Household Labor Supply Insurance around the World*

Annika Bacher
BI Oslo

Kevin Donovan
Yale SOM

Philipp Grübener
Washington University

Lukas Nord
University of Pennsylvania

Todd Schoellman
Minneapolis Fed

March 2026

Abstract

We use harmonized microdata from rotating panel labor force surveys from 46 countries across a wide range of development levels and labor market institutions to study the use of intra-household labor supply as insurance against economic shocks. We find little evidence that it plays an important insurance role across multiple mechanisms and multiple types of shocks. We find that households face correlated labor market shocks and that the presence of informal self-employment in developing countries enables workers who lose a job to self-insure, rather than requiring other household members with lower labor force attachment to participate. We develop a life-cycle model with two-member households, frictional formal labor markets and self-employment, as well as endogenous human capital and asset accumulation. We use the calibrated model to understand why informal self-employment is the dominant response to economic shocks in equilibrium and the consequences of this choice.

*We thank the national statistical agencies of the respective countries for their willingness to provide data and answer numerous questions on construction. The views expressed herein are those of the authors and not necessarily those of the Federal Reserve Bank of Minneapolis, the Federal Reserve System, or the data providers. We thank Chang Tai-Hsieh for helpful comments and Alice Evans for a number of useful conversations at the early stages of this project. Aggregated results, code, and documentation are available online at www.lfsdata.com. This work was supported by computational resources provided by the BigTex High Performance Computing Group at the Federal Reserve Bank of Dallas and by the FUCHS-CSC cluster at Goethe University Frankfurt. *Contact Information:* Bacher, annika.bacher@bi.no; Donovan, kevin.donovan@yale.edu; Grübener, philippgruebener@wustl.edu; Nord, lksnord.econ@gmail.com; Schoellman, todd.schoellman@gmail.com

1 Introduction

One of the most important and salient risks for most households is the potential job loss of a sole or main earner, which can lead to the rapid deterioration of the household's finances. A large literature studies the extent to which the labor supply of other household members, most commonly the wife of a working husband, is used to help insure against this risk in developed countries (Mincer, 1962; Lundberg, 1985). The consensus in the literature is that the vast majority of shocks are not insured through household labor supply, likely because households have ready access to alternatives such as self-insurance through savings, unemployment insurance, and broader social safety net programs.[1] However, existing work has not examined whether these findings extend to other contexts. Workers in developing countries face much higher employment exit rates and have less recourse to financial markets and no access to unemployment insurance programs.[2] In such countries, household labor supply could plausibly play a central role.

This paper extends the literature on household labor supply beyond the existing focus on the United States and Western Europe to include countries with very different labor market institutions and income levels. In doing so, we make two main contributions. The first contribution is empirical: we provide the first evidence on the use of household labor supply insurance around the world. The main obstacle to studying this question has been a lack of data. Estimating household labor supply insurance requires representative, high-frequency panel labor market data that allows one to link together couples, families, or households, such as the Current Population Survey. We have developed a database of harmonized data from rotating panel labor force surveys that fits this requirement.[3] The database covers 16 million married couples and 28 million households from 46 countries around the world.

Our main empirical finding is that there is little evidence of household labor supply being used as insurance in any country. Much of the literature focuses on whether non-working wives are more likely to enter employment if their husband exits. We find a small, positive added worker effect on the order of 1–2 percentage points in most countries, suggesting only modest insurance. We build on recent work by estimating whether working wives provide insurance through a number of mechanisms, such as remaining employed or increasing hours, and find consistent, *negative* effects that are largely explained by the fact that couples appear to face correlated labor market shocks. Finally, we add to the literature by estimating whether wives engage in precautionary labor supply by increasing labor force participation if their husband's employment is riskier. We find that if anything, wives of husbands with more stable jobs are more likely to work. Similar results obtain

[1] See for example Maloney (1987) and Maloney (1991) for early estimates and Blundell et al. (2016), Mankart and Oikonomou (2016), Mankart et al. (2024), Guner et al. (2025), and Casella (2023) for recent evidence. The typical estimate is large relative to the baseline flow of women into employment, but small as a share of men who exit employment. See Cullen and Gruber (2000), Bredtmann et al. (2018), and Birinci (2026) on the role of unemployment insurance and the safety net.

[2] See Donovan et al. (2023) for evidence on employment exit rates. A high cost of private saving is a common finding for developing economies (Karlan et al., 2014; Donovan, 2021; Lagakos et al., 2023).

[3] This database is an expanded version of the one that we previously used to study labor market dynamics and labor market responses to aggregate shocks around the world (Donovan et al., 2023, 2026). Details, code, and aggregated tabulations of the data are available at `www.lfsdata.com`.

for all of these analyses when we instead estimate household responses to shocks suffered by the household head.

While these results are consistent with the existing literature in developed countries, they break new ground in developing countries. They also raise an obvious question: how do households in developing countries cope with job loss, given the lack of other resources? To shed light on this, we focus on a shock of particular interest, which is the loss of a wage job – the most desirable job in developing countries. When a husband or head loses a wage job in developed countries, they typically transition to non-employment, while spouses and other household members do not adjust their labor force status. In developing countries, however, a husband or head that loses their wage job transitions to self-employment 60–80 percent of the time. Previous work has shown that self-employment is often used as a substitute for missing unemployment insurance in developing countries (Donovan et al., 2023). We conclude that husbands and heads self-insure through self-employment.

The fact that households are able to insure against shocks does not imply that doing so is costless. Acemoglu and Shimer (2000) emphasize that one rationale for unemployment insurance is to give separated workers time to look for better matches. A critical question is whether the rapid re-entry of the husband or head comes at the expense of holding out for the right job. This concern ties to existing evidence that workers in developing countries rapidly cycle among employment states without climbing the job ladder and to evidence that workers fail to accumulate as much human capital or wages over the life cycle in developing countries (Donovan et al., 2023; Lagakos et al., 2018a,b).

We develop a joint life-cycle search model for a married couple that builds on Bacher et al. (2025).[4] Households are risk averse and search for work in frictional labor markets, which exposes them to uninsurable idiosyncratic risk. They have four potential mechanisms to help mitigate this risk. First, they can accumulate savings. Second, they may have access to an unemployment insurance scheme. Third, they can accumulate human capital through a learning-by-doing technology, which increases their earnings and allows them to accumulate savings further. Fourth, they have the household labor supply decision. Because our new results concern developing countries, we include an informal self-employment sector that pays less but is not subject to search frictions.

We calibrate the model to U.S. data. Key model parameters governing labor market choices, human capital accumulation, and asset accumulation are disciplined by joint labor market states of couples, labor market transition rates, and our evidence on spousal responsiveness to partner transitions, as well as life-cycle income and asset accumulation profiles. The model captures well the low usage of household labor supply as insurance in the U.S.

We then use the model to perform counterfactuals where we change one parameter at a time to help understand the low utilization of household labor supply as insurance in developing countries. We start from the calibrated U.S. economy and change parameters in two groups. First, we show

[4]See also Mankart and Oikonomou (2017), Wang (2019), Ellieroth (2023), Bardóczy (2022), and Casella (2023) for papers that develop joint search models. Most of these papers focus on the cyclical behavior of labor market stocks and flows.

that lower GDP per capita and lower returns to savings both generate much greater use of household labor supply as insurance. The former works through non-homothetic preferences: in countries with lower income levels, households face higher marginal utility of consumption and are less willing to endure periods of low income. The latter comes through weakening households' ability to build buffer savings against shocks.

Second, we eliminate unemployment insurance. We show that when we do so, the use of household labor supply as insurance collapses. The intuition is consistent with the data. In the absence of unemployment insurance, households find prolonged periods where both members are non-employed painful; this is particularly true for young households who have not yet built up a buffer stock of savings. Thus, economic forces push for someone to go to work. However, there is no reason this has to be the wife. The baseline calibration puts a lower disutility on male labor supply to fit the data, which leads the household to prefer that the husband engage in subsistence self-employment rather than the wife.

These preliminary experiments suggest that the model has the necessary forces to replicate the data. Our plan is to develop a full calibration to developing countries. We can then use the model as a laboratory to understand the relative importance of the various forces to explaining low utilization of household labor supply as insurance. It is also equipped to help us understand the consequences for labor market flows and human capital accumulation.

In addition to the work cited above, our paper is related to two main literatures. The first is the literature that develops a broader perspective on the added worker effect. Bredtmann et al. (2018) have the broadest effort to date, estimating the added worker effect in 28 countries – the United States and much of Europe. Our new dataset allows us to extend these results into a broader part of the world income distribution, which can be useful for the design of formalized social safety nets in developing countries (e.g. Ndiaye et al., 2025).[5] The second is the vast, broader literature on the determinants of female labor force participation, particularly in a cross-country context. See, for instance, Chiplunkar and Kleinberg (2023) and Doss et al. (2024). Dinkelman and Ngai (2022) review this growing literature. Our main contribution is to link household insurance and household decision-making to labor market flows and stocks.

2 Global Estimates of Household Labor Supply Insurance

This section introduces the data that allow us to link together the labor market status of married couples or entire households. We then provide the empirical results on the role that labor supply plays in insuring shocks to husbands or household heads around the world. These empirical results

[5] We also relate to a number of papers that examine the added worker effect or other forms of household labor supply insurance for a single developing country (Fernandes and de Felicio, 2005; Parker and Skoufias, 2004; Skoufias and Parker, 2006; Cardona-Sosa et al., 2018; Ciaschi and Neidhöfer, 2024; Martinoty, 2022; Başlevent and Onaran, 2003). An important contribution of our work relative to this literature is that we harmonized the underlying data, imposed common sample selection criteria, and estimated the importance of household labor supply insurance using a common specification. These features are important for making results comparable across countries because the results vary with the details, as shown in Appendix A.2.

motivate the model we develop in Section 3.

2.1 Data

We study household labor supply insurance using micro data from labor force surveys from a large number of countries worldwide. We are collecting and harmonizing this micro data into a database as part of an ongoing research project, which we previously used to study how labor market dynamics vary with development as well as the severity and incidence of labor market responses to macroeconomic crises (Donovan et al., 2023, 2026). The version of the database used in this paper integrates three main changes relative to the version used in prior work. First, it includes data from new countries. Second, it expands the coverage period for other countries to include the most recently available data. Third, we have harmonized new variables that are relevant for this paper, notably on the composition of households and the relationships among people within households.

A detailed description of the database as well as the code and aggregated results can be found at the project website, `https://www.lfsdata.com/`. For brevity, we focus here on a high-level overview of the database and some of the key concepts that are relevant for linking married couples and households together and studying their joint labor supply.

The database is constructed using labor force survey data from countries that satisfy three criteria. First, the country must use a rotating panel design, meaning that they track the same household for multiple periods. Panel data allow us to identify shocks and the responses of household members to those shocks. For example, we can study the responses of a wife's labor force status to her husband's exit from employment. Second, we further restrict attention to countries whose rotating panel design allows households to be tracked for at least two consecutive quarters, which allows for the largest comparable set of countries. Third, we focus on countries that make the micro data with the identifiers needed to match people consistently across sample waves available to researchers.

We use the identifiers to match people across consecutive quarters. We validate these matches using the standard best practices in the literature (Madrian and Lefgren, 2000). This allows us to study both labor market states and labor market flows in a consistent way for all workers and countries in the database. We post-stratify the original weights so that the matched data and original unmatched samples have the same distribution across age, sex, education, and labor force status to help minimize the effect of attrition.

Our database includes labor market data from people aged 16–65. Many countries (mostly in the EU) collect limited data on people over age 65. Focusing on workers within this age range also mitigates concerns about cross-country differences in labor market institutions such as child labor laws or retirement policies.

We have previously harmonized a number of variables that are relevant to the analysis of household labor supply. These variables include a wealth of information on labor market outcomes: labor force status, employment, hours worked, wage employment versus self-employment status, indus-

try, occupation, tenure, firm size, and monthly earnings. Not all of these variables are available in all countries. The most notable example of this is earnings: less than half of the countries in the database have a continuous measure of earnings. We have also harmonized a number of other variables that will be covariates or controls in our analysis, including marital status, age, sex, and education. We discuss these variables further as they become relevant.

A novel feature of this version of the database is that we cleaned and harmonized variables that relate to the composition of the household and the relationships among household members. We build on the fact that labor force surveys in most countries are surveys of the entire household. The typical design is to collect basic demographic information on all household members and complete labor market information on all adults (or all adults age 65 and younger). Most surveys also collect information on the relationship of each person to the designated household head, which makes it possible to study interrelationships within the household.

