

# Bank Credit Conditions and their Influence on Productivity Growth: Company-level Evidence

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*Disclaimers:*

*Any views expressed cannot be taken to represent those of the Bank of England or to state Bank of England policy.*

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# Motivation

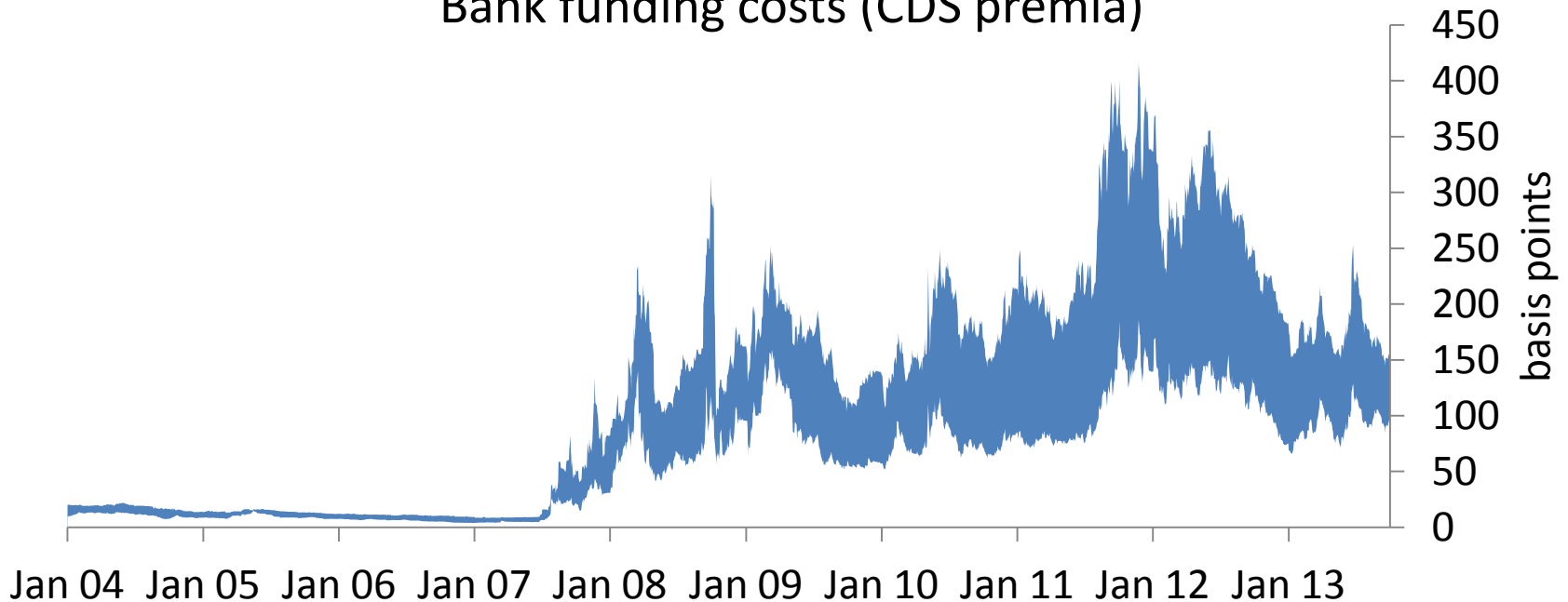
- The productivity puzzle – it remains unclear how and to what extent the lack of credit has affected productivity
- Difficult to disentangle what is a change in credit supply and what is a change in credit demand
- A credit supply shock may reduce labour productivity:
  - Bank forbearance (prevalence of zombie companies)
  - Resource reallocation across companies hampered
  - Reduction in investment due to difficulty in accessing finance

# A Quasi-Experiment

- Exploit exogenous variation induced by the financial crisis in credit availability to companies to investigate impacts of credit supply shocks
- Compare outcomes for companies who were subjected to tougher credit constraints to outcomes for companies that were less likely to be constrained
  - Quasi-experimental approach
  - Divide firm observations into ‘treatment’ and ‘control’ groups based on main bank lender
  - Difficulty switching to a new lender during the crisis
- Provide direct estimates of the impact of credit constraints on UK firms
  - Here we consider impacts on firm survival and productivity

# The Different Experiences of UK Banks

Bank funding costs (CDS premia)

