Macroprudential Policy and Credit Supply

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1. "Systemic Risk, Crises and Macroprudential Policy," *MIT Press*, co-authored with Xavier Freixas (UPF) and Luc Laeven (ECB)

2. "Macroprudential Policy, Countercyclical Bank Capital Buffers, and Credit Supply: Evidence from the Spanish Dynamic Provisioning Experiments"

co-authored with Gabriel Jiménez and Jesús Saurina (both Banco de España) and Steven Ongena (Zurich)

Banking crises and credit cycles

Western Europe and USA suffered a banking crisis, followed by a severe economic recession. These phenomena are not unique: Banking crises are recurrent, triggering deep, long-lasting recessions

- Reinhart & Rogoff (2009), Schularick & Taylor (AER 2012), Laeven and Valencia (2010) …

A key channel by which banks' balance-sheet weaknesses affect the real sector is via a reduction of credit supply

- Bernanke (AER 1983), Jiménez, Ongena, Peydró and Saurina (AER, 2012) …

Banking crises, moreover, come after periods of very strong credit growth

- Kindleberger (1978), Schularick & Taylor (AER 2012)- also with Jorda, Gourinchas & Obstfeld (AEJ Macro 2012), Bordo & Meissner (2012) …

➔ crucial to understand credit, both in good and bad times (cycles)

Credit cycles and financial frictions

Credit cycles due to financial frictions in:

Banks (credit supply)

– Rajan (QJE, 1994), Holmström & Tirole (QJE, 1997), Allen & Gale (2007), Diamond & Rajan (JPE, 2001, AER, 2006 & QJE, 2012), Adrian & Shin (Handbook, 2011), Shleifer & Visnhy (JFE & AER, 2010), Tirole (2011), Gersbach & Rochet (2012) …

Non-financial sector (credit demand)

– Bernanke & Gertler (AER, 1989), Kiyotaki & Moore (JPE, 1997), Lorenzoni (RES, 2008), Jeanne & Korinek (2011) …

where credit growth is 7% on average in good times before banking crises and -2% after the start of the crises

– Schularick & Taylor (AER, 2012)

Let me concentrate on credit supply cycles

Credit cycles due to bank frictions ("excessive" bank pro-cyclicality)

In good times (ex-ante):

- Problem: high credit supply (seeds for the next crisis) since e.g. banks have little capital (owned shareholder funds) at stake
  - e.g. Freixas, Laeven and Peydró (MIT, 2015), Holmström & Tirole (QJE 1997)…

In bad times (ex-post):

- Problem: credit crunch by banks due to e.g. low capital since bank capital increase is then very costly, may be lower than socially optimal and affects bank funding liquidity
  - e.g. Freixas, Laeven and Peydró (MIT, 2015), Iyer & Peydró (RFS 2011), Gertler, Kiyotaki & Queralto (2011)…

Macroprudential policy and credit cycles

The strong real effects from financial crises imply that regulation needs to move into a macroprudential direction, ultimately aims at reducing the strong negative externalities from the financial to the real sector

- Borio (2003), Trichet (2010), Bernanke (2011), Tirole (2011), Freixas, Laeven and Peydró (MIT, 2015)…
- Systemic orientation of macropru vs. individual safety of "microprudential": e.g., credit supply reduction to the real sector due to deleveraging of a bank after a negative balance-sheet shock (Hanson, Kashyap & Stein (JEP 2011), Freixas, Laeven and Peydró (MIT, 2015)…)

Main correlate with financial crises are credit cycles (eg Jorda-Schularick-Taylor), thus countercyclical macroprudential policy (pro-cyclical capital/provision requirements) tools could be used to address cyclical vulnerabilities (time dimension) in systemic risk stemming from credit cycles

- Yellen (2012), Basel III, Dewatripont and Tirole (2013), Freixas, Laeven and Peydró (MIT, 2015) …

One *macropru* potential solution: Countercyclical bank capital buffers (ie pro-cyclical capital requirements)

Higher bank capital and provision standards in good times (and lower standards in bad times) potentially could be beneficial both in good and bad times by reducing "excessive" bank pro-cyclicality in credit supply

In good times: ex-ante preventive role

- Problem: high bank credit availability/soft lending standards
- Potential solution: banks could hold more capital ("skin in the game") to internalize more potential loan costs/externalities. Moreover, since bank capital may be costly, credit supply would be reduced

In bad times: ex-post buffers

- Problem: credit crunch by banks due to low capital
- Potential solution: higher bank capital buffers built in good times to support credit supply in bad times (less need of government help)

One example:

"Macroprudential Policy, Countercyclical Bank Capital Buffers, and Credit Supply: Evidence from the Spanish Dynamic Provisioning Experiments"

Gabriel Jiménez *(Banco de España)*
Steven Ongena *(Zurich and CEPR)*
José-Luis Peydró *(ICREA-Pompeu Fabra, Barcelona GSE, CREI and CEPR)*
Jesús Saurina *(Banco de España)*

Question

- General question: Impact of macroprudential policy on credit supply cycles and the externalities to the real sector?

- What is the effect of a countercyclical bank capital buffer (pro-cyclical capital/provision requirements) on the supply of credit and on firm real effects, in good and bad times?

THEORY on bank capital impact on credit supply

The complementary rationales of bank capital (i.e., higher buffers in crises, better ex-ante incentives and potential higher costs) highlighted by policy makers are also present in theoretical models

- Holmström & Tirole (QJE 1997), Morrison & White (AER 2005), Diamond & Rajan (JF 2000, JPE 2001, AER 2006), Gale & Özgür (JEEA 2005), Freixas & Rochet (2008), Admati, DeMarzo, Hellwig & Pleiderer (2010), Admati-Hellwig (2013), Gennaioli, Shleifer & Vishny (JF 2012), Tirole (2011), Gersbach & Rochet (2011) …

POLICY on bank capital → Basel III

- Capital requirements have been *the* central tool of banking prudential regulation since 1980s and now we move to Basel III

- *"The new [capital] standards will markedly reduce banks' incentive to take excessive risks… lower the likelihood and severity of future crises, and enable banks to withstand - without extraordinary government support - stresses of a magnitude associated with the recent financial crisis."*

  G-20 Seoul Official statement, November 2010

- Under Basel III, variation of minimum capital requirements over the cycle, the so-called countercyclical bank capital buffers:

  During boom times, capital requirements would increase and during recessions they would decline, as part of the cyclical mandate of macroprudential policies

BANKERS complain about the high cost of bank capital

- *"More equity might increase the stability of banks. At the same time however, it would restrict their ability to provide loans to the rest of the economy. This reduces growth and has negative effects for all"*

Josef Ackermann, CEO of Deutsche Bank (Nov 20, 2009)

- *"The British Bankers' Association ... calculated that demands by international banking regulators in Basle that they bolster their capital will require the UK's banking industry to hold an extra £600bn of capital that might otherwise have been deployed as loans to businesses or households"*

bba
The voice of banking & financial services

The Observer (July 11, 2010)

- *"Excess bank equity capital ... would constitute a buffer that is not otherwise available to finance productivity-enhancing capital investment"*

Allen Greenspan (FT, July 27, 2011)

Specific questions

- What is the effect of a countercyclical bank capital buffer (pro-cyclical capital/provision requirements) on the supply of credit and on firm real effects, in good and bad times?

  - **Average** effects at the bank-firm and firm level
  - **Heterogeneous** bank and firm effects (e.g., search for yield)
  - **Real effects** on firm employment, assets and survival
  - Any **regulatory arbitrage**?

