



BANK FOR INTERNATIONAL SETTLEMENTS

Financial Innovation, Bank Capital and the Bank Lending Channel: A European Empiricist's Perspective

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The opinions are those of the authors only and in no way involve the responsibility of the Bank for International Settlements and the European Central Bank

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Road map

- The main results of the MTN (2001)
- The new dimensions of the monetary transmission mechanism
 - A new role for bank capital
 - Market funding and securitization
 - The risk-taking channel
- New evidence on the monetary transmission mechanism
 - An econometric assessment of the “risk-taking channel”
 - Are there difference between EU and US in the functioning of the bank lending channel?
- Conclusions



The main results of the MTN (2001) ...

- The Monetary Transmission Network (MTN) was an extensive three-year joint effort by the ECB and the other Eurosystem central banks to analyze differences in the monetary transmission mechanism among euro area countries. Main findings:
 1. We found **evidence of a “broad credit channel”** in many of the largest euro area countries over the nineties
 2. **The key factor in Europe seemed to be whether banks were holding high or low levels of liquid assets.** But in contrast to the US, monetary policy did not have stronger effects on the lending of small banks, or banks with low ratios of capital to asset in most of the European countries studied



... and the possible explanations

- These findings were explained by some structural characteristics of European banking markets
- The importance of banks' networks, state guarantee and public ownership were likely to weaken the relevance of bank size and capitalization as determinants of loan supply shifts
- The joint reading of the micro and macro evidence suggested that both in the euro area and in the majority of the component countries **the classic “interest rate channel” was sufficient to explain the broad patterns of the response of the economy to monetary policy shocks**
- Question: do these results still hold?



What has changed?

- In order to answer this question we have to analyze what has changed in the last ten years, after the introduction of the euro:
 1. Competition in European banking markets increased; bank funding become more dependent to market conditions; banks increased in size and are more “macro-economically” relevant
 2. State guarantee and public ownership were progressively reduced, at least up to the government interventions during the current crisis
 3. Banks’ incentives and risk attitude also changed due to financial innovation and changes in business models
- We have to rethink to the monetary transmission mechanism considering: 1) a new role of bank capital; 2) the importance of market funding and securitization; 3) the “risk-taking channel”



A new role for bank capital

- Mounting evidence to suggest that bank capital is a critical factor affecting bank supply of lending. This is true not only in times of financial stress but also when regulatory constraints are not binding (Van den Heuvel, 2002; Angeloni and Faia, 2009)
- A new “bank capital channel” due to maturity transformation (Van den Heuvel, 2002): $i \uparrow$ Bank profits \downarrow Bank Capital \downarrow Supplied loans \downarrow
- Post MTN evidence for euro area countries show that bank capital can indeed have a significant impact on bank lending (Gambacorta and Mistrulli, 2004; Altunbas et al., 2004) in line with previous result for the US (Kishan and Opiela, 2000)
- First difference: bank capital seems to matter!

