



Understanding the Macro-Financial Effects of Household Debt: A Global Perspective

Pension Research Council Conference

May 2-3, 2019

Wharton School, University of Pennsylvania

Nico Valckx

Joint work with Adrian Alter and Alan Xiaochen Feng

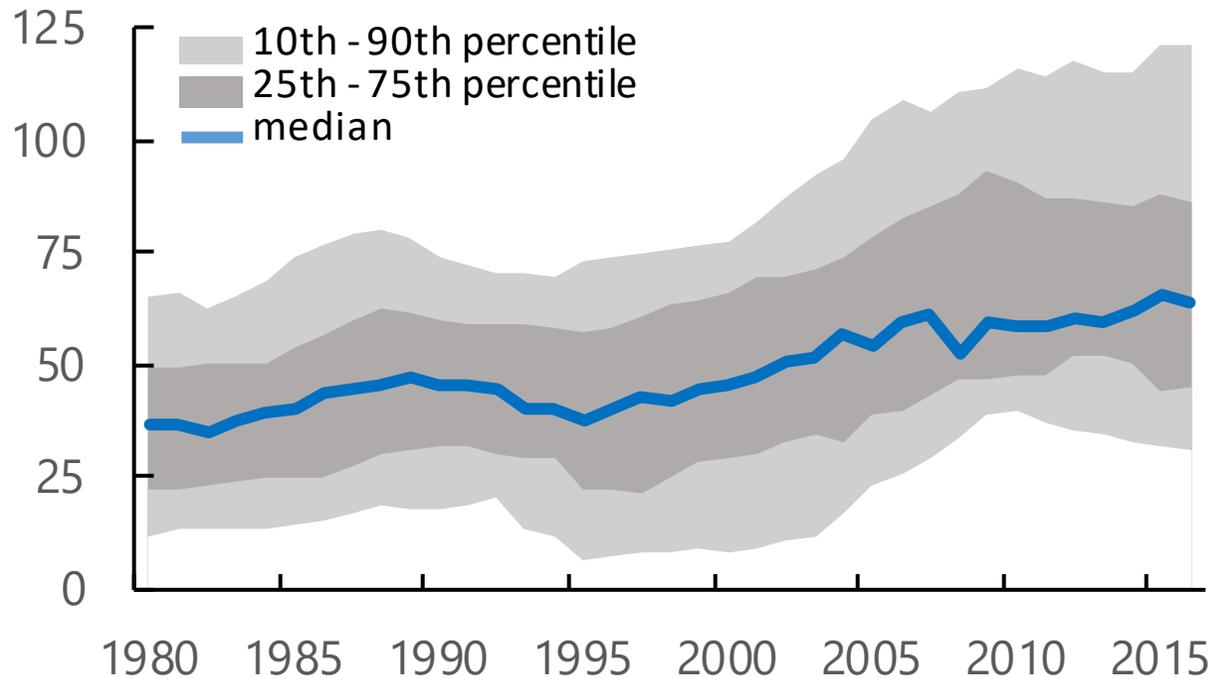
Based on Chapter 2 of the Global Financial Stability Report, “Household Debt and Financial Stability”, October 2017, and IMF Working Paper 18/76 “Understanding the Macro-Financial Effects of Household Debt: A Global Perspective”.

Disclaimer: The views expressed in IMF Working Papers and this presentation are those of the authors and do not necessarily represent the views of the IMF, its Executive Board, or IMF management.

