

Financial Globalisation, Monetary Policy Spillovers and Macro-Modelling: Tales from One Hundred and One Shocks

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The views expressed are those of the authors and not those of the ECB or of the ESCB.

Motivation

- **Dramatic rise of financial globalisation since 1990s**
 - ▶ **Growing potential for (monetary policy) spillovers**
Kim (2001); Canova (2005); Dedola et al. (2015); Feldkircher and Huber (2015); Georgiadis (forthcoming)
 - ▶ **Global financial cycle hypothesis**
Bekaert et al. (2013); Bruno and Shin (2015); Passari and Rey (2015); Rey (2015)
- **Parallel evolution of structural macro-modelling**
 - ▶ **New Keynesian DSGE models**
Smets and Wouters (2003); Christiano et al. (2005)
 - ▶ **Global financial crisis spurred work on financial frictions**
Gertler and Karadi (2011); Christiano et al. (2014)
 - ▶ **Less focus yet on the role of financial spillovers**
Dedola and Lombardo (2012); Kollmann (2013); Banerjee et al. (2015)
- **Any empirical indications for failure to account for strong financial spillover channels in standard New Keynesian DSGE models?**

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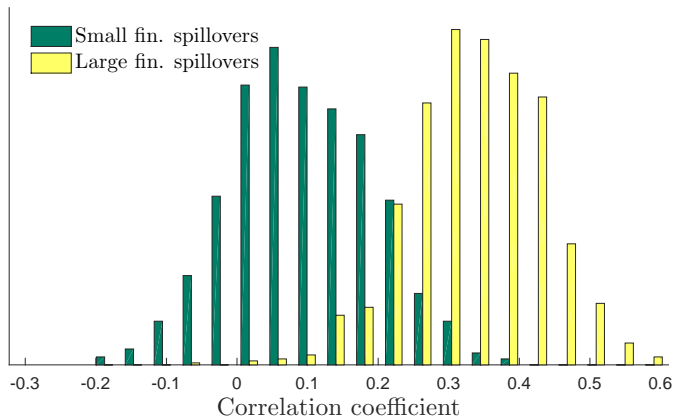
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A counterfactual experiment

- 1 Simulate data in multi-country model with financial spillovers
- 2 Estimate MP shocks with single-country models
- 3 Compute cross-country correlations of shocks
- 4 Repeat steps 1 - 3 a large number of times

► Details

Smoothed MP shocks cross-country correlated in case of strong financial spillovers



This paper: A hypothesis

- Our hypothesis

Standard NK DSGE models imply mis-measured and cross-country correlated monetary policy shocks due to failure to adequately account for financial spillover channels

- Under this hypothesis

- ▶ Global MP shocks transmit to domestic financial markets
- ▶ Financial spillovers not accounted for in NK DSGE models
- ▶ Global MP shocks are labelled as domestic ones

- Possibly serious consequences

- ▶ Likelihood-based estimation compromised
- ▶ Historical decompositions mis-leading

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This paper: Testing the hypothesis

- Set up a cross-country database with MP shock time series from 100+ macro-models
- Systematic analysis of determinants of cross-country correlations
 - ▶ Model type, frequency, country pairs
 - ▶ Economies' financial integration properties

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Outline

- 1 Monetary policy shocks database
 - Overview
 - Descriptives
- 2 Testing the hypothesis about the role of financial integration
 - Regressions
- 3 Conclusion

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MP shocks database

- Database draws on existing/ongoing academic/institutional work
- Multitude of models
 - ▶ Structural macro-models (NK DSGEs)
 - ▶ Statistical models (SVARs, SVECMs, SFAVARs, SDFMs)
 - ▶ Narrative approaches
 - ▶ Shocks based on financial market expectations
- We consider shock time-series over 1993q1-2007q4

Country coverage

	Number of shocks	Percent
AUS	7	6.3
CAN	7	6.3
CHE	4	3.6
CHL	2	1.8
CHN	2	1.8
EAR	21	18.9
GBR	12	10.8
ISR	2	1.8
JPN	3	2.7
KOR	3	2.7
NZL	3	2.7
SWE	4	3.6
USA	36	32.4
ZAF	5	4.5
Total	111	100.0
<i>N</i>	111	

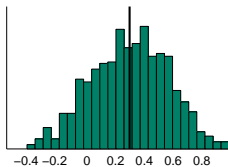
Model type coverage

	Number of shocks	Percent
Financial market expectations	8	7.2
Narrative approach	2	1.8
New Keynesian DSGE models	69	62.2
statistical models	32	28.8
Total	111	100.0
<i>N</i>	111	

