

Research Conference of National Bank of Slovakia, Bratislava, November 23-24, 2016  
Monetary Policy Challenges from a Small Country Perspective

---

# **The Macroeconomic Impact of Basel III: Evidence from a Meta-Analysis**

**Jarko Fidrmuc, Ronja Lind**

*ZU Friedrichshafen*

---



# Introduction

---

- | Intensive discussion since its announcement in 2010.
- | Claims that higher capital ratios will impose costs at the bank-level and finally the country-level:  
*„We must rethink Basel, or growth will suffer.“* (Pandit, Fin. Times 2010)
- | However, macro-financial linkages (*the bank capital channel*) have been neglected in traditional economic literature. Friedman (1991) remarked that  
*“traditionally, most economists have regarded the fact that banks hold capital as at best a macroeconomic irrelevance and at worst a pedagogical inconvenience.”*
- | Noss & Toffano (JBF, 2016) conclude that  
*“there is a high degree of uncertainty as to how banks might respond to future increases in macroprudential capital ratio requirements and the effect of such responses on the real economy (...).”*



## Introduction – Basel III

---

- | The Basel III framework covers a range of regulatory instruments, including capital and liquidity standards, risk coverage and leverage ratio.
- | In general, the discussion mainly focus on minimum capital requirements: The total common equity Tier 1 capital ratio to should increase to 7%.
- | According BIS (2010b), banks would need to raise their capital ratios by 1.3 percentage points in average to achieve this target.
- | These standards should be implemented by 2019.



# Main contributions and results

---

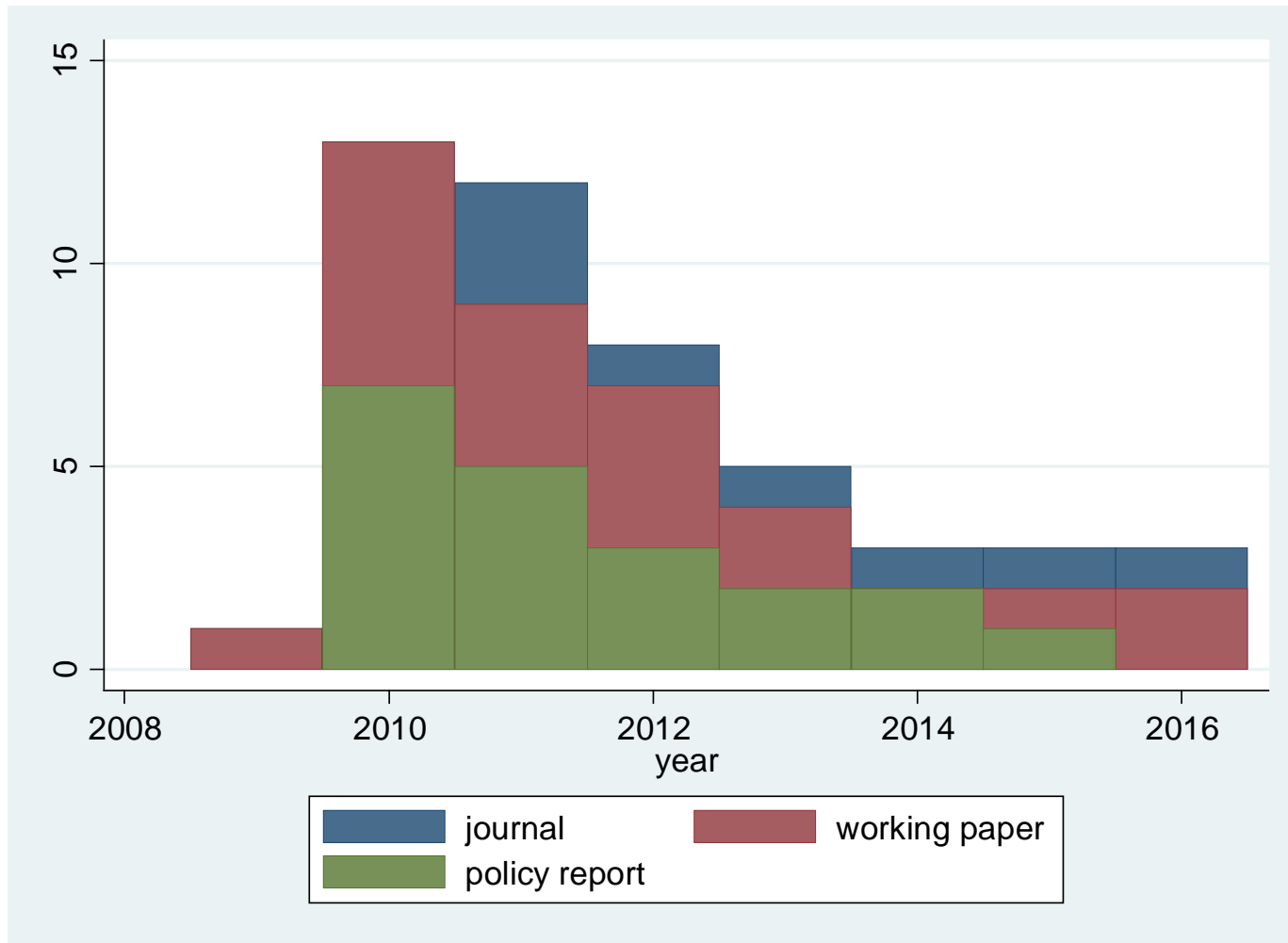
- | We apply meta analysis to economic policy analysis based on simulation studies using econometric models but also DSGE models or “working groups” approach
- | *Basel III capital regulations could have negative but relatively moderate effects.*
- | We discuss binary (important/not important) meta regressions  
*More clear-cut results for such binary models*
- | We discuss the publication bias in policy analysis  
*We show that publication bias is highly important, possibly more important than in standard econometric analysis*
- | We address literature and country heterogeneity (financial systems, legal origins)  
*We find surprisingly low heterogeneity between countries and financial systems.*

