



# **Countercyclical buffers: a distinctive feature of retail banks**

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# Motivation

## Pro-cyclicality and loan supply

- Changes in capital requirements could be procyclical and induce contractionary effects in the supply of bank loans.
- For a given level of bank's available capital  $K$ , regulatory capital requirements – at rate  $\lambda$  – put an upper limit on the bank's lending capacity  $L$ :

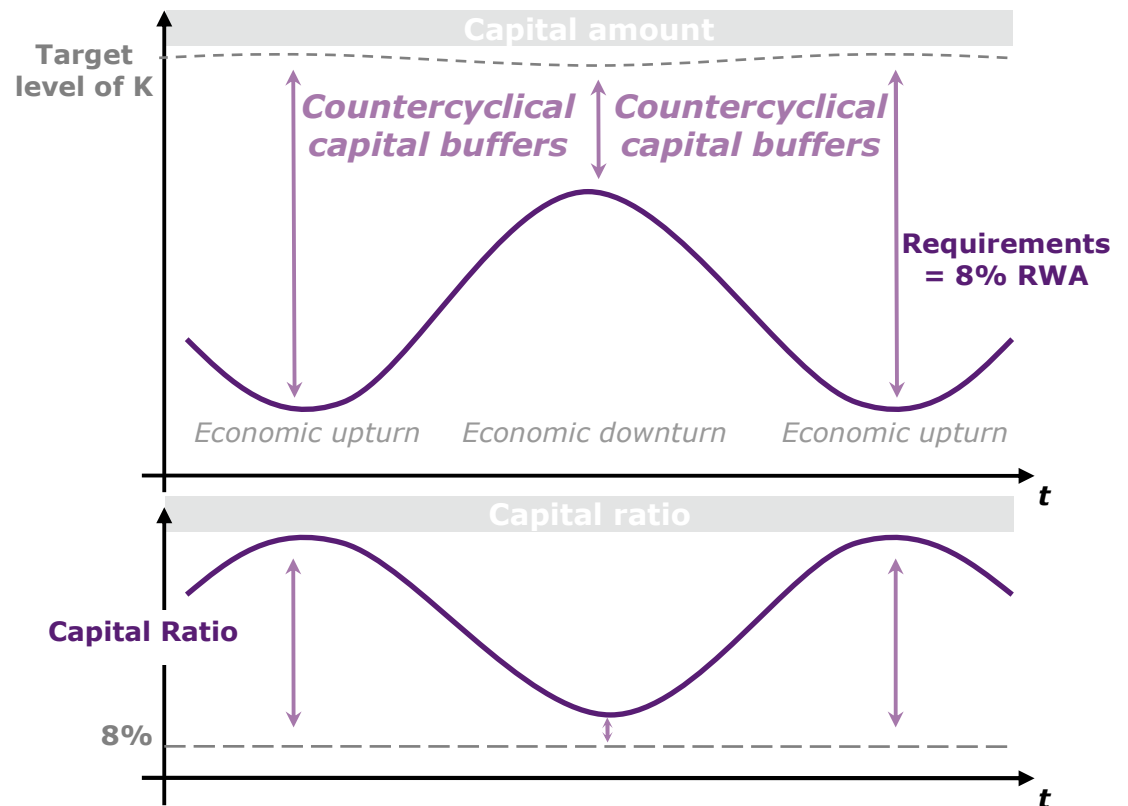
$$K \geq \lambda L (\approx 8\% \text{ RWA}) \Rightarrow L \leq \frac{K}{\lambda}$$

- Yet, because materialisation of credit risk (defaults) is anticyclical by nature, business cycle induces fluctuations in  $K / \lambda$ . So, in a recession:
  - > Loans losses increase and reduce  $K$ ,
  - > Expected future PD and LGD increase, with following consequences:
    - under Basel 1 capital adequacy rules:  $K$  decreases,
    - under Basel 2 rules:  $K$  decreases and  $\lambda$  increases,
  - > And the lending upper limit decreases.
- To preserve their capacity to lend, which is their core business, banks should stabilize the level of  $K$  and maintain a sufficient amount of capital.