We use this information to link adults together so that we can study how one person's employment status responds to shocks experienced by another household member. We use two different approaches to do so. First, we follow the standard approach in the literature and focus on married couples, which allows us to estimate how the wife's employment responds to shocks experienced by her husband. Specifically, we identify for each household the head and also the spouse of the head, if such a person is present.[6] Marriage includes long-term cohabitation relationships in countries where those are common and widely recognized, including the EU. Second, we group together all adults age 16–65 into a household with a designated head, which allows us to ask how the employment of all other members responds to shocks experienced by the head.[7] We focus on households with at least two working-age adults (the head and someone else) so that there is someone else in the household to respond to the head's shock. We also harmonized information on the total number of children age 0–4 and age 5–14 in the household as well as the total number of working-age adults, which are important control variables.

Our final sample includes 46 countries around the world. The number of observations varies depending on the approach that we take: we can link together either 16 million married couples or 28 million households. The database is a highly unbalanced sample, with the years of coverage varying widely by country, largely based on when they adopted a rotating panel design. Table A.1 lists for each country the years of data availability and the number of married couples and households in the sample. It also provides the range of PPP GDP per capita covered by each country, taken from World Bank (2025). The sample is much broader than is typically used in the literature in terms of development (the GDP per capita range is from 4,300 to 81,100 in 2021 US dollars) as well as labor market institutions and geography. We now turn to what this broader sample reveals about

[6] Households can also include married couples where neither person is the head. For example, a young married couple may live with the wife's parents, with the wife's father designated as the household head. Because household relationships are identified through the relationship to the head, our ability to identify these couples precisely is limited and varies by country and so we do not include them in our sample.

[7] The convention for designating a household head varies by country and is often not formalized. Table A.2 shows the characteristics of household heads around the world. The head is highly likely to be a man and to be the oldest and highest-earning member of the household. Only a handful of countries deviate much from this norm.

the use of household labor supply as insurance around the world.

2.2 Household Labor Supply in Response to Shocks

We now estimate the importance of household labor supply as insurance against economic shocks experienced by a husband or household head. We start with the sample of married couples. We estimate the wife's responses to shocks suffered by her husband using equations of the form

$$\text{WifeResponse}_{ict} = \alpha + \beta_0 \text{HusbandShock}_{ict} + \beta_1 \log(y_{ct}) \times \text{HusbandShock}_{ict} + \gamma X_{ict} + \varepsilon_{ict}. \quad (2.1)$$

$\text{WifeResponse}_{ict}$ captures a labor supply response of the wife in couple i in country c at date t, such as entering the labor force. $\text{HusbandShock}_{ict}$ captures whether her husband experiences a shock, such as exiting employment. In a standard analysis with data from only one country, the coefficient of interest is β_0, which captures the differential labor supply response of wives whose husbands suffer a shock relative to wives whose husbands do not. Since we have data from a wide range of countries, we also include an interaction between $\text{HusbandShock}_{ict}$ and $\log(y_{ct})$, the log of country c's GDP per capita in year t normalized by the level of the U.S. in 2021. With this normalization, the coefficient β_0 captures the estimated response at the U.S. income level, which is consistent with the previous literature that estimates household labor supply insurance in developed countries. The coefficient β_1 captures how responses vary with income: a value of $\beta_1 < 0$ implies that wives in developing countries are more responsive.

The vector X_{ict} includes a large set of controls. Given the size of the database, we control for a rich set of fixed effects: country-date interactions, number of children in the household age 0–4, number of children in the household age 5–14, number of working-age adults in the household, age and education level of the husband, and age and education level of the wife.[8] For a subset of countries we can also control for number of adults age 66 or older in the household. Finally, the variable ε_{ict} is the error term.

We start by estimating the classic added worker effect familiar from the literature, which captures whether wives respond by entering the labor force when their husbands exit employment. Recall that we can track each married couple for at least two consecutive quarters. For now, we use data on exactly two quarters, which enables us to use the largest set of countries. We restrict attention to couples where the husband is employed and the wife is non-employed in the first of the two quarters. We then estimate whether the wife enters employment between the first and second quarters as a function of whether the husband exits employment over the same period using a linear probability model. The first column of Table 1 shows the results.

The intercept shows that for developed countries, wives of husbands who exit employment are 1.4 percentage points more likely to enter employment than wives of husbands who remain employed. This point estimate is in line with the large literature that estimates the added worker effect in the

[8] Education is measured using the Barro and Lee (2013) responses: none, some primary, primary complete, some secondary, secondary complete, some tertiary, and tertiary complete.

Table 1: Wife Response to Husband Shocks by Initial Employment Status

	Non-Employed	Employed		
	Enters E	Stays in E	ΔHours	ΔLog(Earnings)
Husband Exits	0.014	-0.101***	-0.197	-0.032
	(0.013)	(0.017)	(0.173)	(0.041)
Exits x Log GDP p.c.	-0.005	-0.002	-0.034	-0.014
	(0.011)	(0.014)	(0.185)	(0.024)
R-squared	0.050	0.085	0.026	0.014
N (millions)	6.2	7.9	6.2	2.7
Countries	46	46	46	20

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

United States and Europe. The estimate is large relative to the aggregate labor market flows or labor force participation of married women (Guner et al., 2025). However, it also shows that the added worker effect provides relatively little insurance: in the vast majority of couples in this sample where the husband exits employment, the wife remains non-employed. The negative coefficient on the interaction with GDP per capita points to the added worker effect being larger in developing countries. However, this interaction is both statistically insignificant at conventional thresholds and economically small.

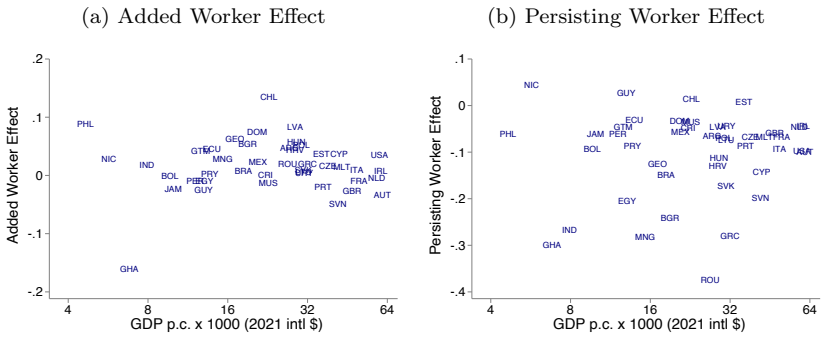
We conduct a robustness analysis of this result in Appendix A.2. We explore alternative definitions of the added worker effect that focus only on cases where the husband moves to unemployment or that include when the wife moves to unemployment. We prefer to pool unemployment and inactivity because of concerns that the two states are less distinct in developing countries (Donovan et al., 2023). We focus on cases where the wife enters employment because this provides insurance. Nonetheless, the estimated added worker effect is also small according to the alternative definitions. We also study subsamples such as younger women or couples who live in urban areas. Across this range of checks the added worker effect provides little insurance, never rising above 6.4 percent.

We next turn our attention to other possible margins of response for wives. Entering the labor force is the relevant margin for wives who are initially non-employed, but a large share of married women work in many countries. These women can also provide insurance if their husbands experience shocks, and indeed they have more margins through which to do so (Juhn and Potter, 2007; Ellieroth, 2023). They can keep their existing job, which we refer to as the persisting worker effect. Conditional on remaining employed, they can also increase their hours of work or their earnings. We restrict attention to couples where the husband and wife are both initially employed and estimate all of these margins. The results are shown in the last three columns of Table 1.

The main result of interest is the coefficient on HusbandExits, which shows that all three of these margins are *negative*. Further, the result for the persisting worker effect on employment is large: working wives of husbands who transition to non-employment are 10 percentage points less likely to remain employed than working wives of husbands who remain employed. The intensive margin

effects on hours worked or earnings conditional on remaining employed are both negative but much smaller: 0.2 fewer hours worked per week and 3 percent lower earnings. Again, the interactions with GDP per capita are small and not statistically significant, suggesting that labor supply insurance is not much more important in developing countries.

Figure 1: Wife Responses to Husband's Non-Employment Transition Around the World



Again, we provide a detailed robustness analysis in Appendix A.2. One obvious culprit for the large negative effect on employment is joint retirement, but we show that similar results obtain if we focus on couples where both the husband and wife are young, ages 25–44. As an alternative way to visualize our findings and to think about their robustness, we re-estimate the added worker effect and the persisting worker effect using a version of equation (2.1) that allows for a country-specific estimate of the added worker effect by estimating instead

$$\text{WifeResponse}_{ict} = \alpha + \beta_c D_c \text{HusbandShock}_{ict} + \gamma X_{ict} + \varepsilon_{ict}.$$

where D_c is an indicator for the couple being in country c. The resulting estimates of the country-specific added worker effect and persisting worker effect are plotted against GDP per capita in Figure 1. While there is heterogeneity across countries, the added worker effect is clearly small in most countries and the persisting worker effect is negative in almost all countries in our sample. Further, neither effect correlates strongly with development. In the Appendix, we show that they also do not correlate strongly with other plausible factors such as norms around women working or aggregate labor market conditions.

Our data do point to an important role for correlated shocks among married couples in accounting for these results, particularly the negative persisting worker effect. To show this, we again take the sample of married couples who both initially work and estimate the effect of the husband's transition to non-employment on the probability that the wife remains employed. However, this time we interact the two terms of interest with dummies for whether the husband and wife are initially employed in the same broad industry category.[9] The results are shown in Table 2. The first column

[9]We harmonize industry codes to be consistent with the indgen code used by IPUMS International, which has 15 categories in total (Ruggles et al., 2025).

Table 2: The Role of Correlated Shocks

	Wife Stays in E		
	All	All	Drop Agr.
Husband Exits	-0.101***	-0.051***	-0.047***
	(0.017)	(0.013)	(0.013)
Exits x Same Ind.		-0.240***	-0.183***
		(0.040)	(0.026)
Exits x Log GDP p.c.	-0.002	-0.000	0.006
	(0.014)	(0.013)	(0.012)
Exits x Same Ind. x Log GDP p.c.		-0.026	-0.033
		(0.028)	(0.020)
R-squared	0.085	0.084	0.076
N (millions)	7.9	6.8	5.9
Countries	46	43	43

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3: Household Responses to Head Shocks

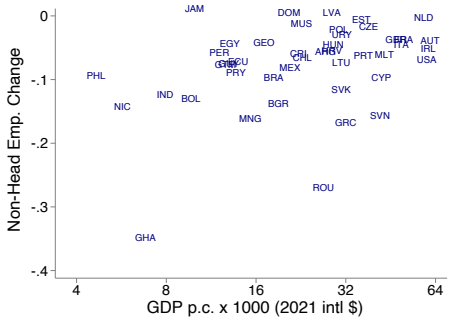
	Change in Total Non-Head Outcomes		
	Employment	Hours	Log Earnings
Head Exits	-0.045***	-4.460	-0.062
	(0.013)	(2.300)	(0.052)
Exits x Log GDP p.c.	0.029*	-0.865	-0.026
	(0.011)	(0.998)	(0.031)
R-squared	0.009	0.011	0.011
N (millions)	16.9	13.8	3.8
Countries	46	46	20

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

repeats the baseline estimates from Table 1. The second column includes the interactions for working in the same industry. Including this interaction cuts the estimated coefficient on HusbandExits by half, showing that the correlation between husband and wife exiting is much weaker when they work in different industries. The estimated effect of a husband exiting when the wife works in the same industry is enormous: she is 29.1 percentage points less likely to remain employed. In the third column we repeat the same estimation while dropping agriculture, which is a particularly volatile, seasonal industry. Doing so does weaken the results modestly, but an important negative correlation remains. We show in Appendix A.2 that similar but slightly weaker results obtain if we instead interact HusbandExits with whether the husband and the wife are initially employed in the same occupation.

The results so far focused on husbands and wives. However, broadly similar results carry over if we instead ask whether other household members use their labor supply to insure shocks to the head of the household. In this case we take the sample of households and measure the combined labor market

Figure 2: Household Responses to Head Shocks around the World



response of all non-head working-age adults. We estimate the change in total employment, hours worked, and log earnings of non-head members of the household when the head exits employment. Note that this approach mixes together the added and persisting worker effects: initially non-employed members can enter employment, or employed members can maintain their job. Table 3 shows the results. Our main finding of interest is that the results are again consistently negative. Employment, hours worked, and earnings of the other members of the household all decline when the head exits employment, relative to when the head does not exit employment.