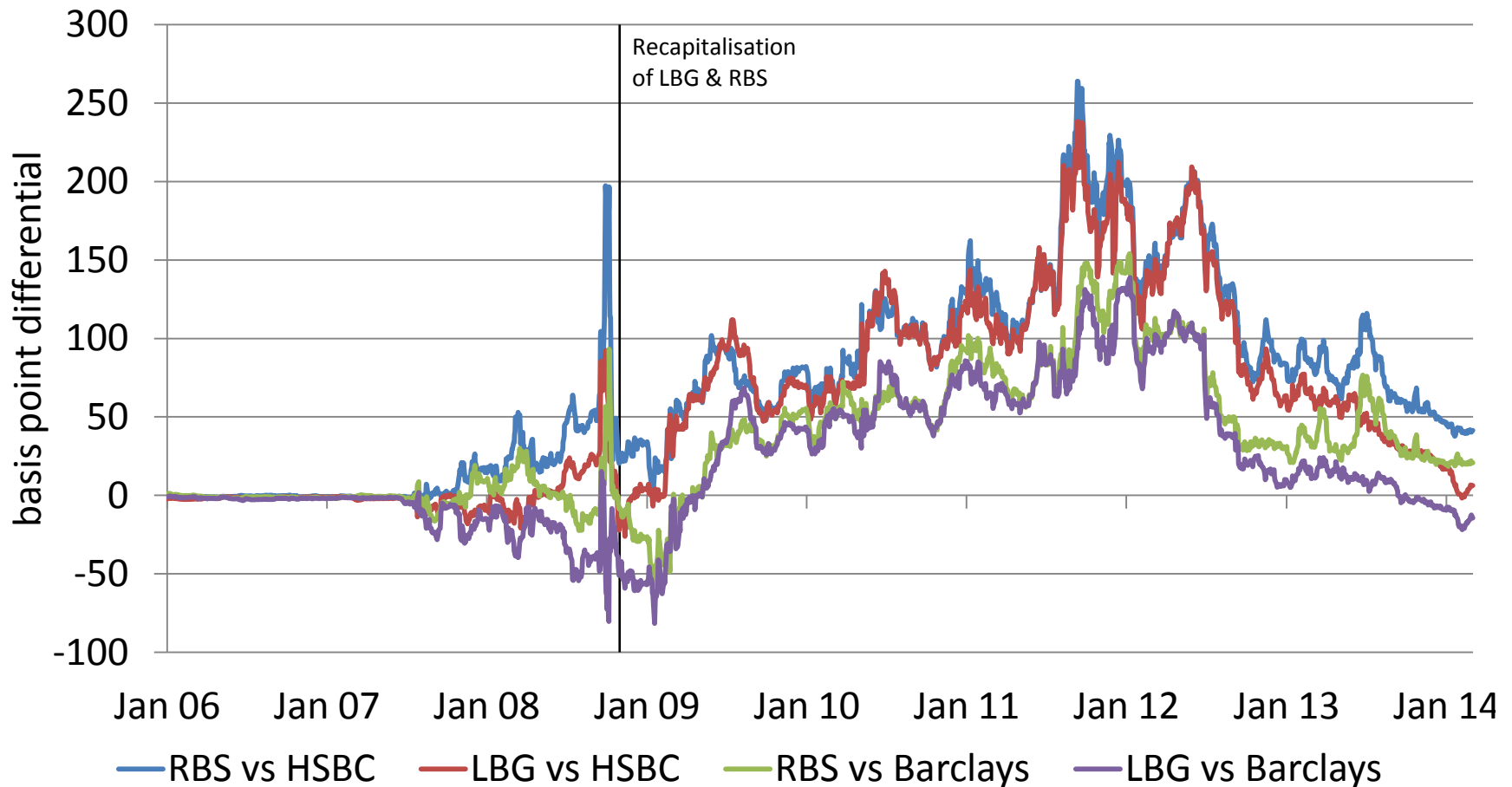


*From the Large Review:*

*Having lent aggressively in the run-up to the crisis, RBS's lending volumes to SMEs have fallen faster than peers and its market share has contracted from an unsustainably high share in 2008, to a level more consistent with its customer base.*

# The Different Experiences of the Big Four UK Banks

## Credit Default Swap Premia Differentials



# Distressed Banks

## LBG

BANK OF SCOTLAND  
LLOYDS TSB  
LLOYDS BANK  
TSB BANK  
BANK OF WALES

HALIFAX  
HBOS  
TRUSTEE SAVINGS BANK  
TSB COMMERCIAL FINANCE  
TSB ENGLAND & WALES  
TSB ASSET FINANCE

## RBS

NATIONAL WESTMINSTER BANK  
ROYAL BANK OF SCOTLAND  
ROYAL BANK OF SCOTLAND COMMERCIAL SERVICES  
WESTMINSTER BANK  
RBS INVOICE FINANCE