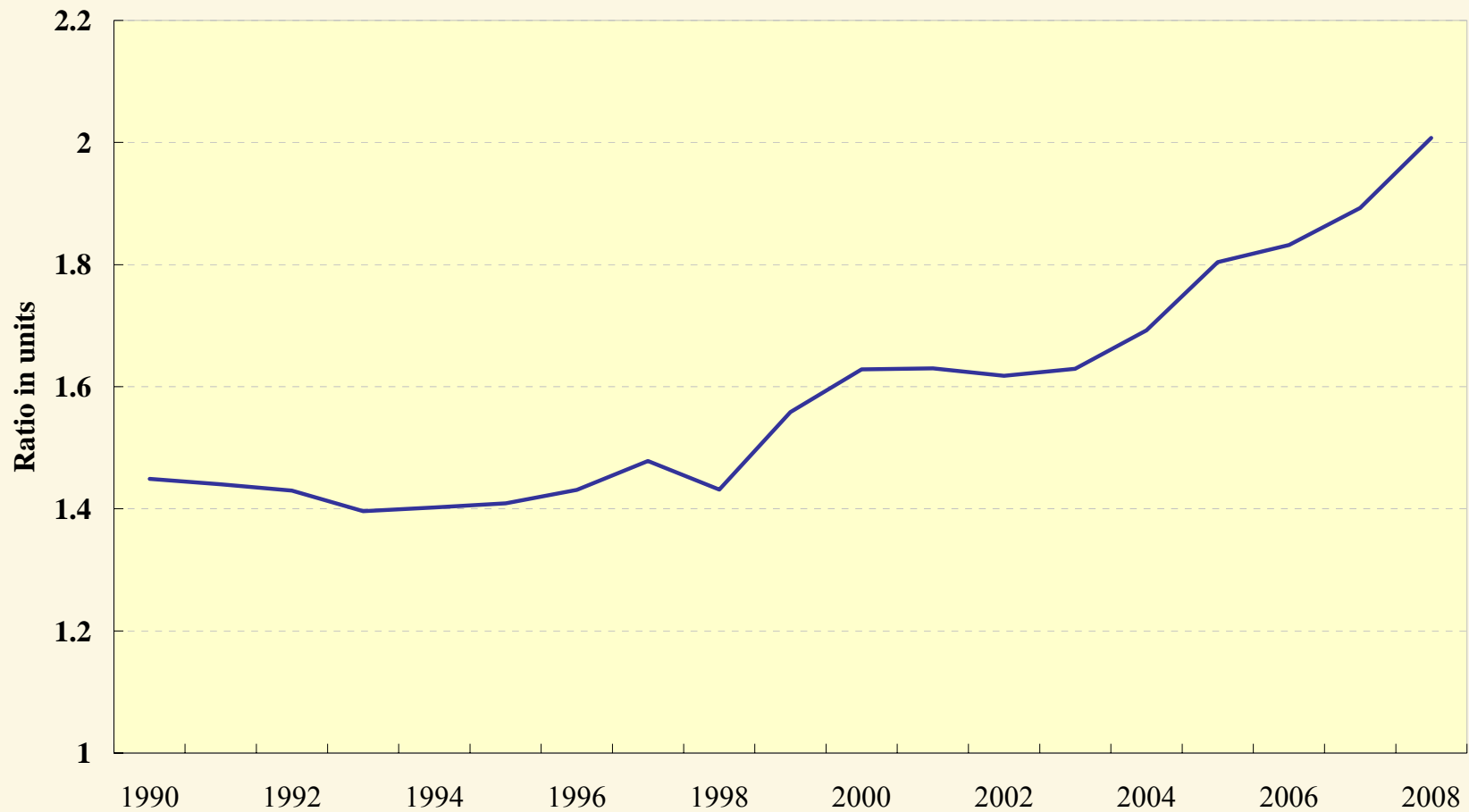


Market funding and securitization

- To finance their balance sheet growth, banks have extensively resorted to market funding (CDs, bonds, covered bonds) and securitization techniques; deposits have reduced their weight on the liability side
- This determines a closer link between bank health conditions and the cost and availability of market funds. Even in this case bank capital is particularly relevant
- Second difference: while in the past banks were overwhelmingly funded via bank deposits (pretty stable and insured) nowadays **financial markets conditions have a significant impact on banks' ability and incentives to grant credit.** This influences the functioning of the bank lending channel

