

Does economic crisis have different impact on husbands and wives? Evidence from the Asian Financial Crisis in Indonesia

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Abstract

This paper analyzes the intra-household allocation of risk-coping mechanisms by testing whether the Asian financial crisis affected married men and women differently in Indonesia. It estimates the effect of the district consumption shock during the crisis on the change in married men's and women's working status and assets. It finds that the regional shock is associated with a large increase in wives' employment and a large decrease in wives' business assets in urban areas, and not associated with change in husbands' working status or asset holdings in urban areas. In rural areas the regional shock is associated with a drop in women's business assets and not related to other outcomes of husbands or wives. Receiving government social safety net program aid during the crisis seems to substitute for the decrease in business assets of women as a coping strategy in both urban and rural areas.

1 | INTRODUCTION

Households in developing countries face high risks of economic shocks.¹ Due to the lack of adequate formal insurance coverage in developing countries, households usually have to rely on informal coping mechanisms such as decreasing consumption, borrowing from friends and family, selling assets, and increasing working hours (for surveys on coping strategies, see Heltberg et al., 2014; Dercon, 2002; Morduch, 1995). These coping mechanisms are often costly. Less

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consumption can result in less food and nutrition intake that can impact long-term health. Long working hours not only affect leisure currently, but can also lead to fewer hours invested in children, or have long-term health effects. Selling assets, especially productive assets, can impact long-term income generation and consumption paths.

Because of the cost associated with these coping strategies, it is interesting to ask who in a household bears more of the cost when a shock happens and whether gender matters in this process. From a policy point of view, knowing the intra-household allocation of risk-coping is important because better-targeted social safety net policies can be designed based on the findings. Also, studies from developing countries have already found some evidence of gender difference in response to shocks, usually resulting in women or girls bearing more of the cost of a shock.²

This study analyzes the impact of an aggregate economic shock in Indonesia, the Asian Financial Crisis (AFC), on married men and women in terms of their working status and asset holdings.³ The AFC is the largest aggregate economic shock experienced by Indonesia in the last 50 years. Gross domestic product per capita dropped by 20 percent from 1997 to 1998, and did not recover to the pre-crisis level until ten years later. Many studies have looked at the impact of the AFC on various outcomes in Indonesia (see Frankenberg et al., 1999, 2003; Hartono and Ehrmann, 2001; Manning, 2000; Poppele et al., 2000; Smith et al., 2002; Soesastro, 1998; Strauss et al., 2004; Wetterberg et al., 1999). At the household level, it is found that households decreased consumption, increased working hours, and sold assets. Households have also been found to change household composition so that dependent members moved to cheaper regions and working-age members moved to regions with more job opportunities. There are also negative effects found on education and health service utilization. The major difference between this study and the previous ones is twofold. First, this study emphasizes the intra-household allocation of risk-coping, especially the allocation between husband and wife. Therefore this study estimates the effect of the crisis separately on married men and women for whom I have information on change in outcomes for both husband and wife. Second, this study utilizes the regional variation in the severity of the crisis and tests the association between the regional shock and change in men and women's outcomes. This approach is one step further from the majority of studies on the AFC in Indonesia which mainly compare averages of outcomes before and after the crisis.⁴

To measure the severity of the crisis at the regional level, I use the deviation of district consumption growth during the crisis from the pre-crisis trend. Consumption is one of the more accurately measured household outcomes in Indonesia, and has been consistently measured by the National Social-Economic Household Survey (SUSENAS) for decades. Since SUSENAS is representative at the district level, I will be able to track the change in consumption over time at this level. Change in consumption is also widely used as a measure of the severity of the crisis since consumption is closely related to households' living standards.⁵

To analyze the intra-household allocation of coping mechanisms during the crisis, I need to look at change in outcomes that can be attributed to individuals instead of just to the household. Working status or leisure is a standard choice when looking at individual outcomes in the intra-household allocation literature. Adjusting working status has also been documented as an important coping mechanism in Indonesia during the AFC. Frankenberg et al. (2003) and Smith et al. (2002) have found that more women were working during the crisis than before. Therefore it is interesting to see if changes in working status of women are related to regional shocks. Another mechanism that is important in the risk and coping literature and also discussed in studies on the AFC in Indonesia is selling assets.⁶ Limited research exists on the gender difference in the adoption of this strategy because it is hard to distinguish household assets that belong to the husband and to the

wife. The survey I am using specifically asks about who in the household owns what percentage of each of the household assets and the value of the household assets. Therefore I am able to calculate a change in the value of assets owned by the husband and the wife during the crisis, and tests whether this change is associated with the regional shock.

It is hard to draw causal inference on the effect of the consumption shock at the district level on the change in husbands' and wives' outcomes at the household level. Unobserved variables that affect both the change in district consumption and change in working status and asset holdings of individuals during the crisis confound the results. This study tries to control for these confounding factors by controlling for a large set of pre-crisis individual, household, village (community), and district level characteristics such as age and education of the husband and the wife, household age and education composition, community remoteness, infrastructure and industry structure, and district labor force composition in terms of formal/informal divide and industry. It also uses two measures of the regional shock that correspond to the timing of the crisis and the timing of the household survey as a robustness test of the regression results.

I find that the regional shock is associated with an increase in wives' employment and a decrease in wives' business assets in urban areas, and is not associated with the change in wives' non-business assets in urban areas. A 10 percentage point drop in growth rate of district consumption is associated with a 4 percentage point increase in women's employment and a 2,648 thousand rupiah decrease in women's business assets in urban areas.⁷ In the rural area, the regional shock is associated with a decrease in wives' business assets as well. A 10 percentage point drop in growth rate of district consumption is associated with a 1,037 thousand rupiah decrease in women's business assets in rural areas. The regional shock is not associated with the change in wives' working status and non-business assets in the rural areas. For husbands, the regional shock is not associated with the change in their outcomes in the urban or the rural areas.

Therefore there seems to be a difference in coping mechanisms between husbands and wives, and the wives seem to be the ones who are making adjustments. It is interesting to see whether only wives in poor households need to make these adjustments. Therefore I interact the shock measure with household consumption level before the crisis, and find a nonlinear relationship with the change in wife's working status in urban areas. Households whose consumption was below median level were less likely to use the increase in wives' work as a coping strategy. But among households whose consumption is above median level, better-off households are less likely to use the change in wives' working status as coping strategy.

Since the Indonesian government has offered many social safety net programs to alleviate the impact of the crisis on households, it is also interesting to see whether these programs have had any intended effect. As a preliminary attempt, I interact the safety net receiving status of the household during the crisis with the shock variable, and find preliminary evidence that receiving social safety net programs may have been a substitute for selling business assets by wives in both urban and rural areas. The effect is stronger in rural areas. This is new evidence on how social safety net programs may affect the intra-household allocation of risk-coping strategies.

I also attempt to see whether the intra-household decision-making power of the wife before the crisis is associated with how she responds to the crisis, by utilizing direct information on household decision-making from the Indonesian data. But there seems to be no such association based on the decision-making power measure I use.

The rest of the paper is organized as follows. Section 2 introduces the data sources I use in this study. Section 3 describes the context of the AFC and shows the change in district consumption level during the crisis. Section 4 discusses the empirical strategy. Section 5 shows results. Section 6 concludes.

2 | DATA

There are two data sources used in this study. Individual and household level information comes from the Indonesian Family Life Survey (IFLS). The IFLS is a household panel survey that follows around 7,000 households from 1993 to 2014. It boasts low attrition and rich information. I use the 1997 IFLS as the survey right before the crisis, as the real hit of the AFC was felt in Indonesia in 1998, and use the 2000 IFLS as the survey during the crisis.⁸ By 2000, Indonesia had partially recovered from the crisis. As evidenced by the fact that GDP per capita had not recovered to the 1997 level until 2008, however, the 2000 observation should still reflect changes during the AFC.⁹

Another feature of the IFLS is its inclusion of the community survey in addition to the household survey. The community survey is usually at the village or *kampung* level and elicits a wide range of information on the community's location, infrastructure, economics structure, and administration. These information will be utilized in the empirical estimation of this study.

The change in average consumption at the district level is calculated using SUSENAS. SUSENAS is the social and economic survey conducted by the Indonesian Bureau of Statistics (BPS). It is conducted at least once per year, and since 1993 has been representative at the district level. Much of the SUSENAS questionnaire aims at eliciting detailed information on household consumption. In this study I use SUSENAS data from 1993 to 2000 to analyze the change in mean and median consumption of districts over time and calculate measures of the regional consumption shock at the district level during the AFC.

3 | THE AFC IN INDONESIA AND CHANGE IN CONSUMPTION AT THE DISTRICT LEVEL DURING THE AFC

The AFC started in May 1997, when the Thai baht came under speculative attack. Indonesia began to be affected in July 1997, when its currency, the 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 percent depreciation followed in the next two months (Figure 1). The sharp depreciation of the rupiah made many banks and corporations insolvent, because they had borrowed heavily in foreign currency denominated short-term debt (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 a halt in many firms (Manning 2000). Several studies reported large-scale layoffs in construction and manufacturing (Hartono & 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 expenditure and foreign debt, the Indonesian government removed subsidies on rice and fuel in January 1998. The removal of subsidies led to a surge in food and other prices (Figure 2). The surge in the prices of basic necessities led to nation-wide protests and riots against the government, which eventually led to the resignation of Suharto in May 1998 and the end of 32 years of Suharto's regime. Real GDP decreased by 14 percent in 1998, and GDP per capita did not recover to the 1996 level until 2008 (Figure 3).