We again estimate country-specific responses to the head transitioning to non-employment. Figure 2 plots the estimated country-specific response of total non-head employment against GDP per capita. Again, the figure is negative for essentially all countries in the sample, pointing to limited ability of other household members to provide insurance against economic shocks experienced by the household head.

Finally, we have explored a broader notion of the shock suffered by the husband or head. Instead of focusing on extensive margin transitions to non-employment, we estimate the extent to which wives or household members increase their earnings in response to any decline in earnings by the husband or head. A decline in earnings can stem from a loss of earnings but also a decline in hours or wages. We show in Appendix A.3 that the response measured in this way is also negative.

2.3 Precautionary Labor Supply

So far, we have focused on whether household labor supply is used in response to shocks suffered by a husband or a household head. However, household members do not necessarily need to wait until the realization of a shock to respond. Instead, they could adjust their baseline level of labor supply in response to the risk faced by the husband or head, which we call precautionary labor supply. We test for this effect using a variation of equation (2.1). Starting again with the case of couples, we now estimate equations of the form

$$\text{WifeWorks}_{ict} = \alpha + \beta_0 \text{HusbandRisk}_{ict} + \beta_1 \log(y_{ct}) \times \text{HusbandRisk}_{ict} + \gamma X_{ict} + \varepsilon_{ict}. \tag{2.2}$$

Table 4: Precautionary Labor Supply

	Wife Employed	Wife Employed
Husband Exits	-0.063***	
	(0.015)	
Exits x Log GDP p.c.	-0.034***	
	(0.009)	
Prob(Husband Exits)		-0.383***
		(0.105)
Prob x Log GDP p.c.		-0.210**
		(0.067)
R-squared	0.147	0.145
N (millions)	14.1	12.6
Countries	46	40

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

In this case, WifeWorks$_{ict}$ is a measure of whether the wife already works in the initial period that the couple is observed. HusbandRisk$_{ict}$ is a measure of the riskiness of the husband's employment.

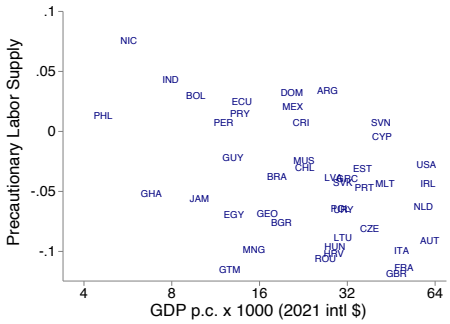
We explore two measures of the riskiness of a husband's employment. The first is a measure of realized risk, which is whether the husband transitions from employment to non-employment between the two quarters that we observe the couple. In this case, we are estimating a measure of precautionary labor supply that is closely related to anticipation effects. The second is a probabilistic measure of risk. In this case, we take the sample of all employed husbands and estimate a country-specific linear probability model for the probability that the husband exits as a function of their age, education, occupation, and industry. We use the fitted values from this regression as the second measure of the risk a husband faces.

Table 4 shows the results from these two specifications in the two columns. Again, the main result is that the effect associated with having a husband who subsequently exits employment, or who is more likely to exit employment, is *negative* and statistically significant. The first column shows that a wife whose husband will subsequently lose his job is 6 percentage points less likely to be working at baseline. The second column shows that a 10 percentage point increase in the probability that a husband exits is associated with the wife being 3.8 percentage points less likely to be working at baseline. These results again suggest that household labor supply exacerbates rather than insures against shocks.

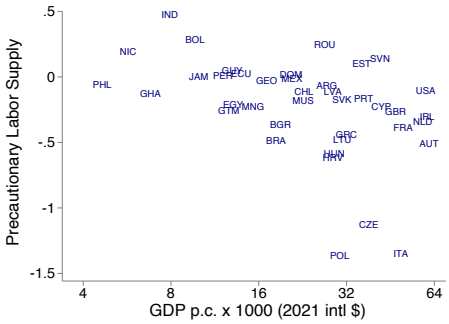
For this specification, the coefficients on the interaction with GDP per capita are negative and statistically significant. This finding indicates for the first time an important difference between the behavior of married couples in developing versus developed countries. To give a clearer view of the data, we again replace the linear term $\beta_0 \text{HusbandRisk}_{ict} + \beta_1 \log(y_{ct}) \times \text{HusbandRisk}_{ict}$ with a country-specific interaction $\beta_c D_c \times \text{HusbandRisk}_{ict}$. We plot the estimates β_c against GDP per capita in Figure 3. This figure shows that for developed countries, precautionary labor supply is negative, indicating that wives are less likely to work if their husband has a riskier job. For developing

Figure 3: Precautionary Labor Supply around the World

(a) Husband Exits



(b) Pr(Husband Exits)



countries, the figure is positive but small. For example, the coefficient for Nicaragua in Figure 3a indicates that wives of husbands who subsequently lose their job are about 8 percent more likely to be working at baseline, as compared to wives of husbands who do not subsequently lose their jobs.

We again provide a number of alternative robustness checks on this result in Appendix A.4. We also show that using households rather than couples yields similar results. Finally, we estimate country-specific results and show that they are negative for most countries.

2.4 Self-Insuring Employment Shocks

So far, we have shown that the labor supply of the wife or other household members does little to insure against income losses associated with a husband or head losing his job. This raises the question: how do couples and households insure against these shocks? This question is of first-order concern in developing countries, where we know that there is little public insurance either through unemployment insurance or broader social safety programs and there is also limited access to financial markets for households.

The answer turns out to be that the husband or the household head primarily self-insures by re-joining the labor market quickly, often through taking up own-account self-employment. As a simple way to make this point, we focus on households where the husband is initially wage employed, the wife is initially non-employed, and the husband transitions out of wage employment. We then study three possible responses: the husband can transition to self-employment, the wife can transition to any employment, or both members of the couple can be non-employed. We focus on the loss of a husband's wage employment because wage employment is generally higher-paying, more desirable work (Donovan et al., 2023). Thus, we infer that a move to self-employment is likely a form of self-insurance, whereas transitions from self-employment to wage work are likely to represent workers climbing the job ladder.

Table 5 shows the results of regressing indicator variables for each of the three possible transitions on GDP per capita with the same controls as we used above. This captures the raw share of

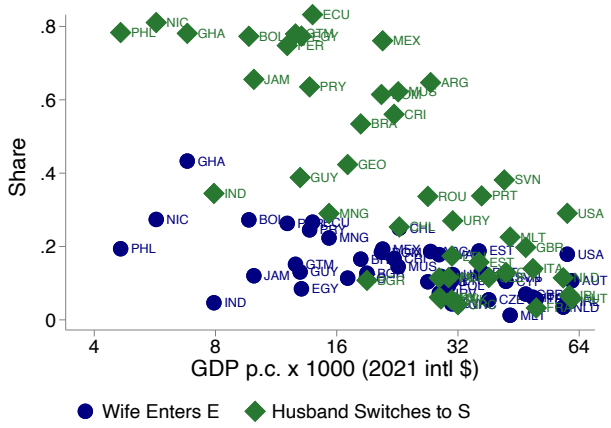
Table 5: Raw Response Rates, Husband's Wage Employment Loss

	Wife Enters E	Husband Switches to S	Neither
Constant	0.129***	0.311***	0.610***
	(0.018)	(0.075)	(0.067)
Log GDP p.c.	-0.036*	-0.192***	0.176***
	(0.017)	(0.045)	(0.040)
R-squared	0.024	0.165	0.161
N (millions)	0.4	0.4	0.4
Countries	45	45	45

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 4: Responses to Wage Employment Loss Around the World



households at various levels of development who make each of the three transitions. The intercepts show that in developed countries, neither member of the couple is employed in about 60 percent of cases. Of cases where someone is employed, the husband is more than twice as likely to move to self-employment than the wife is to enter employment. However, there is a large, statistically significant effect on the interaction with GDP per capita.

Figure 4 shows the results from estimating a full set of country-specific interactions, which is close to simply capturing the average transition share by country; the only difference comes from the effects of the control variables. In most developing countries, 60–80 percent of husbands who lose a wage job move into self-employment. This movement dominates the transition of wives into the labor force in almost all countries. This is consistent with the evidence in Donovan et al. (2023) that self-employment is easy to find in developing countries and that it offers an effective substitute for missing unemployment insurance, with average earnings falling only 15 percent for workers who take up self-employment temporarily. We show in Appendix A.5 that similar results apply when we study how households respond to the loss of a wage job of the head.

While these results are clear, their interpretation is not. One view is that household labor supply is not much used as insurance in developing countries because it is not needed. In this

view, husbands or heads who lose a job can quickly find another job, typically in own-account self-employment, that replaces a high degree of their prior income. Wives and other household members base their employment decisions on long-run comparative advantage, not short-run insurance needs.

An alternative view recalls that an important rationale for unemployment insurance is to allow workers time to find better matches (Acemoglu and Shimer, 2000; Farooq et al., 2020). The speed with which workers find new jobs raises the concern that they may not be searching optimally. This view connects with the fact that workers in developing countries transition among employment states frequently without appearing to climb a job ladder (Donovan et al., 2023) and that they experience lower life-cycle wage growth overall (Lagakos et al., 2018a). To think about these two views and their implications, we now turn to an equilibrium life-cycle model of joint search.

3 Model

3.1 Environment

The setup of the model and its description closely follows Bacher et al. (2025). The two most important differences from that model are that we explicitly model gender and adjust the labor market to be better suited for the analysis of countries at different stages of development by incorporating a self-employment option.

The economy is populated by two-member households which consist of one man (m) and one woman (w). Both members have the same age. Households live for T periods, after which they die deterministically. They retire jointly after a working life of T_W periods, and retirement lasts $T - T_W$ periods.

Households have access to a risk-free bond and members can jointly save in this bond at the exogenous interest rate r, i.e. there is a single asset position a per couple. Borrowing is not allowed.

During working life each household member can be in one of four labor market states. Each member can be employed in wage work (W), in which case he or she receives a wage payment. A member not employed in wage work may choose self-employment (S). In that state, there is an intensive margin choice about how many hours to work. A member may also be non-employed with benefits (B), which he or she receives after an exogenous separation from wage work. Finally, the member can be non-employed without receiving benefits (N). In total, there are 16 joint labor market states for a two-member household: $jk \in \mathcal{J} = \{W, S, B, N\} \times \{W, S, B, N\}$. Throughout the analysis, we label the man as first household member and the woman as second household member (e.g., when considering the household's joint labor market state jk, j refers to the man and k to the woman).

Each household member is endowed with a level of human capital h, which we interpret as the individual's earnings potential capturing both education differences (initial distribution) and labor market experience (dynamics with job tenure). Over the life cycle, human capital evolves stochastically depending on the agent's employment status and current human capital level. In

Figure 5: Individual Transitions through Labor Market States

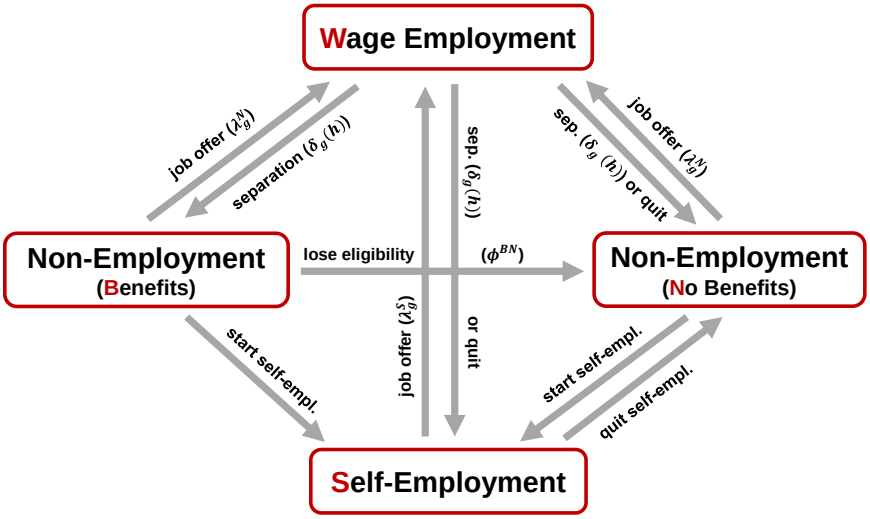


Figure notes: This figure illustrates individual transitions between the four labor market states in the model.

addition, the human capital process is allowed to differ by gender $g = \{m, w\}$. If an individual member is in wage work, each period their human capital will go up by one unit with probability $\phi_g^{up}(h)$. Otherwise, human capital drops by one unit with probability $\phi_g^{down}(h)$. Compensation in wage work is equal to the human capital level.