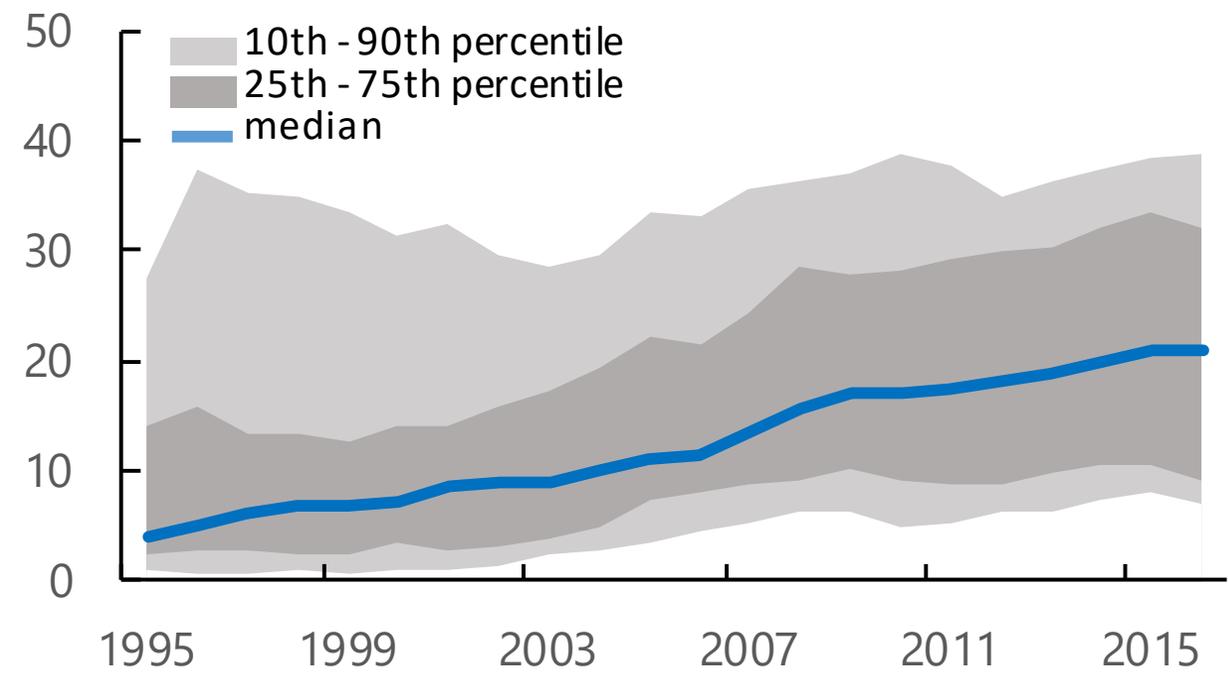


Rising Household Debt in Advanced and Emerging Markets

Advanced Economies Household debt to GDP



Emerging Market Economies Household debt to GDP





Main Questions

1. What is the relationship between household debt and macroeconomic outcomes over the business cycle in a large country sample (advanced & emerging countries)?
2. What role do institutional & behavioral factors play?
Distributional aspects?
3. Is there also consistent micro-level evidence of debt effects?
4. What are the implications of household debt for financial stability? What can policymakers do?



Main Takeaways

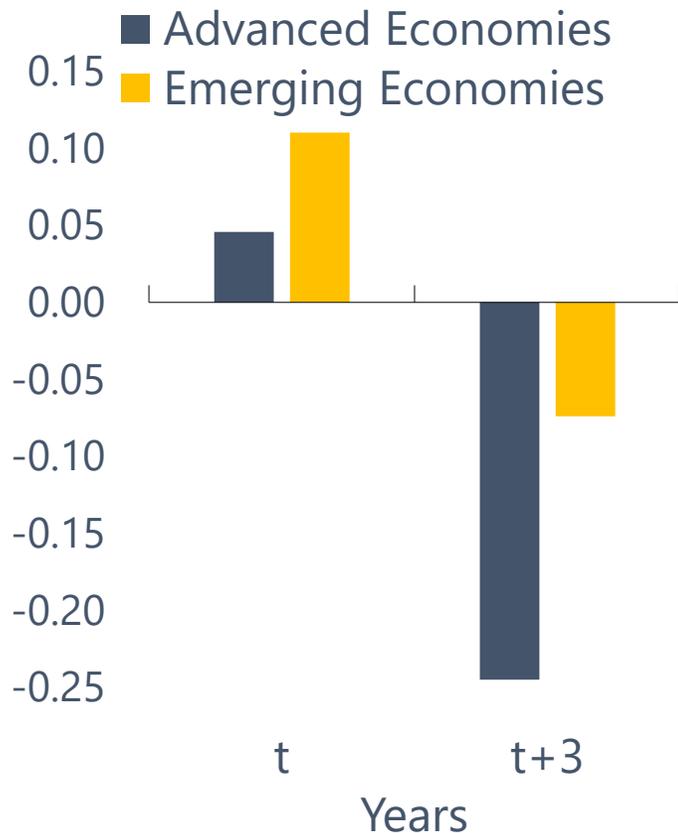
1. Higher growth in HH debt has positive near-term macroeconomic impact, but negative impact 3-5 years later
2. Policies, country characteristics and institutions can mitigate the risks associated with rising household debt. Behavior can amplify risks.
 - Better financial regulation and supervision, less dependence on external financing, more flexible exchange rates, and lower income inequality
 - Role for behavioral factors. Mispricing, neglected risk of HH debt
3. Distributional aspects of debt overhang: most debt is owed by higher income HHs, but most vulnerable are lower income HHs
4. Increases in HH debt are associated with greater probability of banking crises and neglected downside risks
- [5. Targeted (supply and demand-based) macroprudential policies can prevent overborrowing and deal with externalities.]



