Income Risk and the Benefits of Social Insurance: Evidence from Indonesia and the United States*

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Abstract

This paper examines the welfare consequences of social safety nets in developing economies relative to developed economies. Using panel surveys of households in Indonesia and the United States, we find that food consumption falls by approximately ten percent when individuals become unemployed in both countries. This finding suggests that introducing a formal social insurance program would have small benefits in terms of reducing consumption fluctuations in Indonesia. However, in contrast with households in the U.S., Indonesians use costly methods such as reducing human capital investment to smooth consumption. The primary benefit of social insurance in developing countries may therefore come not from consumption smoothing itself but from reducing the use of inefficient smoothing methods.

Keywords: liquidity constraints, consumption smoothing, unemployment

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1 Introduction

Social safety nets in developing countries are far smaller than in developed economies. In 1996, the average expenditure on social insurance as a fraction of GDP in countries with below-median per capita income was 6.8 percent; the corresponding figure in above-median countries was 18.5 percent.[1] In the rapidly growing developing economies of South and East Asia, social insurance may be viewed as an unnecessary precaution that could potentially hamper growth without yielding substantial welfare gains. However, income shocks are prevalent in these economies. For example, at least 15 percent of households in the Indonesian Family Life Survey report some type of income shock in a given year. Recent large-scale shocks in this region such as the financial crises and the Asian tsunami further underscore the point that rapidly growing economies are not immune to large fluctuations. Hence, studying the welfare consequences of social insurance in developing economies is an important issue from a public finance perspective.

This paper takes a step in this direction by comparing the effects of shocks on consumption and other behaviors in developing and developed countries. The goal of this analysis is to provide empirical estimates of elasticities that are relevant in assessing the welfare consequences of social insurance in low-income economies.

Social insurance can only be beneficial if private insurance markets are inadequate. A straightforward and intuitive method of testing for full private market insurance frequently implemented in the development literature is to examine consumption fluctuations associated with shocks (Townsend 1994). We begin our analysis by comparing the effects of unemployment on consumption in the U.S. and Indonesia. We use two large panel datasets that contain consumption and labor force data for each of these countries – the Panel Study of Income Dynamics (PSID) and the Indonesian Family Life Survey (IFLS). We compare the growth rate of food consumption for agents who remain employed and agents who report job loss in the two panels. The mean and median consumption drop associated with unemployment in both economies is roughly 10 percent. The similarity in the consumption drop is remarkable given that Indonesia has no formal UI system whereas the United States

[1] Source: International Labour Organization (2000). See section 2 for further details on this data.

insures nearly 50 percent of the pre-unemployment wage for most individuals. It follows that the introduction of a social safety net in Indonesia would have a relatively small effect in terms of smoothing consumption, since consumption fluctuations are not very large to begin with.

While this finding might suggest that unemployment insurance cannot have large benefits in developing economies, it is important to examine the efficiency costs of the behaviors used by households to smooth consumption before drawing normative conclusions. If individuals mitigate consumption falls by resorting to costly measures – e.g. removing children from school – publicly provided insurance could increase welfare by obviating the need for such measures (Morduch 1999; Holzmann and Jørgensen 2001; Dercon 2002). It is plausible that low-income households resort to very costly measures to maintain consumption because their pre-unemployment consumption appears close to subsistence levels. In the Indonesian sample, the average household devotes nearly 70 percent of its budget on food, compared to 20 percent in the United States. Moreover, many households consume significantly fewer staples (such as rice) when the household head becomes unemployed, suggesting that subsistence constraints are likely to be a concern.

We make inferences about the cost of income smoothing in Indonesia by examining the methods households use to mitigate the income loss associated with unemployment. Strikingly, parents appear to sharply reduce expenditures on children's education substantially during idiosyncratic unemployment spells (see also Thomas et. al. 1999, who document similar patterns during the Asian financial crisis). To the extent that these reductions permanently diminish children's educational attainment, the welfare costs of transitory unemployment shocks could be particularly large and long-lived. In addition, more than 30 percent of households report raising labor supply to maintain their income stream. This high degree of responsiveness is further evidence that consumption-smoothing requires substantial changes in economic behavior for many Indonesian households. In contrast, households in the U.S. typically accomplish consumption smoothing by much less costly methods: Depleting buffer stocks, borrowing, and using social insurance benefits (Dynarski and Gruber, 1997).

In summary, the empirical evidence suggests that social insurance against transitory

shocks in developing countries could have substantial welfare benefits by reducing the use of inefficient smoothing techniques even though consumption volatility may not fall much. In a companion paper (Chetty and Looney, 2007), we establish this point formally in a simple model of risk and insurance by showing that the marginal benefit of insurance can be large when consumption drops are small because a high level of risk aversion leads to use of costly smoothing methods.

Of course, since we focus only on the benefits of social insurance in this paper, one cannot conclude from the results here that introducing a large safety net will raise aggregate welfare. The efficiency costs of social safety nets – e.g., reduced employment or opportunity costs such as forgone infrastructure or health investments – may also be large. On the other hand, the provision of unemployment insurance could also have efficiency-enhancing effects such as improved job matches and increased productivity (Acemoglu and Shimer 1999). Hence, the most important lesson of this study is perhaps that further research on social insurance programs in developing economies would be useful given their potential benefits.

The remainder of the paper proceeds as follows. The next section briefly describes existing social safety nets around the world. Section 3 compares the effects of unemployment on consumption in the United States and Indonesia empirically. Section 4 presents evidence on the cost of consumption smoothing methods used in Indonesia. Section 5 offers concluding remarks.

2 Social Safety Nets in Developing Countries

The size of the formal government-provided social safety net is substantially smaller in developing countries than in developed economies. According to statistics collected by the International Labour Organization (2000) for 91 countries in 1996, the average GDP share of social insurance – defined as total expenditures on social security, disability insurance, unemployment insurance, insurance against work-related injuries, and government provided health insurance – was 12.5 percent, with a range spanning 0.7 percent to 34.7 percent. Figure 1a plots the fraction of GDP devoted to social insurance programs against PPP-adjusted GDP per capita for these countries (with log scales). There is a striking positive

correlation between these two variables. As shown specification 1 of Table 1, a 1 percent increase in GDP per capita is associated with a 0.7 percent increase in the GDP share of social insurance in this cross-section. Perhaps more interestingly, the share of social insurance in government expenditure is also significantly higher in richer countries (Figure 1b and specification 2 in Table 1). Wealthier countries not only have higher government expenditure but also devote a larger fraction of that expenditure to social insurance.