# Methodology - Meta-analysis

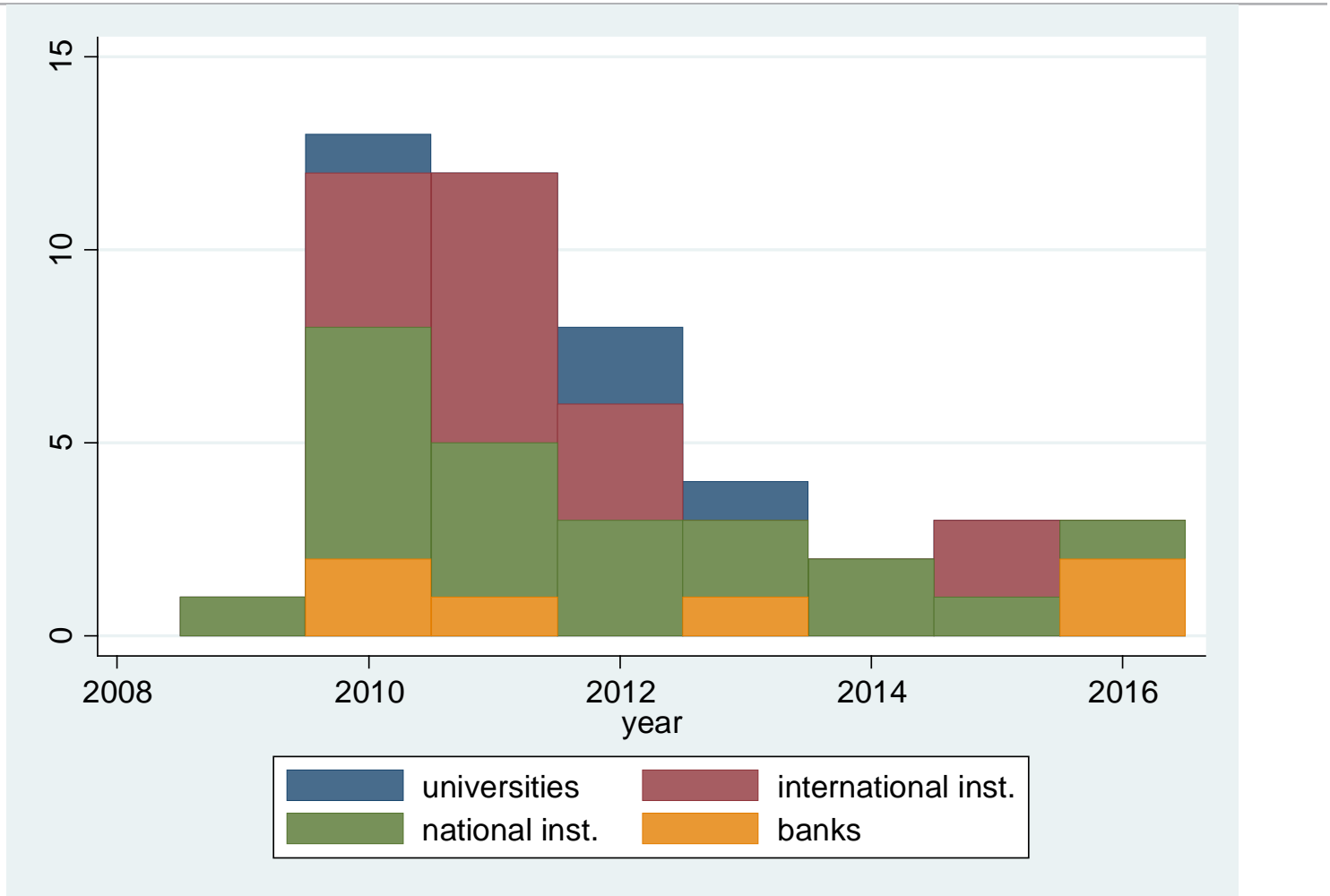
---

- | Meta-analysis is a powerful tool to investigate heterogeneities between publications.
- | It is a technique used to summarize empirical results from a large number of studies on the same topic (Stanley, 2001).
- | Meta-analysis has a long tradition in e.g. medicine and natural sciences and is becoming increasingly popular in economics.
- | This approach is however relatively new in finance (Feld *et al.*, JBF, 2014).