Three key charts: Rising HH debt could challenge growth

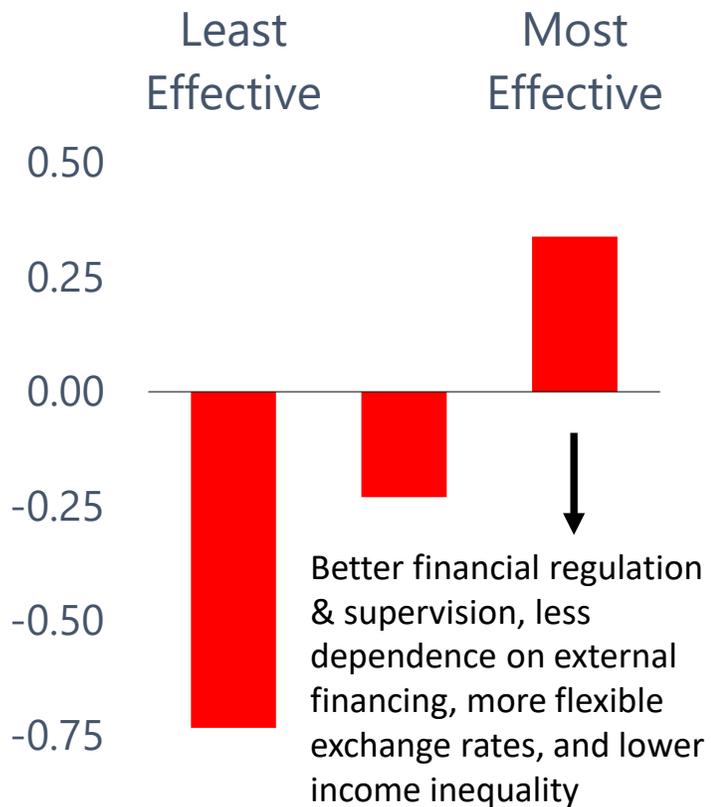
Short Term Expansions May Pose Future Risks to Growth

(Growth Effect of a 1 Percent Increase in HH Debt to GDP, Percent)



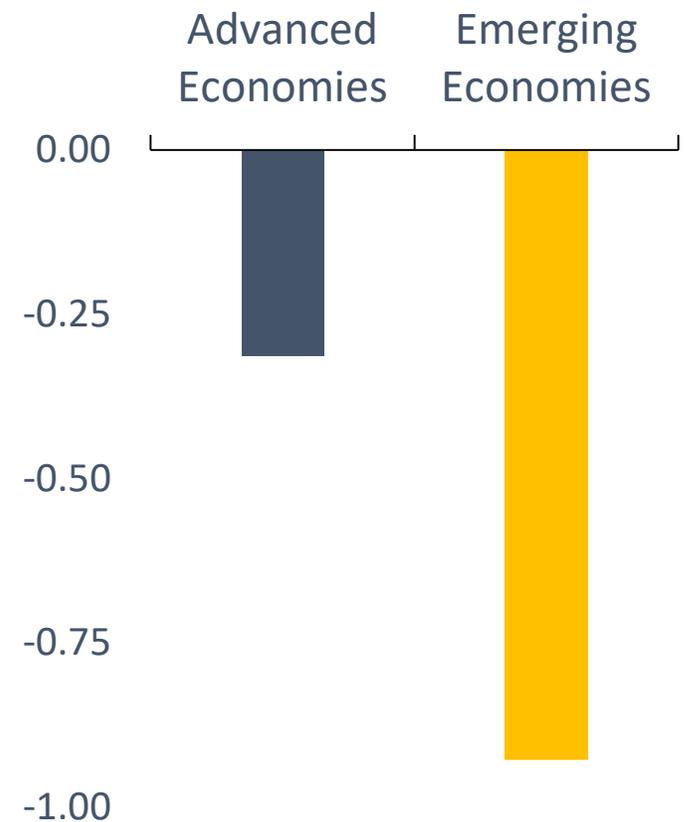
Effective Policies & Institutions Could Mitigate These Risks

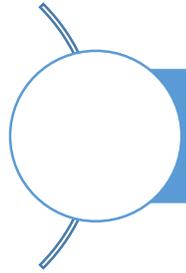
(Growth Effect at t+3 of a 1 Percent Increase in HH Debt to GDP, Percent)



Macroprudential Policies Can Curb Household Credit Growth

(Impact of a Tightening on Real Household Credit Growth, Percentage Points)





Role of Household Debt

Business Cycle

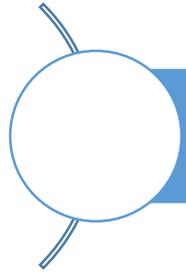
- Household credit can help smooth consumption, but can also cause debt overhang and financial instability

Aggregate Demand Externalities

- Ex ante, households do not internalize aggregate demand externalities and may borrow too much. In recessions, deleveraging constrains the economy to grow.

Distributional Aspects

Highly-leveraged households have higher marginal propensities to consume. Debt overhang reduces consumption.



Modeling & Estimation Approaches

Business cycle analysis:

$$\Delta_3 y_{i,t+k} = \alpha_i + \beta^h \Delta_3 hhd_{i,t-1} + \beta^f \Delta_3 fd_{i,t-1} + \gamma X_{i,t} + \epsilon_{i,t+k}$$

Institutional factor analysis:

$$\Delta_3 y_{i,t+k} = \alpha_i + \beta_1 \Delta_3 hhd_{i,t-1} + \beta_2 \cdot \Delta_3 hhd_{i,t-1} \times IF_i + \beta_3 X_{i,t-1} + \delta_t + u_{i,t+k}$$

Banking sector crisis probability:

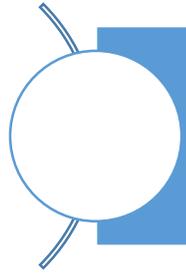
$$\log \frac{P[S_{it} = 1|X_{it}]}{P[S_{it} = 0|X_{it}]} = \Psi_{0i} + \Psi_1 X_{it} + \Psi_2 X_{it} \times I(\text{Hi Debt})_{it} + \epsilon_{it}$$

Bank crash risk:

$$r_{i,t+h} - r_{i,t+h}^f = \alpha_i + \beta \cdot \Delta_k \left(\frac{HHD}{GDP} \right)_{i,t-k} + \gamma \cdot X_{it} + \delta_t + \epsilon_{i,t+h}$$

Panel VAR analysis:

$$Y_{it} = A_{0i}(t) + A_i(l)Y_{it-1} + F_i(l)W_{t-1} + u_{it}$$

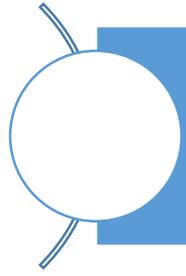


1. Household Debt: Positive or small negative effect in short-term and strong negative effect on GDP growth in medium term

Impact of HH debt on Future Real GDP Growth – Full Sample

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Dependent Variable: | $\Delta_3 y_{i,t}$ | $\Delta_3 y_{i,t+1}$ | $\Delta_3 y_{i,t+2}$ | $\Delta_3 y_{i,t+3}$ | $\Delta_3 y_{i,t+4}$ | $\Delta_3 y_{i,t+5}$ | $\Delta_3 y_{i,t+6}$ |
| $\Delta_3 hhd_{i,t-1}$ | -0.035** (0.016) | -0.112*** (0.039) | -0.180*** (0.053) | -0.211*** (0.058) | -0.185*** (0.055) | -0.146*** (0.045) | -0.122*** (0.044) |
| $\Delta_3 fdd_{i,t-1}$ | -0.010*** (0.002) | 0.021*** (0.004) | -0.030*** (0.007) | -0.026*** (0.008) | -0.012 (0.011) | 0.014 (0.018) | 0.051* (0.026) |
| <i>N</i> | 1,903 | 1,823 | 1,743 | 1,663 | 1,583 | 1,503 | 1,421 |
| Number of Countries | 80 | 80 | 80 | 80 | 80 | 80 | 78 |
| Country Fixed Effects | Y | Y | Y | Y | Y | Y | Y |
| Year Fixed Effects | Y | Y | Y | Y | Y | Y | Y |
| R^2 | 0.88 | 0.65 | 0.42 | 0.41 | 0.40 | 0.41 | 0.42 |

This table presents results from estimating $\Delta_3 y_{i,t+k} = \alpha_i + \beta_1 \Delta_3 hhd_{i,t-1} + \beta_2 \Delta_3 fdd_{i,t-1} + \delta_t + u_{i,t+k}$ for $k=0, \dots, 6$. All regressions control for country and time fixed effects, and lagged GDP growth for the preceding two years. Standard errors are dually clustered on country and year. ***, **, *, indicate statistical significance at the 1 percent, 5 percent, and 10 percent levels.



1. Household Debt: Robustness checks. Similar effects across advanced and emerging markets. Robust to model variations.

Effects on real consumption, unemployment; nonlinearities; endogeneity; Panel VAR; Quantile regression approach.

Impact of HH debt on Future Real GDP Growth – Full Sample

| | Dependent Variable | | | | | | | |
|------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| | Advanced Economies | | | | Emerging Markets | | | |
| | $\Delta_3 y_{i,t+1}$ (1) | $\Delta_3 y_{i,t+3}$ (2) | $\Delta_3 y_{i,t+5}$ (3) | $\Delta_3 y_{i,t+7}$ (4) | $\Delta_3 y_{i,t+1}$ (5) | $\Delta_3 y_{i,t+3}$ (6) | $\Delta_3 y_{i,t+5}$ (7) | $\Delta_3 y_{i,t+7}$ (8) |
| $\Delta_3 hhd_{i,t-1}$ | -0.081** (0.036) | -0.207*** (0.064) | -0.146*** (0.054) | -0.037 (0.047) | -0.156* (0.085) | -0.111 (0.138) | -0.024 (0.093) | -0.249** (0.100) |
| $\Delta_3 fdd_{i,t-1}$ | -0.021*** (0.003) | -0.020*** (0.007) | 0.026+ (0.017) | 0.054** (0.023) | -0.087** (0.038) | -0.064 (0.045) | -0.062 (0.053) | 0.048 (0.064) |
| <i>N</i> | 1,203 | 1,125 | 1,047 | 969 | 620 | 538 | 456 | 374 |
| Number of Countries | 39 | 39 | 39 | 39 | 41 | 41 | 41 | 39 |
| Country Fixed Effects | Y | Y | Y | Y | Y | Y | Y | Y |
| Year Fixed Effects | Y | Y | Y | Y | Y | Y | Y | Y |
| <i>R</i> ² | 0.71 | 0.49 | 0.47 | 0.47 | 0.62 | 0.41 | 0.43 | 0.48 |

This table presents results from estimating $\Delta_3 y_{i,t+k} = \alpha_i + \beta_1 \Delta_3 hhd_{i,t-1} + \beta_2 \Delta_3 fdd_{i,t-1} + \delta_t + u_{i,t+k}$ for $k=0, \dots, 6$. All regressions control for country and time fixed effects, and lagged GDP growth for the preceding two years. Standard errors are dually clustered on country and year. ***, **, *, indicate statistical significance at the 1 percent, 5 percent, and 10 percent levels.

