BANK FOR INTERNATIONAL SETTLEMENTS

An Empirical Assessment of the Risk-Taking Channel

Yener Altunbas (University of Wales)

Leonardo Gambacorta (BIS)

David Marques-Ibanez (ECB)

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

BIS/ECB Workshop on "Monetary Policy and Financial Stability" – Basel, September 11 2009

Road map

- Motivation
- Bank Lending Channel (BLC) vs Risk-Taking Channel (RTC)
- Empirical evidence on the RTC and novelties of our paper
- Data and econometric model
- Results and robustness tests
- Conclusions

Motivation

- The recent credit crisis has drawn the attention of researchers and policymakers to a new dimension of the monetary transmission mechanism the so-called risk-taking channel (Borio and Zhu, 2008)

- A “too accommodative monetary policy” may have caused a reduction in risk perception contributing - together with financial innovation and other factors – to the build up of the crisis

- However, evidence provided so far on the RTC are limited to two countries studies. Need to provide evidence on the effectiveness of the RTC at the global level and to analyze specific aspects of this channel during the crisis

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

BLC: i↓ Deposits↑ ⇒ Loans ↑ Y↑

- Imperfect substitutability between loans and bonds

RTC: i↓ i < i* ⇒ bank risk-taking ↑ Loans ↑ Y↑

- 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" ↑

Empirical evidence on the RTC so far …

- Jiménez et al. (2009) investigate the impact of the stance and path of monetary policy **on the level of credit risk of individual Spanish bank loans**. They find that lower short-term interest rates prior to loan origination result in banks granting more risky *new* loans. Lower interest rates, by contrast, reduce the credit risk of *outstanding* loans (i.e. since clients pay a reduced rate on their variable rate loans their probability to default declines)

- Ioannidou et al. (2009) analyze the link MP-bank risk **on the side of loan pricing using Bolivian data**. When interest rates are low, not only do banks take on higher risk but they also reduce the loan rates of risky vis-á-vis riskless borrowers

… and the novelties of our paper

- Analyze the link between monetary policy and bank risk **at the global level using** a unique dataset of more than 1,100 listed banks in 16 industrialized countries

- To analyze specific aspects of the RTC during the credit crisis:

  i. the link between the RTC and the "financial accelerator"
  ii. the role of bank-size prior and during the crisis
  iii. 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?

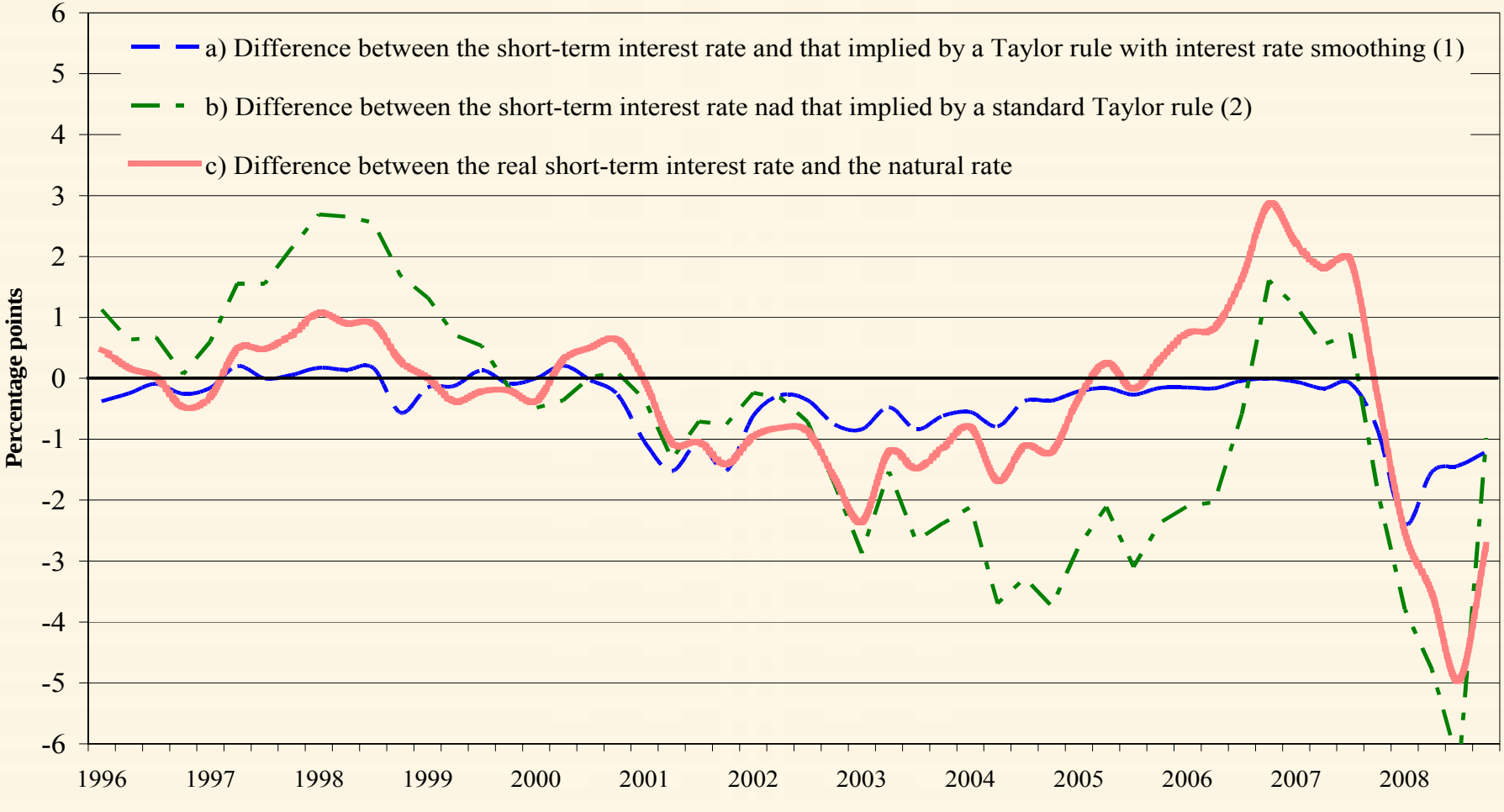
- Two effects of a "too low interest rates" at work:

  i) on the riskiness of outstanding loans: low interest rates reduce the PDF 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: Taylor rule GAP

Bank *i*, country *k*, time *t*

Change in EDF- 1 year ahead

Lagged endogenous variable (+)

Change in Monetary policy (+)

Taylor rule GAP (-)

Nominal GDP growth rate (-)

$$\Delta EDF_{i,t} = \alpha \Delta EDF_{i,t-1} + \sum_{j=0}^{1} \beta_j \Delta MP_{k,t-j} + \sum_{j=0}^{1} \gamma_j TGAP_{k,t-j} + \sum_{j=0}^{1} \delta_j \Delta GDPN_{k,t-j} + \sum_{j=0}^{1} \varphi_j SLOPE_{k,t-j} + \sum_{j=0}^{4} \phi_j SD + \varepsilon_{i,t}$$

Steepness of the yield curve (-)

Seasonal dummies

- 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

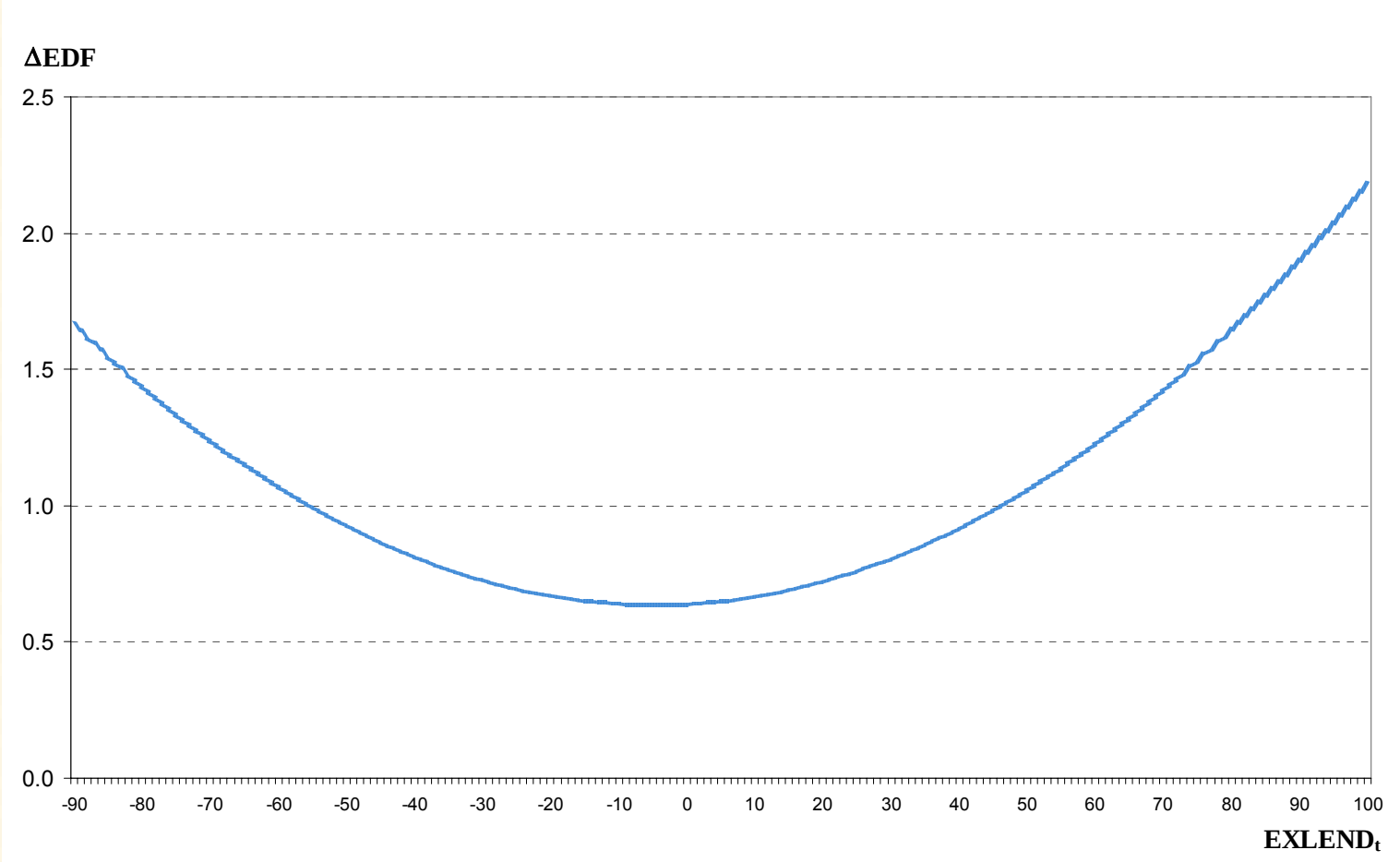
Dependent variable: quarterly change of the EDF over a 1 year horizon	The financial accelerator (house and stock market returns)		The financial accelerator (different behaviour in countries with boom-bust housing cycle)	
	Coeff.	S.Error	Coeff.	S.Error
ΔEDF_{t-1}	0.223 ***	0.007	0.224 ***	0.007
ΔMP_t	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
ΔHP_t*HPBB			0.016 ***	0.004
ΔHP_{t-1}*HPBB			0.014 ***	0.004
ΔSM_t*HPBB			-0.004 ***	0.001
ΔSM_{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