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 closures 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 percent in urban areas,

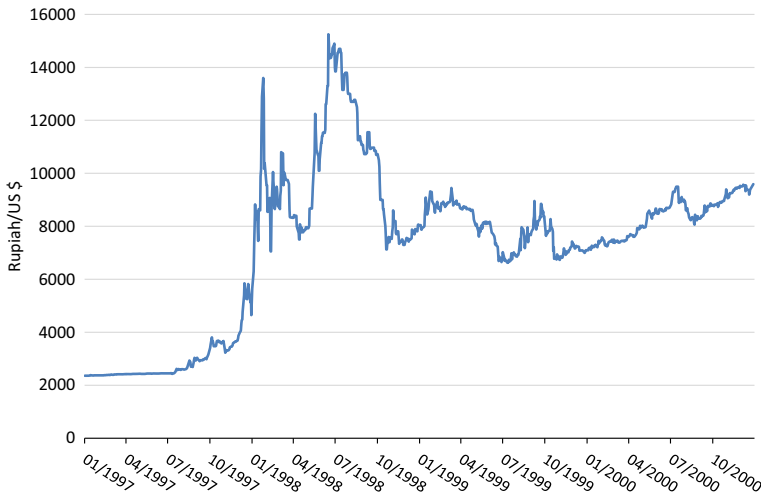


FIGURE 1 Exchange rate fluctuation during crisis

Source: Author, based on daily exchange rate data from Bank of Indonesia, via CEIC. [Colour figure can be viewed at wileyonlinelibrary.com]

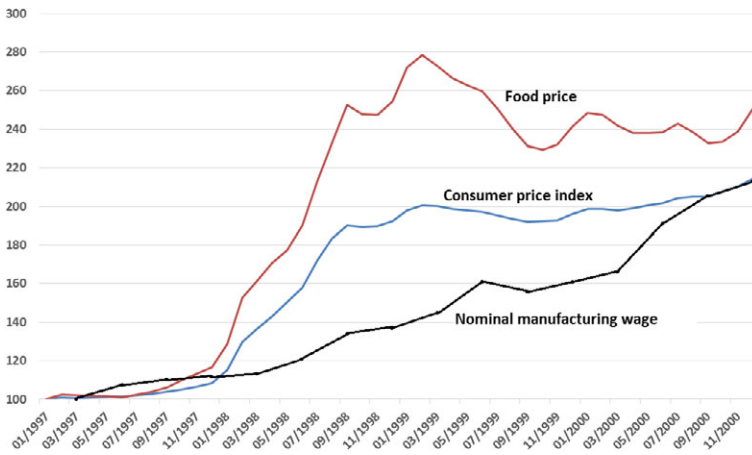


FIGURE 2 Change of price and nominal wage

Source: Author, based on monthly price data from the BPS (43 cities' price data, excluding East Timor) and quarterly wage data from Bank of Indonesia, via CEIC. [Colour figure can be viewed at wileyonlinelibrary.com]

and median household per capita consumption decreased by 5 percent. At the same time, enrollment rates for urban children aged 13–19 years old fell from 67 percent to 62 percent (Poppele et al., 2000).

When we look at the change in real household per capita consumption at the district level calculated by the author using SUSENAS, we can see from Table 1 that before 1997, district mean and median consumption on average did not change between 1993 and 1994, increased rapidly between 1994 and 1996, and did not change between 1996 and 1997. Between 1997 and 1998, both district mean and median consumption on average decreased by about 5 percent. For a quarter of districts, between 1997 and 1998 mean consumption decreased by more than 11 percent and median consumption decreased by more than 9 percent. The decrease in district consumption level seems to have quickly reversed in 1999. By 1999 it seems that on average the districts recovered from the loss during the 1997–1998 period. And from 1999 to 2000, district consumption on average grew further.¹⁰

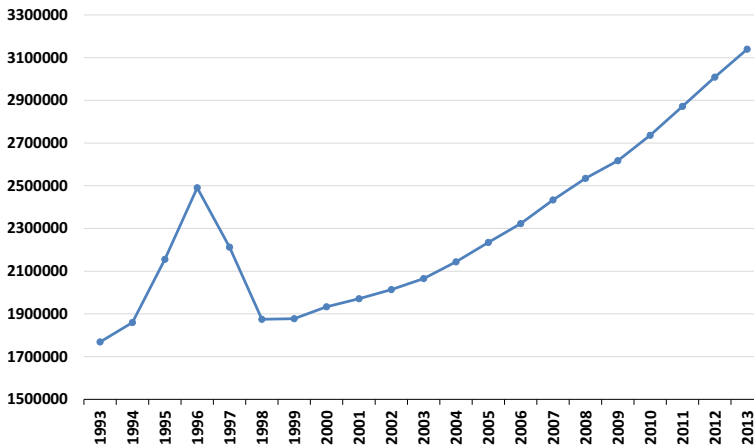


FIGURE 3 GDP per capita (IDR) 1993–2013, 1993 prices

Source: Author, based on data from the BPS, via CEIC. [Colour figure can be viewed at wileyonlinelibrary.com]

Instead of looking at changes in level, an alternative way to analyze the shock in household consumption at the district level is to look at the deviation from trend of the pre-crisis period. Although with a short pre-crisis period in my analysis, there seems to be a general increasing trend of household consumption between 1993 and 1997. Therefore we can assess whether the change in district consumption level deviated from this trend during the crisis period. I followed this logic to calculate the measure of consumption shock for each district, which is the difference between annual growth rate of district median consumption during the crisis period and annual growth rate of district median consumption during the pre-crisis period. I use two time intervals as the crisis period, 1997–1998 and 1997–2000. This is because the 1997–1998 period corresponds more to the timing of the crisis (1998 was the deepest point of the crisis), and the 1997–2000 period corresponds more to the timing of the IFLS survey rounds. Therefore the two measures of district consumption shocks I use in my empirical regressions are

TABLE 1 Change in district level consumption over time (%)

| N=255 | 1993–1994 | 1994–1995 | 1995–1996 | 1996–1997 | 1997–1998 | 1998–1999 | 1999–2000 |
|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Change in natural log of district mean $\times 100$ | | | | | | | |
| Mean | -0.18 | 9.09 | 8.63 | 0.61 | -4.65 | 4.45 | 6.05 |
| 25th percentile | -6.77 | 2.19 | 1.69 | -6.55 | -11.34 | -2.87 | -1.54 |
| Median | -0.69 | 7.65 | 8.08 | -1.55 | -5.17 | 4.43 | 4.95 |
| 75th percentile | 5.12 | 14.42 | 15.35 | 6.22 | 1.3 | 11.96 | 13.15 |
| Change in natural log of district median $\times 100$ | | | | | | | |
| Mean | 0.74 | 9.54 | 5.08 | 1.83 | -3.66 | 4.64 | 6.62 |
| 25th percentile | -4.73 | 2.84 | -1.37 | -3.86 | -9.28 | -1.91 | -0.27 |
| Median | 0.96 | 8.48 | 3.7 | 1.53 | -4.93 | 3.96 | 5.55 |
| 75th percentile | 6.6 | 15.38 | 12.33 | 6.98 | 1.22 | 11.88 | 12.79 |

Source: Author, based on data from SUSENAS, 1993–2000. District mean (median) is calculated as the mean (median) of household per capita consumption across households in the district. Districts are defined using 1993 boundaries. There are 255 1993 districts for which there are consumption data for the whole period.

$$\begin{aligned} shock_{1997-1998} = & growth_{1997-1998} \\ & - \frac{1}{4}(growth_{1993-1994} + growth_{1994-1995} + growth_{1995-1996} + growth_{1996-1997}) \end{aligned} \quad (1)$$

and

$$\begin{aligned} shock_{1997-2000} = & \frac{1}{3}(growth_{1997-1998} + growth_{1998-1999} + growth_{1999-2000}) \\ & - \frac{1}{4}(growth_{1993-1994} + growth_{1994-1995} + growth_{1995-1996} + growth_{1996-1997}). \end{aligned} \quad (2)$$

Table 2 summarizes this measure of consumption shock. We can see that when we look at the shock relative to the pre-crisis trend, the shock has a much bigger magnitude than only looking at year-to-year changes. Also by 2000 recovery from the shock has not occurred. By 2000, for a quarter of districts, the difference between annual growth rate during the 1997–2000 period and annual growth rate during the 1993–1997 period is still below –6 percentage points. To look at the regional distribution of the consumption shock during the crisis, I also mapped my measure of the 1997–1998 consumption shock and the 1997–2000 consumption shock. Figures 4 and 5 show these distributions. We can see that first of all there is a correlation between the 1997–1998 shock and the 1997–2000 shock, with the 1997–2000 shock being milder. There is also geographic correlation between neighboring districts. Kalimantan seems to be the area that is hit the hardest, while parts of Sumatra are also hit hard. Java is hit hard as well, but the crisis's negative impact on consumption is clearly not limited to Java. Wetterberg et al. (1999) also found similar geographic variation of the crisis using a self-conducted survey in 1998.