2a. Role of Institutional Factors

Fixed FX, higher openness (reliance on external funding) reinforce negative effect debt. More financially developed/efficient markets mitigate debt externalities

Stronger institutions mitigate risks associated with HHD on growth in medium term

| | (1) | (2) | (3) | (4) | (5) | (6) |
|--|---|---------------------|---------------------|----------------------|--------------------|----------------------|
| | Institutional Factors and Policies | | | | | |
| $\Delta_3 hhd_{i,t-1}$ | -0.058 (0.043) | 0.029 (0.073) | 0.056 (0.076) | -0.289*** (0.074) | -0.261* (0.150) | -0.273*** (0.067) |
| $\Delta_3 hhd_{i,t-1} \times FIXED$ | -0.247** (0.100) | | -0.223** (0.104) | | | |
| $\Delta_3 hhd_{i,t-1} \times KAOPEN$ | | -0.250** (0.108) | -0.184* (0.108) | | | |
| $\Delta_3 hhd_{i,t-1} \times FINDEV$ | | | | 0.243** (0.101) | | |
| $\Delta_3 hhd_{i,t-1} \times TRANSPAR$ | | | | | 0.158* (0.102) | |
| $\Delta_3 hhd_{i,t-1} \times FINRISK$ | | | | | | 0.122* (0.074) |
| <i>N</i> | 1,503 | 1,333 | 1,333 | 1,503 | 1,285 | 1,126 |
| Number of Countries | 80 | 77 | 77 | 80 | 68 | 76 |
| Country and Year Fixed Effects | Y | Y | Y | Y | Y | Y |
| $\Delta_3 f d_{i,t-1}$, Lagged GDP Controls | Y | Y | Y | Y | Y | Y |
| R^2 | 0.42 | 0.36 | 0.37 | 0.42 | 0.42 | 0.37 |

This table presents results from estimating

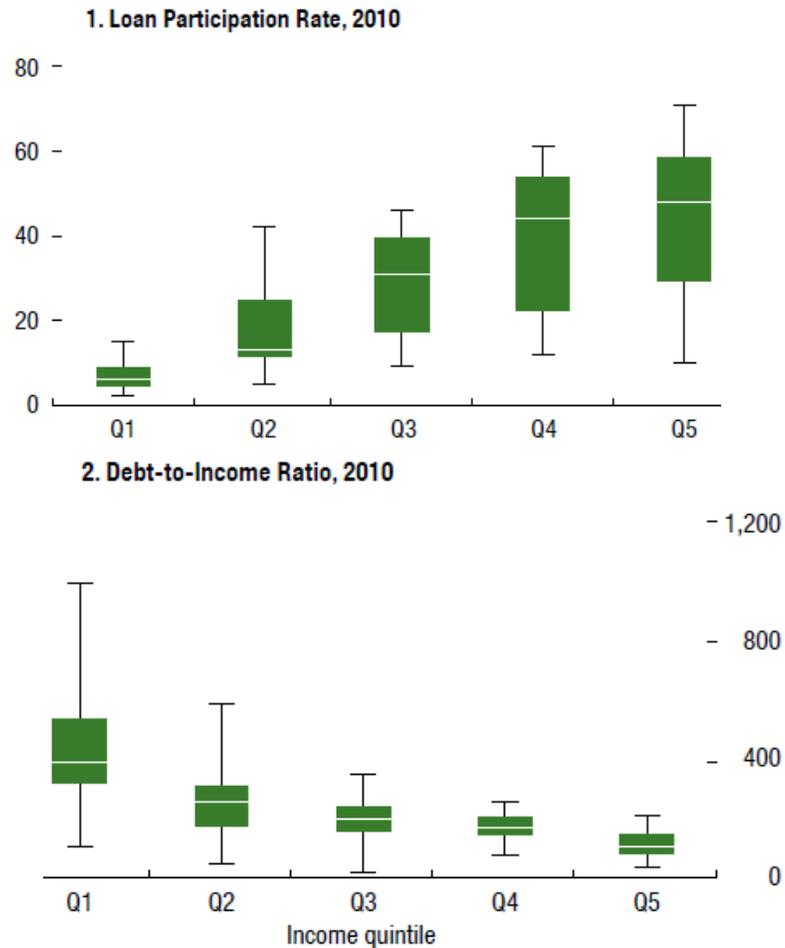
$$\Delta_3 y_{i,t+5} = \alpha_i + \beta_1 \Delta_3 hhd_{i,t-1} + \beta_2 \cdot \Delta_3 hhd_{i,t-1} \times IF_i + \beta_3 X_{i,t-1} + \delta_t + u_{i,t+kk}$$

where IF_i is the dummy variable for institutional factors including fixed exchange rate regime (*FIXED*), high capital account openness (*KAOPEN*), high financial development (*FINDEV*), transparency of consumer credit (*Transparency*) and low financial risk (*FINRISK*). In all regressions, control variables include past growth in non-financial corporate debt ($\Delta_3 f d_{i,t-1}$), country and time fixed effects, and lagged GDP growth for the preceding two years. Standard errors are dually clustered on country and year. ***, **, *, + indicate statistical significance at the 1 percent, 5 percent, 10 percent, and 15 percent levels.

