

Macroprudential policy through the eyes of dynamic macro-banking models

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20 years of Macroprudential Policy in Europe – Looking back and looking ahead

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Organizers' motivational questions:

- What have we learnt about the efficiency of various tools used to dampen financial cycles and to strengthen the resilience of the financial system?
- Have macroprudential policies helped to cushion financial crises that Europe experienced during the last two decades?
- What were success factors and shortcomings?
- Looking ahead, how can macroprudential policies help to address the challenges the European economy is facing?

Next panels: What do we know about macroprudential policy so far?

Here: Through the eyes of **some** dynamic macro-banking models

- All these questions are important
- I am a believer in the value of being macroprudential and have faith in the effectiveness of macroprudential policy action
- But, due to data availability and methodological challenges, we are in a greater state of ignorance than in other areas of economic policy
 - monetary policy
 - microeconomic policies

- Macroprudential policy:

All dimensions of public action directed to monitor, understand and improve financial stability with the aim to ensure that the financial system remains capable to play its functions in both good and bad times without causing major negative externalities to the broader economy

- This is more than just the specific tools under the control of macroprudential authorities

Attitude / approach / perspective / reflection / arguments / discussion

[E.g., management of the Covid 19 crisis]

- Contribution may mainly come from way macroprudential perspective transpires to the design of prudential regulation & supervision
- But there are also dedicated macroprudential tools...
such as banks' CCyB:
 - Attractive idea:
 - * Extra loss absorption capacity required in the boom would allow banks to accommodate future negative shocks without compromising resilience or lending capacity
 - * Complementarily, it might contribute to tame credit cycles
[Repullo, R., and J. Suarez (2013), "The Procyclical Effects of Bank Capital Regulation," *Review of Financial Studies* 26, 452-490]
 - However, evidence on its practical effectiveness is more limited

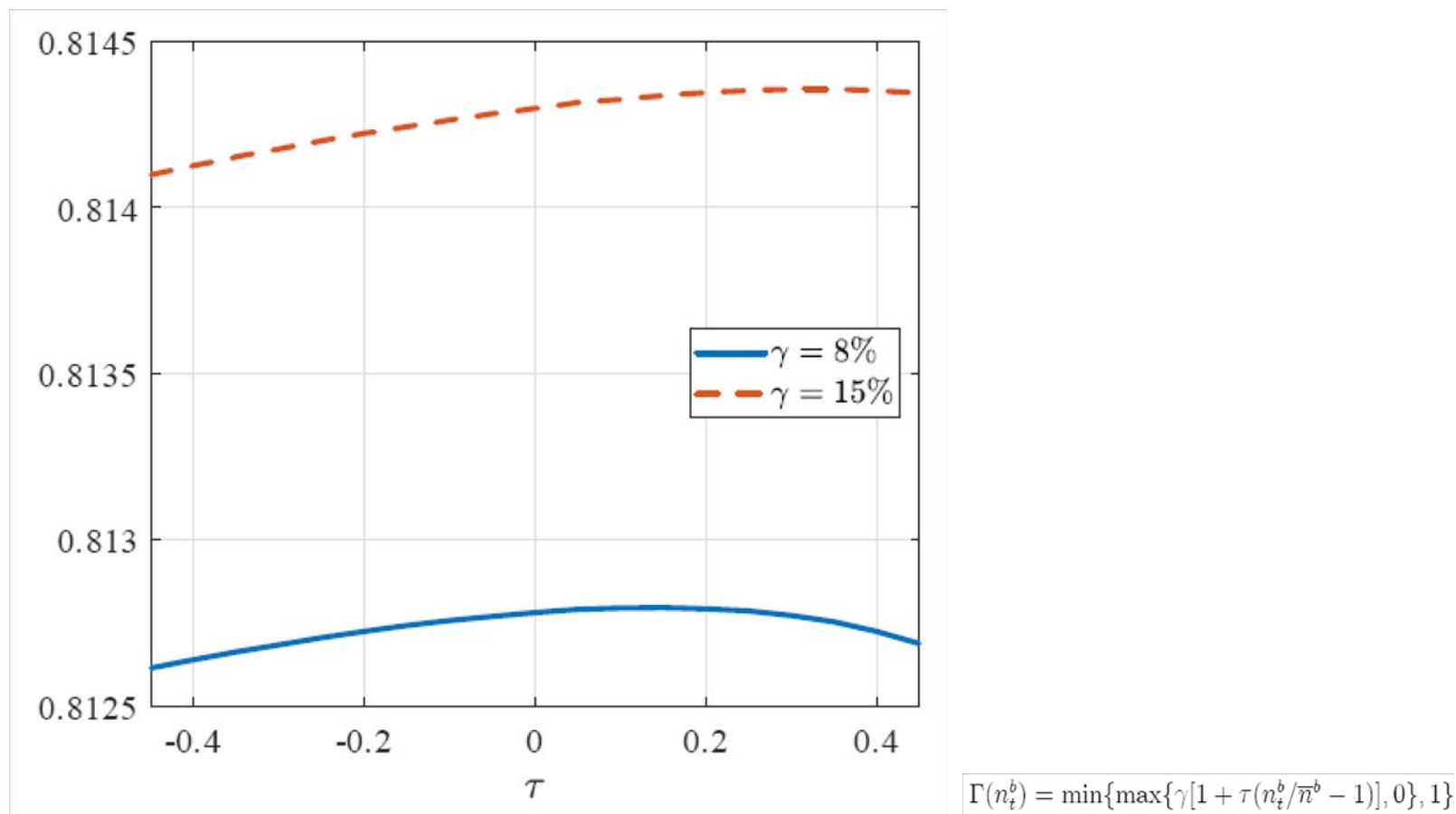
- Reality is more complex:
 - dynamic capital management strategies
 - market pressure
 - concerns on potential signaling effects
 - need to compete with global players
 - fear to violate minimum requirements in the future, or...
 - having to re-build buffers once the crisis is over

