0.0347	0.1829	0.0242	0.1537
Javanese in Yogyakarta	0.0473	0.2122	0.0608	0.2390
Javanese in Central Java	0.1309	0.3374	0.1686	0.3745
Javanese in East Java	0.1250	0.3307	0.1412	0.3483
Javanese in South Kalimtn.	0.0084	0.0913	0.0072	0.0845
Sundanese in Lampung	0.0116	0.1069	0.0111	0.1049
Sundanese in Jakarta	0.0137	0.1161	0.0092	0.0952
Sundanese in West Java	0.1054	0.3071	0.0771	0.2669
Betawi in Jakarta	0.0214	0.1446	0.0144	0.1191
Betawi in West Java	0.0123	0.1100	0.0078	0.0882
Couple Ethn. Differ	0.1257	0.3315	0.1105	0.3136

Appendix F

Estimation of Selection Equation, Chapter 3

Table F.1: Selection Equation

	7 Categories	11 Categories
Urban	-.16112***	-.28559***
	(-3.59)	(-5.15)
Age wife	.01925***	.02483***
	(8.71)	(7.65)
Years of school wife	.02807***	.03632***
	(3.57)	(3.67)
Household Total Non-Labor Income (in 1000 US$)	-.43856***	-.37233***
	(-4.22)	(-2.58)
Household Total Assets (in 1000 US$)	-.00642**	-.00844**
	(-2.33)	(-2.33)
Number of Pre-School Children (0-6)	-.19791***	-.20528***
	(-6.18)	(-5.20)
Number 7-15	.11705***	.06281***
	(4.78)	(2.00)
Number older than 65	-.26092***	-.22418***
	(-5.00)	(-3.35)
Number Female	.05833**	.05876**
	(2.24)	(2.01)
Work age members no school	.02488	.04211
	(0.52)	(0.69)
Work age members elem. sch.	.00397	.02504
	(0.15)	(0.79)
Work age members jr. sec.	-.11529***	-.12182***
	(-3.96)	(-3.42)
Work age members sr. sec.	-.10118***	-.10393***
	(-3.68)	(-2.99)
Work age members post sec.	.15157***	.18963***
	(3.26)	(3.04)
Constant	-.93928***	-1.1196***
	(-7.31)	(-6.71)
Observations	4349	2857

t statistics in parentheses * p<0.10, ** p<0.05, *** p<.01
Coefficients on province dummies not reported here, many of these coefficients are significant
Work age members are members between 15 and 65 years old

Appendix G

Attrition of IFLS at the Individual Level

Table G.1: Number of Respondents Each Year by the Year in Which the Respondent First Appeared in IFLS

	1993	1997	1998	2000	2007
1993 Original Respondents	33081	27236	7975	27530	23902
1997 New Respondents		6694	1725	5112	4190
1998 New Respondents			1458	1099	768
2000 New Respondents				9908	6191
2007 New Respondents					15531
Total	33081	33930	11158	43649	50582

Appendix H

Sakernas Sample Size

Table H.1: Sample Size (Number of Individuals) Sakernas 1993-2007

Year	Total	Q1	Q2	Q3	Q4
1993	279784	72396	68489	69865	69034
1994	245206				
1995	948380				
1996	247199				
1997	219439				
1998	163517				
1999	155572				
2000	98952				
2001	119935				
2002	275353				
2003	232466				
2004	237290				
2005	202633				
2006	193696				
2007	910277				

Notes: Q1 means Quarter 1. In 1993 only Q3 sample is used for analysis in this paper, so that Sakernas field work is conducted in August for all years

Appendix I

Examples of Those who Work in Sakernas and IFLS Interviewer Manual

I.1 1993 IFLS Interviewer Manual

- Those who engage in activities producing rice and/or secondary crops that are consumed by oneself and those engaged in activities yielding something (no rice or secondary crops) which are consumed by oneself like sewing clothes, cooking for the family, angling (fishing) for pleasure is not included in work.
- The household members who help the other household heads/household members in the wet rice fields, dry rice fields, shops, etc. are taken to be working even if they do not receive wages/salaries.
- Somebody who leases machines/farming tools, industry machines, feast equipment, means of transportation etc. is categorized as working.
- Domestic assistants are in the category of working people, both as household members of their employers and non-household members of their employers.
- Criminals who engage in activities like working the soil, making furniture, etc., are not groups as workers
- Somebody who leases farming land to others on a production-sharing basis, is categorized as worker if he takes the risks or joins the management of this farming.

I.2 1996 Sakernas Interviewer Manual

- Conducting work as in the concept of working to earn wages/help seek earnings is an economic activity that produces goods or services.
- A person who conducts activities of planting cultivation where the production is for self consumption is not considered as working except the plant cultivation are main food such as rice, corn, sago and or secondary crop (cassava, sweet potato, potato).
- Household members that help the work of head of the household or other household members, for example, in the rice field, stall/shop etc., are considered as working although they do not receive salary/wages (unpaid worker).
- A person that uses his profession for their own household needs is considered as working, example a doctor who heals his household members, a brick layer that fixes his own house, and tailors who sew their own clothes.
- A person that hires machines/farm machinery, industrial machines, party instruments, transportation and others is categorized as working.
- Domestic help are categorized as working, also as household members of their employer or as non-household members.
- A prisoner that works as a gardener, makes furniture etc. is not categorized as working.
- A person that rents his farm to another person and share production is categorized as working if he/she is responsible or is managing the farm.
- A field laborer and loose laborer who is waiting for a job is considered as not working.

Appendix J

Questions Determining Whether Working in IFLS and Sakernas

J.1 IFLS

1. What was your primary activity during the past week?
   (a) Working/trying to work/helping to earn income – If yes, working; if not, next question
   (b) Job searching
   (c) Attending school
   (d) Housekeeping
   (e) Retired
   (f) Other, specify
2. Did you work for at least 1 hour during the past week?
   (a) Yes – working
   (b) No – next question
3. Do you have a job/business, but were temporarily not working during the past week?
   (a) Yes – working
   (b) No – next question
4. Did you work at a family-owned (farm or non-farm) business during the past week?

(a) Yes – working

(b) No

J.2 Sakernas

J.2.1 1986 - 1996

1. What was your primary activity during the past week?

   (a) Employed – If yes, working; if not, next question

   (b) Schooling

   (c) Housekeeping

   (d) Not capable to have any activities

   (e) Other

2. Did you work for at least 1 hour during the past week?

   (a) Yes – working

   (b) No – next question

3. Do you have a job/business, but were temporarily not working during the past week?

   (a) Yes – working

   (b) No

J.2.2 1997- 2000

1. Did you engage in any of the following activities during the previous week?

   (a) Earned a living/helped to earn a living [1]
   1. Yes 2. No

   (b) Attended school
   1. Yes 2. No

   (c) Housekeeping
   1. Yes 2. No

[1] This particular choice was "worked" in 1998, and in the 1998 questionnaire it is written that the definition of work is to engage in an activity for at least one continuous hour in order to earn/help earn an income

(d) Looked for a job
1. Yes 2. No

(e) Other
1. Yes 2. No

If you answered "Yes" to any of the choices above, what was your primary activity during the previous week?
1 – working [2] 2 3 4

2. Were you employed for at least 1 hour during the past week?

(a) Yes – working

(b) No – next question

3. Do you have a job/business, but were temporarily not working during the past week?

(a) Yes – working

(b) No

J.2.3 2001 - 2011

1. Did you engage in any of the following activities during the previous week?

(a) Work[3]
1. Yes – working 2. No

(b) Attended school
1. Yes 2. No

(c) Housekeeping
1. Yes 2. No

(d) Other
1. Yes 2. No

If you answered "Yes" to any of the choices above, what was your primary activity during the previous week?
1 2 3 4

2. Did you have a job but were temporarily not working during the previous week?

[2] If the individual answered "yes" to 1.(a) but did not choose 1 here, then she will answer "yes" to Question 2.

[3] According to 2001 Sakernas User's Guide by Australian National University, the definition of working in this questionnaire is "an activity done by a person who worked for a pay or assisted others in obtaining pay or profit for the duration at least on hour during the survey week

(a) Yes – working

(b) No

Appendix K

Sampling Weights (provincial weights), Chapter 4

Table K.1: Urban Sampling Weights by Province, IFLS/Sakernas

	1993		1997		2000		2007	
Province	IFLS	Sakernas	IFLS	Sakernas	IFLS	Sakernas	IFLS	Sakernas
North Sumatra	0.683919	1.02049	0.742314	0.983209	0.782238	0.958198	0.905215	0.700086
West Sumatra	0.401093	0.67209	0.389176	0.606484	0.434163	0.679308	0.404575	0.259546
South Sumatra	0.718389	0.823	0.775414	0.805437	0.79903	0.855324	0.812812	0.544405
Lampung	1.071225	0.489658	1.090293	0.46686	0.994875	0.447592	0.723655	0.800568
Jakarta	0.506642	0.66038	0.564603	0.687964	0.618401	0.686956	0.766625	1.1752
West Java	1.950026	1.927211	1.697773	1.955415	1.590765	1.939439	1.506619	1.672111
Central Java	1.689802	1.193811	1.531892	1.184667	1.576675	1.166144	1.691773	1.147714
Yogyakarta	0.339065	0.541098	0.329702	0.512257	0.369674	0.474201	0.33092	1.042359
East Java	1.709395	1.150592	1.668925	1.142402	1.686971	1.206482	1.538467	1.107734
Bali	0.523218	0.555745	0.566029	0.559919	0.525528	0.580897	0.388794	0.593883
West Nusa Tenggara	0.571665	0.557453	0.618211	0.552943	0.552699	0.504033	0.394452	0.665773
South Kalimantan	0.427933	0.35404	0.401943	0.388536	0.402572	0.372846	0.397316	0.465563
South Sulawesi	0.655767	0.558301	0.676519	0.558616	0.476332	0.562541	0.586784	0.525598

These weights match the provincial distribution within urban areas of the IFLS/Sakernas sample to the provincial distribution within urban areas of 2000 Census sample

Table K.2: Rural Sampling Weights by Province, IFLS/Sakernas

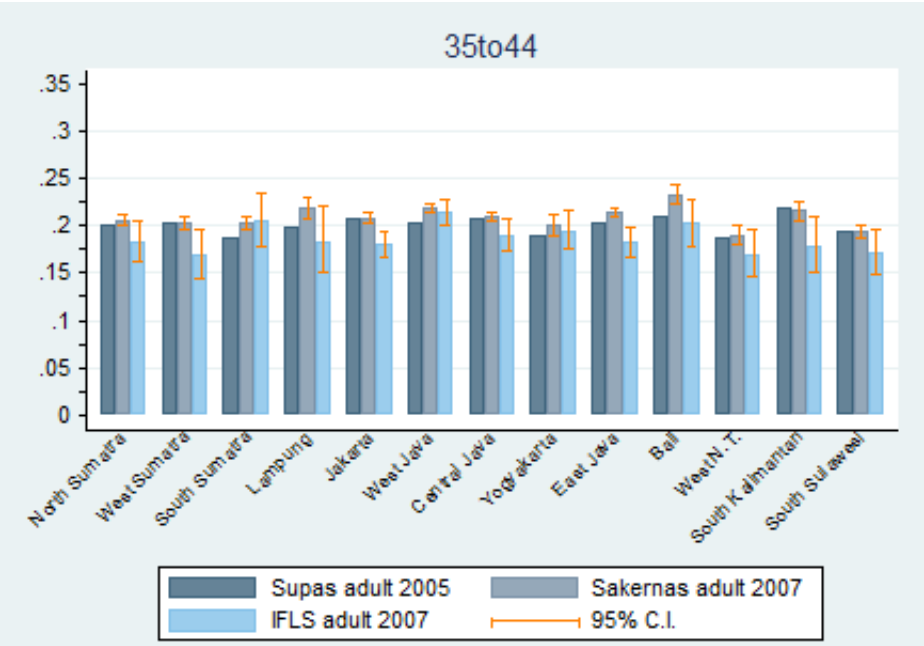
	1993		1997		2000		2007	
Province	IFLS	Sakernas	IFLS	Sakernas	IFLS	Sakernas	IFLS	Sakernas
North Sumatra	0.990701	1.193716	1.190664	1.234812	1.259637	1.160556	0.996605	0.713981
West Sumatra	0.352935	0.512588	0.345181	0.47685	0.353715	0.459599	0.398424	0.305348
South Sumatra	0.698492	0.910192	0.725752	0.869477	0.632611	0.87781	0.585074	0.494795
Lampung	0.474503	0.562272	0.475054	0.542581	0.50691	0.558352	0.478634	0.568473
West Java	1.841836	1.605818	1.724328	1.590162	1.644721	1.630773	1.726978	2.525649
Central Java	1.493631	1.102389	1.398948	1.123108	1.421029	1.101066	1.381165	1.450741
Yogyakarta	0.492541	0.400431	0.5111	0.413065	0.55002	0.422175	0.836835	1.34139
East Java	1.454179	1.089323	1.476094	1.084443	1.384765	1.093172	1.410495	1.352721
Bali	0.379793	0.413804	0.393726	0.431727	0.399502	0.427376	0.471699	0.647014
West Nusa Tenggara	0.281609	0.515161	0.254179	0.496525	0.260285	0.53673	0.296564	0.743586
South Kalimantan	0.361272	0.515228	0.396326	0.509643	0.363895	0.499141	0.322139	0.354688
South Sulawesi	0.643684	0.826502	0.696062	0.880741	0.890134	0.840717	0.679979	0.30989

These weights match the provincial distribution within rural areas of the IFLS/Sakernas sample to the provincial distribution within rural areas of 2000 Census sample

Appendix L

Age and Education Distribution of IFLS, Sakernas, Census and Inter-Census

Figure L.1: Age Distribution by Survey Urban 2007


35to44
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North Sumatra
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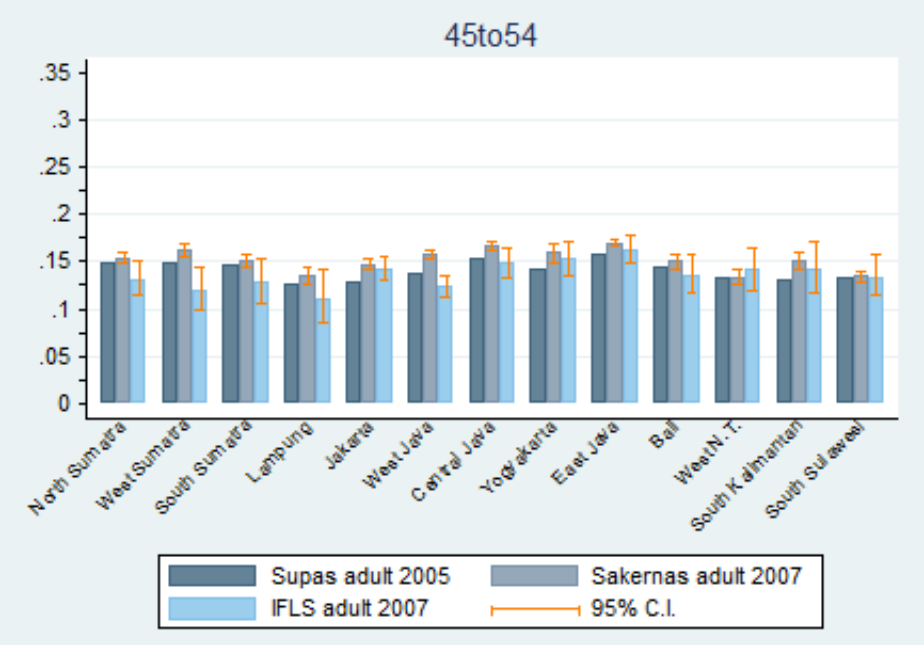
South Sumatra
Lampung
Jakarta
West Java
Central Java
Yogyakarta
East Java
Bali
West N. T.
South Kalimantan
South Sulawesi
Supas adult 2005
Sakernas adult 2007
IFLS adult 2007
95% C.I.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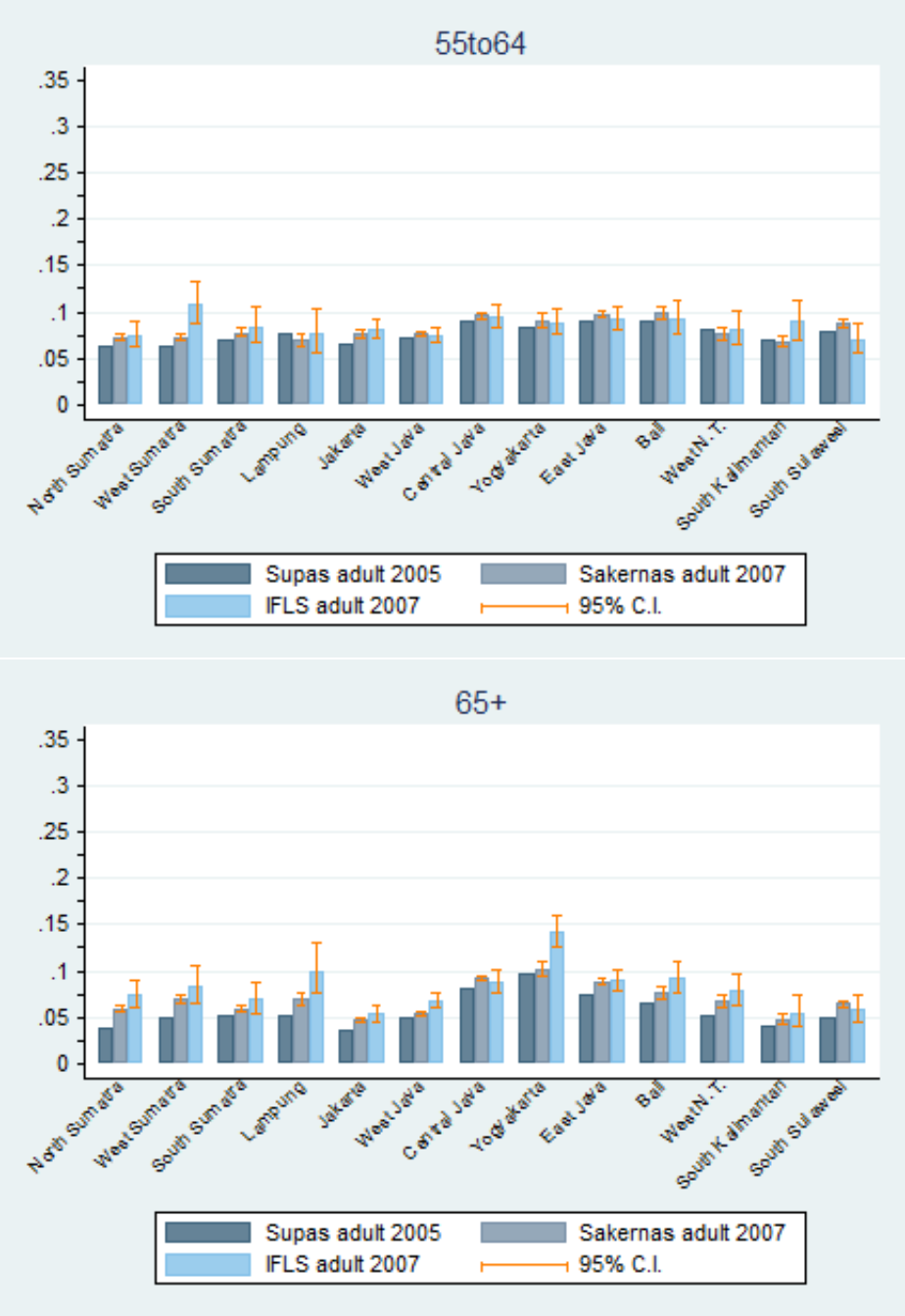
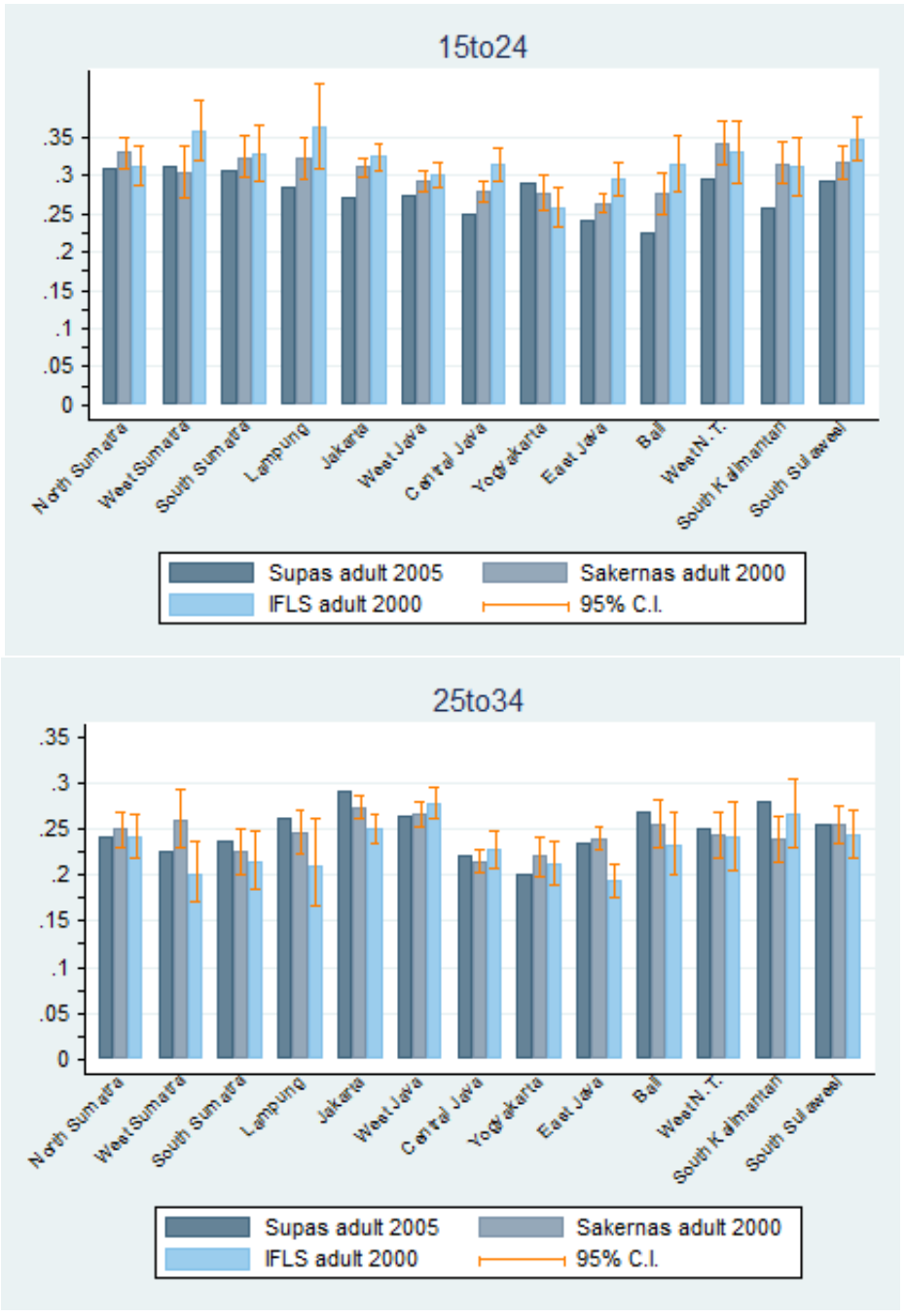
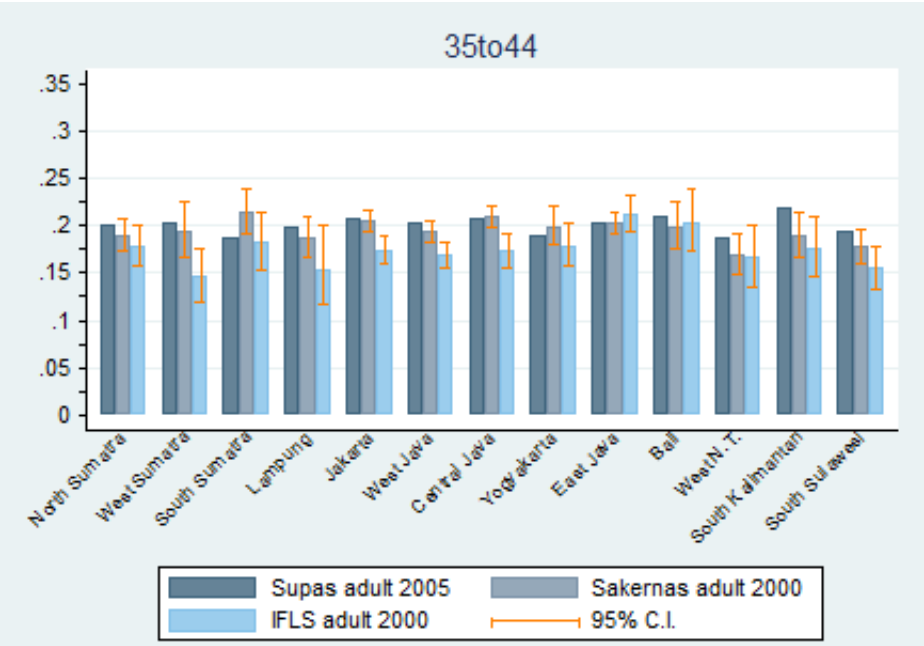
West N. T.
South Kalimantan
South Sulawesi
Supas adult 2005
Sakernas adult 2007
IFLS adult 2007
95% C.I.