LOMBARD NORTH CENTRAL  
WILLIAMS & GLYN'S BANK  
ROYAL BANK OF SCOTLAND SECURITY TRUSTEE  
NATIONAL PROVINCIAL BANK  
ULSTER BANK

## Other

AIB GROUP  
GOVERNOR AND COMPANY OF BANK OF IRELAND  
ANGLO IRISH BANK CORPORATION  
ALLIED IRISH BANKS  
CAPITAL HOME LOANS

FIRST TRUST BANK  
  
NORRN ROCK  
ALLIANCE & LEICESTER  
BRADFORD & BINGLEY BUILDING SOCIETY  
MORTGAGE EXPRESS



# Not Distressed Banks

## HSBC

HSBC BANK  
MIDLAND BANK  
HSBC INVOICE FINANCE  
HSBC INVOICE FINANCE SECURITY HOLDER

## Barclays

BARCLAYS BANK  
WOOLWICH

## Other

CLYDESDALE BANK  
YORKSHIRE BANK  
CO-OPERATIVE BANK  
SANTANDER  
ABBAY NATIONAL  
NATIONWIDE BUILDING SOCIETY  
MORTGAGE WORKS  
PARAGON MORTGAGES  
MORTGAGE TRUST  
COUTTS & CO

COUTTS & COMPANY  
CLOSE BRORS  
CLOSE INVOICE FINANCE  
SKIPTON BUILDING SOCIETY  
NORWICH UNION MORTGAGE FINANCE  
BIBBY FINANCIAL SERVICES  
VENTURE FINANCE  
GRIFFIN CREDIT SERVICES  
ROYAL TRUST CORPORATION OF CANADA TRUSTEE  
SVENSKA HANDELSBANKEN AB PUBL



# Data: Financial Analysis Made Easy (FAME)

- Company Accounts information held by Companies House
  - provided by Bureau Van Dijk
  - annual historical discs
  - subsidiaries removed from the dataset
- Chargeholder recorded
  - tells us which banks a company is borrowing from
- Data issues
  - selective reporting of key accounts information
  - reporting of employment and output is particularly sparse
  - decline over time in tendency to report detailed accounting information
  - self-reporting of SIC codes

# Difference-in-differences set-up

- Treatment (T) and Control (C) group
  - T = Companies with an outstanding charge with a DISTRESSED BANK at the time the bank was rescued
  - C = Companies with an outstanding charge with a NOT DISTRESSED BANK at the same time
- Track difference in the development of outcomes between the T and C groups since bank rescue/financial crisis
  - FY 2007/8 or FY 2008/9 (PRE-period) - FY 2011/12 or FY 2012/13 (POST-period)
- And compare this to differences in the development of outcomes between these two groups before the crisis

# Difference-in-differences set-up (continued)

$$\begin{aligned} Y_{it} = & \text{cons} + \beta_{DB} DB_i + \beta_{NDB} NDB_i \\ & + \gamma_{post} + \gamma_{DB} post \times DB_i + \gamma_{NDB} post \times NDB_i \\ & + \text{controls}_{it} + u_i + \varepsilon_{it} \end{aligned}$$

where  $(\gamma_{DB} - \gamma_{NDB})$  identifies the effect of being stuck with a distressed bank.

