Households Financial Vulnerability

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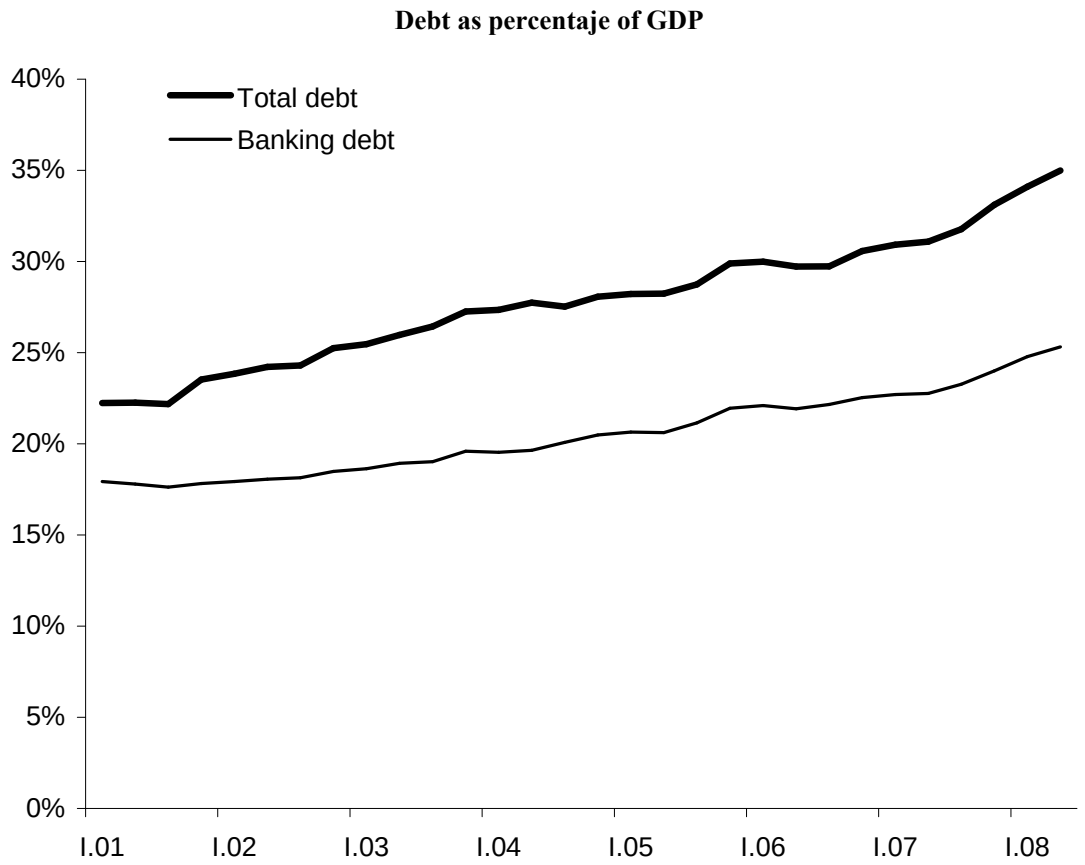
Households Financial Vulnerability

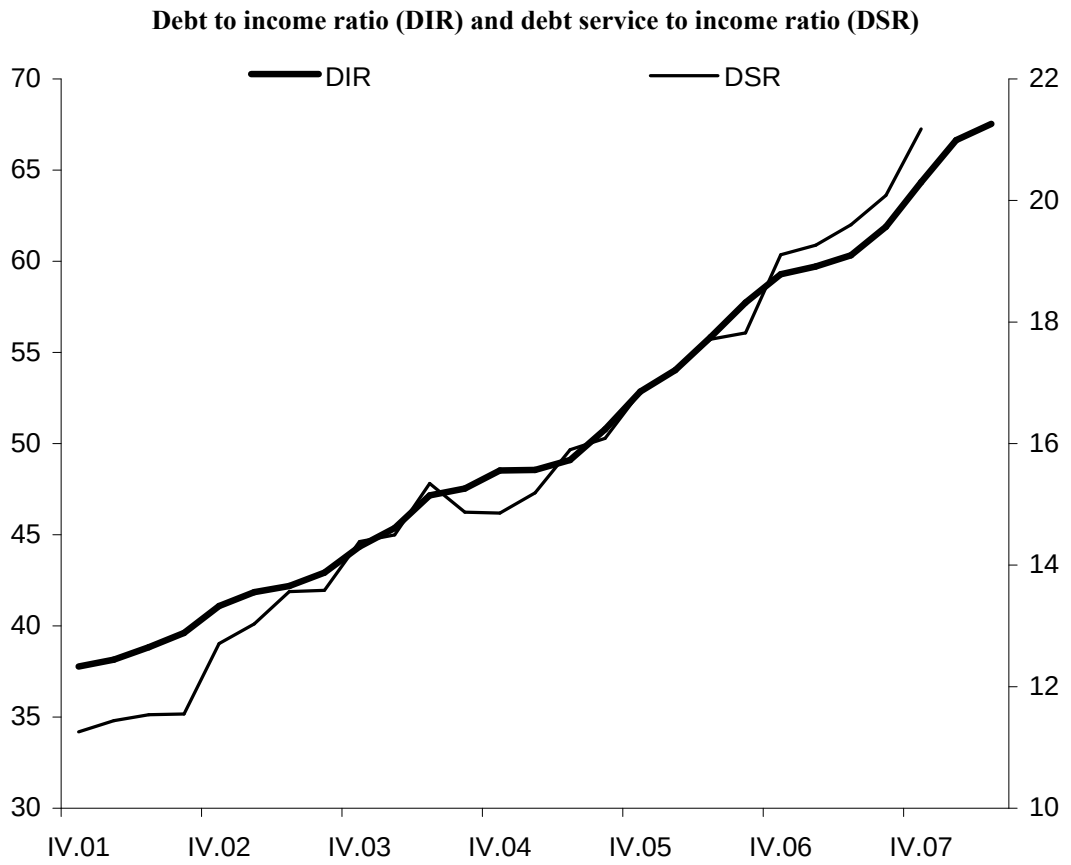
- Macro level shocks impact households behavior $\Rightarrow$ potential risk for financial stability.
- Households financial vulnerability depends on their debt levels and on the fragility of their incomes.
- Job loss is the main source of household uncertainty (also the main cause of debt default).
- Macro shocks have heterogeneous impacts on households $\Rightarrow$ micro analysis required.
- Stress test for households debts at the individual level allows to quantify the debt at risk under aggregate shocks.