4 | EMPIRICAL STRATEGY

In this paper I use the change in regional consumption level as a measure of the severity of the crisis, and this choice is based on several considerations. First, SUSENAS is considered the most

TABLE 2 Annual shock in district consumption relative to 1993–1997 trend

| N=255 | 1997–1998 | 1997–1999 | 1997–2000 |
|--------------------------|------------------|------------------|------------------|
| Shock in district mean | | | |
| Mean | –9.18 | –4.61 | –2.57 |
| 25th percentile | –17.04 | –9.78 | –6.44 |
| Median | –9.18 | –4.47 | –2.1 |
| 75th percentile | –1.32 | 1.07 | 1.86 |
| Shock in district median | | | |
| Mean | –7.96 | –3.81 | –1.76 |
| 25th percentile | –15.05 | –8.59 | –5.76 |
| Median | –9.4 | –3.61 | –2.09 |
| 75th percentile | –2.42 | 0.77 | 1.7 |

Source: Author, based on data from SUSENAS, 1993–2000. District mean (median) is calculated as mean (median) of household per capita consumption across households in the district. Districts are defined using 1993 boundaries. There are 255 1993 districts for which there are consumption data for the whole period. For each district, the shock is the difference between annual change (%) in district mean/median consumption during the crisis period and annual change (%) in district mean/median consumption between 1993 and 1997.

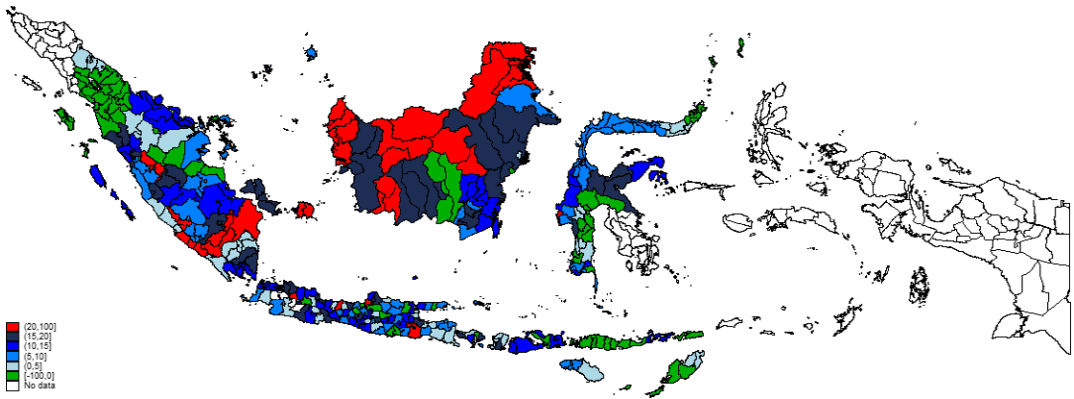


FIGURE 4 Drop (%) in median district consumption in 1997–1998, relative to 1993–1997 trend
 Source: author, based on data from SUSENAS, 1993–2000. Median consumption is calculated as the median of household per capita consumption across households in the district. Shocks computed for 255 1993 districts for which there are consumption data for all years between 1993 and 2000. Then the shocks of the 1993 districts are mapped onto the 2010 districts. Numbers in the legend represents the drop in consumption relative to the trend. For example, 20 means the difference between annual growth rate in district median consumption during 1997–1998 and annual growth rate in district median consumption during 1993–1997 is –20 percentage points. Therefore green areas are the districts that had no drop in growth rate compared with the pre-crisis period. [Colour figure can be viewed at wileyonlinelibrary.com]

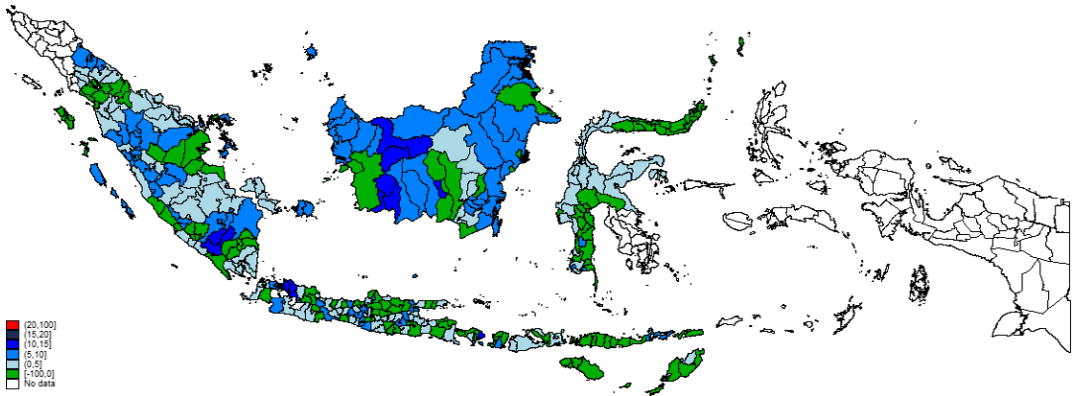


FIGURE 5 Annual drop (%) in median district consumption in 1997–2000, relative to 1993–1997 trend
 Source: Author, based on data from SUSENAS, 1993–2000. Median consumption is calculated as the median of household per capita consumption across households in the district. Shocks computed for 255 1993 districts for which there are consumption data for all years between 1993 and 2000. Then the shocks of the 1993 districts are mapped onto the 2010 districts. Numbers in the legend represent the drop in consumption relative to the trend. For example, 20 means the difference between annual growth rate in district median consumption during 1997–2000 and annual growth rate in district median consumption during 1993–1997 is –20 percentage points. Therefore green areas are the districts that had no drop in growth rate compared with the pre-crisis period. [Colour figure can be viewed at wileyonlinelibrary.com]

reliable Indonesian household survey. Since SUSENAS mainly focuses on eliciting information on consumption patterns of households, household consumption should be relatively accurately measured. Also, it is well known in the development literature that consumption is usually more

accurately measured than income in developing countries. Also SUSENAS has been representative at the district level since 1993. Therefore I can get accurately measured average consumption at the district level since 1993. Since there are 255 districts consistently observed by SUSENAS between 1993 and 2000, there is potentially substantial regional variation in consumption shock I can exploit. Second, consumption level is the best proxy for households' living standards, and this is the main reason the Indonesian government spends substantial resources on SUSENAS every year to observe the cross-section variation and over-time change of living standards of people in Indonesia. When we define an economic crisis, the ultimate standard is whether the crisis has had serious impacts on people's living standards. Therefore, change in consumption level is also highly relevant to measure the severity of the crisis at the regional level.

As discussed in the previous section, to measure consumption shock during the crisis at the district level, I can use either the change in average consumption during the crisis, or the deviation of annual growth rate from the pre-crisis trend. I choose to use the latter measure, as it takes into consideration not only the change just between two years, but also the pre-existing situation in the district. I also choose to use the shock in median rather than mean district consumption since median consumption is more relevant to poor households.

Since the shock variables are at the district level, the most likely confounding variables when analyzing the effect of regional shocks on change in individuals' outcomes are the initial conditions in the district before the crisis. These conditions can both affect how severely the district is affected by the crisis and also the coping strategies available to individuals and households in the district. Therefore controlling for initial characteristics of the district is crucial. One way to do this is to control for province fixed effect since this will control for unobserved differences across provinces before the crisis that are part of the cross-district variation. This approach, however, cannot control for all unobserved variation between districts prior to the crisis. Another approach is to directly control for district characteristics before the crisis. Since the AFC is a modern sector crisis that started in the financial sector and affected exporting/importing businesses more, the industry composition of the district can be important for how severely the district can be hit. Therefore I control for industry composition (in terms of the percentage of workers employed in different industries, which is available from SUSENAS) of the district prior to the crisis. I also control for the formal/informal composition of the workforce at the district prior to the crisis since formal/information composition is a proxy for how modern the local economy is. I also control for the gender composition of the district labor force since the initial level of women's employment may affect opportunities faced by women and the change in women's employment during the crisis.

Because it is hard to control for all important district level characteristics that may confound the results, I also control for community (village) characteristics that are available in the IFLS. IFLS has more detailed community characteristics than SUSENAS in terms of the remoteness, infrastructure, and local economy. I also control for basic individual and household characteristics prior to the crisis.