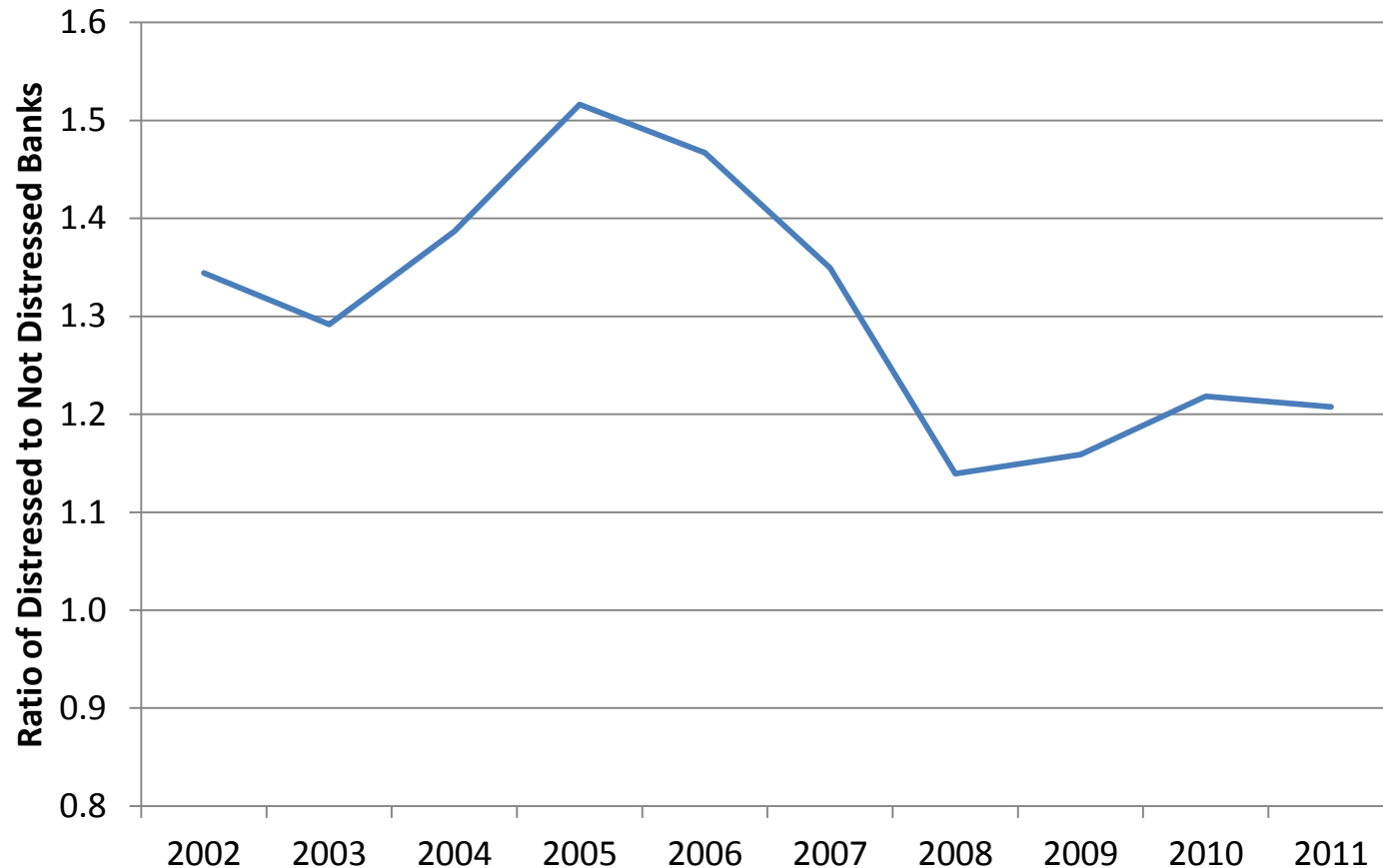
Further interactions included to distinguish the treatment effect by additional characteristics

$$+ \beta_H H_i + \gamma_H post \times H_i + \alpha_{DB} H_i \times DB_i + \alpha_{NDB} H_i \times NDB_i + \lambda_{DB} post \times H_i \times DB_i + \lambda_{NDB} post \times H_i \times NDB_i$$

where  $(\lambda_{DB} - \lambda_{NDB}) + (\gamma_{DB} - \gamma_{NDB})$

identifies the effect of being type  $H$  and stuck with a distressed bank.