# Motivation

One of the solution: countercyclical capital buffers

- In particular, banks can counteract the consequences of business cycle on their capacity to lend if they forecast the consequences of loans losses and other capital shocks (reinforcement of regulatory requirements in recessions) on their earnings by **building countercyclical capital buffers**.
- A countercyclical capital buffers policy:
  - > Consists in holding capital in advance in upturn periods and keeping it available, to counteract consequences of future shocks on earnings in economic downturn periods.
  - > In downturn, these buffers will be used to absorb loans losses and other capital variations.
  - > An optimal policy for forward looking rational banks.



# Motivation

The case of retail banks and paper's objective

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- Relevance of this policy for banks who adopt a retail banking business model:
  - > These banks concentrate their lending on the local small businesses and on the households financing of real estate.
  - > Either due to their size or their status (cooperative banks), these banks have a restricted access to the equity market.
    - Their external funding depends on the financial behavior of their clients – who are also their relationships borrowers – as depositors and subscribers of social shares. Due to these constraints, retail banks funding depends upon earnings retention and reserves.
- The objective of this presentation is:
  - > To investigate if retail banks already build up countercyclical capital buffers or, on the contrary, are short-sighted (procyclical capital buffers) and react only in period of stress,
  - > To explain how capital buffers fluctuate with the business cycle,
  - > And to assess the relationship between business cycle and capital buffers for a sample of French regional retail banks.

# Agenda

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- 1. Motivations for banks to build up countercyclical capital buffers**
- 2. Observation of banks' behaviour: a (short) review of the literature**
- 3. Methodology**
- 4. The case of French local retail banks – Data and results**

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- 1. Motivations for banks to build up countercyclical capital buffers**
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# Why countercyclical capital buffers ?

Two types of reasons to build up capital buffers

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- What are capital buffers ?
  - > Measured by the difference between available capital and required capital. Here, required capital is defined as regulatory capital (regulatory capital requirements).
  - > In other words :  $Buffers = Capital - 8\% \times Risk\ Weight\ Assets$ 
    - Where:  $Capital = Tier\ 1 + Tier\ 2 + Tier\ 3 - deductions$
- In practice, most banks tend to hold a significant amount of capital in excess to the regulatory requirements, even if capital holding is costly. Why ?
- We should distinguish general reasons to build up capital buffers from specific reasons to build up countercyclical capital buffers.

# Why countercyclical capital buffers ?

## General reasons to build up capital buffers (1/2)

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- Main general reasons are efficiency reasons or precautionary reasons
  - > Efficiency reasons:
    - To signal the bank's soundness,
      - Market capital requirements (from OTC markets or Ratings agencies) are generally higher than regulatory requirements: market discipline increases capital buffers.
    - To avoid higher cost of capital (debt and/or equity) if capital needs appear in an emergency situation,
    - To counteract the decrease of the implicit public protection,
    - Or simply to be able to take advantage of future investment opportunities with positive NPV when they occur. And, more generally, to implement a policy of external growth by using M&A.
  - > Precaution against negative capital shocks:
    - To maintain the bank as a going concern and protect bank's franchise (or charter) value. Here capital plays a role of an insurance or a guarantee,
    - To maintain an insurance against the reputational and financial costs associated with breaching the minimum regulatory capital requirements,
    - To offset the volatility of capital ratio which is determined by bank's assets risk. Banks holding riskier assets should have higher capital buffers.

# Why countercyclical capital buffers ?

General reasons to build up capital buffers (2/2)

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- Thus, the level of capital buffers is determined by a trade-off between gains and costs of holding capital.
  - > Main gains come from economizing on costs – costs of failure or other costs, such as reputational costs - which result from the shortage of capital.
  - > Main financial costs come from higher cost of capital if equity capital should be raised in emergency.
- Building up capital buffers is more likely when:
  - > Value on ongoing lending relationships and bank's charter value is sufficiently large,
  - > Cost of equity capital and other costs are not very large.