Figure 5 illustrates how an individual transitions through the four different labor market states. A wage worker can receive an exogenous separation shock with probability $\delta_g(h)$, which depends on the individual's gender and level of human capital. If such a separation shock occurs, the agent transitions to non-employment with benefits (B). An agent can also choose to immediately leave to non-employment without benefits (N) or to self-employment (S) instead of becoming non-employed and receiving benefits.[10] If there is no separation shock, the individual can either stay employed or quit to self-employment or non-employment without benefits.

A non-employed agent who receives benefits can transition to all other labor market states in the following ways. First, a job offer arrives with probability λ_N^g and allows the agent to transition to employment if they choose to accept the offer. The arrival rates are exogenously set and we keep them constant across the two non-employment states. An agent can always choose to reject a job offer to avoid the utility cost of working. Second, a non-employed worker who receives benefits can stochastically lose benefit eligibility with probability ϕ^{BN}, capturing that benefits are limited in time. Third, the agent can choose to take up self-employment.

A non-employed worker without benefits can receive job offers at rate λ_N^g or switch to self-employment. Self-employed agents can also receive job offers, at rate λ_S^g, or transition into non-

[10] Typically, the option of non-employment with benefits dominates non-employment without benefits. However, as we discuss below, we allow for taste shocks, which make foregoing benefits possible - we keep that option in the description for completeness.

Table 6: Labor Supply Choice Sets

Benefit Eligibility	**Job (Offer)** Both	Man (m)	Woman (w)	None
Both	$\mathcal{J}_{BB}^{WW} = \{W,S,B,N\} \times \{W,S,B,N\}$	$\mathcal{J}_{BB}^{WX} = \{W,S,B,N\} \times \{S,B,N\}$	$\mathcal{J}_{BB}^{XW} = \{S,B,N\} \times \{W,S,B,N\}$	$\mathcal{J}_{BB}^{XX} = \{S,B,N\} \times \{S,B,N\}$
Man (m)	$\mathcal{J}_{BX}^{WW} = \{W,S,B,N\} \times \{W,S,N\}$	$\mathcal{J}_{BX}^{WX} = \{W,S,B,N\} \times \{S,N\}$	$\mathcal{J}_{BX}^{XW} = \{S,B,N\} \times \{W,S,N\}$	$\mathcal{J}_{BX}^{XX} = \{S,B,N\} \times \{S,N\}$
Woman (w)	$\mathcal{J}_{XB}^{WW} = \{W,S,N\} \times \{W,S,B,N\}$	$\mathcal{J}_{XB}^{WX} = \{W,S,N\} \times \{S,B,N\}$	$\mathcal{J}_{XB}^{XW} = \{S,N\} \times \{W,S,B,N\}$	$\mathcal{J}_{XB}^{XX} = \{S,N\} \times \{S,B,N\}$
None	$\mathcal{J}_{XX}^{WW} = \{W,S,N\} \times \{W,S,N\}$	$\mathcal{J}_{XX}^{WX} = \{W,S,N\} \times \{S,N\}$	$\mathcal{J}_{XX}^{XW} = \{S,N\} \times \{W,S,N\}$	$\mathcal{J}_{XX}^{XX} = \{S,N\} \times \{S,N\}$

Table notes: This table reports households' labor supply choice sets, depending on job offers and benefit eligibility of the man and woman.

employment without benefits.

3.2 Household Search Problem

Timing in the model is as follows: In the beginning of each period households receive their labor income (wages, benefits) and asset income from investing in the risk-free bond. Given their budget constraint, households then make a consumption-savings choice and, if in that state, choose their self-employment hours. Afterwards, separation shocks are realized. Job offers for previously non-employed spouses arrive after separations are revealed. Newly separated individuals cannot receive an offer immediately. Next, potential losses of benefit eligibility are realized and human capital transitions are revealed. Finally, households choose their joint future labor market state from the feasible subset of $\mathcal{J}$.

Table 6 summarizes all possible combinations of job opportunities and benefit eligibility of the man and woman along with the associated choice sets over joint labor market states. The superscripts to $\mathcal{J}$ indicate whether the household members have the opportunity to be employed in wage work. An employment opportunity arises either because a previously employed agent did not receive a separation shock or because an agent received a job offer while non-employed. If both members have the opportunity to be employed, the superscript is WW. In contrast, X indicates that a member cannot be employed in wage work. Hence, WX and XW are the cases in which only one member has a job opportunity, whereas XX indicates that neither household member can be employed in the following period.

The logic for the subscripts is similar. However, they refer to benefit eligibility of the individual household members. Again, B indicates eligibility, while X refers to non-eligibility. Note that the options of non-employment without benefits and self-employment are always available.

We can now formally state the household search problem.[11] The value function of a household of age t in joint labor market state jk is:

$$V_t^{jk}(h_m, h_w, a) = \max_{a', s_m, s_w} u(c^{jk}(h_m, h_w, a, a')) - v_m(s_m) - v_w(s_w) + \psi_t^{jk} + \beta\Theta_{t+1}^{jk}(h_m, h_w, a'), \quad (3.1)$$

where the additional state variables are the human capital levels of the man and woman (h_m, h_w), and joint asset holdings a. Households value consumption c according to the utility function $u(c)$. Consumption is pooled within the household. Each household member faces a separate disutility $v_g(\cdot)$ of hours worked in self-employment s_g, and we allow preferences over s_g to vary by gender. We restrict the choice of s_g to be zero for any state except self-employment (S) and assume $v_g(0) = 0$. Additionally, instantaneous utility is affected by ψ which may vary by labor market state and age. The term ψ captures disutility from working and searching for employment. Note that ψ depends on the *joint* labor market state of the household. Hence, we allow for the possibility that households derive a different utility from whether the man or woman is working or staying at home as well as complementarities. Finally, households discount their continuation value Θ with discount factor β. Their intertemporal budget constraint reads as follows:

$$c^{jk}(h_m, h_w, a, a') = -\underbrace{(a' - (1+r)a)}_{\text{net savings}} +$$

$$(1-\tau)\left[\underbrace{\mathbb{I}_{j=W} w_m(h_m) + \mathbb{I}_{k=W} w_w(h_w)}_{\text{labor income}} + \underbrace{\mathbb{I}_{j=S}\hat{w}_m s_m + \mathbb{I}_{k=S}\hat{w}_f s_f}_{\text{self-employment}} + \underbrace{\mathbb{I}_{j=B} b_m(h_m) + \mathbb{I}_{k=B} b_m(h_w)}_{\text{(unemployment) benefits}}\right].$$

Conditional on their employment status household members receive wage or benefit income whose level depends on their human capital level and gender. Benefit income has a constant replacement ratio up to a maximum level of benefits, i.e. $b_g(h) = \min\{b^{rep} w_g(h), b^{max}\}$. Households in the S state receive income from self-employment. All forms of labor income and benefits are taxed at the flat rate τ. In addition, a household can use its assets and interest income to finance consumption and new purchases of the risk-free bond.

To write the continuation utility for one labor market state explicitly, we consider a household in which the man is in wage work and the woman is non-employed without benefits (a WN-couple). We express the continuation value in two steps. First, we take expectations over separation shocks

[11] We focus on couples in working age in the description here. Retired couples only solve a standard consumption-savings problem, essentially just providing a terminal condition for the problem in working age.

and job offer arrivals, i.e. over the choice sets for future labor market states:

$$
\begin{aligned}
&\Theta_{t+1}^{WN}(h_m, h_w, a') = \\
&\quad (1-\delta_m(h_m))(1-\lambda_w^N)\ \widetilde{V}_{t+1}^{WN}(h_m, h_w, a', \mathcal{J}_{XX}^{WX}) \\
&+(1-\delta_m(h_m))\lambda_w^N\ \widetilde{V}_{t+1}^{WN}(h_m, h_w, a', \mathcal{J}_{XX}^{WW}) \\
&+\delta_m(h_m)(1-\lambda_w^N)\ \widetilde{V}_{t+1}^{WN}(h_m, h_w, a', \mathcal{J}_{BX}^{XX}) \\
&+\delta_m(h_m)\lambda_w^N\ \widetilde{V}_{t+1}^{WN}(h_m, h_w, a', \mathcal{J}_{BX}^{XW}).
\end{aligned}
\tag{3.2}
$$

We distinguish four different cases – the combinations of cases in which the man loses or does not lose the wage job with probability $\delta_m(h_m)$ and the woman receives or does not receive an offer for wage work with probability $\lambda_w(N)$. The woman can never be eligible for benefits, while the man is eligible only in the case of exogenous separation.

In a second step, we consider transitions for human capital h of both spouses and the household's discrete choice over feasible future labor market states:

$$
\begin{aligned}
&\widetilde{V}_{t+1}^{WN}(h_m, h_w, a', \mathcal{J}_{QR}^{OP}) = \\
&\quad \phi_m^{up}(h_m)\phi_w^{down}(h_w)\ \mathbb{E}_\epsilon \max_{\widehat{jk}\in\mathcal{J}_{QR}^{OP}} \left\{ V_{t+1}^{\widehat{jk}}(h_m+1, h_w-1, a') + \sigma\epsilon^{\widehat{jk}} \right\} \\
&+\phi_m^{up}(h_m)(1-\phi_w^{down}(h_w))\ \mathbb{E}_\epsilon \max_{\widehat{jk}\in\mathcal{J}_{QR}^{OP}} \left\{ V_{t+1}^{\widehat{jk}}(h_m+1, h_w, a') + \sigma\epsilon^{\widehat{jk}} \right\} \\
&+(1-\phi_m^{up}(h_m))\phi_w^{down}(h_w)\ \mathbb{E}_\epsilon \max_{\widehat{jk}\in\mathcal{J}_{QR}^{OP}} \left\{ V_{t+1}^{\widehat{jk}}(h_m, h_w-1, a') + \sigma\epsilon^{\widehat{jk}} \right\} \\
&+(1-\phi_m^{up}(h_m))(1-\phi_w^{down}(h_w))\ \mathbb{E}_\epsilon \max_{\widehat{jk}\in\mathcal{J}_{QR}^{OP}} \left\{ V_{t+1}^{\widehat{jk}}(h_m, h_w, a') + \sigma\epsilon^{\widehat{jk}} \right\}
\end{aligned}
\tag{3.3}
$$

For the previously employed man human capital can either remain constant or increase, while for the non-participating woman it remains constant or decreases. Each line of equation 3.3 corresponds to one of the resulting four combinations of possible human capital transitions.

The feasible future labor market states can be read off Table 6. The term $\epsilon \in \mathbb{R}^{|\mathcal{J}_{QR}^{OP}|}$ is a vector of iid, Type-I extreme value (Gumbel) shocks with mean zero. We introduce these taste shocks for computational purposes, as they smooth out kinks and discontinuities in the policy functions that arise from the discrete choices over labor market states.

While we outline the continuation value for a WN-couple, the problem for all other current joint labor market states evolves in a very similar manner. In equation 3.2, expectations are formed over the relevant combinations of separations and job offer arrivals. For members previously in the B-state and hence eligible for benefits, the problem has to be extended by expectations over benefit losses. Equation 3.3 considers the relevant combinations of human capital transitions.

Table 7: Exogenously Set Parameters

Parameter	Interpretation	Value
γ	Risk aversion	2
r	Interest rate	0.5% (2% annually)
$\rho_f = \rho_m$	Frisch elasticity	0.5
τ	Labor income tax	0.28
b(h)	Individual benefit level	$\min\{0.5w_g(h), \$7500\}$
ϕ^{US}	Probability of losing benefits	0.5
p	Individual pension level	$\min\{\$3000+0.25w_g(h), \$12000\}$
$\hat{w}_m$, $\hat{w}_f$	Return to self-employment	\$6000, \$4200
σ_ϵ	Gumbel shock	0.1

Table notes: This table reports all exogenously set parameters and their corresponding values.

4 Calibration

We start by calibrating the model to the U.S. economy. Afterwards, we vary individual model elements (savings technology, preferences for female employment, benefits, GDP per capita) to understand which adjustments are necessary to explain the empirical patterns across countries presented in Section 2. The model frequency is one quarter. The period of working life lasts for 40 years (160 quarters) and the retirement period for 10 years (40 quarters).

4.1 Functional Form Assumptions and Parameter Restrictions

Utility function. We parameterize households' utility over consumption according to the constant relative risk aversion type:

$$u(c) = \frac{c^{1-\gamma} - 1}{1-\gamma}.$$

The term γ reflects the coefficient of relative risk aversion, which we fix at a standard value of 2. We report all exogenously set parameters in Table 7.