- Dynamic general equilibrium considerations further complicate the assessment
 - In Martinez-Miera and Suarez (2014) a “scarce equity preservation effect” discourages systemic gambling
 - A CCyB can erode the effect and exacerbate risk taking

[Martinez-Miera, D., and J. Suarez (2014), “Banks’ Endogenous Systemic Risk Taking,” *mimeo*, CEMFI]

[Perotti, Enrico, and Javier Suarez (2002), “Last Bank Standing: What Do I Gain if You Fail?,” *European Economic Review* 46, 1599-1622]

Social welfare for different degrees of cyclical adjustment



[Figure 8 in Abad, Martinez-Miera, and Suarez (2023, mimeo)]

- Full empirical or theoretical understanding of the CCyB may take years
 - As time passes, there are opportunities to empirically gauge the causal effects of changing the CCyB
 - But identification is far from obvious; aggregate feedback effects further complicate the assessment (net effects can be paradoxical)
- Genuine interest in being able to run counterfactuals justifies the need for structural models
- Adaptation of dynamic macro models to the analysis of macroprudential issues becomes of central importance

- Back in about 2010, there were very few dynamic macroeconomic models with banks
 - Meh, C., and K. Moran (2010), “The Role of Bank Capital in the Propagation of Shocks,” *Journal of Economic Dynamics and Control* 34, 555-576
 - Gertler, M., and N. Kiyotaki (2010), “Financial Intermediation and Credit Policy in Business Cycle Analysis” in B. Friedman and M. Woodford (eds.), *Handbook of Monetary Economics*, vol. 3, Elsevier, 547-599
 - Gerali, A., S. Neri, L. Sessa, and F. M. Signoretti (2010), “Credit and Banking in a DSGE Model of the Euro Area,” *Journal of Money, Credit and Banking* 42 (s1): 107–41

- The literature was full of shortcuts
 - assuming banks away,
 - abstracting from loan making,
 - avoid having default of banks and/or their borrowers

which limited the capacity to fully capture distortions related to limited liability (risk shifting) & bankruptcy (spreading losses to creditors or taxpayers)

- Having models in which
 - banks fail with an endogenous probability
 - bank default can be traced back to the default of the borrowers

was relevant to establish a dialogue on reform of prudential bank regulations: minimum requirements + risk weights

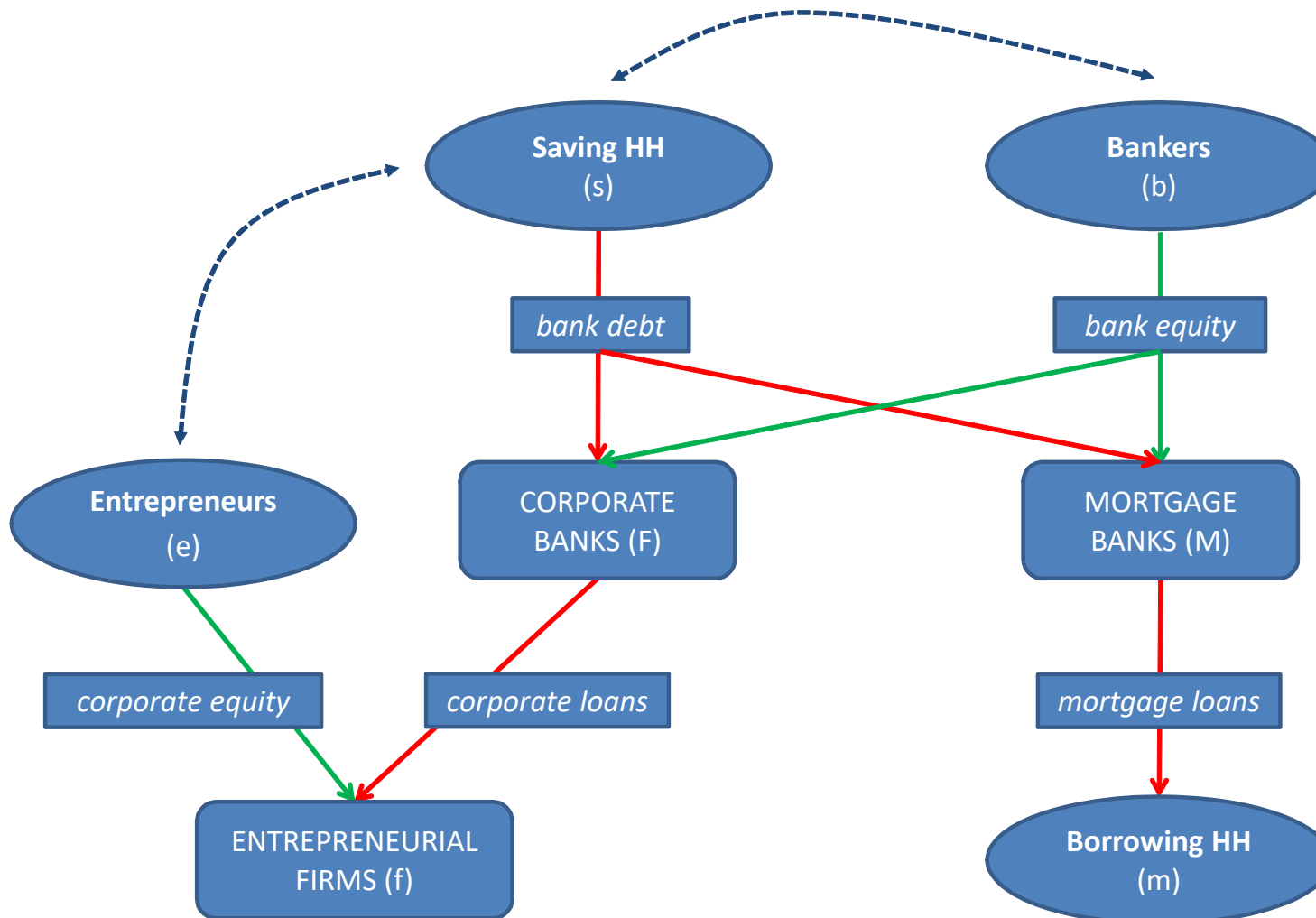
- Pre-requisite: models that could endogenously account for how a capital requirement might contribute to financial stability & welfare
- Sources of inspiration:
 - Kareken, J., and N. Wallace (1978), “Deposit Insurance and Bank Regulation: A Partial-Equilibrium Exposition,” *Journal of Business* 51, 413-438
 - Blum, J., and M. Hellwig (1995), “The Macroeconomic Implications of Capital Adequacy Requirements for Banks,” *European Economic Review* 39, 739-49
 - Holmström, B., and J. Tirole (1997), “Financial Intermediation, Loanable Funds, and the Real Sector,” *Quarterly Journal of Economics* 112, 663-691
 - Repullo, R., and J. Suarez (2013), “The Procyclical Effects of Bank Capital Regulation,” *Review of Financial Studies* 26, 452-490. (draft version existed since 2008)