Notably, the rapidly growing East Asian economies are on average 1.3 log units below the trend line plotted in Figure 1. In other words, they devote about 10 percentage points less of GDP to social insurance than other countries of similar income. East Asian economies devote on average 4.9 percent of their GDP to social insurance, compared with 16.5 percent in the U.S. and 22 percent in Europe. The positive relationship between GDP per capita and social safety nets is evident even among the small subsample of East Asian economies, with Indonesia having the lowest income and expenditure on social insurance and Japan having the highest of both.

These statistics understate the size of the social safety net in developing countries because they ignore other forms of in-kind and charity assistance, such as minimum food grants and NGO aid. However, these types of programs are generally quite limited in size (Gough et. al. 2004) and have two features that considerably limit their scope relative to western social safety nets. First, they are often means-tested and so may not provide consumption smoothing benefits to a majority of the population. Second, aid tends to flow toward large-scale catastrophes (such as the recent tsunami), with significantly fewer funds available for the smaller but more numerous idiosyncratic shocks like unemployment or disability.

There are many reasons that developing countries might choose not to implement such social safety nets. The most plausible reason is that financing such systems is infeasible given limitations on the government's ability to raise revenue (Gordon and Li 2005). While it is important to understand the political economy of social insurance in developing countries, the purpose of this study is to assess the normative value of such a program if it could be implemented. As illustrated by the recent introduction of a formal unemployment insurance system in Korea, some of these countries are reaching a point where such systems are feasible, making this normative question of practical relevance.

3 Consumption Fluctuations in Indonesia and the U.S.

The first step in determining whether there is a role for social insurance is to determine whether private insurance markets are adequate for agents to smooth consumption over shocks. The standard method of testing for full consumption insurance, originally implemented by Cochrane (1991) using U.S. data and Townsend (1994) using data on Indian farmers, is to directly examine the effect of idiosyncratic shocks such as job loss, health changes, or weather shocks on consumption. Under the assumption that utility is additively separable over consumption and leisure, a drop in consumption associated with these shocks is evidence that insurance markets are incomplete. More recently, in the public finance literature, Gruber (1997) and Browning and Crossley (2001) have implemented tests of full insurance that do not rely on additive separability by examining whether the size of consumption drops during unemployment spells is related to the amount of government-provided unemployment insurance. Their estimates show that with full unemployment insurance, consumption would not fall at all during job loss, implying that most or all of the consumption fluctuations identified in prior studies are indeed attributable to incomplete insurance rather than complementarity between consumption and leisure.

Following this literature, we begin our comparison of the welfare gains of social insurance in developing versus developed economies by examining consumption fluctuations. We first establish consistent measures of consumption drops for a specific shock in two economies. The shock we focus on is unemployment, since it is a well-defined and common event in both types of economies. We focus on the United States as the developed economy, primarily because of our familiarity with the institutions and the availability of the longitudinal PSID data there. We focus on Indonesia as the developing economy because it has high-quality panel data with a design very similar to the PSID. Indonesia also has minimal social insurance, making it an ideal laboratory in which to investigate the response of families to idiosyncratic shocks in a low-income economy without any social safety net. In this paper, we report results on the effects of unemployment on food consumption; as we discuss below, other analysis using broader measures of consumption from different datsets yields results similar to those we report here for food.

Our methods and empirical results are borrowed from and consistent with a large body of prior work. Most relevant are studies that examine responses of Indonesian households to shocks. The general consensus of these papers on Indonesia and of the literature on developing countries more generally is that transitory shocks seldom translate into significant fluctuations in consumption. This is because households have developed a variety of coping mechanisms, such as depleting household wealth and assets or borrowing (Frankenberg, Smith, and Thomas, 2003), increasing family labor supply (Beegle, Frankenberg, and Thomas 2000; Cameron and Worswick 2003), and reducing investments in children's health and education (Frankenberg, Thomas, and Beegle 1999; Thomas et. al. 2004). The smoothness of consumption has been taken to imply that economic shocks are not costly and that the scope for publicly provided social insurance for transitory shocks is small (Morduch 1995; Cameron and Worswick 2003).[2] Our goal here is to examine the validity of this normative conclusion by comparing behavioral responses to risk in Indonesia and the United States.

3.1 Data

We use two household-level panel datasets in this study. The first is the Panel Study of Income Dynamics (PSID), which tracks approximately 8,000 households and their children over more than 30 years in the United States. We use an extract of the PSID that contains consistently defined annual data between 1980 and 1993. The second is the Indonesian Family Life Survey (IFLS), which follows roughly 7,500 households over a span of 7 years, with interviews in 1993, 1997, and 2000.

To examine the impact of unemployment shocks, we focus on households for which longitudinal data exists and with household heads who were employed at the time of the immediately preceding interview. Hence, we include only households where the head was employed one year before the current interview in the PSID, and three or four years before in the IFLS.[3] We discuss below how the lack of annual data in the IFLS could affect the

[2] Studies which examine large, persistent health shocks in Indonesia (Gertler and Gruber (2002), Gertler, Levine, and Moretti (2001)) do find large consumption drops. However, Gruber and Gertler observe that their results offer "little insight into consumption smoothing of more likely and less costly risks" that are our primary focus here.

[3] We include all unemployed PSID households, and not just those who report receiving unemployment

comparison between the datasets.

Table 2 provides summary statistics on these households. Inflation in Indonesia was high over this time period, largely due to the 1998 financial crisis. The price level rose an average of 91 percent in the 3-4 year periods between interviews. In comparison, average annual inflation in the U.S. was 5 percent over our sample. The IFLS statistics reported in Table 2 are deflated using an aggregate CPI series from the Asian Development Bank and are converted to year 2000 dollars using the US/Rupiah exchange rate as of January 2000. The PSID statistics are deflated using the standard CPI series from the BLS. Note that real food consumption growth rates are small in both samples. In our empirical analysis, we use nominal growth rates for transparency, since inflation rates are thought to differ significantly across goods and regions in Indonesia around the financial crisis. Not surprisingly, nominal growth rates are much higher in the IFLS sample than in the PSID.

The most striking differences between the samples are in economic characteristics. PSID household heads earn on average $31,828 per year and PSID households consume $7,255 of food per year ($2,687 per person). In contrast, IFLS households report average total incomes of $1,484, and consume approximately $926 in food each year ($162 per person). Note that this figure includes food purchased and food produced (important given the large number of farmers in the data). Unemployment shocks appear more frequently in the IFLS data: approximately 8 percent of heads of household become unemployed between interview waves while 4 percent become unemployed between years in the PSID.