Households Indebtedness in Chile



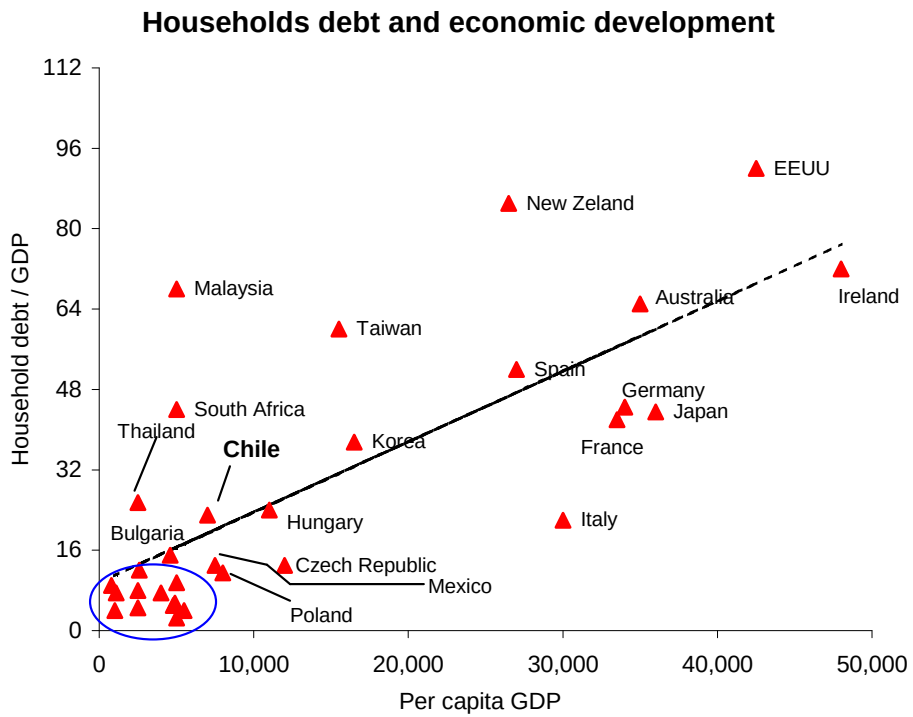
- Household Indebtedness in Chile has grown significantly in recent years.
- Banking debt continues to be by far the most important household debt.

Households Indebtedness in Chile



- Debt to Income Ratio and Debt Service Ratio have followed a similar trend.

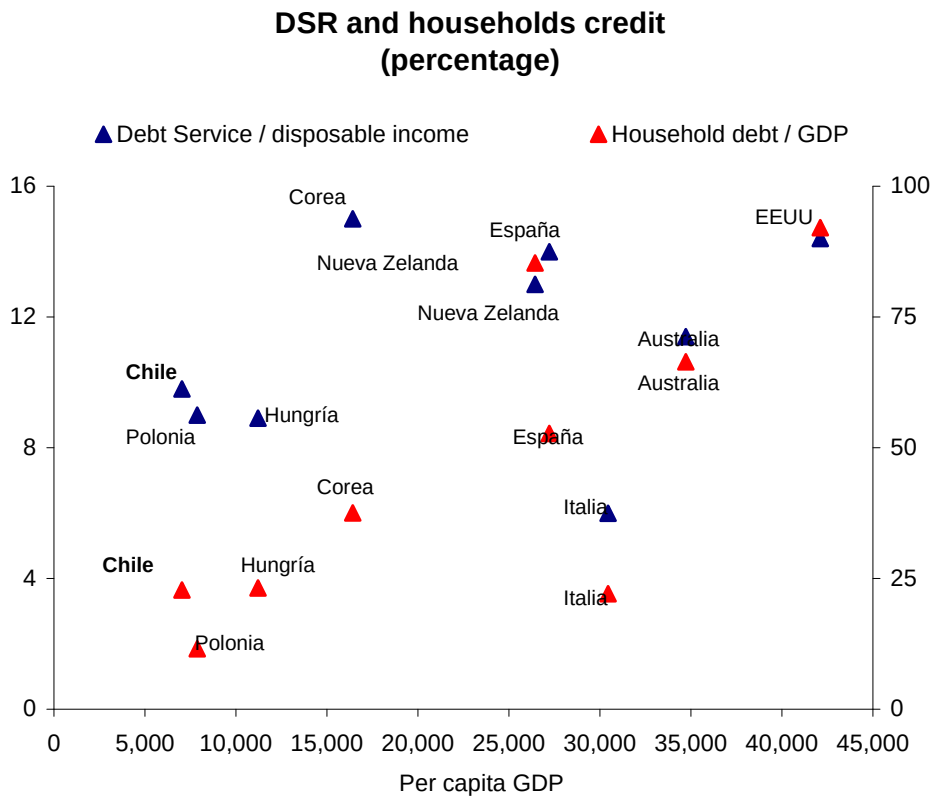
Chile vs. Other countries



(*) Countries inside the circle: Venezuela, Philippines, Russia, Colombia, Indonesia, Peru, Brazil, Romania, Argentina, India, China y Turkey.

- There are no signs that Chile is following a trend significantly different from other countries.
- Household debt is not a significant share of GDP.

Chile vs. Other countries



- However, (bank) debt service ratio is not particularly low.