- This perspective explains the elements of the first prototype of the saga of 3D models:

Clerc, L., A. Derviz, C. Mendicino, S. Moyen, K. Nikolov, L. Stracca, J. Suarez, and A. Vardoulakis (2015), “Capital Regulation in a Macroeconomic Model with Three Layers of Default,” *International Journal of Central Banking* 11, 9-63

- Economy with a bank-intermediated financial system in which agents with endogenously evolving net worth raised external funding in the form of defaultable non-contingent debt
- Extension of the approach in Bernanke, Gertler, and Gilchrist (1999)
[Bernanke, B., M. Gertler, and S. Gilchrist (1999), “The Financial Accelerator in a Quantitative Business Cycle Framework,” in J. Taylor and M. Woodford, eds., *Handbook of Macroeconomics*, Elsevier, Chapter 21, 1341-1393]

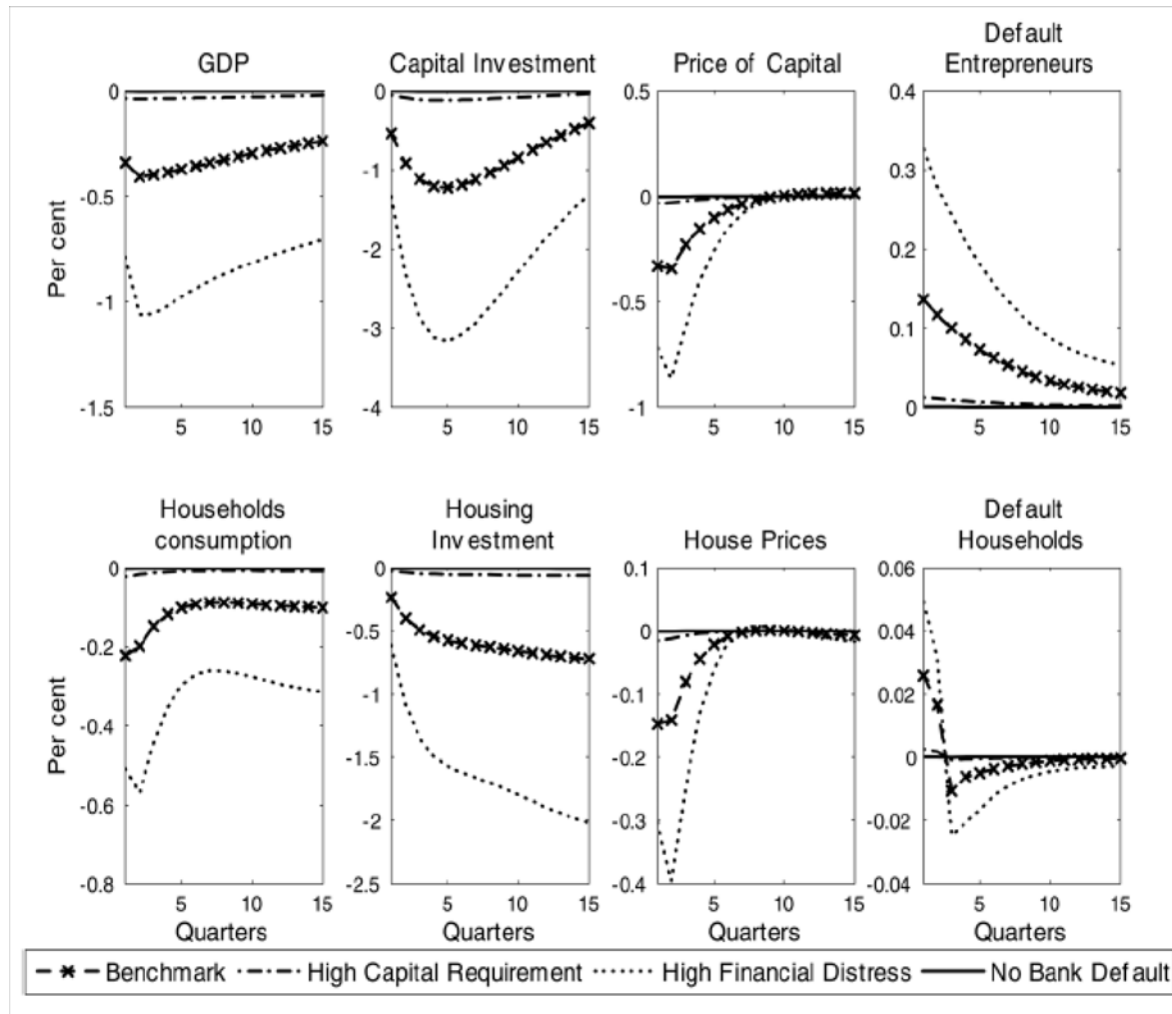
Funding flows in Mendicino et al. (2018, JMCB)