The parameters ψ_t^{jk} capture the disutility of work and utility of staying at home, incorporating potential complementarities between spouses. To impose structure, we first specify the utility by gender and individual labor market state for each household member separately:

$$\begin{aligned}
&\psi_f^W = \psi_m^W = 0 \\
&\psi_m^S, \psi_f^S \text{ internally calibrated} \\
&\psi_m^B = \psi_m^N \text{ internally calibrated} \\
&\psi_f^B = \psi_f^N = \bar{\psi}_f^N + \frac{\underline{\psi}_f^N - \bar{\psi}_f^N}{1 + e^{-0.15(t-33)}} \text{ internally calibrated}
\end{aligned}$$

Then, we assume that household utility is the sum of the respective individual terms. We normalize the utility of wage work to zero and assume that the utility of non-employment does not depend on whether the individual receives benefits or not (that is, $\psi_g^B = \psi_g^N$). We allow the utility of

women for non-employment to vary by age, to capture in a reduced form way that young women disproportionately take care of children. Finally, we allow for leisure complementarity within couples by introducing an additional utility term for couples when both spouses are non-employed (ψ^{add}), also to be internally calibrated.

The disutility of self-employment is given by

$$v_g(s) = \rho_g \frac{s^{1+\nu}}{1+\nu},$$

where we fix the inverse Frisch elasticity ν at 0.5.

Human capital and wages. Wages are equal to human capital:

$$w_g(h_g) = h_g.$$

We define human capital over an equidistant grid with 12 points. For men and women separately, we define these grids as follows. We compute from the Survey of Income and Program Participation (SIPP) the labor incomes of wage workers by gender, restricting the sample to those working at least 240 hours per quarter and having positive earnings. We then set the lower and upper bounds of the model grids to the 5th and 95th percentile of the gender dependent distribution from the data.

The following processes illustrate the likelihood of moving up or down the human capital, depending on the individual's labor market state:

$$\phi_g^{up}(i) = \bar{\phi}_g^{up} i^{\underline{\phi}_g^{up}}$$
$$\phi_g^{down}(i) = \bar{\phi}_g^{down},$$

where g denotes gender and i the grid point. These processes allow for both increasing and decreasing probabilities of moving along the human capital ladder at higher (or lower) grid points.

For self-employment, we compute earnings of the self-employed from the contingent worker supplement of the CPS. We work with the contingent worker supplement as our definition of self-employment refers to easy-to-get jobs, as opposed to potentially high-growth entrepreneurship (for that reason, we also do not allow for human capital accumulation when in the S state). We impose returns to self-employment such that a man who works full-time earns around \$8,700. A woman working full-time in self-employment earns around \$6,000. One complication arises because wage workers typically receive additional benefits such as health insurance and pension plans. Hence, we impose a 30% penalty on self-employment earnings to approximate the fact that the self-employed have to pay themselves for health insurance and private pensions.

Separation rates. The exogenous separation rates depend on gender and the human capital grid point according to:

$$\delta_g(i) = \bar{\delta}_g i^{\delta_g}.$$

Figure 6: Separation Rates

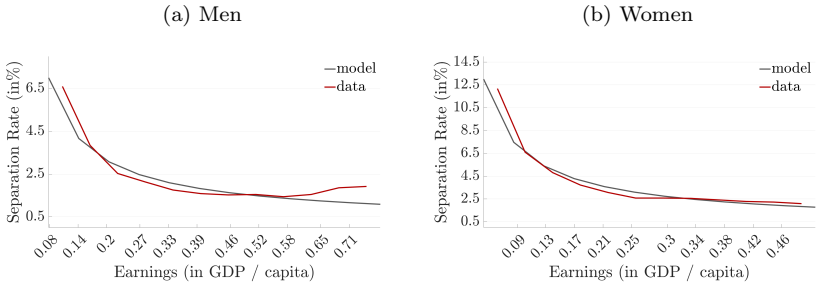


Figure notes: This figure shows separation rates from wage work in the model and data. In the data, separation rates by earnings level are computed from the SIPP and rescaled such that the aggregate flow is consistent with the labor force survey data from the CPS.

To calibrate this parameter, we compute transition rates from wage work to non-employment by earnings from the SIPP. On average, transition rates in the SIPP are lower than what we find in the labor force survey based on CPS data. Therefore, we rescale the transition rates such that the average is consistent with the CPS. Figure 6 shows the resulting separation rates in the data and model-implied separation rate given our parameter choices. The earnings grids differ by gender, as women's earnings are much lower than men's, and women's separation rates are higher.

Government. As in Trabandt and Uhlig (2011), we impose a linear income tax of $\tau = 0.28$, applied to wages in wage work, self-employment, and benefits. Benefits are calibrated to a replacement rate of $b^{rep} = 0.5$, up to a cap of roughly \$7,500 per quarter. Benefits expire with probability $\phi^{BN} = 1/2$, to match the average benefit duration of six months in the U.S. The individual pension is set to a minimum of \$3,000 per quarter. It increases above this minimum by replacing 25% of pre-retirement period wages (based upon human capital irrespective of whether individual is in wage work or not). The maximum pension is \$12,000 per quarter. These values roughly approximate the quite progressive U.S. social security system.

Other fixed parameters. The quarterly interest rate is $r = 0.5\%$, reflecting an annual interest rate of roughly 2%. The variance of the taste shock is $\sigma_\varepsilon = 0.1$.

4.2 Parameters and Moments

We now turn to the internally calibrated parameters. While it is understood that all parameters influence all targeted moments, we discuss the relation between the parameters and most closely related targets. We report the calibrated parameters in Table 8.

Joint labor market states – labor utilities ψ. The disutility of wage work and self-employment parameters are closely related to joint labor market states of couples. We report the model fit for joint labor market states in Figure 7.

The parameter ψ^{add}, capturing leisure complementarities between spouses, is also closely related

Table 8: Internally Calibrated Parameters

Parameter	Interpretation	Value
β	Discount factor	0.986
$\bar{\phi}_m^{up}$	Human capital appreciation process men, level	0.300
$\underline{\phi}_m^{up}$	Human capital appreciation process men, exponent	-2.000
$\bar{\phi}_m^{down}$	Human capital depreciation process men	0.100
$\bar{\phi}_f^{up}$	Human capital appreciation process women, level	0.250
$\underline{\phi}_f^{up}$	Human capital appreciation process women, exponent	-2.000
$\bar{\phi}_f^{down}$	Human capital depreciation process women	0.150
ρ_m	Labor disutility self-employment men	1.800
ρ_f	Labor disutility self-employment women	2.200
λ_m^N	Arrival rate in non-employment men	0.150
λ_m^S	Arrival rate in self-employment men	0.070
λ_f^N	Arrival rate in non-employment women	0.210
λ_f^S	Arrival rate in self-employment women	0.090
ψ_m^S	Utility shifter self-employment men	2.175
ψ_f^S	Utility shifter self-employment women	1.150
ψ_m^N	Utility shifter non-employment men	3.000
$\bar{\psi}_f^N$	Utility shifter non-employment women, level	2.400
$\underline{\psi}_f^N$	Utility shifter non-employment women, exponent	1.600
ψ^{add}	Utility shifter non-employment both (complementarity)	0.800

Table notes: This table summarizes all internally calibrated parameters and their corresponding values.

to the magnitude of the AWE. If spouses value very highly to both be in non-employment, the likelihood that a non-employed wife transitions into employment upon the job loss of her husband declines.

Individual labor market transitions – arrival rates. The externally set separation rates and internally calibrated arrival rates are closely related to individual transition rates, shown in Table 9.

The main shortcoming of the current quantification is that there is too little persistence in the self-employment and non-employment states relative to the data. The tension between the model and the data, to be reconciled in future versions, is that in the data there are many self-employed in

Figure 7: Joint Labor Market States

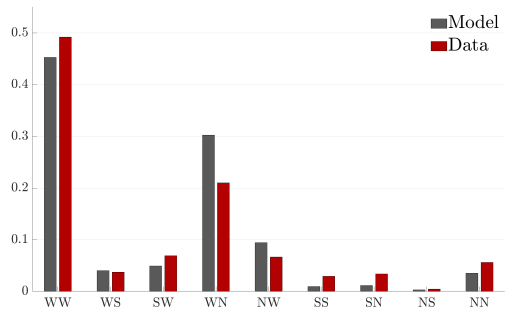


Figure notes: This figure compares joint labor market states in model and data. Data come from the CPS.

Table 9: Individual Labor Market Transition Rates

	Data			Model		
	W	S	N	W	S	N
Panel I: Men						
W	0.96	0.01	0.03	0.97	0.00	0.03
S	0.05	0.92	0.03	0.06	0.75	0.18
N	0.14	0.03	0.84	0.12	0.13	0.74
Panel II: Women						
W	0.95	0.01	0.05	0.94	0.01	0.06
S	0.06	0.85	0.09	0.05	0.45	0.51
N	0.09	0.02	0.90	0.09	0.08	0.83

Table notes: This table compares individual transition rates between wage work, self-employment, and non-employment in the data and model. Panel I refers to men, and panel II refers to women. Data come from the CPS.

well-paying professions, who never leave self-employment, whereas in the model the self-employment state represents an easy-to-take job with a relatively low return.

A crucial feature of the calibration is that the arrival rate for wage work in self-employment is lower than in non-employment. This result is intuitive since the self-employed have less time to search for wage work than the non-employed. In addition, it is also quite important for a realistic magnitude of the AWE: if self-employment has the same arrival rate as non-employment, very few men actually transition to non-employment in case of an exogenous separation. Instead, they would directly transition into self-employment, as this state can provide more income. Given the sizable gender wage gap in the model it is key for many couples to bring the husband back into wage work and hence, a lower arrival rate in self-employment leads to a realistic number of men actually transitioning to non-employment after an exogenous separation to benefit from the higher arrival rates.

Hours worked in self-employment – disutility of work. For self-employment, we internally calibrate the disutility parameters for men and women. The most closely related target is average hours worked in self-employment which we again take from the contingent worker supplement of the CPS. We find that men work on average 46 hours in self-employment and women 33. By choosing $\rho_m = 1.8$ and $\rho_f = 2.2$, the model produces that self-employed men work on average 51 hours and self-employed women 33 hours, which is close to the empirical values.

Life-cycle income profiles – human capital gains. In the model, wages are equal to human capital and the level of human capital depends in expectation on the individual's employment history. Hence, the parameters governing the probability of human capital appreciation are closely related to life-cycle income profiles. We report the model fit in Table 10.

Earnings losses through non-employment – human capital losses. To parameterize the depreciation of human capital during non-employment or self-employment, we match – separately by

Table 10: Mean Labor Income (in 000s US$)

	Men		Women	
	Data	Model	Data	Model
Aggregate	19.8	19.0	13.3	10.9
Age 25-35	17.6	17.0	12.9	10.8
Age 35-45	20.6	18.7	13.5	10.8
Age 45-55	20.8	19.8	13.7	11.0
Age 55-65	19.8	20.5	13.0	10.9

Table notes: This table compares average labor income between data and model, separately for men and women. We restrict the sample to individuals who work at least 240 hours per quarter and report positive earnings. Data come from the SIPP.

Table 11: Earnings Losses through Non-Employment Spells

	Men		Women	
	Data	Model	Data	Model
Δwage_{1q}	-2.6%	-1.6%	-2.6%	-2.3%
$\Delta \text{wage}_{2-4q}$	-10.3%	-6.7%	-12.0%	-10.4%
$\Delta \text{wage}_{5-8q}$	-15.2%	-15.8%	-22.6%	-24.6%

Table notes: This table compares average earnings losses (in percent) after non-employment spells of 1 quarter, 2-4 quarters, and 5-8 quarters between model and data, separately for men and women. Data come from the SIPP.

gender – earnings losses after spells of non-employment, conditional on the length of spell. Table 11 reports the results.

Life-cycle asset profiles – discount factor. The discount factor β is closely related to life-cycle asset profiles which we report in Table 12. We target median household net financial wealth, which we define as net worth minus home and vehicle equity. We use this asset measure because we are interested in funds that can be liquidated within a relatively short time-frame for the purpose of providing insurance.

Table 12: Median Asset Levels (in 000s US$)

	Data	Model
Aggregate	44	60
Age 25-35	4	31
Age 35-45	40	83
Age 45-55	84	60
Age 55-65	146	121

Table notes: This table compares median household net financial wealth between model and data. Net financial wealth is defined as net worth minus home and vehicle equity. Data come from the SIPP.

5 Quantitative Results

After having calibrated the model, we now turn to the main questions we aim to answer with our structural framework: Why is there so little utilization of household labor supply insurance across countries? And what are the consequences of low utilization?

