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Discussion of **'The Aggregate Effects of Credit Market Frictions:  
Evidence from Firm-Level Default Assessments'**

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<sup>1</sup>The views expressed herein are solely those of the discussant and do not reflect the views of the Bundesbank or the Eurosystem.

# What the Paper Does

## Motivation and research question

- Credit frictions distort capital allocation  $\Rightarrow$  depresses output
- Use firm-level data to estimate aggregate losses from credit frictions

## Model

- 1 Static model of moral hazard, credit frictions and firm default
- 2 Aggregate credit friction and associated output loss

## Empirical implementation

- 1 Estimate firm default probabilities from firm-level data
- 2 These correspond to firm-level wedges/distortions
- 3 Aggregate distortions up to industry- and then macro-level

# What the Paper Finds

## Default probabilities

- PD systematically higher for SMEs, i.e. firms with < 250 employees
- Aggregate 1-year PD increased over time; sample 2004-2012

## Firm-level outcomes

- Positive correlation between expected repayment probability and: higher employment, greater investment, larger capital stock

## Aggregate outcomes

- Output loss due to default risk roughly 3% to 5% p.a.
- Aggregate credit friction  $\Theta_t$  has worsened over time
- Scale effect drives most aggregate effects of credit frictions in UK

## Praise

- Very nice paper; innovative, relevant, well-written
- Macro implications of firm-level evidence is the way forward
- Required reading for macroeconomists (still) working with representative agent models

## Main points

- Great Recession narrative
- Monetary loosening
- Alternative interpretation

# Comment 1: Great Recession Narrative

Sample period considered

- Paper covers only one downturn: the Great Recession
- Do results apply solely to GR, or are they more general?
- Do results reflect cyclical pattern, or rather structural trend?

Narrative of Great Recession (Christiano, 2017)

- Paper abstracts from deficient demand. *"Great Recession seems impossible to understand without [...] appealing to shocks in aggregate demand."*
- Paper abstracts from financial intermediation. *"...asset decline damaged the whole banking system and hindered its ability to intermediate not just house purchases, but investment more generally."*

What about monetary policy?

- Paper abstracts from monetary policy
- Unconventional measures implemented to ease credit access
- Do paper's findings imply that these measures were unsuccessful?

Empirical evidence suggests that

- ECB's LTROs boosted credit in France (Andrade et al, JEEA 2018)
- Large scale asset purchases raised GDP significantly in UK (Kapetanios et al, EJ, 2012; Weale and Wieladek, JME, 2016)

⇒ In UK, monetary policy easing contained output losses

## Comment 3: Alternative Interpretation

'Aggregated' microeconomic model of the firm

- Paper uses micro model of the firm, then aggregates up to macro level
- Allows for firm heterogeneity, but not for macro2micro feedback
- In particular, no selection effects in response to macro shocks

A macroeconomic interpretation of rising default probabilities

- Consider macro model with heterogeneous firms (Melitz, 2003)
- Negative demand shock reduces profits  $\Rightarrow$  productivity threshold  $\uparrow$
- Firm defaults go up, surviving firms more productive: 'cleansing effect' of recessions

In this case, rising defaults are efficient, do not reflect rising wedge

# Conclusion

## Summary of main points

- The Great Recession: demand shocks and financial intermediation
- Hasn't monetary policy helped to ease credit frictions?
- Rise in default probabilities could be interpreted differently

## Extension

- Could you test selection effect hypothesis on your firm-level data?



-  Andrade, P., Cahn, C., Fraise, H. and Mésonnier, J., 2018. 'Can the Provision of Long-Term Liquidity Help to Avoid a Credit Crunch? Evidence from the Eurosystems LTRO', *Journal of the European Economic Association*.
-  Christiano, L., 2017. The Great Recession: A Macroeconomic Earthquake. *Economic Policy Papers 17-01*, Federal Reserve Bank of Minneapolis.
-  Kapetanios, G., Mumtaz, H., Stevens, I. and Theodoridis, K., 2012. 'Assessing the Economywide Effects of Quantitative Easing'. *The Economic Journal* 122: F316-F347.

-  Melitz, M.J. 2003. 'The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity', *Econometrica* 71(6), 1695-1725.
-  Weale, M. and Wieladek, T., 2016. 'What are the macroeconomic effects of asset purchases?', *Journal of Monetary Economics* 79, 81-93.

# Model of moral hazard, credit frictions and firm default

## Model setup

- Firm-specific productivity  $\theta$ , assets  $A \Rightarrow$  outside option  $U_{++}(\theta, A)$
- $K$  committed up front; borrow  $B$ , repay  $R$  with prob.  $\phi$
- Unobserved repayment prob.  $\phi$  increasing in 'effort'; effort cost  $c(\phi)$
- Risk neutral lenders have access to funds at rate  $\rho$
- Contract  $\{B, R\}$  maximizes lender's expected profit s.t. firm's PC

## Timing

- 1 Lender offers contract, given  $\theta, A \Rightarrow B^*, R^*$
- 2 Firm maximizes profits, given contract  $\{B, R\} \Rightarrow \phi^*_{++}(A, U)$
- 3 Optimal capital allocation  $\Rightarrow MPK = \frac{\rho}{\phi^*(A, \theta)}$

$\Rightarrow$  Obtain expression for firm-level wedge

# Aggregate credit friction and associated output loss

Model with moral hazard, credit frictions and firm default

- Obtain expression for default probability (firm-level wedge)

From firm-level wedges...

- Derive factor demands from firm's profit maximization
- In profit function, rental (wage) bill divided by wedge  $\tau^K(\tau^L) \leq 1$
- Frictionless case:  $\tau^K = \tau^L = 1$
- Firm output  $Y_n = f(\text{productivity } \theta, \text{ factor prices, } \tau)$

...to aggregate distortions

- Aggregate output  $Y = \sum_{n=1}^N Y_n = f(\text{factor prices, } \theta, \Theta)$ , where  $\Theta$  captures factor market distortions
- $\Theta = \sum_{n=1}^N \omega_n \tau_n$ , where  $\omega_n$  are relative productivity weights

# Empirical implementation

Estimate firm default probabilities  $\phi$  from historical default data

- Standard and Poor's PD model

Aggregation

- Estimate industry-specific distortion  $\Theta_{jt}$
- Aggregate distortion  $\Theta_t$ : weighted average of industry-level PDs with industry employment shares as weight

Decompose aggregate credit friction into:

- 'Scale effect': how aggregate capital stock affected by default risk
- 'TFP effect': how default risk varies with firm-level productivity