[Red = debt funding; Green = equity funding; Blue = intra saving dynasty flows]

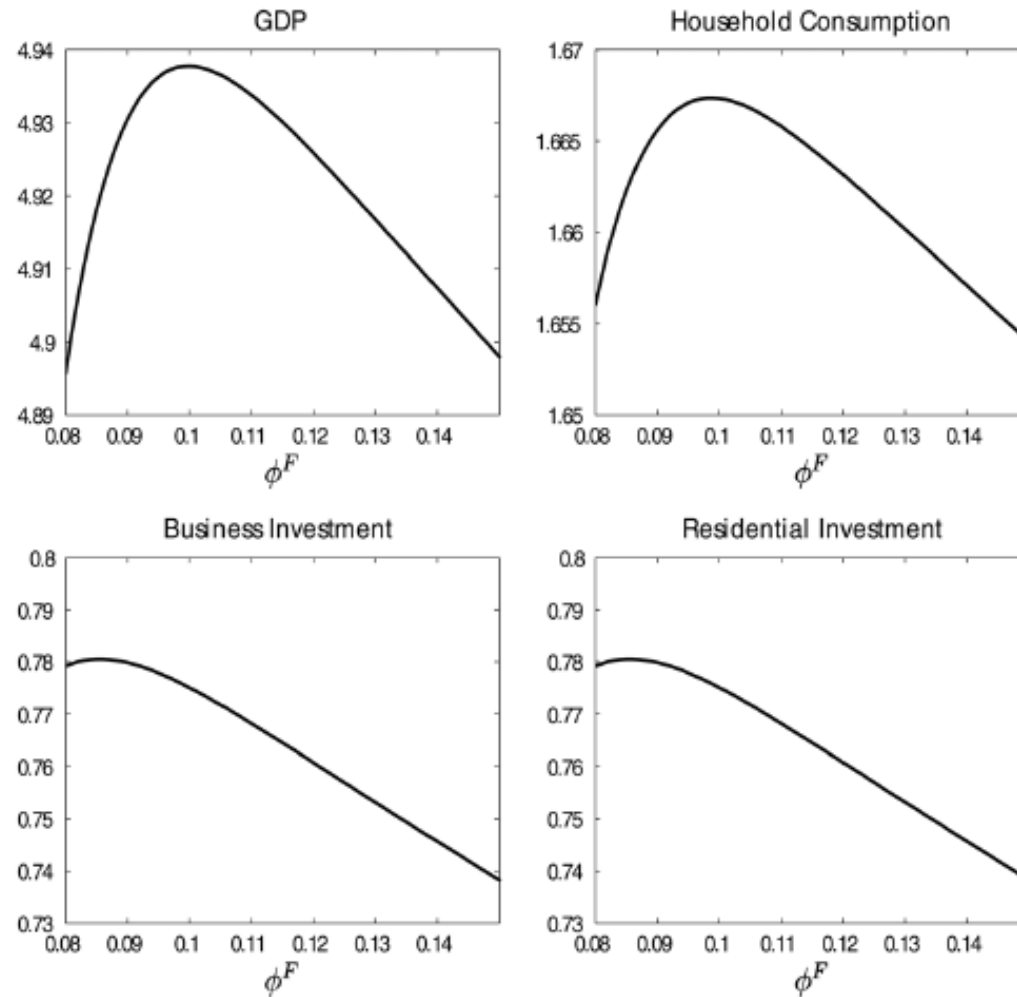
- Capital requirements affect banks' leverage, loan pricing, and the default probabilities of banks and their borrowers
- With shortcuts along multiple dimensions (one-period debt maturities, exogenous dividend policies, non-stochastic solution, highly tentative calibration), but promise in terms of tractability and the richness of results
- One insight: capital requirements can contribute to financial stability by reducing bank failures but at the cost of reducing credit supply

Impulse Responses after a Shock to Bank Risk



[Figure 10 in Clerc et al. (2014, IJCB)]