Notes: All means all individuals of all ages. Adults means individuals older than or equal to 15

Figure L.2: Age Distribution by Survey Urban 2000

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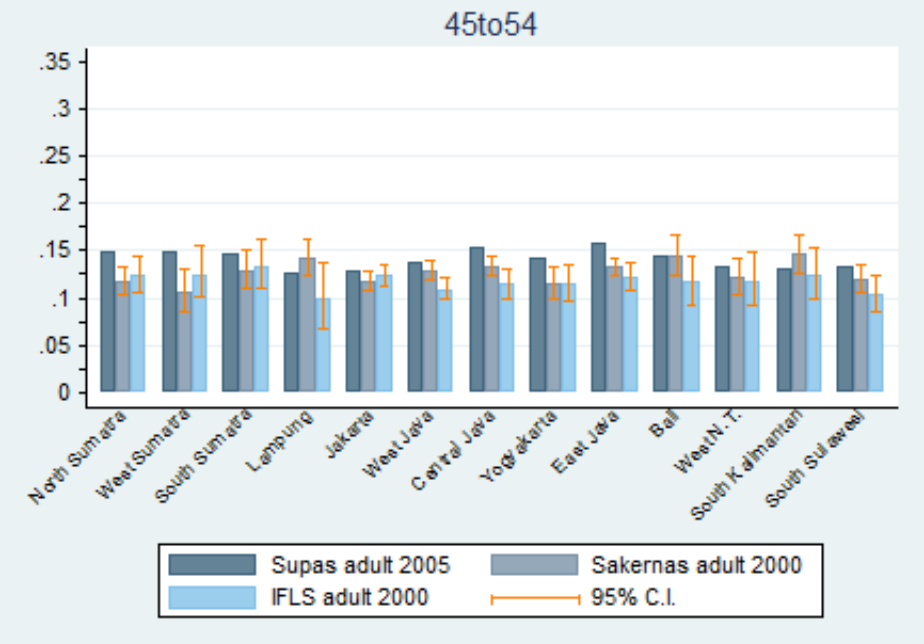
Jakarta
West Java
Central Java
Yogyakarta
East Java
Bali
West N. T.
South Kalimantan
South Sulawesi
Supas adult 2005
Sakernas adult 2000
IFLS adult 2000
95% C.I.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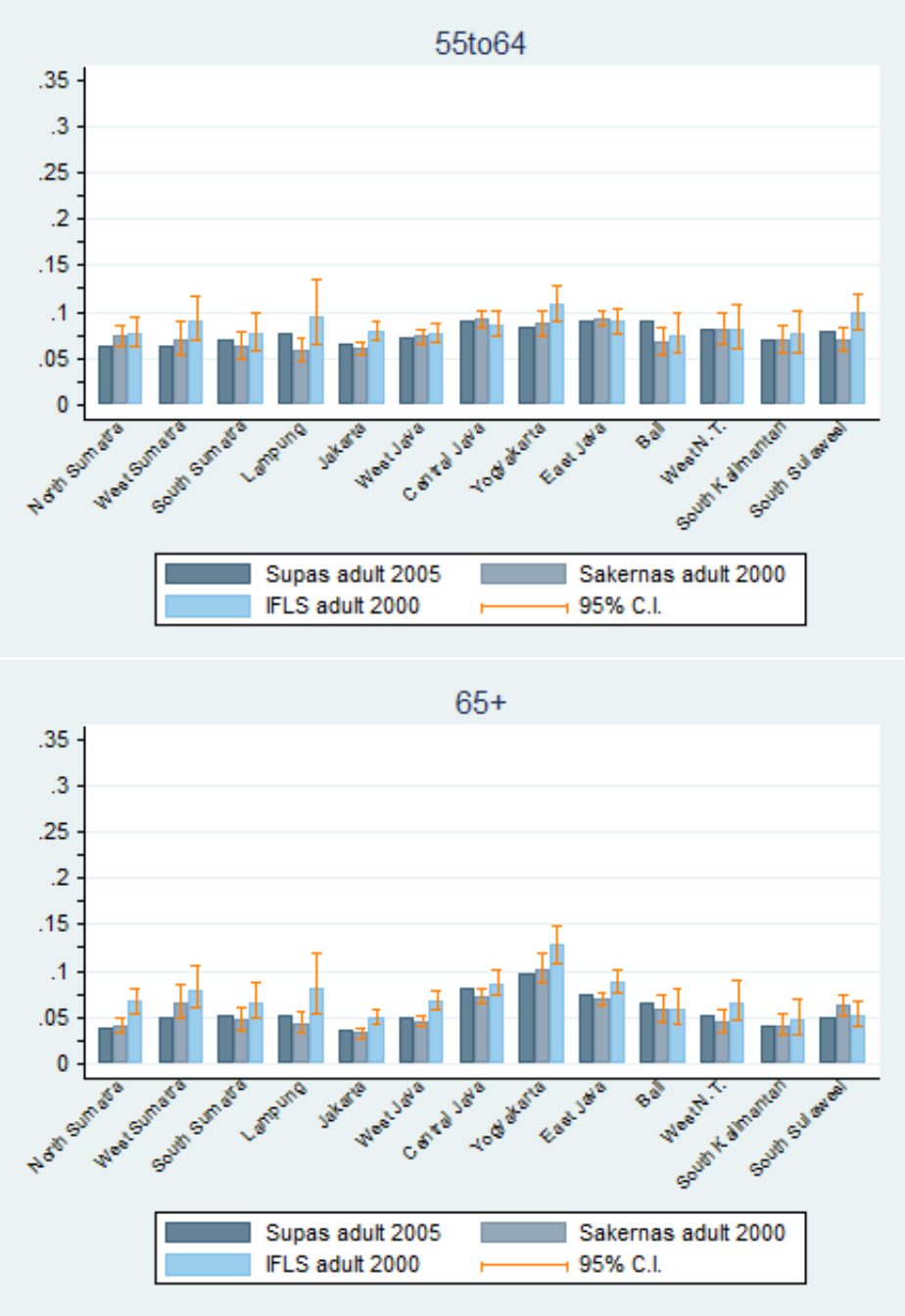
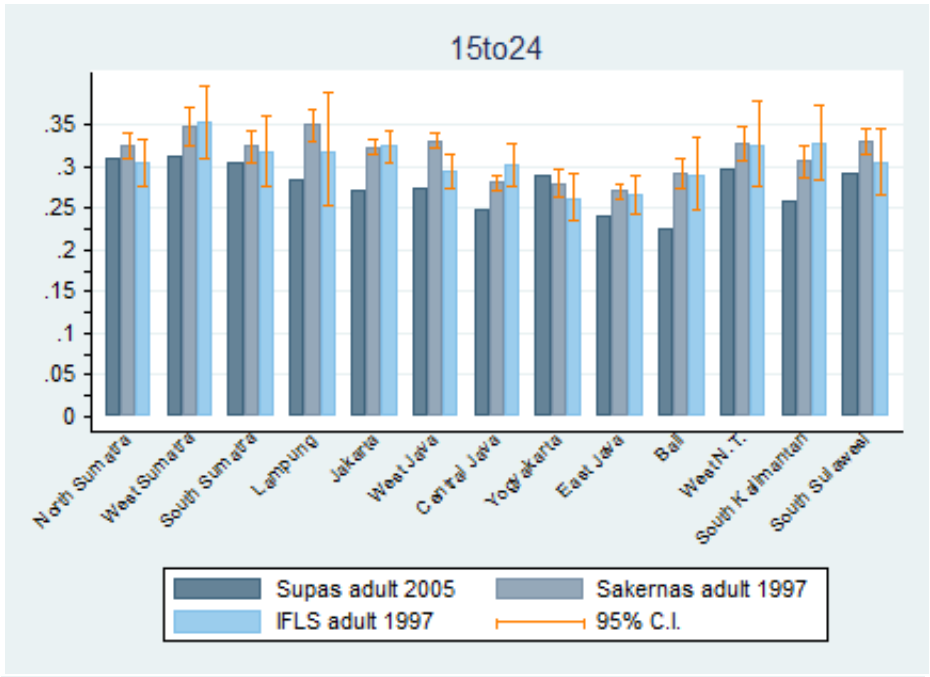
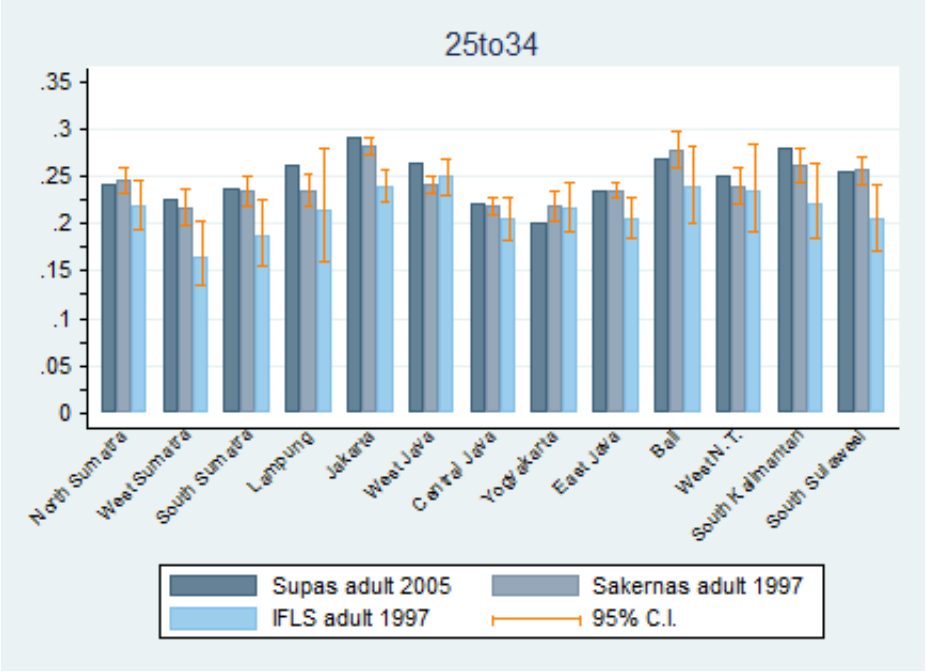
Bali
West N. T.
South Kalimantan
South Sulawesi
Supas adult 2005
Sakernas adult 2000
IFLS adult 2000
95% C.I.

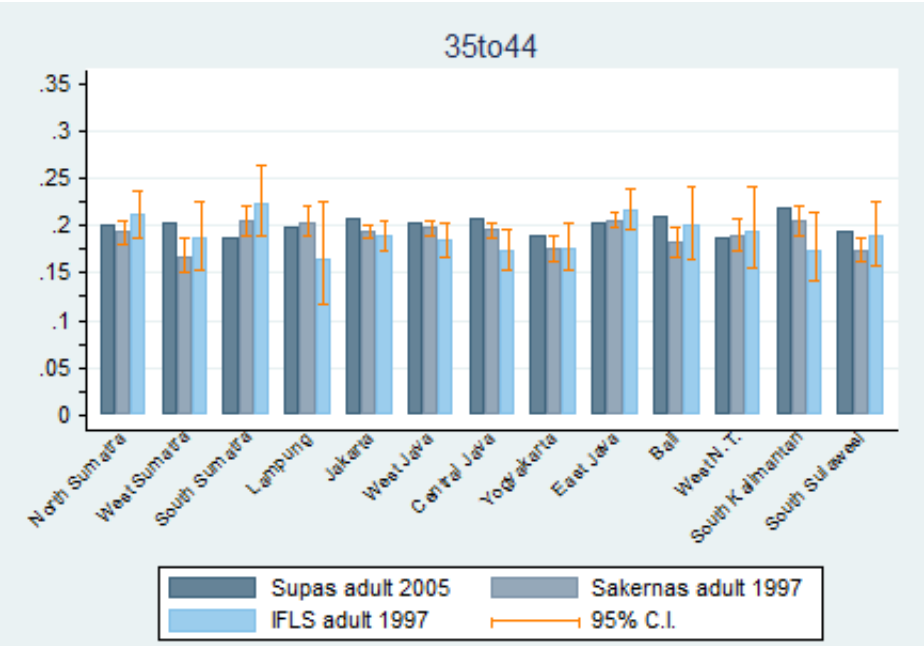


Notes: All means all individuals of all ages. Adults means individuals older than or equal to 15

Figure L.3: Age Distribution by Survey Urban 1997



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North Sumatra
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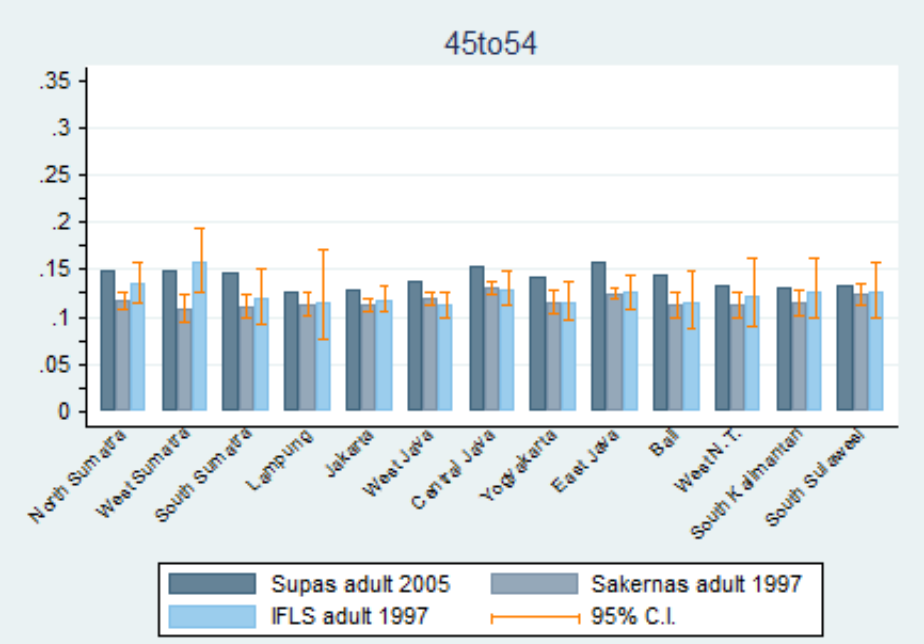
Lampung
Jakarta
West Java
Central Java
Yogyakarta
East Java
Bali
West N. T.
South Kalimantan
South Sulawesi
Supas adult 2005
Sakernas adult 1997
IFLS adult 1997
95% C.I.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Lampung
Jakarta
West Java
Central Java
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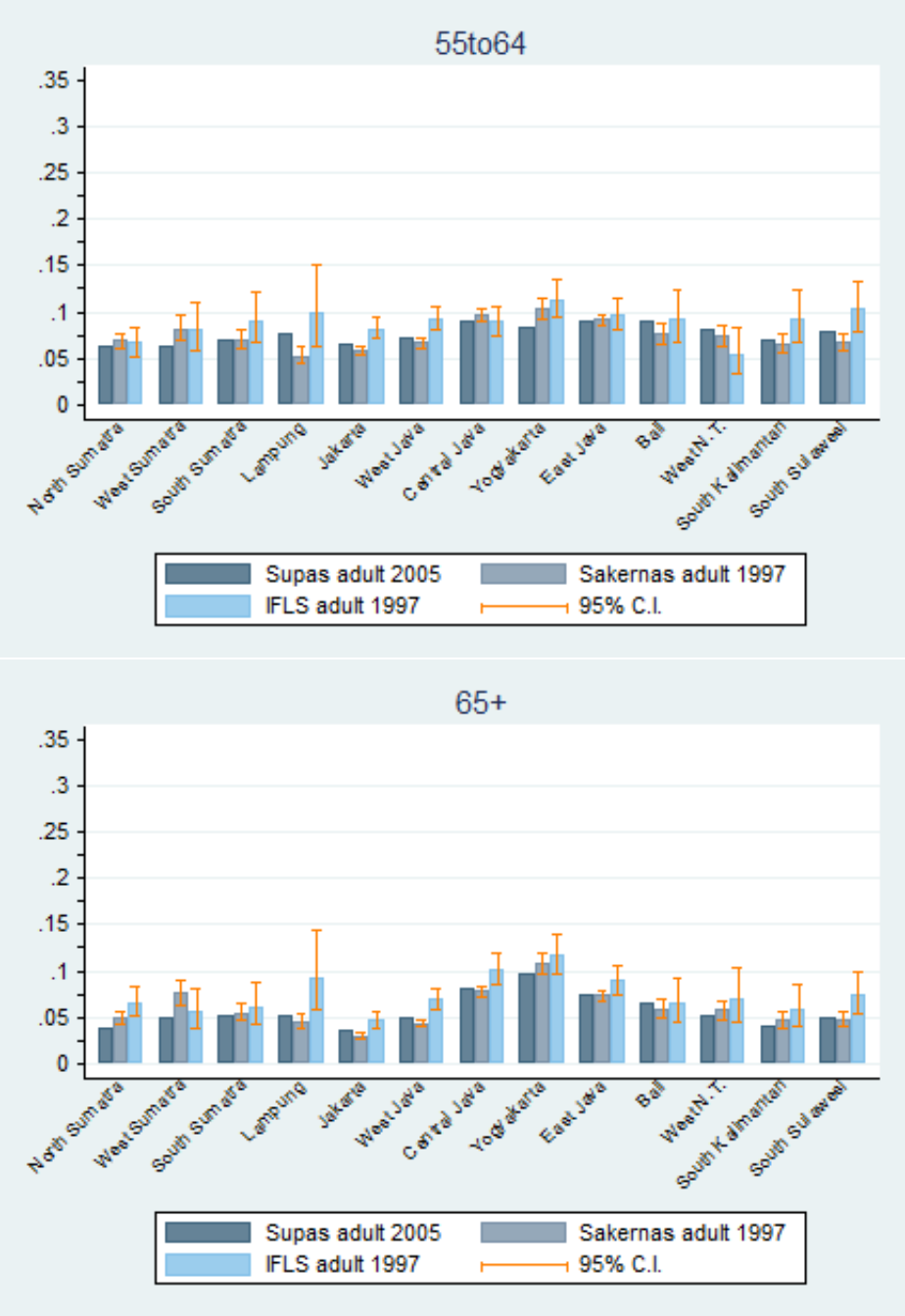
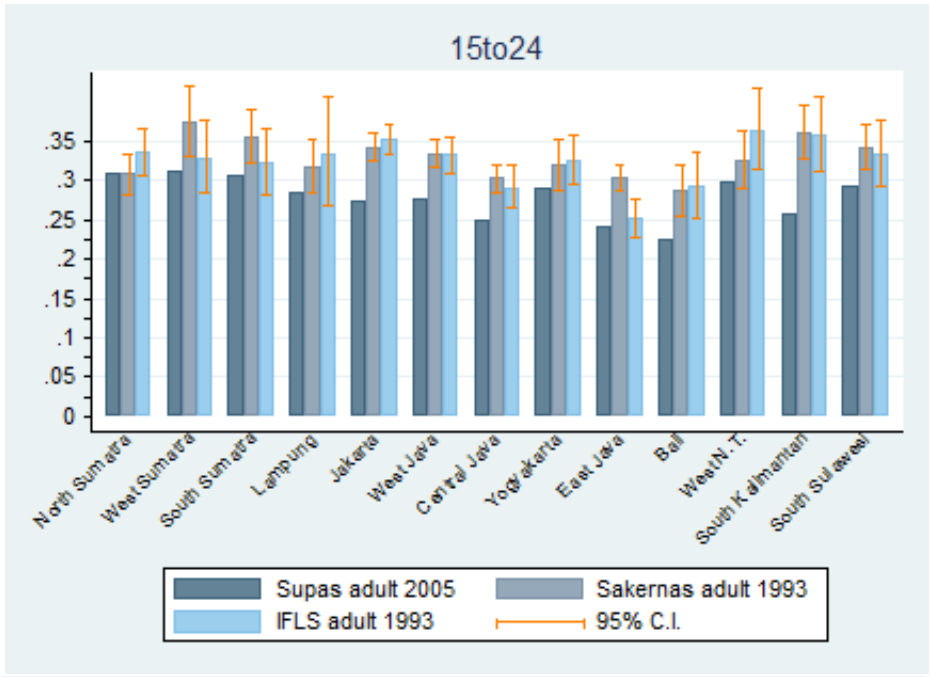
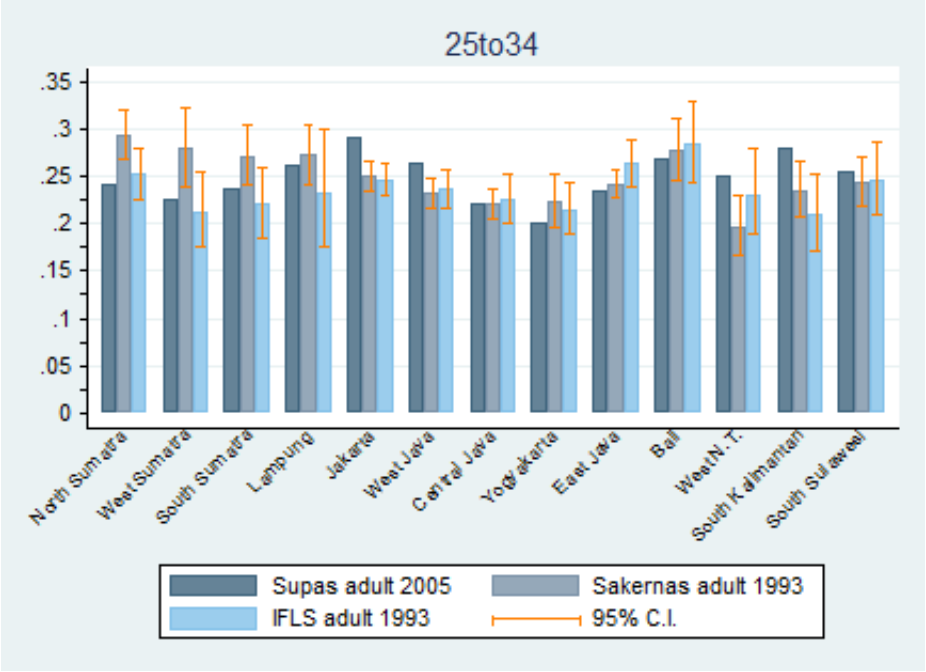
East Java
Bali
West N. T.
South Kalimantan
South Sulawesi
Supas adult 2005
Sakernas adult 1997
IFLS adult 1997
95% C.I.