2b. Role of Distributional Characteristics across Households

Inclusion: High participation by low-incomes reduces (-) effect HHD

Depth: When DTI is *high* for low incomes, (-) effect HHD worsens a bit.



HH-level income distributional factors reinforce HHD effects on growth in medium term

| | (7) | (8) | (9) |
|--|--------------------------------------|---------------------|---------------------|
| | Household-level Debt Characteristics | | |
| $\Delta_3 hhd_{i,t-1}$ | -0.303*** (0.088) | -0.258** (0.106) | -0.251** (0.117) |
| $\Delta_3 hhd_{i,t-1} \times LowIncPart$ | 0.272*** (0.106) | | |
| $\Delta_3 hhd_{i,t-1} \times LowDTI$ | | 0.222+ (0.143) | 0.216+ (0.147) |
| $\Delta_3 hhd_{i,t-1} \times EM$ | | | -0.086 (0.170) |
| <i>N</i> | 835 | 784 | 784 |
| Number of Countries | 30 | 25 | 25 |
| Country and Year Fixed Effects | Y | Y | Y |
| $\Delta_3 f d_{i,t-1}$, Lagged GDP Controls | Y | Y | Y |
| <i>R</i> ² | 0.53 | 0.54 | 0.54 |

This table presents results from estimating

$\Delta_3 y_{i,t+5} = \alpha_i + \beta_1 \Delta_3 hhd_{i,t-1} + \beta_2 \cdot \Delta_3 hhd_{i,t-1} \times IF_i + \beta_3 X_{i,t-1} + \delta_t + u_{i,t+kk}$ where *IF*_{*i*} is the dummy variable for household-level debt characteristics including high low-income households mortgage participation (*LowIncPart*), low debt-to-income of low-income households (*LowDTI*), and emerging market economies (*EM*).

2c. Role of Behavioral Factors

- i) Predictability of HH debt for future stock returns. Hence mispricing.
- ii) Neglected crash risk due to HH debt, for bank stocks, 2-3 years ahead.

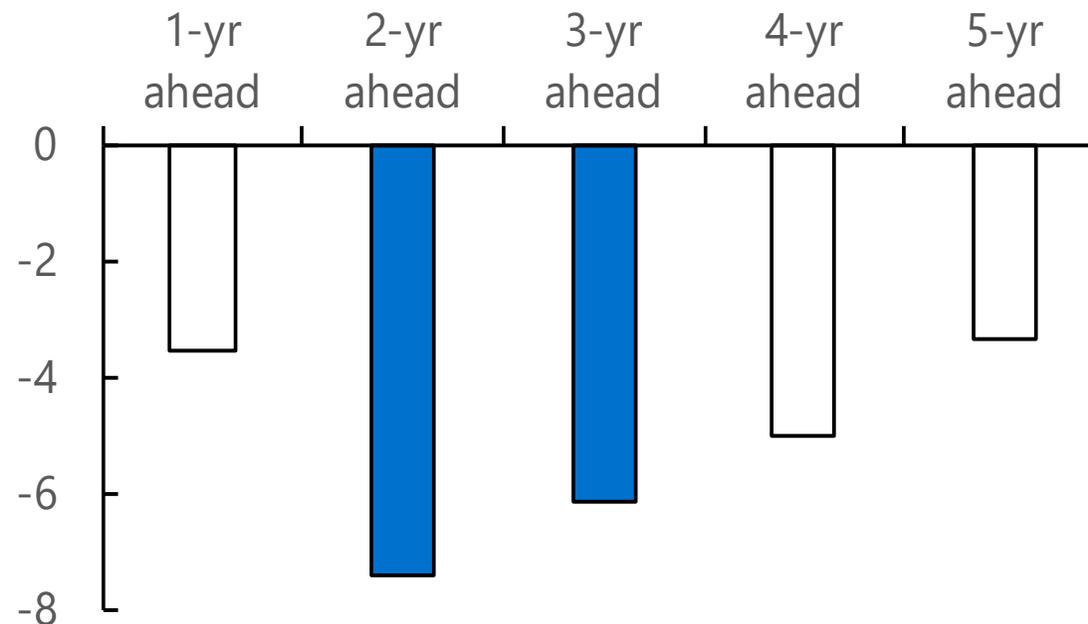
Ad ii) Bank Equity Crashes

Equity crashes are defined as having an annual return of below -30 percent, as in Baron and Xiong (2017). Forecasting horizons vary from one year to five years. Standard errors are clustered at the country level. Marginal effects are reported for the probability of future equity crashes. ***, **, *, indicate statistical significance at the 1 percent, 5 percent, and 10 percent levels.