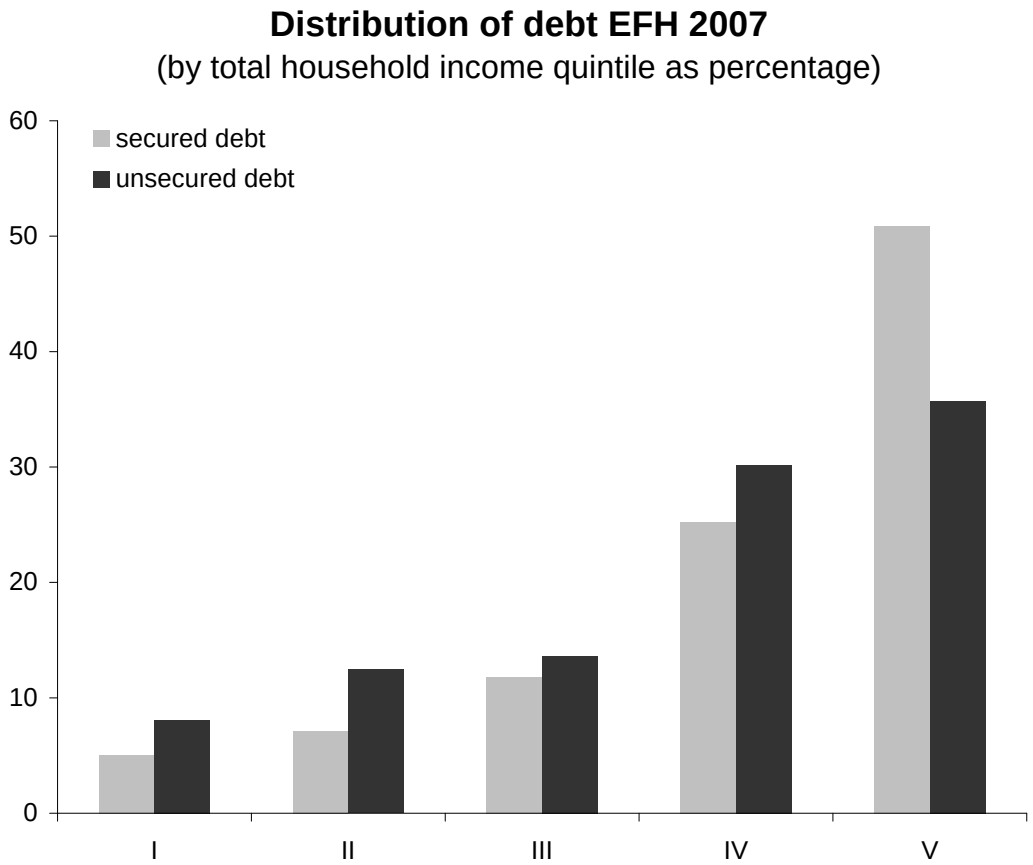
New Micro Data: Household Financial Survey (EFH)

- The EFH 2007, interviewed 4,021 households representing the Chilean urban population.
- This survey has complete information about labor situation, financial assets, debts, credit access, savings, real states, among others.
- Since richer households hold the majority of assets and debt, the EFH 2007 considers an oversampling of the rich.
- The EFH 2007 allows to obtain household balance sheets and hence allows to estimate debt at risk.

Indebtedness in Chilean Households

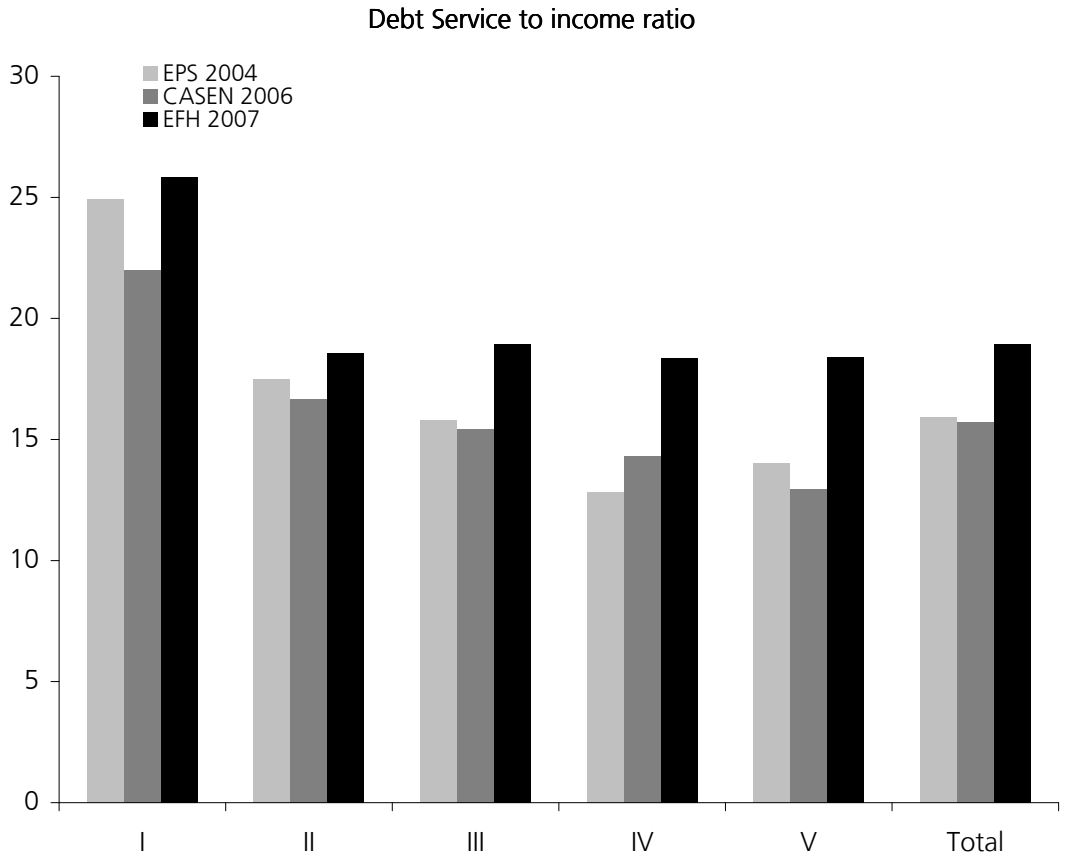
- 61% of the households has formal debt (16% have secured debt and 57% have unsecured debt).
- Secured debt represents 60% of total debt.
- 45% of the debt is concentrated in the richest quintile (51% of secured debt and 36% of unsecured debt).
- The median of DSR is 19.5%.

Debt Distribution by Income



- The vast majority of debt is held by richer households.