# Short term loans and overdrafts held by companies with outstanding charges in DISTRESSED and NOT DISTRESSED banks

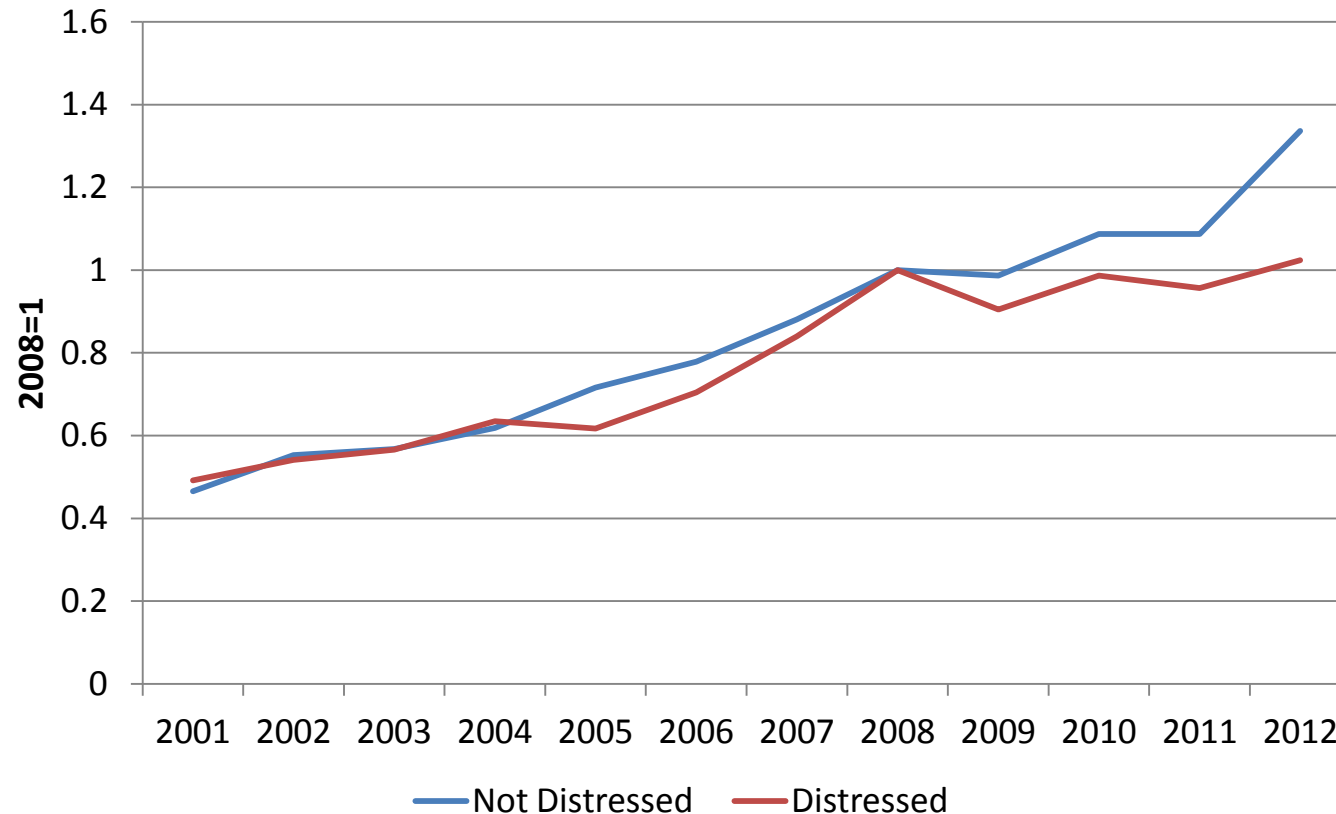


Source: FAME BvD and authors' calculations.

Notes: Companies in the non-financial non-farm business sectors excluding the Mining and Real Estate industries.

Companies who do not have an outstanding charge with any other lender and who report their loans.

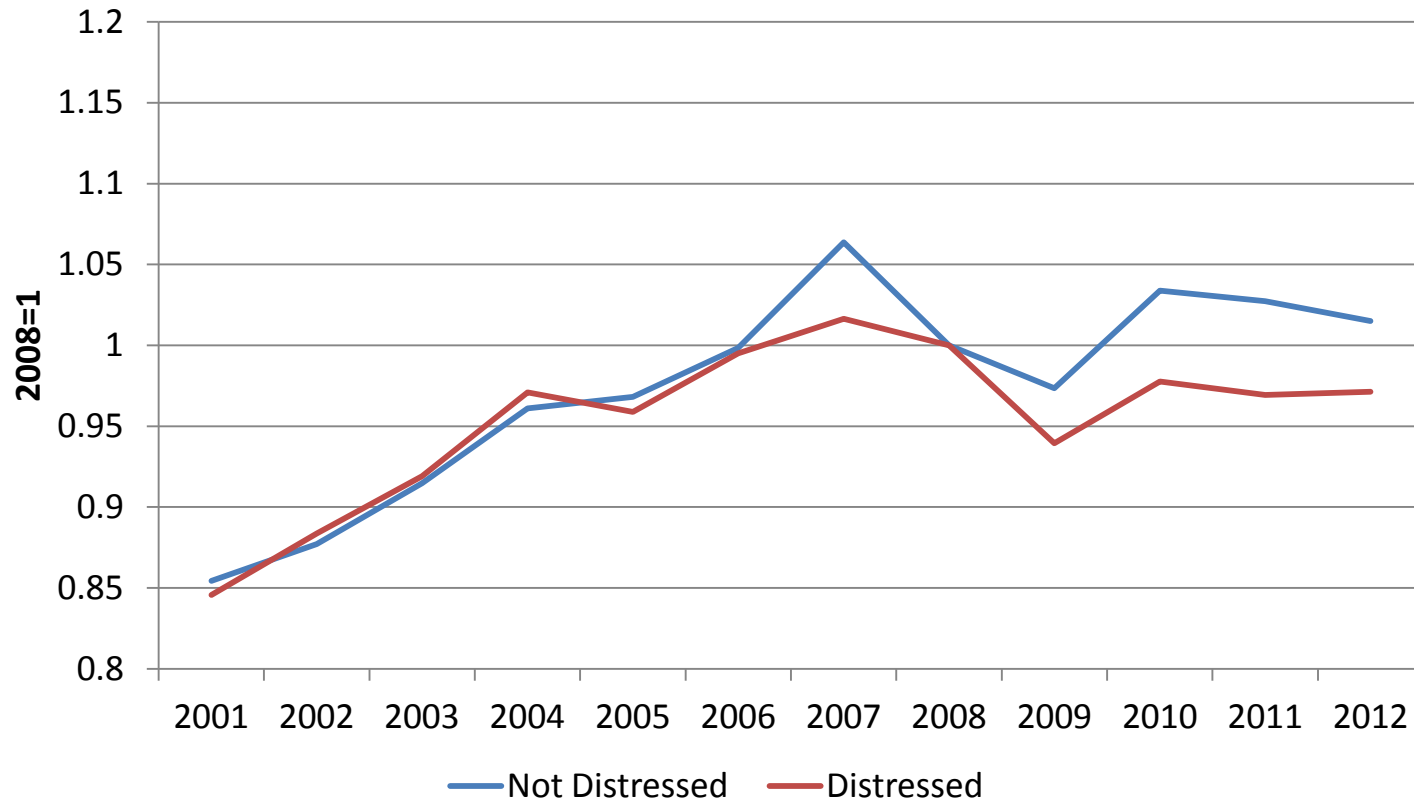
# Median short term loans and overdrafts held by companies with outstanding charges in DISTRESSED and NOT DISTRESSED banks