Empirical identification

- To identify the effects of macroprudential policy on credit supply (in good and bad times) one needs:

1. **Policy changes** to countercyclical bank capital buffers that affect banks differentially, and a **full credit cycle** with an unexpected crisis shock to assess good & bad times (ex-ante, ex-post)

2. **Comprehensive bank-, firm-, loan- and loan application-level data** to isolate credit supply (availability) from demand (firm fundamentals)
   - No randomized experiments in macro-prudential policy
   - Difference-in-differences of policy and crisis shocks
   - To obtain firm-level aggregate estimates
   - Compositional effects of credit supply, eg risk-taking, search for yield
   - Real effects

Our paper: Experimental setting: Spain 1999-2013

- 5 policy shocks on dynamic provisioning that increase bank capital in good times (not related to specific provisions) which could be used in bad times
  - Introduction in 2000 July and formula change in 2005 (good times)
  - Change in 2008:Q4 and in 2009:Q4 (bad times): ex-post reduction in capital requirements for lowly capitalized banks
  - Increase in 2011:Q4 as existing provisions were depleted
  - Same formula for all banks, but differently affected; foreign banks not affected
  - Tier 2 capital; discussed by BIS Basel, G-20, Federal Reserve, ECB, IMF, WB …
- 2008:Q3 unexpected crisis shock that allows drop in capital requirements To analyze ex-ante pre-crisis (2007) buffers on credit and real effects
    - Instrumented with 2000 data as it is not a policy shock
- Credit register: access to all business loans in Spain (including loan applications) matched with firm and bank administrative level data
- Diff-in-Diff: credit outcomes at loan and at firm level (also real variables), control for unobserved heterogeneity, lots of robustness

Our paper: pre-view on main results

- Average effects
  - At the loan- (or bank-) level: pro-cyclical provisioning requirements reduce credit supply in good times and increase it in crisis times
  - At the firm-level:
    - Good times: Weak short-lived effects (firms switched banks easily)
    - Crisis times: Strong both short and medium term impact (when switching banks is very difficult: big decrease in granted loan applications)
      - Strong externalities on firm employment and survival !!
  - After dynamic provisions were depleted, the government increased provisions in 2011:Q4: the increase in provisions creates a strong credit crunch with associated firm deaths

Our paper: pre-view on main results

- Heterogeneous effects
  - Good times:
    - weaker effects for firms with ex-ante higher yield and lowly-capitalized firms that default more ex-post ! (consistent with search for yield and risk-taking)
    - stronger effects for smaller banks and smaller firms
    - regulatory arbitrage by non-affected banks
  - Bad times:
    - drop in requirements for lowly provisioned banks: riskier (lowly-capitalized and smaller) firms get more credit (consistent with gambling for resurrection)
    - instead, higher pre-crisis provision buffers: favor better firm credit history
    - weaker at banks with higher NPL ratios (market vs. policy constraints)

Outline for the rest of the talk

- Policy shocks: dynamic provisioning experiments
  - How does dynamic provisioning work?
  - Different policy shocks and the crisis shock
- Empirical strategy and data
  - Empirical strategy
  - Bank-, firm-, loan- and loan application-level data sets
- Results I will focus on today
  - 2000 policy shock and the crisis period
  - Loan- and firm-level results
- Conclusions
  - Contributions to the literature
  - Summary of results for theoreticians and policy-makers

Dynamic provisioning

- In July 2000, the *Banco de España* (Spain's central bank, banking supervisor and responsible for bank accounting) put in place dynamic provisioning
  - Spain had the lowest loan loss provisions ratio among all OECD countries in 1999

- Forward-looking: provisions before any loan loss arrives. Tier-2 Capital: bank shareholders owned funds as of 2005

- Countercyclical
  - Higher provision requirements in good times. The required provisioning in 2000 was over and above specific and general loan-loss provisions
  - In bad times, there is a regulatory reduction of this type of provisioning → key to exploit the 2008 crisis shock

- Introduced in 2000:Q3: Contractionary shock
  - Modified in 2005:Q1: Mildly expansionary shock
  - Floor Lowering in 2008:Q4 and in 2009:Q4: Allow banks to use more the dynamic provision funds (DPF) built up in good times
  - Increase in 2012:Q1 as provisions were depleted

$$\text{General Provisions}_{i,t} = \alpha\, \Delta\text{Loans}_{i,t} + \mathbf{(\beta\, Loans_{i,t} - Specific\ Provisions_{i,t})}$$

α is an estimate of % latent loss in bank loan portfolio

β is the over the cycle average % of Specific Provisions

α, β are set by Bank of Spain and calibrated based on previous cycle

6 different risk buckets (which categorizes components of bank loan portfolio)

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IN GOOD TIMES

Loan Growth

$\alpha\, \Delta\text{Loans}_t > 0$

Most loans perform and, hence, Specific Provisions are small

$$\mathbf{\beta\ Loans_t - Specific\ Provisions_t > 0}$$

$$\mathbf{\Delta\ Dynamic\ Provision\ Fund_t > 0}$$

33 % < DPF < 125 %

of latent loss of loan portfolio

General Provisions$_{i,t}$ = α ΔLoans$_{i,t}$ + **(β Loans$_{i,t}$ – Specific Provisions$_{i,t}$)**

α is an estimate of % latent loss in bank loan portfolio

β is the over the cycle average % of Specific Provisions

α, β are set by Bank of Spain and calibrated based on previous cycle

6 different risk buckets (which categorizes components of bank loan portfolio)

IN BAD TIMES

No Loan Growth

α ΔLoans$_t$ < 0

Many non-performing loans, thus Specific Provisions are large

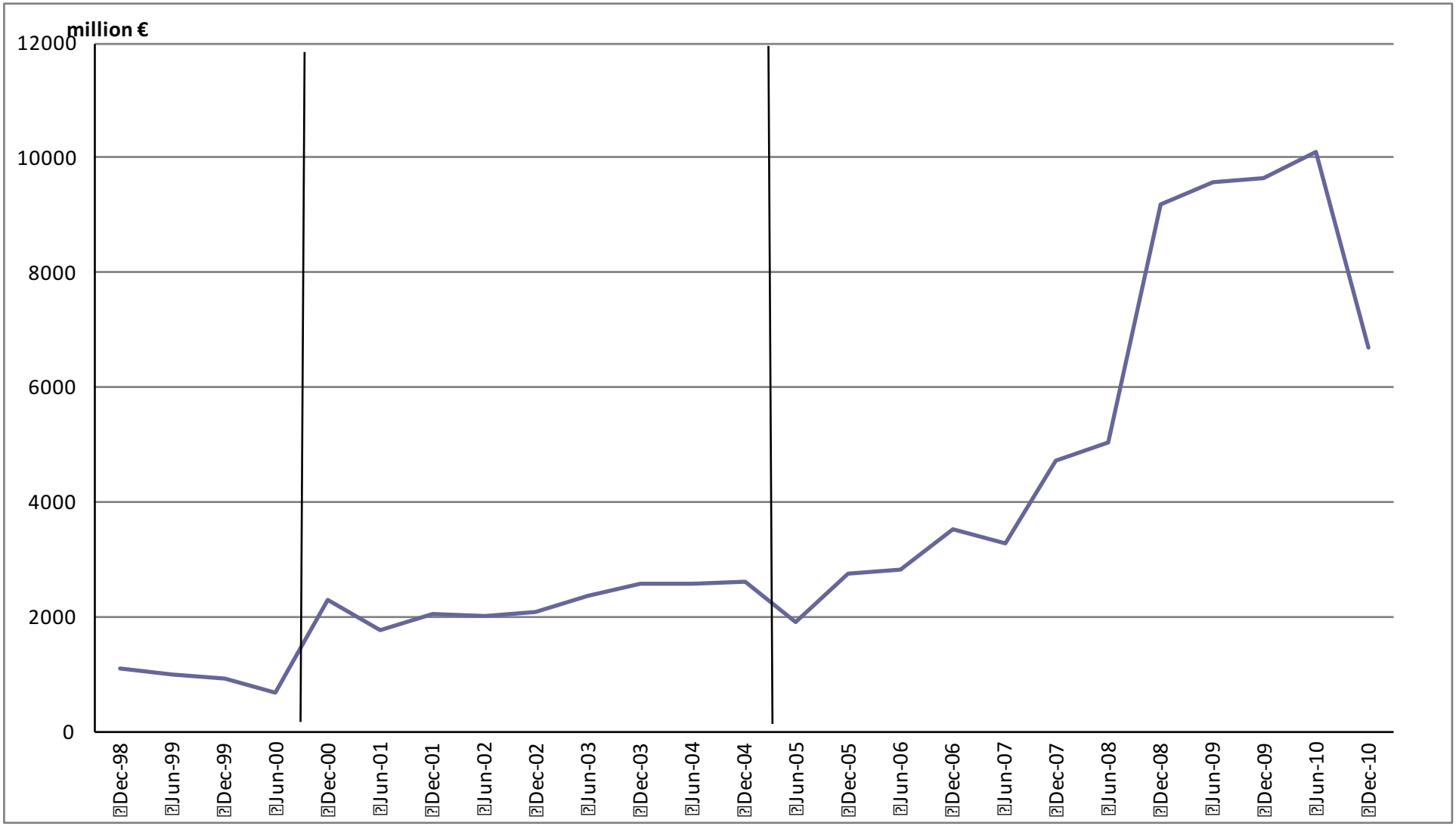
β Loans$_t$ – Specific Provisions$_t$ < 0