Steady-State Values Depending on the Capital Requirement



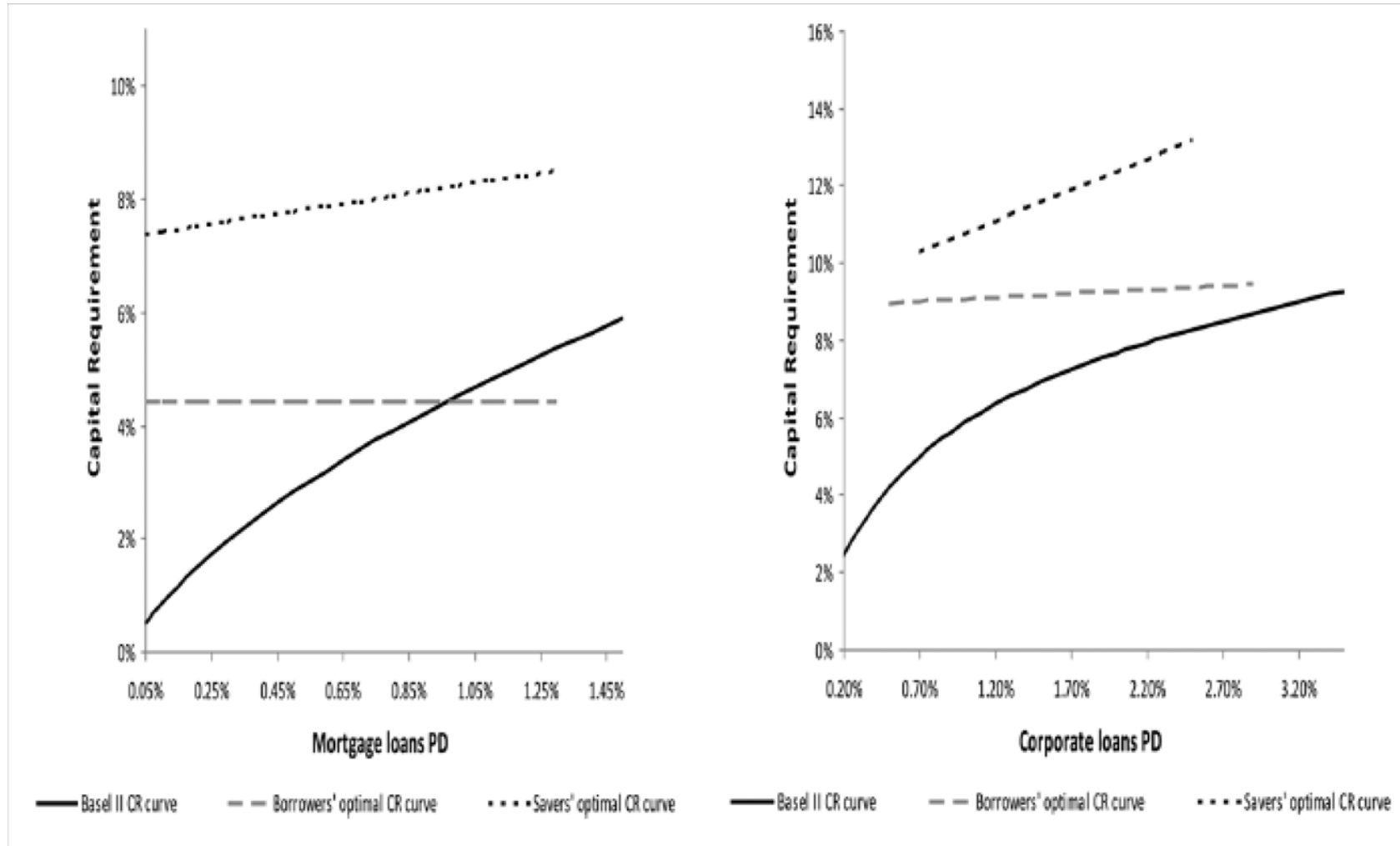
[Figure 3 in Clerc et al. (2014, IJCB)]

- Next research highlight:

Mendicino, C., K. Nikolov, J. Suarez, and D. Supera (2018), “Optimal Dynamic Capital Requirements,” *Journal of Money, Credit, and Banking* 50, 1271-1297

- Risk weights to mimic the IRB approach of Basel II (and III); calibrating the stochastic version of the model to fit the EU data
- Lending households tend to prefer higher capital requirements while borrowing households benefit from capital ratio increases only up to some point
- A CCyB is only modestly beneficial if the baseline requirement is sufficiently large

Basel versus Optimal Capital Requirements



[Figure 6 in Mendicino et al. (2018, JMCB)]

- Another piece explored interactions between capital regulation and monetary policy:

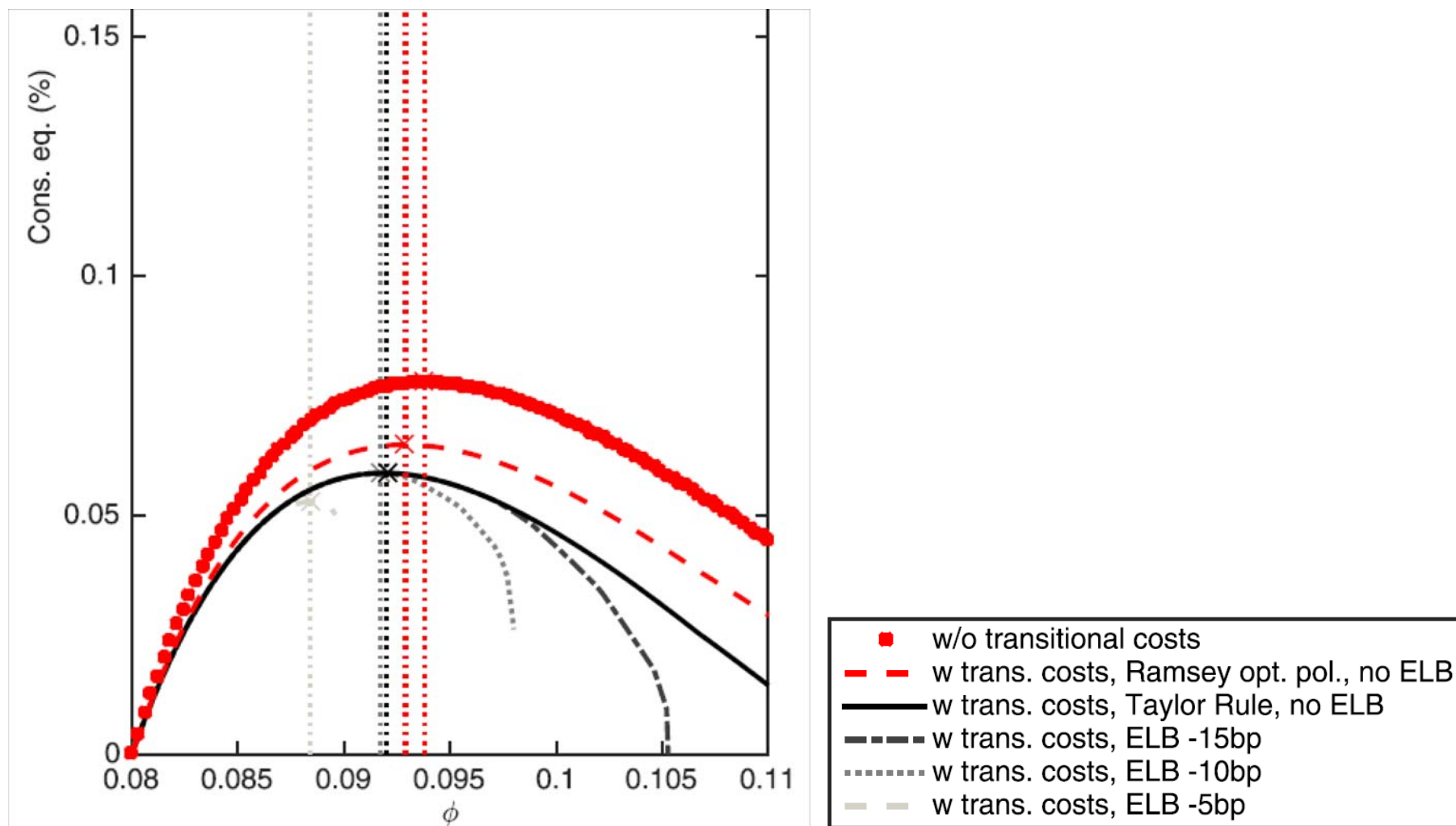
Mendicino, C., K. Nikolov, J. Suarez, and D. Supera (2020), “Bank Capital in the Short and in the Long Run,” *Journal of Monetary Economics* 115, 64-79

- Analyzing transitional dynamics along alternative paths for rising capital requirements and different monetary policy setups:

Transitional costs can be reduced with

- gradualism
- accommodative monetary policy

Welfare effects of capital requirements with and without transitional costs



[Figure 5 in Mendicino et al. (2020, JME)]

- Next step was removing a shortcut that had been used by us and others so far: shocks operating directly bank assets, like in the classical Merton (1974) model of credit risk

[Merton, R. (1974), “On the Pricing of Corporate Debt: The Risk Structure of Interest Rates,” *Journal of Finance* 29, 449-470]

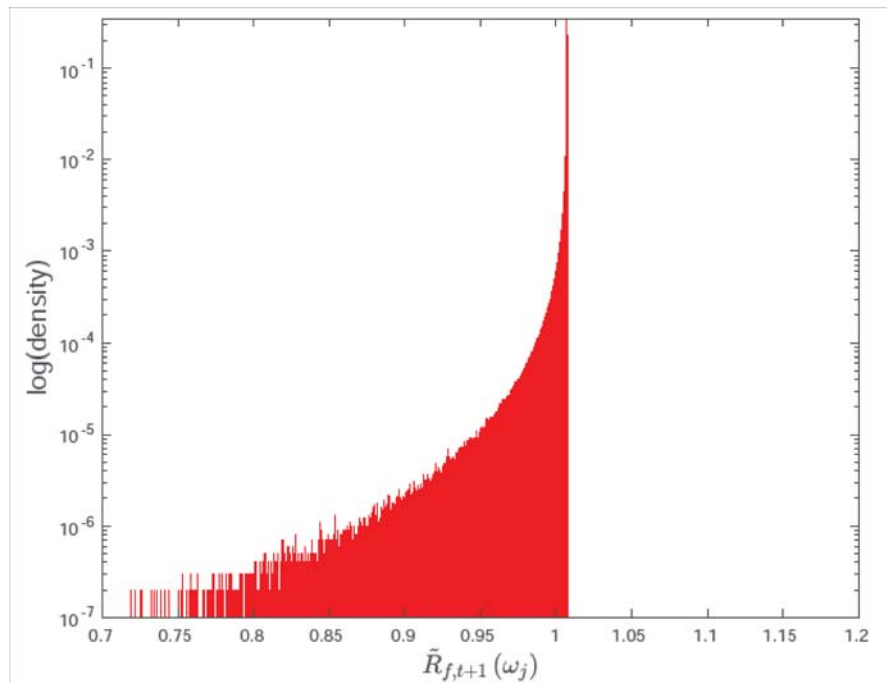
- As noticed by Gornall and Strebulaev (2018) and Nagel and Purnanandam (2020) in partial equilibrium setups...