Indebtedness by Income

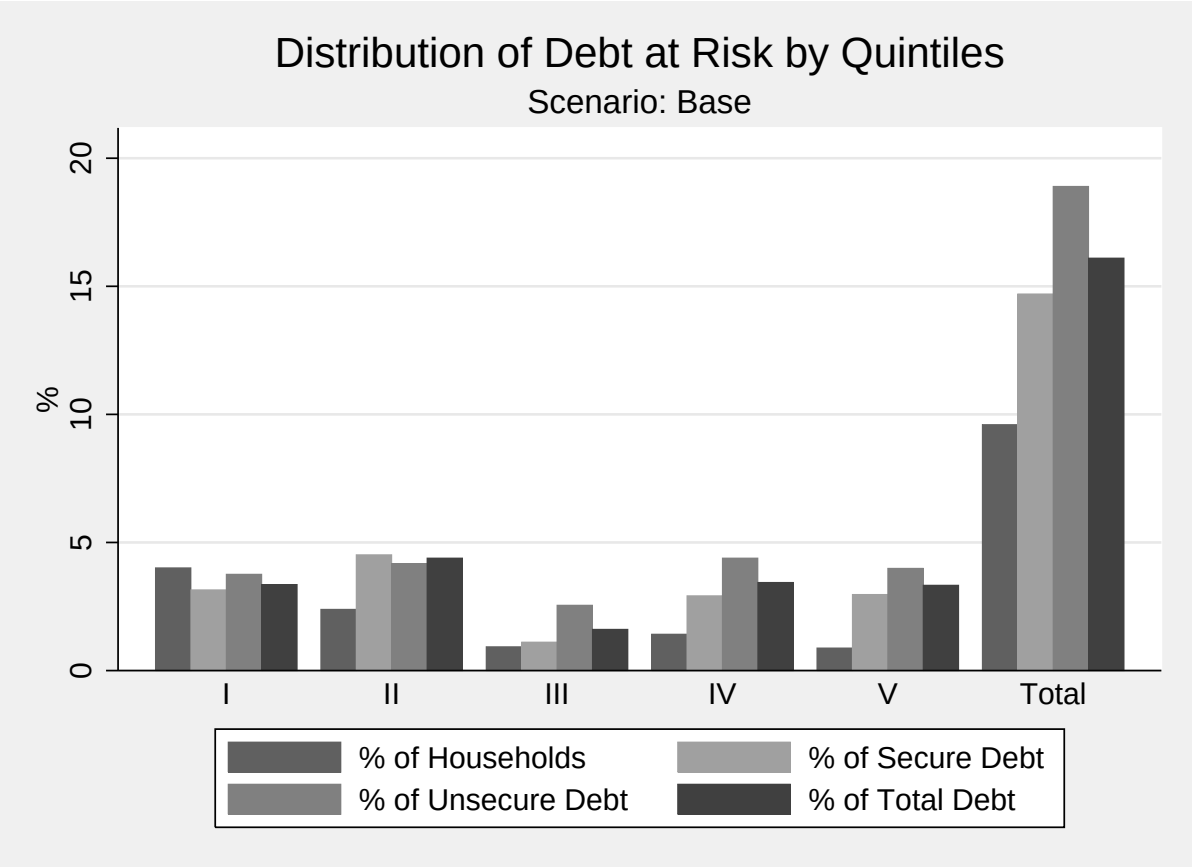


- Debt service ratio is not particularly high, except for lowest income groups.

Definition and computation of *Debt at Risk*

- There is no obvious definition of Debt at Risk.
- Negative margin: $M = Y - E - DS < 0$ (or $\frac{E+DS}{Y} > 1$).
- High Debt Service to Income Ratio $DSR = \frac{DS}{Y}$.
- Household survey data imply some interpretation problems:
  - There is a risk of double counting; for example expenses in clothes may also appear as a debt if they were bought using credit.
  - If everything were bought using credit (including supermarket), then Debt Service to Income Ratio may overestimate household stress.
- In this work we define Debt at Risk as debt held by "stressed households".
- Stressed households are defined as those with negative margin (more than 20%) AND high DSR (> 50-75)).

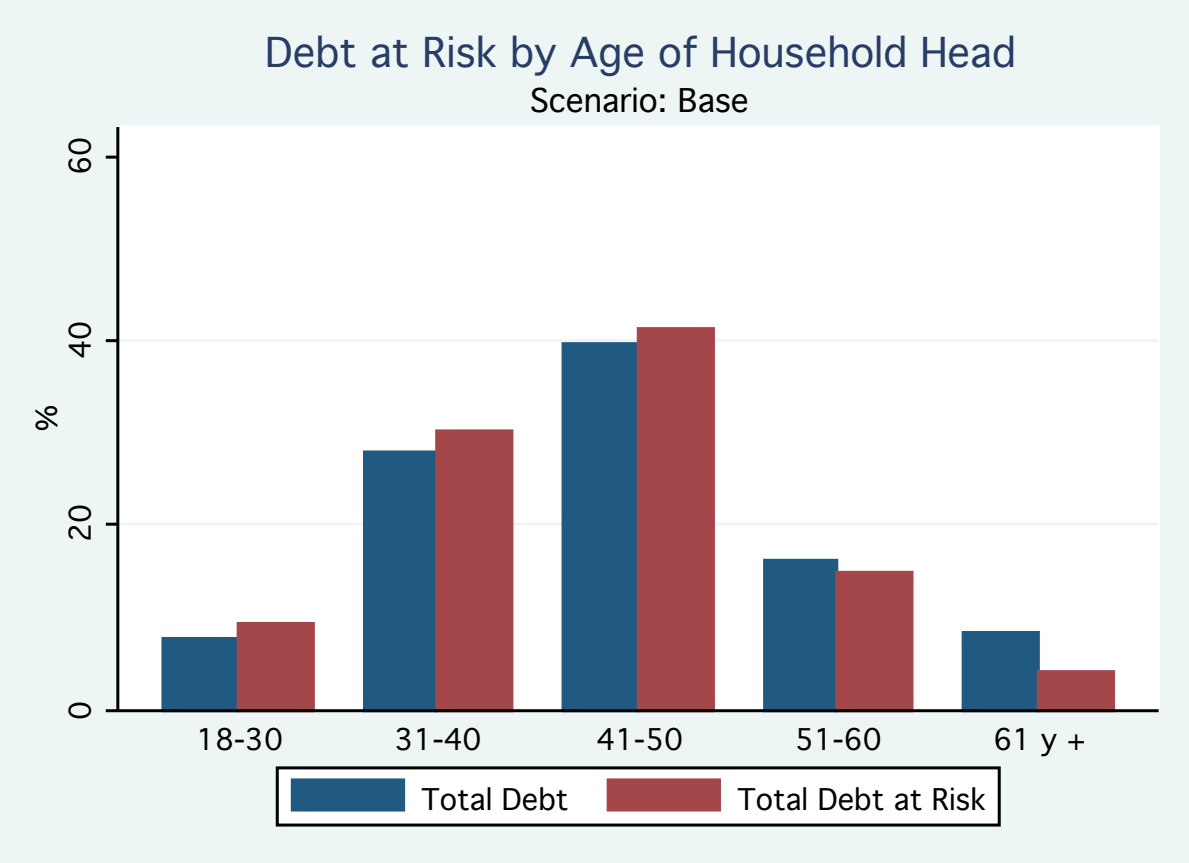
Debt at Risk by Income



- 9.5% of households are stressed, holding 16.1% of total debt (this is called Debt at Risk).
- Debt at risk is held by relatively few high income households with large debts and by many low income households with lower amount of debts.