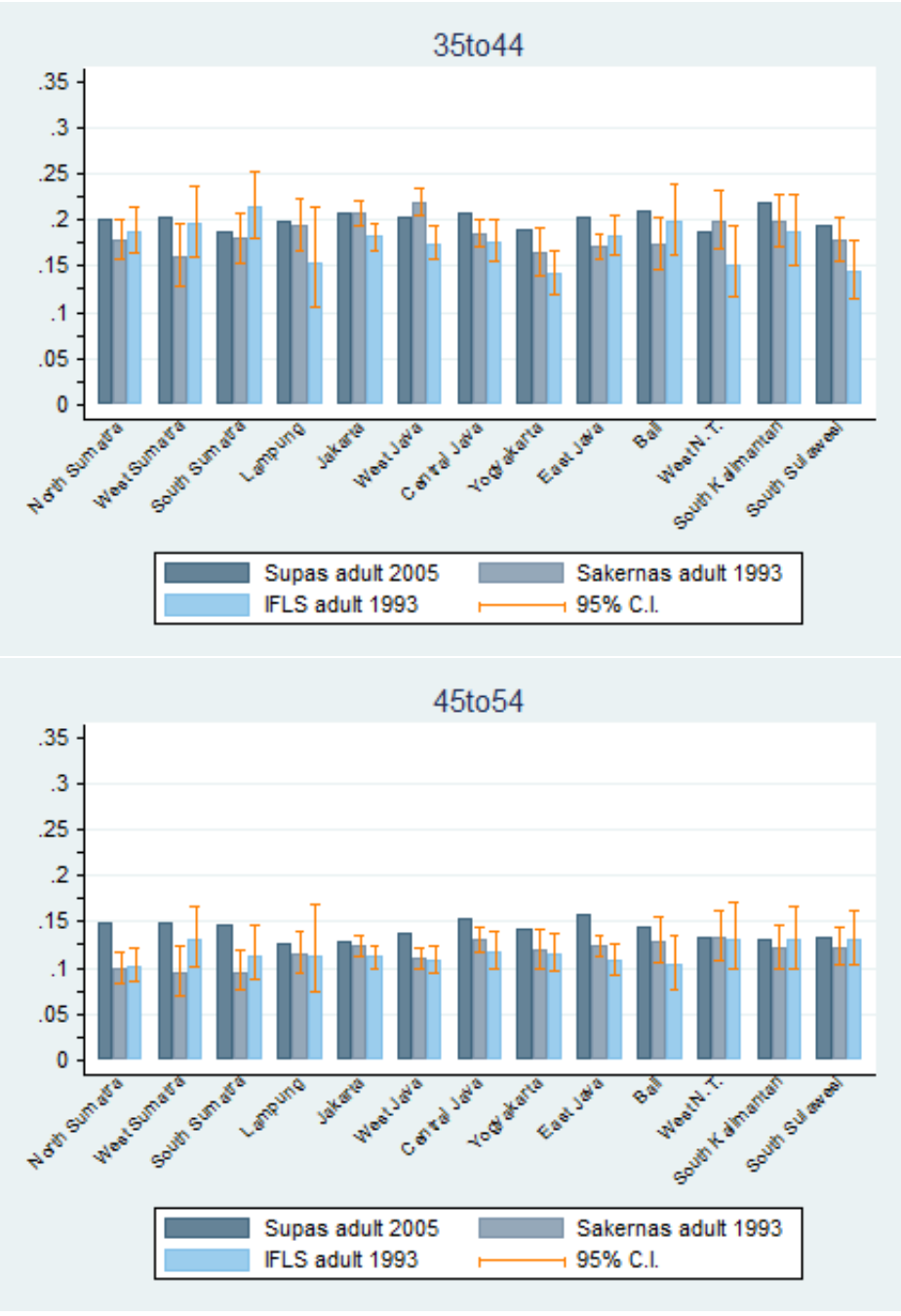


Notes: All means all individuals of all ages. Adults means individuals older than or equal to 15

Figure L.4: Age Distribution by Survey Urban 1993



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West Java
Central Java
Yogyakarta
East Java
Bali
West N. T.
South Kalimantan
South Sulawesi
Supas adult 2005
Sakernas adult 1993
IFLS adult 1993
95% C.I.
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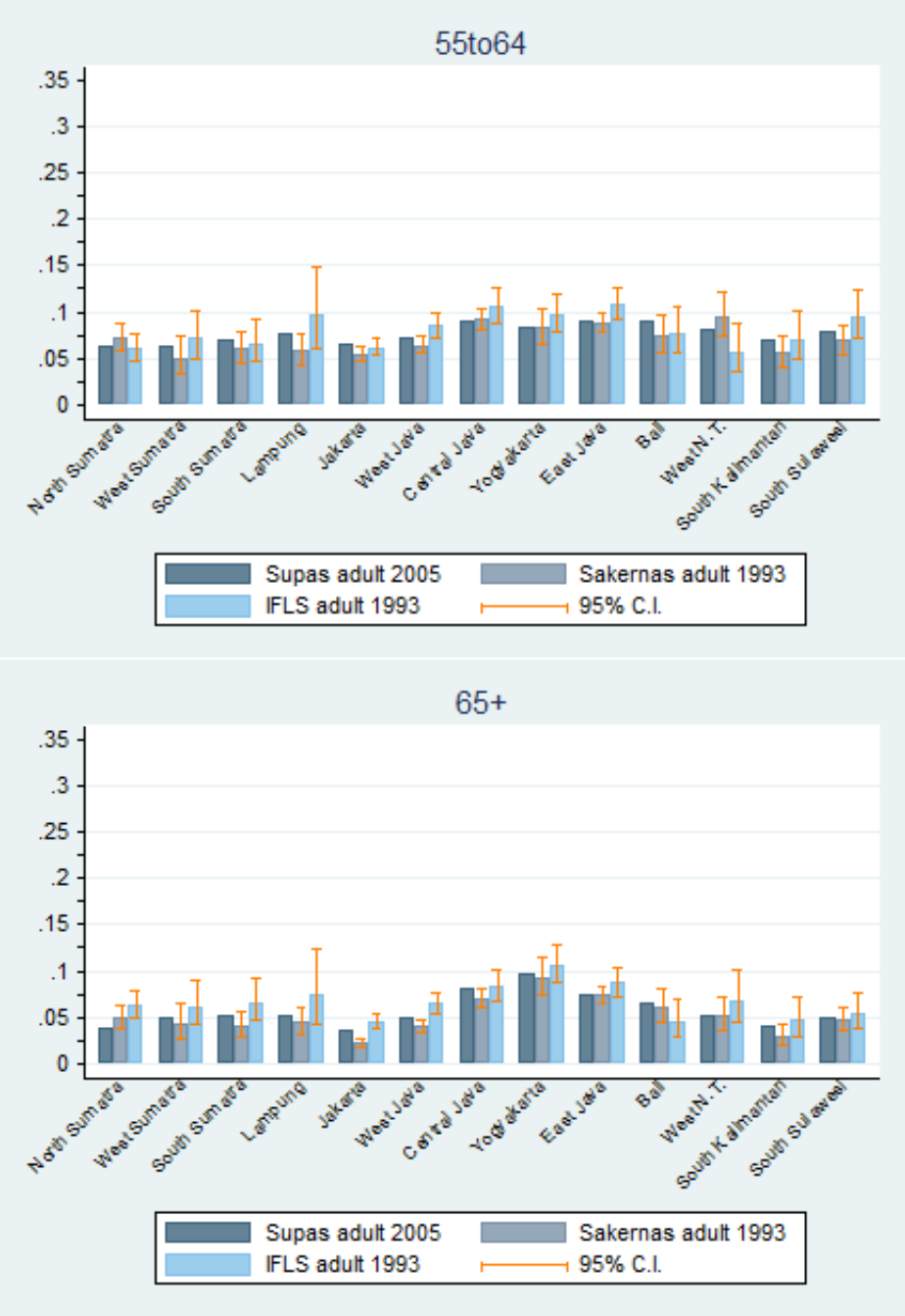
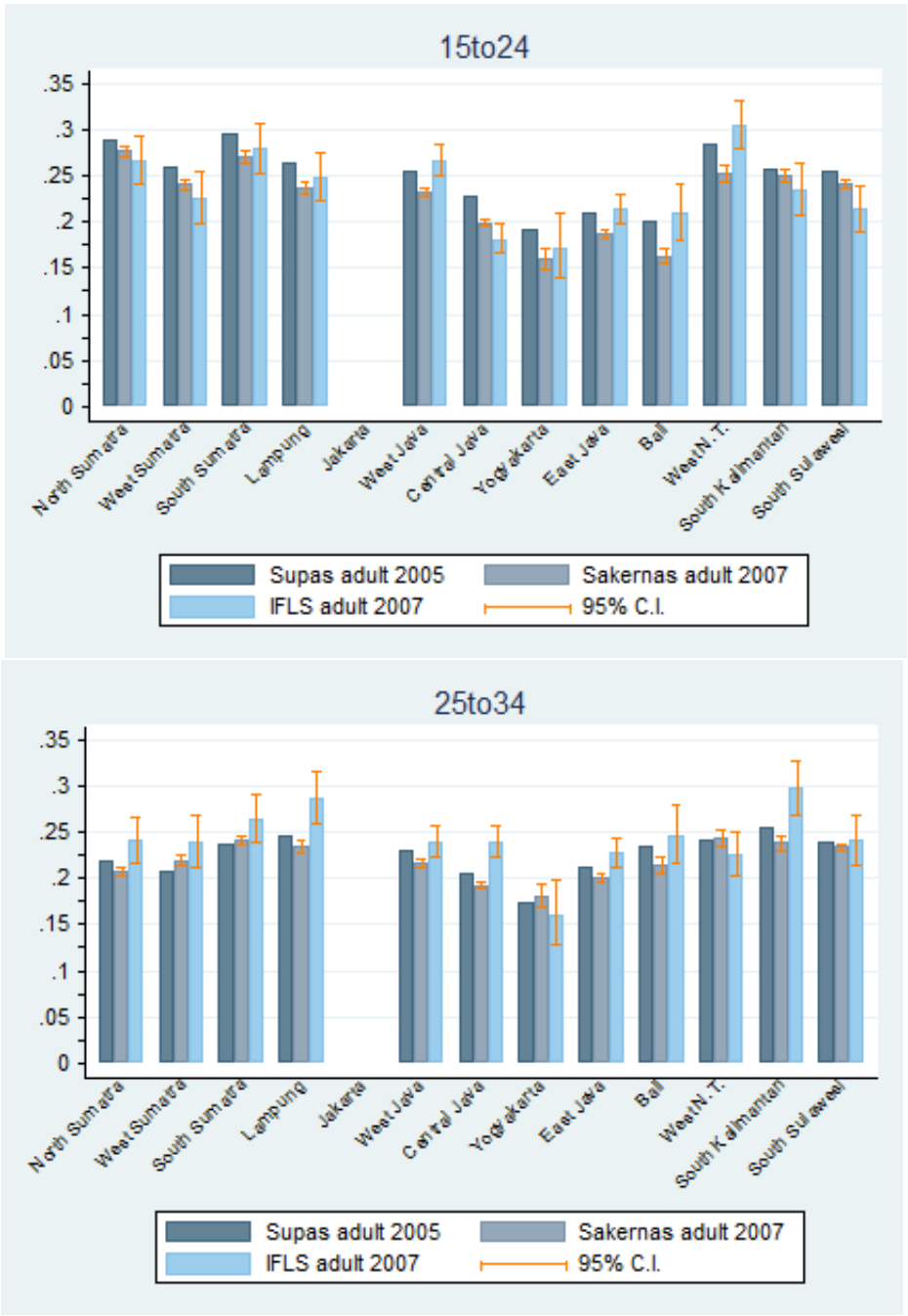
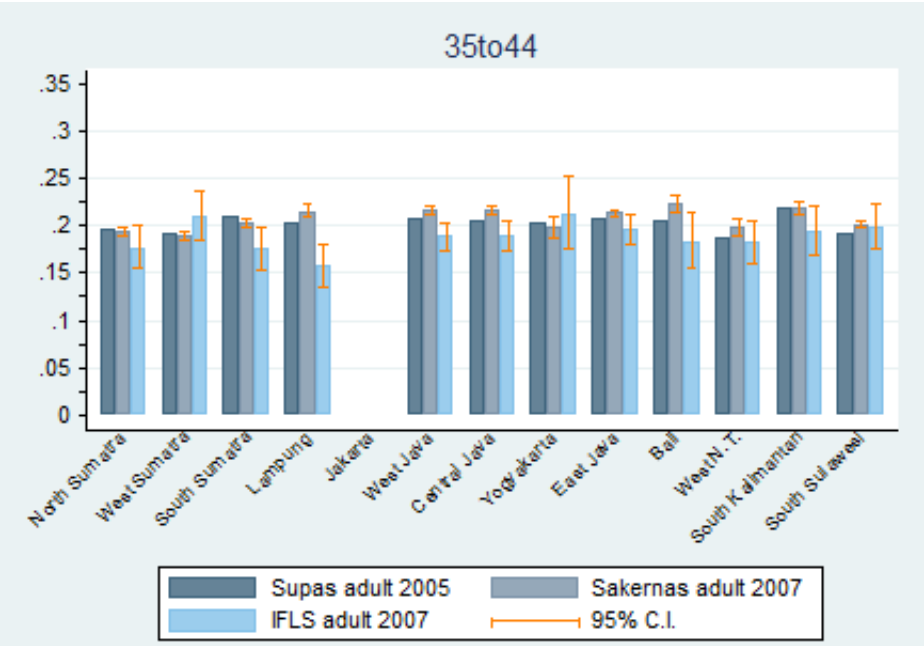
Supas adult 2005
Sakernas adult 1993
IFLS adult 1993
95% C.I.



Notes: All means all individuals of all ages. Adults means individuals older than or equal to 15

Figure L.5: Age Distribution by Survey Rural 2007

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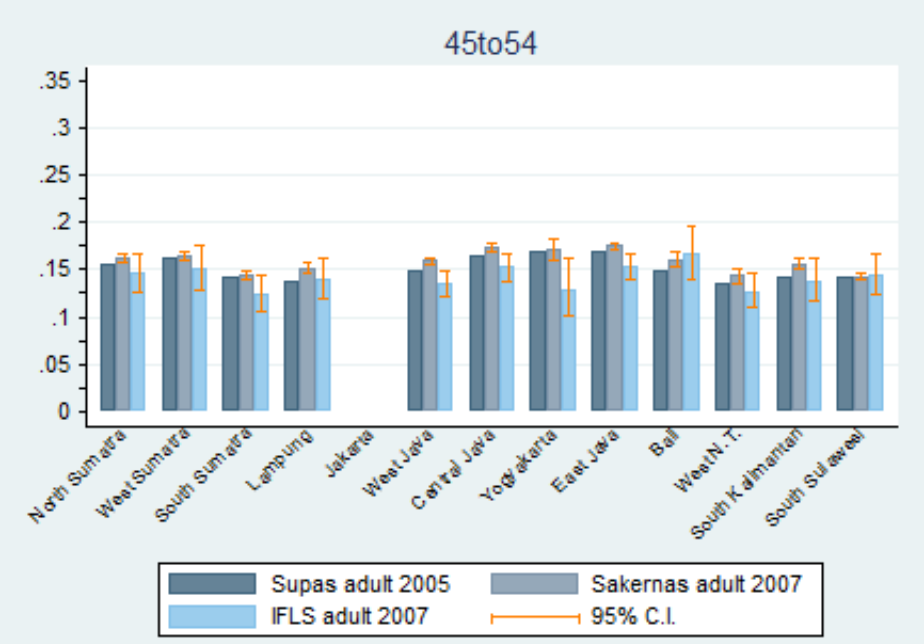
Central Java
Yogyakarta
East Java
Bali
West N. T.
South Kalimantan
South Sulawesi
Supas adult 2005
Sakernas adult 2007
IFLS adult 2007
95% C.I.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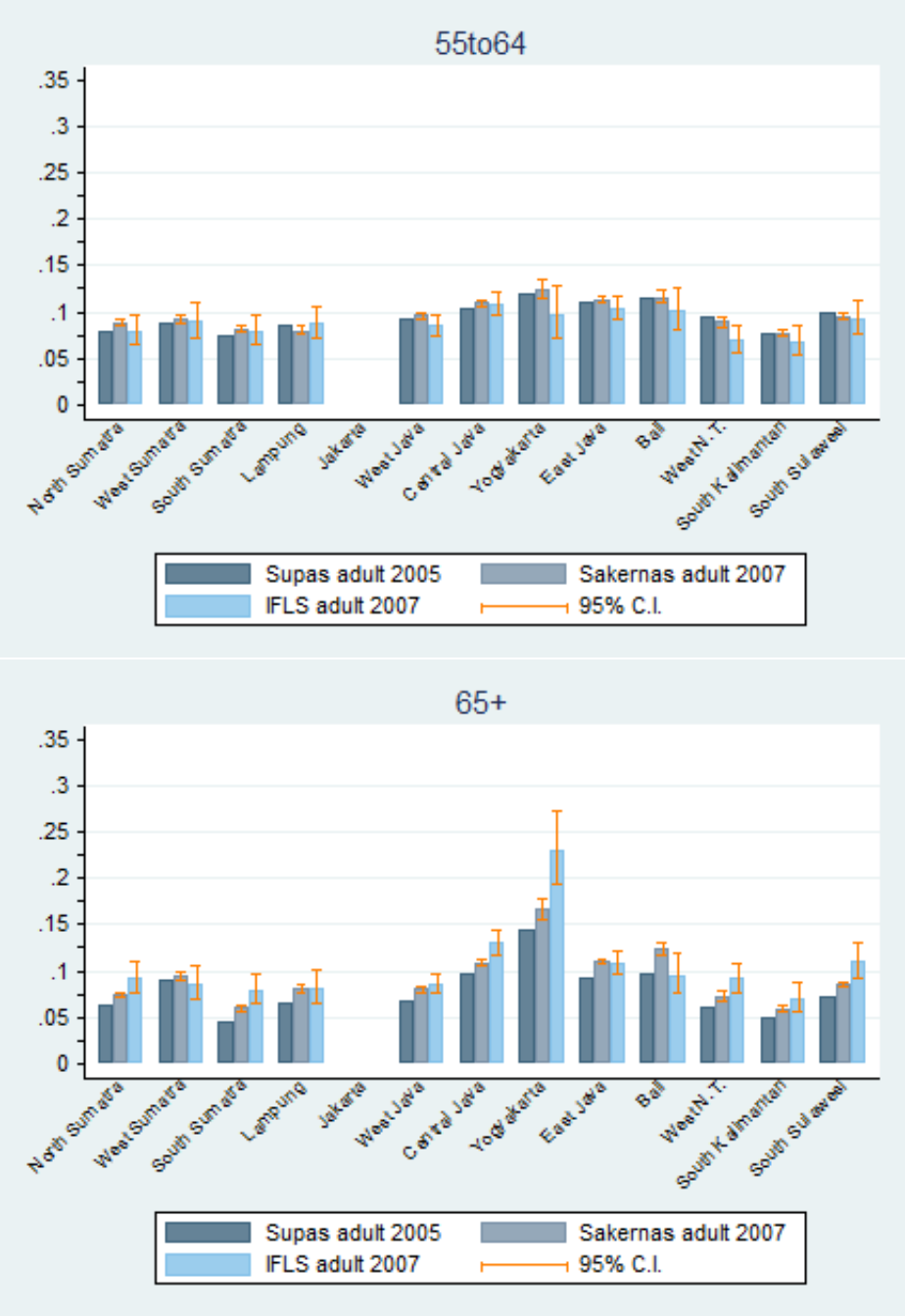
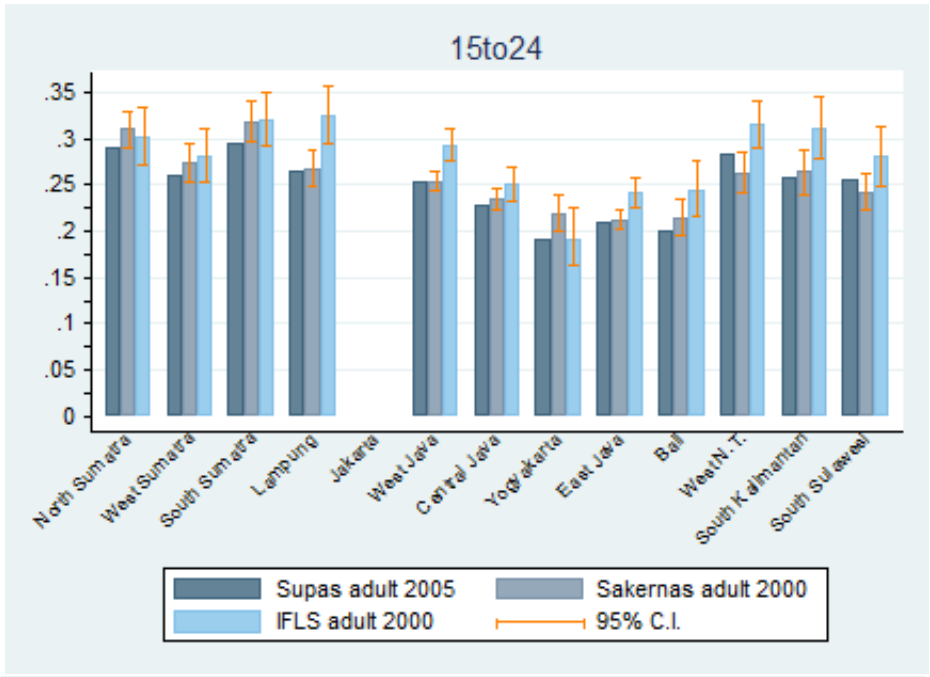
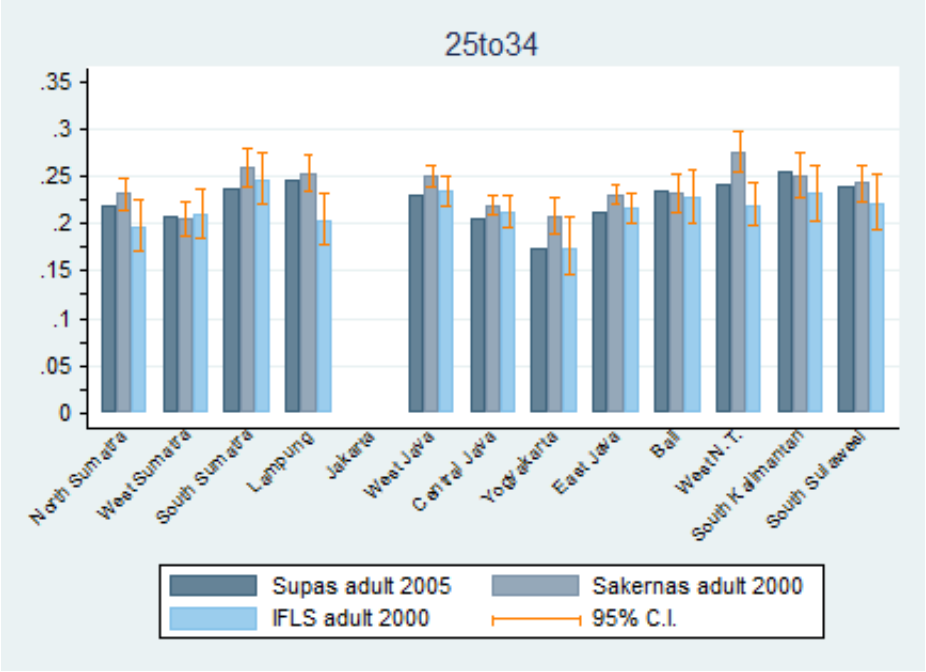
Bali
West N. T.
South Kalimantan
South Sulawesi
Supas adult 2005
Sakernas adult 2007
IFLS adult 2007
95% C.I.