Δ Dynamic Provision Fund$_t$ < 0

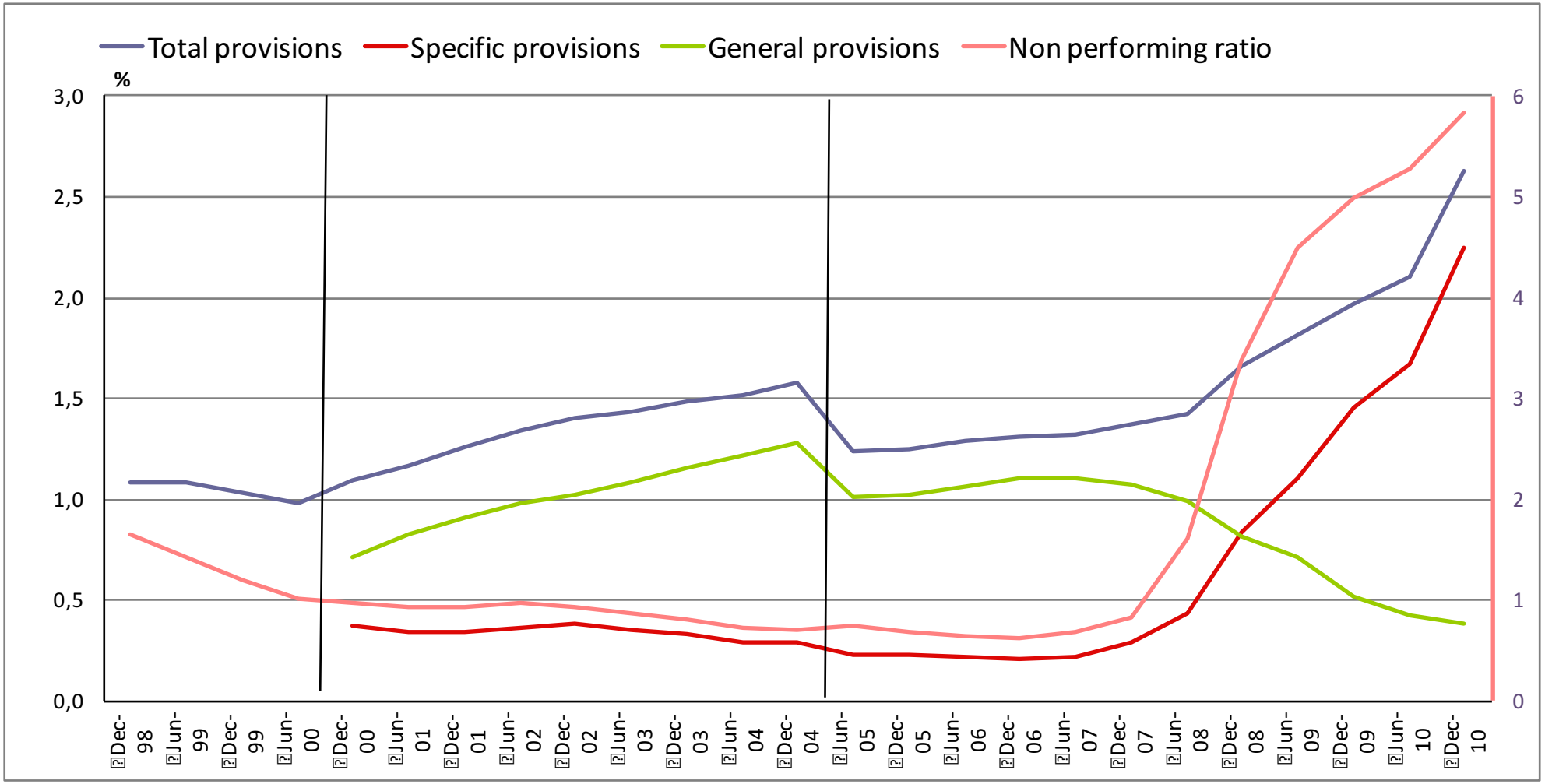
33 % < DPF < 125 %

of latent loss of loan portfolio

Dynamic provisioning policy shocks and crisis
Flows of total provisions



Dynamic provisioning policy shocks and crisis
Stocks



Empirical identification

- Difference-in-differences:
  - We compare bank-firm credit before and after the different shocks
  - Differentiate across banks more/less affected by the shocks
  - Impact of public policy on credit and real outcomes, but also a two stage model where the policy changes affect the change in total provisions

- Saturate with firm (time-varying) fixed effects in loan-level regressions to control for observed and unobserved firm heterogeneity to identify credit availability

- In robustness, we control also for all the other key bank characteristics (up to 32 variables and different samples), as non-randomized experiments

- Main variable is change in log credit commitment, but also analyze the other loan outcomes and all margins of lending
  - Analyze also bank and firm heterogeneity in credit supply and the associated real effects for firms

Data: Credit register

- Credit register from Spain matched with bank and firm information
  - Exhaustive loan (bank-firm) level data on *all* outstanding business loan contracts (including loan applications) at a quarterly frequency matched with supervisory bank data and firm-level balance sheet data
  - e.g. in 2007:Q2: 600,000 loans; 100,000 firms; 175 banks

- We calculate the total exposures by each bank to each firm in each quarter from 1999:Q1 to 2013:Q3
  - The sample period includes 1.5 years before the initial shock (to run placebo tests) and several years on the crisis

- We analyze changes in (log) credit volume commitment
  - Also credit drawn, maturity, collateral and the cost of lending (proxied by the percentage of drawing down to total committed loans)
  - Intensive and extensive margin of lending
  - Also heterogeneous effects and real effects

Shock	Dynamic Provisioning	Bank Dynamic Provisioning Variable
Introduction 2000:Q3	Introduced (≠ tightening)	Dynamic Provision (formula) / total assets (1998:Q4)
Floor Lowering 2008:Q4 & 09:Q4	Loosened more for Low DPF Banks	D(Dynamic Provision Funds below ceiling) (2008:Q3)
(Unexpected) Crisis 2008:Q3	Loosened more for High DPF Banks	Dynamic Provision Funds / total assets (2007:Q4) (instrumented with 2000:Q3 data)
Provisioning up 2012:Q1	Higher for banks with higher RE exposure	RE exposure / total assets (2011)

Loan-Level Models

$$\Delta \log \text{Commitment(impact period)}_{bf} = \text{Bank Dynamic Provisioning(basis period)}_{bf} + \text{firm fixed effects} + \text{controls}_{bf} + \varepsilon_{bf}$$

Δlog Commitment

Δlog Drawn

Loan Dropped?

ΔShort-Term Maturity Rate (<1 year)

ΔCollateralization Rate

ΔDrawn to Committed Ratio

Other Bank Characteristics

(bank size, capital, NPL, ROA, liquidity, bank type, securitization, real estate, wholesale…)

Bank-Firm Relationship Characteristic

Sample with Multiple Bank-Firm Relationships Only

Firm Fixed Effects or Firm * Bank-Type Fixed Effects

Loan Characteristics

Instrumenting the change in total provisions instead of the direct effects of policies

Sample without large 4 banks, without cajas, foreign branches, high risk banks…

Cluster at bank and firm Level

1 cross section after-before shock and also 1 DiD regression for each quarter

Firm-Level Models

$$\Delta \log \text{Commitment(impact period)}_f = \text{Bank Dynamic Provisioning(basis period)}_f + \text{controls}_f + \varepsilon_f$$

Δlog Commitment
Δlog Total Assets
Δlog Employees
Firm Death?