As a step towards answering these questions, we start from the baseline calibrated economy and change a sequence of parameters one at a time. We focus on the parameters that capture the main distinct features of household labor supply in developing countries. Our goal is to shed light on how these changes can be used to understand the limited use of household labor supply as insurance.

To do so, we start from the calibrated baseline model and one-by-one change individual model elements that each capture one possible feature of a developing country. Thereby, we take as reference a hypothetical country that has a GDP per capita at 10% of the U.S. value (ca. $6000), which roughly corresponds to the poorest countries in our sample.

In the first counterfactual we study the effect of income level directly. To do so, we rescale all nominal parameters (wage income, self-employment wages, unemployment and pension benefits) to 10% of their respective baseline values while leaving all other parameters unchanged. The choice of 10% (roughly $6000) is motivated by the fact that this is approximately the income level in the poorest countries in our database. In the second counterfactual, we set the interest rate on savings to zero. This counterfactual captures that private asset accumulation tends to be more difficult in low-income countries (Karlan et al., 2014; Donovan, 2021; Lagakos et al., 2023).

We then consider two gender-specific factors. We study the role of gender norms by increasing the preference for female non-employment by 1.5 to match the average female labor force participation in countries whose GDP per capita is at 10% of the U.S. value. We also perform one counterfactual in which we decrease female wages to again match the average female labor force participation in countries whose GDP per capita is at 10% of the U.S. value.

Finally, to understand the importance of public benefits for the AWE, we consider two counterfactuals in which we adjust the level of unemployment benefits. We consider a modest reduction to 75 percent of the baseline U.S. level as well as a complete elimination of unemployment insurance as is typical in developing countries.

Table 13 reports our results. The first two rows show the added worker effect (AWE) and female labor force participation (FLFP) in U.S. data and the baseline model. The baseline model performs well in matching both moments. We now turn to explaining the results of each counterfactual, corresponding to rows $3-8$ in Table 13.

Income levels (GDP 10%). A decrease in economy-wide income increases the AWE from 1.7% to 10.6%. Lower income levels (and associated lower levels of benefits and asset holdings) increase the need for spousal insurance. However, note that female labor force participation in this counterfactual is close to 90%. These findings are somewhat at odds with the data, which calls for lower FLFP in low income countries.

Table 13: Spousal Insurance: Model Counterfactuals

	AWE	FLFP
USA (data)	1.6%	70%
Baseline model	1.7%	65%
Income levels (GDP 10%)	10.6%	89%
Asset markets ($r = 0\%$)	7.7%	67%
Gender norms ($\psi_f^N + 1.5$)	9.6%	26%
Female wages (35%)	-2.2%	25%
Benefits (75%)	2.0%	65%
Benefits (none)	-3.0%	65%

Asset markets ($r = 0\%$). Reducing the return to savings has a similar effect on the added worker effect as a reduction in income levels. With a lower return to savings, households hold fewer assets and have therefore less private insurance against the job loss of a primary earner, increasing the AWE to 7.7%. This change has a smaller effect on female labor force participation rates. Put together, these first two changes lead us to believe that a developing country in the model would have higher female labor force participation rates and much greater utilization of household labor supply insurance.

Gender norms ($\psi_f^N + 1.5$). A higher preference for female non-employment (that is, an increase in ψ_f^N) leads to a lower labor force participation rate. To match the average FLFP of countries at 10% of the U.S. GDP per capita level (25%), we need to increase ψ_f^N by 1.5 from an initial level of 2.4 when young and 1.6 when old. The lower FLFP implies that more women in the economy are available to provide insurance against their husbands' job loss, resulting in an increase of the AWE. Comparing the moments in this counterfactual to the predicted values for an economy with 10% of U.S. GDP per capita, it appears that variation in ψ_f^N is a promising channel to jointly explain the cross-country variation across both margins of spousal insurance.

Female wages (35%). Next, we lower female wages to 35% of their baseline value to test another channel through which gender might affect spousal insurance along the development spectrum. We again set this value to match a FLFP of 25%. In contrast to before, women are now less likely to work because they have little financial reward to doing so. In contrast to the data, the AWE decreases relative to the baseline. The lower AWE arises through a selection of couples we consider for the AWE: if female wages are too low, men who get exogenously separated do not enter non-employment but directly transition into self-employment, shrinking the sample of potential added workers.

Benefits. We consider a final set of counterfactuals in which we lower the level of benefits to test whether less public insurance leads to an increase of private insurance through spousal labor supply. First, we set the benefit level to 75% of its baseline value. In this counterfactual, the AWE increases,

albeit only slightly. Next, we eliminate benefits altogether, which is in line with observed benefit levels in countries with GDP per capita at 10% of the U.S. level. This more substantial reduction in benefits leads to a decline in the AWE, while FLFP remains unchanged. Again, this result arises from a selection effect. Absent unemployment benefits, husbands have no incentive to remain in non-employment and will directly enter self-employment if the household needs additional income. However, wage-work-to-self-employment transitions of husbands (and the response of their wives) count towards the baseline group, and hence lead to a negative AWE.

Recap of Quantitative Results

Our baseline model is calibrated to U.S. data and is able to match both the added worker effect and the labor force participation rate well. Lowering income levels and interest rates to mimic a developing country leads to a higher added worker effect and a higher female labor force participation rate. Gender barriers push towards lower female labor force participation rate. However, while gender norms lead to a higher added worker effect, the gender wage gap implies a lower added worker effect. Finally, the absence of unemployment insurance mainly leads to a collapse of the added worker effect. Our hypothesis is that a combination of low income levels, low interest rates, missing unemployment insurance, and gender-specific barriers should be sufficient to generate both low utilization of household labor supply insurance and intermediate female labor force participation rates in developing countries.

Our plan is to develop a fuller calibration that targets the new measures of household labor supply insurance. We then want to extend the calibrated model to developing countries by changing multiple parameters simultaneously, either in line with the observed data (GDP per capita, interest rates) or to fit targets. The goal is to understand the relative importance of various factors in explaining the household labor supply patterns we document. Our model is also capable of generating endogenous predictions for labor market flows and for life-cycle human capital accumulation and wage growth.

6 Conclusion

This paper provides new evidence on the extent of household labor supply insurance around the world. We draw on harmonized microdata from rotating panel labor force surveys covering 46 countries across a wide range of development levels and labor market institutions. The classic added worker effect is small everywhere, on the order of 1–2 percentage points. Working wives are actually less likely to remain employed when their husbands exit, largely because couples face correlated shocks. We find no evidence of precautionary labor supply providing insurance either. The dominant response to the loss of a wage job in developing countries is not a spousal adjustment but self-insurance: the husband or head transitions to self-employment roughly 60–80 percent of the time. This margin substitutes for missing unemployment insurance in developing countries.

We develop a life-cycle model of joint household search to help understand these patterns and

their implications. We calibrate the model to the United States and perform model comparative statics to understand the importance of key factors. Preliminary counterfactual exercises point to two key forces. First, lower income levels and lower returns to savings both push toward greater use of household labor supply as insurance. Second, eliminating unemployment benefits leads husbands to self-insure through self-employment, crowding out any spousal response. A combination of these forces, together with gender norms that reduce female labor force participation, appears necessary to rationalize the data. Our plan is to develop a full calibration to developing countries that targets the new measures of household labor supply insurance directly. The calibrated model can then serve as a laboratory to quantify the relative importance of these forces and to trace out their consequences for labor market flows and life-cycle human capital accumulation.

References

Acemoglu, Daron and Robert Shimer, "Productivity gains from unemployment insurance," *European Economic Review*, 2000, *44* (7), 1195–1224.

Andersen, Asger Lau, Amalie Sofie Jensen, Niels Johannesen, Claus Thustrup Kreiner, Søren Leth-Petersen, and Adam Sheridan, "How do households respond to job loss? lessons from multiple high-frequency datasets," *American Economic Journal: Applied Economics*, 2023, *15* (4), 1–29.

Bacher, Annika, Philipp Grübener, and Lukas Nord, "Joint Search over the Life Cycle," *Journal of Monetary Economics*, 2025, *150* (103696).

Bardóczy, Bence, "Spousal Insurance and the Amplification of Business Cycles," 2022. Working Paper.

Barro, Robert J. and Jong Wha Lee, "A New Data Set of Educational Attainment in the World, 1950–2010," *Journal of Development Economics*, 2013, *104*, 184–198.

Başlevent, Cem and Özlem Onaran, "Are Married Women in Turkey More Likely to Become Added or Discouraged Workers?," *LABOUR*, 2003, *17* (3), 439–458.

Birinci, Serdar, "Spousal Labor Supply Response to Job Displacement and Implications for Optimal Transfers," 2026. mimeo, Federal Reserve Bank of St. Louis.

Blundell, Richard, Luigi Pistaferri, and Itay Saporta-Eksten, "Consumption Inequality and Family Labor Supply," *American Economic Review*, 2016, *106* (2), 387–435.

Bredtmann, Julia, Sebastian Otten, and Christian Rulff, "Husband's Unemployment and Wife's Labor Supply: The Added Worker Effect across Europe," *ILR Review*, 2018, *71* (5), 1201–1231.

Cardona-Sosa, Lina M., Claudia L. Flórez, and Laura C. Morales, "How Does the Household Labour Supply Respond to an Unemployment Shock? The Added Worker Effect in Colombia," *LABOUR*, 2018, *32* (4), 174–212.

Casella, Sara, "Women's Labor Force Participation and the Business Cycle," 2023. Working Paper.

Chiplunkar, Gaurav and Tatjana Kleinberg, "Gender Barriers, Structural Transformation, and Economic Development," 2023. Working Paper.

Ciaschi, Matías and Guido Neidhöfer, "Job Loss and Household Labor Supply Adjustments in Developing Countries: Evidence from Argentina," *The World Bank Economic Review*, 2024, *38* (3), 558–579.

Cullen, Julie Berry and Jonathan Gruber, "Does Unemployment Insurance Crowd Out Spousal Labor Supply?," *Journal of Labor Economics*, 2000, *18* (3), 546–572.

Dinkelman, Taryn and L. Rachel Ngai, "Time Use and Gender in Africa in Times of Structural Transformation," *Journal of Economic Perspectives*, 2022, *36* (1), 57–80.

Donovan, Kevin, "The equilibrium impact of agricultural risk on intermediate inputs and aggregate productivity," *Review of Economic Studies*, 2021, *88* (5), 2275–2307.

_ , Joseph Pedkte, Will Jianyu Lu, and Todd Schoellman, "Labor Market Anatomy of a Macroeconomic Crisis," 2026. mimeo, Yale University.

_ , Will Jianyu Lu, and Todd Schoellman, "Labor Market Dynamics and Development," *Quarterly Journal of Economics*, 2023, *138* (4), 2287–2325.

Doss, Cheryl, Douglas Gollin, Charles Gottlieb, and Markus Poschke, "The Gender Division of Work Across Countries," 2024. Working Paper.

Ellieroth, Kathrin, "Spousal Insurance, Precautionary Labor Supply, and the Business Cycle," 2023. mimeo, Colby College.

Fagereng, Andreas, Helene Onshuus, and Kjersti N Torstensen, "The consumption expenditure response to unemployment: Evidence from Norwegian households," *Journal of Monetary Economics*, 2024, p. 103578.

Farooq, Ammar, Adriana D. Kugler, and Umberto Muratori, "Do Unemployment Insurance Benefits Improve Match and Employer Quality? Evidence from Recent U.S. Recessions," NBER Working Paper 27574, National Bureau of Economic Research July 2020.

Fernandes, Reynaldo and Fabiana de Felicio, "The Entry of the Wife into the Labor Force in Response to the Husband's Unemployment: A Study of the Added Worker Effect in Brazilian Metropolitan Areas," *Economic Development and Cultural Change*, 2005, *53* (4), 887–911.

Guner, Nezih, Remzi Kaygusuz, and Gustavo Ventura, "Rethinking the Welfare State," *Econometrica*, 2023, *91* (6), 2261–2294.

_ , Yuliya A. Kulikova, and Arnau Valladares-Esteban, "Does the Added Worker Effect Matter?," *Review of Economic Dynamics*, 2025, *56* (101271).

International Labour Organization and Gallup, *Towards a Better Future for Women and Work: Voices of Women and Men*, International Labour Office and Gallup, 2017.

Juhn, Chinhui and Simon Potter, "Is There Still an Added Worker Effect?," 2007. NBER Working Paper RRC NB07-14.