An important summary statistic in assessing households ability to smooth consumption is asset holdings. In Indonesia, the median household holds total assets of $2,692, which is substantially larger than annual income for many households. However, most of this wealth in held in farm and housing. Median liquid wealth (savings, stocks, and jewelry) is only $21, indicating that consumption-smoothing using liquid assets would be infeasible for many households. Frankenberg et al. (2003) report that few households move when they face shocks, suggesting that homes and farms are not directly used to smooth consumption either. Individuals could in principle take secured loans against their farm and housing collateral when shocks occur. Studying the extent to which individuals are able to use such

benefits.

secured loans to smooth consumption is an interesting direction for further research.

Because of data constraints, we define unemployment spells slightly differently in the two samples. In the PSID, a household head is defined to be unemployed if he or she is not working and searching for a job at the time of the interview. Replicating this measure in the IFLS is not always possible because weekly employment data (module TK) for the 1997 interview has not yet been publicly released. Instead, we use a question corresponding to employment status during the last 12 months. In 1993 and 2000, when both weekly and annual employment statistics are available, these measures are highly correlated and we find that the effects of unemployment on consumption are very similar regardless of which variable is used. We use the annual employment variable to maximize the sample size and to avoid focusing only on changes in outcomes over seven years, as required if we dropped 1997 interview information.

A concern with our definition of unemployment in the IFLS data is that the IFLS annual employment variable provides little detail on employment status, so that we cannot always differentiate involuntary unemployment from endogenous transitions out of the labor force such as retirement. The work by Frankenberg, Thomas, and Beegle (199) addresses this issue better by using additional unpublished data. The results we report below are very similar to their results. In addition, when we restrict the sample to cases where we do know whether the individual is still in the labor force, we obtain similar point estimates. These findings suggest that this limitation of our data is not a significant source of bias.

3.2 Results

We begin our analysis with a simple comparison of growth rates of food consumption in the U.S. and Indonesia. Define the growth rate of food consumption for household i from year t to year t' as

$$g_{it} = \log c_{it} - \log c_{it'}$$

where c_{it} denotes household i's food consumption in period t. Ideally, the gap between t and t' would be small, but in Indonesia data is available only every 3-4 years while in the U.S. data is annual. In the baseline analysis, we attempt to get as close a measure to the

true drop as possible in each dataset, by examining the growth rate from t to $t+1$ in the U.S. and t to $t+3$ or $t+4$ (as data permits) in Indonesia.

Our basic identification strategy is to divide our sample of employed heads-of-household in the pre-period year t' into two groups: Job losers, who reported being unemployed at the time of the survey in year t, and job keepers, who reported still having a job. We then compare the distribution of growth rates for these two groups to estimate the effect of unemployment on consumption. The key identification assumption that must hold for this method to give a consistent estimate of the causal effect of unemployment on consumption growth is that the "treatment" group of job losers and the "control" group of job-keepers have identical consumption growth rates absent the shock. This identification assumption may be questionable given that individuals prone to job loss are generally lower skill types, and therefore may have relatively lower rates of trend wage and consumption growth in a society with increasing income inequality. In this case, the simple differences below will overstate the true consumption drop caused by unemployment. We implement some tests to address this concern below.

We first demonstrate the effect of unemployment on food consumption using the long time series available in the PSID data with an "event study" in Figure 2. This figure is constructed by redefining as year 0 the year of job loss for the set of household heads who lost their jobs once during the PSID sample. We then plot real average annual consumption growth rates (more precisely, change in real log household consumption) against year relative to year of job loss (e.g. -3 is 3 years before job loss). The figure shows that food consumption grows at a real rate of roughly 2-4 percent per year before time 0, and then drops by nearly 10 percent in the year of job loss. Consumption then recovers gradually over the next few years back to its original level. This graph confirms that unemployment causes a sharp, temporary decline in consumption for the typical household in the United States, consistent with the results of Cochrane (1991) and Gruber (1997). Unfortunately, a similar graph showing a long pre-event and post-event period cannot be drawn for Indonesia because there are at most three observations per household in the IFLS. We are therefore forced to compare single observations on growth rates in consumption from time -1 to time 0 across job losers and job keepers to identify the effect of unemployment in the IFLS. We adopt a similar

strategy in the PSID for purposes of comparability.

We begin our comparison of Indonesia and the U.S. with a nonparametric, graphical analysis of the effect of job loss on food consumption. We estimate kernel densities for the distribution of nominal growth rates by employment status in each country. Following the convention in the consumption growth literature (see e.g. Zeldes 1989 or Gruber 1997), we trim outliers (the lower and upper 2 percent of the reported distribution), though our results are insensitive to this restriction. The kernel densities are estimated using an "optimal" bandwith chosen to minimize the asymptotic mean squared error of the fitted distribution.

Figure 3a plots the density of growth rates for job losers (red) and keepers (blue) in Indonesia. It is clear that unemployment leads to a left-shift in the distribution, indicating that households are unable to fully smooth consumption over this transitory shock. The medians of each distribution are depicted by vertical lines of corresponding color. The median nominal growth rate of food consumption for job keepers in the sample is 67 percent (due to the high rate of inflation in Indonesia over this period), in comparison with a growth rate of 56 percent for job losers. Hence, at the median, unemployment appears to reduce food consumption by approximately 11 percent.

Figure 3b plots analogous densities for the United States. Again, it is clear that agents are not fully insured, consistent with the results of Gruber (1997). Of greater interest here is the comparison of these distributions to their analogs in Indonesia. The distribution of growth rates reported by Indonesian households has variance twice as high as that in the U.S., which could be either because of measurement error or because outcomes in developing countries tend to be more stochastic. Despite this general difference in the distributions, the within-sample difference between job losers and job keepers is strikingly similar. In the U.S., the median nominal growth rate for job keepers is approximately 8.5 percent, compared to -1.5 percent for job losers. Hence, job loss appears to reduce food consumption by approximately 10 percent in the United States, only 1 percent different from the Indonesian value. Other quantiles of the distribution shifts are also quite similar across the two economies.[4]

[4]The estimated consumption drops become *larger* in the PSID if we use changes from t to $t+3$ (as in the IFLS). Hence, using a comparable strategy across the two datasets only further reinforces the point that consumption is as smooth during shocks in Indonesia as it is in the U.S.