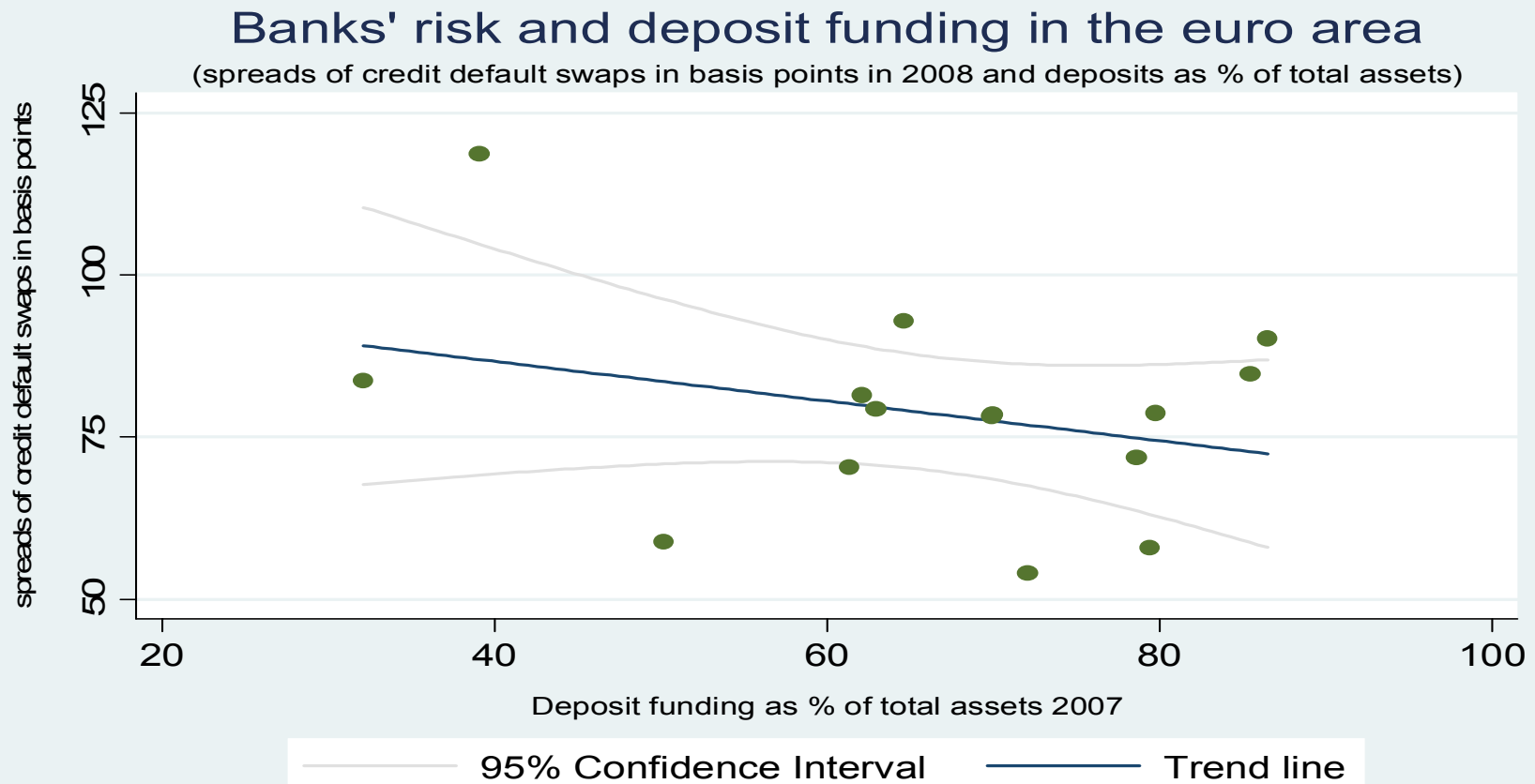


Loans to deposits for euro area largest banks





More deposit funding has been associated with less risk during the current crisis



Source: BvD Bankscope and Bloomberg data for 17 of the largest euro area banks measured by total assets in 2007.



The effects of securitization on the bank lending channel

- Securitisation may have led to lax screening of borrowers, looser credit standard and higher default on bank loans (Dell’Ariccia et al., 2008; Keys et al., 2008).
- So far the evidence is provided mainly for the US where the “sub prime segment” was in place. Less evidence for the rest of the world (Maddaloni et al., 2008). Is the “Originate-to-distribute” model bad after all?
- What we know is that in “normal times”, securitisation makes the bank lending channel less effective (Loutskina and Strahan, 2006; Altunbas et al. 2009): banks making more use of securitisation were more sheltered from the effects of monetary policy changes



... but the effects are quite different during a crisis

- However, the role of securitization as shock absorber of on bank lending could reverse in a situation of financial distress. A sudden stop of securitization activity, funding problems of SPV and uncertainty on the use of such instruments could make those banks active in the securitization market more subject to shocks (Altunbas, Gambacorta and Marques, 2009)
- We also find that bank risk conditions, as perceived by financial market investors, play an important role in determining lending supply supply and in sheltering banks from the effects of monetary policy and GDP shocks
- Greater exposure of high-risk bank loan portfolios to monetary policy shock is however attenuated in the expansionary phase, consistently with the hypothesis of a reduction in market perception of risk in good times. This is coherent with the existence of a “risk-taking channel” of monetary policy



New evidence on the MTM

- Risk-taking channel

- Altunbas, Gambacorta and Marqués, “An econometric assessment of the Risk Taking Channel”, mimeo

- Bank Lending Channel in Europe and US

- Altunbas, Gambacorta and Marqués, “Are there differences in the bank lending channel in Europe and US”, very preliminary





Bank Lending Channel (BLC) vs Risk-Taking Channel (RTC)

BLC: $i \downarrow$ Deposits $\uparrow \Rightarrow$ Loans \uparrow $Y \uparrow$

- Imperfect substitutability between loans and bonds

RTC: $i \downarrow$ $i < i^* \Rightarrow$ bank risk-taking \uparrow Loans \uparrow $Y \uparrow$

- Amplification of the “financial accelerator”: low interest rates boost collateral values and this reduces perception of risk and increase risk-tolerance (Borio et al., 2001)
- “Search for yield”: sticky rates on nominal contractual return targets and demand for risky assets (Rajan, 2005)

“Insurance effect” \uparrow



Novelties of Altunbas, Gambacorta and Marques (2009)

- Analyze the link between monetary policy and bank risk **at the international level using** a unique dataset of more than 1,100 listed banks in 16 industrialized countries
- Analyze specific aspects of the “risk-taking channel” (RTC) during the credit crisis:
 - i. the link between the RTC and the “financial accelerator”
 - ii. RTC and excessive bank lending expansion



Data

- **Quarterly data from 1999:q1 to 2008:q4.** Banks' balance sheet indicators from Bloomberg. Macro variables from IMF, OECD and BIS databases
- **Initial sample includes over 1,100 listed banks from 16 countries:** Belgium, Denmark, Germany, Greece, Finland, France, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, the United Kingdom and the United States
- **Bank risk measures:** 1) EDF (Moody's KMV) at different time horizons 1,3,5 and 10 years ahead, 2) Idiosyncratic risk measure from a CAPM model; 3) Idiosyncratic risk measure following Campbell et al (2001); 4) CDS; 5) Ratings
- **Final sample:** 643 banks, Luxemburg excluded for confidentiality reasons