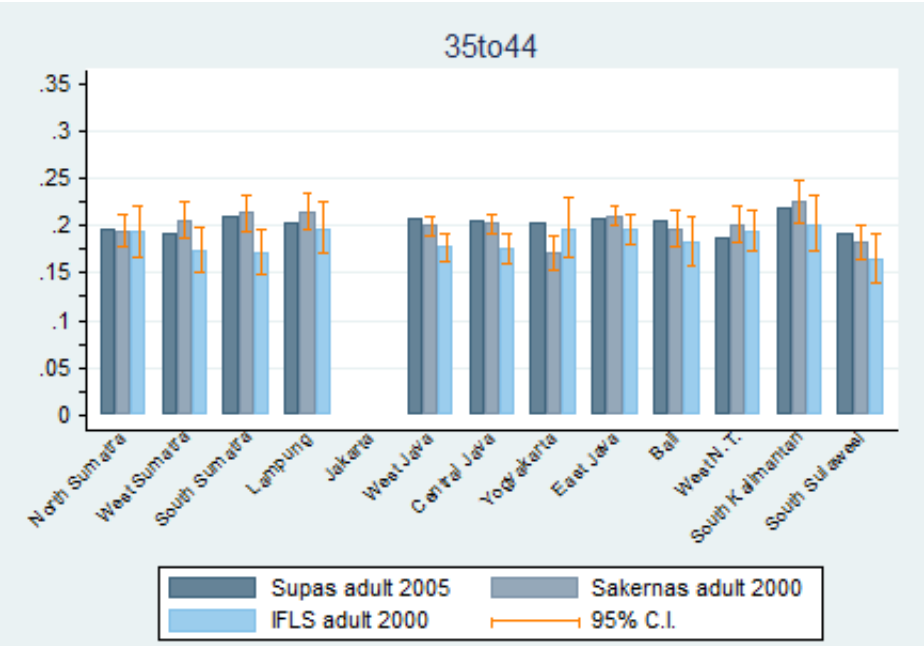


Notes: All means all individuals of all ages. Adults means individuals older than or equal to 15

Figure L.6: Age Distribution by Survey Rural 2000



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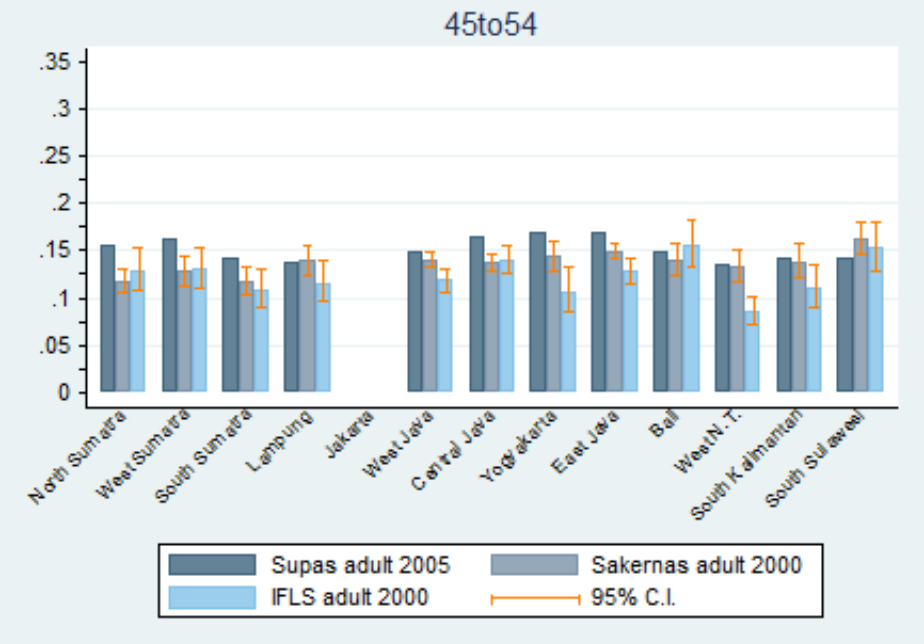
Jakarta
West Java
Central Java
Yogyakarta
East Java
Bali
West N. T.
South Kalimantan
South Sulawesi
Supas adult 2005
Sakernas adult 2000
IFLS adult 2000
95% C.I.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Central Java
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West N. T.
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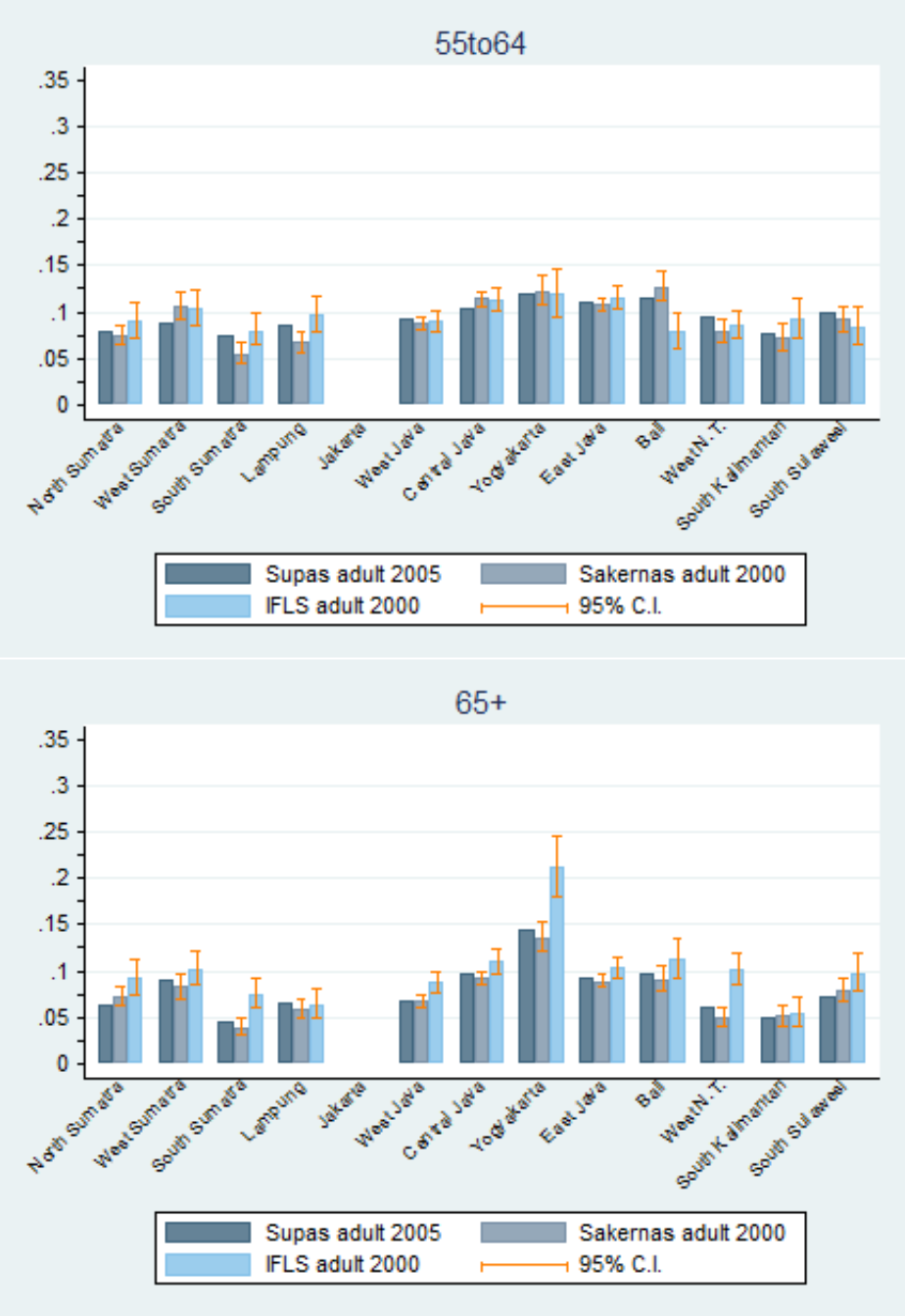
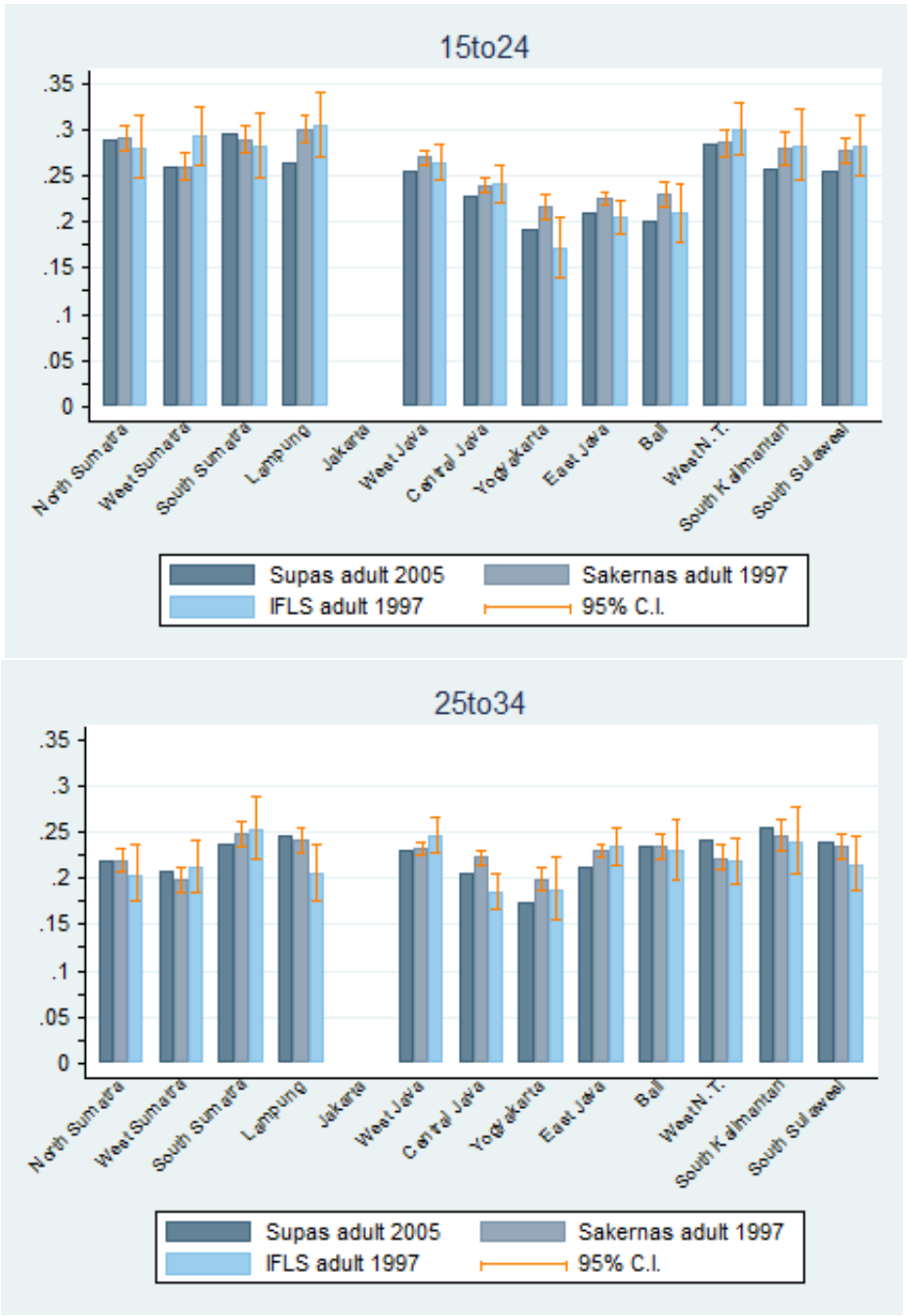
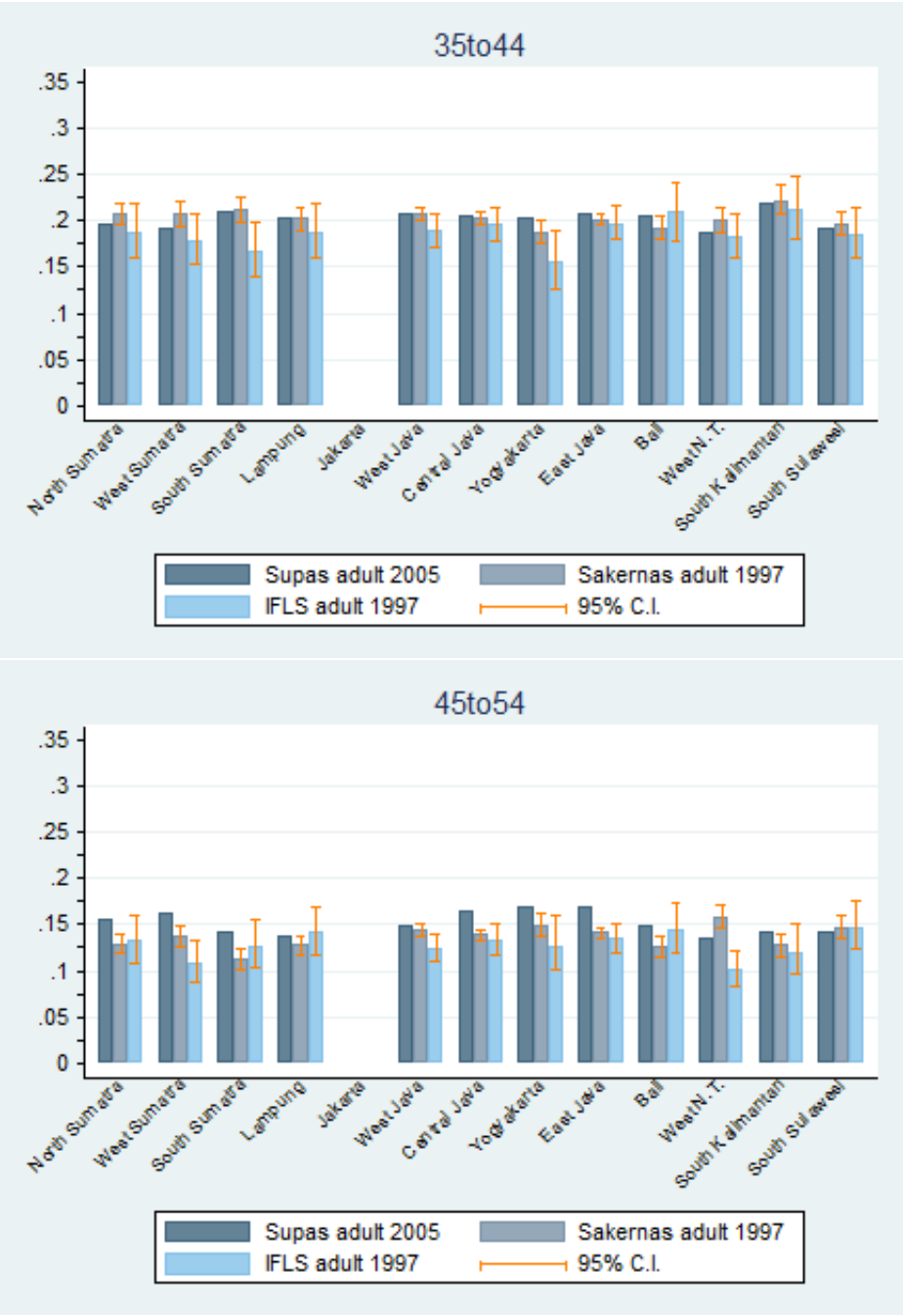
South Sulawesi
Supas adult 2005
Sakernas adult 2000
IFLS adult 2000
95% C.I.



Notes: All means all individuals of all ages. Adults means individuals older than or equal to 15

Figure L.7: Age Distribution by Survey Rural 1997

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Central Java
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Bali
West N. T.
South Kalimantan
South Sulawesi
Supas adult 2005
Sakernas adult 1997
IFLS adult 1997
95% C.I.
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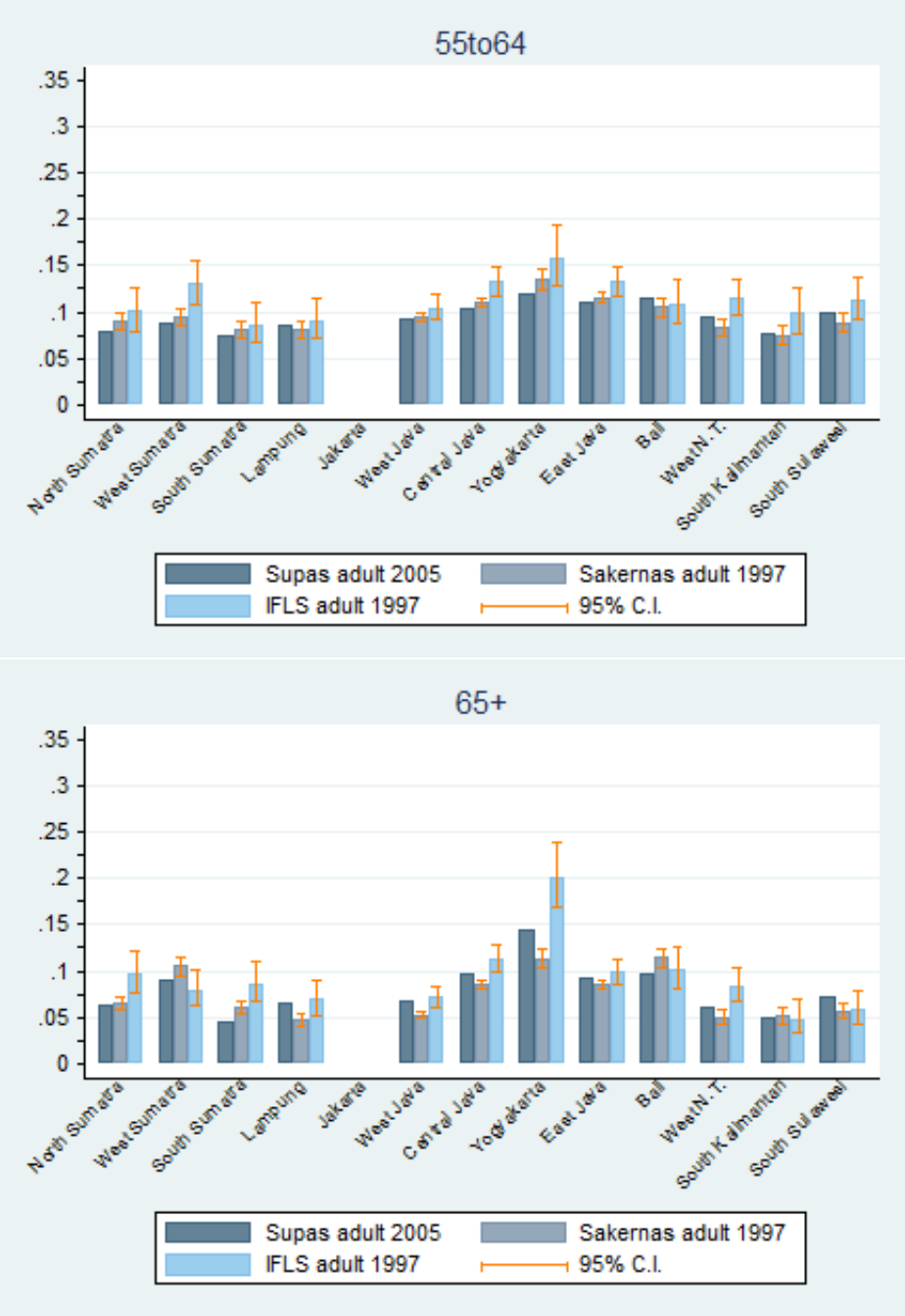
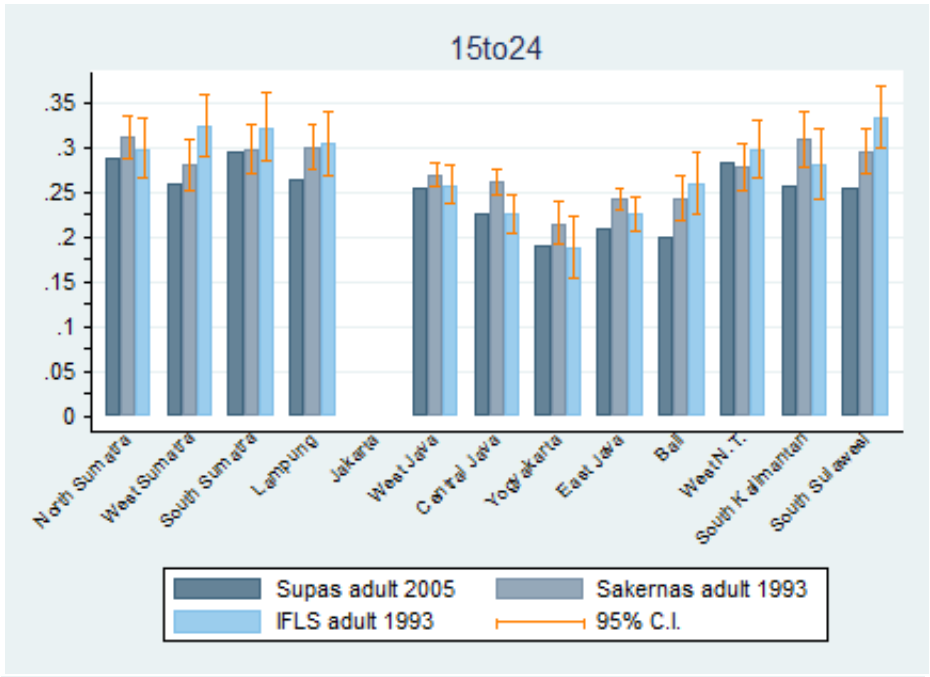
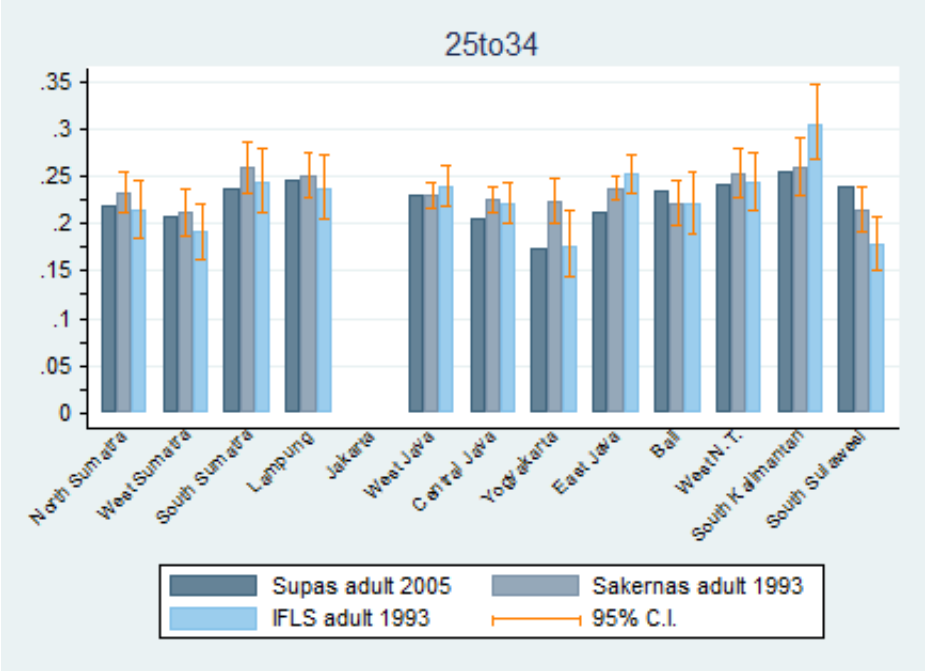
South Sulawesi
Supas adult 2005
Sakernas adult 1997
IFLS adult 1997
95% C.I.