We now examine the robustness of this conclusion to controls using a more structured regression analysis. We estimate specifications of the following form:

$$g_i = \alpha + \beta \text{unemp}_i + \theta X_i + \varepsilon_i \tag{1}$$

where $\text{unemp}_i = 1$ if the agent reports unemployment at time t', $\text{unemp}_i = 0$ if the agent is employed at time t', and X_i denotes a vector of covariates. The key coefficient β equals the effect of job loss on the consumption growth rate.

Table 3 reports several estimates of (1) for Indonesia and the U.S. The first specification is estimated with OLS using no controls except year dummies. Consistent with the graphical results, unemployment is estimated to reduce consumption by about 9 percent in the U.S. and 10 percent in Indonesia. The second specification introduces several controls: age, gender, marital status, education, and region dummies (to control for differential inflation patterns). The coefficient estimates on the unemployment dummy are essentially unchanged. These results show that after controlling for observable heterogeneity in trend growth rates across job losers and job keepers, consumption drops remain quite similar in the two countries.

The third specification tests the "common trends" identification assumption more directly by restricting the sample to individuals who lost jobs at some point within the panel. In this specification, the counterfactual for the job losers in year t' are individuals who lost their jobs at some other point in the dataset. The advantage of this specification in terms of identification is that growth rates in consumption for job losers are compared to what is arguably a better "control" group. The problem of unobservable differences between job losers and keepers is mitigated in the restricted sample by identifying purely from variation in the date of job loss rather than whether or not job loss occurred. As shown in the last two columns of the table, this smaller sample yields estimates that are generally similar to the original results, supporting the claim that the causal effect of the unemployment shock on consumption is being identified.

One concern with these results is that unemployment shocks induce changes in consumption because of changes in expectations about permanent income rather than a transitory shock. To test this alternative hypothesis, we compared consumption growth rates from

period t to $t+1$ for individuals who became unemployed in period t vs. those who kept their job in period t. We find that consumption grows 8-10% *more* from t to $t+1$ for the job losers, indicating that food consumption recovers to pre-unemployment levels within three years after the shock for the average household. This result supports the view that unemployment is a transitory shock that affects consumption because of inability to smooth.

We also conducted a series of other robustness checks and sensitivity analyses that are not reported in the table. Quantile regressions generally yield estimates very similar to the OLS results. Different trimming criteria for outliers, such as 1 percent or 5 percent also yield similar results. Broader measures of consumption also follow a similar pattern. Gruber (1998) augments the results from the PSID with broader measures of consumption from the Consumer Expenditure Survey and finds that the decline in total consumption mirrors that of food consumption. We find a similar decline in total consumption in the IFLS sample as well (not reported).

An additional concern specific to the Indonesian sample is that all households, including job-keepers, may have reduced consumption during the Asian Financial Crisis in 1997-98. This could bias our estimates of the consumption drop associated with unemployment downward in this sample. To address this concern, we split the sample in two and repeated the analysis using the job losers/keepers in 2000 and job losers/keepers in 1997 separately. The estimates of the consumption drop associated with unemployment are similar in both subsamples. This suggests that the financial crisis does not create significant bias: If consumption was unusually low throughout the economy in 1997, job keepers should have experienced excess growth in consumption between 1997 and 2000, biasing the estimate of the consumption drop *upward* in the 2000 sample.

To summarize, the evidence from the IFLS and the PSID suggests that idiosyncratic unemployment shocks lead to temporary consumption fluctuations of similar magnitude in the U.S. and Indonesia. This similarity is surprising given that the U.S. has a large UI system that replaces approximately 50 percent of pre-unemployment wages for most individuals, whereas Indonesia has very little formal social insurance (Figure 1).

These results may appear to suggest that families in Indonesia (and perhaps other developing economies) have "adequate" insurance because they are able to maintain a reasonably

smooth consumption path when faced with shocks, as originally suggested by Townsend's (1994) classic study of Indian farmers. In this case, social insurance would offer relatively modest welfare gains in these economies. However, the smoothness of household consumption may belie significant costs of income risk if households resort to costly smoothing methods. Intuitively, social insurance may provide welfare gains if it crowds out the use of more costly smoothing techniques. The next section explores how households maintain consumption while unemployed in Indonesia.

4 The Costs of Consumption Smoothing

Households would resort to costly consumption smoothing techniques only if the welfare costs of reductions in consumption are large. We therefore first evaluate the nature of consumption reductions in Indonesia to determine whether such reductions are likely to have large welfare costs.

The average household in the IFLS devotes nearly 70 percent of its total expenditure to food (in contrast with 20 percent in the PSID). This suggests that Indonesians may have to reduce consumption of basic necessities much more than households in the US when shocks occur. To provide direct evidence on this hypothesis, we study the effect of unemployment shocks on the consumption of staple foods (including rice, corn, cassava, and flour) in Indonesia. Consumption of these goods would presumably fall only in the most dire circumstances, when agents are unable to reduce consumption on "luxuries" which have lower marginal utility. We implement empirical specifications analogous to (1) to test whether staples consumption falls in households experiencing unemployment shocks relative to households that do not experience such shocks. The sample specifications and trimming procedures are analogous to those described above for total food consumption.

We begin with an OLS regression on the full sample. The estimate in column (1) of Table 4 indicates that mean consumption of staple foods falls by 6 percent during unemployment spells; however the estimate is not statistically significant. As one might expect, the magnitude of this decline is smaller than the drop in total food consumption (see Table 3) and total consumption (not shown) because households are presumably more willing to

cut back on "luxuries" than "necessities." A kernel density plot (not shown) for growth in staples consumption by job status analogous to Figure 3a reveals a clear downward shift in consumption of staples for job losers who experience the most negative growth rates, but little shift for those who fared better. This is consistent with the claim that only the worst off reduce consumption of staples. This suggests that even though the change in the mean growth rate may not be statistically significant, other moments could reveal a more robust response. Column (2) of Table 4 confirms this point by showing that median staples growth rate is 10 percent lower for job losers relative to keepers. This estimate is highly statistically significant. Column (3) shows that the mean drop in staple consumption is 12 percent among households without any farmers, who might have less capacity to store crops. In sum, these results indicate that many households reduce consumption of the most basic and important sources of nutrition when the household head loses his job. These findings are consistent with those of Beegle, Frankenberg, and Thomas (2000) and Frankenberg, Smith, and Thomas (2003), who study the effects of the 1998 Asian Financial Crisis on consumption using an augmented IFLS sample.

