EUROPEAN CENTRAL BANK

EUROSYSTEM

Financial Fragility of Euro Area Households

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Vienna, September 18th, 2014

The views expressed here are our own and not necessarily those of the ECB or the Eurosystem.

Motivation

- **What?**
  - Which households in the euro area are financially vulnerable and how much risk they pose to the stability of the financial system.

- **Why?**
  - Policy relevance (new SSM tasks).
  - Strengthen the ECB stress testing framework.

Motivation

- Financial stability has become one of the main concerns of policy makers.
- Some areas of monitoring still need further development.
- In particular, there is not much analysis on risks coming from the household sector.

Literature review

- **Households' stress testing exercises.**
  - Define a measure of vulnerability.
  - Define the type and magnitude of the shocks.
  - Quantify change in % of vulnerable households.
  - Quantify EAD.
  - Quantify LGD.
- **Problems**
  - Micro data on both balance sheet and income is needed.
  - How to go from vulnerable to default.

Metric of distress
Literature review

- Sugawara and Zaluendo (2011): debt-service-to-income ratio and financial margin for Croatia (budget survey)
- Zajaczkowski and Żochowski (2007): debt-service-to-income ratio for Poland (using budget survey)
- Persson (2009): financial margin for Sweden
- Herrala and Kauko (2007): financial margin for Finland (income survey)
- Albacete and Lindner (2013): debt-service-to-income ratio and debt-to-asset ratio for Austria (using HFCS)
- IMF (2012): debt-service-to-income ratio for Spain (using HFCS)

Metric of distress
a proposal

- Financial burden measures provide useful insight into the credit risk stemming from the distressed households, BUT:
  - ability to cover instalments from income vs. from liquid assets
  - distressed households can continue servicing their debt by selling assets
  - each measure focuses on a single aspect of the problem (and thus each one is affected by a different type of shock but no others)
  - where to set the thresholds?
- More precise definition of vulnerability: income + liquid assets

Other contributions

- **Extend analysis to euro area.**
  - HFCS contains balance sheet and income data.
  - Some shocks cannot be isolated at country level.

- **Methodology.**
  - Macro data calibration.

Metric of distress
a proposal

- **Negative financial margin.**

  (Financial margin = gross income - income tax - debt payments - basic living costs)

  +

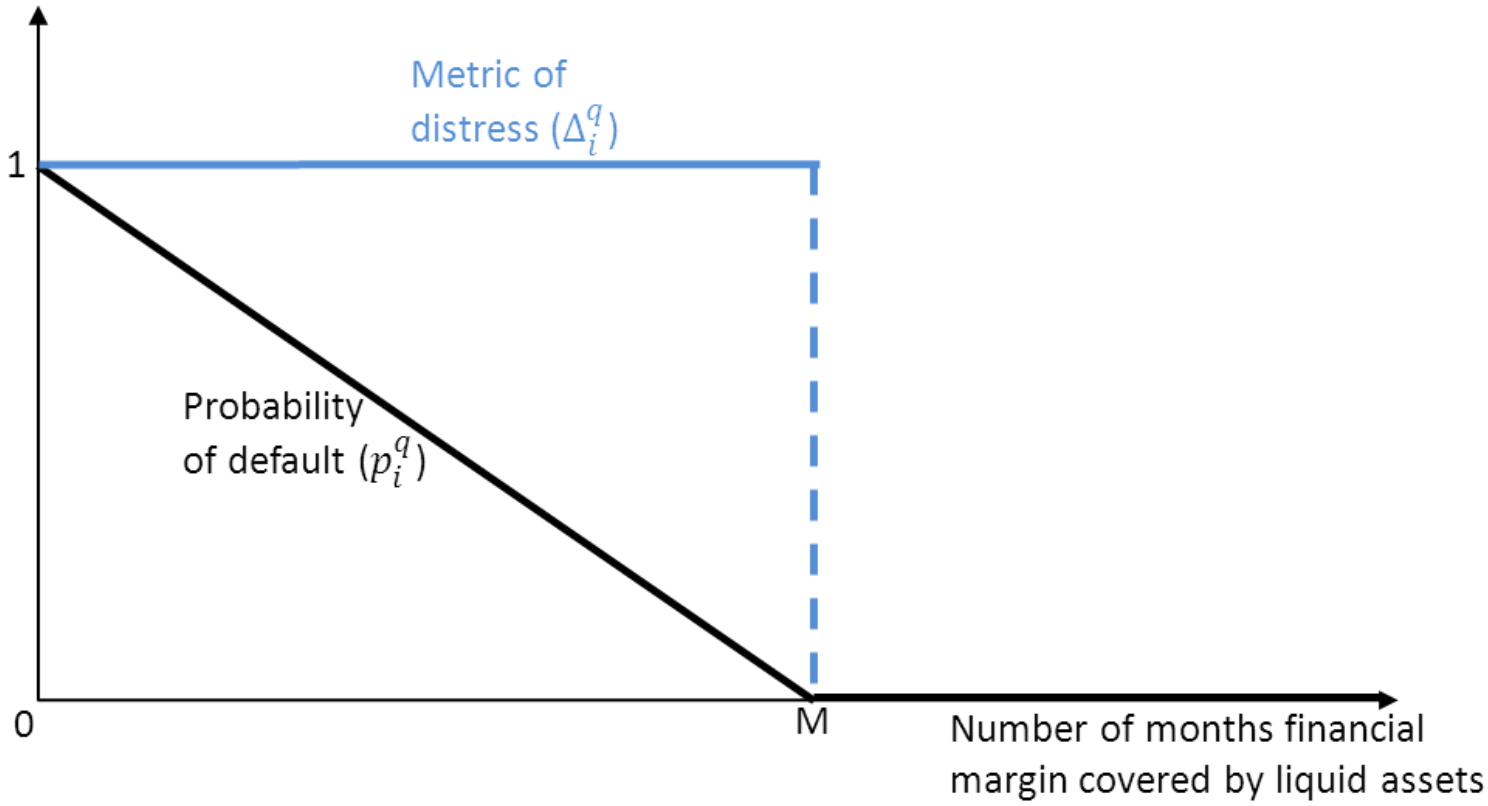
- **Financial margin (X months) > liquid assets.**