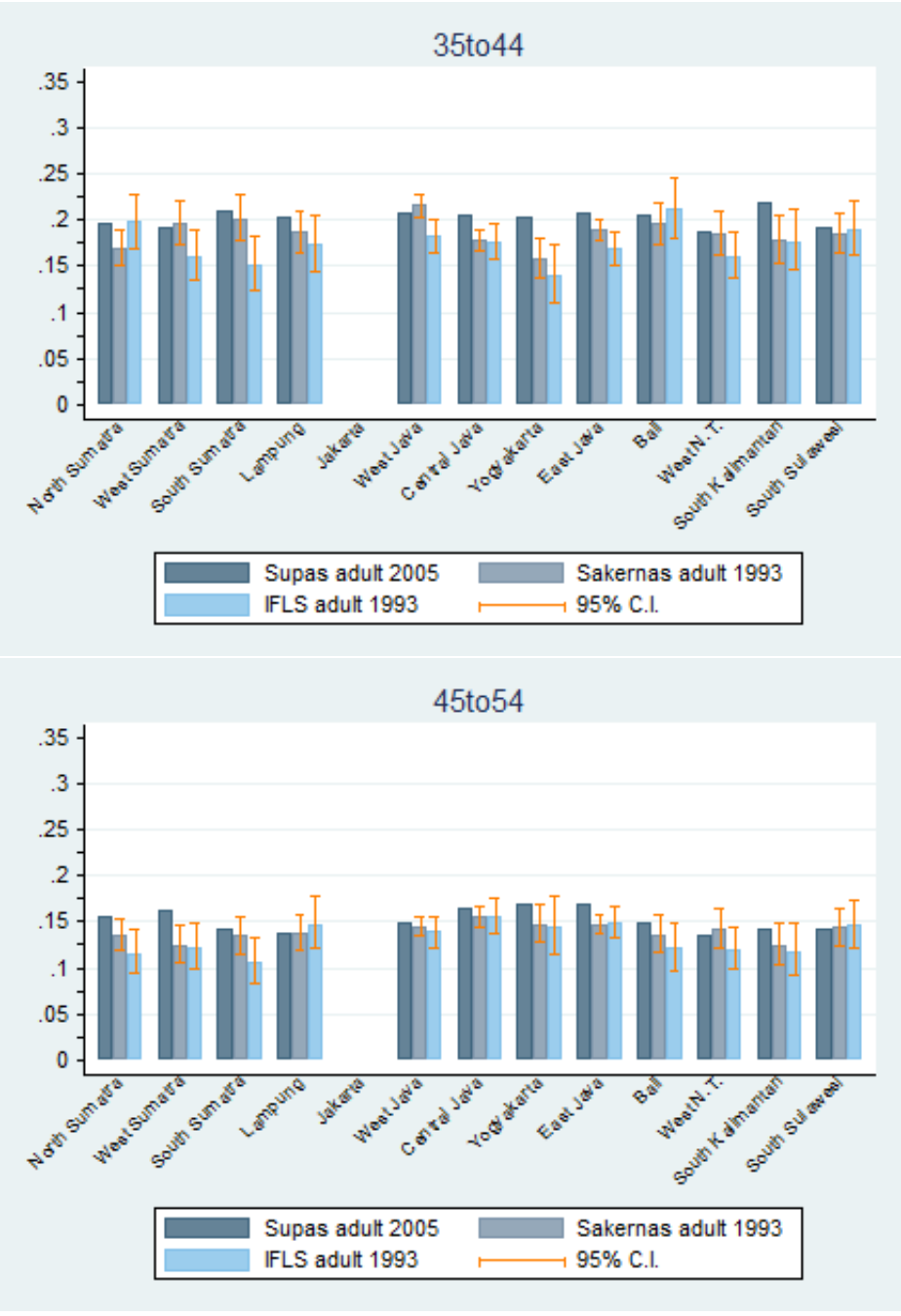


Notes: All means all individuals of all ages. Adults means individuals older than or equal to 15

Figure L.8: Age Distribution by Survey Rural 1993



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Central Java
Yogyakarta
East Java
Bali
West N. T.
South Kalimantan
South Sulawesi
Supas adult 2005
Sakernas adult 1993
IFLS adult 1993
95% C.I.
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Lampung
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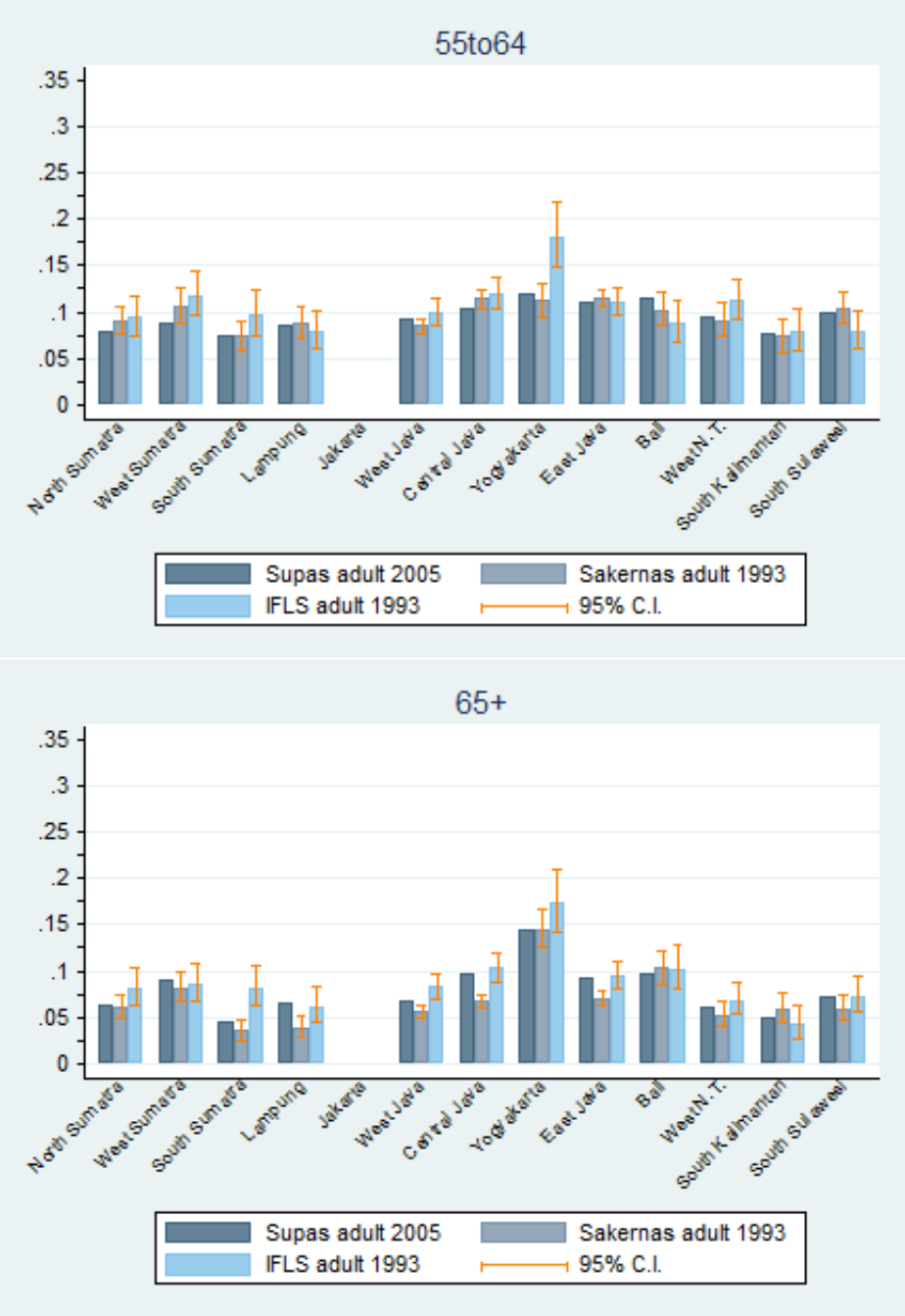
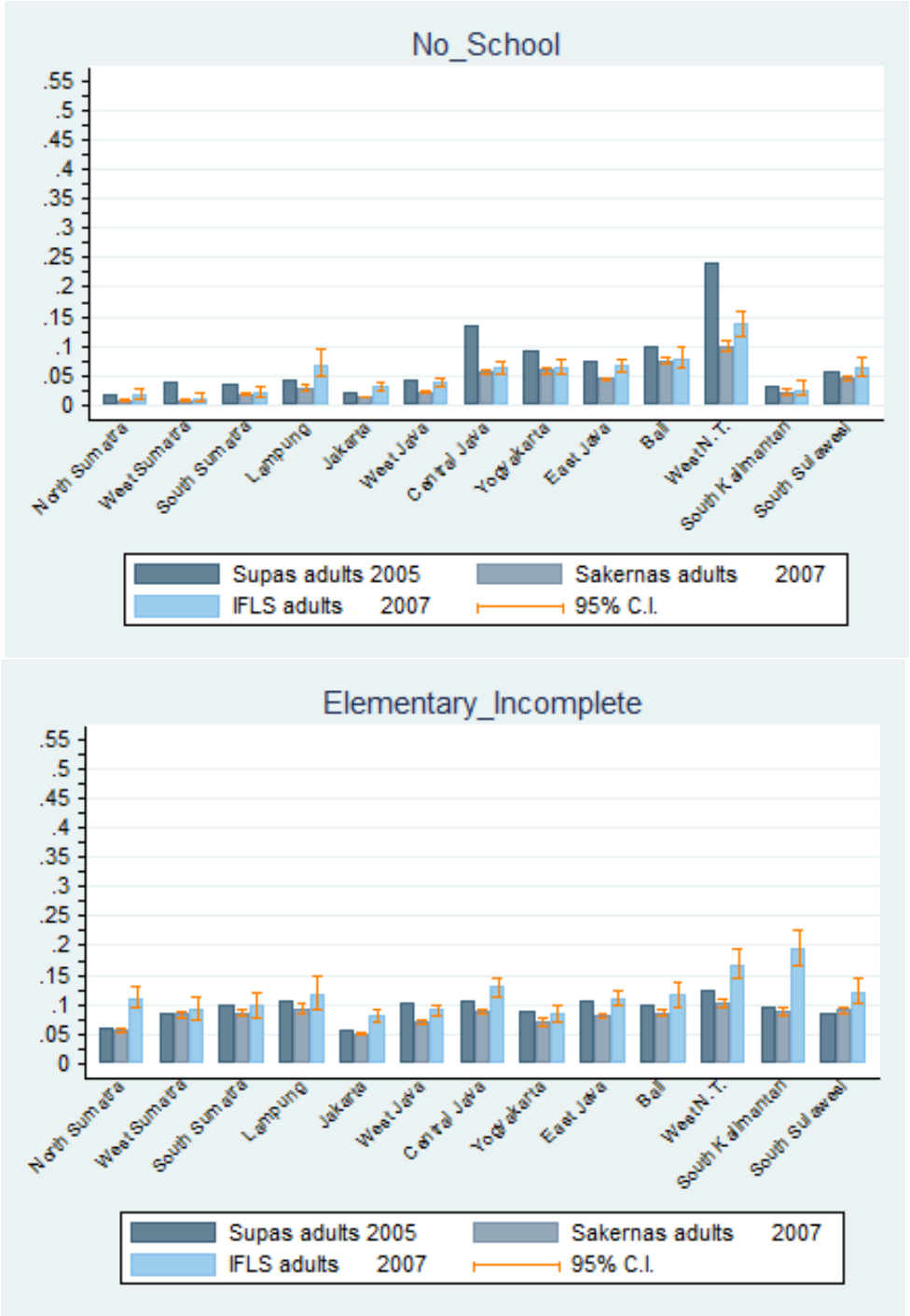
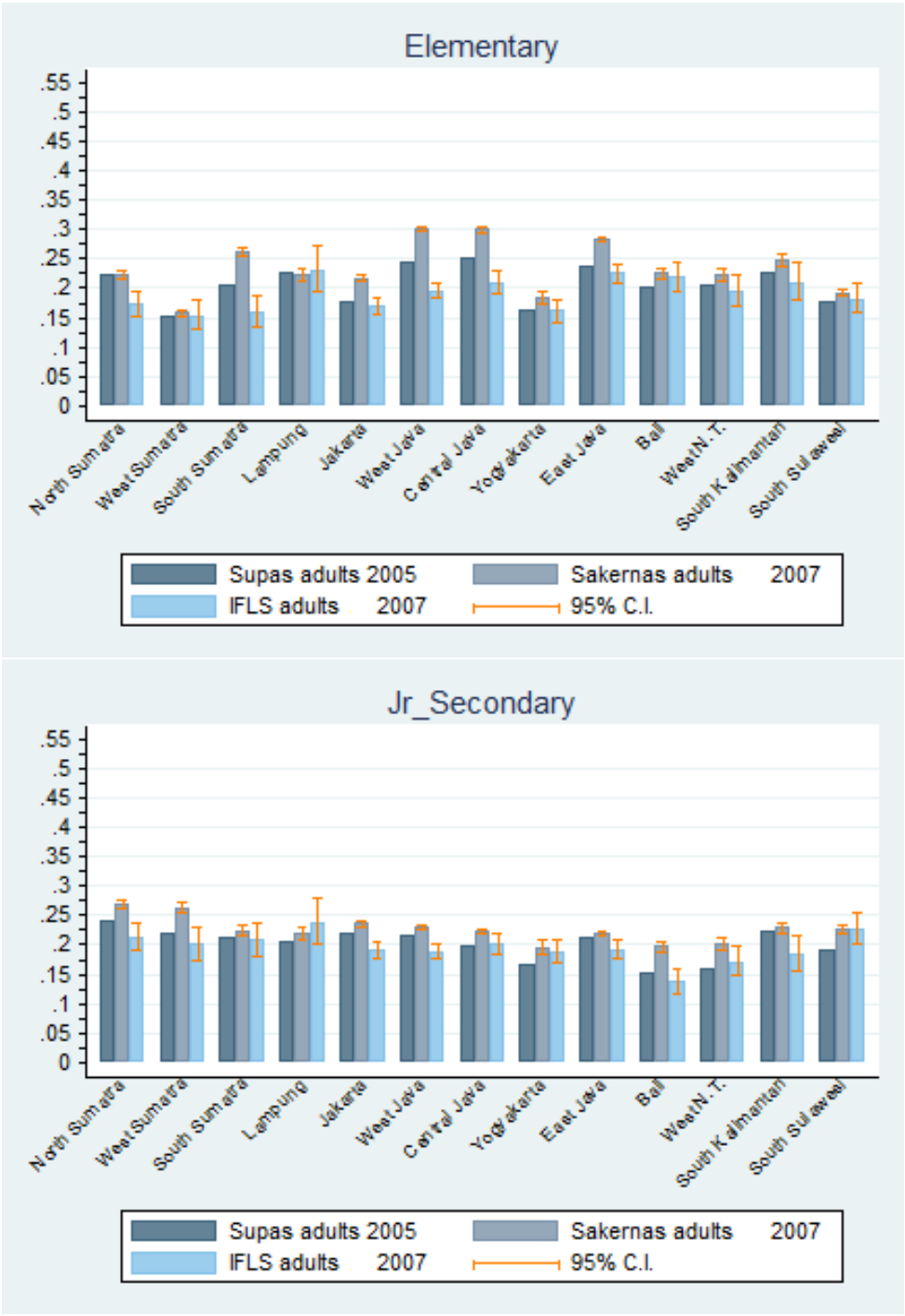
South Sulawesi
Supas adult 2005
Sakernas adult 1993
IFLS adult 1993
95% C.I.



Notes: All means all individuals of all ages. Adults means individuals older than or equal to 15