The fact that income shocks force households to reduce consumption of basic necessities makes it plausible that they would use very costly methods to smooth consumption. We now document some of these methods directly.[5] One particularly costly method is reducing educational expenditures on children. The first three specifications in Table 5 report the effect of unemployment shocks on educational investment. In these regressions, we restrict the sample to households with children under 24 years of age who reported educational expenses at the time of the previous interview. Specifications (1) and (2) examine extensive-margin (participation) effects by using a dummy for positive household educational expenditure as the dependent variable. The results reported in column (1) imply that families experiencing unemployment were 13 percentage points more likely to stop spending on education entirely (presumably by withdrawing their children from school). This is a large reduction relative to the sample mean of 77 percent participation in education in this group. Controlling for household characteristics reduces the estimated magnitude of this response slightly, but

[5] The behavioral responses examined here are only two examples among many possibilities. Examining the costs of other consumption smoothing methods used by households would be very useful.

does not alter the conclusion that unemployment shocks significantly reduce the likelihood a household will spend on education. Column (3) examines the intensive margin by changing the dependent variable to the log change in education expenditures (with 2 percent trimming as above). Median educational expenditure falls by 12 percent in households experiencing unemployment. Average educational spending (not shown) falls by less than 12 percent, largely because richer households do not appear to reduce expenditures as much as poorer households, for reasons similar to the staples results. Figure 4 shows the distributional shift on the intensive margin, confirming the regression results visually.

These results indicate that many households reduce spending on education to mitigate the income loss during an unemployment shock. A concern with the interpretation of these results is reverse causality. One might worry that families with children who finish school are those where the parent stops working, generating the observed correlation. However, Frankenberg, Thomas, Beegle (1999) and Thomas et. al. (2004) have documented similar patterns in educational expenditure among households affected by the Asian Financial Crisis. These studies take advantage of this large exogenous shock to address the identification concerns more carefully, suggesting that shocks do indeed cause reductions in education.

A second behavioral response, which perhaps has a lower cost than reducing human capital accumulation but is nonetheless more costly than depleting savings, is augmenting labor supply by other members of the household. Columns (4)-(6) of Table 5 examine labor supply responses. On the extensive margin, Column (4) shows that other household members are 17 percentage points more likely to work for wages when the head of household becomes unemployed. Controlling for other household characteristics does not significantly affect this conclusion. Column (6) examines the income earned by other family members on the intensive margin with a specification analogous to (3) for educational expenditures. The point estimate suggests that income earned by other household members increases by between 11 percent in households where the head becomes unemployed. Figure 5 corroborates this result visually. These results suggest that unemployment shocks increase the labor supply of other family members along a variety of margins. Part of these effects may again be due to reverse causality. But other studies (e.g. Beegle, Frankenberg, Thomas (2000), Cameron and Worswick (2003), Frankenberg, Smith, and Thomas (2003)) report similar responses

in terms of labor market participation, second jobs, and additional hours of work among household members using better identification of exogenous shocks.

The methods used to smooth consumption in Indonesia contrast sharply with corresponding patterns in the United States. Dynarski and Gruber (1997) examine how households smooth variable earnings in the U.S. They find that (1) transfer income (e.g. unemployment insurance) replaces 15 cents of every dollar of lost income, (2) changes in tax burdens replace 26-35 cents per dollar lost, and 3) savings are used to replace the remaining 25-40 cents. In addition, Cullen and Gruber (2000) observe that there is no change in labor supply of secondary earners at the mean when household heads lose their jobs in the U.S. On the human capital margin, there is some anecdotal evidence that investment in human capital (e.g. graduate school applications) *rises* during recessions in the United States, as people substitute timing of education intertemporally to periods when the opportunity cost of going to school is low. These points suggest that households in lower income countries use much more costly smoothing mechanisms than those in developed economies.

5 Conclusion

Unemployment shocks induce remarkably similar reductions in food consumption in the United States and Indonesia. However, households in Indonesia use much more costly methods to smooth consumption than households in the U.S. Even though they may have little effect on consumption volatility, social insurance programs could yield substantial welfare gains in developing economies by reducing the need for these costly behaviors. These gains would arise because households would not be forced to pull children out of school or send additional members into the workforce to maintain consumption in the short run.

The results of this paper indicate that programs such as unemployment insurance *could* be beneficial in certain domains. Additional empirical work is required to determine whether increases in social insurance benefits actually do reduce inefficient behavior in developing economies. Another important caveat is that we have not examined the types of social insurance programs that would be feasible in developing countries. If these programs were to offer only limited or unequal coverage (e.g. to public sector employees), then they could in-

duce additional behavioral distortions (such as a preference for public sector work) that could exacerbate economic inefficiency. Further research is required to determine whether the constraints imposed by the political economy of developing countries would permit welfare-enhancing social insurance programs. This research agenda is especially relevant for South and East Asian economies as they reach a phase of development where implementation of a formal social safety net is feasible.

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Table 1

RELATIONSHIP BETWEEN SOCIAL INSURANCE AND PER CAPITA GDP

	(1) SI as % of GDP vs GDP	(2) SI as % of Gov't Exp vs GDP	(3) Continent dummies	(4) East Asian Countries
Dependent Variable:	log SI % of GDP	log SI % of Gov't Exp	log SI % of GDP	log SI % of GDP
log GDP Per Capita	**0.630**	**0.351**	**0.357**	**0.674**
	(0.070)**	(0.064)**	(0.069)**	(0.062)**
Constant	-3.376	0.267		-3.673
	(0.626)**	(0.589)		(0.550)**
East asia indicator				**-1.318**
				(0.250)**
Continent dummies	No	No	Yes	No
Observations	89	64	89	89

NOTE--Social Insurance statistics are from ILO (2000); GDP statistics are from the Penn World tables.
Social insurance is defined as sum of expenditures on ocial security, disability insurance, unemployment insurance, insurance against work-related injuries, and government provided health insurance.
East Asian countries in the sample are Indonesia, Japan, Korea, Malaysia,Thailand, and Singapore.
GDP is measures in 1996 US dollars.