# Why countercyclical capital buffers ?

Specific reasons to build up **countercyclical** capital buffers

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- Main reasons for banks to build up countercyclical capital buffers are:
  - > To anticipate an increase of future losses in downturn period
    - In upturn periods, in providing large amounts of credit, lenders increase the possibility of unusual large losses during a cyclical economic downturn. Rational looking forward banks will anticipate such consequences.
  - > To anticipate that, in downturn period, capital is rare and expensive.
    - Weak availability and high cost of external equity capital in downturn period increases the risk is to be obliged to increase capital buffers through a reduction in RWA. Thus, materialisation of risk involves high social costs coming from a contraction of the supply of loans.
  - > To counteract the pro-cyclicality of the Basel II capital requirements (RWA)
    - RWA increase in downturn period whereas they decrease in upturn period.
  - > *Same logic is behind the Basel III proposals* to avoid the contractionary effects in the credit supply in downturn periods
    - Principe: in upturn periods, regulatory capital ratio is increased to induce banks to build up additional buffers, while in downturn periods, the regulator lowers capital requirements to allow banks to use previously built capital buffers to cover a potential rise in credit losses.
    - In the Basel III proposals, the criterion used to determine periods of capital buffers building is the gap between loans' growth and economic growth.

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1. Motivations for banks to build up countercyclical capital buffers
  - 2. A (short) review of the literature**
  3. Methodology
  4. The case of French local retail banks – Data and results

# A short review of the literature

## Expected relationships and interpretations

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- We investigate the relationship between capital buffers and economic cycle, in a bank's capital management perspective.
- A positive relationship means that:
  - > Banks manage buffers by adopting a forward-looking attitude, taking into account the anticyclical nature of credit risk.
  - > Banks build up countercyclical capital buffers in economic upturn periods to anticipate future capital shocks in an economic downturn period and to avoid the contractionary effects in the credit supply.
- A negative relationship means that:
  - > Banks are short-sighted:
    - In economic upturn periods, the capital ratio should increase simply because of the increase of earnings and the decrease of RWA. Banks do not build capital buffers. They continue to expand loans supply (cf. equation  $L \leq K/\lambda$ ).
    - In economic downturn periods, credit risk losses can not be completely absorbed by previously built capital buffers. Banks have to raise capital in emergency, in an economic context where equity capital is rare and expensive. If they do not able to suffer these costs, they have to decrease their credit exposures (cf. equation in slide 1) in order to maintain their capital ratio.
  - > But, this kind of bank's capital management exposes banks to large costs in economic downturn periods and exposes the economy to a contraction of loans supply.

# A short review of the literature

## Main findings

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- The cyclical behaviour of bank capital buffers has been investigated by many researchers. But, the evidence is mixed.
- Some papers suggest that the existence of capital buffers can potentially mitigate the volatility in total capital:
  - > Actual capital is more volatile than regulatory capital.
- Most of empirical papers find a *negative relationship*
  - > Ayuso & al. (2004) on Spanish banks, which they interpret as short-sighted of banks.
  - > Stoltz and Wedow (2010) on German Savings Banks and Cooperative Banks. This paper also analyses separately the impact of business cycle on equity capital and on risks, measured by RWA.
  - > Alfon & al. (2004) and Francis & Osborne (2009) on UK banks.
  - > Coffinet & al. (2011) on French banks.
  - > Lindquist (2003) find a *positive relationship* between capital buffers and business cycle in Norwegian banks. However, in another paper (2004), he finds also a negative relationship between capital buffers and business cycle.