# Meta-Dataset: 48 studies with more than 300 estimates



# Publications authors' affiliations

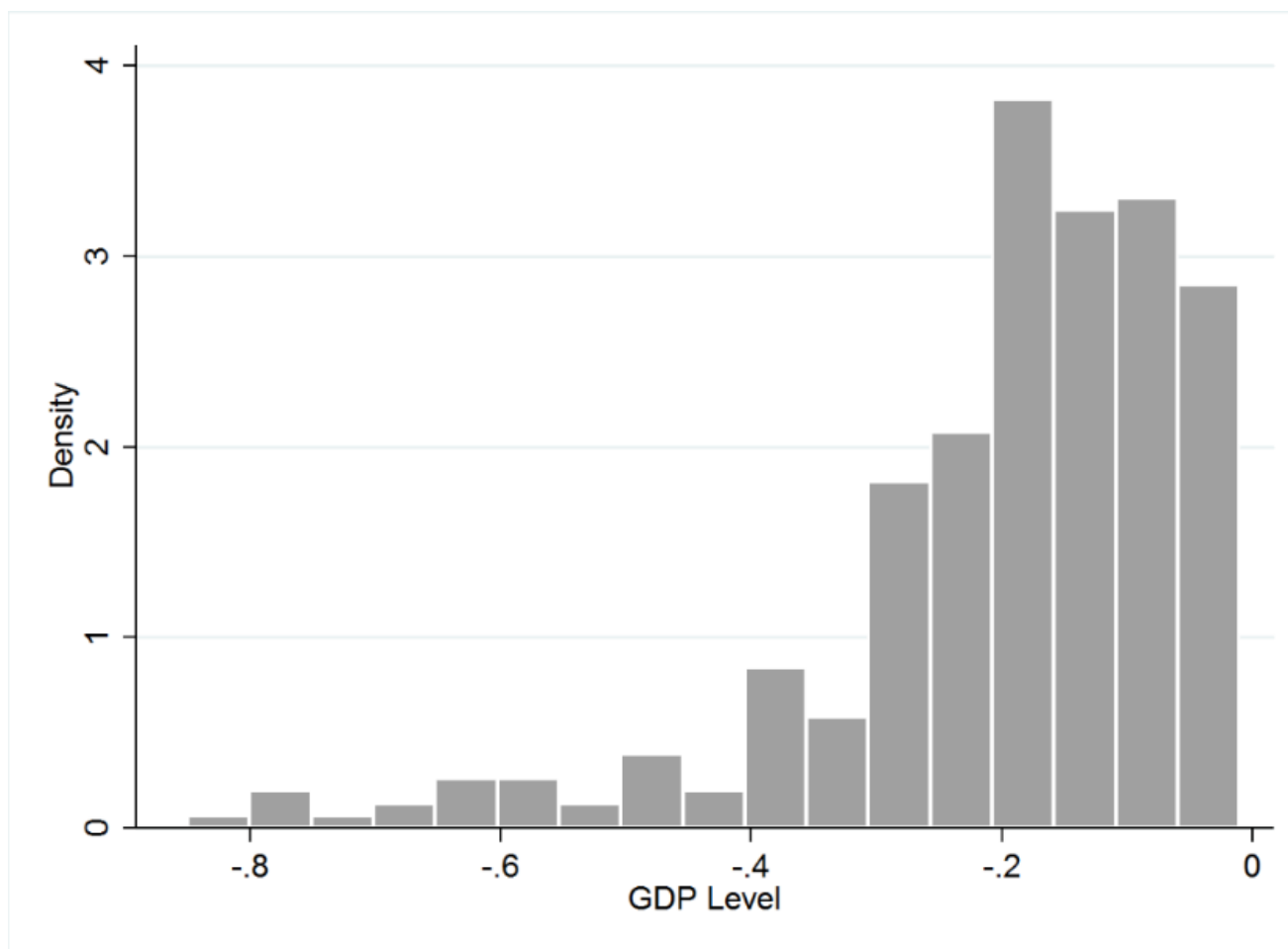


# Meta-statistics

	Obs.	Mean	Min	Max
Total	312	-0.198	-0.85	-0.01
BIS	87	-0.194	-0.56	-0.04
Central Bank	65	-0.175	-0.85	-0.01
European Institution	36	-0.189	-0.39	-0.05
Banking sector	28	-0.425	-0.80	-0.04
Academic sector	22	-0.193	-0.42	-0.01
Bank-based system	238	-0.206	-0.80	-0.01
Market-based system	74	-0.171	-0.85	-0.01
English origin	80	-0.173	-0.85	-0.01
French origin	43	-0.171	-0.64	-0.01
German origin	33	-0.226	-0.80	-0.01
Other origin	145	-0.213	-0.78	-0.03



# Meta-Dataset - Histogram



# Publication Bias Analysis - Funnel plots

---

- | Authors or referees may follow their preferences for statistically significant and theoretically expected results (Stanley, 2005).
- | Funnel graph plots the precision of the reported effect against the measured effect.
- | The funnel plot shows strong evidence for publication bias.
- | For simulation and policy studies, however, the precision (standard errors) is not published.
- | Therefore, we compute study-average results and study specific standard deviation of results.