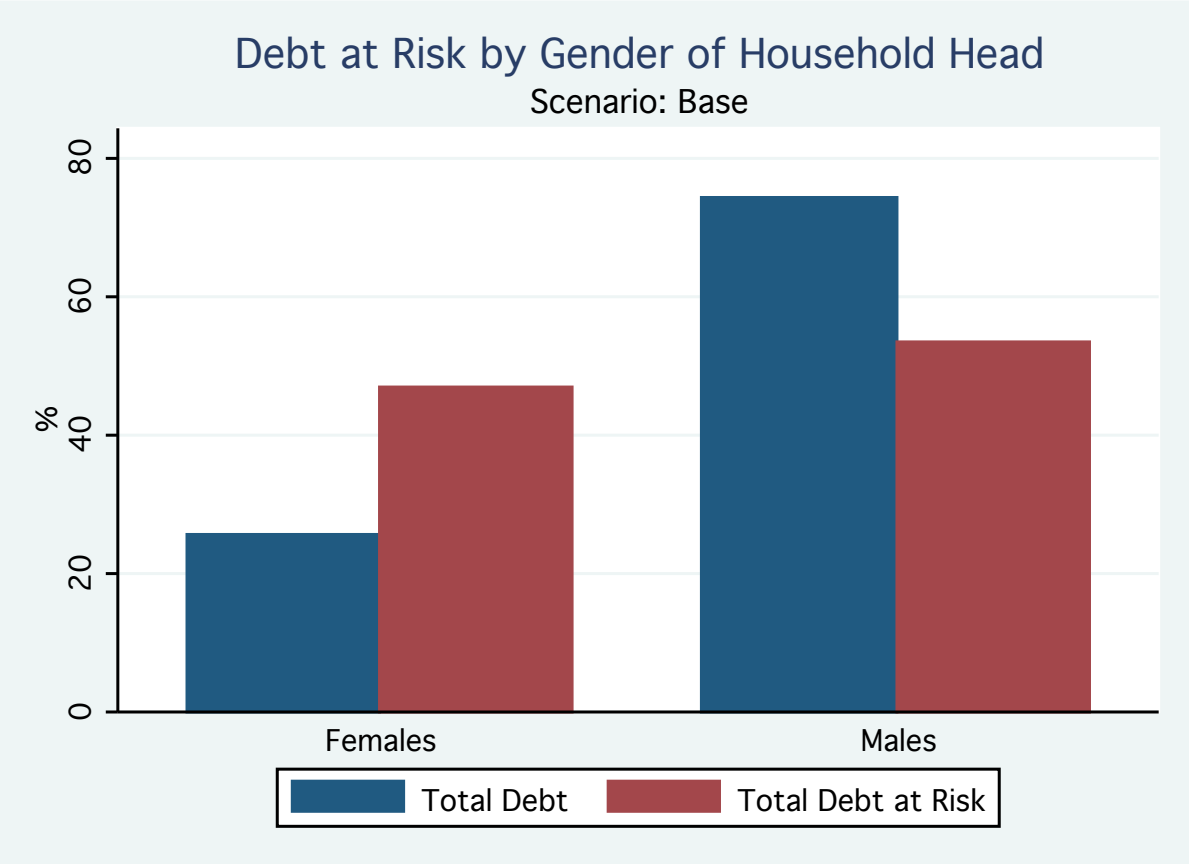
back

Debt at Risk by Age of Household Head



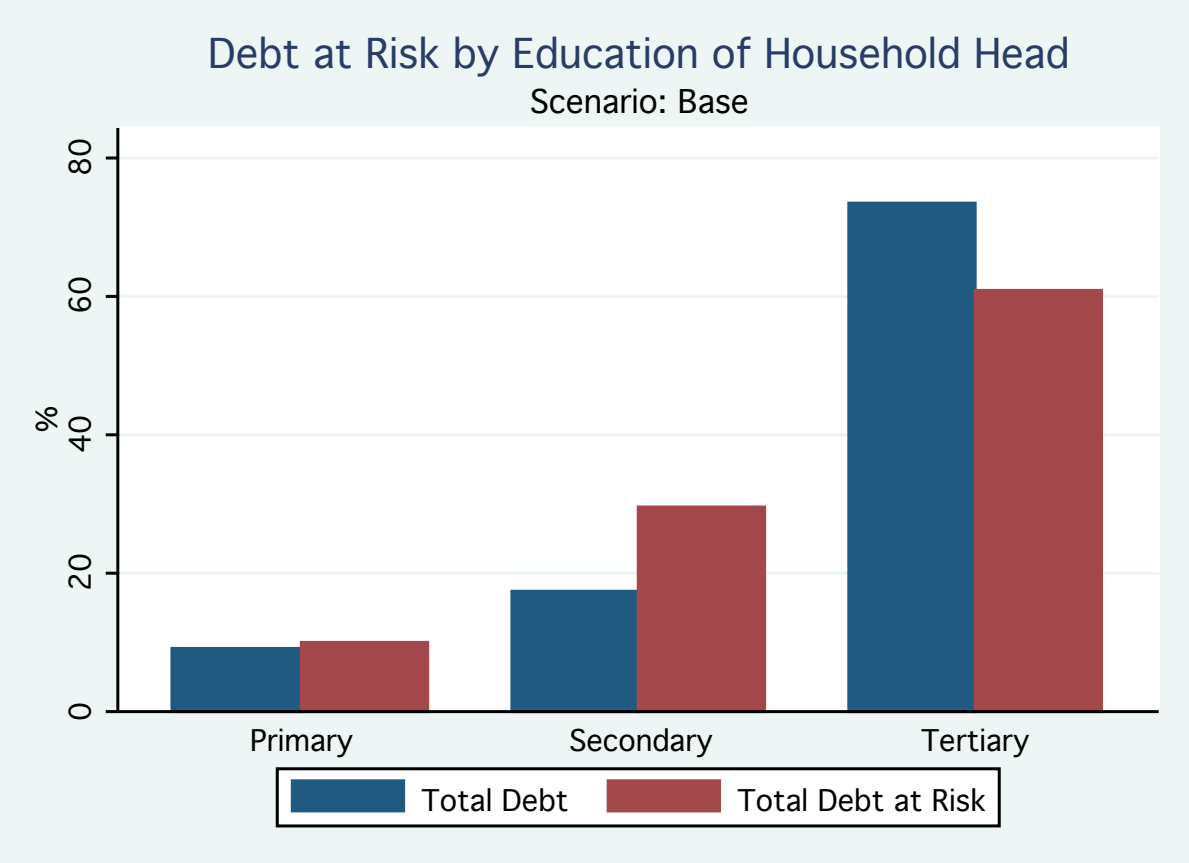
- Debt at Risk is slightly concentrated in younger households.