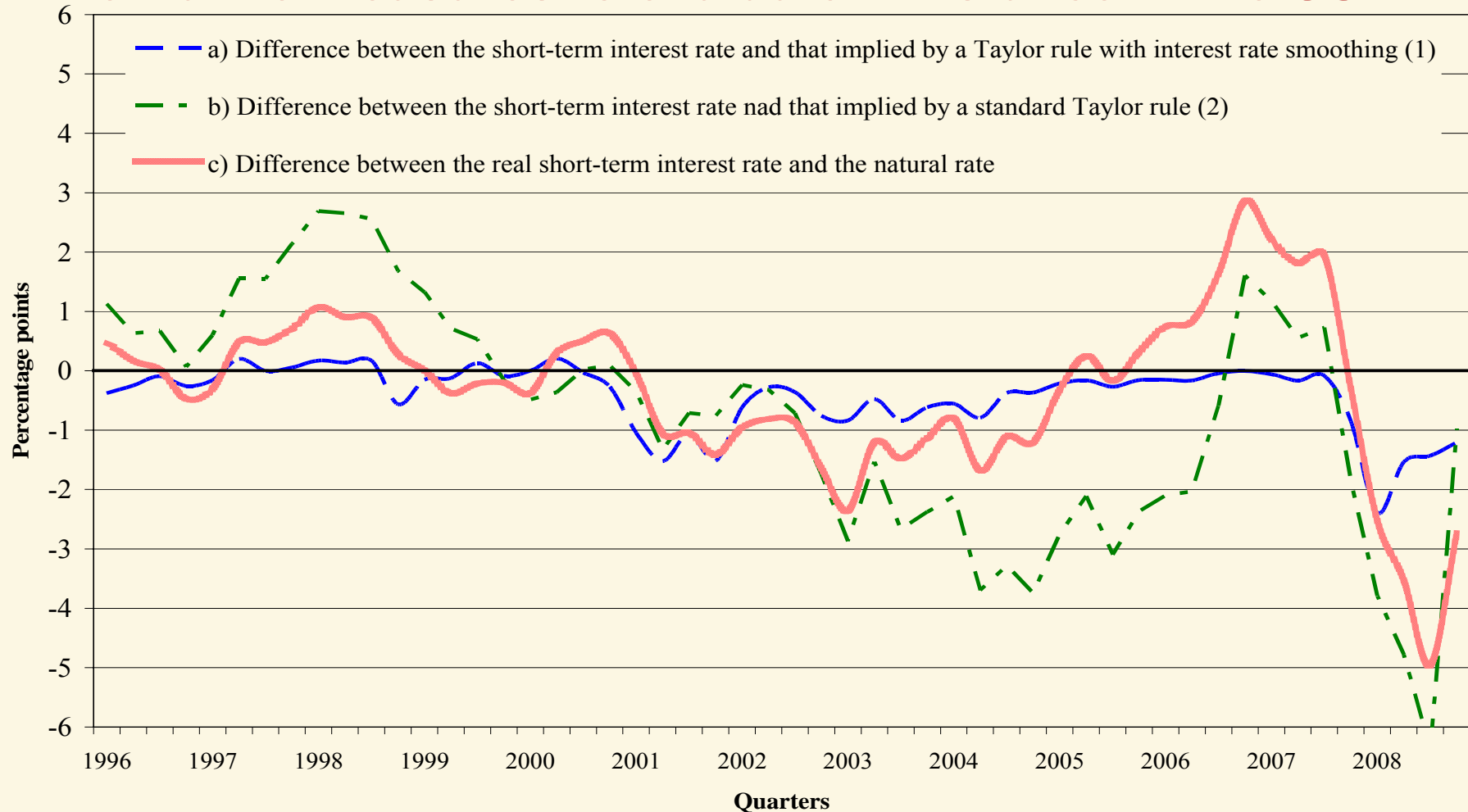
How to disentangle the effects of ΔMP on the RTC?

- Two effects of a “too low interest rates” at work:
 - i) on the riskiness of outstanding loans:** low interest rates reduce the PD of the old clients (those with variable rate loans)
 - ii) on banks’ incentive towards new risk:** low interest rates cause an overall increase for new risk taking

- How to evaluate if the interest rate is “too low”?
 1. The difference between the actual nominal short term interest rate and that implied by a “**Taylor rule**” with (and without) interest rate smoothing (TGAP)
 2. The difference between the real short term interest rate and the “**natural interest rate**” (NRGAP)