Formally, our measure of distress:

$$\Delta_i^q = \begin{cases} 1 \Leftrightarrow FM_i^q < 0 \text{ and } LIQ_i^q < -\sum_{t=1}^{M} FM_{t,i}^q \\ 0 \Leftrightarrow FM_i^q \geq 0 \text{ or } \quad LIQ_i^q \geq -\sum_{t=1}^{M} FM_{t,i}^q \end{cases}$$

Metric of distress
a proposal

In addition we assign a probability of default to households in distress



Metric of distress
calibration

Exposure at default:

$$EAD^q = \frac{\sum_{i=1}^{N} p_i^q D_i^q}{\sum_{i=1}^{N} D_i^q}$$

Loss given default:

$$LGD^q = \frac{\sum_{i=1}^{N} p_i^q (D_i^q - W_i^q) C_i^q}{\sum_{i=1}^{N} D_i^q}$$

where:

$$C_i^q = \begin{cases} 1 \Leftrightarrow D_i^q - W_i^q > 0 \\ 0 \Leftrightarrow D_i^q - W_i^q \leq 0 \end{cases}$$

In our calibration we are going to match the exposure at default with the non-performing loans ratio

Calibration: matching NPL ratios to EAD

Non-performing loan ratios:

Austria	5.0%*
Belgium	3.1%
Cyprus	8.5%
Germany	1.8%*
Spain	3.7%
France	3.2%
Greece	9.3%
Italy	8.0%
Luxembourg	0.3%*
Malta	3.0%
The Netherlands	1.3%
Portugal	5.7%
Slovenia	4.0%
Slovakia	5.0%

Sources: National Central Banks, ECB Consolidated Banking Statistics, ECB MFI Interest Rate Statistics.

Caveats:

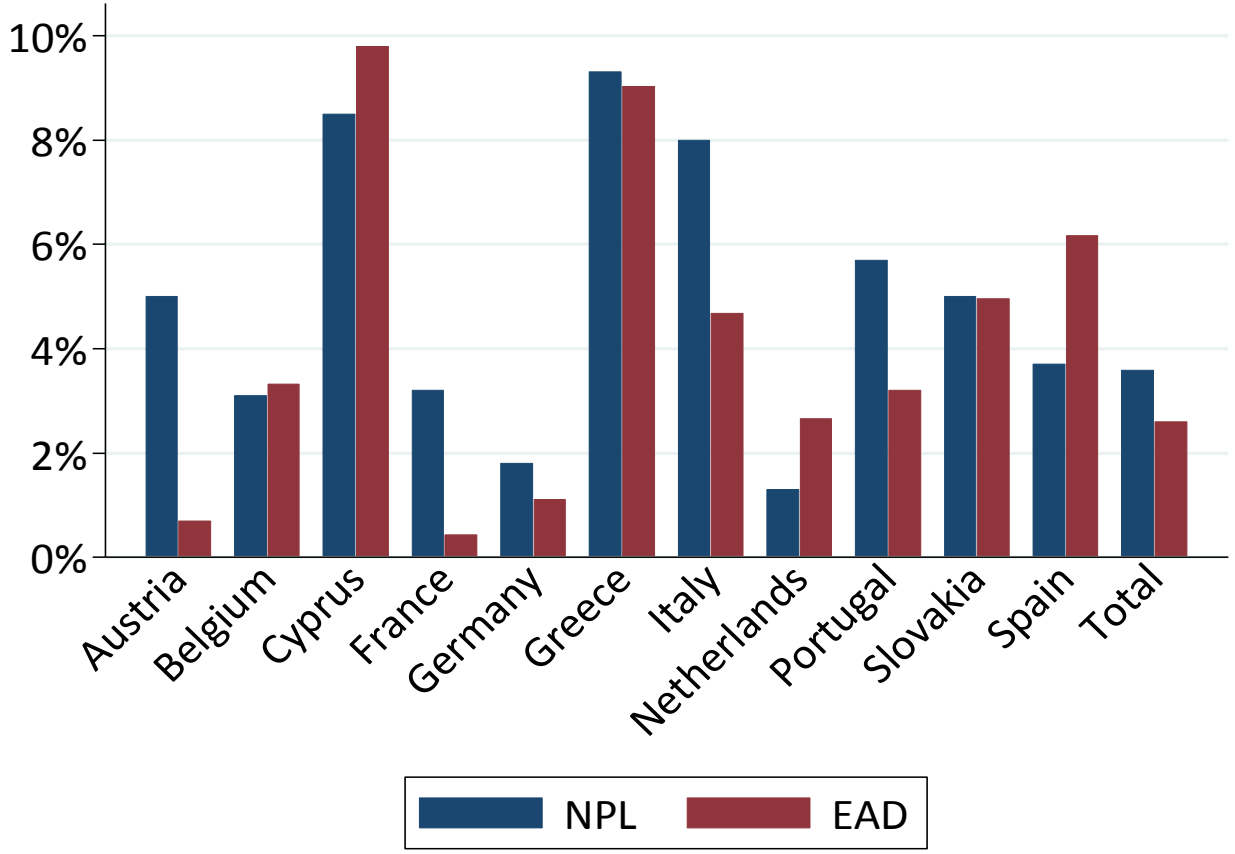
- NPL classification lag
- NPL classification discrepancies (collateral, borrowers conditions)
- NPL is an outcome of flows resulting from defaults, recoveries and write-offs: time to the recovery of the collateral from 5M in NL to 56M in IT (Bover et al. (2013)
- Loan restructurings