Figure L.9: Education Distribution by Survey Urban 2007

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West Java
Central Java
Yogyakarta
East Java
Bali
West N. T.
South Kalimantan
South Sulawesi
Supas adults 2005
Sakernas adults 2007
IFLS adults 2007
95% C.I.
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South Sumatra
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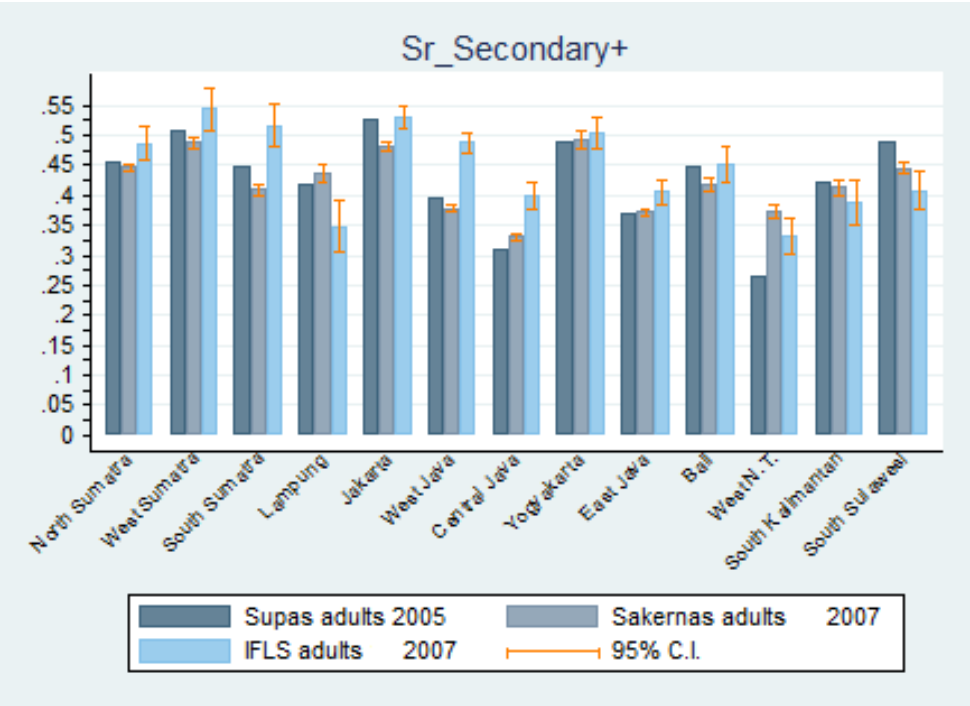
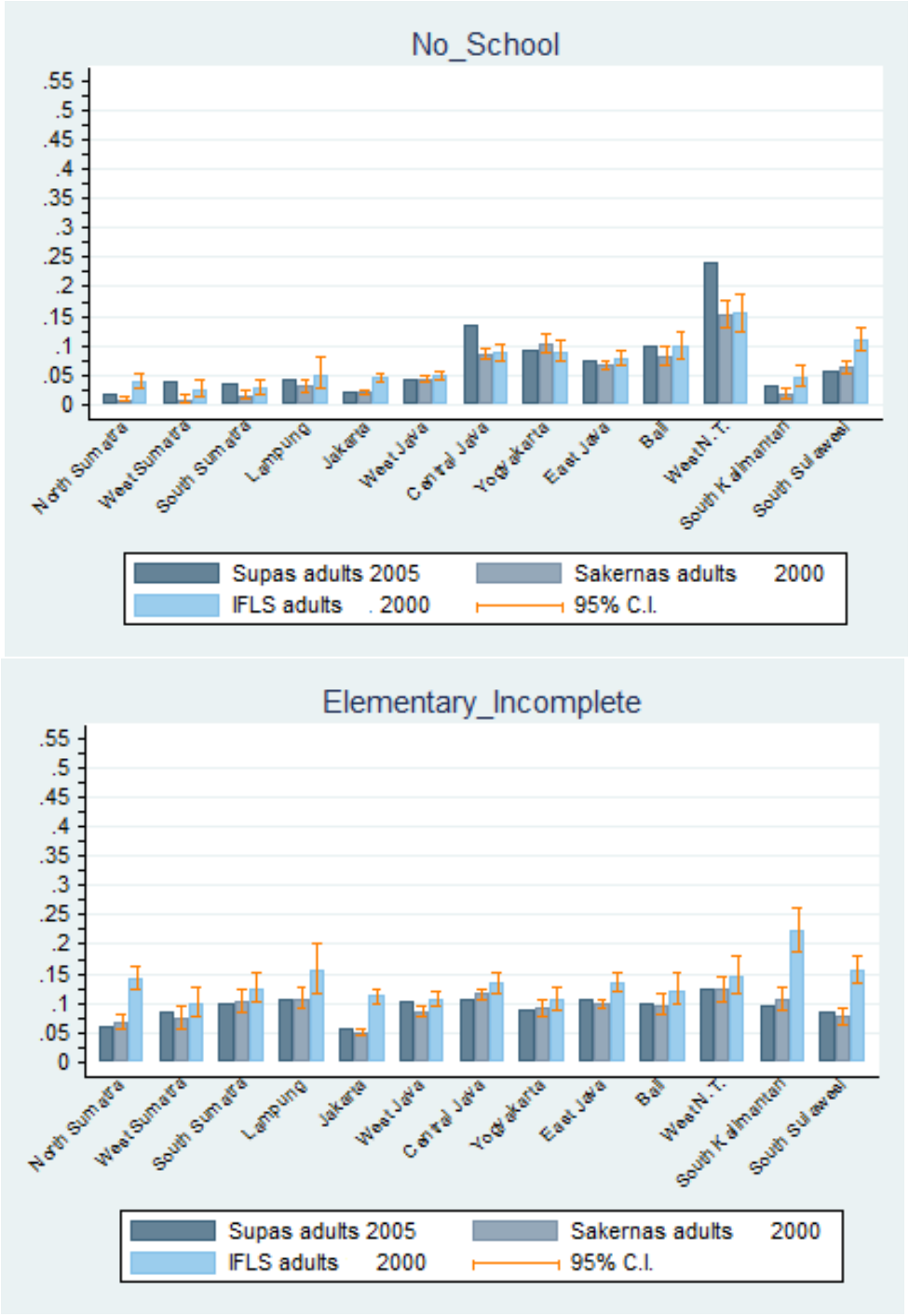
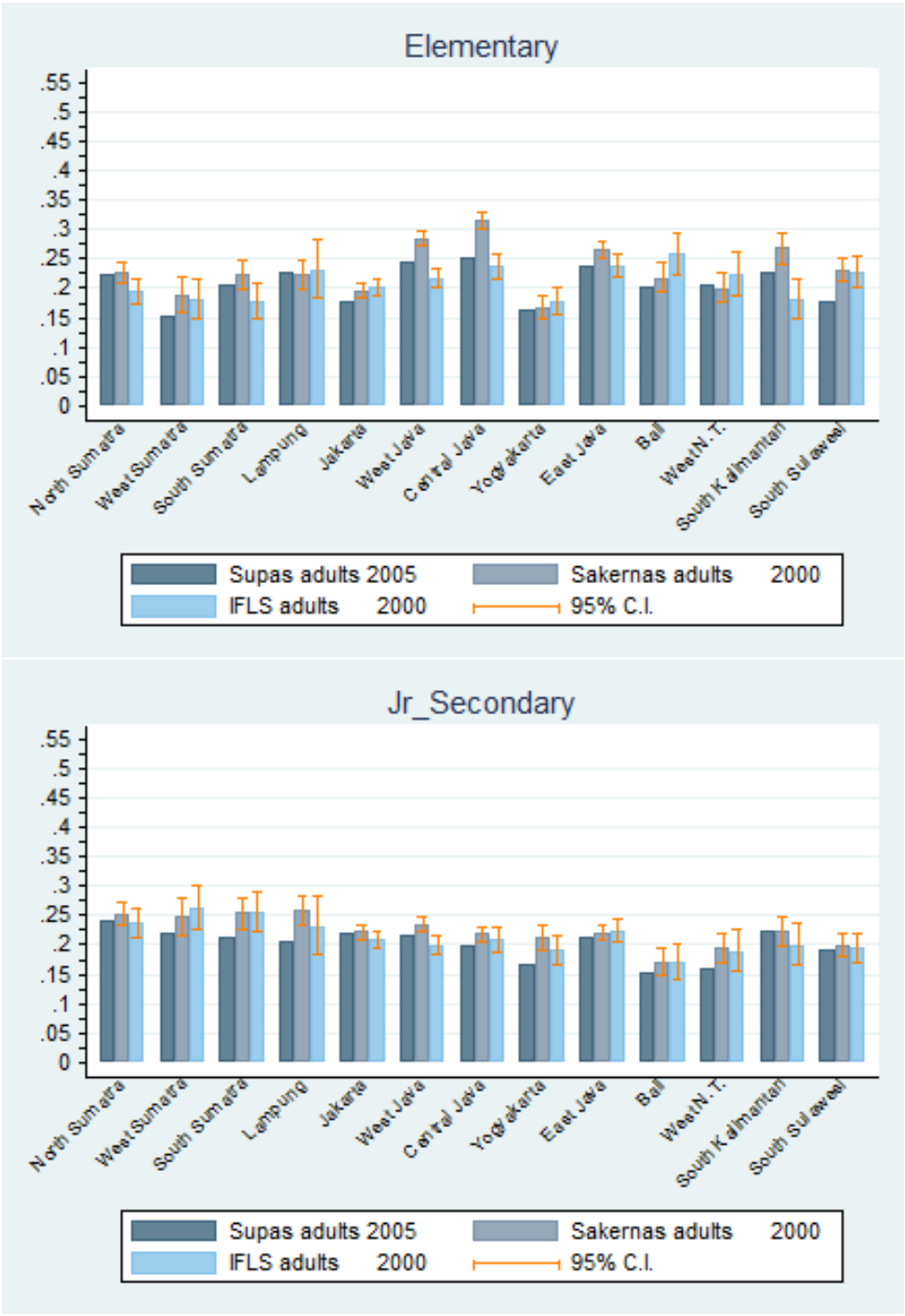
West Java
Central Java
Yogyakarta
East Java
Bali
West N. T.
South Kalimantan
South Sulawesi
Supas adults 2005
Sakernas adults 2007
IFLS adults 2007
95% C.I.



Notes: All means all individuals of all ages. Adults means individuals older than or equal to 15

Figure L.10: Education Distribution by Survey Urban 2000

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Central Java
Yogyakarta
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Bali
West N. T.
South Kalimantan
South Sulawesi
Supas adults 2005
Sakernas adults 2000
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South Kalimantan
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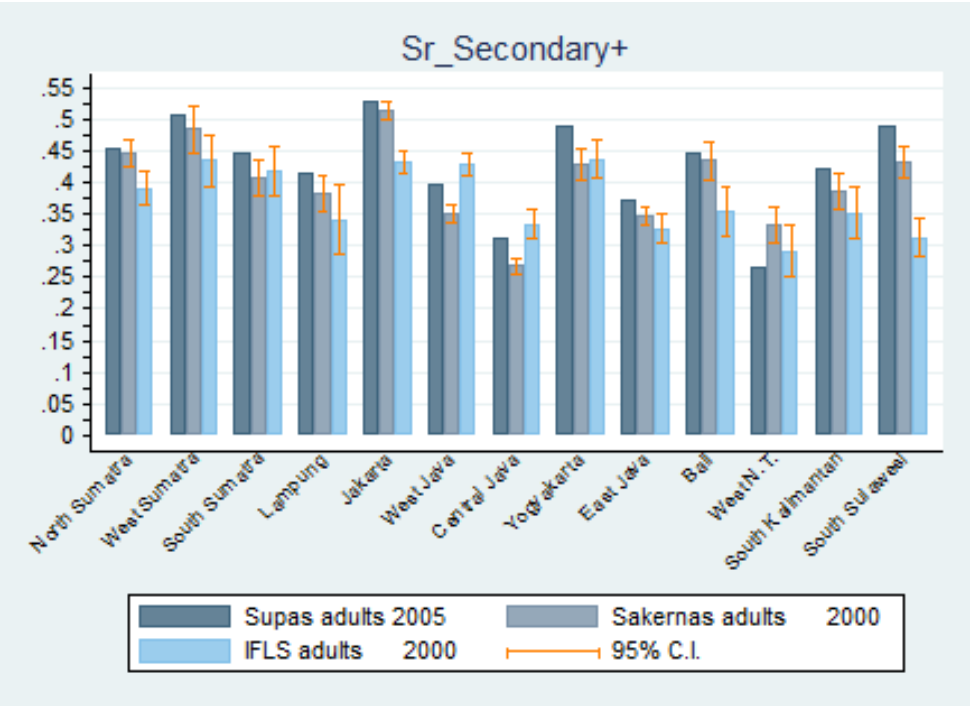
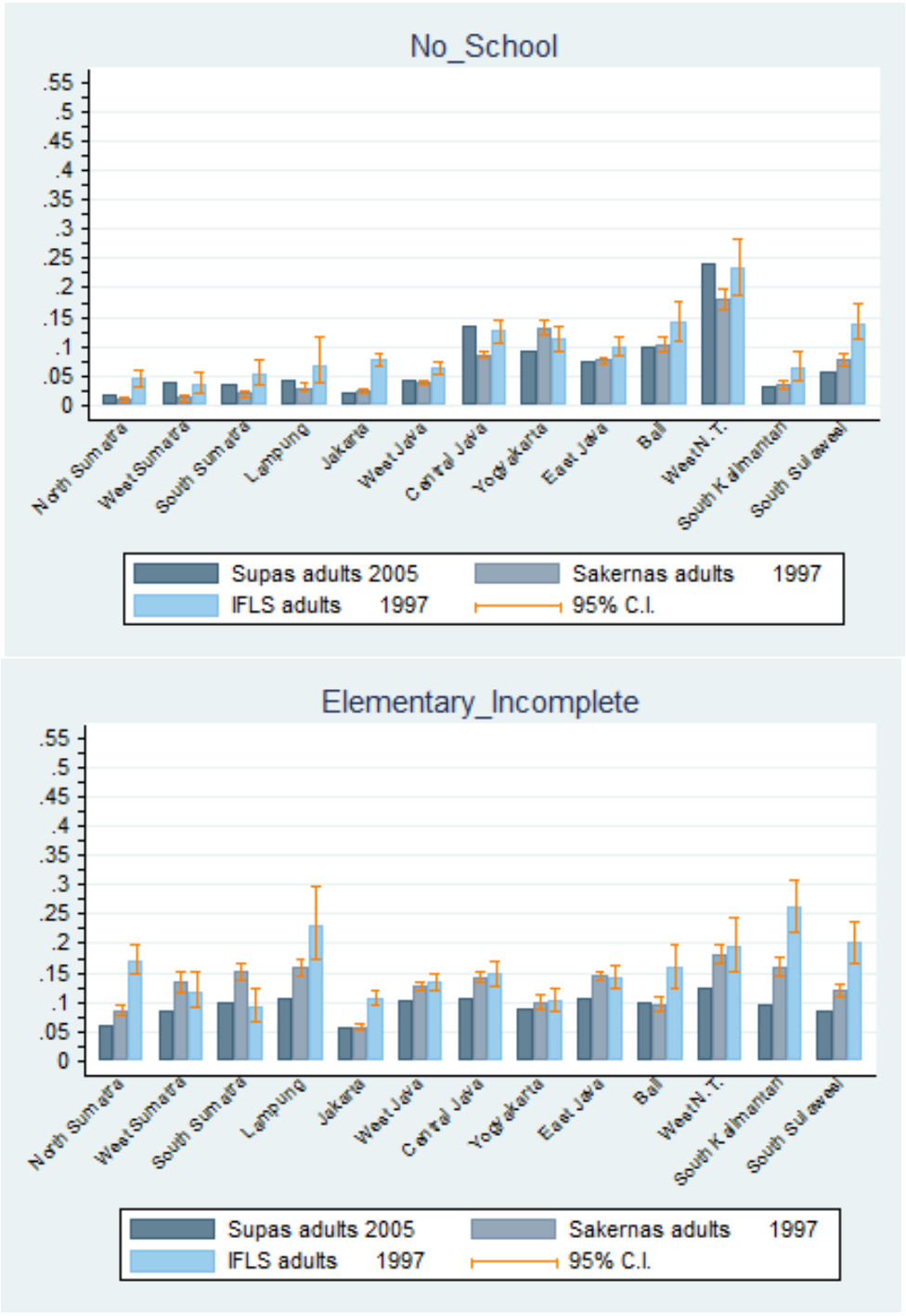
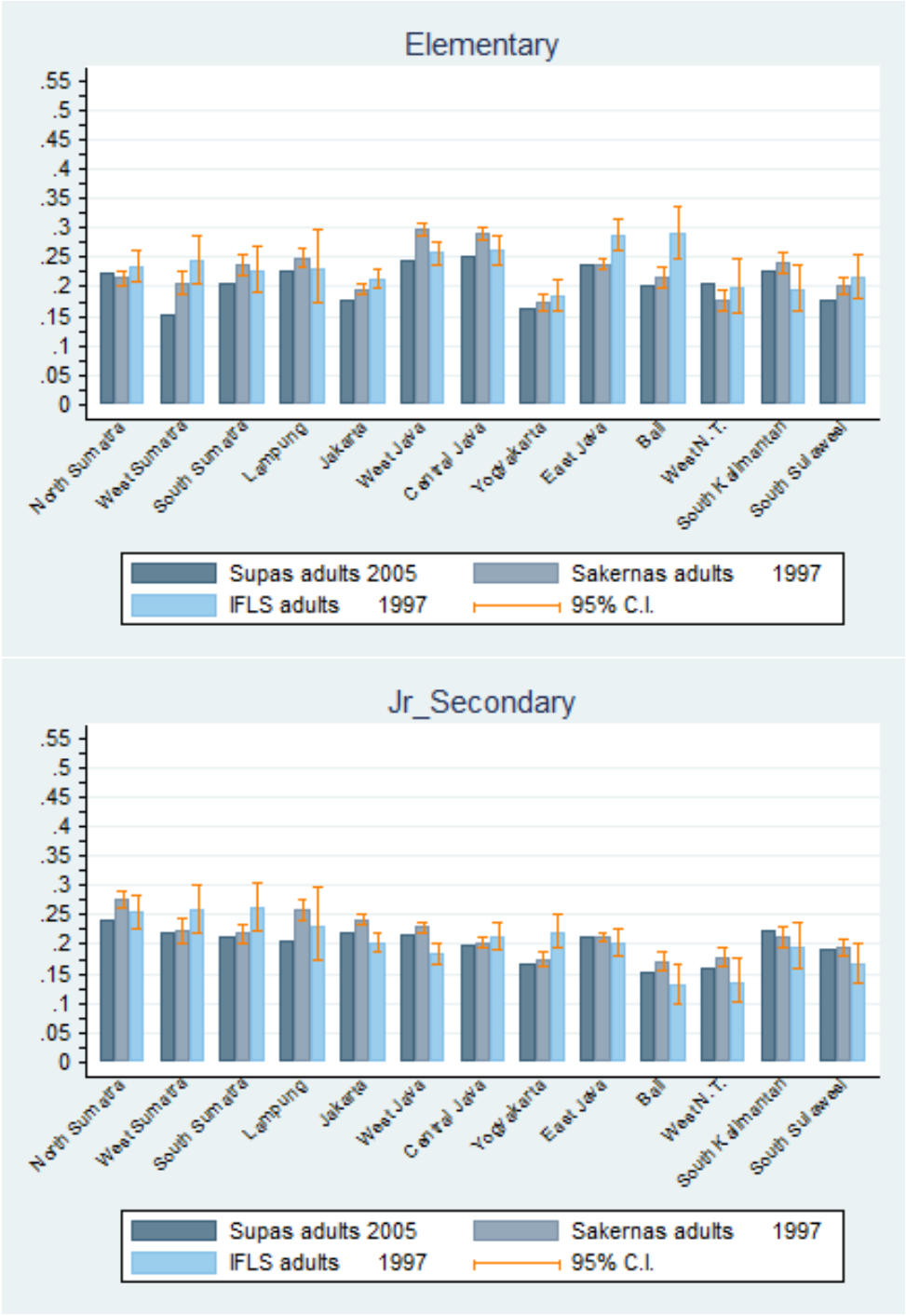
Supas adults 2005
Sakernas adults 2000
IFLS adults 2000
95% C.I.



Notes: All means all individuals of all ages. Adults means individuals older than or equal to 15

Figure L.11: Education Distribution by Survey Urban 1997

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South Kalimantan
South Sulawesi
Supas adults 2005
Sakernas adults 1997
IFLS adults 1997
95% C.I.
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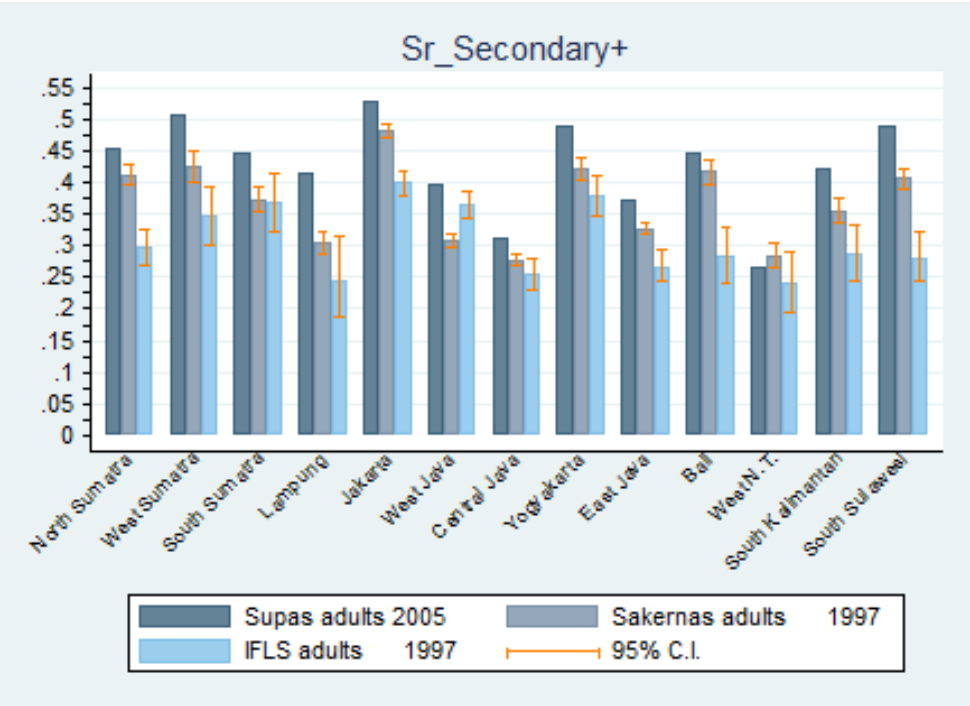
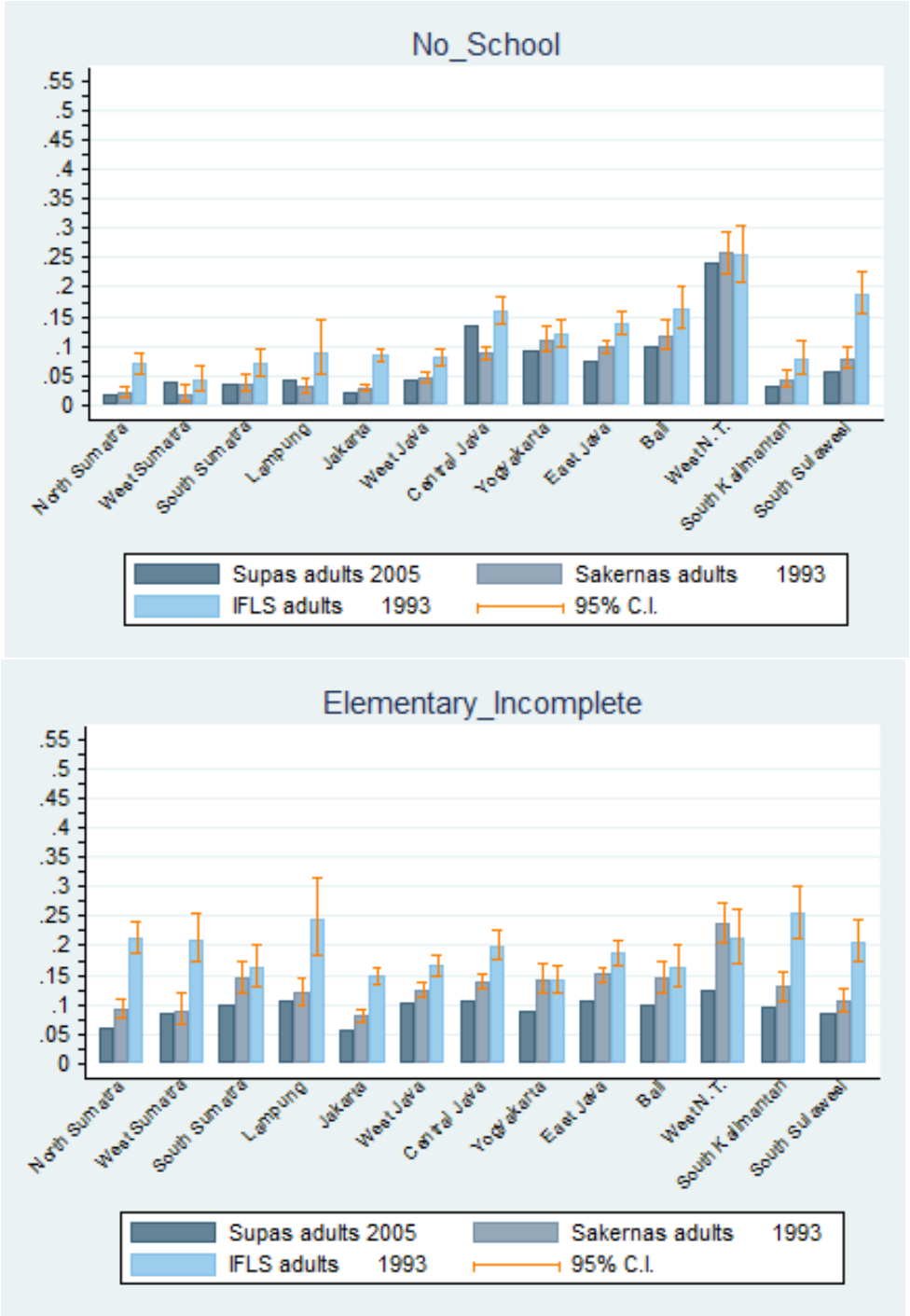
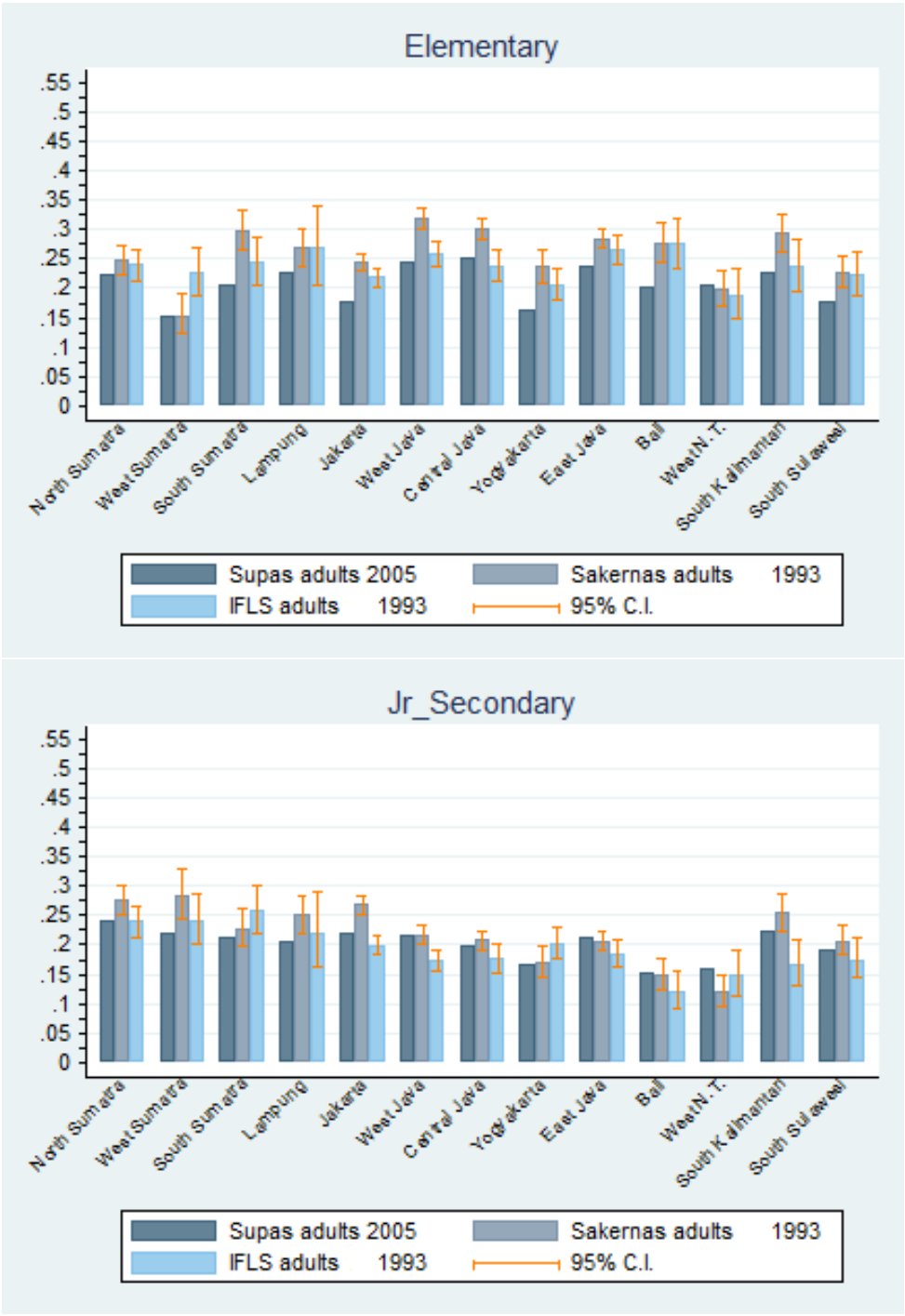
West N. T.
South Kalimantan
South Sulawesi
Supas adults 2005
Sakernas adults 1997
IFLS adults 1997
95% C.I.