Bank Dynamic Provisioning at firm-level is a weighted average of banks (DP) that lend to the firm pre-shock

Other average Bank Characteristics at the firm level

Bank-Firm Relationship Characteristic

Firm Characteristics
(size, leverage, profits, liquidity, tangible assets, and credit history, Location and Industry Fixed effects)

Sample with Multiple Bank-Firm Relationships Only

Sample with Firm Characteristics Only

Identification of credit availability in OLS (as FE coeff of loan level reg is stat. identical to the OLS coeff)

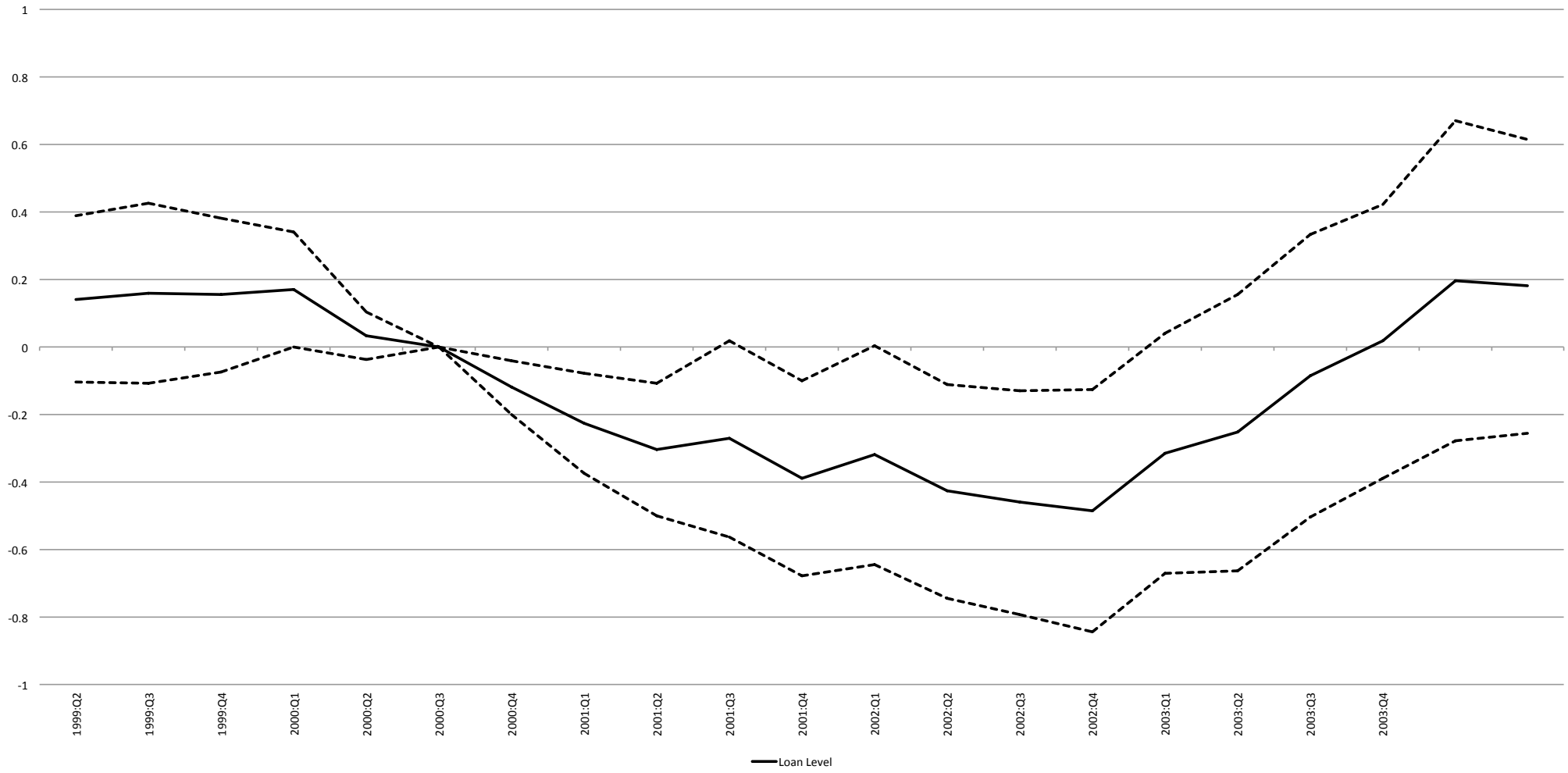
Cluster at Main Bank Level (also second and third main bank)

1 cross section after-before shock and also 1 DiD regression for each quarter

INTRODUCTION IN 2000:Q3

ΔLOG COMMITMENT ON DYNAMIC PROVISION

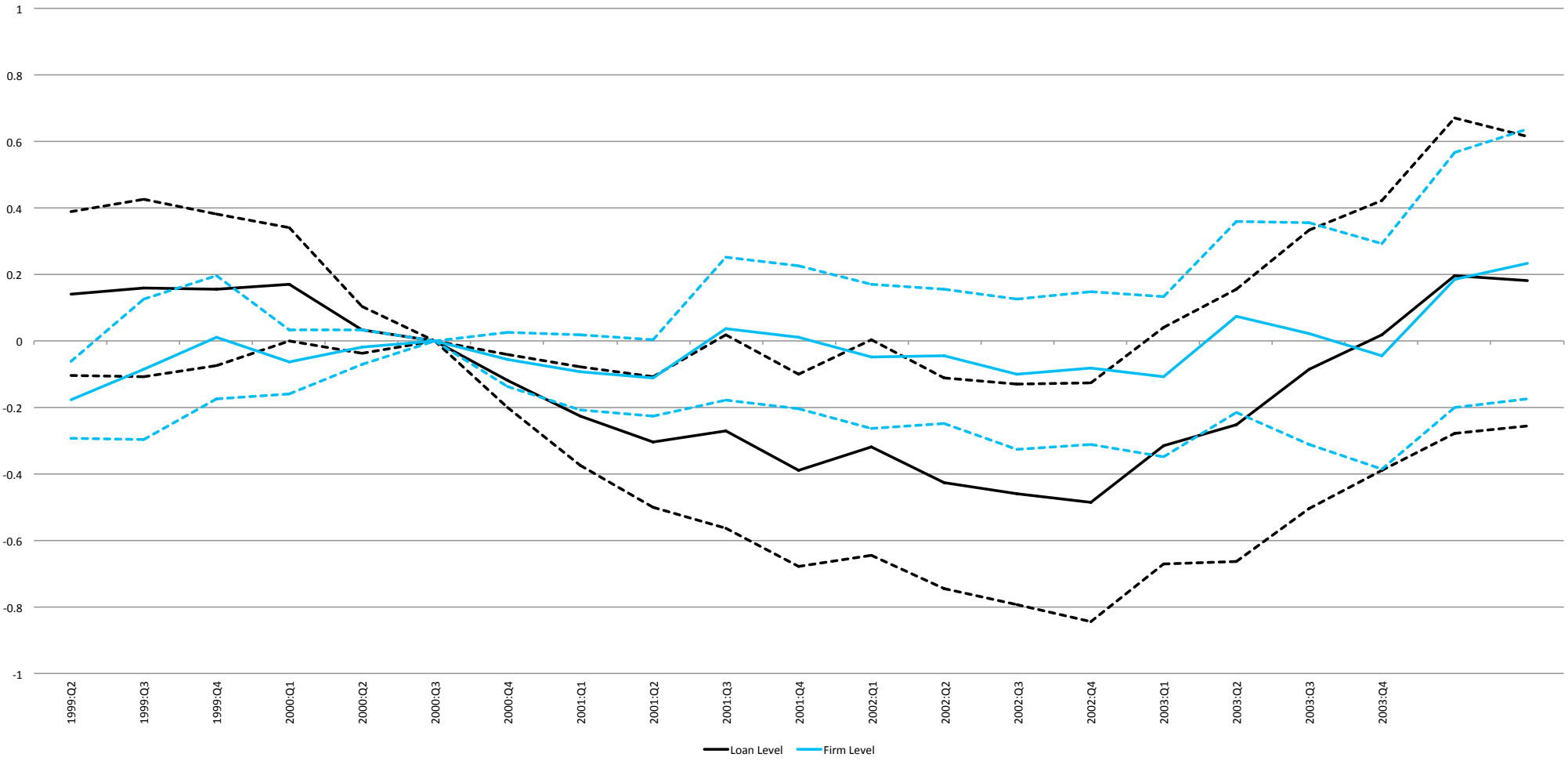
Time-varying coefficients of Δ log credit commitment on Δ dynamic provisioning



Loan (Bank-Firm) Level-Data

Similar results for extensive margin and for credit drawn, maturity, collateral and cost