Karlan, Dean, Aishwarya Lakshmi Ratan, and Jonathan Zinman, "Savings by and for the Poor: A Research Review and Agenda," *Review of Income and Wealth*, 2014, *60* (1), 36–78.

Lagakos, David, Ahmed Mushfiq Mobarak, and Michael E. Waugh, "The welfare effects of encouraging rural–urban migration," *Econometrica*, 2023, *91* (3), 803–837.

_ , **Benjamin Moll, Tommaso Porzio, Nancy Qian, and Todd Schoellman**, "Life-Cycle Wage Growth Across Countries," *Journal of Political Economy*, 2018, *126* (2), 797–849.

_ , _ , _ , _ , **and** _ , "Lifecyle Human Capital Accumulation Across Countries: Lessons from U.S. Immigrants," *Journal of HUman Capital*, 2018, *12* (2), 305–342.

Landais, Camille and Johannes Spinnewijn, "The value of unemployment insurance," *Review of Economic Studies*, 2021, *88* (6), 3041–3085.

Lundberg, Shelly, "The Added Worker Effect," *Journal of Labor Economics*, 1985, *3* (1), 11–37.

Madrian, Brigitte C. and Lars Lefgren, "An Approach to Longitudinally Matching Current Population Survey (CPS) Respondents," *Journal of Economic and Social Measurement*, 2000, *26* (1), 31–62.

Maloney, Tim, "Employment Constraints and the Labor Supply of Married Women: A Reexamination of the Added Worker Effect," *Journal of Human Resources*, 1987, *22* (1), 51–61.

_ , "Unobserved Variables and the Elusive Added Worker Effect," *Economica*, 1991, *58* (230), 173–187.

Mankart, Jochen and Rigas Oikonomou, "The Rise of the Added Worker Effect," *Economics Letters*, 2016, *143*, 48–51.

_ **and** _ , "Household Search and the Aggregate Labor Market," *Review of Economic Studies*, 2017, *84* (4), 1735–1788.

_ , _ , **and Francesco Pascucci**, "Household Job Search: From the 1980s to the 2000s (and Beyond)," 2024. Mimeo, Central Bank of Slovakia.

Martinoty, Laurine, "Partner's Income Shock and Female Labor Supply. Evidence from the Repeal of Argentina's Convertibility Law," *World Development*, 2022, *159*, 106039.

Mincer, Jacob, "Labor Force Participation of Married Women: A Study of Labor Supply," in H. Gregg Lewis, ed., *Aspects of Labor Economics*, Princeton, NJ: Princeton University Press, 1962, pp. 63–105.

Ndiaye, Abdoulaye, Kyle F. Herkenhoff, Abdoulaye Cisse, Alessandro Dell'Acqua, and Ahmadou Aly Mbaye, "How to Fund Unemployment Insurance with Informality and False Claims: Evidence from Senegal," *Journal of Monetary Economics*, 2025, *150* (103699).

Parker, Susan W. and Emmanuel Skoufias, "The Added Worker Effect over the Business Cycle: Evidence from Urban Mexico," *Applied Economics Letters*, 2004, *11* (10), 625–630.

Ruggles, Steven, Lara Cleveland, Rodrigo Lovaton, Sula Sarkar, Matthew Sobek, Derek Burk, Dan Ehrlich, Jane Lee, and Nate Merrill, "Integrated Public Use Microdata Series, International: Version 7.6 [dataset]," 2025.

Skoufias, Emmanuel and Susan W. Parker, "Job Loss and Family Adjustments in Work and Schooling during the Mexican Peso Crisis," *Journal of Population Economics*, 2006, *19* (1), 163–181.

Trabandt, Mathias and Harald Uhlig, "The Laffer Curve Revisited," *Journal of Monetary Economics*, 2011, *58* (4), 305–327.

Wang, Haomin, "Intra-Household Risk Sharing and Job Search over the Business Cycle," *Review of Economic Dynamics*, 2019, *34*, 165–182.

World Bank, *World Development Indicators*, Downloaded July 2, 2025. ed., Washington DC: World Bank, 2025.

A Data Appendix

This appendix provides further results on the database as it is used in this paper and the empirical results in Section 2.

A.1 Sample Details

Our empirical results draw on the database that we are building as part of a long-running effort to collect and harmonize rotating panel labor force surveys from as many countries worldwide as possible. Details of the overall database can be found at `https://www.lfsdata.com/`. The database currently consists of roughly 91 million observations from 54 countries around the world. In this paper we focus on the subset of countries and years that collect the necessary data on households and relationships among people in households. Of the countries from the database, Denmark, Luxembourg, South Africa, Sweden, and Switzerland cannot be used because they include information for only one household member or do not provide the information to link household members together. Albania, Spain, and the West Bank and Gaza are lost because they do not collect information on young children; we view this as an essential control variable for our analysis. Some countries also lose data for some years because of these restrictions.

Table A.1 contains information on the sample used in the paper. Each row corresponds to one country. For each country, the table gives the dates for which data are available, the PPP GDP per capita range across the corresponding years, and the number of married couples and households in the data.

Much of our analysis rests on an examination of household heads. Countries differ in the rules that they use to determine who is the head of a household. Further, many countries do not document the rules. To give a sense of who the households are, we restrict attention to households with at least two working-age adults (our sample of interest) and compute some simple summary statistics for each country. The results are shown in Table A.2. The main result is that household heads are highly likely to be employed men and highly likely to be the oldest and highest-earning person in the household. For example, on average across countries, 78 percent of heads are the highest earner in their household and 82 percent are the oldest person.

A few countries have different patterns, suggesting an alternative mechanism for designating a household head. The most striking example is Latvia, where household heads are usually women and are less likely to be employed. Several other European countries also have more balanced gender compositions of household heads. However, our main results derive from focusing on married couples, for which the identity of the head is not relevant. Further, examination of the figures in the text shows that the European countries with different household heads do not much drive our results.

Table A.1: Sample Overview

Country	Dates	PPP GDP per capita	Couples (1000s)	Households (1000s)
Argentina	2003q3 – 2025q2	20,000 – 29,400	247	411
Austria	2010q1 – 2020q3	59,800 – 64,700	168	367
Bolivia	2015q4 – 2025q1	9,000 – 10,000	171	294
Botswana	2019q3 – 2019q3	18,100 – 18,100	0.1	0.2
Brazil	2002q1 – 2025q2	14,300 – 19,600	3,294	5,447
Bulgaria	2005q1 – 2007q3	17,700 – 20,400	27	35
Chile	2010q1 – 2024q4	24,100 – 30,200	630	1,093
Costa Rica	2010q3 – 2024q4	18,700 – 27,000	132	223
Croatia	2010q1 – 2020q3	28,300 – 35,100	24	31
Cyprus	2005q1 – 2020q3	36,400 – 46,200	73	101
Czech Republic	2005q1 – 2010q3	35,500 – 40,300	154	255
Dominican Republic	2016q1 – 2023q4	19,000 – 23,300	62	117
Ecuador	2007q2 – 2025q2	11,000 – 14,300	142	113
Egypt	2008q1 – 2012q3	12,400 – 13,100	45	58
Estonia	2005q1 – 2020q3	29,600 – 42,700	17	41
France	2003q1 – 2019q3	46,700 – 53,400	745	1,703
Georgia	2009q1 – 2024q3	10,600 – 25,000	42	65
Ghana	2022q1 – 2024q3	6,700 – 7,100	59	93
Greece	2008q1 – 2018q3	30,800 – 41,700	380	587
Guatemala	2024q4 – 2025q1	12,600 – 12,600	9	15
Guyana	2017q3 – 2021q1	12,800 – 22,900	3	7
Hungary	2005q1 – 2020q3	27,400 – 37,700	373	672
India	2017q3 – 2024q1	7,300 – 9,800	559	740
Ireland	2007q1 – 2016q3	58,600 – 81,100	167	319
Italy	2005q1 – 2020q3	45,500 – 52,700	517	820
Jamaica	2016q2 – 2021q3	9,200 – 10,200	9	37
Latvia	2007q1 – 2016q3	24,100 – 31,700	16	36
Lithuania	2005q1 – 2020q3	23,900 – 43,100	58	103
Malta	2009q1 – 2020q3	35,500 – 53,400	15	22
Mauritius	2013q1 – 2023q3	20,800 – 26,100	26	35
Mexico	2000q1 – 2025q3	19,400 – 22,000	4,483	6,408
Mongolia	2019q1 – 2024q3	14,800 – 16,800	29	41
Netherlands	2005q1 – 2005q3	58,400 – 58,400	52	89
Nicaragua	2009q2 – 2012q3	5,500 – 6,300	40	60
Paraguay	2010q1 – 2017q2	12,700 – 15,300	10	15
Peru	2003q1 – 2018q3	8,200 – 15,400	44	68
Philippines	1988q2 – 2003q1	4,300 – 5,000	537	134
Poland	2010q1 – 2020q3	27,100 – 38,200	245	361
Portugal	2010q1 – 2020q3	34,700 – 40,200	132	219
Romania	2005q1 – 2020q3	20,600 – 36,600	266	345
Slovak Republic	2005q1 – 2020q3	23,300 – 37,200	167	230
Slovenia	2014q1 – 2020q3	37,700 – 44,600	26	48
St. Lucia	2020q2 – 2023q3	17,100 – 23,400	0.2	0.5
United Kingdom	1997q1 – 2025q2	39,300 – 53,000	244	2,040
United States	1982q1 – 2025q4	43,700 – 75,500	1,897	4,439
Uruguay	2021q3 – 2025q1	29,400 – 32,000	46	131
Total: 46 Countries	**542 Country-Years**	**4,300 – 81,100**	**16,382**	**28,468**

Table A.2: Characteristics of Household Heads

	Share of Heads Who Are:				
Country	Male	Employed	Oldest in HH	Highest Educated in HH	Highest Earner in HH
Argentina	0.71	0.83	0.77	0.55	0.70
Austria	0.73	0.86	0.85	0.87	
Bolivia	0.76	0.89	0.79	0.53	0.81
Botswana	0.58	0.73	0.83	0.66	0.84
Brazil	0.65	0.76	0.73	0.59	0.79
Bulgaria	0.88	0.72	0.92	0.76	
Chile	0.71	0.86	0.73	0.60	
Costa Rica	0.71	0.80	0.79	0.51	0.70
Croatia	0.75	0.69	0.87	0.74	
Cyprus	0.92	0.84	0.92	0.66	
Czech Republic	0.86	0.83	0.91	0.89	
Dominican Republic	0.71	0.84	0.81	0.54	0.69
Ecuador	0.80	0.90	0.83	0.54	0.76
Egypt	0.90	0.82	0.96	0.62	0.93
Estonia	0.49	0.81	0.73	0.80	
France	0.92	0.78	0.81	0.65	0.72
Georgia	0.79	0.72	0.87	0.79	
Ghana	0.72	0.91	0.89	0.57	0.91
Greece	0.89	0.72	0.87	0.65	
Guatemala	0.78	0.88	0.80	0.49	0.81
Guyana	0.74	0.72	0.86	0.48	0.77
Hungary	0.87	0.77	0.90	0.80	
India	0.89	0.80	0.92	0.51	0.79
Ireland	0.44	0.68	0.76	0.74	
Italy	0.80	0.76	0.89	0.63	
Jamaica	0.55	0.81	0.78	0.64	0.89
Latvia	0.29	0.71	0.66	0.82	
Lithuania	0.54	0.78	0.71	0.80	
Malta	0.86	0.80	0.89	0.61	
Mauritius	0.87	0.83	0.87	0.48	0.80
Mexico	0.81	0.87	0.80	0.59	0.83
Mongolia	0.87	0.75	0.78	0.67	0.80
Netherlands	0.53	0.76	0.77	0.74	
Nicaragua	0.70	0.88	0.76	0.42	0.64
Paraguay	0.68	0.77	0.81	0.49	0.61
Peru	0.81	0.87	0.79	0.66	0.79
Philippines	0.90	0.90	0.84	0.51	0.89
Poland	0.74	0.83	0.84	0.80	
Portugal	0.76	0.79	0.88	0.58	
Romania	0.87	0.75	0.93	0.83	
Slovak Republic	0.85	0.78	0.90	0.82	
Slovenia	0.49	0.77	0.67	0.78	
St. Lucia	0.54	0.72	0.84	0.43	
United Kingdom	0.91	0.84	0.76	0.69	0.83
United States	0.67	0.80	0.70	0.77	0.76
Uruguay	0.47	0.80	0.69	0.73	0.69
Average	0.73	0.80	0.82	0.65	0.78

A.2 Additional Results on Responses to Shocks

This appendix contains additional results on wives and household members respond to shocks experienced by the husband or the head.