If banks hold a portfolio of defaultable debt, the distribution of bank asset returns is very different from a log-normal

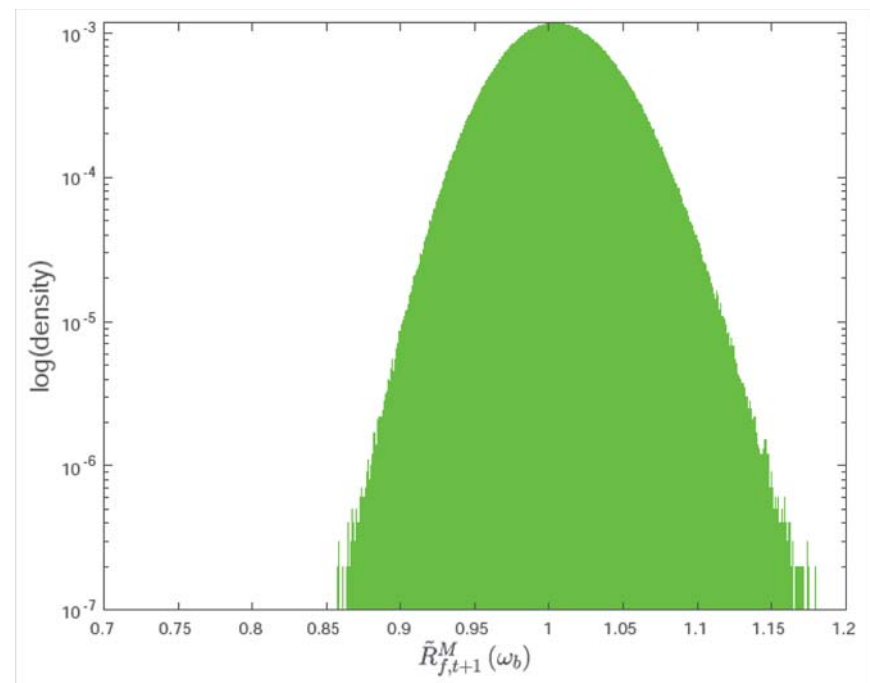
[Gornall, W. and I. Strebulaev (2018), “Financing as a Supply Chain: The Capital Structure of Banks and Borrowers,” *Journal of Financial Economics* 129, 510-530]

[Nagel, S. and A. Purnanandam (2020), “Banks Risk Dynamics and Distance to Default,” *Review of Financial Studies* 33, 2421-2467]

Histograms of Bank Asset Returns: Baseline vs Merton-type Model



Baseline model



Merton-type model

[Figure 3 in Mendicino et al. (2021, CEPR DP)]

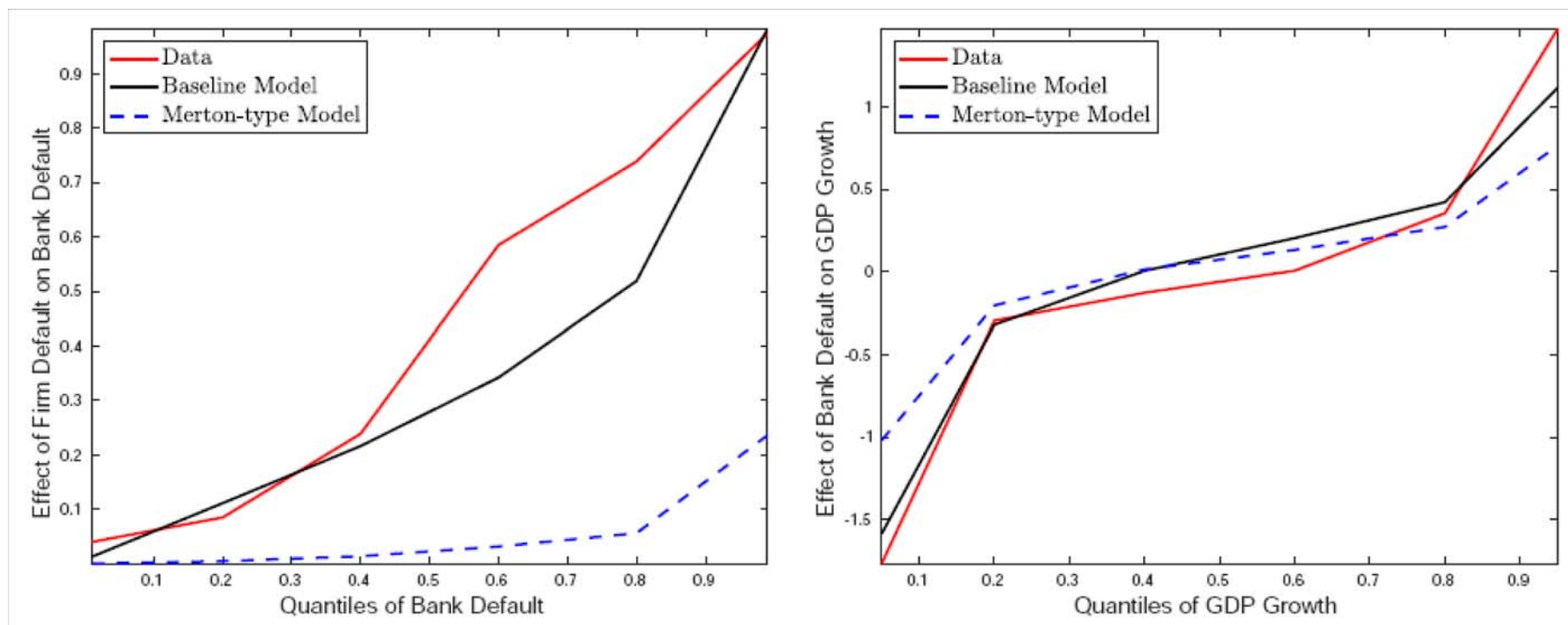
- In Mendicino et al. (2021), we consider this more structural modeling of bank default, richer non-linearities. . .