Therefore I estimate the following equation:

$$\Delta y_{i,c,d,1997-2000} = \beta_0 + \beta_1 shock_d + \beta_2 X_{i,c,d,1997} + \beta_3 H_{i,c,d,1997} + \beta_4 Z_{c,d,1997} + \beta_5 W_{d,1997} + \beta_6 Province_{1997} + \varepsilon_{i,c,d}, \quad (3)$$

where $\Delta y_{i,c,d,1997-2000}$ is the change in men's or women's outcome in couple i , community c , and district d .¹¹ $shock_d$ is the consumption shock in district d . $X_{i,c,d,1997}$ is a vector of couple characteristics including the wife's age and years of education and the husband's age and years of

education. $H_{i,c,d,1997}$ is a vector of household characteristics in 1997 including the per capita household consumption, age composition, gender composition and education composition.¹² $Z_{c,d,1997}$ is a vector of community characteristics in 1997 including remoteness, infrastructure, and main industry as source of income.¹³ $W_{d,1997}$ is a vector of district characteristics. It includes the percentage of the labor force who are searching for a job, the percentage of workers in the district who are female, the percentage of male workers who are formal (wage) workers, the percentage of female workers who are formal (wage) workers, and the percentage of workers in different industries. $Province_{1997}$ is a vector of province dummies in 1997. The IFLS sampled households from around 300 communities (villages in rural areas and the urban equivalent in urban areas). In each community around 20 households were sampled in the baseline survey. Therefore for all regressions I cluster the standard errors at the community level.

I look at the change in men's and women's working status (whether working), business assets, and non-business assets as outcome variables. Assets are calculated in monetary value. If the husband says he owns 20 percent of a particular asset, the value of this asset is 20 percent of the total value of the asset. Asset values in 2000 are deflated to the 1997 price level using the BPS province level consumer index. The IFLS asks about business and non-business assets separately. It also asks about farm and non-farm business assets separately. Business assets usually include land for business use, house for business use, livestock for business (usually farm) use, vehicles for business use, and equipments for business use. Non-business assets usually include land not for business use, house not for business use, vehicles not for business use, livestock not for business use, savings, jewelry, and furniture. Therefore I add the individual owned value across all business asset categories to calculate the total value of business assets owned by the individual, and similarly for non-business assets. For $shock_d$ I use the 1997–1998 shock, and alternatively use the 1997–2000 shock, whose calculations are explained in more detail in the previous section. I use the linear probability model to model the change in working status.¹⁴

I estimate Equation (3) separately for urban and rural areas because urban and rural areas in Indonesia are systematically different in terms of stage of development, industrial composition, cultural norms, etc. The dynamics during the AFC were also different for urban and rural areas. I use couples for whom I have full information on the change in all outcome variables (working status, business assets, non-business assets) for both husband and wife and other characteristics controlled for in Equation (3) to conduct the regressions. Sample size has become significantly lower than the number of couples who are covered in IFLS in 1997 and 2000, and this is due to several reasons. First, not all couples are interviewed in both 1997 and 2000. Therefore the attrition of the survey between 1997 and 2000 causes a slight drop in sample size. Second, for couples who are interviewed in either 1997 or 2000, not all couples have reported full information for all the variables included in my regression equation. This is a bigger cause of drop in sample size. Third, in 1997 only communities which are the original communities in 1993 (the baseline survey) had a community survey. Therefore couples in 1997 who have moved out of their original community in 1993 do not have corresponding community characteristics in 1997. This has caused a slight drop in sample size. We can see that all these causes of drop in sample size are subject to selection problems. Therefore the results shown in the next section are more valid for this selected group.

After estimating Equation (3), I am also interested in finding out whether the association between the shock and the change in individual outcomes differs by household characteristics. The analysis with interactions can help to uncover more about the nature of intra-household allocation. If we see that the crisis affects men and women differently, it would be interesting to see if the gender difference in household allocation is associated with certain household characteristics or can be influenced by policy. For example, it would be interesting to see whether the gender

TABLE 3 Summary statistics: individual and household characteristics

| | Urban couples, N=1101 | | Rural couples, N=1794 | |
|---|--------------------------|-----------|--------------------------|-----------|
| | Mean | Std. Dev. | Mean | Std. Dev. |
| 1997–1998 shock | −0.09 | 0.10 | −0.09 | 0.09 |
| 1997–2000 shock | −0.03 | 0.06 | −0.02 | 0.05 |
| Working wife 1997 | 0.50 | 0.50 | 0.59 | 0.49 |
| Change in working wife | 0.09 | 0.48 | 0.15 | 0.55 |
| Working husband 1997 | 0.92 | 0.28 | 0.96 | 0.20 |
| Change in working husband | −0.01 | 0.30 | −0.01 | 0.22 |
| Business asset wife 1997 (× 10,000 Rp) | 146 | 1630 | 194 | 685 |
| Change in business asset wife (× 10,000 Rp) | −37 | 1800 | 39 | 992 |
| Business asset husband in 1997 (× 10,000 Rp) | 331 | 1730 | 551 | 2060 |
| Change in business asset husband (× 10,000 Rp) | 49 | 1920 | 119 | 3000 |
| Non-business asset wife in 1997 (× 10,000 Rp) | 868 | 2230 | 309 | 496 |
| Change in non-business asset wife (× 10,000 Rp) | 216 | 3080 | 125 | 614 |
| Non-business asset husband in 1997 (× 10,000 Rp) | 1290 | 3300 | 387 | 650 |
| Change in non-business asset husband (× 10,000 Rp) | −125 | 2920 | 72 | 660 |
| Household per capita monthly consumption 1997 (× 10,000 Rp) | 38 | 122 | 27 | 41 |
| Whether receiving assistance in 2000 | 0.05 | 0.22 | 0.03 | 0.16 |
| Whether receiving subsidy in 2000 | 0.34 | 0.48 | 0.48 | 0.50 |
| Bargaining power index wife 1997* | 0.31 | 0.22 | 0.30 | 0.22 |
| Individual characteristics in 1997 | | | | |
| Age of wife in 1997 | 39.31 | 9.71 | 39.32 | 10.83 |
| Age of husband in 1997 | 44.63 | 10.93 | 45.26 | 12.43 |
| Years of school wife in 1997 | 6.42 | 4.10 | 4.05 | 3.68 |
| Years of school husband in 1997 | 7.64 | 4.14 | 5.06 | 3.94 |
| Household composition in 1997 | | | | |
| Household size | 4.99 | 1.90 | 4.68 | 1.73 |
| Number younger than 15 | 1.51 | 1.22 | 1.62 | 1.31 |
| Number older than 65 | 0.13 | 0.36 | 0.16 | 0.39 |
| Number female | 2.49 | 1.28 | 2.34 | 1.17 |
| Number of working age members with no school | 0.20 | 0.51 | 0.48 | 0.73 |
| Number of working age members with elementary school | 1.28 | 1.15 | 1.53 | 1.08 |
| Number of working age members with junior high school | 0.60 | 0.85 | 0.40 | 0.68 |
| Number of working age members with senior high school | 0.96 | 1.13 | 0.37 | 0.72 |
| Number of working age members with post-secondary school | 0.22 | 0.63 | 0.06 | 0.28 |
| Province in 1997 | | | | |
| North Sumatra | 0.09 | 0.29 | 0.05 | 0.22 |
| West Sumatra | 0.04 | 0.20 | 0.04 | 0.20 |

(Continues)

TABLE 3 (Continued)

| | Urban couples, N=1101 | | Rural couples, N=1794 | |
|--------------------|--------------------------|-----------|--------------------------|-----------|
| | Mean | Std. Dev. | Mean | Std. Dev. |
| South Sumatra | 0.02 | 0.15 | 0.04 | 0.21 |
| Lampung | 0.01 | 0.12 | 0.05 | 0.22 |
| Jakarta | 0.16 | 0.37 | | |
| West Java | 0.14 | 0.35 | 0.12 | 0.33 |
| Central Java | 0.12 | 0.33 | 0.18 | 0.38 |
| Yogyakarta | 0.10 | 0.30 | 0.05 | 0.21 |
| East Java | 0.16 | 0.37 | 0.18 | 0.39 |
| Bali | 0.04 | 0.18 | 0.08 | 0.27 |
| West Nusa Tenggara | 0.02 | 0.15 | 0.09 | 0.29 |
| South Kalimantan | 0.03 | 0.18 | 0.06 | 0.23 |
| South Sulawesi | 0.05 | 0.22 | 0.06 | 0.23 |

Source: Author, based on data from IFLS and SUSENAS. Sample includes couples for whom there are no missing variables for all variables included in the table. Changes in asset values are at the 1997 price level, where 2000 values are deflated using BPS provincial CPI. Consumption in 1997 is also at the 1997 price level. *N=1086 for bargaining index in urban area.