*Source: Stanley (2005: 314)*

# Proxy for Precision for Simulation Studies

---

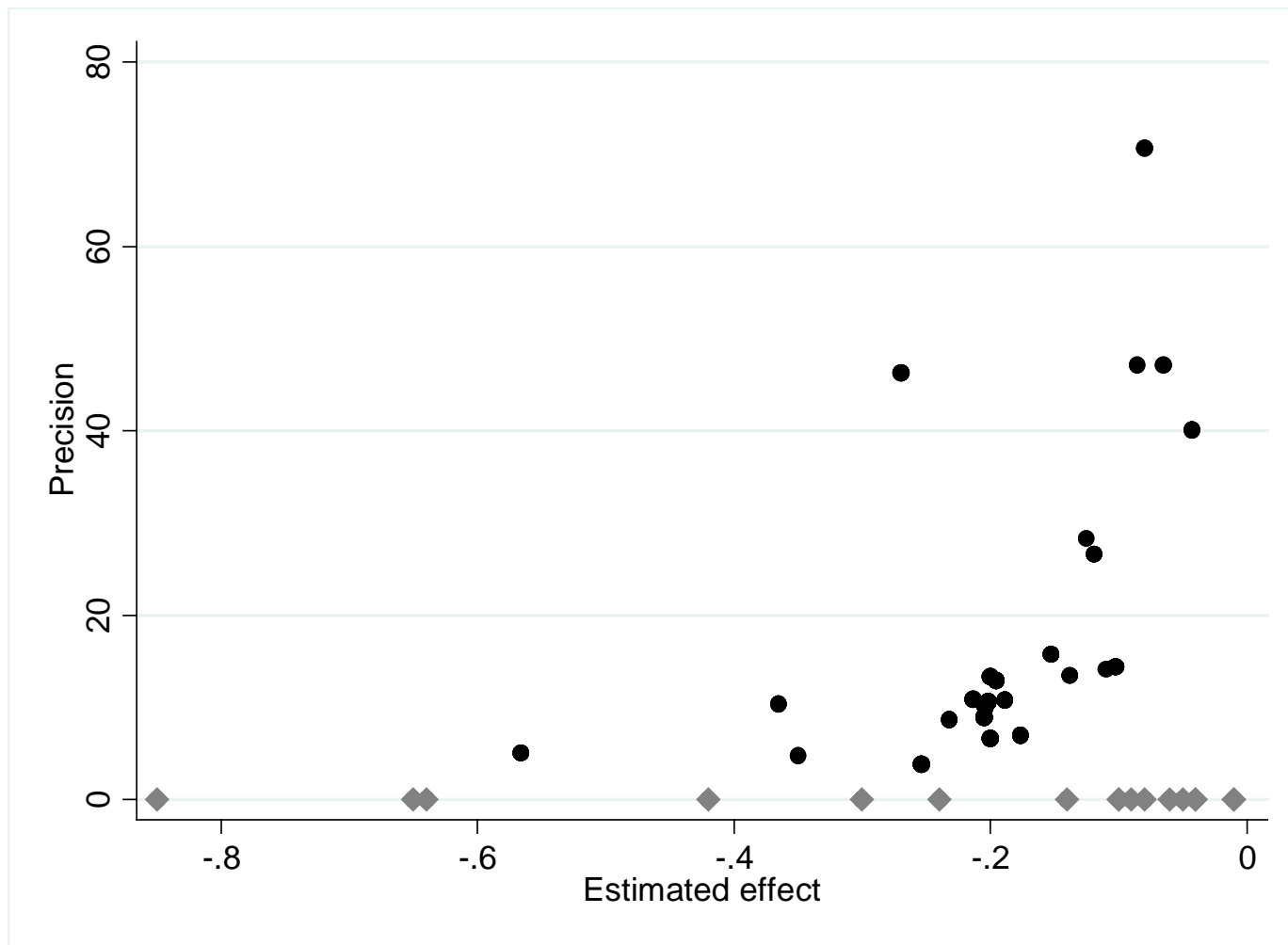
- | The standard errors, a usual measure of precision ( $1/SE$ ), are not available in especially for simulation studies.
- | Therefore, we use the average precision of studies,  $APS$ , which uses the standard deviation,

$$SD_k = \frac{1}{N_k} \sum_i (\widehat{bsl}_{ki} - \overline{bsl}_k)$$

- | For studies with only 1 estimate, we set the precision proxy to 0

$$APS_k = \begin{cases} \frac{1}{SD_k} & \text{if } N_k > 1 \\ 0 & \text{if } N_k = 0 \end{cases}.$$

# Funnel plot



# Publication Bias Analysis (cont'd)

## Funnel asymmetry tests

---

- | The funnel asymmetry test is based on a simple regression of available effects and the corresponding standard errors:

$$\overline{bsl}_k = \alpha APS_k + bsl + \varepsilon_{ki},$$

- | Evidence for publication bias: Researchers discard positive estimates too often.

---

	(1)	(2)	(3)	(4)
	OLS	WLS	OLS	WLS
Publication bias, $\alpha$	-0.465	-1.035	-1.242***	-1.396**
Observations	48	48	26	26

---

# Meta-Regression Analysis

---

- | Meta-regressions allow to control systematically for study characteristics.
- | We estimate a regression of the form:

$$\widehat{bsl}_{ki} = \mu + \sum_{l=1}^L \beta_l D_{lki} + u_{ki}$$

- | We compare OLS estimation with probit models for large effects (left to -0.25 percentage points of GDP, e.i., the first quartile).

$$P(\widehat{bsl}_{ki} < 0.25) = \mu + \sum_{l=1}^L \beta_l D_{lki} + u_{ki}$$

- | Note that probit estimations should have the opposite sign.

# Meta-Regression Analysis – Control Variables

---

## **Authors' affiliations:**

- Authors' sector affiliation, authors' affiliation with a specific institution.

## **Publication characteristics:**

- Publication year, publication format (journal, working paper, policy reports, other).

## **Regional focus:**

- Individual countries, financial system (bank-based / market-based), legal origin.

## **Model classes:**

- Model classes (regression, VAR, DSGE, macro-structural model...).

## **Model definitions:**

- Long-term estimate, implementation horizon, monetary policy.