# A short review of the literature

## Limits of previous studies

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- Main problems when implementing empirical analysis
  - > Distinction of deliberate capital buffer decision (supply-side effects) from demand-side effects
    - Loan demand is known to fluctuate procyclically over the business cycle. Demand-side effects may also lead to the anticyclical behaviour of capital buffers through their effect on RWA. Moreover, if banks' capitalisation affects the behaviour of capital buffers, this would indicate the existence of supply-side effects.
  - > Decomposition of the effects of the business cycle on capital and risks (effects on numerator and denominator of the ratio)
    - It is necessary to analyse the impact of the cycle on capital and risks distinctively
    - See Stoltz and Wedow (2010)
  - > Necessary to take into account the importance (weight) of bank funding of the economy
    - The impact on the building of capital buffers can vary from country to country.
    - For example, in Germany, savings and cooperative banks play a dominant role in lending to SME and PME (backbone of the German economy).
  - > The problem of the use of national indicators of business cycle
    - Some retail banks are local banks. For example in France or in Germany.
    - Local or regional banks are not sensitive to the same cycle of defaults which affect national banks.
  - > To isolate the effects of regulatory requirements rules on capital buffers
    - It is necessary to distinguish buffers built to prevent future losses from capital shocks which are the result of changes in the regulatory requirements rules.
    - For example, requirements changes with the passage from Basel I to Basel II.

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# The methodology

Model's choice (1/2)

- A dynamic panel data methodology is used.
  - > Panel data methods have the advantage of capturing both the individual and temporal dimensions of the data.
  - > The econometric model also takes into account the dynamic relationship that can exist between capital buffers in period  $t$  and period  $t+1$ .
  - > We introduce the GDP growth and other control variables to explain capital buffers.

$$BUF_{it} = \alpha BUF_{it-1} + \beta GDP_t + \sum_k \gamma^k X_{it}^k + u_{it}$$

↑  
Vector of control variables

- Choice of the parameters estimator:
  - > Arellano and Bond (1991) estimator
  - > Use of the differenced equation with lag of variables in level as instruments for the estimation

# The methodology

Model's choice (2/2)

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- Estimation methodology: Generalised Method of Moments (GMM)
  - > This method uses orthogonality conditions (non-correlation between certain variables and the error term) to construct the objective function.
  - > In order to obtain more robust parameters, a two-step estimation process was used.
- Choice of the instruments for the orthogonality conditions
  - > Crucial choice because using too many instruments can make seriously biased parameter estimators.
  - > In our model: lags 1 to 3 of the dependant variable and lags 1 to 3 of all other variables
- Tests
  - > Tests of the significance of parameters
  - > Sargan/Hansen test of over-identification to check the validity of the instruments
  - > Test for second order autocorrelation of the differenced residuals
    - Autocorrelation of order 1 of the differenced residuals
    - Non-autocorrelation of order 2 of the differenced residuals