Source: FAME BvD and authors' calculations.

Notes: Companies in the non-financial non-farm business sectors excluding the Mining and Real Estate industries. Companies who do not have an outstanding charge with any other lender and who report their debt.

# Median labour productivity for companies with outstanding charges in DISTRESSED and NOT DISTRESSED banks



Source: FAME BvD and authors' calculations.

Notes: Companies in the non-financial non-farm business sectors excluding the Mining and Real Estate industries. Companies who do not have an outstanding charge with any other lender and who report their debt.

# PNFC Switching Between Lenders

## Probability of changing lender

| after:   | 1 year | 2 years | 3 years | 4 years |
|----------|--------|---------|---------|---------|
| All*     | 4.2    | 7.7     | 10.6    | 13.2    |
| Big Four | 3.3    | 6.1     | 8.6     | 10.7    |

Source: FAME BvD and authors' calculations.

Notes: Companies in the non-financial non-farm business sectors excluding the Mining and Real Estate industries.

Companies who do not have an outstanding charge with any other lender. Big Four = RBS, Lloyds, HSBC, Barclays. Switching to another lender evaluated over the period 2001-2011.

\*Switching between 15 categories of lender

# Sample Characteristics (loan sample 2006-8)

|                          | NDB   | DB    |                                 | NDB   | DB    |
|--------------------------|-------|-------|---------------------------------|-------|-------|
| Exit rate (4 years)      | 0.202 | 0.197 | Start-up                        | 0.070 | 0.080 |
| Exit rate (3 years)      | 0.162 | 0.155 | Young                           | 0.280 | 0.288 |
| Total asset distribution |       |       | Foreign owned                   | 0.045 | 0.052 |
| 2nd quintile             | 0.050 | 0.028 | Exporter                        | 0.042 | 0.040 |
| 3rd quintile             | 0.115 | 0.078 | Count court judgment 0-24 mths  | 0.042 | 0.045 |
| 4th quintile             | 0.271 | 0.252 | Normal credit score             | 0.801 | 0.807 |
| 5th quintile             | 0.549 | 0.628 | Short term gearing >50th pctile | 0.442 | 0.449 |
| Group accounts           | 0.032 | 0.039 | Short term gearing >75th pctile | 0.180 | 0.182 |
| Full accounts            | 0.122 | 0.144 |                                 |       |       |
| Companies                | 64991 | 75789 |                                 |       |       |

Notes: Companies in the non-financial non-farm business sectors excluding the Mining and Real Estate industries. Companies who do not have an outstanding charge with any other lender and who report short term loans and overdrafts. Control group equals companies with an outstanding charge with a not distressed bank. Treatment group equals companies with an outstanding charge with a distressed bank. Financial years 2006-2008.