## Meta-Regression Results (OLS/Probit) – I

	OLS	OLS	Probit	Probit
	Stepwise	Preferred	Stepwise	Preferred
Banking sector	-0.233***	-0.181***	0.373*	0.164
BIS	-0.001	0.081***	-0.009	-0.229**
Central Bank	0.018	0.073***	0.019	-0.168*
IMF	0.051**		-0.073	
Europ. Institution	0.004	0.096***	0.023	-0.188***
OECD	0.040	0.140***	-0.171*	-0.226***
FSA	0.133***	0.153***	0.141	0.135*



## Meta-Regression Results (OLS/Probit) – II

---

	OLS	OLS	Probit	Probit
	Stepwise	Preferred	Stepwise	Preferred
Publication year	0.008		-0.012	
Journal	-0.020		-0.059	
Working paper	0.018		-0.046	
Public policy report	-0.011		0.090	
Bank policy report	-0.274***		0.443**	

---

## Meta-Regression Results (OLS/Probit) – III

	OLS	OLS	Probit	Probit
	Stepwise	Preferred	Stepwise	Preferred
Bank-based system	-0.022	-0.060***	0.141	0.135*
French origin	0.022		-0.106	
German origin	-0.033		-0.026	
Scandinavian origin	0.013		-0.124	
Other origin	-0.020		-0.051	
Long-term estimate	-0.028*		-0.136	
Long implementation	0.064*			
Monetary policy offset	0.107***	0.101***	-0.225***	-0.210***

## Meta-Regression Results (OLS/Probit) – IV

	OLS	OLS	Probit	Probit
	Stepwise	Preferred	Stepwise	Preferred
Mean estimate	-0.012		0.027	
Median estimate	0.049**		-0.163*	
Accounting-based mod.	-0.075**		0.086	
VAR models	-0.107***	-0.097**	0.328*	0.290*
DSGE models	0.080***	0.069***	-0.128*	-0.136*
Macro models	0.088***	0.124***	-0.204***	-0.278***
Production function	0.132***	0.148***	0.082	

# Robustness Analysis

---

- | We perform different robustness checks:
  - e.g. weighted regression, median regression, country-fixed and study-random effects
- | Moreover, we perform further model extensions of standard meta-analysis:
  - (i) Multilevel models
  - (ii) Bayesian model averaging
- | Robustness checks and model extensions do not change coefficients.

# Conclusions

---

## | Main findings

- On average, there is a negative, albeit moderate *regulation effect*.
- Estimated effects depend on numerous study characteristics (e.g. econometric specifications and the underlying financial system).
- There is strong evidence for publication bias.

## | Implications

- Empirical results in this field must be interpreted with some caution, as individual studies rely on different assumptions and are highly selective.
- More research efforts are required to improve the calibration of the policy models employed to estimate regulation effects.

---

**Thank you for your attention.**

jarko.fidrmuc@zu.de

r.lind@zeppelin-university.net



# Motivation - conflicting results and assumptions

---

	Required increase in capital percentage points	GDP growth <sup>a</sup>
MAG (2010b)	1.3 pp	–5 basis points over 4 years
IIF (2011) <sup>b</sup>	4.8 pp	–30 to 60 basis points over 5 years
Slovik and Coumède, OECD (2011)	3.7 pp	–15 basis points over 9 years
Elliott et al., IMF (2012) <sup>b</sup>	1.2–2.7 pp	(not estimated)
Miles et al. (2013)	3.3 pp	–15 basis points, permanent
Oxford Economics (2013) <sup>b</sup>	4–10 pp	–7 to 16 basis points over 9 years

*Source: Cohen (JBF, 2016)*



# Introduction – macroeconomic impact of Basel III

---

- | In recent years, a growing number of studies has tried to quantify these effects.
- | The first empirical models emerged after the 1988 Basel Accord (*“credit crunch hypothesis”*, e.g. Bernanke & Lown, 1991; Hancock & Wilcox, 1993).
- | Blum & Hellwig (1995) pioneered the empirical work assessing macro effects.
- | Recent Basel III impact studies use a variety of models:  
*e.g. bank-augmented DSGE models (Meh & Moran, 2010), target capital ratio model (Francis & Osborne, 2009), credit spread model (Barrell, 2009), loan pricing model (Elliott, 2009), or reduced-form econometric models*