- * implied household sector NPLs ratios from total NPL ratios.

Metric of distress
calibration

φ^q: BLC = 33% of median income in DE, adjusted for PPP

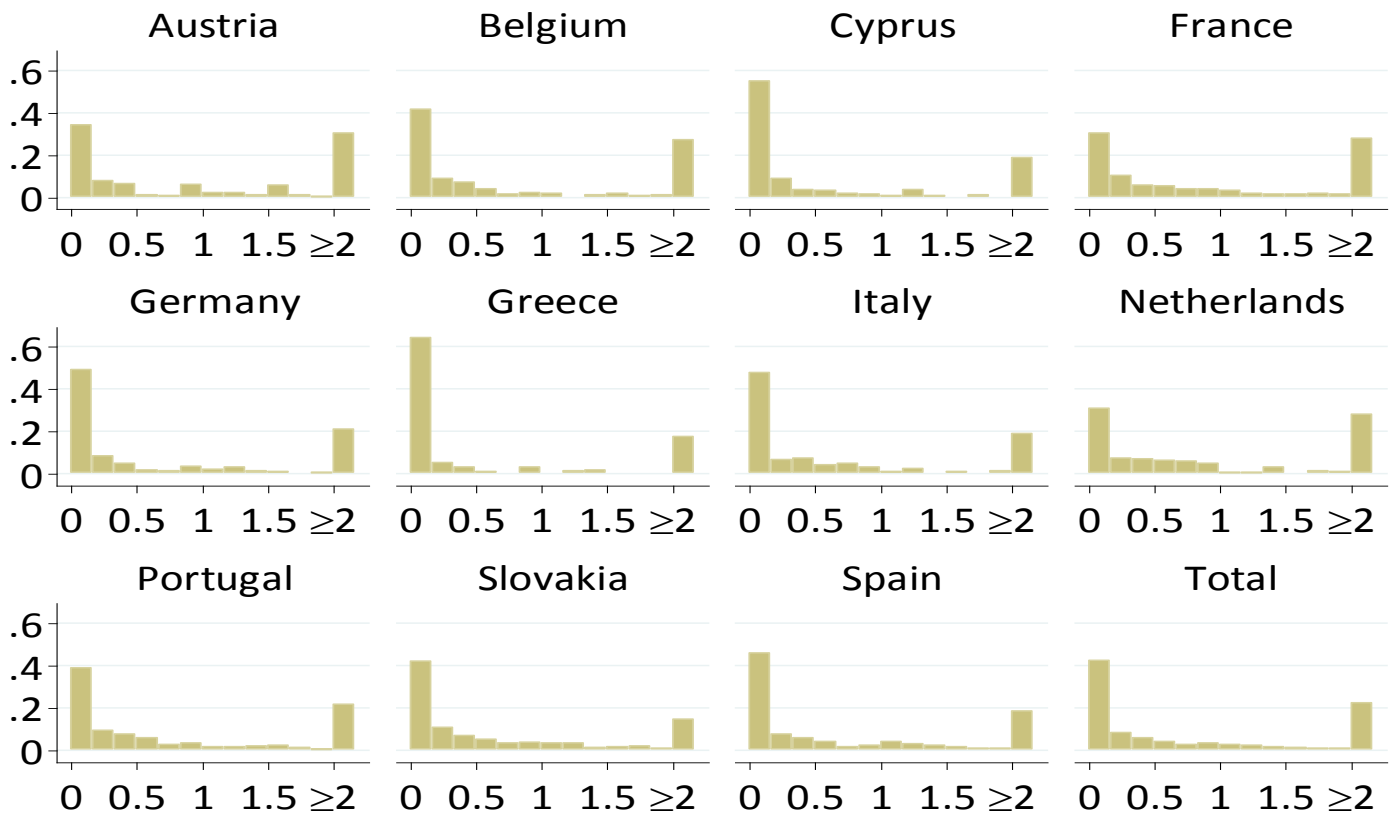
M : Servicing of negative margin from liquid assets = 1/2 month



Sources: HFCS, various Central Banks, Consolidated Banking Data & own calculations.