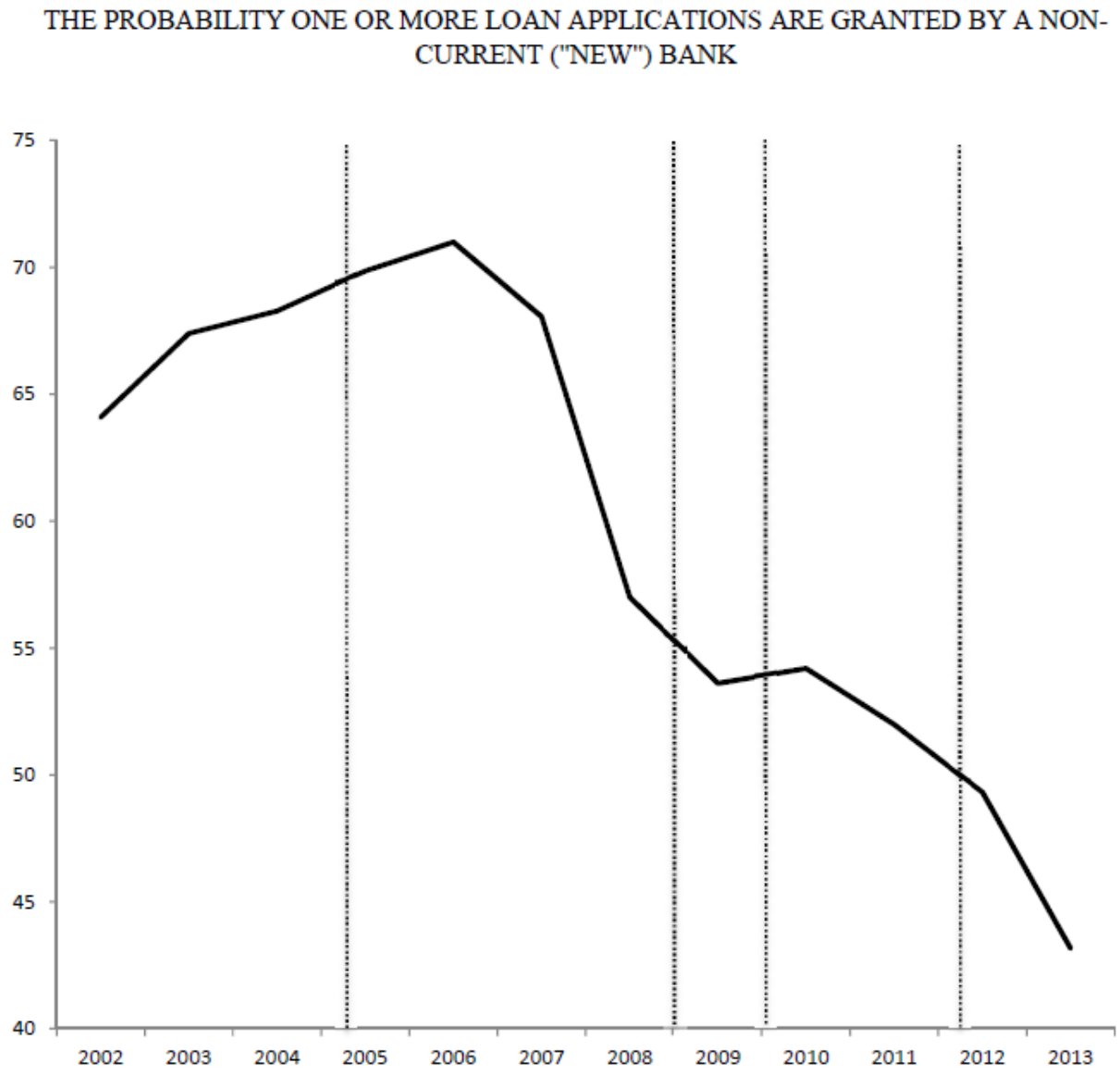
Time-varying coefficients of Δ log credit commitment on Δ dynamic provisioning



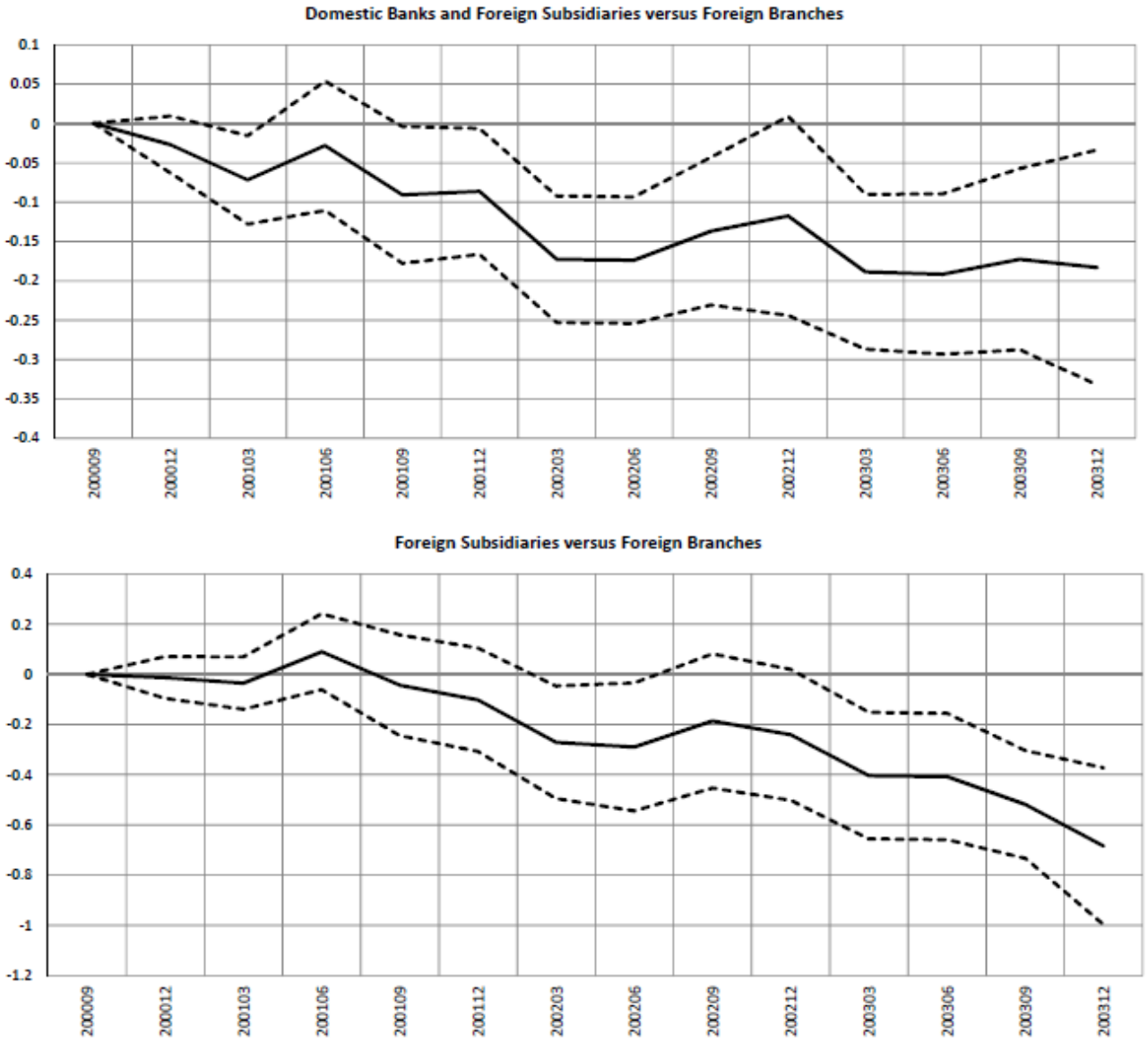
Loan (Bank-Firm) Level-Data vs. ***Firm Level-Data***

Short-lived weak firm level effect on credit despite loan-level! Nor real effects

