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The Macroeconomic Impact of Basel III:

Evidence from a Meta-Analysis

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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

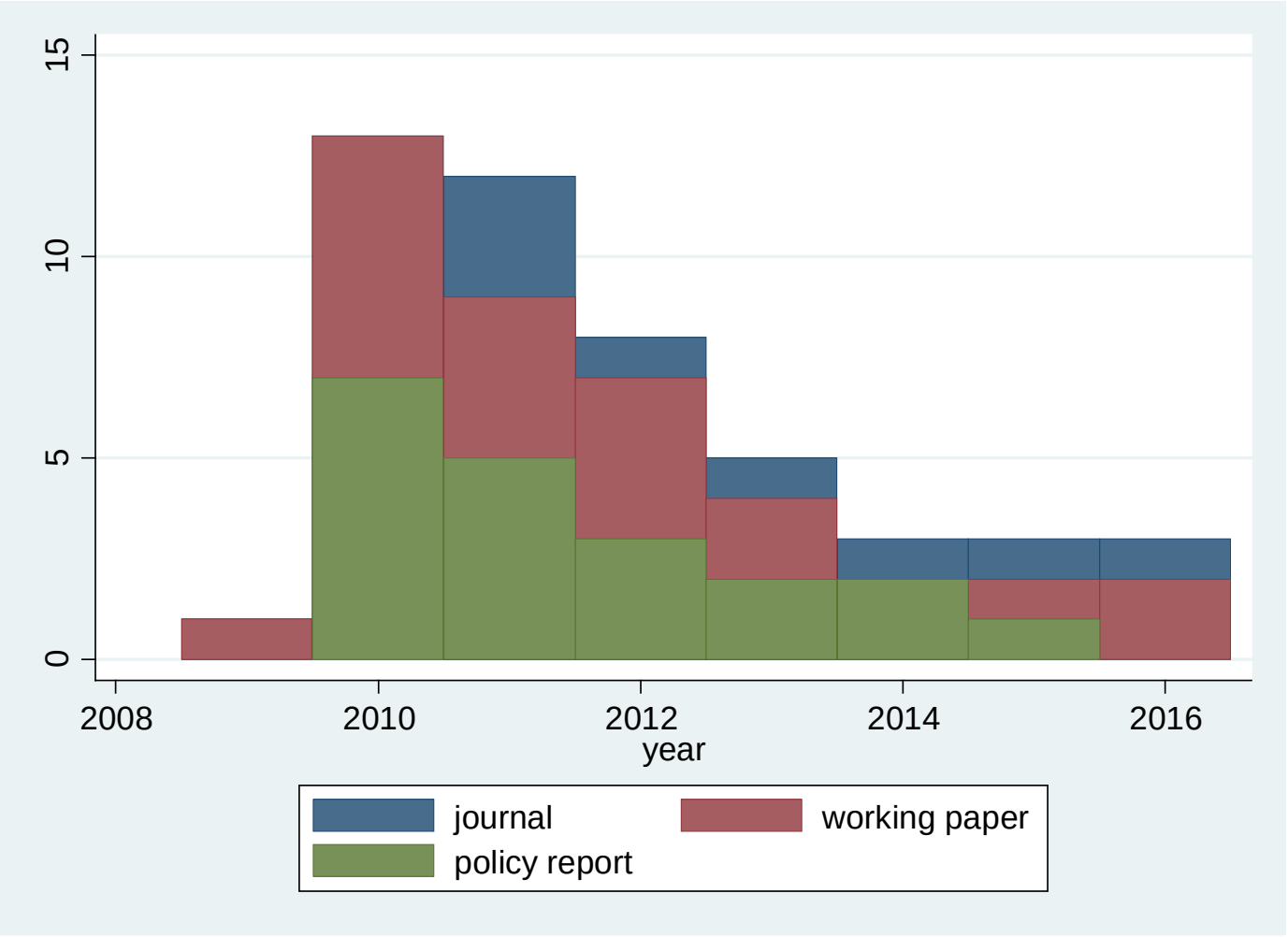
  We show that publication bias is highly important, possibly more important than in standard econometric analysis
- We address literature and country heterogeneity (financial systems, legal origins)

  We find surprisingly low heterogeneity between countries and financial systems.