Metric of distress
calibration

Time-to-default (in years)

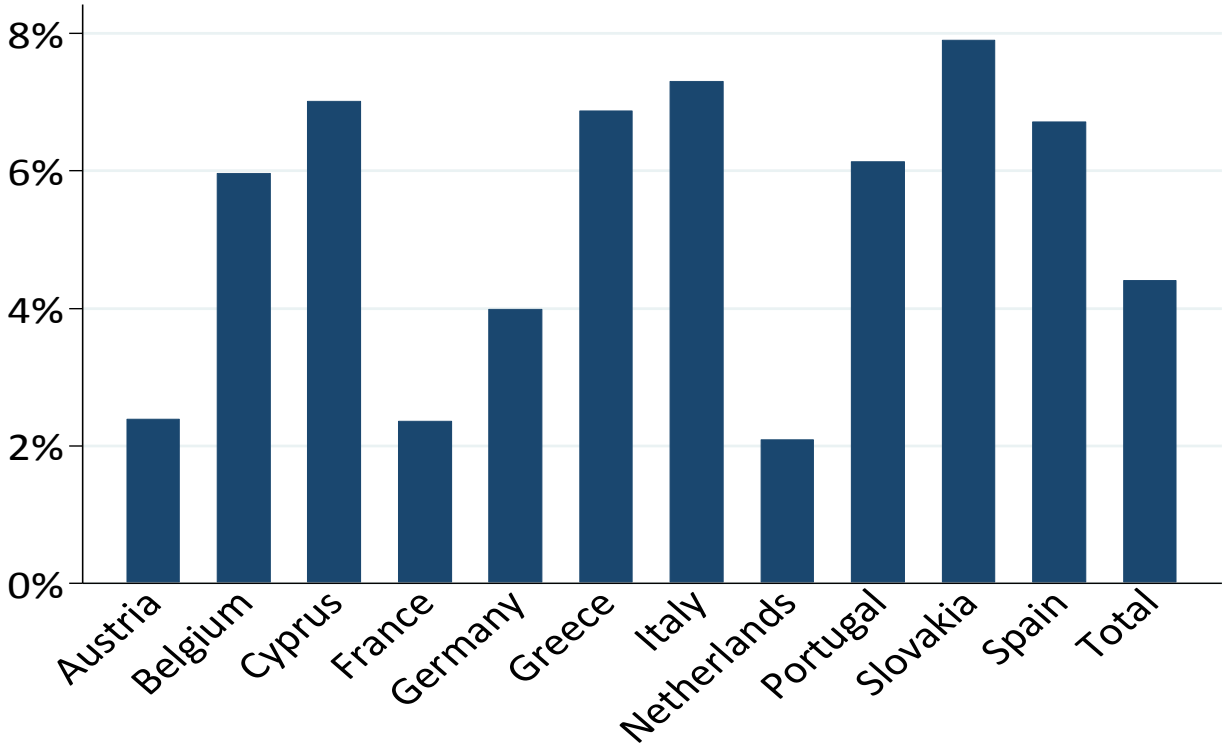


Sources: HFCS & own calculations.

Notes: The data is censored at 2. The fraction is plotted.

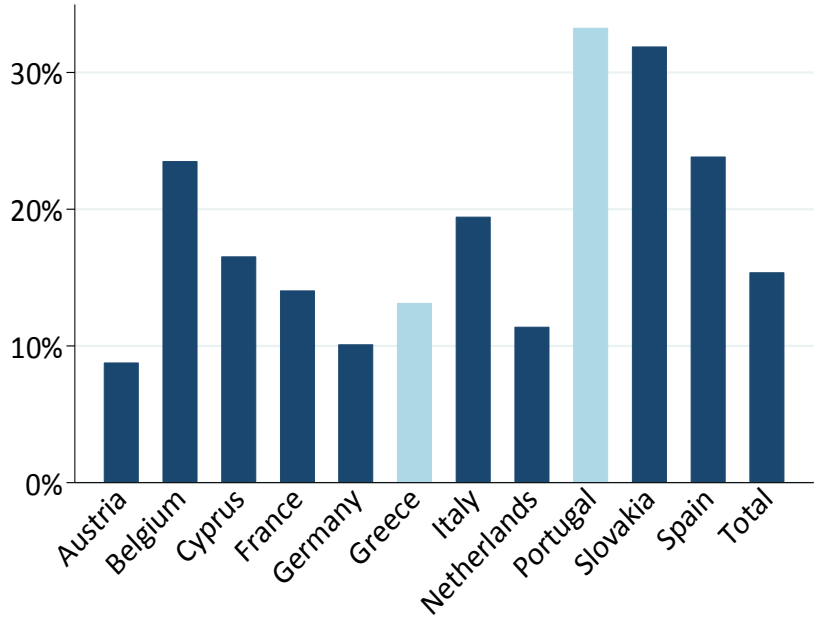
Financially vulnerable households.

Percentage of households with a positive probability of default.