Alternative measures to evaluate MP stance in the US

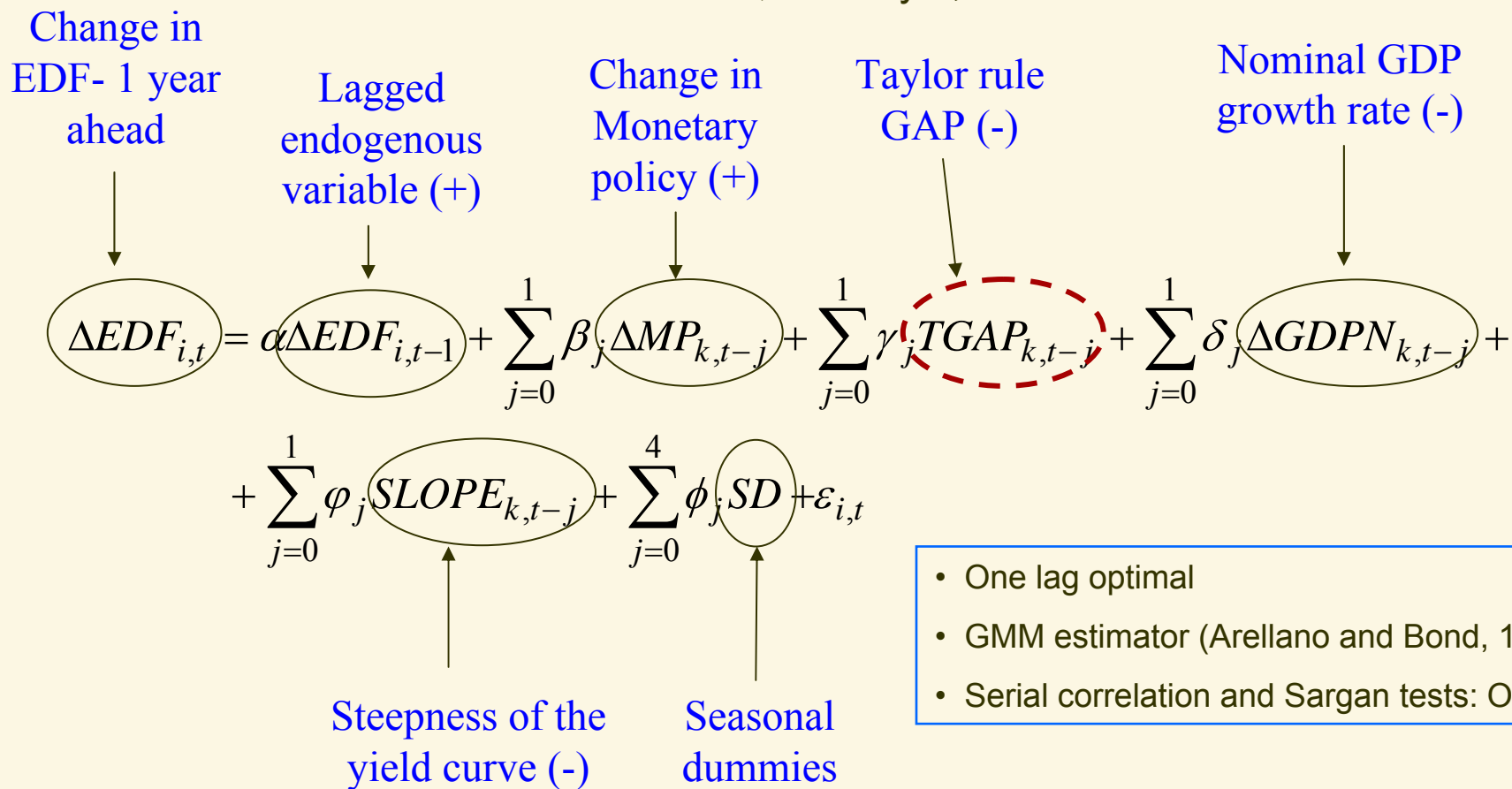


Notes: The Taylor rule is given by the formula $i_t = \alpha + \beta_\pi (\pi_t - \pi^*) + \beta_y (y_t - y_t^*) + \gamma (i_t - i_{t-1})$. (1) $\beta_\pi = 1.5$; $\beta_y = 0.5$; $\gamma = 0.9$ – (2) $\beta_\pi = 0.5$; $\beta_y = 0.5$; $\gamma = 0$.



Baseline model: is there a risk-taking channel?

Bank i , country k , time t



- One lag optimal
- GMM estimator (Arellano and Bond, 1991)
- Serial correlation and Sargan tests: OK



Using different measures for bank-risk...

Different measures of bank risk as dependent variable.	ΔEDF 1yrs		ΔEDF 5yrs		ΔEDF 10yrs		ΔRating	
	Coeff.	S.Error	Coeff.	S.Error	Coeff.	S.Error	Coeff.	S.Error
Dependent variable _{t-1}	0.222 ***	0.006	0.310 ***	0.006	0.291 ***	0.000	0.001	0.011
ΔMP_t	0.114 **	0.050	0.276 ***	0.052	0.202 ***	0.069	0.002	0.002
ΔMP_{t-1}	0.425 ***	0.047	0.091 ***	0.023	0.089 *	0.047	0.007 *	0.004
$\Delta TGAP_t$	-0.111 **	0.050	-0.176 ***	0.064	-0.684 ***	0.078	-0.007 **	0.003
$\Delta TGAP_{t-1}$	-0.497 ***	0.056	-0.592 ***	0.094	-0.254 **	0.110	-0.001	0.002
$\Delta GDPN_t$	-0.095 ***	0.013	-0.192 ***	0.029	-0.357 ***	0.035	-0.001	0.001
$\Delta GDPN_{t-1}$	-0.140 ***	0.008	-0.206 ***	0.018	-0.331 ***	0.026	-0.001	0.001
$\Delta SLOPE_t$	-0.011 **	0.005	-0.090 *	0.047	-0.092	0.058	-0.001	0.002
$\Delta SLOPE_{t-1}$	-0.068 ***	0.020	-0.155 ***	0.050	-0.251 ***	0.054	-0.001	0.001
Sample period	1999 Q1 - 2008 Q4		2004 Q1 - 2008 Q4		2004 Q1 - 2008 Q4		1999 Q1 - 2008 Q4	
No. of banks, no. of obs.	643	19,796	643	11,631	643	11,631	149	4,500
Sargan test (pvalue)		0.211		0.175		0.222		0.311
MA(1), MA(2) (p-value)	0.000	0.695	0.000	0.202	0.000	0.599	0.000	0.364

Notes: Robust standard errors. The coefficients for the seasonal dummies are not reported.