difference in household allocation during the crisis exists more in poor or in rich households. It would also be interesting to see if household members' initial bargaining position is associated with how individual members change their allocations during the crisis. Also it is interesting to see whether social safety net programs that were introduced on a large scale in Indonesia during the AFC influenced household allocations during the crisis. Therefore I estimate the following three equations:

$$\begin{aligned} \Delta y_{i,c,d,1997-2000} = & \beta_0 + \beta_1 shock_d + \alpha_1 consumption_{i,c,d,1997} + \alpha_2 shock_d \times consumption_{i,c,d,1997} \\ & + \beta_2 X_{i,c,d,1997} + \beta_3 H_{i,c,d,1997} + \beta_4 Z_{c,d,1997} + \beta_5 W_{d,1997} + \beta_6 Province_{1997} + \epsilon_{i,c,d}, \end{aligned} \quad (4)$$

where $consumption_{i,c,d,1997}$ is either household per capita consumption in 1997 or an indicator variable indicating that the household's per capita consumption in 1997 is below the median;

$$\begin{aligned} \Delta y_{i,c,d,1997-2000} = & \beta_0 + \beta_1 shock_d + \gamma_1 assistance_{i,c,d,2000} + \gamma_2 shock_d \times assistance_{i,c,d,2000} \\ & + \gamma_3 subsidy_{i,c,d,2000} + \gamma_4 shock_d \times subsidy_{i,c,d,2000} \\ & + \beta_2 X_{i,c,d,1997} + \beta_3 H_{i,c,d,1997} + \beta_4 Z_{c,d,1997} + \beta_5 W_{d,1997} + \beta_6 Province_{1997} + \zeta_{i,c,d}, \end{aligned} \quad (5)$$

where $assistance_{i,c,d,2000}$ is whether the household receives any kind of transfer either in cash or in kind from the government or a nongovernmental organization (NGO), and $subsidy_{i,c,d,2000}$ is whether the household receives any kind of subsidy from the government (including rice, sugar, cooking oil, etc.); and

$$\begin{aligned} \Delta y_{i,c,d,1997-2000} = & \beta_0 + \beta_1 shock_d + \delta_1 power_{i,c,d,1997} + \delta_2 shock_d \times power_{i,c,d,1997} \\ & + \beta_2 X_{i,c,d,1997} + \beta_3 H_{i,c,d,1997} + \beta_4 Z_{c,d,1997} + \beta_5 W_{d,1997} + \beta_6 Province_{1997} + \upsilon_{i,c,d}, \end{aligned} \quad (6)$$

where $power_{i,c,d,1997}$ is the wife's decision-making power in 1997 (this is calculated from a decision module in the IFLS that asks who makes decisions in various categories of household decision-making; I take the percentage of categories in which the wife has sole decision-making power as the measure for this study).

5 | RESULTS

5.1 | Summary statistics

From Table 3 we can see that the average consumption shocks across districts are 9 percentage points for urban and rural areas from 1997 to 1998, and 3 percentage points for urban areas and 2 percentage points for rural areas from 1997 to 2000. Negative numbers represent a fall in the growth rate relative to the pre-crisis trend. In urban areas wives' employment rate increased from 50 percent in 1997 to 59 percent in 2000, and in rural areas it increased from 59 percent in 1997 to 74 percent in 2000. This is a large increase in just three years. On the other hand, husbands' employment rate has dropped by 1 percentage point in both urban and rural areas.

In terms of changes in assets, all values are adjusted for inflation using the BPS province consumer price index and therefore are real values at the 1997 price level. Wives' business asset values fell on average by 370,000 rupiah in urban areas between 1997 and 2000, from 1,460,000 rupiah in 1997. This is a large drop compared with the 1997 average business asset value. Women's business assets increased in rural areas by 390,000 rupiah, from 1,940,000 rupiah in 1997. Husbands' business asset values increased in both urban and rural areas from 1997 to 2000, by 490,000 rupiah and 1,190,000 rupiah, respectively. Non-business asset values increased for wives on average between 1997 and 2000, while for husbands non-business assets values decreased in the urban area and increased in the rural area.

Household per capita consumption (also in 1997 prices) in urban areas in 1997 is on average 380,000 rupiah per month, and lower at 270,000 rupiah in rural areas. In 2000 about 5 percent of households in urban areas received cash or in-kind transfers from government or NGOs, while about 3 percent received these transfers in rural areas. About 34 percent of urban households and 48 percent of rural households received subsidies (in rice, sugar, cooking oil, etc.) in 2000.

In terms of intra-household decision-making power, in 1997 wives in both urban and rural areas were sole decision-makers in 30 percent of decision categories. The decision categories are expenditure on food eaten at home, expenditure on routine purchases, expenditure on the wife's clothes, expenditure on the husband's clothes, gifts for parties/weddings, time the husband spends socializing, and time the wife spends socializing.

In 1997 there was a clear difference between urban and rural areas in education level. Both wives and husbands in urban areas have about 1.5 more years of education than their rural counterparts. Household size and age composition did not differ between urban and rural areas. The average household size is about 4.8, with 1.5 persons under 15.

Table 4 shows that first of all, the difference between districts in urban areas and districts in rural areas is not large. This is mainly due to the definition of urban/rural in IFLS; urban areas include urban segments of large districts that have both more urban areas and more rural areas. As a result there may be common districts between the urban and rural sample. Across districts, the proportion of the labor force searching for work in 1997 was between 8 and 10 percent. The proportion of workers who are women is between 36 and 39 percent. Districts that cover IFLS urban communities have a higher percentage of formal workers than districts that cover IFLS rural communities. Also the percentage of female workers who are formal is lower than the percentage of

male workers who are formal. In terms of industry composition, the largest industry in terms of employment is agriculture, followed by trade, restaurants and hotels, social services, and manufacturing.

Community characteristics show a much larger urban–rural divide than district characteristics. This reflects the Indonesian pattern that the geographically large districts have both urban and rural areas. Rural communities are much further from district and province capitals. While most households in urban areas have access to electricity, only about 70 percent of rural households have access to electricity. Also the percentage of communities whose main source of water is water piped into the house is much lower in rural areas than in urban areas.

Another interesting observation to make is that even in urban communities the main source of income is farming for 20 percent of communities. This is surprising, indicating either a special feature of urban livelihoods in Indonesia or a problem with the urban–rural categorization in IFLS. We can also see that in rural areas for the majority of communities the main source of income is farming. In urban areas, in 29 percent of communities the main source of income is trade, restaurants and hotels, and the other sectors that are likely to be the main source of income for urban communities are manufacturing (12 percent of communities), finance (7 percent of communities) and social services (13 percent of communities).

5.2 | Main results

Table 5 summarizes the regression results from Equation (3). We can see that the most consistent results are for change in wives' working status, change in wives' business asset values, and change in men's business asset values, all in the urban area.

A 10 percentage point drop in district consumption growth rate between 1997 and 1998 is significantly associated with a 4.2 percentage point increase in wives' employment rate in the urban area. This is a quite large coefficient, considering the shock is in terms of a fall in growth rate and not in terms of a fall in absolute level. This means that if average household consumption in a district was increasing at about 10 percent per year from 1993 to 1997, and did not increase from 1997 to 1998, married women's employment increased on average by 4 percentage points from 1997 to 2000 in this district. This coefficient is also remarkably consistent when using 1997–2000 as the crisis period. On the other hand, the shock is not associated with the change in husbands' working status in the urban area. The fact that the coefficient changes sign when using another crisis period indicates weak association.

For the change in working status of wives and husbands in rural areas, there seems to be a consistently positive and large association between the shock and the change in wives' working status, suggesting that a drop in consumption growth is associated with a drop in wives' employment. Nevertheless since the coefficients are not significant and the standard errors are large, no conclusion can be drawn about this association. The association between the shocks and the change in husbands' working status in rural areas is neither large nor significant, so there seems to be no association in this regard.

Another consistent association between the shock and the change in wives' outcomes is in terms of change in business asset values. There is a positive association between both shock measures and the change in wives' business asset values in urban areas, although the magnitude is larger when using the 1997–2000 shock period. Although none of the coefficients are significant, the standard error is relatively small when using the 1997–2000 shock measure. A 10 percentage point drop in district consumption growth rate between 1997 and 2000 is associated with a decrease in wives' business asset value by 2,648,000 rupiah from 1997 to 2000. This is a quite large

coefficient, considering the average monthly per capita household consumption is only about 380,000 rupiah in urban areas in 1997 and the average business asset values of women in urban areas in 1997 were only about 1,460,000 rupiah.¹⁵ The association between the shock measures and change in husband's business asset values shows a similar pattern. A 10 percentage point drop in district consumption growth rate between 1997 and 2000 is associated with a decrease in husbands' business asset values by 2,564,000 rupiah from 1997 to 2000.

In rural areas, there is a positive and significant association between the 1997–2000 shock and the change in wives' business asset values, although the association with the 1997–1998 shock is small and nonsignificant. For the change in husbands' business asset values, the coefficient changes sign when using a different shock period.

In terms of change in non-business asset value, we can see that the association between the shock variables and the change in wives' non-business asset values in urban areas is negative, and significant when using the 1997–1998 shock period. The association between shock and change in husbands' non-business values is positive and large for both shock periods, but nonsignificant.

5.3 | Robustness checks

I conduct a set of robustness checks to see if the associations between shock measures and changes in wives' and husbands' outcomes are robust.

I estimate the same relationships by starting with no controls and adding additional controls gradually. More specifically, I add household and individual basic characteristics in 1997 first, as these controls are less likely to be confounding factors but just controls to reduce standard error. Then I add province dummies as controls, since they partially control for initial regional differences that may affect both the severity of the crisis and people's coping strategies. Then I add the district characteristics to further control for across-district variation in initial conditions. Finally, I add the community characteristics to further control for regional variation in initial conditions.

Tables 6–8 shows the results from the robustness checks. Standard errors are in parentheses, and *R*-squared values are in square brackets. In terms of change in working status, we can see that the association between the shock variables and changes in women's work in urban areas is highly consistent across all specifications, and significant both without controls and with full controls. Also the magnitude of the association is similar without controls and with full controls. Therefore this relationship is robust, and we can say with confidence that a 10 percentage point drop in district consumption growth is associated with a 4 percentage point increase in wives' employment. The association between the shock variables and changes in husbands' working status is much less consistent across specifications, and not significant for any specification. The same is true for changes in wives' working status and changes in husbands' working status in rural areas. Therefore in terms of change in working status, there is convincing evidence of a large association between regional shock and changes in wives' working status in urban areas.