Table 2
SUMMARY STATISTICS FOR IFLS AND PSID

	Mean	Median	Standard Deviation
IFLS (Indonesia)			
Currently Unemployed	8%	0	27%
Age of Head	48	46	25
Married	83%	1	37%
College	6%	0	24%
Number of people in household	5.7	5.0	2.5
Food consumption	$926	$703	$1,065
Real food consumption growth rate	4%	3%	61%
Inflation rate	91%	132%	42%
Staples consumption	$191	$144	$247
Total consumption	$1,604	$1,073	$2,047
Wage income of head	$580	$308	$1,056
Other family members earn income	58%	1	49%
Total household income	$1,484	$811	$3,569
Total household assets	$7,525	$2,692	$17,189
Home and Land	$5,625	$1,999	$12,054
Equipment, livestock, vehicles, and other.	$1,587	$352	$8,057
Liquid Assets (Cash, Stock, Jewelry)	$313	$21	$2,295
No household member is a farmer	58%	1	49%
Education expenditure	$144	$49	$344
Positive education expenditure	77%	1	42%
Number of obs: 12,236; Number of households: 7,197			
PSID (United States)			
Currently Unemployed	4%	0	21%
Age of Head	38	36	12
Married	65%	1	48%
College	40%	0	49%
Number of people in household	2.7	3.0	1.4
Food consumption	$7,255	$6,303	$4,646
Real food consumption growth rate	2%	3%	56%
Inflation rate	5%	4%	2%
Wage Income of Head	$31,828	$27,285	$30,267
Number of obs: 70,889; Number of households: 11,685			

All monetary values are annual figures in real 2000 US dollars.
Education expenditure data are for households with children under 24 years old

Table 3

EFFECT OF UNEMPLOYMENT ON FOOD CONSUMPTION: INDONESIA VS UNITED STATES

Dependent variable: Food cons. growth rate (change in log household food consumption)

	(1)		(2)		(3)	
	No controls		With controls		Only Those Unemployed Exactly Once	
	US	Indonesia	US	Indonesia	US	Indonesia
Unemployed dummy	**-0.087**	**-0.097**	**-0.106**	**-0.078**	**-0.095**	**-0.098**
	(0.006)***	(0.027)***	(0.010)***	(0.022)***	(0.017)***	(0.038)**
People in household			0.01	-0.005	0.012	-0.004
			(0.002)***	(0.002)**	(0.005)**	(0.007)
Age			-0.001	0.000	0.000	0.001
			(0.000)***	(0.000)	(0.001)	(0.000)
Married			0.033	0.057	0.032	0.02
			(0.007)***	(0.027)**	(0.018)*	(0.06)
Sex			-0.012	-0.007	0.006	-0.035
			(0.007)*	(0.014)	(0.017)	(0.03)
School			0.000	-0.005	0.000	0.005
			(0.000)	(0.008)	(0.001)	(0.025)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Province/state dummies	No	No	Yes	Yes	Yes	Yes
Observations	50769	11284	50763	11284	7894	1231

NOTE-Sample includes all households who remain in panel for two or more years where head is employed in previous observation. Observations with nominal food consumption growth rates in bottom 2% and top 2% of distribution are discarded to trim outliers. Dependent variable in all specifications is $\log(c_t)$-$\log(c_{t-1})$ where t-1 refers to the previous observation (1 year lag in PSID, 3 or 4 years in IFLS. Unemployed dummy is 1 if head of household is not working at time of interview; else 0.

Table 4

EFFECT OF UNEMPLOYMENT ON CONSUMPTION OF STAPLES

Dependent variable: Staples cons. growth rate (change in log staples consumption)			
	(1) OLS	(2) Median Reg.	(3) OLS, No Farmers
Unemployed dummy	**-0.060**	**-0.100**	**-0.119**
	(0.039)	(0.035)***	(0.048)**
People in household	-0.009	-0.005	-0.013
	(0.004)**	-0.004	(0.006)**
Age	0.000	0.000	0.001
	(0.000)	(0.000)	(0.001)
Married	0.129	0.147	0.060
	(0.047)***	(0.043)***	(0.068)
Sex	0.042	0.048	0.037
	(0.024)*	(0.022)**	(0.033)
School	0.052	0.042	0.080
	(0.014)***	(0.013)***	(0.020)***
Year dummies	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes
Observations	9,466	9,466	5,205

NOTE-Sample includes all IFLS households who remain in panel for two or more years where head is employed in previous observation. Observations with nominal staples consumption growth rates in bottom 2% and top 2% of distribution are discarded to trim outliers. Dependent variable in all specifications is $\log(c_t)$-$\log(c_{t-1})$ where t-1 refers to the previous obs. Unemployed dummy is 1 if head of household is not working at time of interview; 0 otherwise. Median regression is a quantile regression at the 50th percentile. No farmers specification excludes all households with one or more individual working on a farm.

Table 5

OTHER RESPONSES TO UNEMPLOYMENT: EVIDENCE OF RISK AVERSION

	Educational Expenditures			Other family members' labor supply		
	(1)	(2)	(3)	(4)	(5)	(6)
	Extensive margin		Intensive margin	Extensive margin		Intensive margin
	No controls	With controls	Median Reg	No controls	With controls	Median Reg
Dependent Variable:	Education dummy		log Δ ed exp	Participation dummy		log Δ other fam inc
Unemployed dummy	**-0.13**	**-0.09**	**-0.12**	**0.17**	**0.15**	**0.11**
	(0.02)***	(0.02)***	(0.07)	(0.02)***	(0.02)***	(0.07)*
People Per Household		0.01	-0.03		0.06	0.02
		(0.00)***	(0.01)***		(0.00)***	(0.01)***
Age		0.00	-0.01		0.00	0.00
		(0.00)***	(0.00)***		(0.00)***	(0.00)
Married		0.13	-0.03		0.07	0.28
		(0.02)***	(0.09)		(0.03)***	(0.09)***
Sex		0.01	-0.05		0.04	0.21
		(0.01)	(0.04)		(0.01)***	(0.04)***
School		0.06	0.05		0.00	-0.04
		(0.01)***	(0.02)**		(0.01)	(0.02)*
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Province dummies	No	Yes	Yes	No	Yes	Yes
Observations	7,700	7,457	6,156	6,778	6,407	3,478

NOTE-Sample includes all IFLS households who remain in panel for two or more years where head is employed in previous observation. Dependent variable in (1) and (2) is an indicator for whether household reported positive education expenditures. Only households with positive education expenditures in previous year are included in (1) and (2). Dependent variable in (3) is log change in education expenditures; sample includes all households reporting positive education expenditures in both previous year and current year. In (3), outliers are trimmed at upper and lower 2% as in Table 3. Dependent variable in (4) and (5) is an indicator for whether any household member besides the head is earning income in current year. Only households where no other member besides head was working in prior year included in (4) and (5). Dependent variable in (6) is log change in other family members' income, with 2% trimming analogous to that in Table 3.
Sample in (6) includes households reporting positive non-head income in both previous year and current year. Unemployed dummy is 1 if head of household is not working at time of interview; 0 otherwise. Median regression is a quantile regression at the 50th percentile.