Notes: All means all individuals of all ages. Adults means individuals older than or equal to 15

Figure L.12: Education Distribution by Survey Urban 1993

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South Kalimantan
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Supas adults 2005
Sakernas adults 1993
IFLS adults 1993
95% C.I.
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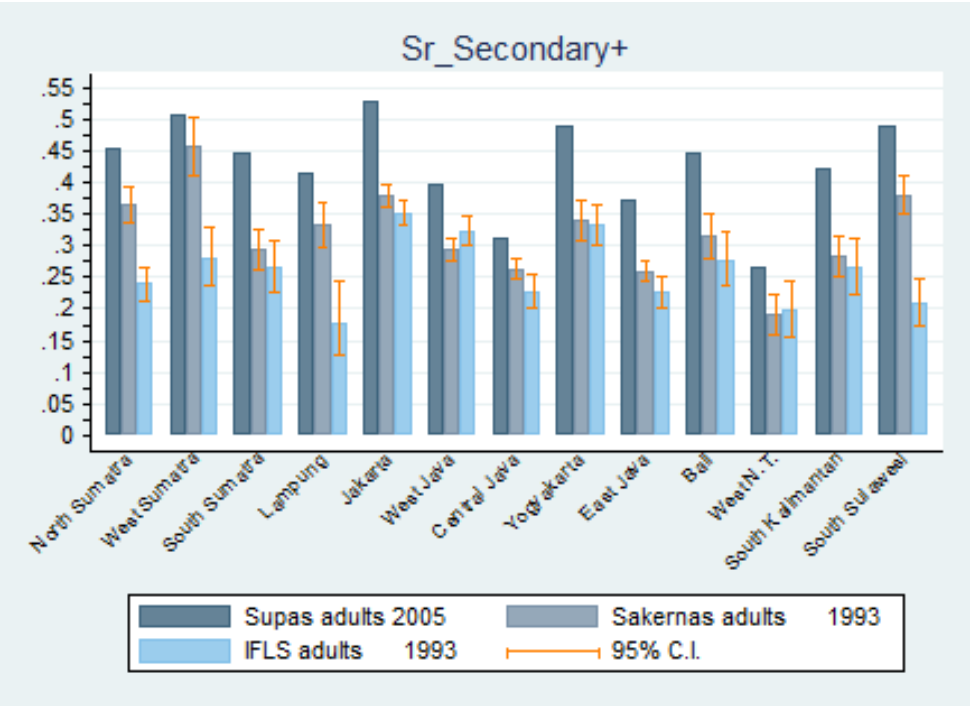
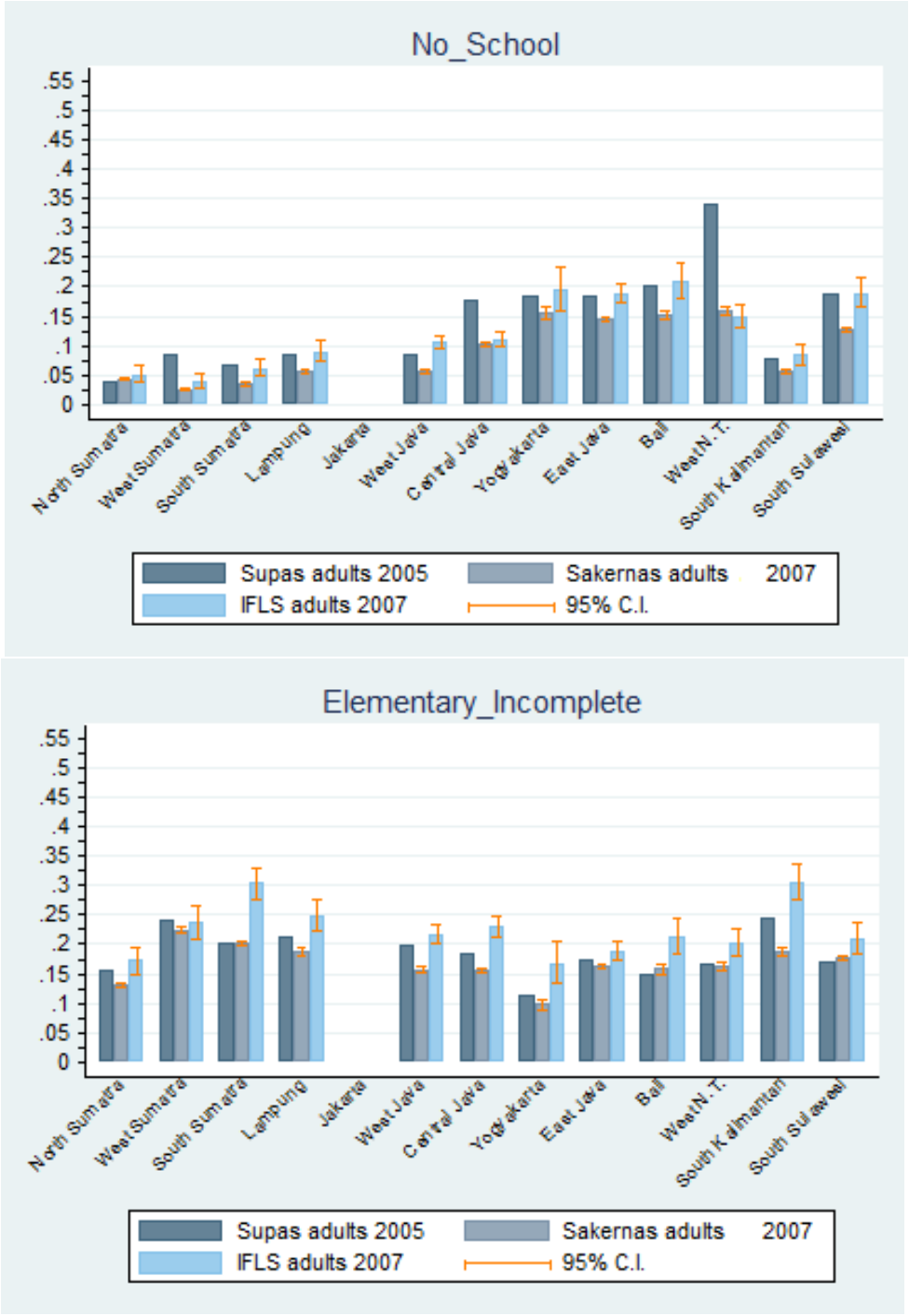
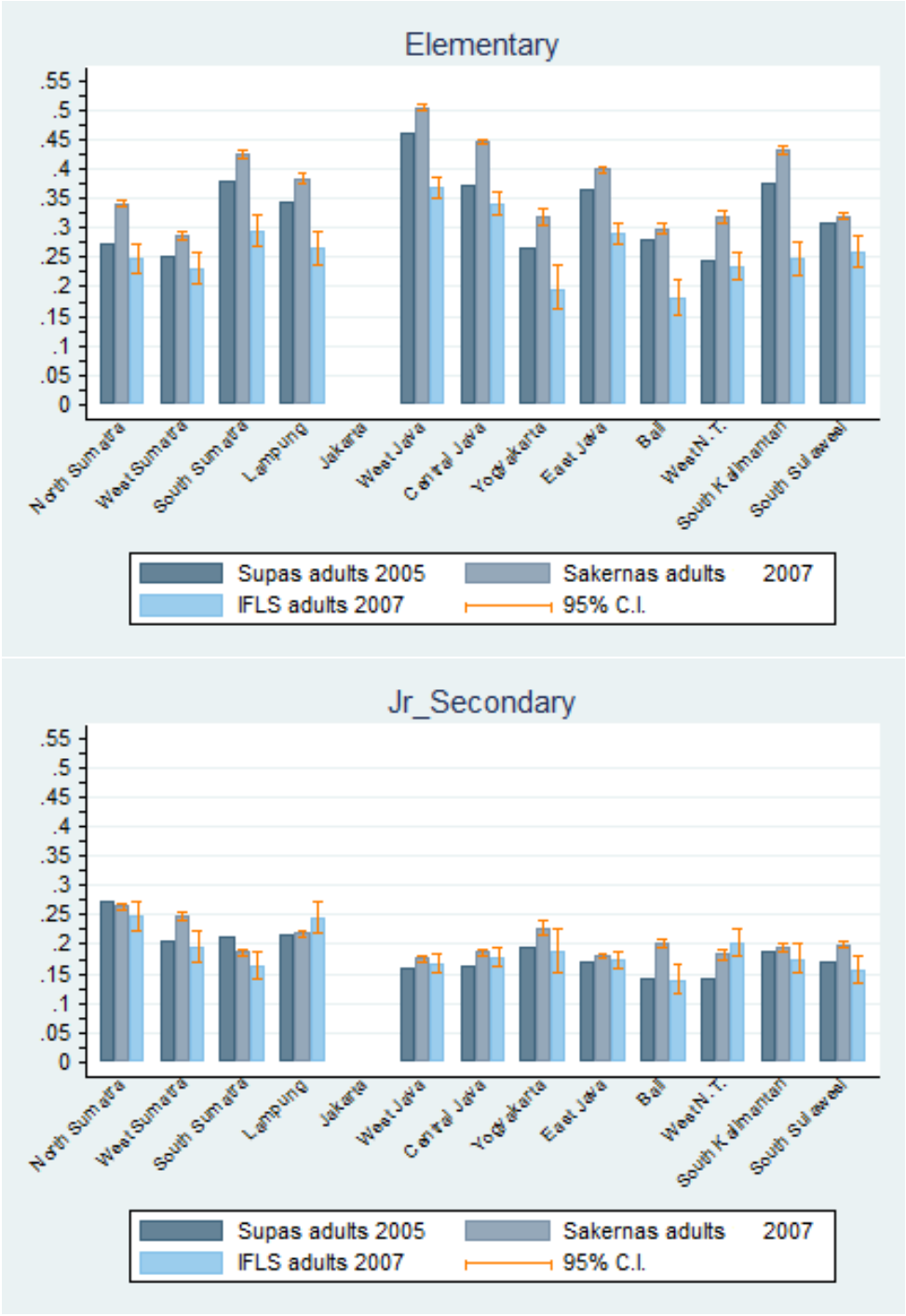
South Kalimantan
South Sulawesi
Supas adults 2005
Sakernas adults 1993
IFLS adults 1993
95% C.I.



Notes: All means all individuals of all ages. Adults means individuals older than or equal to 15

Figure L.13: Education Distribution by Survey Rural 2007

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South Kalimantan
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Supas adults 2005
Sakernas adults 2007
IFLS adults 2007
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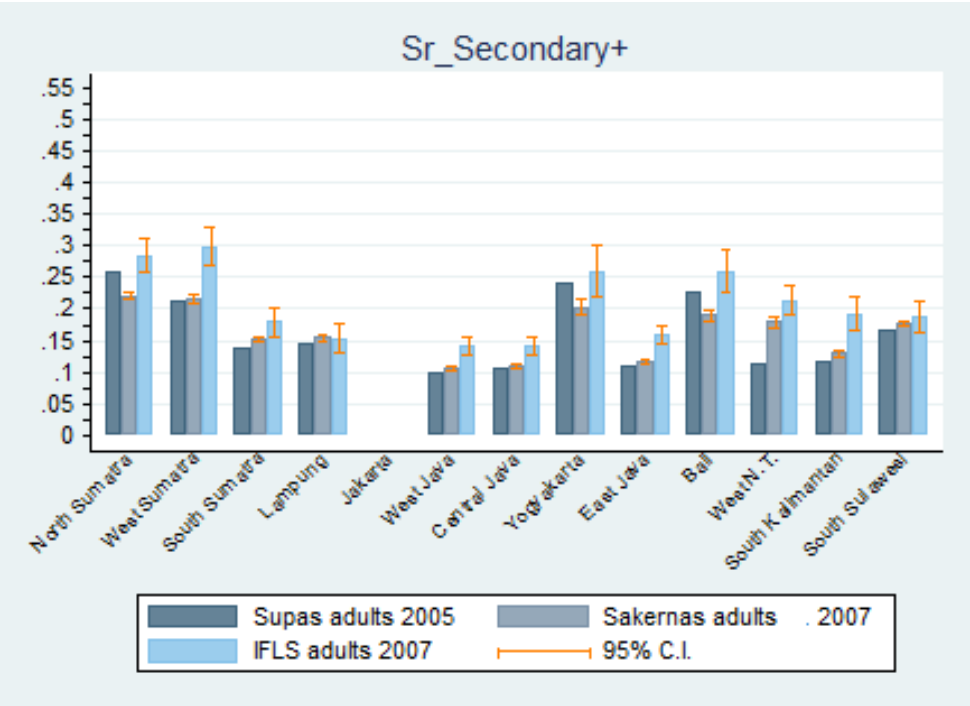
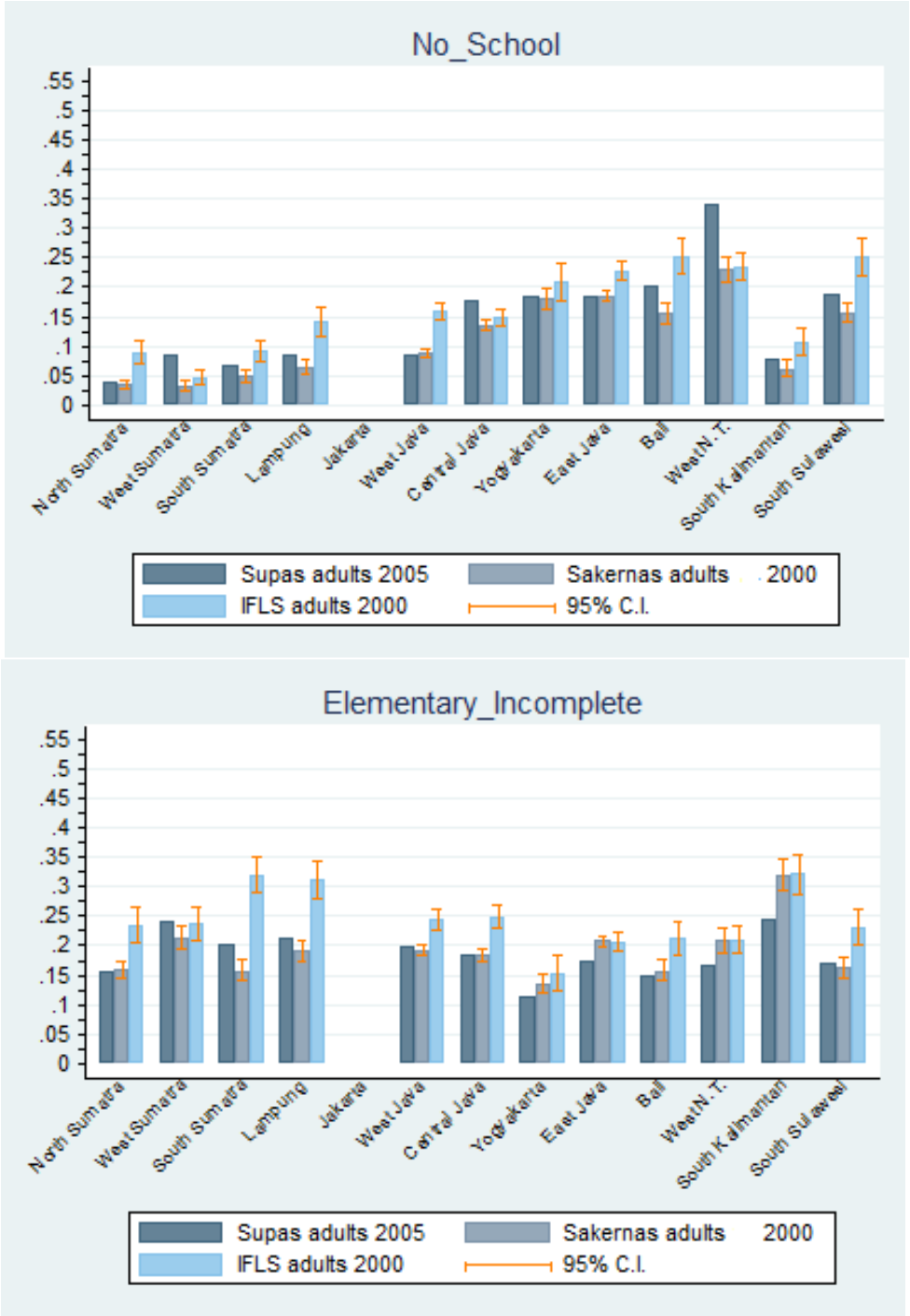
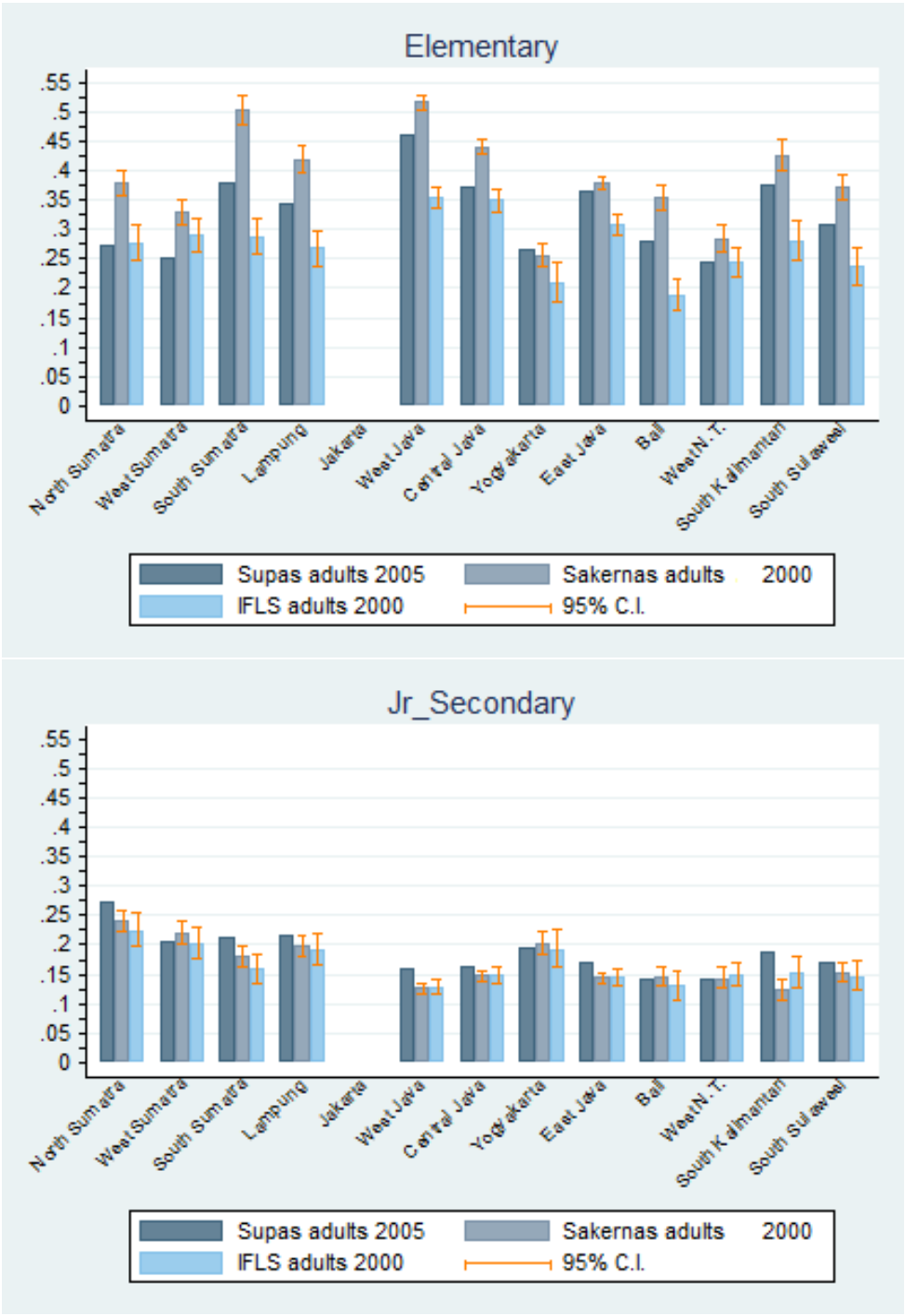
South Kalimantan
South Sulawesi
Supas adults 2005
Sakernas adults 2007
IFLS adults 2007
95% C.I.