[Mendicino, C., K. Nikolov, J. Rubio-Ramirez, J. Suarez, and D. Supera (2021) “Twin Defaults and Bank Capital Requirements,” *CEPR DP 14427*]

- Helps explain low tail co-movements between bank solvency and GDP growth
- Having sufficiently well capitalized banks is crucial to reduce the frequency and severity of “twin default episodes”

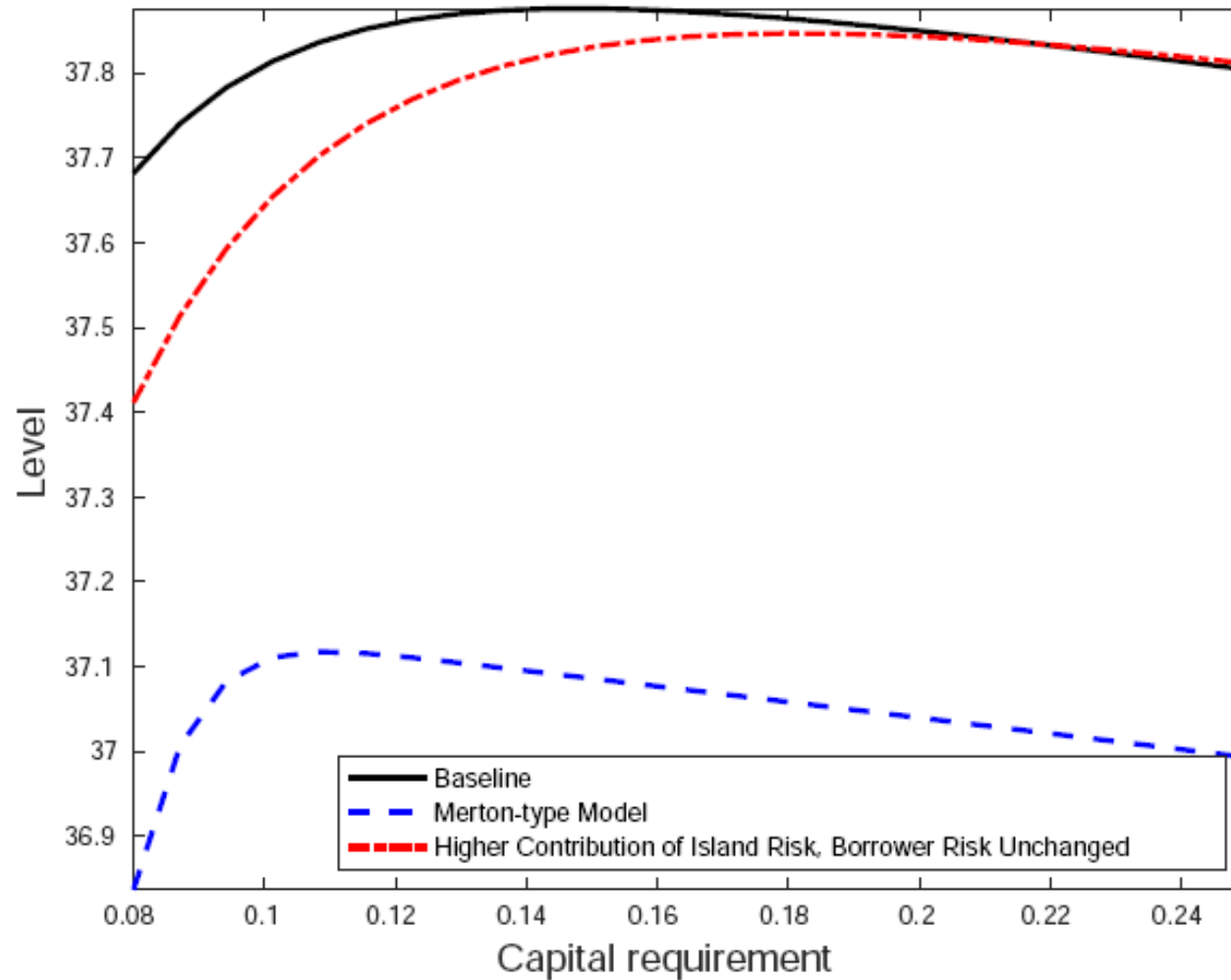
[How much? 15%, +4pp relative to Merton-type formulation]

Quantile Regressions: Baseline vs Merton-type Model



[Figure 4 in Mendicino et al. (2021, CEPR DP)]

Welfare Effects of the Capital Requirement in Different Scenarios



[Figure 8 in Mendicino et al. (2021, CEPR DP)]

- Recently models of the class that my coauthors and I have been exploring for 10 years have reached publications in top journals:
 - Elenev, V., T. Landvoigt, and S. V. Nieuwerburgh (2021), “A Macroeconomic Model with Financially Constrained Producers and Intermediaries,” *Econometrica* 89, 1361-1418
 - Corbae, D., and P. D’Erasmus (2021), “Capital Buffers in a Quantitative Model of banking Industry,” *Econometrica* 89, 2975-3023

- To conclude:

- We are making progress, even if the final answers are not quite there yet
- There is work to be done (e.g., including other macroprudential tools in this type of analysis)
- Bottom line: convenience to pay attention to what structural dynamic models can provide

[However, this approach is just one of many (including reduced-form micro-econometric and macro-econometric evidence, stress-test exercises, semi-structural models,...); my defense of it is not intended to go in the detriment of any other]

Thank you very much!