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# The data

## Data sources

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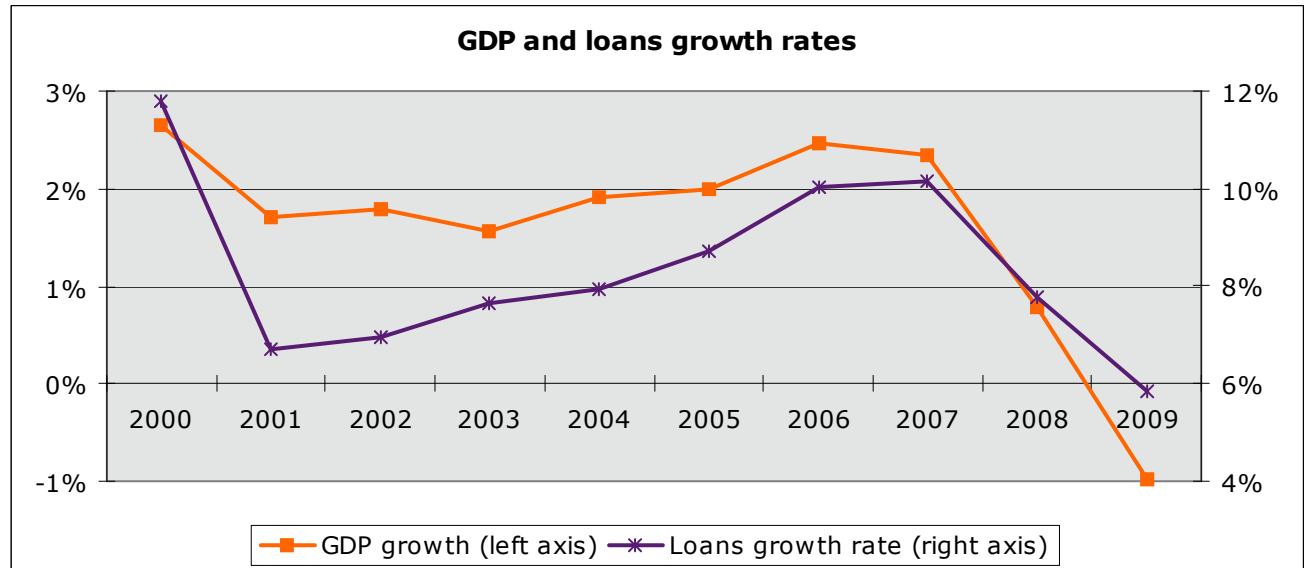
- Data
  - > Panel data including 35 regional banks over the period 1999-2009
    - Data related to banks activity, profitability and solvency come from supervisory reports (BAFI – Base des Agents Financiers and COREP)
    - Advantages of these data: reliability and homogeneity of data
  - > Other (control) data come from external sources:
    - Coface services ratings system for the SMEs' rate of default and the indicator of credit quality
  - > Macroeconomic data come from INSEE, Banque de France and OECD.
  
- Definition of capital buffers – Endogenous variable
  - > *Buffers = Capital – 8% x Risk Weight Assets*
    - Where: *Capital = Tier 1 + Tier 2 + Tier 3 - deductions*

# The results

Expected Result on French retail banks (1/2)

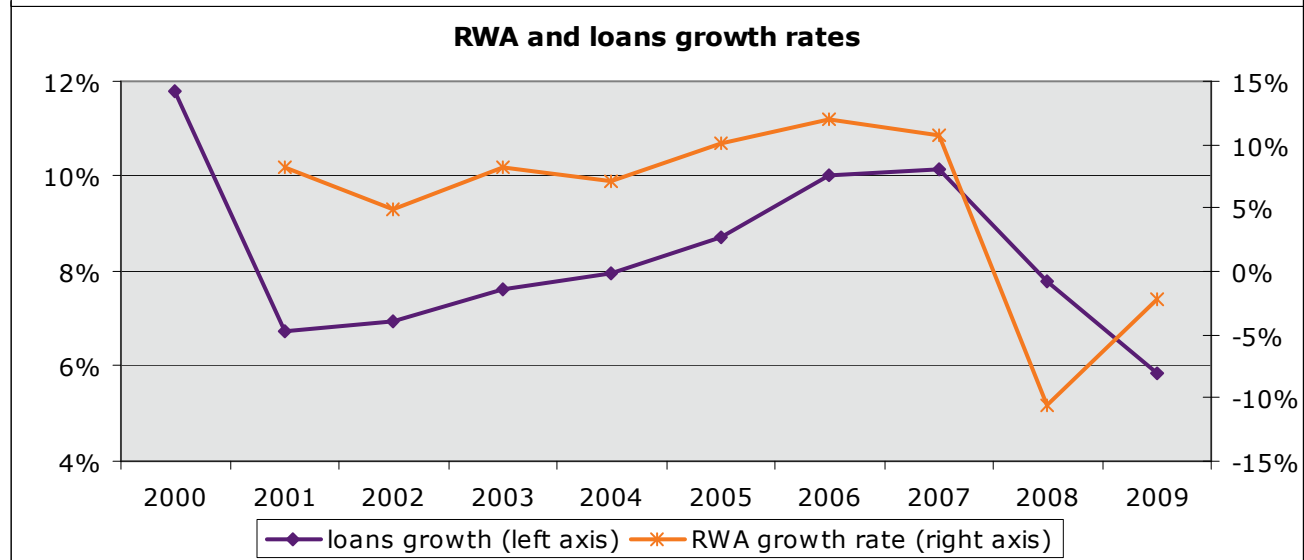
- Average changes in French banks sample:

- > GDP and total loans co-move



- > RWA and loans co-move, but at different speeds

- NB: in 2008 Basel II rules apply

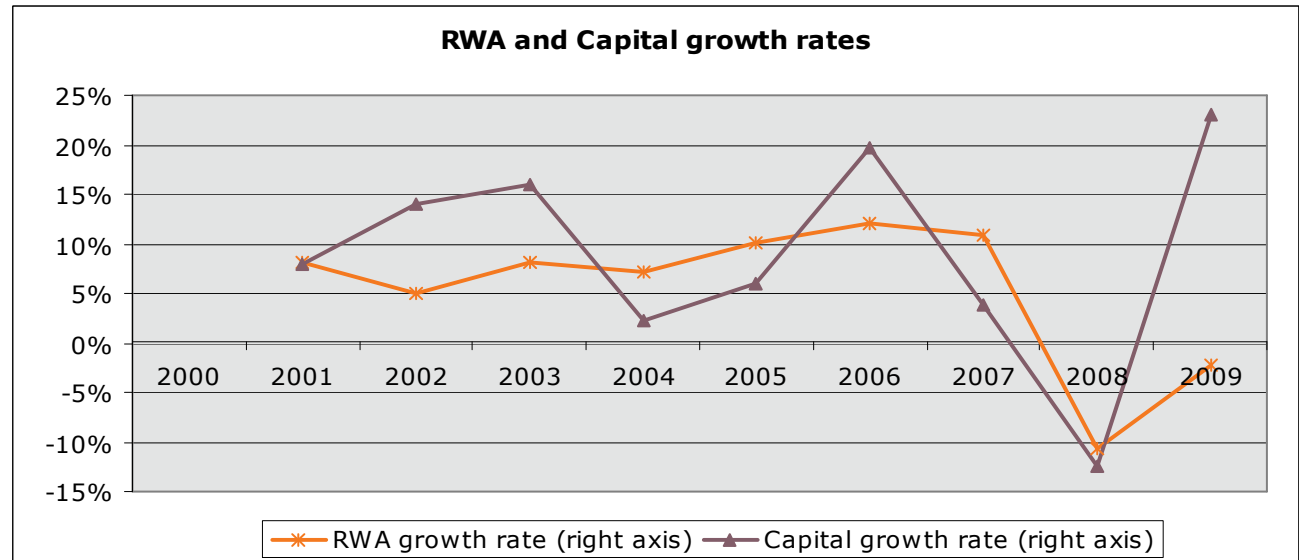


# The results

Expected Result on French retail banks (2/2)