Granting of loan applications: changing banks in good times is very easy



Regulatory arbitrage for non-regulated foreign branches



Heterogeneous effects: search for yield

TABLE 4

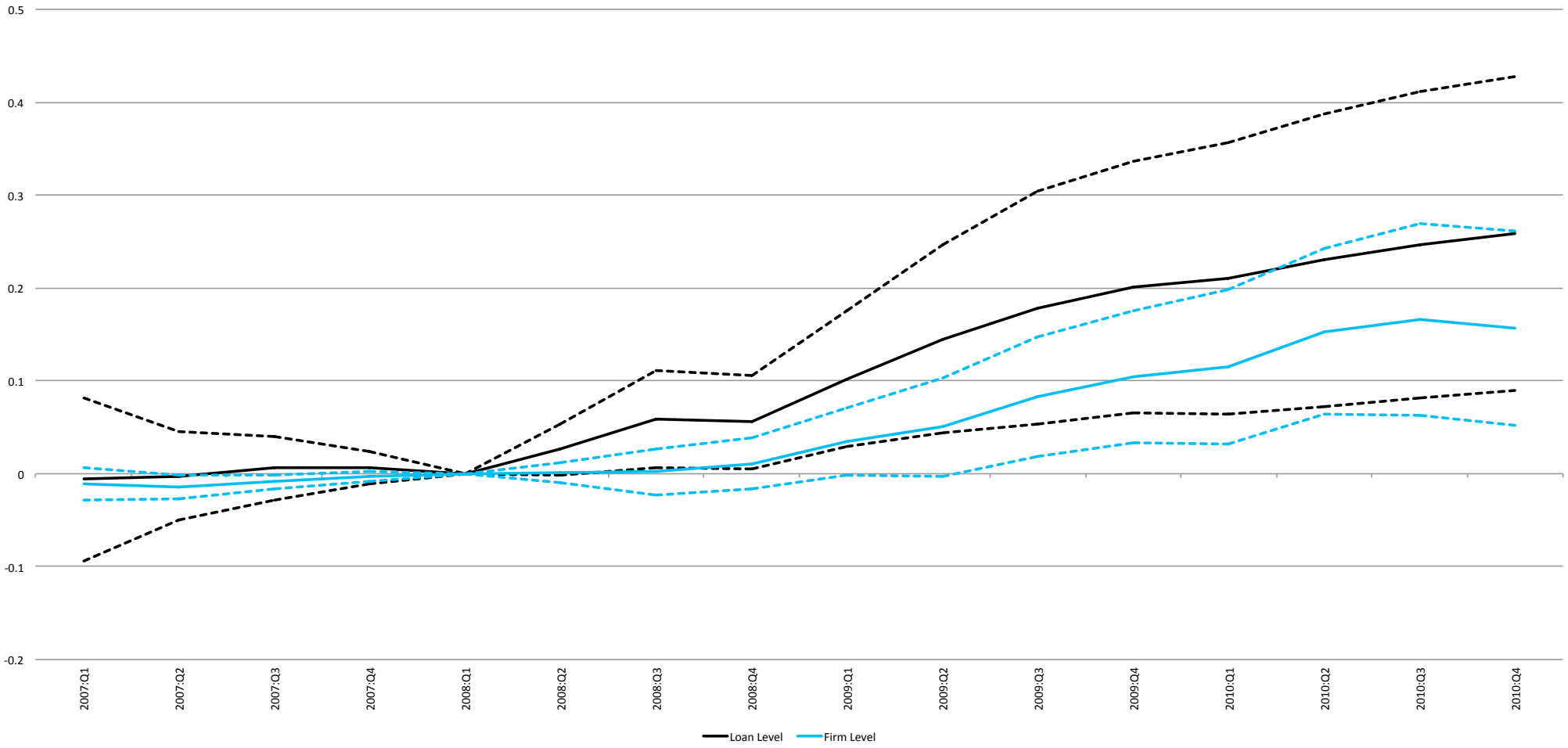
ANALYSIS OF THE CHANGES IN COMMITTED LENDING AT THE INTRODUCTION OF DYNAMIC PROVISIONING IN 2000:Q3 ACROSS BANKS AND FIRMS

Model	(1)	(2)	(3)	(4)	(5)
Dynamic Provision(for 1998:Q4)$_b$ [=DP$_b$]	-0.987 ***				
	(.199)				
DP$_b$ * Ln(Total Assets$_b$)	0.302 ***				
	(.061)				
DP$_b$ * Capital Ratio$_b$	-0.046				
	(.045)				
DP$_b$ * ROA$_b$	-0.067				
	(.109)				
DP$_b$ * Doubtful Ratio$_b$	-0.222				
	(.19)				
DP$_b$ * Ln(Total Assets$_f$)	0.111 ***	0.115 ***		0.061 **	0.115 ***
	(.037)	(.038)		(.028)	(.038)
DP$_b$ * Capital Ratio$_f$	-0.010 ***	-0.010 ***		-0.008 ***	-0.010 ***
	(.003)	(.003)		(.002)	(.003)
DP$_b$ * ROA$_f$	-0.004	-0.004		0.000	-0.004
	(.005)	(.005)		(.003)	(.005)
DP$_b$ * Bad Credit History$_f$	-0.135	-0.139	0.031	-0.029	-0.129
	(.086)	(.087)	(.053)	(.073)	(.09)
DP$_b$ * Interest Paid$_f$	1.300 **	1.309 **			1.280 **
	(.557)	(.559)			(.56)
DP$_b$ * Future Default(2001-2005)$_f$			0.255 ***	0.145 **	0.068
			(.073)	(.071)	(.079)
DP$_b$ * Ln(1+Number of months with the bank)$_{bf}$	-0.009	-0.020	-0.033	-0.047	-0.019
	(.035)	(.035)	(.038)	(.037)	(.035)
Firm * Bank Type Fixed Effects	Yes	Yes	Yes	Yes	Yes
Bank Fixed effects	No	Yes	Yes	Yes	Yes
Cluster	Bank, Firm	Bank, Firm	Bank, Firm	Bank, Firm	Bank, Firm
Number of Observations	77,483	77,483	77,483	77,483	77,483

CRISIS SHOCK IN 2008:Q3
FLOOR LOWERING IN 2008:Q4 & 09:Q4
INCREASE IN 2011:Q4

ΔLOG COMMITMENT
ON
PRE-CRISIS DYNAMIC PROVISION FUNDS
D(DYNAMIC PROVISION FUNDS<125%)
PROVISIONS BASED ON RE EXPOSURE

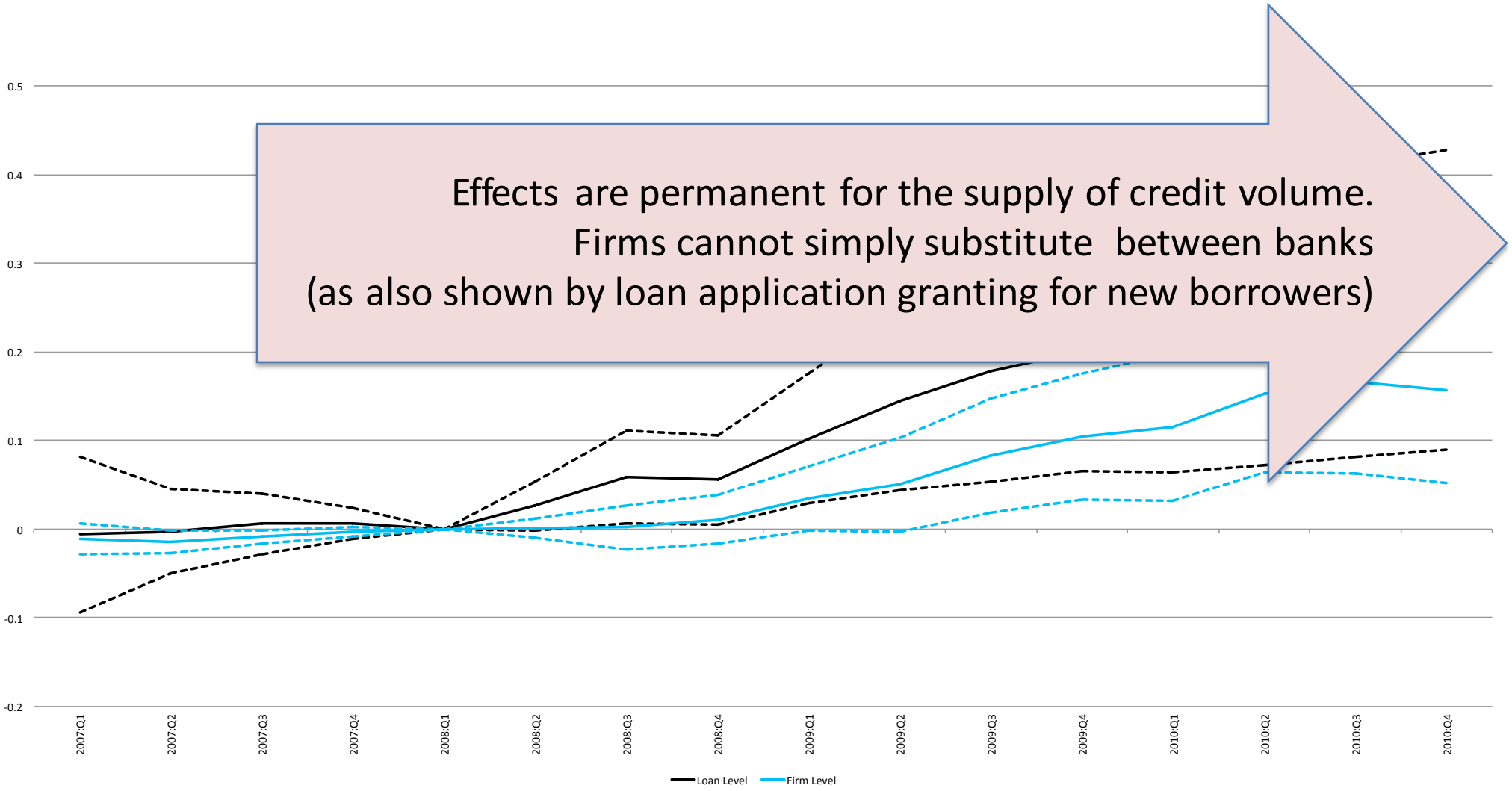
Time-varying coeff. of Δ log credit commitment on pre-crisis Dynamic Provision Funds



Loan (Bank-Firm) Level-Data vs. ***Firm Level-Data***

Real effects at the firm level for firm assets, employment, and survival!