In terms of changes in business asset values, we can see that the association between the 1997–2000 shock and the change in wives' business asset values in urban areas is significant without controls, and significant for most specifications. With full controls this association is not significant, but the standard error is small. The magnitude of this association changes for different specifications, although the magnitude with no controls and the magnitude with full controls are similar. The association between 1997–1998 shock and changes in wives' asset values in urban areas is also positive for all specifications, although nonsignificant and of smaller magnitude. Therefore there is evidence of a large association between the shock and changes in wives' business asset values in urban areas. A similar pattern can be found for changes in husbands' business asset values in urban areas. The

TABLE 4 Summary statistics: district and community characteristics

| | Urban | | Rural | |
|---|-----------------|-----------|-----------------|-----------|
| | Mean | Std. Dev. | Mean | Std. Dev. |
| District characteristics in 1997 | 81 districts | | 91 districts | |
| % of labor force searching for job | 0.10 | 0.05 | 0.08 | 0.03 |
| % of workers who are female | 0.36 | 0.06 | 0.39 | 0.06 |
| % of male workers who are formal | 0.46 | 0.16 | 0.33 | 0.13 |
| % of female workers who are formal | 0.39 | 0.18 | 0.25 | 0.14 |
| % of workers in agriculture | 0.30 | 0.24 | 0.51 | 0.18 |
| % of workers in mining | 0.01 | 0.01 | 0.01 | 0.01 |
| % of workers in manufacturing | 0.13 | 0.08 | 0.10 | 0.07 |
| % of workers in utility | 0.01 | 0.01 | 0.00 | 0.00 |
| % of workers in construction | 0.06 | 0.03 | 0.04 | 0.02 |
| % of workers in transportation | 0.06 | 0.03 | 0.04 | 0.02 |
| % of workers in trade, restaurant and hotels | 0.23 | 0.09 | 0.16 | 0.06 |
| % of workers in finance | 0.01 | 0.01 | 0.00 | 0.00 |
| % of workers in social service | 0.19 | 0.10 | 0.12 | 0.05 |
| Community characteristics in 1997 | 153 communities | | 126 communities | |
| Time to district capital (in hours) | 0.40 | 0.40 | 1.19 | 1.60 |
| Distance to district capital (km) | 7.05 | 8.24 | 32.76 | 34.52 |
| Time to province capital (in hours) | 2.25 | 2.18 | 3.93 | 3.12 |
| Distance to province capital (km) | 94.82 | 112.76 | 155.53 | 125.75 |
| Predominant source of drinking water is pipe into house | 0.50 | 0.50 | 0.13 | 0.33 |
| Predominant source of bathing water is pipe into house | 0.47 | 0.50 | 0.09 | 0.28 |
| Percent of households with electricity | 0.94 | 0.10 | 0.66 | 0.32 |
| Main source of income | | | | |
| Farming | 0.20 | 0.42 | 0.93 | 0.26 |
| Mining | 0.01 | 0.08 | | |
| Manufacturing | 0.12 | 0.33 | 0.02 | 0.15 |
| Construction | 0.05 | 0.21 | | |
| Trade, restaurants and hotels | 0.29 | 0.45 | 0.01 | 0.09 |
| Transportation | 0.02 | 0.14 | | |
| Finance | 0.07 | 0.26 | | |
| Social services | 0.13 | 0.34 | 0.01 | 0.09 |
| Other | 0.12 | 0.32 | 0.03 | 0.18 |

Source: Author, based on data from IFLS (community characteristics) and SUSENAS (district characteristics). Sample includes districts and communities where couples in Table 3 live in 1997.

association with no controls, however, is not significant and the magnitudes changes more across specifications, indicating a stronger selection problem for this outcome variable. Therefore there is not enough evidence for an association between the shock variables and changes in husbands'

TABLE 5 Effect of district level shock on change in individual outcomes during the crisis

| | | Urban <i>N</i> =1101 couples | | Rural <i>N</i> =1794 couples | |
|--|---------------------------|---------------------------------|---------------------------|---------------------------------|---------------------------|
| | | Wife | Husband | Wife | Husband |
| Effect on change in working status | Effect of 1997–1998 shock | −0.42** (0.21) [0.06] | −0.04 (0.14) [0.04] | 0.36 (0.25) [0.09] | 0.03 (0.07) [0.05] |
| | Effect of 1997–2000 shock | −0.40 (0.41) [0.06] | 0.31 (0.28) [0.04] | 0.43 (0.37) [0.09] | 0.12 (0.12) [0.05] |
| | Effect of 1997–1998 shock | 857 (793) [0.06] | 946 (607) [0.05] | 185 (321) [0.02] | −2163 (2957) [0.02] |
| Effect on change in business asset (× 10,000 Rp) | Effect of 1997–2000 shock | 2648 (1682) [0.06] | 2564* (1505) [0.05] | 1037* (536) [0.02] | 3595* (2171) [0.03] |
| | Effect of 1997–1998 shock | −2326* (1293) [0.05] | 2495 (2338) [0.09] | −370 (251) [0.08] | −309 (218) [0.03] |
| | Effect of 1997–2000 shock | −154 (3165) [0.04] | 3530 (3170) [0.07] | −63 (348) [0.08] | 357 (345) [0.03] |

Source: Author, based on data from IFLS and SUSENAS. Sample includes couples for whom there are no missing variables for either husband or wife in Table 3. Changes in asset values are at the 1997 price level, where 2000 values are deflated using BPS provincial CPI. Consumption in 1997 is also at the 1997 price level. Numbers in parentheses are standard errors. Numbers in square brackets are *R*-squared values. *Significant at 10% level, **significant at 5% level, ***significant at 1% level. Standard errors are clustered at the community level.

business asset values in urban areas. For changes in wives' business asset values in rural areas, the association with the 1997–2000 shock is consistent across specifications and significant both without controls and with full controls. Also the association with the 1997–1998 shock is positive for all specifications. Therefore there is evidence for an association between the shock and changes in wives' asset values in rural areas. For husbands in rural areas, although the association is significant for many specifications, it changes sign when using a different shock period. This is an interesting finding, but it is hard to conclude about the association for husbands in rural areas.

In terms of non-business assets, the association between shock variables and the change in husbands' asset value in urban areas is large and significant in the absence of controls, becoming smaller and less significant when more controls are added. With full controls it becomes much smaller and nonsignificant. This is a strong sign of a selection problem, so not much can be concluded about the association between the regional shock and the change in husband's non-business asset values in urban areas. For wives in urban areas, wives in rural areas, and husbands in rural areas, there is no consistent evidence for an association with the regional shock either.

To conclude, the stronger evidence is for association between shocks and changes in wives' working status in urban areas, changes in wives' business asset values in urban areas, and changes

TABLE 6 Robustness checks: Change in working

| Urban wives | | Urban husbands | | Rural wives | | Rural husbands | |
|--|------------|----------------|------------|-------------|------------|----------------|------------|
| 1998 shock | 2000 shock | 1998 shock | 2000 shock | 1998 shock | 2000 shock | 1998 shock | 2000 shock |
| No control | | | | | | | |
| −0.26* | −0.43* | 0.02 | 0.08 | −0.00 | −0.02 | 0.01 | 0.09 |
| (0.15) | (0.24) | (0.09) | (0.14) | (0.14) | (0.24) | (0.06) | (0.10) |
| [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] |
| Control for household characteristics in 1997 | | | | | | | |
| −0.23 | −0.38 | 0.02 | 0.07 | −0.02 | −0.09 | −0.00 | 0.09 |
| (0.15) | (0.24) | (0.09) | (0.15) | (0.14) | (0.24) | (0.06) | (0.10) |
| [0.02] | [0.02] | [0.02] | [0.02] | [0.01] | [0.01] | [0.02] | [0.02] |
| Additional control for province dummies | | | | | | | |
| −0.37* | −0.52 | 0.01 | 0.15 | 0.05 | 0.15 | 0.07 | 0.16 |
| (0.19) | (0.32) | (0.12) | (0.20) | (0.19) | (0.28) | (0.08) | (0.12) |
| [0.03] | [0.03] | [0.02] | [0.02] | [0.06] | [0.06] | [0.03] | [0.03] |
| Additional control for district characteristics | | | | | | | |
| −0.31 | −0.51 | 0.04 | 0.26 | 0.11 | −0.01 | 0.02 | 0.13 |
| (0.22) | (0.38) | (0.14) | (0.24) | (0.21) | (0.31) | (0.09) | (0.13) |
| [0.04] | [0.04] | [0.03] | [0.03] | [0.07] | [0.07] | [0.04] | [0.04] |
| Additional control for community characteristics | | | | | | | |
| −0.42** | −0.40 | −0.04 | 0.31 | 0.36 | 0.43 | −0.03 | 0.12 |
| (0.21) | (0.41) | (0.14) | (0.28) | (0.25) | (0.37) | (0.07) | (0.12) |
| [0.06] | [0.06] | [0.04] | [0.04] | [0.09] | [0.09] | [0.05] | [0.05] |

Source: Author, based on data from IFLS and SUSENAS. Sample includes couples for whom there are no missing variables for either husband or wife in Table 3. Urban sample size is 1101, and rural sample size is 1794. Changes in asset values are at the 1997 price level, where 2000 values are deflated using BPS provincial CPI. Numbers in parentheses are standard errors. Numbers in square brackets are *R*-squared values. *Significant at 10% level, **significant at 5% level, ***significant at 1% level. Standard errors are clustered at the community level.

in wives' business asset values in rural areas. This finding indicates that wives made more adjustments during the crisis in terms of working more and selling business assets. One caveat to note is that a decrease in asset value is not equivalent to selling assets. The fact that only wives' business asset values are associated with the regional shock, however, still points to a gender difference in crisis-related response. There is no clear reason to think that during the crisis the business assets women usually own had a bigger drop in real value compared with the business assets men usually own. Therefore, the association between the shock and changes in wives' business asset values still points more to the possibility that wives sold some of their business assets in harder-hit districts.