Debt at Risk by Gender of Household Head



- Debt at risk is over represented in female headed households.

Debt at Risk by Education of Household Head



- Debt at risk is over represented in households with heads with secondary education.

Other countries examples

- Nordic countries have been leading this sort of analysis:
- Sweeden (Riksbank, 2006 y 2007): 6.3% of the households have “negative margin” and they hold 5.6% of total debt (this is what they call “debt at risk”); when unemployment rate raises between 1-3 per cent points, households without margin increase to 6.7% and debt at risk increases to 6.3%.
- Norway (Norges Bank, 2006): 19% of households have negative margin in 2004, holding 16% of total debt; low and middle income groups hold the majority of the most exposed debt, and they are increasing their share.

- They do not consider that aggregate unemployment rate has a different impact at the micro level (they assume unemployment affects different households uniformly). This may bias results in Chile (high household heterogeneity).

Households stress test framework

- This paper uses panel data survival analysis to estimate the job loss probabilities at the individual level (data from the Social Protection Survey (EPS) 2004 and 2002 with retrospective labor stories covering 1994-2004 period).
- Job loss probabilities are estimated as a function of individual characteristics and exogenous variables:

$$P^t_{h,i} = f(X^t_{h,i}, Z^t) \tag{1}$$

where vector X contains individuals characteristics such as gender, age, education, contract situation, status, economic sector among others. Vector Z contains unemployment rate.

- Job loss probabilities are estimated in EPS and then they are imputed in EFH 2007.

Households stress test framework

1. Monte Carlo simulations are used to create a random variable which is compared to job loss probability estimation. Then, households debt indicators are re-computed.
2. Individual income is re-computed for each individual in EFH2007 as:

$$\hat{Y}_{j,h}^{T+s} = Y_{j,h}^{T+s} \times \mathbf{1}\left(\hat{\Pr}_{j,h}^{T+s}\left(X_{j,h}^{T+s}, Z^{T+s}\right) > u\right). \tag{2}$$

3. Total household income is re-computed.
4. Households debt indicators are re-computed.

Stress test simulations caveats

There is a number of caveats to take into account in the stress test exercise:

1. Currently unemployed individuals individuals may find a job.
2. Unemployed individuals may receive unemployment insurance.
3. Workers who retire to inactivity may receive a pension.
4. Households may use other sources of income to fulfill they financial obligations.
5. Households may sell assets to pay their debts.

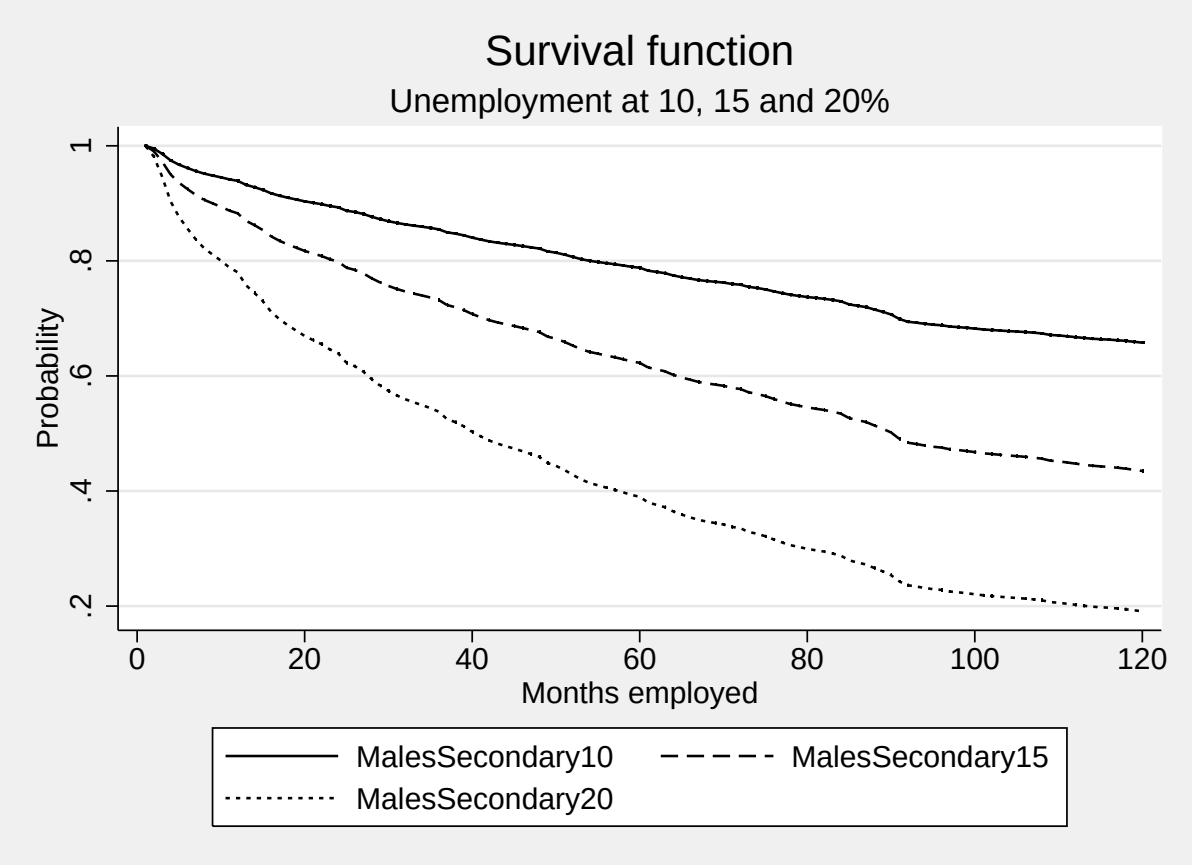
However..., this is a stress test!

Job loss probabilities

- Non-parametric analysis of survival functions (Kaplan-Meier), shows heterogeneity patterns in job loss probabilities.
- Semi-parametric analysis (Cox regressions; proportional hazard model) allows multivariate analysis.
- Main findings:
  - Young and female workers have larger job loss probabilities.
  - Unemployment rate shifts have larger impact on males and less educated workers.