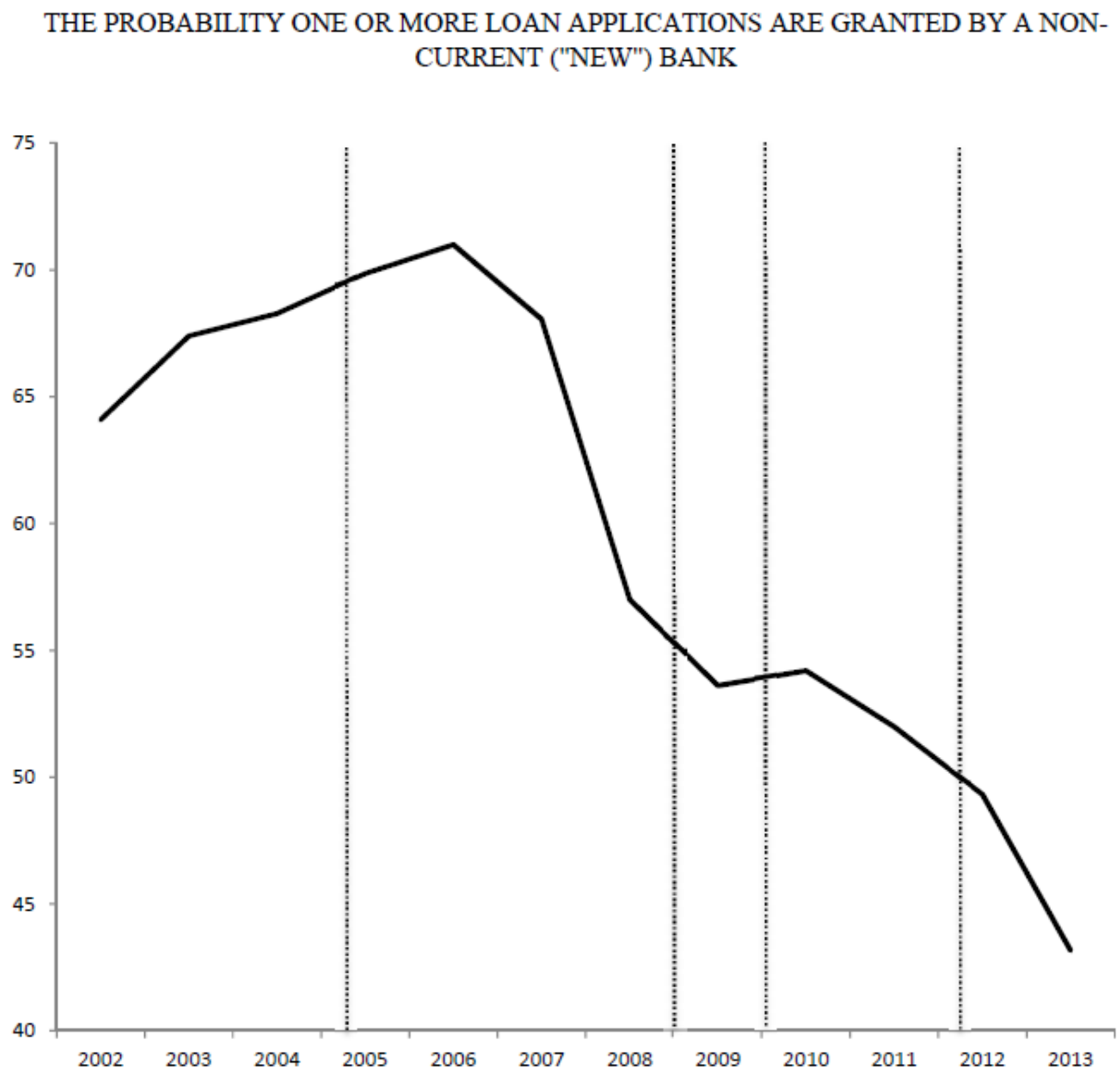
Time-varying coeff. of Δ log credit commitment on pre-crisis Dynamic Provision Funds



Loan (Bank-Firm) Level-Data vs. ***Firm Level-Data***

Real effects at the firm level for firm assets, employment, and survival!

Granting of loan applications over time



Economic relevancy

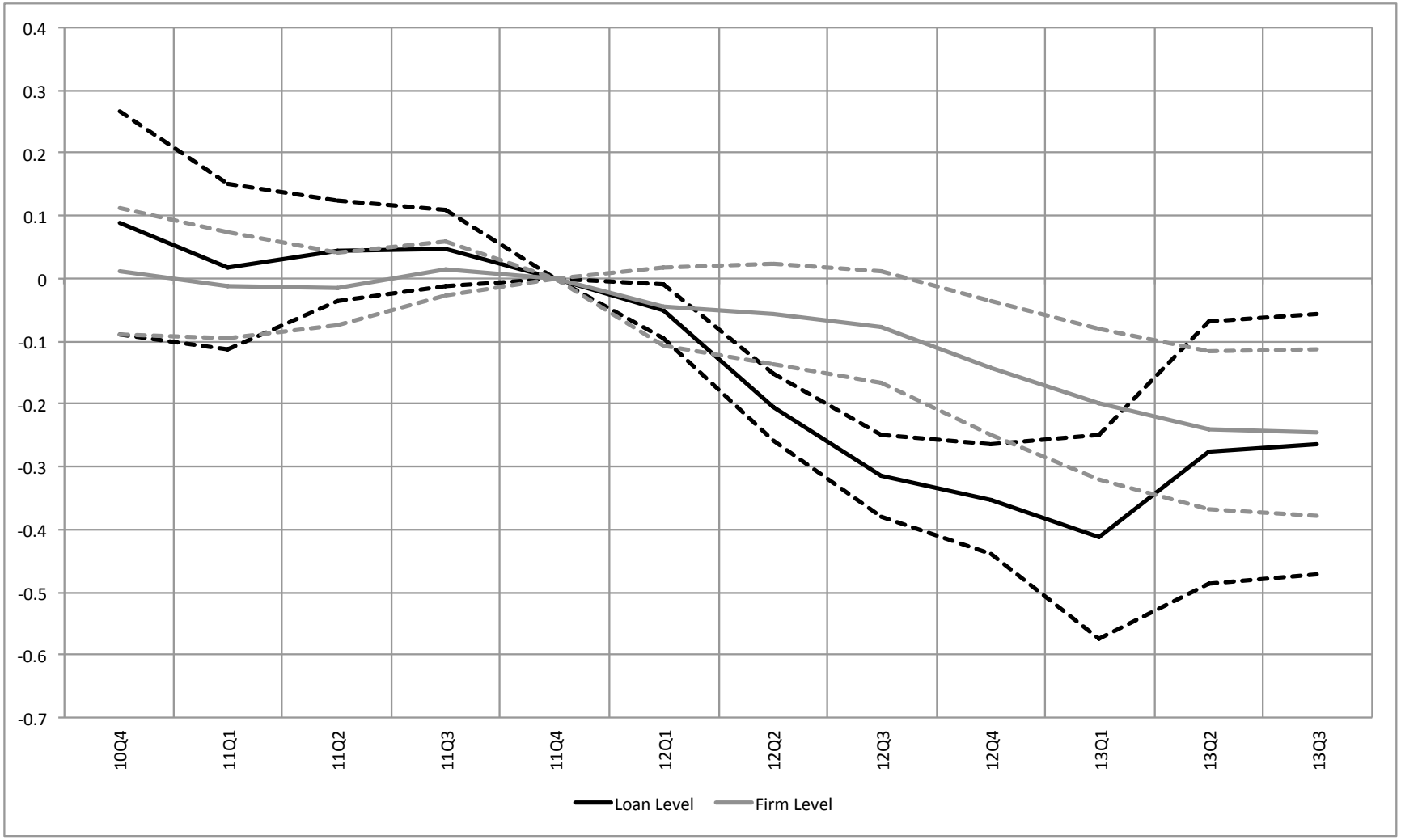
If banks' *Dynamic Provision Funds* would have dropped from 1 pp in 2007:Q4, then firms would have faced:

- 9 pp less committed credit availability
- 6 pp less employment (for the firms that survive)
- 1 pp lower likelihood of firm survival