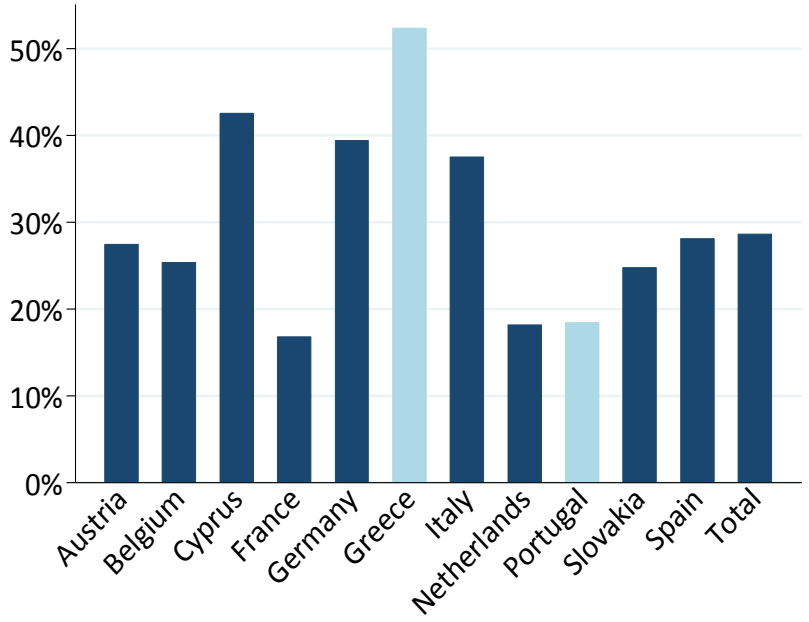


Distressed households: two components

Percentage of indebted household with negative financial margin



Percentage[1] of households not being able to cover debt payments from liquid assets



Sources: HFCS & own calculations.

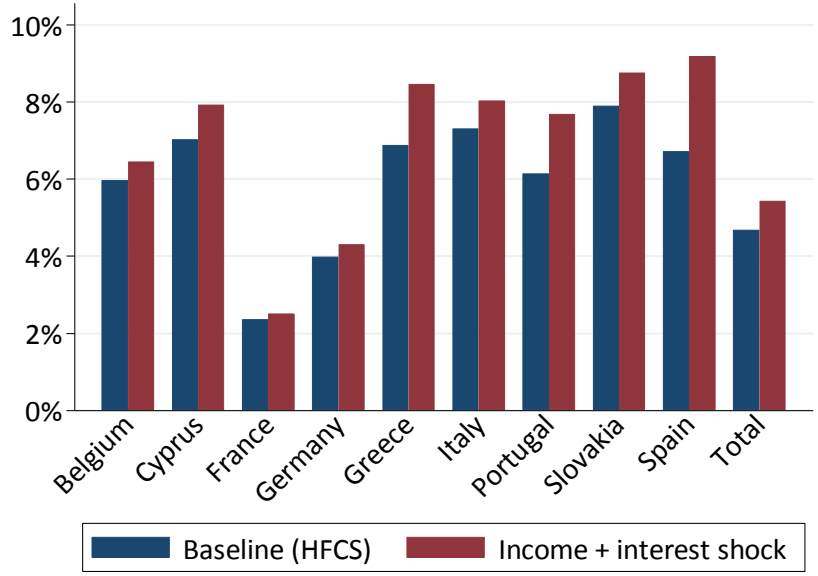
[1]: as a percentage of households having a negative financial margin.

Stress testing households

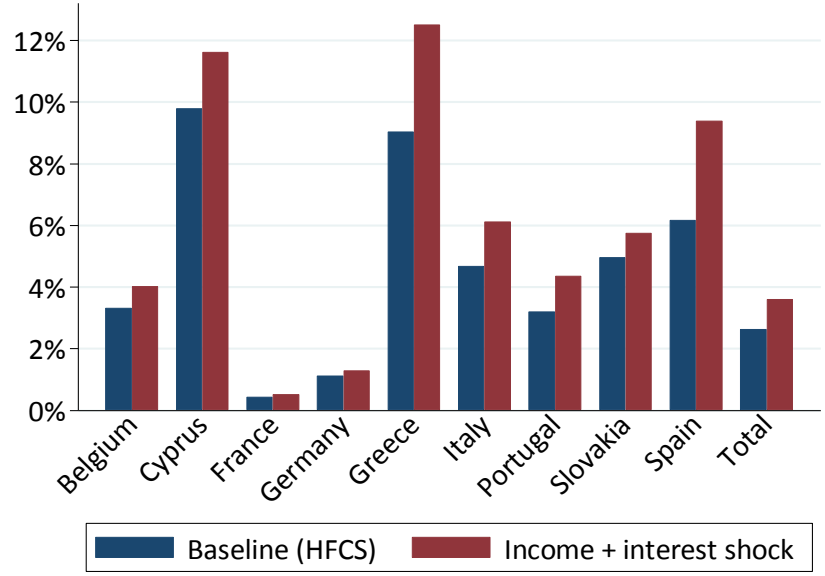
- Shocks
  - Interest rate shock (+300 bp.), affects adjustable-rate loans
  - Income shock (5 pp increase in unemployment rate)
  - House price shock (-20%): affects only LGD
  - Combined shocks
- Impact of shocks on
  - Percentage of distressed households
  - EAD
  - LGD