The role of bank size during the crisis

- The link between size and bank-risk is contrary on the “too big to fail” paradigm. Big banks are perceived as “more risky”.
- Is this effect connected with the crisis?
- Two possible effects at work: a) Main culprits of crisis were large institutions which traded new and complex securities; b) Big banks could have been considered “too big to be saved by their national governments alone”
- Interaction between a dummy CRISIS that takes the value of one from 2007:q3 to 2008:q4 and the variable SIZE
- Result: the log of total assets (*SIZE*) turns out to have the expected negative impact on bank risk in the pre-crisis period, while the interaction with the dummy for the crisis period is positive

Dependent variable: quarterly change of the EDF over a 1 year horizon	Bank specific characteristics (size, liquidity, capitalization)		Bank size effect during the crisis	
	Coeff.	S.Error	Coeff.	S.Error
ΔEDF_{t-1}	0.302 ***	0.007	0.278 ***	0.007
ΔMP_t	0.080 **	0.041	0.082 ***	0.018
ΔP_{t-1}	0.216 ***	0.043	0.185 ***	0.027
$TGAP_t$	-0.078 *	0.043	-0.202 ***	0.028
$TGAP_{t-1}$	-0.262 ***	0.046	-0.156 ***	0.017
$\Delta GDPN_t$	-0.080 ***	0.010	-0.092 ***	0.010
$\Delta GDPN_{t-1}$	-0.102 ***	0.008	-0.112 ***	0.007
$SLOPE_t$	-0.053 ***	0.013	-0.030 **	0.013
$SLOPE_{t-1}$	-0.050 ***	0.011	-0.031 ***	0.011
ΔHP_t	0.011 ***	0.002	0.011 ***	0.002
ΔHP_{t-1}	0.002 *	0.001	0.002 *	0.001
ΔSM_t	-0.011 ***	0.001	-0.007 ***	0.001
ΔSM_{t-1}	-0.007 ***	0.001	-0.004 ***	0.001
$SIZE_{t-1}$	0.060 ***	0.009	-0.033 ***	0.011
LIQ_{t-1}	-0.008 ***	0.001	-0.004 ***	0.001
CAP_{t-1}	-0.013 ***	0.001	-0.016 ***	0.001
$SIZE_{t-1}$*CRISIS			0.030 ***	0.002
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)		0.275		0.277
MA(1), MA(2) (p-value)	0.000	0.374	0.000	0.741

Excessive lending expansion and bank risk



Robustness tests

- Use of Credit Default Spreads as bank risk variable (subset of around 100 banks over the period 2002-2009)
- Different measures for "idiosyncratic" component of bank risk: i) a simple CAPM model; ii) the approach used by Campbell et al. (2001) $\Rightarrow$ RTC is not only industry driven but it also depends upon bank-specific characteristics
- Introduction of a geographical control dummy for each model: check for country specific institutional factors (lax screening?)
- Ratings with and without Government guarantees

Further work to be done …

- Control for deregulation (World Bank Indicators)
- Impact of bank competition (Bank Lending Survey)
- Is it "search for yield"?

1. Include Risk aversion indicators from State Street and Goldman Sachs
2. Include actual and expected bank profits indicator from Consensus Forecast

Conclusions

- Our paper evaluates if a risk-taking channel of monetary policy was actually in place over the period 1999-2008
- Using a comprehensive database of listed banks operating in the European Union (EU15) and the United States, we find evidence of a significant link between relative monetary policy looseness – calculated using both the Taylor rule and the natural rate – and bank risk-taking
- This result holds for a wide range of indicators of bank risk and macroeconomic controls
- The main policy implication of the paper is that central banks actions have an impact on bank risk attitudes and that monetary policy is not fully neutral from a financial stability perspective