| Dependent Variable: | Probability of Future Equity Crashes | | |
|--|--------------------------------------|---------------------|---------------------|
| | (1) | (2) | (3) |
| | $k = 1$ | $k = 3$ | $k = 5$ |
| $\Delta_3 \left(\frac{HHD}{GDP} \right)_{c,t}$ | -0.011 (0.010) | 0.035** (0.015) | 0.080*** (0.017) |
| $\Delta_3 \left(\frac{NFCD}{GDP} \right)_{c,t}$ | 0.053*** (0.011) | 0.099*** (0.017) | 0.057*** (0.020) |
| Country FEs | Y | Y | Y |
| Year FEs | N | N | N |
| N | 1,680 | 1,680 | 1,668 |
| Countries | 70 | 70 | 70 |
| R^2 | 0.11 | 0.15 | 0.14 |

Ad ii) Abnormal Returns for Bank Stocks:

Neglect of crash risk due to HH debt is particular concern for banking sector



Note: Coefficients from regressions of future bank equity risk-adjusted abnormal returns, one to five year ahead, using past 3-year changes in the household debt-GDP ratio as independent variable.

3. Micro-level Evidence

Debt overhang of highly levered households reduces consumption
(European data)

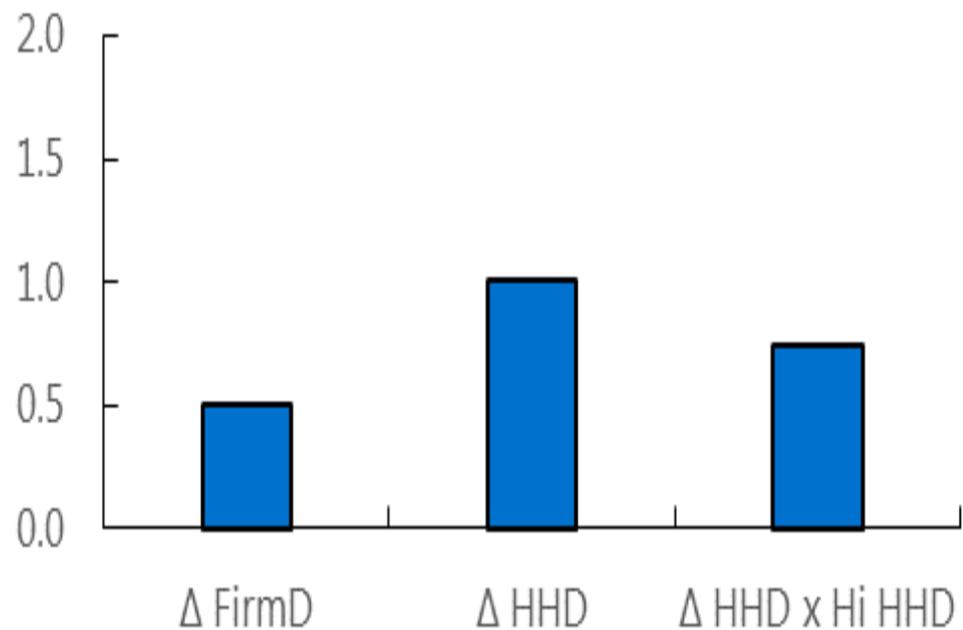
| Dependent Variable: | Change in Consumption to Income Ratio | | | | | | |
|----------------------------------|---------------------------------------|-----------------------|-------------------------|----------------------|-------------------------|-----------------------|-------------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| DTI (lag) | -0.0396*** (0.00235) | | -0.0404*** (0.00183) | | -0.0401*** (0.00226) | | -0.0152* (0.00619) |
| LTV (mortgages, lag) | | -0.123*** (0.0218) | | -0.128** (0.0302) | | -0.131*** (0.0154) | |
| DTI x I(DTI>300) (lag) | | | | | | | -0.0537*** (0.00816) |
| I(DTI>300) (lag) | | | | | | | 26.32*** (2.010) |
| Size of household main residence | | | | | 0.0294** (0.00694) | -0.0506* (0.0173) | 0.0200* (0.00779) |
| Education of reference person | | | | | 0.986*** (0.0584) | 0.557 (2.923) | 0.721*** (0.108) |
| Age of reference person | | | | | 0.110 (0.0469) | 0.116 (0.0720) | 0.132** (0.0264) |
| Unemployment | | | | | -4.096 (3.693) | 10.59 (8.163) | -3.451 (3.114) |
| N | 2,925 | 699 | 2,925 | 699 | 2,744 | 656 | 2,744 |
| R ² | 0.102 | 0.059 | 0.103 | 0.113 | 0.109 | 0.133 | 0.142 |
| Country FE | Y | Y | Y | Y | Y | Y | Y |
| Net Wealth FE | Y | Y | Y | Y | Y | Y | Y |
| Cluster Country | Y | Y | Y | Y | Y | Y | Y |