Sensitivity to the income + interest rate shock

Percentage of indebted household in distress



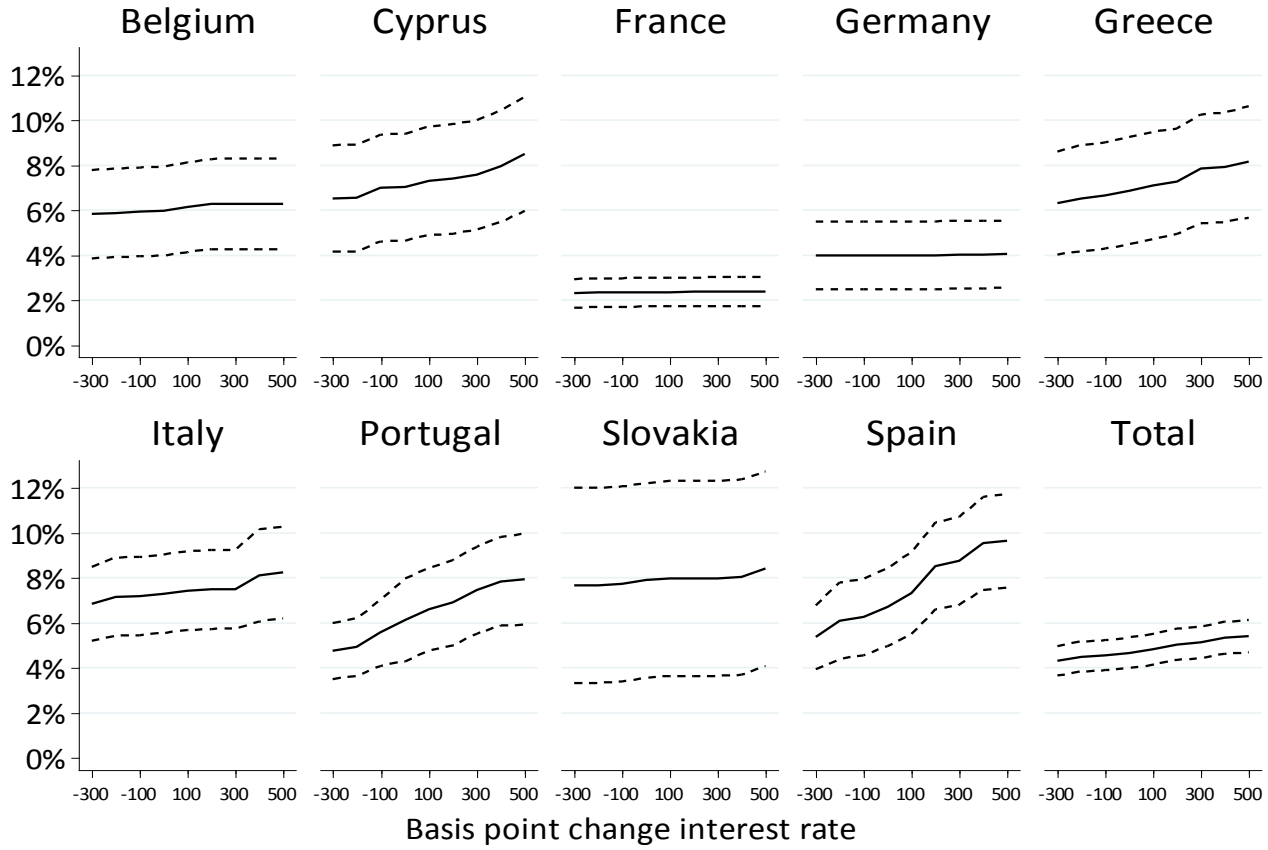
Exposure at default



Sources: HFCS & own calculations.

Sensitivity to the interest rate shock

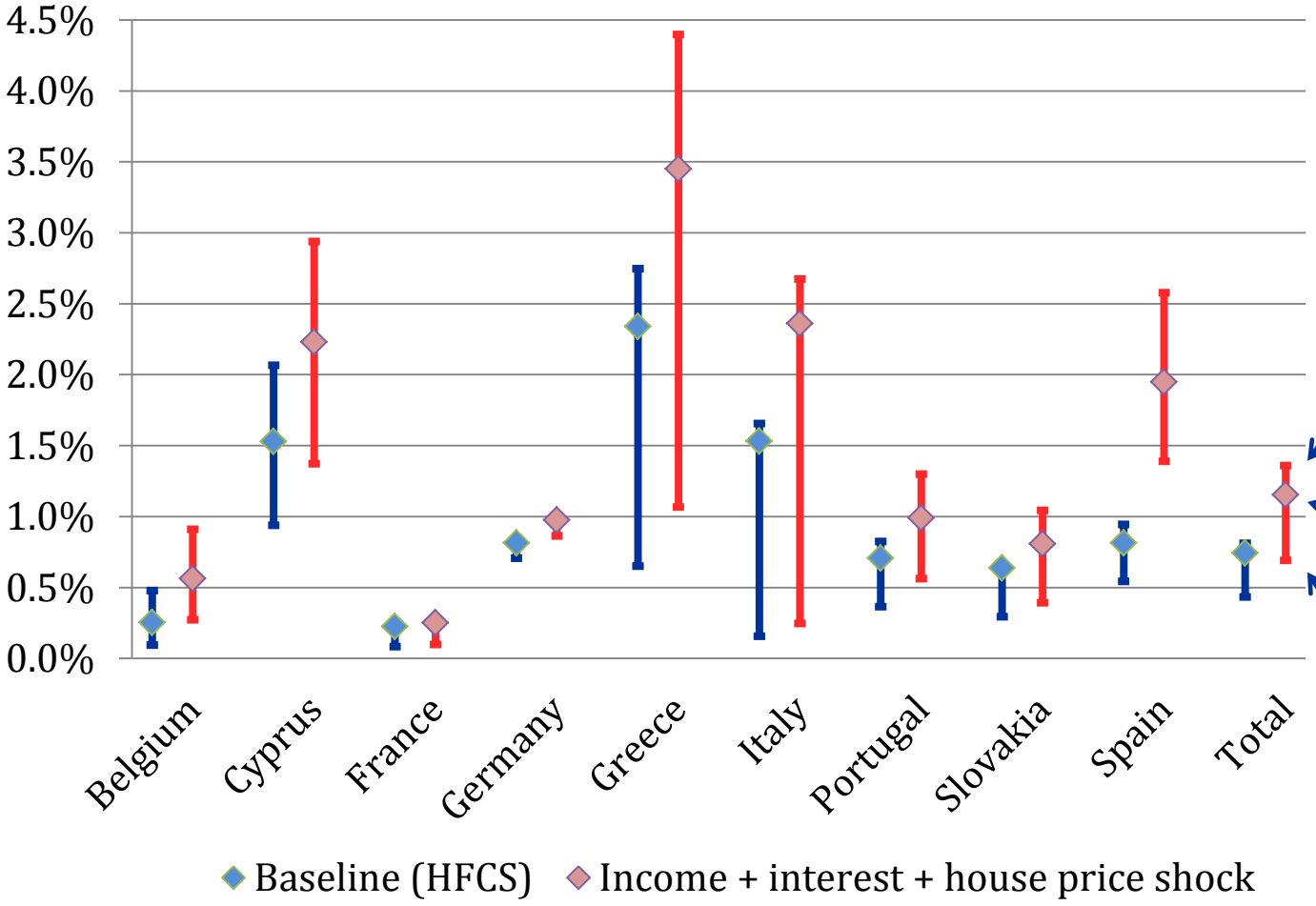
Percentage of indebted households in distress for various changes to the interest rate