5.4 | Interaction with household characteristics

Since the change in women's working status and business asset values is associated with regional shocks, it will be interesting to see whether this association is driven more by poorer or richer households. Therefore I interact the shock variables with 1997 household per capita consumption, and also with an indicator variable that the household per capita consumption is below median

TABLE 7 Robustness checks: Change in business assets ($\times 10,000$ Rp)

| Urban wives | | Urban husbands | | Rural wives | | Rural husbands | |
|--|------------|----------------|------------|-------------|------------|----------------|------------|
| 1998 shock | 2000 shock | 1998 shock | 2000 shock | 1998 shock | 2000 shock | 1998 shock | 2000 shock |
| No control | | | | | | | |
| 538 | 1894** | 350 | 728 | 239 | 750* | -937 | 2636** |
| (551) | (878) | (591) | (943) | (255) | (433) | (770) | (1311) |
| [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] |
| Control for household characteristics in 1997 | | | | | | | |
| 341 | 1515* | 518 | 1023 | 199 | 643 | -998 | 2632** |
| (552) | (891) | (597) | (964) | (258) | (439) | (778) | (1326) |
| [0.03] | [0.03] | [0.01] | [0.01] | [0.00] | [0.01] | [0.01] | [0.01] |
| Additional control for province dummies | | | | | | | |
| 1147 | 3420*** | 988 | 2177* | 198 | 1215** | -1962* | 2623* |
| (709) | (1180) | (767) | (1279) | (348) | (519) | (1047) | (1566) |
| [0.03] | [0.04] | [0.01] | [0.02] | [0.01] | [0.01] | [0.02] | [0.02] |
| Additional control for district characteristics | | | | | | | |
| 784 | 3108** | 979 | 2984* | 154 | 985* | -2093* | 2818* |
| (827) | (1415) | (893) | (1529) | (391) | (565) | (1179) | (1706) |
| [0.04] | [0.05] | [0.03] | [0.03] | [0.02] | [0.02] | [0.02] | [0.02] |
| Additional control for community characteristics | | | | | | | |
| 857 | 2648 | 946 | 2564* | 185 | 1037* | -2163 | 3595 |
| (793) | (1682) | (607) | (1505) | (321) | (536) | (2957) | (2171) |
| [0.06] | [0.06] | [0.05] | [0.05] | [0.02] | [0.02] | [0.02] | [0.03] |

Source: Author, based on data from IFLS and SUSENAS. Sample includes couples for whom there are no missing variables for either husband or wife in Table 3. Urban sample size is 1101, and rural sample size is 1794. Changes in asset values are at the 1997 price level, where 2000 values are deflated using BPS provincial CPI. Numbers in square brackets are *R*-squared values. *Significant at 10% level, **significant at 5% level, ***significant at 1% level. Standard errors are clustered at the community level.

level. The result from these estimations (Equation (4)) are shown in the first and second panels of Table 9.

We can see that coefficients on the interaction with consumption variables are not significant when the dependent variable is change in women's business asset values. When the dependent variable is change in working status in urban areas, however, the interaction with baseline consumption level is positive and significant, indicating that a richer household is less likely to use the increase in wives' work as a crisis coping strategy. When the interaction is with a below-median indicator, the coefficient on the interaction is significant, large and positive, indicating that below-median households are less likely to use the change in wives' working status as a coping strategy. These two pieces of evidence point to a nonlinear relationship between baseline consumption level and the use of wives' work as a coping strategy. This could be due to the fact that in very poor households women were already working, and therefore there is not much room for an increase during the crisis. In better-off households women are less likely to work, so they have flexibility to adjust their work status. If the households are very rich, however, they do not need to use the increase in wives' work to cope with the crisis.

TABLE 8 Robustness checks: Change in non-business assets ($\times 10,000$ Rp)

| Urban wives | | Urban husbands | | Rural wives | | Rural husbands | |
|--|------------|----------------|------------|-------------|------------|----------------|------------|
| 1998 shock | 2000 shock | 1998 shock | 2000 shock | 1998 shock | 2000 shock | 1998 shock | 2000 shock |
| No control | | | | | | | |
| -253 | 455 | 2913*** | 6280*** | -223 | 379 | -6 | 445 |
| (947) | (1511) | (894) | (1420) | (157) | (268) | (169) | (288) |
| [0.00] | [0.00] | [0.01] | [0.02] | [0.00] | [0.00] | [0.00] | [0.00] |
| Control for household characteristics in 1997 | | | | | | | |
| -92 | 1070 | 2551*** | 5879*** | -212 | 405 | -49 | 401 |
| (956) | (1545) | (891) | (1434) | (158) | (270) | (171) | (291) |
| [0.01] | [0.01] | [0.05] | [0.05] | [0.02] | [0.02] | [0.01] | [0.01] |
| Additional control for province dummies | | | | | | | |
| -672 | 794 | 2060* | 5369*** | -291 | 231 | -46 | 529 |
| (1229) | (2052) | (1138) | (1895) | (209) | (312) | (231) | (345) |
| [0.01] | [0.01] | [0.06] | [0.06] | [0.06] | [0.06] | [0.01] | [0.01] |
| Additional control for district characteristics | | | | | | | |
| -1432 | 129 | 1179 | 4588** | -232 | 114 | -193 | 411 |
| (1430) | (2453) | (1325) | (2268) | (235) | (339) | (259) | (375) |
| [0.03] | [0.03] | [0.07] | [0.08] | [0.07] | [0.07] | [0.02] | [0.02] |
| Additional control for community characteristics | | | | | | | |
| -2326* | -154 | 337 | 2495 | -370 | -63 | -309 | 357 |
| (1293) | (3165) | (920) | (2338) | (251) | (348) | (218) | (345) |
| [0.05] | [0.04] | [0.09] | [0.09] | [0.08] | [0.08] | [0.03] | [0.03] |

Source: Author, based on data from IFLS and SUSENAS. Sample includes couples for whom there are no missing variables for either husband or wife in Table 3. Urban sample size is 1101, and rural sample size is 1794. Changes in asset values are at the 1997 price level, where 2000 values are deflated using BPS provincial CPI. Numbers in square brackets are *R*-squared values. *Significant at 10% level, **significant at 5% level, ***significant at 1% level. Standard errors are clustered at the community level.

Since there is evidence of gender difference in terms of coping strategies and women seem to have borne more of the cost, a natural follow-up question is whether this difference is related to the intra-household power structure. In the IFLS there is direct information on intra-household decision-making in the sense that both husband and wife are asked who makes the decisions in a set of decision categories related to household life. Therefore I am able to construct an index of women's decision-making power based on this information. The approach I take is to calculate in what percentage of the categories wife has sole decision-making power, although many other measures of decision-making power can be derived from the rich information in the survey. When I interact this measure of wife's decision-making power in 1997 with the shock variables, we can see from the third panel in Table 9 that the interaction terms are not significant.