The link between the RTC and the “Financial Accelerator”

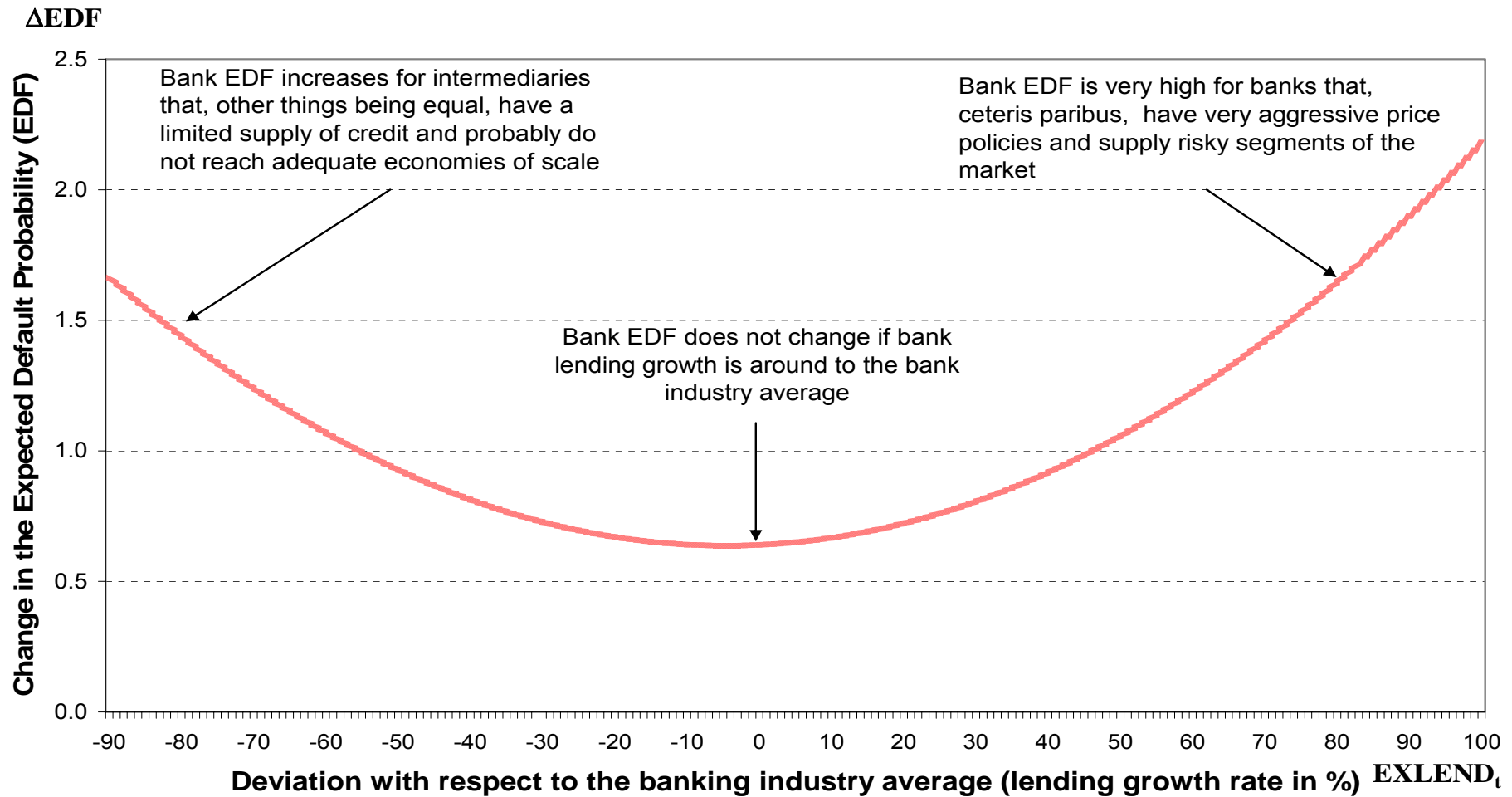
- We control for improvements in borrowers’ net worth and collateral by introducing in the specification the evolution of asset prices (stock market and housing prices) as deviations from their long-term averages (ΔSM and ΔHP)
- Only the coefficient for ΔSM have the expected negative sign, while a positive coefficient is detected for housing prices ($\Delta HP \uparrow \Rightarrow EDF \uparrow$)
- The positive link between housing prices and bank risk is accounted for by developments in the housing market of those countries that experienced a boom-bust housing cycle (dummy HPBB for DE, IR, SP, SW, UK, US). Controlling for these effects the coefficient on ΔHP for the remaining countries turns out to be indeed negative