# Sample Characteristics (productivity sample 2006-8)

|                          | NDB   | DB    |                                  | NDB   | DB    |
|--------------------------|-------|-------|----------------------------------|-------|-------|
| Exit rate (4 years)      | 0.108 | 0.109 | Start-up                         | 0.043 | 0.046 |
| Exit rate (3 years)      | 0.083 | 0.082 | Young                            | 0.144 | 0.156 |
| Total asset distribution |       |       | Foreign owned                    | 0.171 | 0.160 |
| 2nd quintile             | 0.007 | 0.003 | Exporter                         | 0.208 | 0.182 |
| 3rd quintile             | 0.021 | 0.015 | Count court judgment 0-24 mths   | 0.037 | 0.045 |
| 4th quintile             | 0.059 | 0.047 | Normal credit score              | 0.953 | 0.960 |
| 5th quintile             | 0.913 | 0.935 | Short term gearing >50th pctile  | 0.356 | 0.356 |
| Group accounts           | 0.186 | 0.198 | Short term gearing >75th pctile  | 0.106 | 0.100 |
| Full accounts            | 0.441 | 0.441 | Labour productivity >50th pctile | 0.539 | 0.559 |
|                          |       |       | Labour productivity >75th pctile | 0.239 | 0.247 |
| Companies                | 10195 | 13566 |                                  |       |       |

Notes: Companies in the non-financial non-farm business sectors excluding the Mining and Real Estate industries. Companies who do not have an outstanding charge with any other lender and who report short term loans and overdrafts and for whom we can measure labour productivity and fixed assets. Control group equals companies with an outstanding charge with a not distressed bank. Treatment group equals companies with an outstanding charge with a distressed bank. Financial years 2006-2008.

# Exit Rate effect of being with a nationalised bank

| Exit period |                   | Full sample        | Loan sample        | Productivity sample |                       |                    |
|-------------|-------------------|--------------------|--------------------|---------------------|-----------------------|--------------------|
| 4-year      |                   | 0.006 *** (0.0019) | 0.011 *** (0.0037) | 0.009               | (0.0070)              |                    |
| 3-year      |                   | 0.007 *** (0.0016) | 0.009 *** (0.0030) | 0.005               | (0.0053)              |                    |
|             | Leverage position |                    |                    |                     | Productivity position |                    |
| 4-year      | BELOW 50th        |                    | 0.010 ** (0.0045)  | 0.018 ** (0.0079)   | BELOW 50th            | -0.007 (0.0117)    |
| 4-year      | ABOVE 50th        |                    | 0.012 * (0.0061)   | -0.007 (0.0135)     | ABOVE 50th            | 0.023 *** (0.0083) |
| 3-year      | BELOW 50th        |                    | 0.011 *** (0.0035) | 0.013 ** (0.0058)   | BELOW 50th            | -0.003 (0.0086)    |
| 3-year      | ABOVE 50th        |                    | 0.007 (0.0051)     | -0.012 (0.0104)     | ABOVE 50th            | 0.012 * (0.0061)   |
| 4-year      | BELOW 75th        |                    | 0.013 *** (0.0039) | 0.014 * (0.0071)    | BELOW 75th            | 0.008 (0.0085)     |
| 4-year      | ABOVE 75th        |                    | 0.002 (0.0103)     | -0.027 (0.0275)     | ABOVE 75th            | 0.016 (0.0112)     |
| 3-year      | BELOW 75th        |                    | 0.010 *** (0.0031) | 0.008 (0.0053)      | BELOW 75th            | 0.006 (0.0064)     |
| 3-year      | ABOVE 75th        |                    | 0.006 (0.0085)     | -0.022 (0.0210)     | ABOVE 75th            | 0.000 (0.0083)     |

Notes: OLS regression; robust standard errors in brackets clustered by firm.

3-6 %points added to the exit rate

# Exit Rate effects (pre-crisis falsification test)

| Exit period |                   | Full sample |          | Loan sample |          | Productivity sample |          |                       |                 |
|-------------|-------------------|-------------|----------|-------------|----------|---------------------|----------|-----------------------|-----------------|
| 4-year      |                   | -0.002      | (0.0019) | -0.003      | (0.0034) | -0.008              | (0.0067) |                       |                 |
| 3-year      |                   | -0.003 *    | (0.0019) | -0.001      | (0.0032) | -0.007              | (0.0060) |                       |                 |
|             | Leverage position |             |          |             |          |                     |          | Productivity position |                 |
| 4-year      | BELOW 50th        |             |          | -0.001      | (0.0044) | -0.003              | (0.0078) | BELOW 50th            | -0.004 (0.0109) |
| 4-year      | ABOVE 50th        |             |          | -0.006      | (0.0058) | -0.016              | (0.0131) | ABOVE 50th            | -0.012 (0.0085) |
| 3-year      | BELOW 50th        |             |          | 0.000       | (0.0039) | -0.005              | (0.0067) | BELOW 50th            | -0.008 (0.0099) |
| 3-year      | ABOVE 50th        |             |          | -0.002      | (0.0054) | -0.011              | (0.0119) | ABOVE 50th            | -0.006 (0.0073) |
| 4-year      | BELOW 75th        |             |          | 0.000       | (0.0037) | -0.005              | (0.0069) | BELOW 75th            | -0.009 (0.0080) |
| 4-year      | ABOVE 75th        |             |          | -0.018 *    | (0.0098) | -0.036              | (0.0261) | ABOVE 75th            | -0.005 (0.0124) |
| 3-year      | BELOW 75th        |             |          | 0.001       | (0.0034) | -0.003              | (0.0061) | BELOW 75th            | -0.010 (0.0072) |
| 3-year      | ABOVE 75th        |             |          | -0.011      | (0.0093) | -0.036              | (0.0238) | ABOVE 75th            | 0.003 (0.0105)  |