Sources: HFCS & own calculations.

Notes: the dashed lines represent the 95% confidence intervals.

Impact on banks: Loss given default



Three different recoveries for the bank in case of a default:

Liquid assets + 80% value of the house

Liquid assets + value of the house

All assets the household has

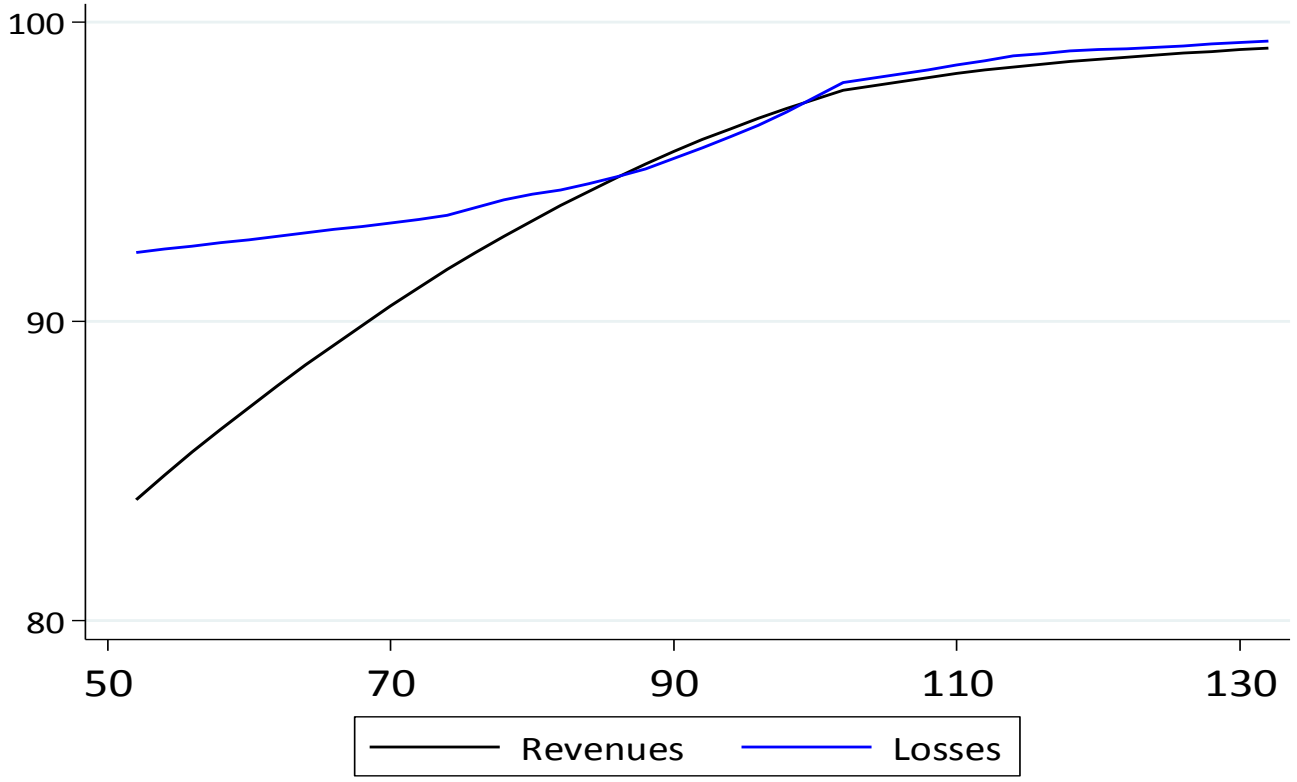
Sources: HFCS & own calculations.