Table A.3: Added Worker Effect: Alternative Definitions

	Wife Enters			
	Emp	Emp	Emp or Unemp	Emp or Unemp
Husband Exits to U or N	0.014		0.032*	
	(0.013)		(0.015)	
Exits to U or N x Log GDP p.c.	-0.005		-0.005	
	(0.011)		(0.012)	
Husband Exits to U		0.019*		0.064***
		(0.009)		(0.011)
Exits to U x Log GDP p.c.		-0.000		0.001
		(0.008)		(0.011)
R-squared	0.050	0.050	0.061	0.061
N (millions)	6.2	6.1	5.7	5.6
Countries	46	46	46	46

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The literature has proposed a number of measures of the added worker effect. Our benchmark identifies the shock as when the husband moves from employment to non-employment because we have concerns about distinguishing unemployment from inactivity in developing countries. We focus on the case where the wife enters employment because this results in earnings that can help insure against the loss of the husband's income. Table A.3 shows the results from using alternative definitions. The largest effect derives from restricting attention to husbands who move only to unemployment and counting wives who transition to employment or unemployment. In this case, wives of husbands who transition to unemployment are 6.3 percent more likely to enter the labor force than wives of husbands who remain employed. This is still a relatively modest response, particularly when accounting for the fact that much of this transition is evidently into unemployment (derived from comparing columns 2 and 4).

Table A.4: Added Worker Effect: Robustness

	Wife Enters					
	All	All	All	All	Wife Age 25-44	Urban
Husband Exits	0.014	0.015	0.014	0.015	0.038*	0.024
	(0.013)	(0.012)	(0.013)	(0.013)	(0.016)	(0.014)
Exits x Log GDP p.c.	-0.005	-0.008	-0.005	-0.005	0.000	-0.006
	(0.011)	(0.012)	(0.011)	(0.011)	(0.013)	(0.012)
Exits x Gender Norms		0.000				
		(0.001)				
Exits x Agg. Unemp. Dev.			-0.011			
			(0.148)			
FE: HH Members 66+				✓		
R-squared	0.050	0.050	0.050	0.050	0.049	0.056
N (millions)	6.2	6.2	6.2	6.2	3.4	3.3
Countries	46	43	46	44	46	43

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

We also explore a number of robustness checks. We show in the main text that the strength

of the added worker effect is not strongly related to development, as measured by PPP GDP per capita. We explore also whether it is related to gender norms or aggregate economic conditions. A small added worker effect could stem from strong social norms against women working at all. A literature also estimates business cycle variation in the added worker effect which could potentially confound our results. We measure gender norms using data from Gallup and the International Labour Organization on the share of people in a country who agree with the assertion "It is perfectly acceptable for any woman in your family to have a paid job outside the home if she wants one."[12] We measure aggregate labor market conditions in country c at time t as $u_{ct} - \bar{u}_c$, the unemployment rate at date t relative to the average unemployment rate across all dates, both calculated using our sample. In each case we interact these variables with $\text{HusbandShock}_{ict}$ as we did with $\log(y_{ct})$. Columns (1)–(3) of Table A.4 shows that neither factor correlates with the strength of the added worker effect and that controlling for them does not change our main result.

We then explore whether changing the controls or sample materially changes our estimates. We explore controlling for the number of adults age 66 and up, which we can only do for a subset of countries. We then focus on younger wives (age 25–44) who may be more responsive in their labor supply. Finally, we focus on households (and couples) in urban areas. The last three columns show that these changes have little impact on our main results.

Table A.5: Added Worker Effect: Both Genders

	Wife Enters	Husband Enters
Husband Exits	0.014	
	(0.013)	
Exits x Log GDP p.c.	-0.005	
	(0.011)	
Wife Exits		0.013
		(0.019)
Exits x Log GDP p.c.		-0.037*
		(0.018)
R-squared	0.050	0.205
N (millions)	6.2	0.9
Countries	46	46

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

We focus in the text on the response of non-working wives to the husband's transition to non-employment. We can also estimate the response of non-working husbands to the wife's transition to non-employment. Table A.5 shows that there are many fewer observations of this type, consistent with higher male labor force participation rates. Nonetheless, the main finding of a small added worker effect carries over.

We conduct a similar analysis for the persisting worker effect. Table A.6 checks the same checks as Table A.4. The main take-away is that employed wives are less likely to remain employed if their husband exits employment across all specifications.

Finally, we show in the main text that some of these patterns can be understood as the result of correlated shocks, where we proxy for correlated shocks using whether the couple both work in the

[12] Source: International Labour Organization and Gallup (2017).

Table A.6: Persisting Worker Effect: Robustness

	Wife Stays in E					
	All	All	All	All	Partners 25-44	Urban Non-Agr.
Husband Exits	-0.101***	-0.098***	-0.101***	-0.101***	-0.085***	-0.080***
	(0.017)	(0.017)	(0.017)	(0.017)	(0.020)	(0.014)
Exits x Log GDP p.c.	-0.002	-0.007	-0.002	-0.001	0.005	0.003
	(0.014)	(0.018)	(0.014)	(0.015)	(0.016)	(0.013)
Exits x Gender Norms		0.002				
		(0.002)				
Exits x Agg. Unemp. Dev.			-0.146			
			(0.181)			
FE: HH Members 66+				✓		
R-squared	0.085	0.086	0.085	0.086	0.080	0.077
N (millions)	7.9	7.8	7.9	7.7	3.5	4.2
Countries	46	43	46	44	46	43

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.7: Correlated Shocks: Occupations

	Wife Stays in E		
	All	All	Drop Farmers
Husband Exits	-0.101***	-0.069***	-0.064***
	(0.017)	(0.013)	(0.013)
Exits x Same Occ.		-0.163***	-0.124***
		(0.035)	(0.018)
Exits x Log GDP p.c.	-0.002	-0.002	0.002
	(0.014)	(0.012)	(0.012)
Exits x Same Occ. x Log GDP p.c.		-0.019	-0.025
		(0.021)	(0.013)
R-squared	0.085	0.083	0.078
N (millions)	7.9	7.5	6.8
Countries	46	42	42

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

same broad industry. Here, we explore using instead whether the couple work in the same broad (1-digit) occupation. Table A.7 shows that the results are qualitatively similar but weaker than when we use industry.

A.3 Measuring Shocks as Earnings Losses

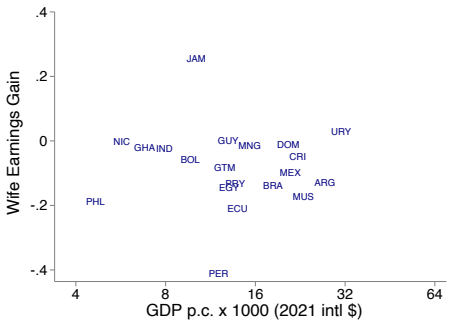
In the text, we define $\text{HusbandShock}_{ict}$ based on extensive margin movements from employment to non-employment. For a subset of countries we have continuous measures of earnings and so we can instead define the shock as the decline in earnings experienced by the husband. For husbands who move to non-employment, this adds information on how much earnings were lost; it also captures that some husbands who remain employed see a decline in earnings that adversely affects the households. We then measure the increase in income experienced by the wife and regress

$$\text{WifeEarningsGain}_{ict} = \alpha + \beta_c D_c \text{HusbandEarningsLoss}_{ict} + \gamma X_{ict} + \varepsilon_{ict}. \tag{A.1}$$

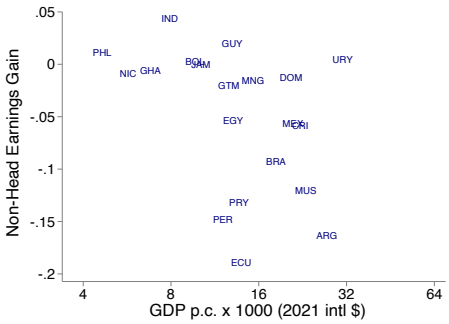
Note that we enter the wife's earnings as a gain and the husband's earnings as a loss to maintain the convention that coefficients of $\beta = 0$ corresponds to no insurance and $\beta > 0$ to insurance. In this case, the coefficient β_c has a useful interpretation: it is the share of the husband's earnings loss that is insured by an increase in the wife's earnings in country c. However, in order to maintain this interpretation with earnings measured in levels, we streamline the set of controls in X_{ict} to consist only of country-date interactions.

Figure A.1: Response to Earnings Loss by Sample

(a) Husband Earnings Loss



(b) Head Earnings Loss



We estimate these results country by country and plot them against PPP GDP per capita in Figure A.1. Figure A.1a shows the results for husbands and wives, while Figure A.1b shows the corresponding results for heads and other household members.

A.4 Results on Precautionary Labor Supply

This appendix contains additional results on the use of precautionary labor supply within couples or families. We start in Table A.8 with a robustness analysis of precautionary labor supply that includes alternative controls and sample selection criteria. As for previous analyses, the results are broadly similar.

Table A.8: Precautionary Labor Supply: Robustness

	Wife Employed					
	All	All	Urban Only	All	All	Urban Only
Husband Exits	-0.064***	-0.064***	-0.057**			
	(0.015)	(0.015)	(0.016)			
Exits x Log GDP p.c.	-0.036***	-0.034***	-0.041***			
	(0.010)	(0.009)	(0.009)			
Exits x Gender Norms	0.000					
	(0.001)					
Exits x Agg. Unemp. Dev.		-0.118				
		(0.136)				
Prob(Husband Exits)				-0.393***	-0.384***	-0.376**
				(0.108)	(0.107)	(0.122)
Prob x Log GDP p.c.				-0.177**	-0.210**	-0.238**
				(0.064)	(0.068)	(0.073)
Prob x Gender Norms				-0.006		
				(0.006)		
Prob x Agg. Unemp. Dev.					-0.065	
					(0.832)	
R-squared	0.148	0.147	0.149	0.145	0.145	0.146
N (millions)	14.1	14.1	7.8	12.6	12.6	7.3
Countries	43	46	43	38	40	38

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.9 shows the results when we estimate precautionary labor supply at the household rather than the couple level. They are broadly similar. Figure A.2 shows the corresponding country-by-country estimates of precautionary labor supply at the household level. The results are again centered around zero.

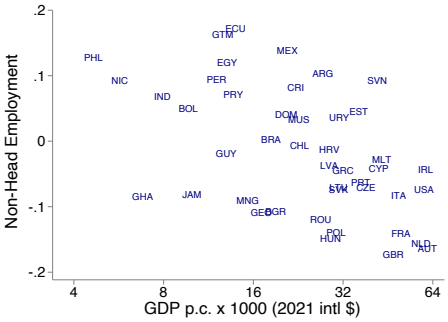
Table A.9: Precautionary Labor Supply: Household

	Non-Head Emp.	Non-Head Emp.
Head Exits	-0.084***	
	(0.022)	
Exits x Log GDP p.c.	-0.083***	
	(0.017)	
P(Head Exits)		-0.478**
		(0.147)
P(Exits) x Log GDP p.c.		-0.428***
		(0.102)
R-squared	0.306	0.305
N (millions)	16.9	15.1
Countries	46	41

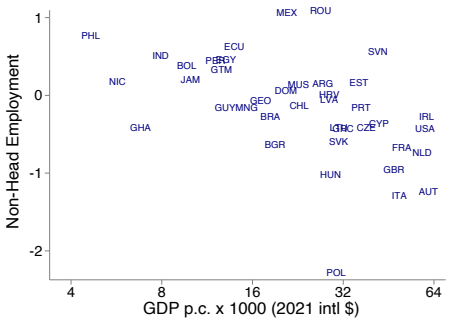
Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure A.2: Precautionary Labor Supply around the World

(a) Head Exits



(b) Pr(Head Exits)



A.5 Additional Results on Self-Insuring Employment Shocks

Table A.10 and Figure A.3 show how households respond to the wage job loss of the head. They parallel the results for how couples respond to the wage job loss of the husband shown in the text: the modal response is for no one to react in developed countries, and the modal response in developing countries is for the head to self-insure by taking up self-employment.

Table A.10: Raw Response Rates, Head's Wage Employment Loss

	Wife Enters E	Husband Switches to S	Neither
Constant	0.078***	0.155***	0.778***
	(0.012)	(0.037)	(0.036)
Log GDP p.c.	-0.043***	-0.259***	0.248***
	(0.008)	(0.026)	(0.025)
R-squared	0.030	0.149	0.141
N (millions)	1.0	1.0	1.0
Countries	46	46	46

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure A.3: Responses to Head Wage Employment Loss Around the World