4. Crash Risk related to Banking Crises

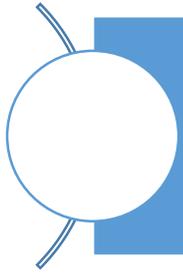
Change household debt is reliable early warning indicator for banking crises
When HH debt level is high, extra negative potential impact

Probability of Banking Crisis: Marginal Effects

(percentage points)



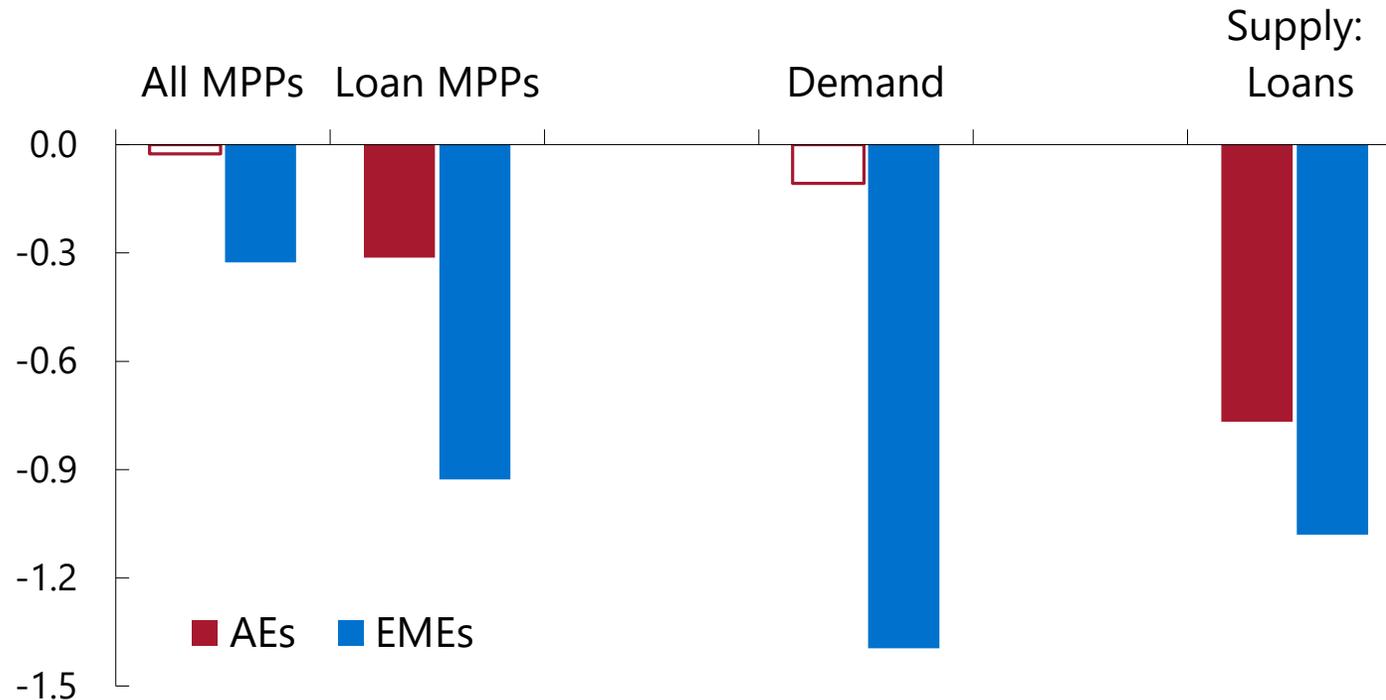
Note: Panel logit model for systemic banking crises with 32 countries, including country fixed effects, levels and changes in household (HHD) and nonfinancial corporate (FirmD) debt-GDP ratios and interaction dummy with high level of household debt (HiHHD), set at about 65 percent of GDP.



5. Role of Macroprudential Policies

Targeted macroprudential tools successfully reduce household credit growth

Average Effect of Policies on Real Household Credit Growth, by Type
(Percentage points)



“All MPPs”: 14 macroprudential measures. “Loan MPPs”: demand and supply-side loan restrictions. “Demand”: DTI and LTV restrictions. “Supply: Loans” consists of limits on bank credit growth, loan loss provisions, loan restrictions, and limits on foreign currency loans. Shaded bars depict significant effects at the 10 percent confidence levels. See analysis in Chapter 2 from GFSR October 2017.



Conclusions & Policy Lessons

1. Higher growth in HH debt has positive near-term macroeconomic impact, but negative impact 3-5 years later
2. Country-level policies can mitigate the risks associated with rising household debt. Behavior can amplify risks.
 - Better financial regulation and supervision, less dependence on external financing, more flexible exchange rates, and lower income inequality (+)
 - Role for behavioral factors. Mispricing, neglected risk of HH debt (-)
3. Distributional aspects matter. Debt overhang is most concerning for lower income HHs with higher debt levels.
4. Increases in HH debt are associated with greater probability of banking crises and neglected downside risks
5. Macroprudential policies can prevent overborrowing and deal with externalities