To alleviate the impact of the crisis on households, the Indonesian government has offered extensive social safety net programs, including cash transfers and subsidies. Therefore it is interesting to find out whether these programs worked as substitutes for the informal coping strategies households used. A rigorous evaluation of these programs requires utilizing exogenous variation in

TABLE 9 Effect of shock on change in wives' outcomes: interactions

| Shock period | Whether working | Business asset ($\times 10,000$ Rp) | |
|--|--------------------|--------------------------------------|-------------------|
| | Urban 1997–1998 | Urban 1997–2000 | Rural 1997–2000 |
| Interaction with baseline household per capita consumption | | | |
| Effect of shock | −0.56*** (0.22) | 2098 (1531) | 761 (660) |
| Effect of interaction (Consumption $\times 10,000$ Rp) | 0.004** (0.002) | 0.001 (0.001) | 0.001 (0.002) |
| Interaction with baseline indicator that household consumption is below median | | | |
| Effect of shock | −0.66** (0.26) | 3816* (2268) | 1352 (827) |
| Effect of interaction | 0.44** (0.28) | −2875 (1888) | −575 (805) |
| Interaction with baseline bargaining power index | | | |
| Effect of shock | −0.16 (0.26) | 1993 (1264) | 1269** (603) |
| Effect of interaction | −0.84 (0.63) | 1933 (1866) | −864 (863) |
| Interaction with whether receiving social safety net in 2000 | | | |
| Effect of shock | −0.35 (0.27) | 3493* (2012) | 1664** (765) |
| Effect of interaction with subsidy | −0.06 (0.40) | −2793* (1428) | −1485* (830) |
| Effect of interaction with assistance | −1.07 (1.17) | −1483 (1279) | −4194** (1812) |

Source: Author, based on data from IFLS and SUSENAS. Sample includes couples for whom there are no missing variables for all variables included in Table 3. Changes in asset values are at the 1997 price level, where 2000 values are deflated using BPS provincial CPI. Consumption in 1997 is also at the 1997 price level. Numbers in square brackets are *R*-squared values. *Significant at 10% level, **significant at 5% level, ***significant at 1% level. Standard errors are clustered at the community level.

program allocation, because social safety net programs during the crisis were targeted at poor households. This is beyond the scope of this study, however, and I simply add the interaction between program receiving status and the shock variables to my main regression equation. I use a dummy variable to indicate whether the household receives any social safety net program in 2000, and I distinguish between subsidy and transfer. As shown in Table 9, there is no evidence that receiving subsidy or assistance works as a substitute for the increase in wives' employment. There is strong evidence, however, that receiving subsidies worked as a substitute for the decrease in women's business asset values in urban areas, and the substitution is quite large. A similar pattern is found in rural areas. In rural areas, receiving subsidies and receiving assistance seem to be an almost full substitute and a more than full substitute for the decrease in women's business asset values, respectively. This is an interesting finding as it indicates that the social safety net programs may have played a large mitigating role during the crisis and substituted for other costly coping strategies of households, especially those pertaining to women.

6 | CONCLUSION

This study analyzed the impact of an aggregate economic shock, the Asian Financial Crisis, on married men and women in terms of their working status and asset holdings.

It used the deviation of district consumption growth during the crisis from the pre-crisis trend as a measure the severity of the crisis at the regional level, estimating the association between this shock and the change in wives' and husbands' outcomes during the crisis. I found that the regional shock is associated with an increase in wives' employment and a decrease in wives' business assets in urban areas, and is not associated with the the change in wives' non-business assets in urban areas. A 10 percentage points drop in growth rate of district consumption is associated with a 4 percentage point increase in women's employment, and a 2,648 thousand rupiah decrease in women's business assets in urban areas. In rural areas, the regional shock is associated with an decrease in wives' business assets as well. A 10 percentage points drop in the growth rate of district consumption is associated with a 1,037 thousand rupiah decrease in women's business assets in rural areas. The regional shock is not associated with the change in wives' working status and non-business assets in the rural areas. For husbands, the regional shock is not associated with the change in their outcomes in the urban or the rural areas. There is a U-shaped relationship between baseline household consumption level and the utilization of the increase in wives' work as a coping strategy in urban areas. There is strong evidence that receiving social safety net programs may have been a substitute for selling business assets by wives in both urban and areas. I also attempted to see whether the intra-household decision-making power of the wife before the crisis is associated with how she responds to the crisis, by utilizing direct information on household decision-making from the Indonesian data. But there seems to be no such association based on the decision-making power measure I use.

Based on these findings, it would be interesting to find out whether the effect of the crisis is long-term. There may be long-run consequences of changes in working status and the selling of business assets. The longitudinal nature of the IFLS may be useful for this analysis. The interaction between social security programs and the intra-household risk-coping allocation would also be a fruitful area of research. The preliminary evidence from this paper points to the possibility that social security programs can substitute for costly risk-coping strategies employed by women. Understanding more about this relationship will help with designing better social security systems.

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NOTES

¹ Using household surveys from 16 developing countries, Heltberg et al. (2014) find that households in all 16 countries face frequent economic shocks.

² Behrman (1988) finds that in rural India health outcomes of girls are affected more than those of boys by lack of food before the major harvest. Behrman and Deolalikar (1990) find that women's and girls' food intake shares a disproportionate burden of rising food prices in rural India. Dercon and Krishnan (2000) find that in rural Ethiopia women are more affected by adverse health shocks than men as their nutritional intake varies more with these shocks. Friedman and Schady (2009) and Baird et al. (2007) also find that girls' health is more negatively affected during recessions than boys' in low-income countries. The phenomenon that women's employment increases during economic crisis while men's decreases is found during several crisis episodes in Latin America and Asia. For a survey of these studies, refer to Sabarwal et al. (2011).

- ³ Note that the sample for this study consists of married couples who both report change in their own working status and asset holdings. Single individuals are not taken into consideration. Also couples who have missing information on the outcome variables are dropped.
- ⁴ The paper by Frankenberg et al. (2003) is an exception, taking a similar approach utilizing the regional variation of the shock and testing the effect of shocks on change in household consumption level.
- ⁵ Frankenberg et al. (2003) also use the change in average consumption at the sub-district level as a measure of the shock of the crisis, although it is unknown how sub-district level representative consumption data is available from Indonesia around the time of the crisis.
- ⁶ See Frankenberg et al. (2003) on the discussion in asset transactions during the crisis.
- ⁷ In 2000 US\$1 was about 10,000 rupiah.
- ⁸ The attrition rate between 1997 and 2000 is less than 5 percent.
- ⁹ Strauss et al. (2004) also use IFLS 2000 as the crisis round to analyze the effect of AFC in the entire book.
- ¹⁰ BPS statistics on provincial inflation are used to deflate the consumption levels.
- ¹¹ Note that households in the same community will be in the same district, but not vice versa.
- ¹² The full list of these characteristics is in Table 3.
- ¹³ A full list of the community characteristics is in Table 3.
- ¹⁴ I also tried to use ordered logit, and the results are similar. Since the linear probability model is easier to interpret, I use the linear model in my main results.
- ¹⁵ Note that 1997 asset value, 2000 asset value, and 1997 consumption value are all at 1997 prices.

REFERENCES

- Baird, S., Friedman, J., & Schady, N. (2007). *Aggregate economic shocks and infant mortality in the developing world*, World Bank Policy Research Working Paper no. 4346.
- Behrman, J. (1988). Intrahousehold allocation of nutrients in rural India: Are boys favored? Do parents exhibit inequality aversion? *Oxford Economic Papers*, 40(1).
- Behrman, J., & Deolalikar, A. (1990). The intrahousehold demand for nutrients in rural South India: Individual estimates, fixed effects, and permanent income. *Journal of Human Resources*, 25(4).
- Dercon, S. (2002). Income risk, coping strategies, and safety nets. *World Bank Research Observer*, 17(2).
- Dercon, S., & Krishnan, P. (2000). In sickness and in health: Risk-sharing within households in Ethiopia. *Journal of Political Economy*, 32(6).
- Frankenberg, E., Smith, J., & Thomas, D. (2003). Economic shock, wealth and welfare. *Journal of Human Resources*, 38(2).
- Frankenberg, E., Thomas, D., & Beegle, K. (1999). *The real costs of Indonesia's economic crisis: Preliminary findings from the Indonesia Family Life Survey*. RAND Labor and Population Program Working Paper Series, no. 4.
- Friedman, J., & Schady, N. (2009). *How many more infants are likely to die in Africa as a result of the Global Financial Crisis?* World Bank Policy Research Working Paper no. 5023.
- Hartono, D., & Ehrmann, D. (2001). *The Indonesian economic crisis and its impact on educational enrollment and quality*. Singapore: Institute of Southeast Asian Studies.
- Heltberg, R., Oviedo, A. M., & Talukdar, F. (2014). *What are the sources of risk and how do people cope? Insights from household surveys in 16 countries*. World Development Report Background Paper, World Bank, Washington, DC.
- Manning, C. (2000). Labor market adjustment to Indonesia's economic crisis: Context, trends and implications. *Bulletin of Indonesian Economic Studies*, 36(1).
- Morduch, J. (1995). Income smoothing and consumption smoothing. *Journal of Economic Perspectives*, 9(3).
- Poppele, J., Sumarto, S., & Pritchett, L. (2000). *Social impact of the Indonesian crisis: New data and policy implications*. Working Paper, SMERU Research Institute, Jakarta.
- Sabarwal, S., Sinha, N., & Buvinic, M. (2011). *How do women weather economic shocks? What we know*. Economic Premise no. 46. World Bank, Washington, DC.
- Smith, J. P., Thomas, D., Frankenberg, E., Beegle, K., & Teruel, C. (2002). Wages, employment and economic shocks: Evidence from Indonesia. *Journal of Population Economics*, 15(1).

- Soesastro, H. (1998). Survey of recent developments. *Bulletin of Indonesian Economic Studies*, 34(1).
- Strauss, J., Beegle, K., Dwiyanto, A., Herawati, Y., Pattinasarany, D., Satriawan, E., Sikoki, B., Sukamdi, & Witoe-lar, F. (2004). *Indonesia living standards: Before and after the financial crisis*. Singapore: Institute of Southeast Asian Studies.
- Wetterberg, A., Sumarto, S., & Pritchett, L. (1999). A National Snapshot of the Social Impact of Indonesia's Crisis. *Bulletin of Indonesian Economic Studies*, 35(3).

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