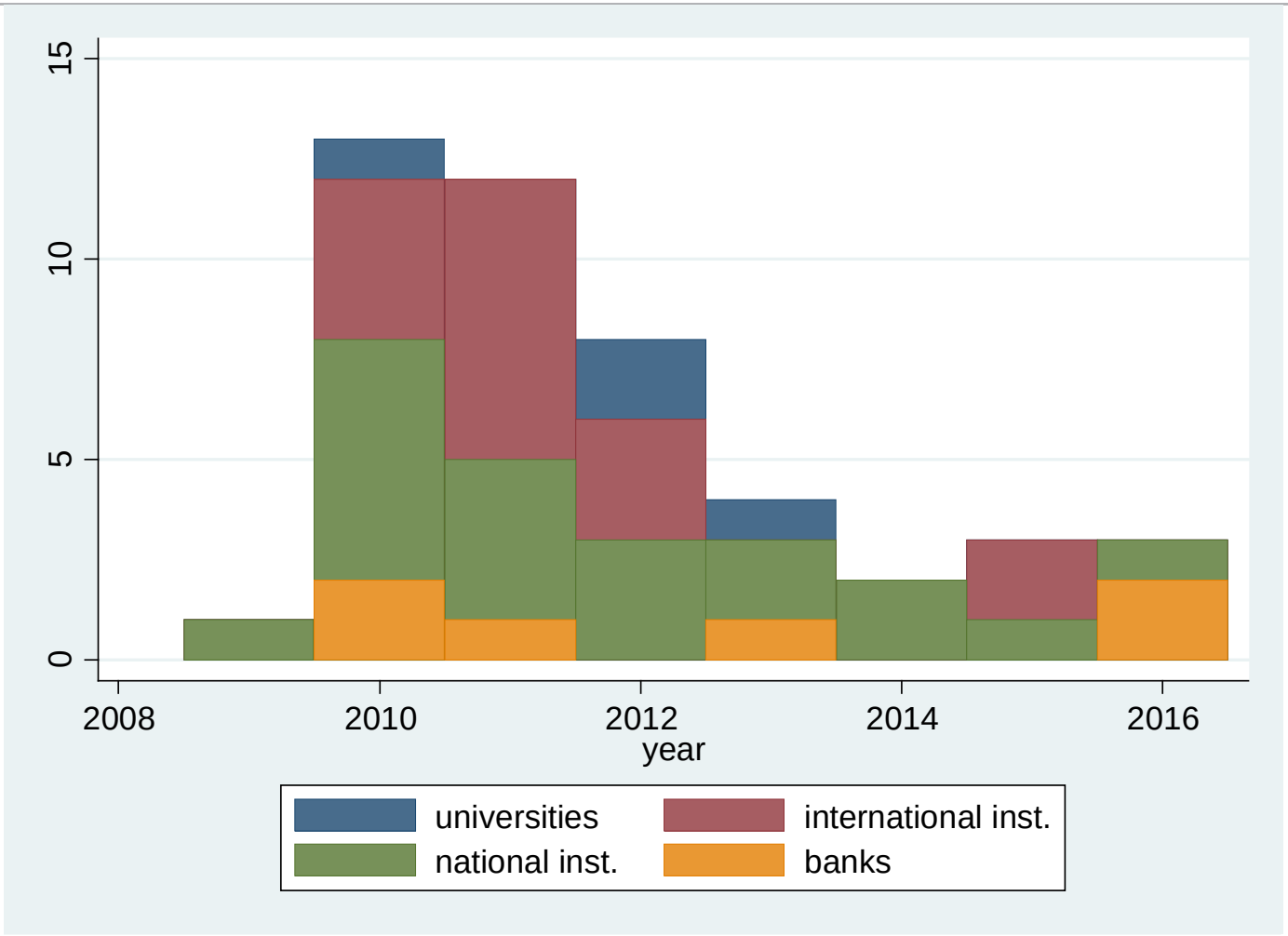
Methodology - Meta-analysis

- 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



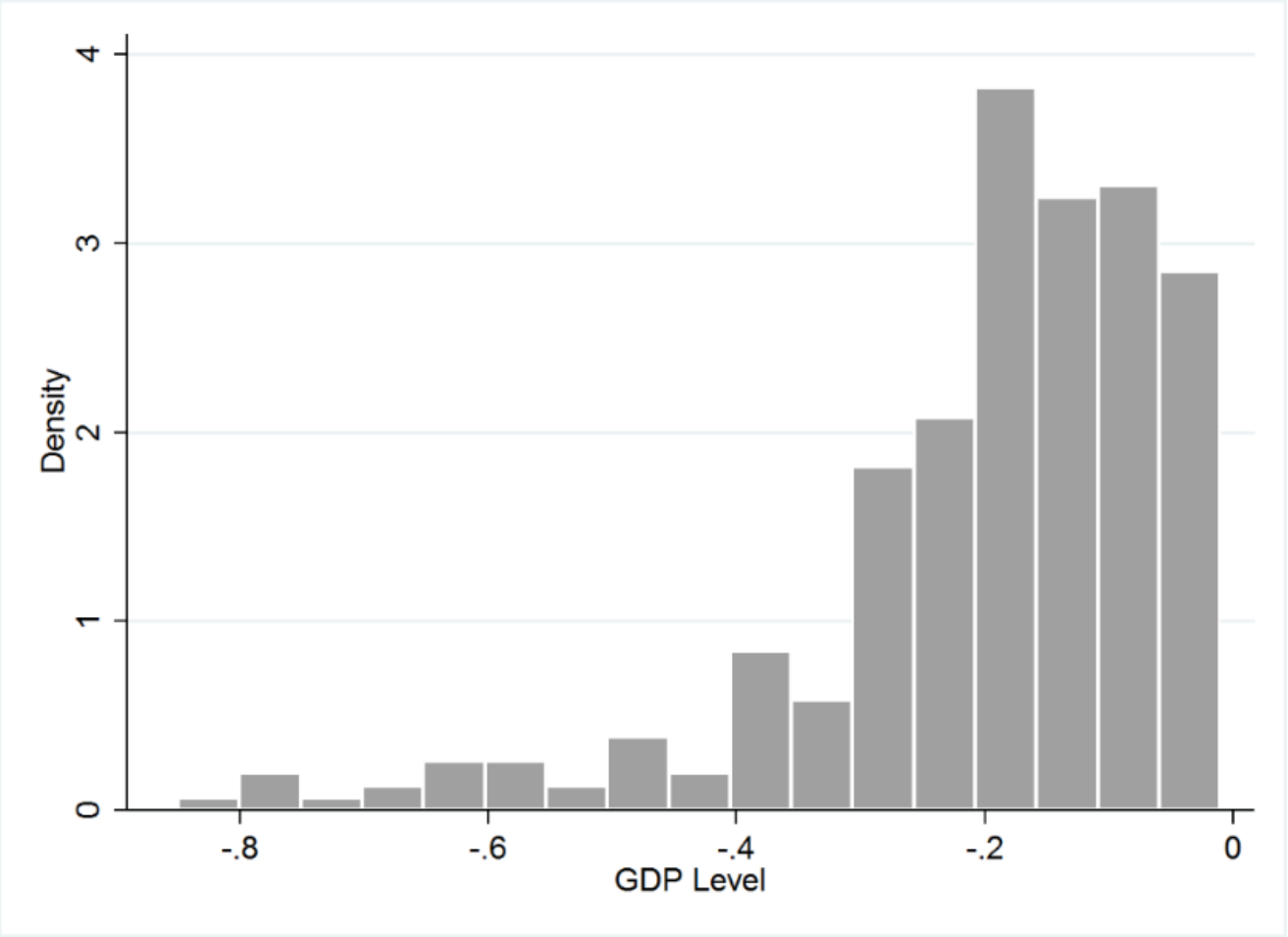
Publications authors' affiliations



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

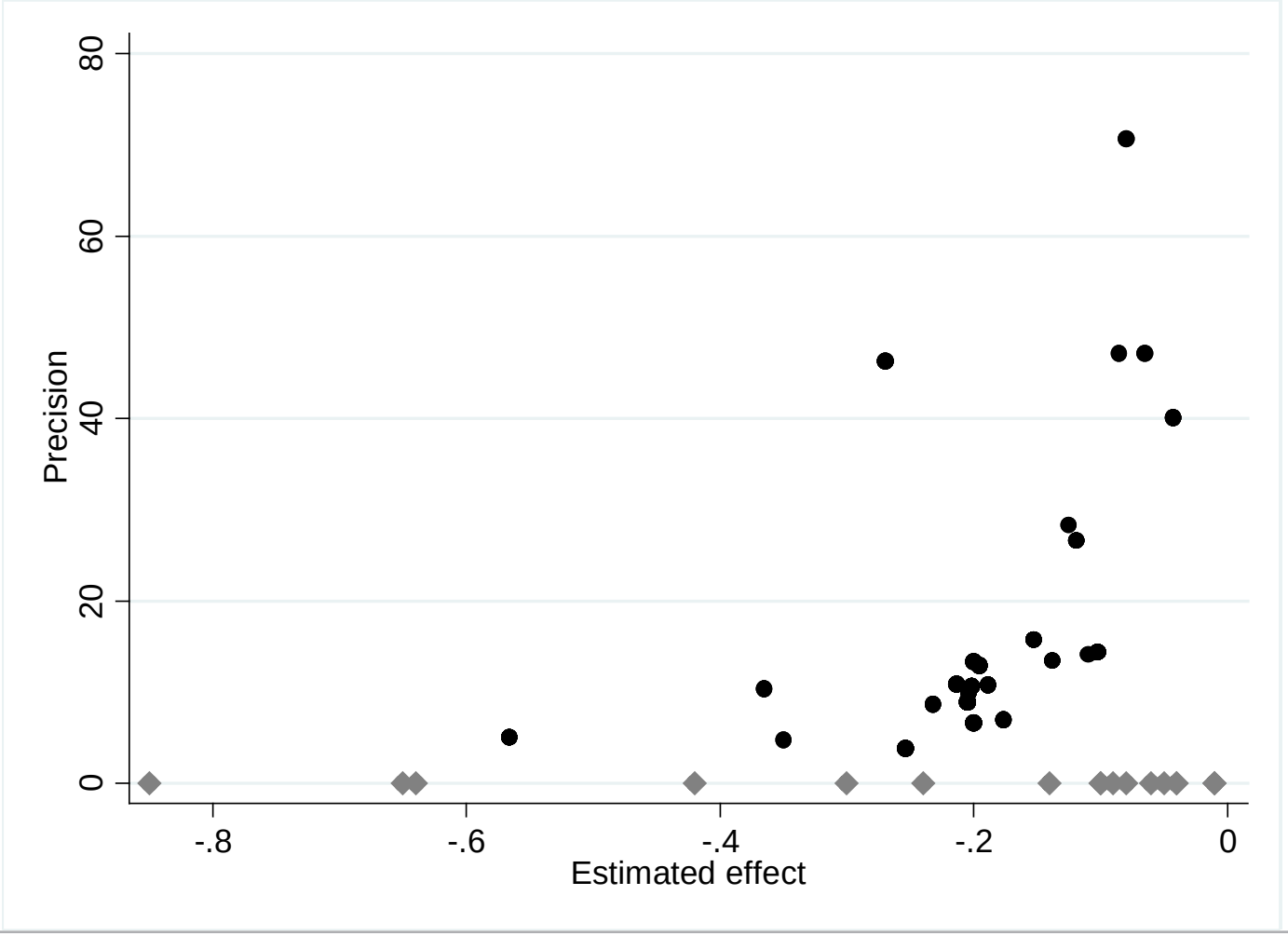
- The standard errors, a usual measure of precision (1/SE), are not available in especially for simulation studies.
- Therefore, we use the average precision of studies, *APS*, which uses the standard deviation,

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

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

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

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) OLS	(2) WLS	(3) OLS	(4) WLS
Publication bias, α	-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).

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

- 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 Stepwise	OLS Preferred	Probit Stepwise	Probit 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 Stepwise	OLS Preferred	Probit Stepwise	Probit 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 Stepwise	OLS Preferred	Probit Stepwise	Probit 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 Stepwise	OLS Preferred	Probit Stepwise	Probit 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.

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Motivation - conflicting results and assumptions

	Required increase in capital percentage points	GDP growth[a]
MAG (2010b)	1.3 pp	−5 basis points over 4 years
IIF (2011)[b]	4.8 pp	−30 to 60 basis points over 5 years
Slovik and Cournède, OECD (2011)	3.7 pp	−15 basis points over 9 years
Elliott et al., IMF (2012)[b]	1.2–2.7 pp	(not estimated)
Miles et al. (2013)	3.3 pp	−15 basis points, permanent
Oxford Economics (2013)[b]	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*