Dependent variable: quarterly change of the EDF over a 1 year horizon	The financial accelerator (house and stock market returns)		The financial accelerator (different behaviour in countries with boom-bust housing cycle)	
	Coeff.	S.Error	Coeff.	S.Error
ΔEDF_{t-1}	0.223 ***	0.007	0.224 ***	0.007
ΔMP_t	0.185 ***	0.065	0.191 ***	0.069
ΔMP_{t-1}	0.344 ***	0.051	0.281 ***	0.052
$TGAP_t$	-0.142 ***	0.052	-0.185 ***	0.055
$TGAP_{t-1}$	-0.447 ***	0.060	-0.408 ***	0.060
$\Delta GDPN_t$	-0.106 ***	0.014	-0.152 ***	0.017
$\Delta GDPN_{t-1}$	-0.124 ***	0.008	-0.158 ***	0.008
$SLOPE_t$	-0.027 **	0.012	-0.019 *	0.010
$SLOPE_{t-1}$	-0.084 ***	0.023	-0.077 ***	0.024
ΔHP_t	0.010 ***	0.002	-0.004 *	0.002
ΔHP_{t-1}	0.002 *	0.001	-0.110 ***	0.001
ΔSM_t	-0.010 ***	0.001	-0.009 ***	0.001
ΔSM_{t-1}	-0.011 ***	0.001	-0.007 ***	0.001
$\Delta HP_t * HPBB$			0.016 ***	0.004
$\Delta HP_{t-1} * HPBB$			0.014 ***	0.004
$\Delta SM_t * HPBB$			-0.004 ***	0.001
$\Delta SM_{t-1} * HPBB$			-0.005 ***	0.001
Sample period	1999 Q1 - 2008 Q4		1999 Q1 - 2008 Q4	
No banks, No of obs.	643	19,796	643	19,796
Sargan test (2nd step; pvalue)		0.247		0.225
MA(1), MA(2) (p-value)	0.000	0.631	0.000	0.759

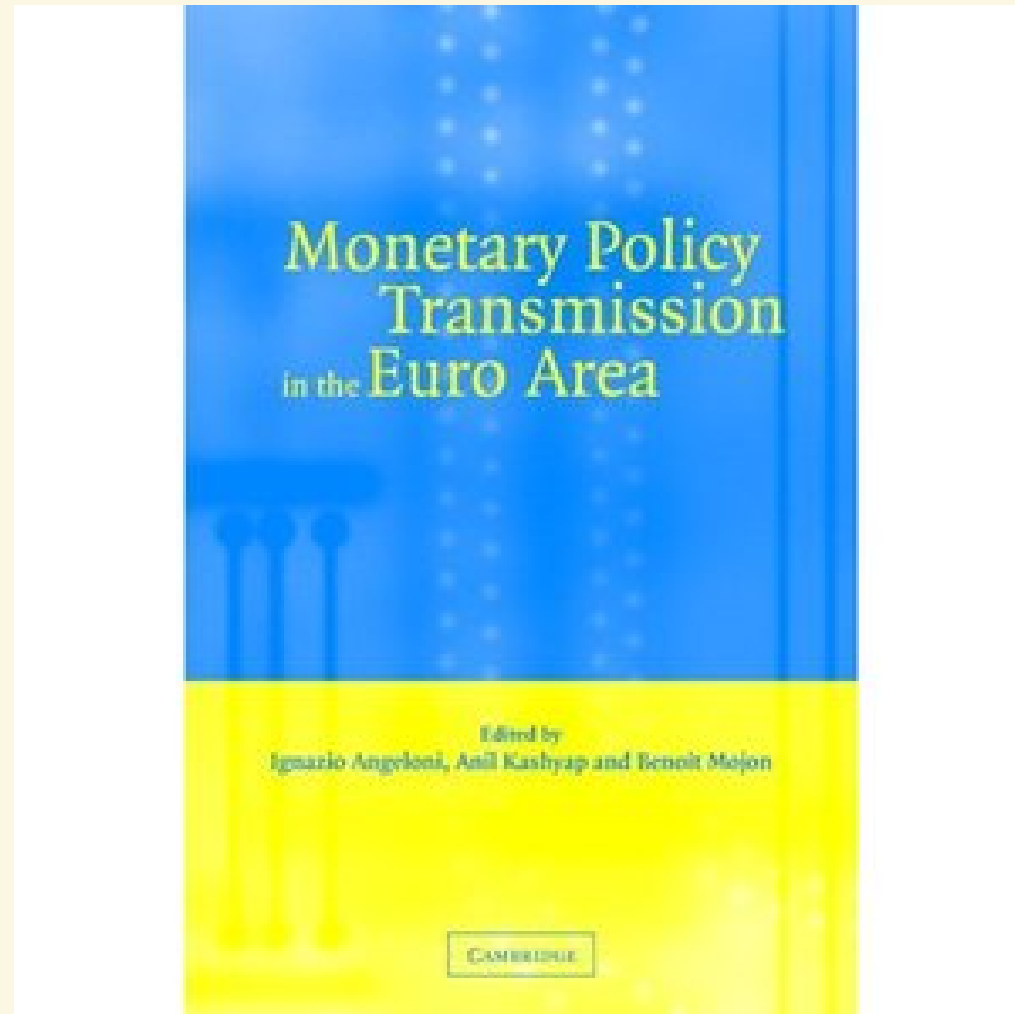


Excessive lending expansion and bank risk





Restarting where we left off ...