Job loss probabilities

Figure: Job loss probability by gender (months)



Source: Authors' own calculations using EPS 2002 and 2004.

Job loss probabilities

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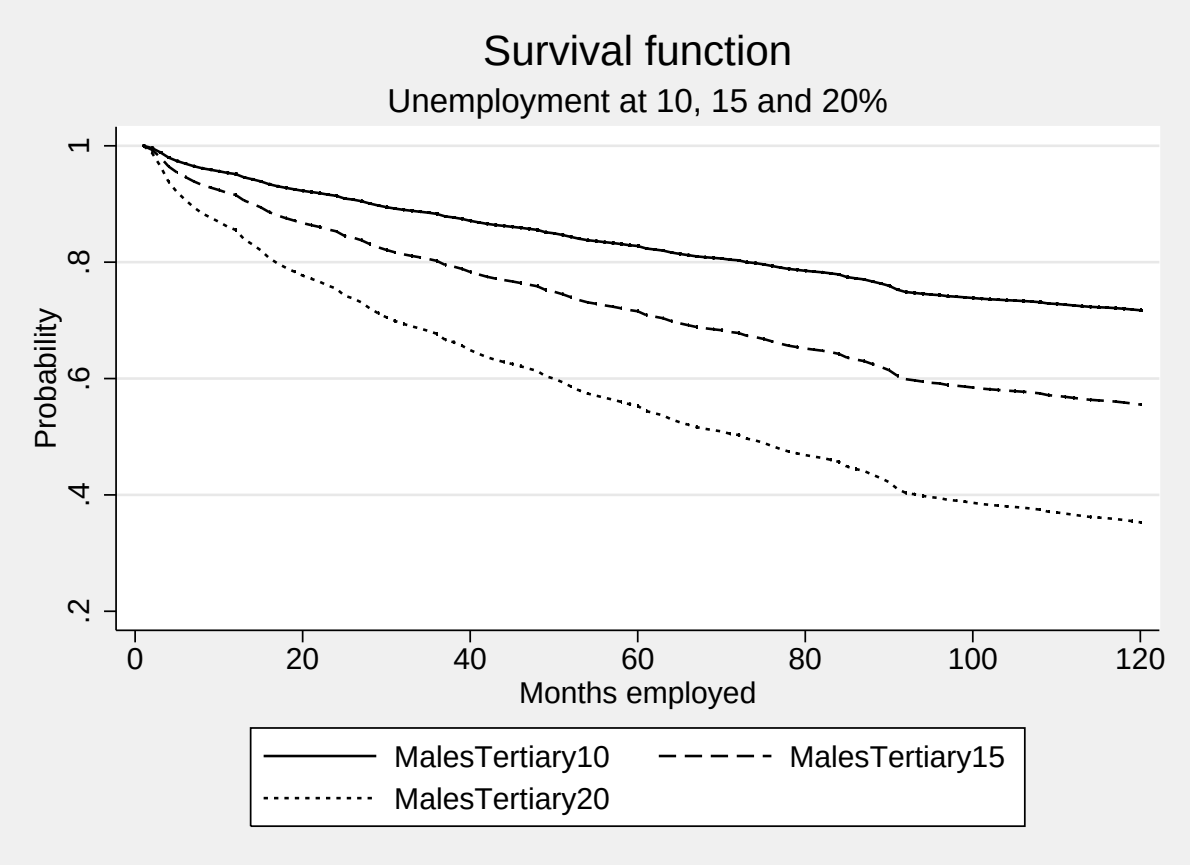

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Job loss probabilities

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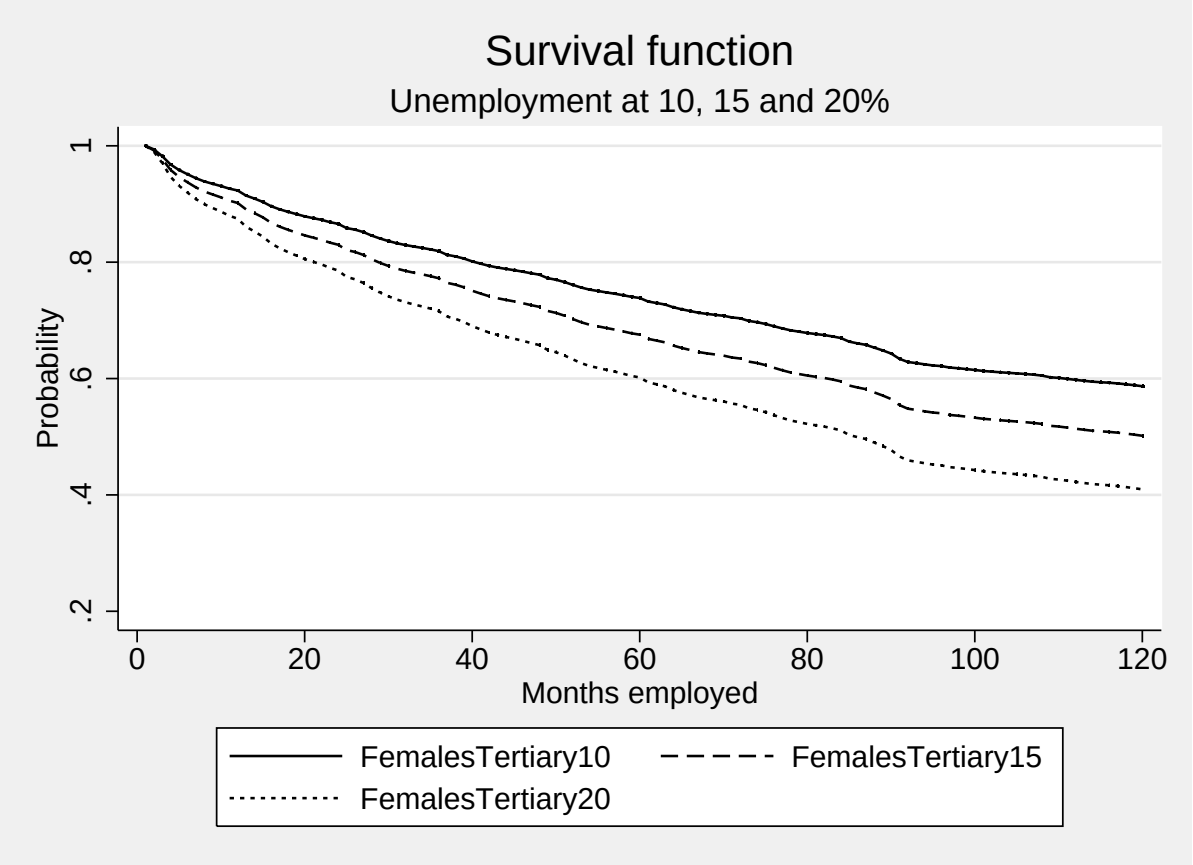


Source: Authors' own calculations using EPS 2002 and 2004.