Notes: OLS regression; robust standard errors in brackets clustered by firm.

# Exit Rates by Big-4 Lender (Bilateral Comparisons)

| Exit period | Bank      |            |             |          |             |          |                     |          |
|-------------|-----------|------------|-------------|----------|-------------|----------|---------------------|----------|
|             | Treatment | Comparison | Full sample |          | Loan sample |          | Productivity sample |          |
| 4-year      | RBS       | HSBC       | 0.008 ***   | (0.0026) | 0.015 ***   | (0.0053) | 0.009               | (0.0113) |
| 4-year      | LBG       | HSBC       | 0.007 **    | (0.0031) | 0.018 ***   | (0.0062) | 0.011               | (0.0124) |
| 4-year      | Barclays  | HSBC       | -0.002      | (0.0030) | 0.006       | (0.0060) | -0.003              | (0.0118) |
| 4-year      | RBS       | Barclays   | 0.010 ***   | (0.0028) | 0.009       | (0.0054) | 0.012               | (0.0094) |
| 4-year      | LBG       | Barclays   | 0.009 ***   | (0.0033) | 0.013 **    | (0.0063) | 0.014               | (0.0107) |
| 4-year      | RBS       | Lloyds     | 0.001       | (0.0029) | -0.004      | (0.0056) | -0.002              | (0.0101) |
| 3-year      | RBS       | HSBC       | 0.009 ***   | (0.0023) | 0.015 ***   | (0.0044) | 0.008               | (0.0085) |
| 3-year      | LBG       | HSBC       | 0.008 ***   | (0.0028) | 0.023 ***   | (0.0051) | 0.011               | (0.0095) |
| 3-year      | Barclays  | HSBC       | 0.000       | (0.0027) | 0.012 **    | (0.0050) | 0.003               | (0.0091) |
| 3-year      | RBS       | Barclays   | 0.009 ***   | (0.0024) | 0.003       | (0.0044) | 0.004               | (0.0072) |
| 3-year      | LBG       | Barclays   | 0.008 ***   | (0.0028) | 0.011 **    | (0.0052) | 0.008               | (0.0083) |
| 3-year      | RBS       | Lloyds     | 0.001       | (0.0025) | -0.008      | (0.0046) | -0.004              | (0.0077) |

Notes: OLS regression; robust standard errors in brackets clustered by firm.

# Summary

- Companies that borrowed from banks that became distressed (and nationalised) were
  - more likely to exit the market in the years following nationalisation compared to a counterfactual where they had borrowed from a bank that did not become distressed
- Some evidence that nationalised banks differed from other banks in contributing to the exit of
  - Lower leverage companies
  - Higher productivity companies
- Productivity in surviving companies
  - Looking at companies that stay in business we do not detect a general effect on short term loans, capital intensity, or productivity of being associated with a distressed bank (comparing several years before and after the crisis)
    - Data weaknesses may be contributing to this

# Conclusions

- Did a credit supply shock contribute to a reduction in productivity?
  - Maybe yes, by contributing to the exit of potentially productive companies
  - Less differential across banks in contribution to exit of high leverage companies
    - Evidence of forbearance?
    - Or is it just that high leverage companies are more likely to exit in a recession (regardless of the lender)?
- Are credit constraints a key driver of recent productivity weakness?
  - Key explanations of recent productivity weakness need to be able to explain the weakness of productivity *within* companies
  - No obvious correlation at the sector level between the productivity deviation from trend or reallocation effects on productivity and bank dependence
- To what extent are these results applicable more widely?
  - Not clear that we can extrapolate from this experiment to credit shocks more generally
    - Banks could de-leverage in alternate ways.
    - Credit tightening by good banks might also have contributed to productivity weakness.
    - Data issues.