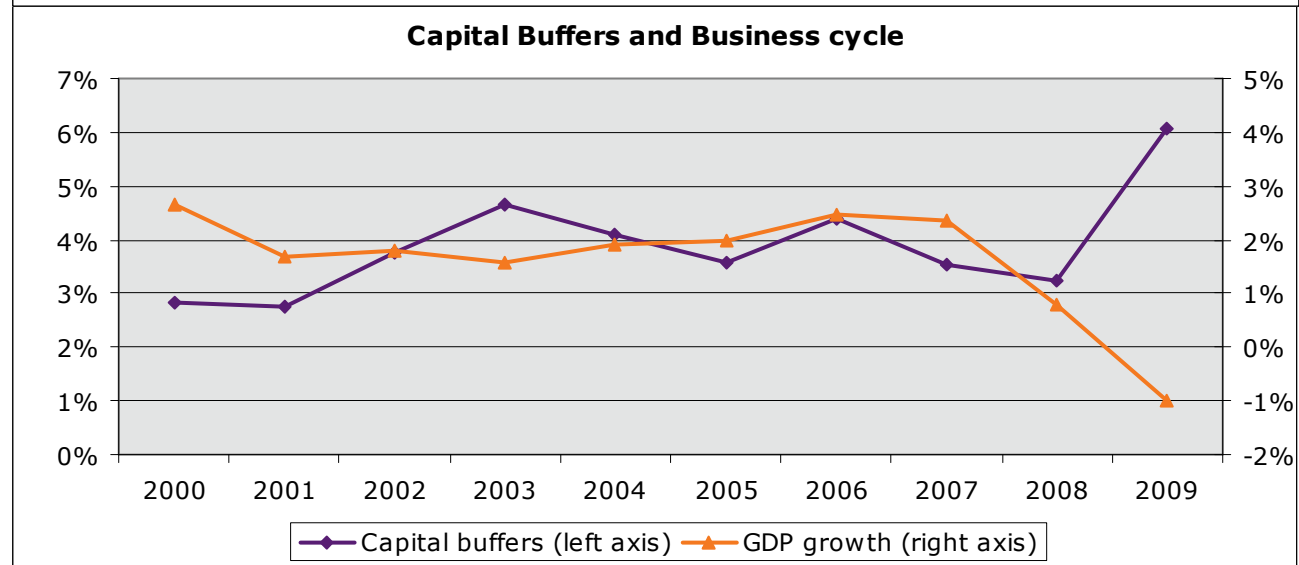
- Average changes in French banks sample:

- > Equity capital varies more than RWAs



- > Average capital buffers and business cycle vary seemingly in opposite way

- > A negative relationship ?



# The data

## Choice of the variables

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- Choice of the explanatory variables
  - > Lagged endogenous variable
  - > Macroeconomic variables
    - GDP growth
  - > Control variables: differences in capital buffers can arise due to:
    - differences in the persistence of the bank's profit, due in particular to a steeper interest rate slope
    - differences in assets portfolio's composition and risk, measured by the ratio transaction loans / total loans
    - differences in the cost of capital, measured by the Return-on-Equity (ROE)
    - differences in the loans expansion strategy, measured by loans growth rate
    - differences in the size, measured by the log of assets minus the log of the mean assets of the period
    - differences in bank's liquidity, because liquidity makes it easier to maintain capital without restricting credit supply in period of stress,
  - > Dummies variables
    - Semester dummy
    - 2nd semester 2006 dummy
    - Basel II dummy: in 1st semester 2008 for the passage from Basel I rules to Basel II rules

# The data

## Descriptive statistics and expected sign of the variables

	Mean	Std Dev	Min.	Max.	Expected sign in capital buffers regression and comments	
Capital buffers	3,7%	2,1%	0,1%	15,1%		
Capital on assets	10,3%	1,8%	4,4%	15,7%		
RWA on assets	62,7%	14,3%	28,8%	101,4%		
GDP growth rate	1,6%	1,1%	-2,0%	3,3%	?	<i>To determine this sign is the objective of the study</i>
Interest rate slope	1,1%	0,9%	-0,5%	2,8%	+	Any steepening of the slope tends to increase the persistence of profits and favours capital retention.
Ratio transaction loans / total loans	56,1%	8,6%	32,2%	73,7%	-	Any increase of the share of transactional loans tend to decrease capital requirements, because credit risk decreases on average.
ROE	6,1%	2,3%	0,1%	13,2%	-	Any increase of the cost of equity capital tend to reduce capital buffers.
Loan growth rate	4,2%	3,1%	-12,6%	27,7%	-	Any increase in loans growth rate increases RWA and reduces capital buffers.
Size indicator	-0,18	0,58	-1,62	1,28	-	Bigger the bank, lower the capital buffers.
Liquidity indicator (Berger-Bouwman)	0,54	0,14	0,00	0,77	-	Any increases in the bank's liquidity helps to maintain lending for a given level of capital buffers.