Figure 1a

Social Insurance vs. GDP Per Capita in 1996

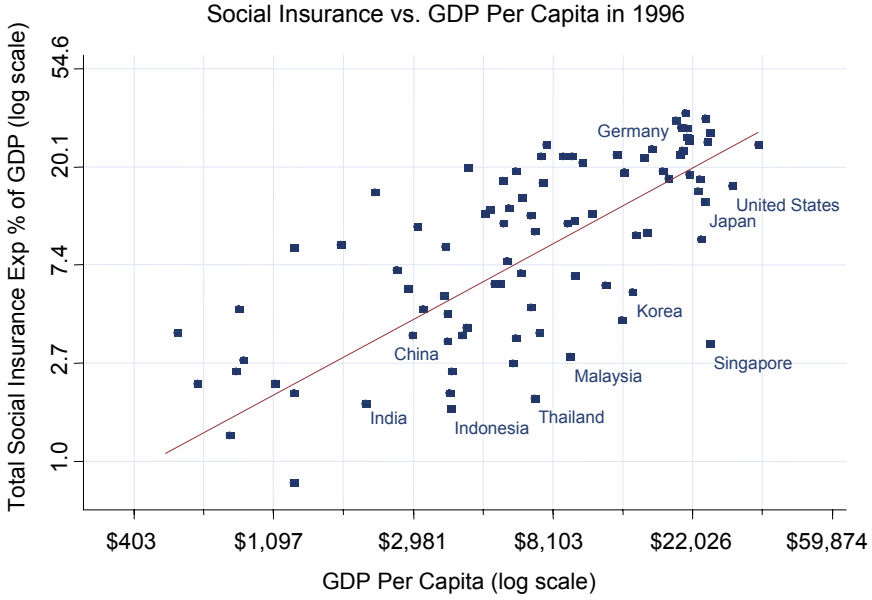
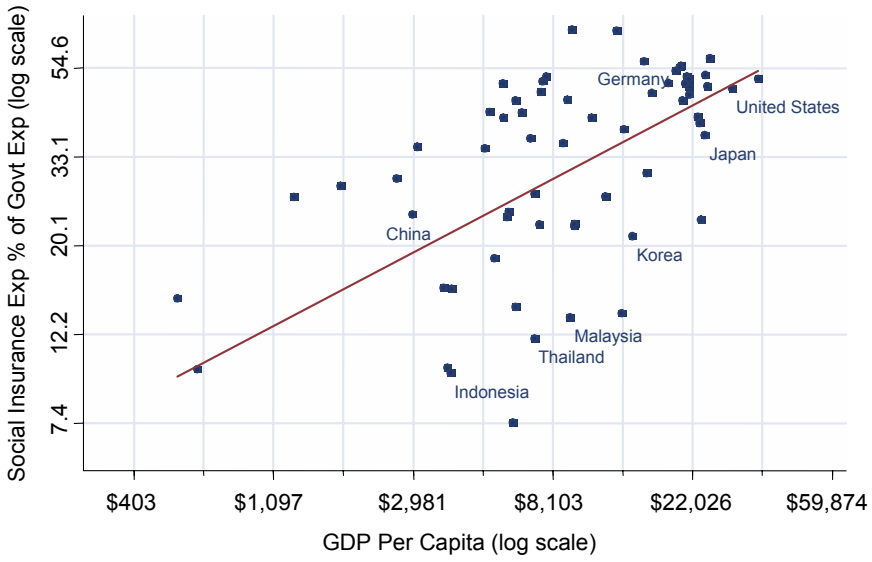


Figure 1b

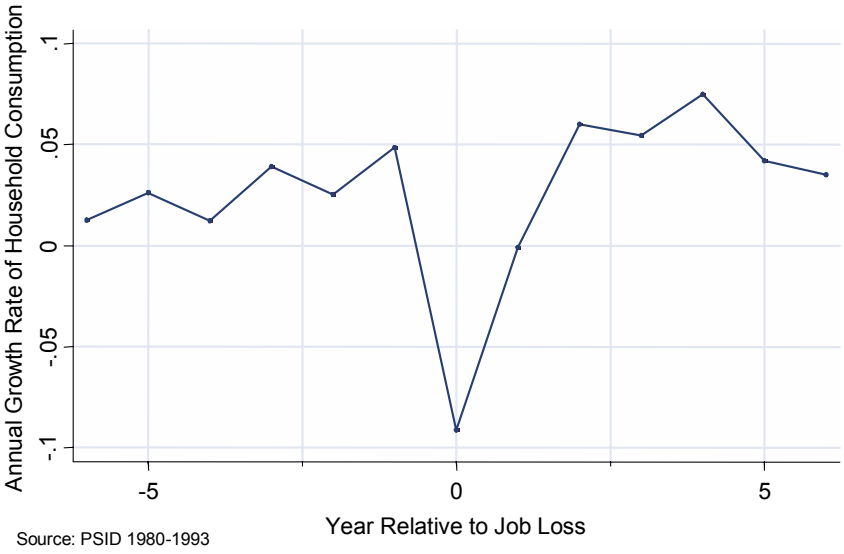
Govt. Budget Share of Social Insurance vs. GDP Per Capita



NOTE–Social Insurance statistics are from ILO (2000); GDP statistics are from the Penn World tables. GDP is measured in 1996 US dollars. Panel A shows relationship between social insurance share of GDP and GDP per capita. Panel B shows relationship between social insurance share of government budget and GDP per capita.

Figure 2

Effect of Unemployment on Consumption Growth in the US



NOTE–Sample consists of all household heads who experienced exactly one unemployment spell between 1980 and 1993 in the PSID. Annual growth rates of food consumption are computed as change in log of real (CPI deflated) food consumption from year $t-1$ to year t. Year of job loss is normalized at 0 and all other years are defined as difference relative to that year.