Sheltering the banks: the impact of an LTV ratio cap on banks' losses

- We assume an LTV ratio cap in place at the time of the loan origination
- For those having an initial LTV above this cap the loan size is reduced in order to make the cap binding
- This translates to lower current debt and lower debt instalments
- Hence it increases the financial margin and potentially decreases the level of distress
- Bank's losses are affected in two ways:
  1. Lower debt exposure by distressed households
  2. Less distressed households

Effect of an LTV ratio cap on banks' losses

Banks' losses and revenues (index)



Sources: HFCS & own calculations.

Note: the index is set to 100 in case there is no LTV ratio cap (i.e. the baseline).

Work in progress and the road ahead

- **We would like to develop a micro simulation model.**
- **Keeping in mind:**
  - **Policy makers should have an interest.**
  - **How far can/should we go.**

- **First step: Bring HFCS forward in time using macro data.**
  - **Address the timeliness issue.**
  - **Already used to study the Great Recession.**

Conclusions

- Vulnerability of households is generally smaller than in other studies
- Tight definition of vulnerable households – taking account of collateral and liquidity position.
- Micro based data with macro data calibration.
- Small LGDs are critical to drawing this conclusion, so any factors hindering the seizure of the collateral may impact the results (not efficient legal system, moratoria on foreclosures, dead logs in the courts, etc.).
- Heterogeneity across the countries was identified.

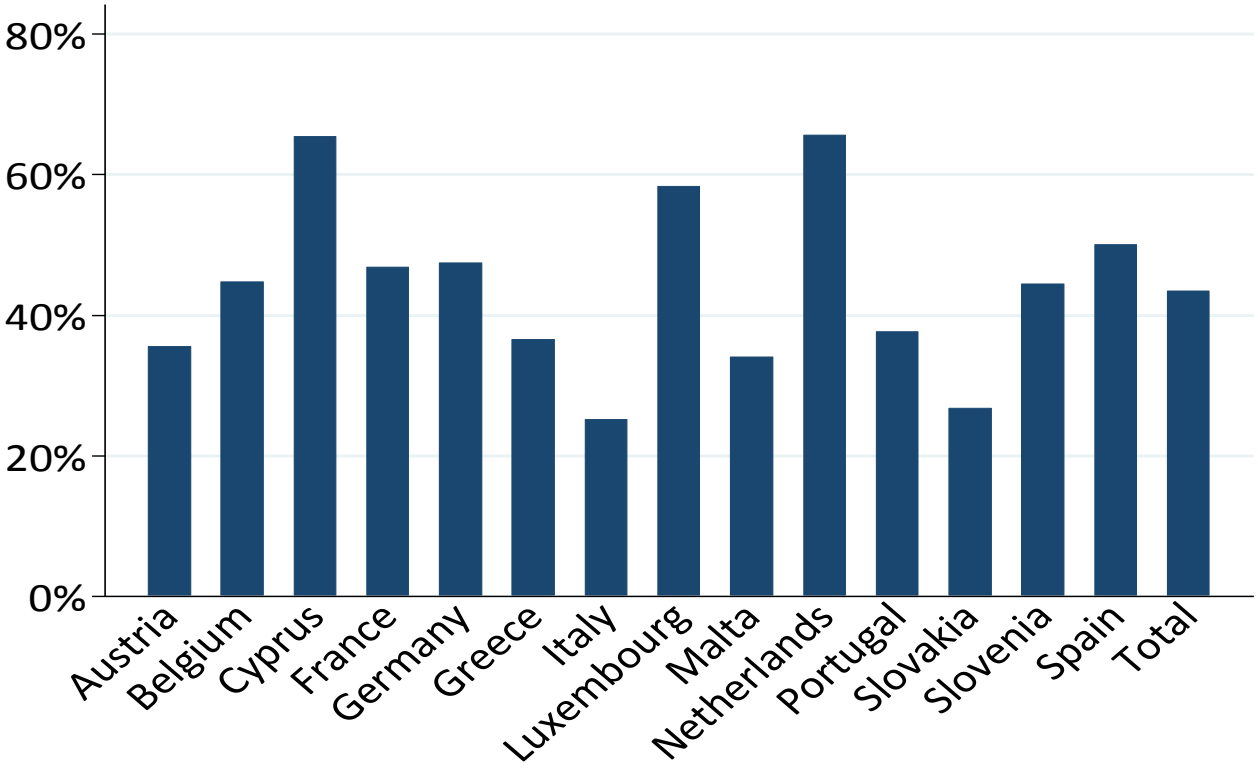
THANK YOU FOR YOUR ATTENTION.

ANY QUESTIONS?

Background slides

Bird's-eye view: indebted households

Percentage of indebted household



Source: HFCS.

PPP adjustment

Purchasing power of BLC in SK = Purchasing power of BLC in DE

$$\%\boldsymbol{BLCsk} * \boldsymbol{medianINCsk} * \boldsymbol{PPPsk} = \%\boldsymbol{BLCde} * \boldsymbol{medianINCde} * \boldsymbol{PPPde}$$

$$\%\boldsymbol{BLCsk} = \frac{\boldsymbol{medianINCde} * \boldsymbol{PPPde}}{\boldsymbol{medianINCsk} * \boldsymbol{PPPsk}} * \%\boldsymbol{BLCde}$$