# The data

## Correlation matrix

	Capital buffers	Capital on assets	RWA on assets	GDP growth rate	Interest rate slope	Ratio transaction loans / total loans	ROE	Loan growth rate	Size indicator	Liquidity indicator (Berger-Bouwman)
Capital buffers	1	0,38	-0,26	-0,12	0,21	0,09	-0,14	-0,05	0,08	-0,21
Capital on assets		1	0,28	-0,18	0,02	0,32	-0,02	-0,02	-0,22	0,42
RWA on assets			1	0,33	-0,13	-0,43	0,23	0,23	-0,49	0,77
GDP growth rate				1	-0,46	-0,15	0,33	0,24	-0,03	0,01
Interest rate slope					1	-0,05	-0,07	-0,23	0,00	-0,01
Ratio transaction loans / total loans						1	0,08	-0,13	0,22	-0,17
ROE							1	0,18	-0,11	0,19
Loan growth rate								1	-0,12	0,14
Size indicator									1	-0,59
Liquidity indicator (Berger-Bouwman)										1

# The results

## Estimation of the model

	Capital Buffers	Capital on assets	RWA on assets
Intercept	0,001 ***	0,001 ***	0,001
Lag of dependant variable	0,789 ***	0,579 ***	0,471 ***
GDP growth rate	0,189 ***	0,135 ***	0,523 ***
Interest rate slope	0,432 ***	0,184 ***	0,079
Ratio transaction loans / total loans	-0,061 ***	0,030	-0,009
ROE	-0,078 *	-0,159 ***	-0,260 ***
Loan growth rate	-0,015 *	-0,035 ***	-0,112 ***
Size indicator	-0,035 ***	-0,029 ***	-0,071 *
Liquidity indicator (Berger-Bouwman)	-0,062 ***	0,034 ***	0,448 ***
2th semester 2006 dummy	0,025 ***	0,023 ***	-0,001
Semester dummy	0,003 ***	-0,006 ***	-0,003 ***
Basel II dummy	0,003	-0,003 ***	-0,092 ***

Note: \*\*\* significant at the threshold of 1%, \*\* 5% and \* 10%.

	Statistic	p-value	Statistic	p-value	Statistic	p-value
Hansen test	32,23	1,00	32,98	1,00	28,46	1,00
AR(1) test	-4,61	1,00	-4,45	1,00	-3,91	1,00
AR(2) test	2,25	0,01	2,17	0,02	1,68	0,05

- We find a positive relationship between the capital buffers and GDP growth.
- This relationship is explained more by the impact of GDP growth on RWA than by the one of capital.
- The other variables generally have the expected signs.

# Conclusion

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- Building countercyclical buffers - defined as the difference between available capital and regulatory capital – is a rational decision for forward looking banks anticipating future loans losses when they expand lending in upturn periods.
- This behaviour should be a distinctive feature of banks running a retail banking business model for two reasons:
  - > Relationship lending is at the core of this business model and should be preserved in downturn period.
  - > Retail banks have a limited access to equity markets and they encounter difficulties to raise equity capital in period of stress.
- This paper tested this hypothesis applying a panel data dynamic econometric model on a sample of 35 French regional retail banks over the 2000-2009 period.
- Consistent with a forward looking banks behavior, our econometric results show a positive relationship between buffers and the business.
- Several reasons could explain this result:
  - > French banks have managed high level of equity capital, well in excess to regulatory requirements, over the period under study.
  - > The level of credit risk in French retail loans portfolios is quite low, due to banks “prudent” lending policies.
  - > High level of banks’ liquidity which decreases needs to build capital buffers and allows to maintain lending.
  - > High persistence of the banks’ profits helps to maintain buffers in downturn periods.
  - > In a Basel I regime, capital requirements (risk weight) are not so risk sensitive.

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