The baseline MTN model (Ehrmann et al., 2001)

Bank i , country k , time t

Quarterly growth rate of lending

Lagged endogenous variable (+)

Change in the MP (-)

Nominal GDP growth rate (+)

$$\Delta \ln L_{it} = \sum_{j=1}^4 \alpha_j \Delta \ln L_{it-j} + \sum_{j=1}^4 \beta_j \Delta MP_{k,t-j} + \sum_{j=1}^4 \delta_j \Delta \ln y_{k,t-j} + \gamma_0 X_{it-4} + \sum_{j=1}^4 \gamma_j X_{it-4} \Delta MP_{t-j} + \sum_{j=1}^4 SD_j + \varepsilon_{it}$$

Size, Liquidity, Capitalization (+)

Bank specific characteristics interacted with ΔMP (+)

Seasonal dummies

- Four lag
- GMM estimator (Arellano and Bond, 1991)
- Serial correlation and Sargan tests: OK



Dependent var.: quarterly growth rate of lending ($\Delta \ln L_{it}$)	MTN model		Effect of liquidity during the crisis	
	Coeff.	S.Error	Coeff.	S.Error
Lags in $\Delta \ln L$	0.115 ***	0.015	0.119 ***	0.015
Monetary policy	-1.183 ***	0.259	-0.723 **	0.319
Nominal GDP growth	0.634 ***	0.122	0.698 ***	0.131
Bank characteristics:				
Size	0.335 ***	0.128	0.384 ***	0.134
Liquidity	0.014	0.015	0.020	0.018
Capitalization	0.274 ***	0.100	0.301 ***	0.104
Bank characteristics* ΔMP :				
Size	2.134 ***	0.306	2.259 ***	0.344
Liquidity	-0.782 ***	0.019	-0.274 ***	0.043
Liquidity*CRISIS			0.797 ***	0.153
Capitalization	0.174	0.120	0.230 *	0.125
Sample period	1999 Q1 - 2008 Q4		1999 Q1 - 2008 Q4	
Sargan test (2nd step; pvalue)		0.089		0.200
MA(1), MA(2) (p-value)	0.000	0.577	0.000	0.453
No of banks, no of observations	1078	29917	1078	29917



Dependent var.: quarterly growth rate of lending $(\Delta \ln L_{it})$	Bank risk and monetary policy (AGM, 2009)		Bank size effect: US vs Europe		Bank lending reaction to GDP: US vs Europe	
	Coeff.	S.Error	Coeff.	S.Error	Coeff.	S.Error
Lags in $\ln L$	0.064 **	0.027	0.070 ***	0.025	0.136 ***	0.017
Monetary policy	-1.207 **	0.529	-1.040 **	0.463	-1.107 **	0.464
Nom. GDP growth	0.756 ***	0.176	0.721 ***	0.169	0.676 ***	0.211
Nom. GDP growth*EU					0.744 **	0.374
Nom. GDP growth*EU*CRISIS					-2.030 ***	0.680
Bank characteristics:						
Size	0.188	0.128	1.528 ***	0.307	0.804 ***	0.222
Size*EU			-2.104 ***	0.603	-1.200 **	0.487
Liquidity	0.026 **	0.011	0.050 ***	0.017	0.058 ***	0.015
Capitalization	0.325 **	0.152	0.568 ***	0.195	0.438 **	0.178
EDF: Bank risk	-0.208 **	0.098	-0.197 *	0.111	-0.502 ***	0.149
Bank characteristics* \ln MP:						
Size	1.368 ***	0.388	2.410 ***	0.774	0.606 *	0.338
Size*EU			-1.231	0.802	0.198	0.189
Liquidity	-0.023	0.033	0.008	0.072	0.085	0.063
Liquidity*CRISIS	0.145 **	0.057	0.308 ***	0.118	0.448 ***	0.103
Capitalization	0.598 **	0.241	0.498 **	0.248	0.334 *	0.201
EDF: Bank risk	-1.060 **	0.462	-0.953 **	0.427	-0.292 **	0.132
Sample period	1999 Q1 - 2008 Q4		1999 Q1 - 2008 Q4		1999 Q1 - 2008 Q4	
Sargan test (2nd step; pvalue)		0.190		0.290		0.230
MA(1), MA(2) (p-value)	0.000	0.764	0.000	0.184	0.000	0.198
No of banks, no of observations	612	16192	612	16192	612	16192



Conclusions

- The monetary transmission mechanism is changing: there is a new role for bank capital, market funding, securitization and bank risk
- Using a comprehensive database of listed banks operating in Europe and US, we find evidence of:
 1. A significant link between low interest rates and bank risk-taking ⇒ central banks actions have an impact on bank risk attitudes; monetary policy is not fully neutral from a financial stability perspective
 2. differences in the bank lending channel due mainly to size (old story) and in the reaction of credit to GDP shocks; bank capital does matter in the transmission of shocks