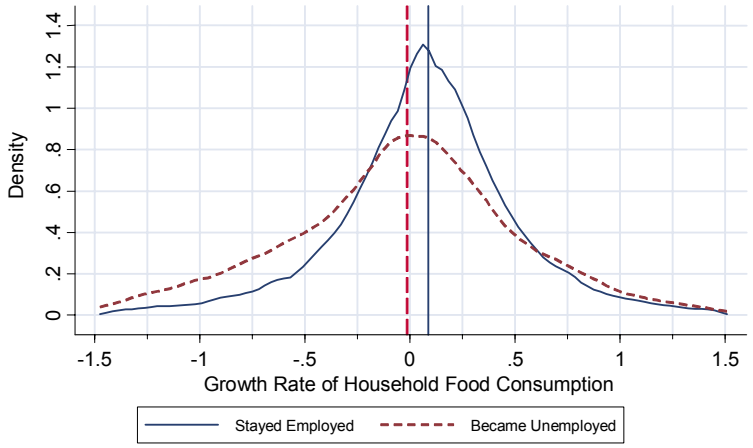
Figure 3a

Effect of Unemployment on Food Consumption in Indonesia

Source: IFLS 1993-2000

Figure 3b

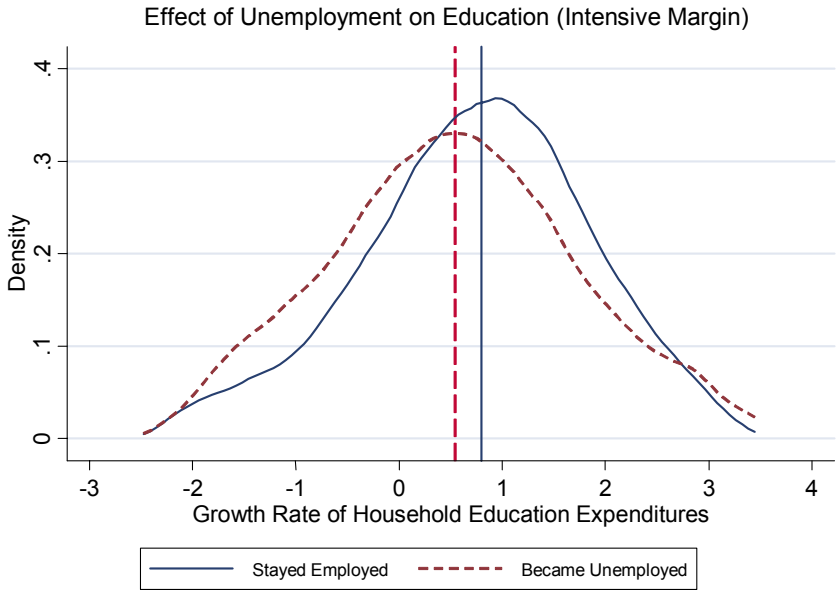
Effect of Unemployment on Food Consumption in the US



Source: PSID 1980-1993

NOTE-In each figure, vertical lines denote median for density of corresponding color. Sample consists of all household heads in IFLS or PSID who reported being employed at the time of previous interview. "Stayed Employed" group includes household heads who remain employed in interview t. "Became Unemployed" group includes household heads who are not working at time of inteview t. Growth rate of household food consumption is defined as nominal difference in log food consumption in inteview t and interview $t-1$. Gap between interviews is one year in PSID and 3 or 4 years in IFLS. Observations with growth rates in top 2% or bottom 2% of unconditional food growth distribution in each dataset are discarded to trim outliers. Kernel densities are estimated using an optimal bandwith procedure.

Figure 4

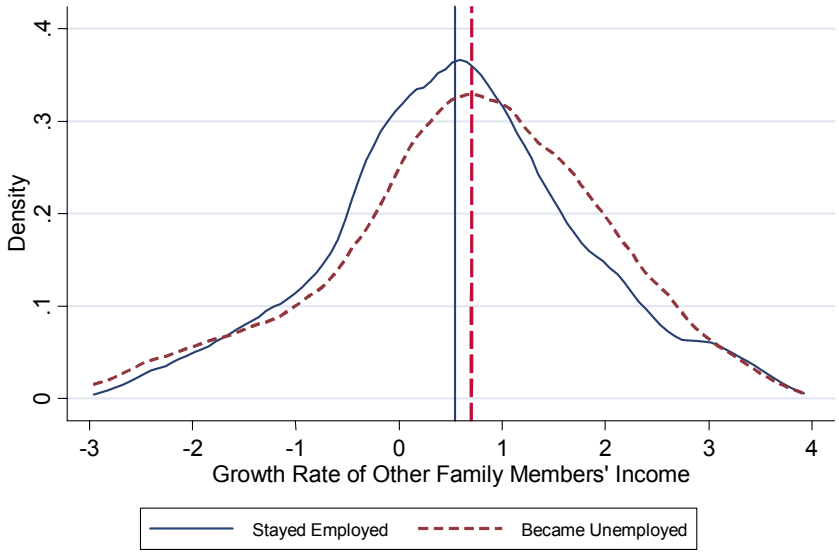


Source: IFLS 1993-2000

NOTE-Vertical lines denote median for density of corresponding color. Sample consists of all household heads in IFLS who reported being employed at the time of previous interview and who report positive educational expenditures in both previous interview and current interview. "Stayed Employed" group includes household heads who remain employed in interview t. "Became Unemployed" group includes household heads who are not working at time of inteview t. Growth rate of is defined as nominal difference in log educational expenditure in inteview t and interview $t-1$. Gap between interviews is 3 or 4 years in IFLS. Observations with growth rates in top 2% or bottom 2% of unconditional educational expenditure growth distribution are discarded to trim outliers. Kernel densities are estimated using an optimal bandwith procedure. See Table 5 for corresponding results on extensive margin.

Figure 5

Effect of Unemployment on Others' Labor Supply (Intensive Margin)



Source: IFLS 1993-2000

NOTE-Vertical lines denote median for density of corresponding color. Sample consists of all household heads in IFLS who reported being employed at the time of previous interview and who report positive income from other family members in both previous interview and current interview. "Stayed Employed" group includes household heads who remain employed in interview t. "Became Unemployed" group includes household heads who are not working at time of inteview t. Growth rate of is defined as nominal difference in log of other family members' income in inteview t and interview $t-1$. Gap between interviews is 3 or 4 years in IFLS. Observations with growth rates in top 2% or bottom 2% of unconditional other-income growth distribution are discarded to trim outliers. Kernel densities are estimated using an optimal bandwith procedure. See Table 5 for corresponding results on extensive margin.