Households stress test exercise

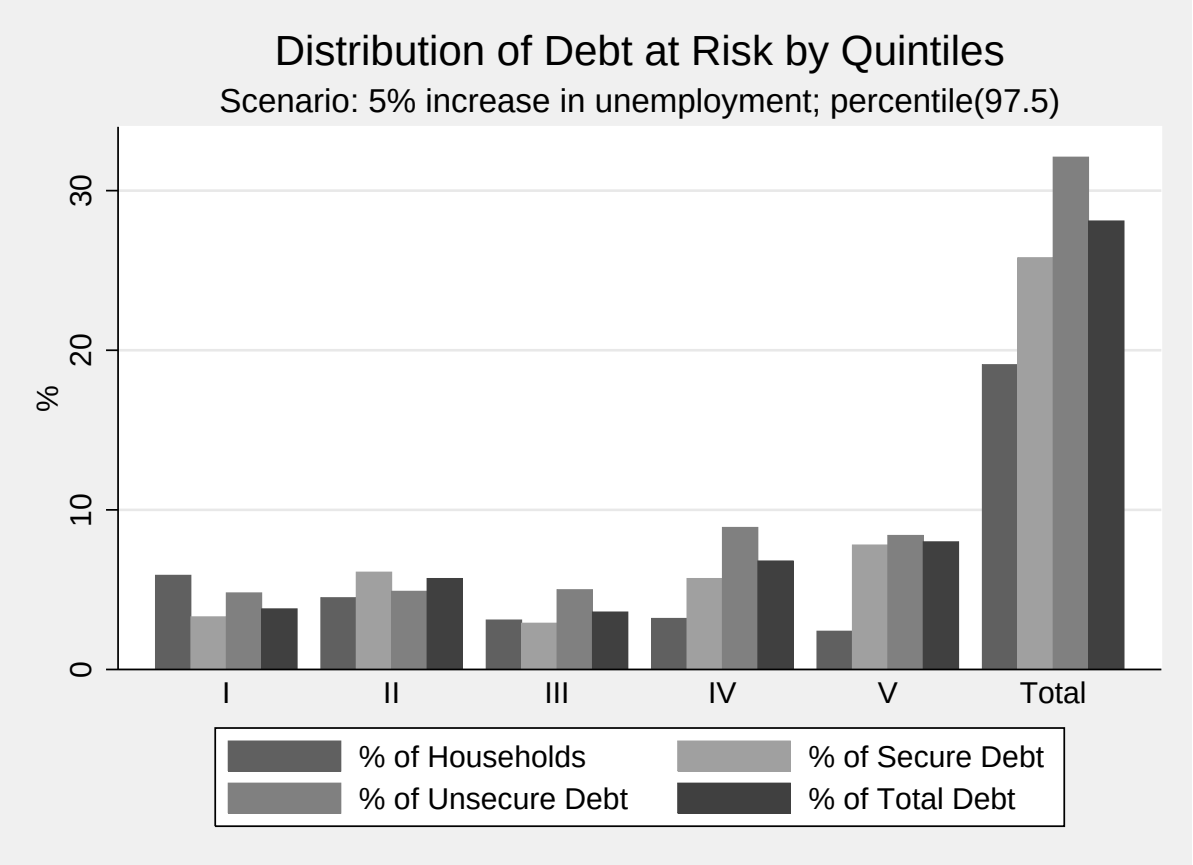
- Monte Carlo simulations are used to estimate household financial stress and then to compute aggregate “debt at risk” under stressing unemployment scenarios.
- It is necessary to impute job tenure in EFH 2007:
  - By gender and age group, employment status duration was computed (and its corresponding distribution) in EPS
  - A 9-degree polynomial was adjusted for each group.
  - The polynomial functions were used to simulate job tenure in EFH2007 (additional source of randomization).

Stress test simulations

Table: Households with negative margin

	% Households	% Secured Debt	% Unsecured Debt	% Total Debt
Base scenario (6.3% unemployment)				
DSI>50	13.6	17.1	26.1	20.2
DSI>75	9.5	14.5	18.8	16.1
Base scenario + underlying job loss probability				
DSI>50	18.2 - 20.8	20.3 - 26.3	30.8 - 36.5	24.3 - 29.4
DSI>75	13.2 - 15.6	17.1 - 22.6	23.1 - 29.0	19.7 - 24.6
Δ^+ 5% Unemployment (Asian crisis 98-99)				
DSI>50	21.5 - 24.4	22.9 - 30.2	34.1 - 40.4	27.1 - 33.0
DSI>75	15.9 - 18.8	19.2 - 26.2	26.2 - 33.3	22.3 - 28.1
Δ^+ 15% Unemployment (Debt crisis 82-83)				
DSI>50	31.0 - 34.6	31.9 - 40.9	44.3 - 51.4	36.6 - 44.3
DSI>75	24.5 - 28.0	27.0 - 35.3	36.4 - 44.3	31.0 - 37.9

Stress test simulations by income



- Under a 5% increase in unemployment rate, in the upper bound case (worst case) it is quintiles IV and V those which increase their debt at risk significantly.

see Debt at Risk by Quintiles Base

Conclusions

- Defining debt at risk is not straightforward. A combination of criteria is useful for stress testing.
- Financially stressed households are 9.5% of total households, and they hold 16% of total debt (which is called debt at risk).
- Underlying job loss probabilities suggest that stressed households may reach about 14%, so that debt at risk could be 22% of total debt.

Conclusions

- Under a scenario similar to the Asian crisis (unemployment shift less than 5%), debt at risk could increase significantly, but it would not mean more tan 30% of total debt.
- Under a scenario similar to the Debt crisis (unemployment shift about 15%) debt at risk could increase up to 38%.
- These“upper bound” results indicate that a higher unemployment rate does not necessary mean that the financial sector will suffer a significant default caused by households. Shock at a macro level would be bounded.