Notes: All means all individuals of all ages. Adults means individuals older than or equal to 15

Figure L.14: Education Distribution by Survey Rural 2000

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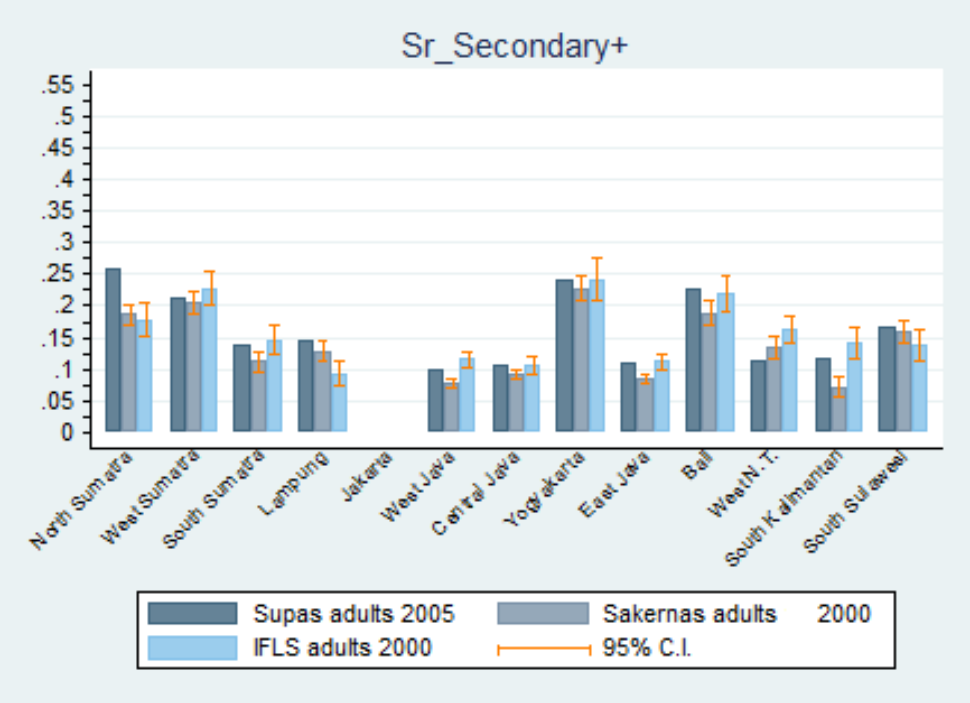
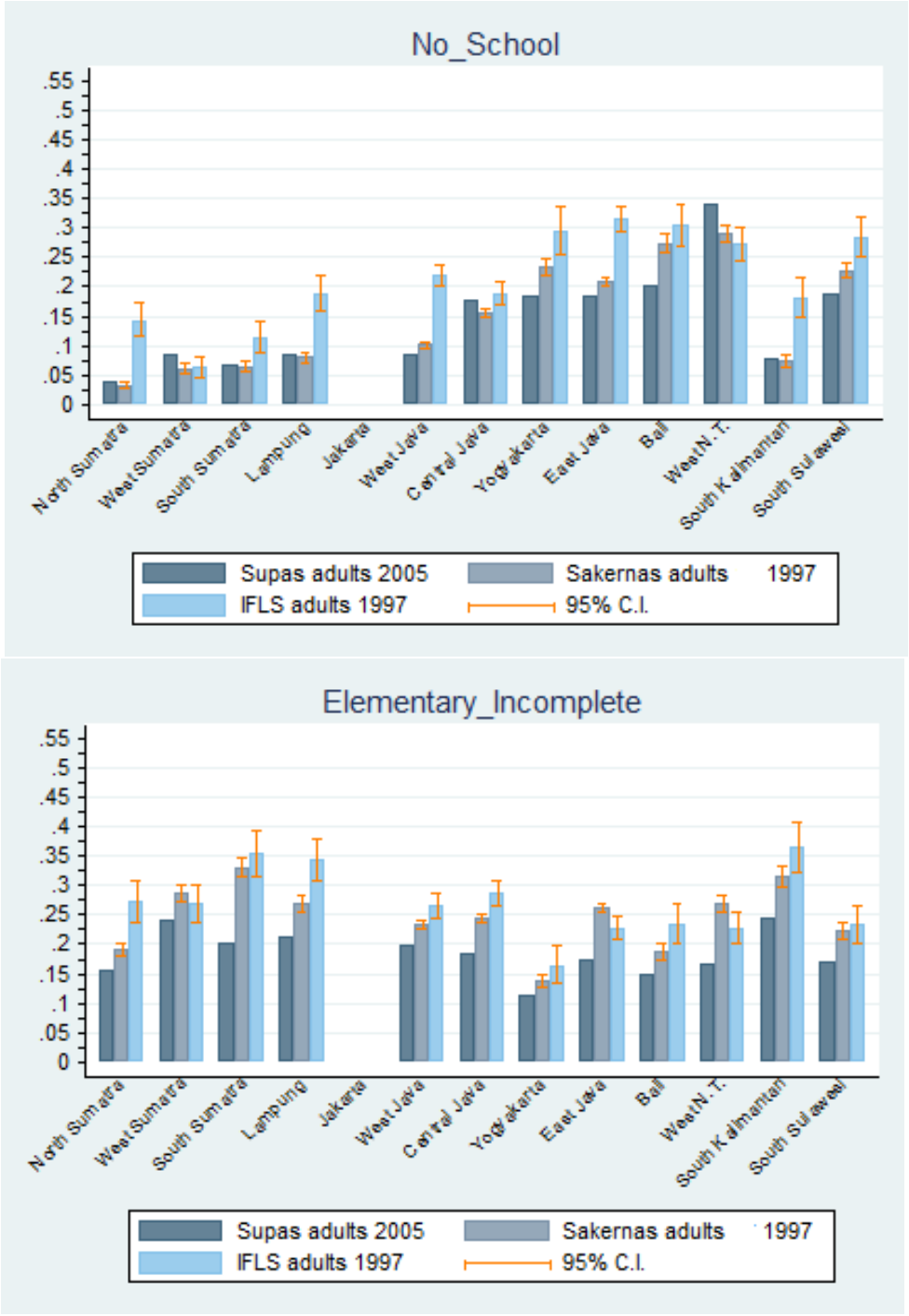
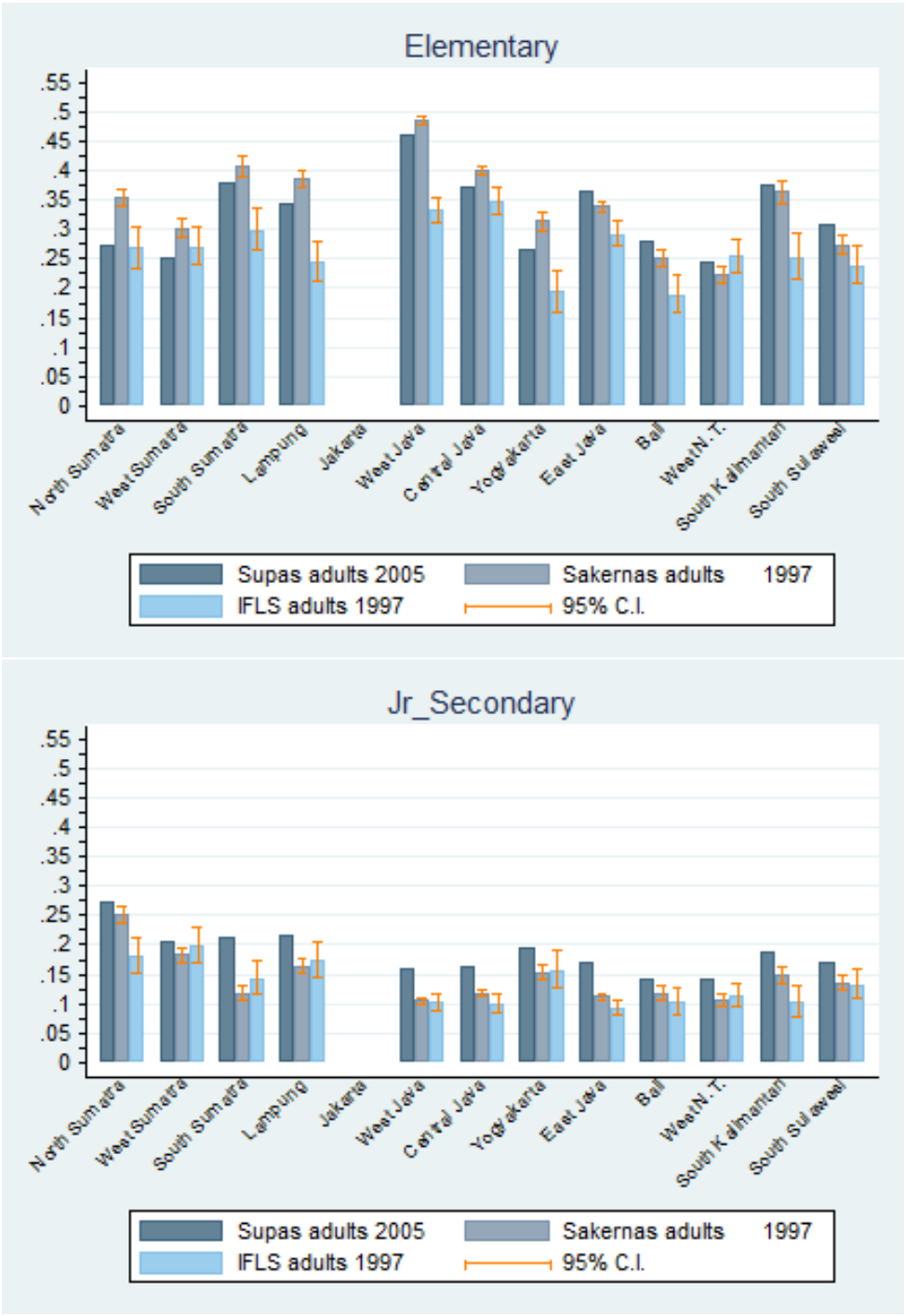
South Sulawesi
Supas adults 2005
Sakernas adults 2000
IFLS adults 2000
95% C.I.



Notes: All means all individuals of all ages. Adults means individuals older than or equal to 15

Figure L.15: Education Distribution by Survey Rural 1997

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Supas adults 2005
Sakernas adults 1997
IFLS adults 1997
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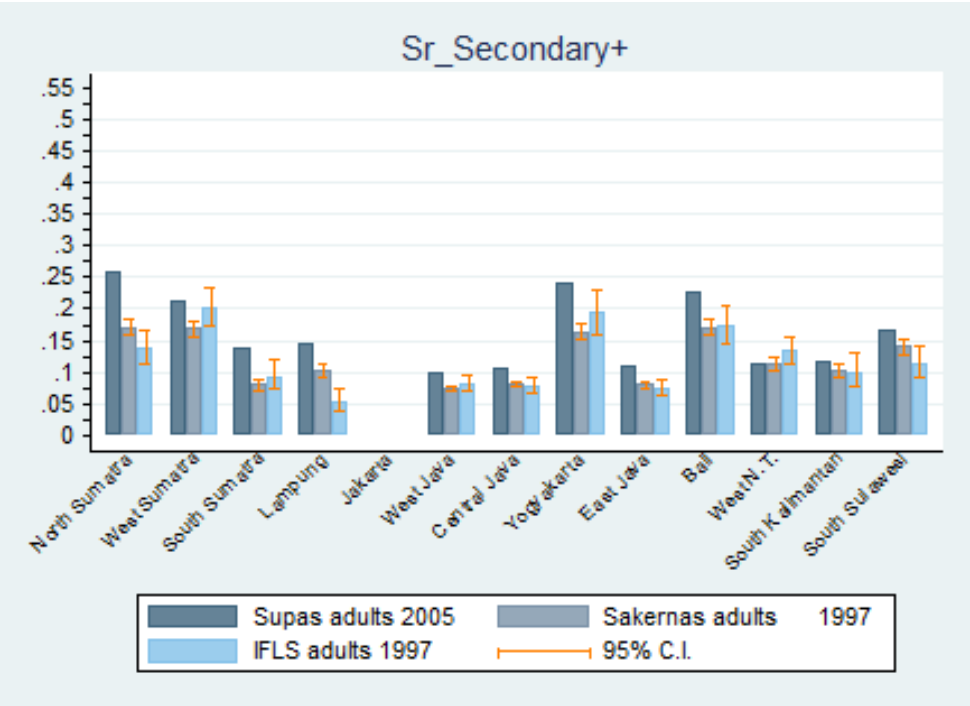
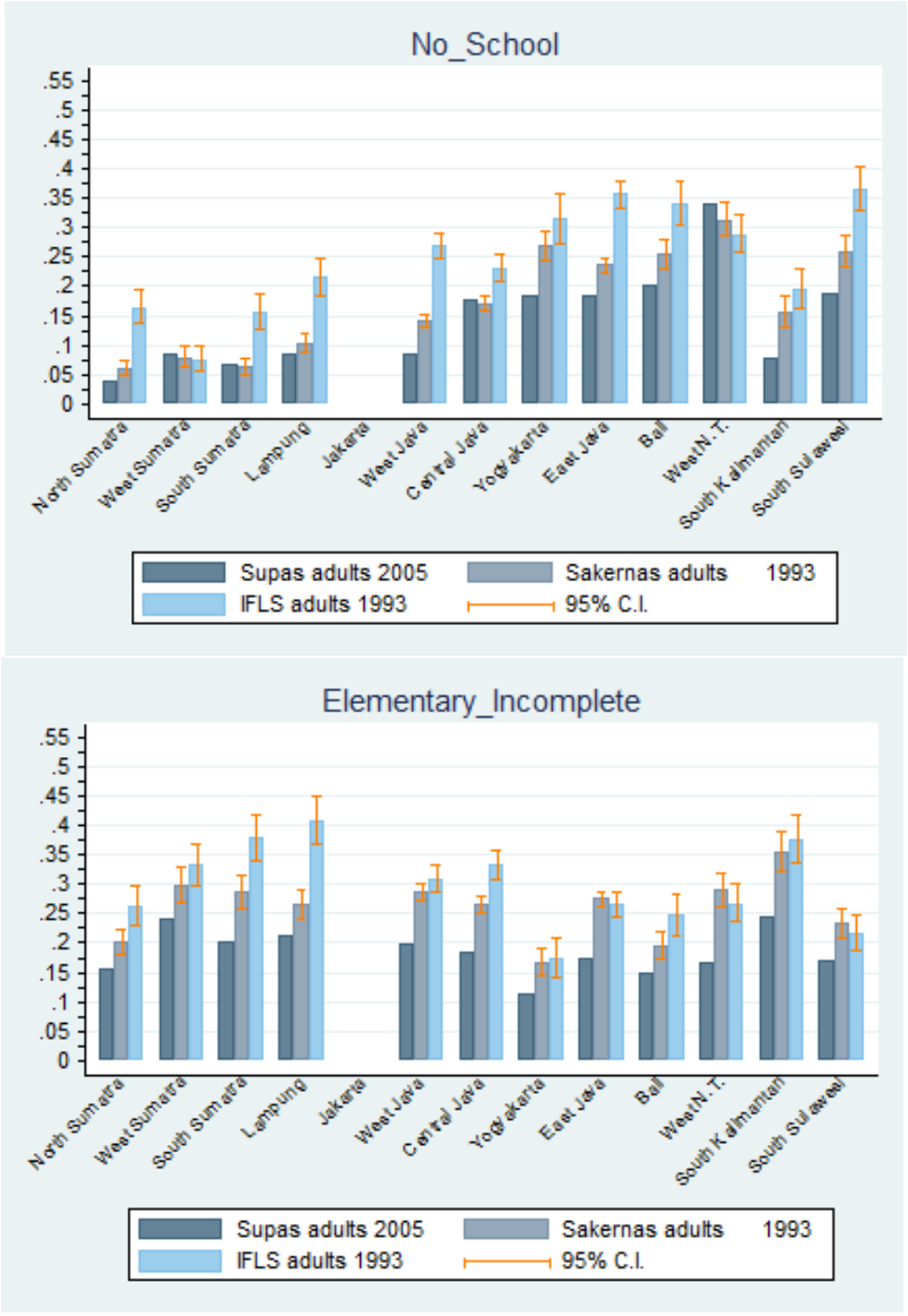
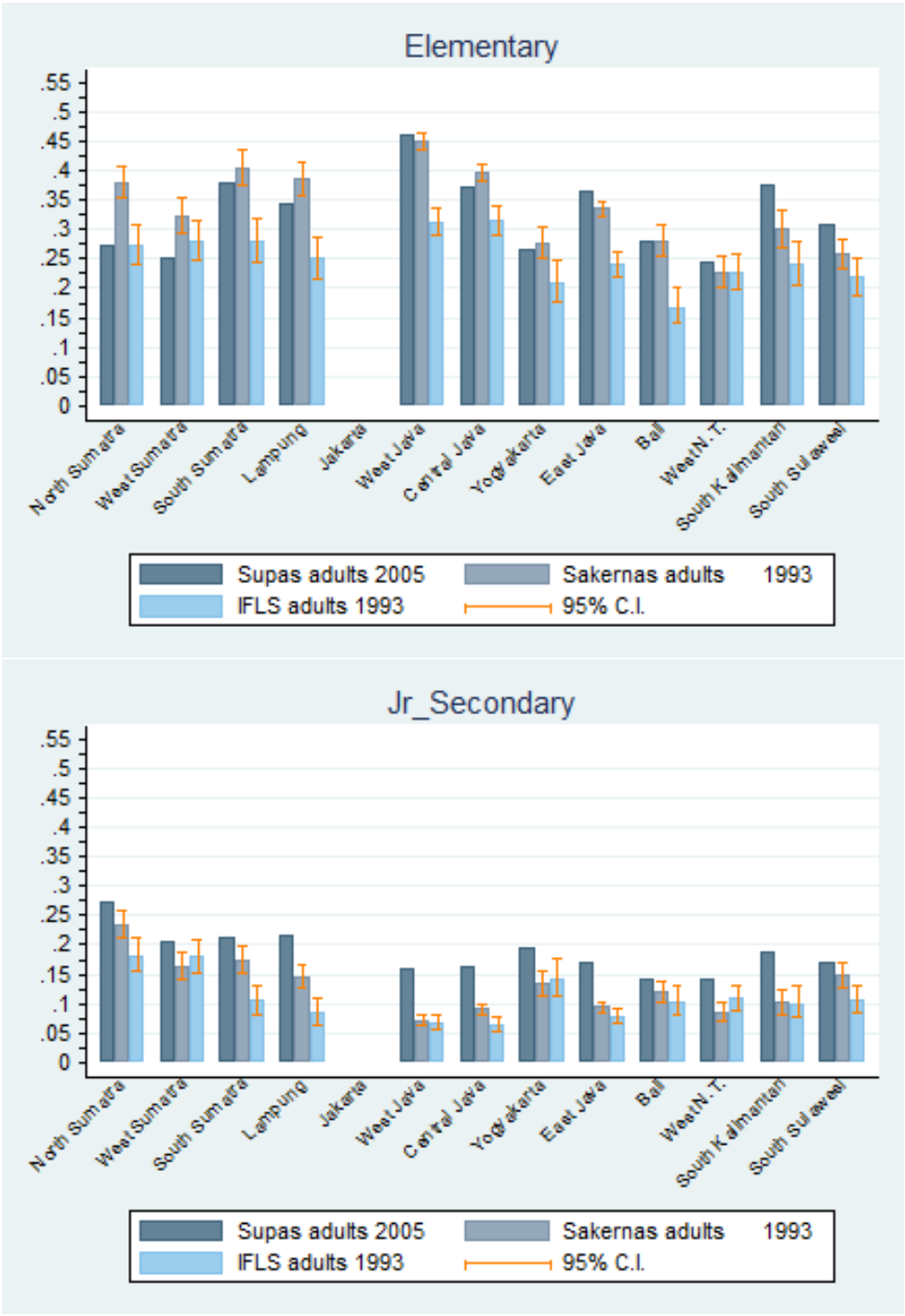


Notes: All means all individuals of all ages. Adults means individuals older than or equal to 15

Figure L.16: Education Distribution by Survey Rural 1993

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Supas adults 2005
Sakernas adults 1993
IFLS adults 1993
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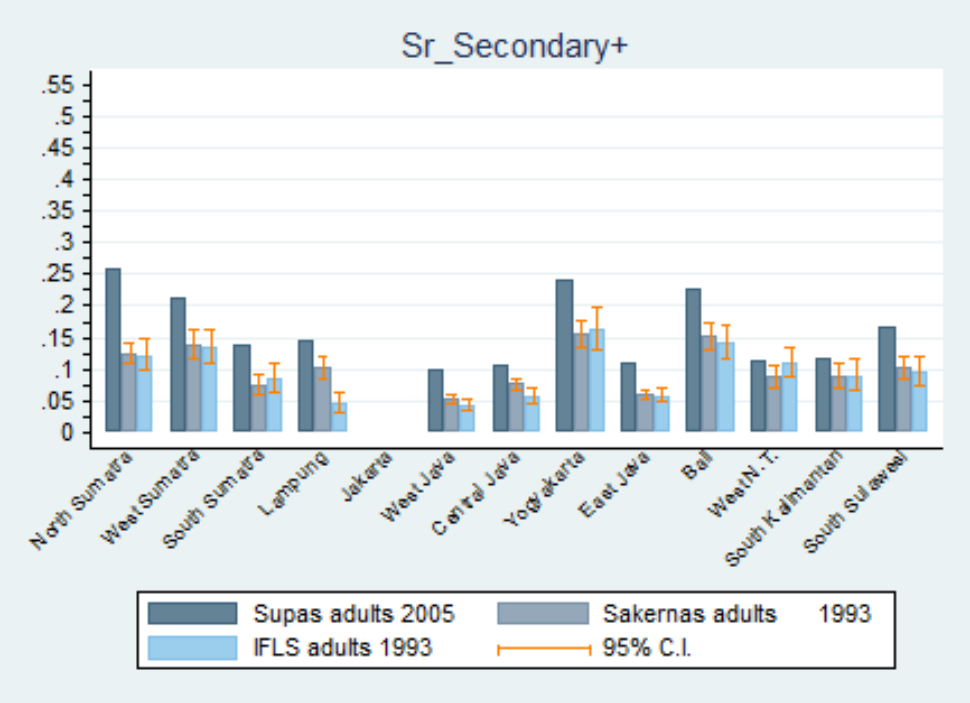
South Kalimantan
South Sulawesi
Supas adults 2005
Sakernas adults 1993
IFLS adults 1993
95% C.I.



Notes: All means all individuals of all ages. Adults means individuals older than or equal to 15

Curriculum Vitae

Name:	Xue Dong
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Honours and Awards:	Ontario Graduate Scholarship 2012 SSHRC Doctoral Scholarship 2009-2011 Western Graduate Research Scholarship 2008 Gold Medal in Science, University of Alberta 2008
Related Work Experience:	Instructor, University of Western Ontario Summer 2011 Teaching Assistant, University of Western Ontario 2008-2013 Research Assistant, University of Western Ontario Summer 2010 Actuarial Co-op, Manulife Financial, Toronto Summer 2007