Time-varying coeff. of Δ log credit commitment on d(Dynamic Provision Funds<125%)

Loan (Bank-Firm) Level-Data

Time-varying coeff. of Δ log credit commitment on non-RE on d(Provision RE based)



Loan (Bank-Firm) Level-Data

Heterogeneous effects

- Interactions of firm (and bank) variables and bank DP. Results:
  - Good times:
    - weaker effects for firms with ex-ante higher yield and lowly-capitalized firms that default more ex-post ! (consistent with search for yield and risk-taking)
    - stronger effects for smaller banks and smaller firms
    - regulatory arbitrage through foreign bank branches
  - Bad times:
    - drop in requirements for lowly provisioned banks: riskier (lowly-capitalized and smaller) firms obtain more credit! (consistent with gambling for resurrection)
    - instead, higher pre-crisis provision buffers: favor better firm credit history
    - weaker at banks with higher NPL ratios (market vs. policy constraints)

Intended contributions and conclusions

We exploit macroprudential policy shocks to identify its impact on credit supply cycles and the associated externalities to the real sector

1. Unique (in the world) policy experiments over a full credit cycle from 1999 to 2013 with countercyclical capital buffers taking place before Basel III and the new macroprudential policies
   - Our paper is not on whether the BdE policy was optimal. Note also that the DP buffers were only 1% of total assets

1. In Jiménez, Ongena, Peydró and Saurina (AER 2012 and Econometrica 2014) we find output and monetary cycles affect credit supply cycles, both average and heterogeneous effects. Macroprudential policy as well, but in different ways

Results for theoreticians and policy-makers:

- Credit supply cycles can be reduced
- Main real effects in crisis due to limits on firm substitution across financiers
- Quantification of the elasticities to real effects, large in crisis times
- Unintended consequences of policy as the increase in requirements in good times implies a search for yield and higher risk taking
- Heterogeneity is crucial:
  - In bank capital: in bad times not only does total shareholder funds matter, but also how they are distributed among banks
  - Not only does total credit supply matter but also compositional changes of credit supply, with respect to borrower risk and size
- Not only do policy constraints matter, but also market constraints
- Very costly to raise capital in bad times, a credit crunch and firm death follows
- Interesting results not only for macroprudential policy, but also for the debate on bank capital (e.g., Admati and Hellwig, 2013)
- Macropru is targeted as compared to monetary policy which is nice to target the main sources of systemic risk, but there can be regulatory arbitrage

Thank you for your attention ☺

Empirical Identification

- **We follow a Differences-in-differences approach**
- **Local Effect: We compare bank-firm credit before and after the different shocks**

$$\Delta log\ Commitment(impact\ period)_{bf} = \delta_f + Bank\ Dynamic\ Provisioning(basis\ period)_{bf} + controls_{bf} + \varepsilon_{bf}$$

- **Aggregate Effect: We compare firm credit before and after the different shocks**

$$\Delta log\ Commitment(impact\ period)_{f} = \delta_p + \delta_i + Bank\ Dynamic\ Provisioning(basis\ period)_{f} + controls_{f} + \varepsilon_{f}$$

Empirical Identification

- **We also analyze other dependant variables:**
  - **At loan (firm-bank) level**
    - **Δlog Drawn**
    - **Loan Dropped?**
    - **ΔMaturity**
    - **ΔCollateralization**
    - **ΔDrawn to Committed Ratio**
  - **At firm level:**
    - **Δlog Total Assets**
    - **Δlog Employees**
    - **Firm Death?**

Results 1 Introduction of the DP: 2000Q3

- Independent variable: αCredit/Total Assets (1998Q4)$_b$

TABLE 2
LOAN AND FIRM LEVEL ANALYSIS OF THE EFFECTS OF THE INTRODUCTION OF DYNAMIC PROVISIONING IN 2000:Q3

Model / *Stage*	(1)	(2)	(3)	(4)	(5)	(6) *Stage 1*	(6) *Stage 2*	(7)
Level	**Loan**							
Dependent Variable	Δlog Commitment (2000:Q1-2001:Q2)	Δlog Commitment (2000:Q1-2001:Q2)	Δlog Commitment (2000:Q1-2001:Q2)	Δlog Commitment (2000:Q1-2001:Q2)	Δlog Commitment (2000:Q1-2001:Q2)	Dynamic Provision Funds (2001:Q2)$_b$	Δlog Commitment (2000:Q1-2001:Q2)	Δlog Drawn (2000:Q1-2001:Q2)
Dynamic Provision(for 1998:Q4)$_b$	-0.357 ***	-0.397 ***	-0.335 ***	-0.426 ***	-0.394 **	0.711 ***		-0.451 ***
	(.124)	(.107)	(.111)	(.123)	(.186)	(.186)		(.109)
Dynamic Provision Funds(2001:Q2)$_b$							*-0.558* ***	
							(.162)	
The resultant impact of Dynamic Provision(for 1998:Q4)$_b$							-0.397	
Loan Characteristics	No	No	Yes	No	No	No	No	No
Firm Characteristics & Province and Industry Fixed Effects	--	--	--	--	Yes	--	--	--
Firm Fixed Effects	Yes	--	--	--	No	--	--	--
Firm * Bank Type Fixed Effects	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Sample with Firm Characteristics Only	No	No	No	Yes	Yes	No	No	No
Cluster	Bank, Firm	Bank, Firm	Bank, Firm	Bank, Firm	Bank, Firm	Bank, Firm	Bank, Firm	Bank, Firm
Number of Observations	416,611	273,518	273,518	167,034	237,905	273,518	273,518	242,452

Results 1 Introduction of the DP: 2000Q3

- Independent variable: αCredit/Total Assets (1998Q4)$_b$

Model	(8)	(9)	(10)	(11)
Level	Loan			
Dependent Variable	Loan Dropped?	ΔLong-Term Maturity Rate (>1 year) (2000:Q1-2001:Q2)	ΔCollateralization Rate (2000:Q1-2001:Q2)	ΔDrawn to Committed Ratio (2000:Q1-2001:Q2)
Dynamic Provision(for 1998:Q4)$_b$	0.061	-0.165 ***	0.060 ***	-0.069 *
	(.137)	(.047)	(.022)	(.04)
Loan Characteristics	Yes	Yes	Yes	Yes
Firm Characteristics & Province and Industry Fixed effects	--	--	--	--
Firm * Bank Type Fixed Effects	Yes	Yes	Yes	Yes
Sample with Firm Characteristics Only	No	No	No	No
Cluster	Bank, Firm	Bank, Firm	Bank, Firm	Bank, Firm
Number of Observations	384,419	273,518	273,518	131,077

Results 1 Introduction of the DP: 2000Q3

- Independent variable: αCredit/Total Assets (1998Q4)$_b$

Model	(12)	(13)	(14)	(15)	(16)
Level	**Firm**				
Dependent Variable	Δlog Commitment (2000:Q1-2001:Q2)	Δlog Commitment (2000:Q1-2001:Q2)	Δlog Total Assets (1999:Q4-2001:Q4)	Δlog Employees (1999:Q4-2001:Q4)	Firm Death? (2000- 2001)
Dynamic Provision(for 1998:Q4)$_b$	-0.019	0.006	-0.086	-0.099	0.006
	(.067)	(.098)	(.054)	(.067)	(.016)
Loan Characteristics	No	Yes	No	No	No
Firm Characteristics & Province and Industry Fixed effects	Yes	Yes	Yes	Yes	Yes
Firm * Bank Type Fixed Effects	><	><	><	><	><
Sample with Firm Characteristics Only	Yes	Yes	Yes	Yes	Yes
Cluster	Main Bank	Main Bank	Main Bank	Main Bank	Main Bank
Number of Observations	76,593	76,593	59,449	41,146	71,227

Results 2 & 3

Model	(11)	(12)	(13)
Level	Firm		
Dependent Variable	Δlog Commitment (2011:Q4-2012:Q4)	Δlog Commitment (2011:Q4-2012:Q4)	Firm Death? (2012)
Loans to Construction & Real Estate/Total Loans to Firms(2011:Q4)$_b$	-0.142 **	-0.117 *	0.035 **
	(.065)	(.098)	(.015)
Loan Characteristics	No	Yes	No
Firm Characteristics & Province and Industry Fixed effects	Yes	Yes	Yes
Firm Fixed Effects	><	><	><
Sample with Firm Characteristics Only	Yes	Yes	No
Cluster	Prov., Ind.	Prov., Ind.	Prov., Ind.
Number of Observations	56,119	56,119	116,259