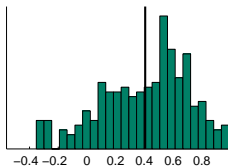
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MP shock correlations: Distributions

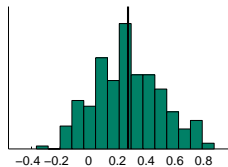
Domestic correlations
(All models)



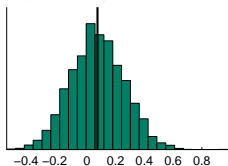
Domestic correlations
(DSGE models)



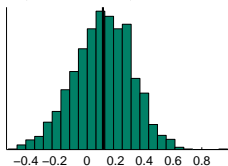
Domestic correlations
(Non-DSGE models)



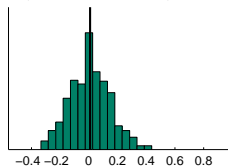
Cross-country correlations
(All models)



Cross-country correlations
(DSGE models)



Cross-country correlations
(Non-DSGE models)



MP shock correlations: Regression analysis

We consider regressions of the form

$$\rho_{\ell_i, m_j} = \alpha_i + \gamma_j + \mathcal{I}_{\ell_i, m_j} \cdot \beta + u_{\ell_i, m_j}, \quad (1)$$
$$i, j = 1, 2, \dots, N, \quad \ell_i = 1, 2, \dots, L_i, \quad m_j = 1, 2, \dots, M_j,$$

where

- ρ_{ℓ_i, m_j} : Correlation between shock time series ℓ_i of economy i and shock time series m_j of economy j
- $\mathcal{I}_{\ell_i, m_j}$: Indicator variables equalling unity if shocks ℓ_i and m_j , e.g.
 - ▶ pertain to same economy
 - ▶ stem from same model type

MP shocks for same economy correlated

	(1)	(2)	(3)	(4)
	US, EA, UK	US, EA, UK	All	All
Same economy	0.16*** (0.00)		0.21*** (0.00)	
Both shocks for USA		0.17*** (0.00)		0.20*** (0.00)
Both shocks for EAR		0.15*** (0.00)		0.19*** (0.00)
Both shocks for GBR		-0.02 (0.42)		0.01 (0.71)
Both shocks for JPN				0.15 (0.28)
Both shocks for SWE				-0.01 (0.96)
Both shocks for AUS				0.06 (0.28)
Both shocks for CAN				0.31*** (0.00)
Both shocks for ZAF				0.13 (0.20)
Both shocks for CHE				-0.02 (0.79)
Both shocks for NZL				0.53*** (0.00)
Both shocks for KOR				0.11 (0.66)
Both shocks for CHL				0.33*** (0.00)
Both shocks for ISR				0.41*** (0.00)
Constant	0.03*** (0.00)	0.06*** (0.00)	0.03*** (0.00)	0.05*** (0.00)
Adj. R-squared	0.16	0.21	0.15	0.18
Observations	2346	2346	6105	6105

p-values in parentheses

* p < 0.1, ** p < 0.05, *** p < 0.01

Shocks from same model type correlated within *and* across economies

	(1) US, EA, UK	(2) US, EA, UK	(3) All	(4) All
Same model type	0.06*** (0.00)		0.04*** (0.00)	
Both DSGE		0.11*** (0.00)		0.06*** (0.00)
Same economy x Both DSGE		0.02 (0.46)		0.09*** (0.00)
Both financial market expectation		-0.11*** (0.00)		-0.04** (0.03)
Same economy x Both financial market expectations		0.27*** (0.00)		0.24*** (0.00)
Both narrative		-0.14*** (0.00)		-0.07*** (0.00)
Both statistical models		-0.06*** (0.00)		-0.05*** (0.00)
Same economy x Both statistical models		0.06** (0.04)		0.07*** (0.01)
Same frequency	0.09*** (0.00)	0.08*** (0.00)	0.03*** (0.00)	0.03*** (0.00)
At least one shock from multi-country DSGE model		-0.08*** (0.00)		-0.04*** (0.00)
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Cross-country correlation for same model-type driven by NK DSGE model shocks

	(1) US, EA, UK	(2) US, EA, UK	(3) All	(4) All
Same model type	0.06*** (0.00)		0.04*** (0.00)	
Both DSGE		0.11*** (0.00)		0.06*** (0.00)
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...and not by non-NK DSGE model shocks

	(1) US, EA, UK	(2) US, EA, UK	(3) All	(4) All
Same model type	0.06*** (0.00)		0.04*** (0.00)	
Both DSGE		0.11*** (0.00)		0.06*** (0.00)
Same economy x Both DSGE		0.02 (0.46)		0.09*** (0.00)
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Observations	2346	2346	6105	6105

p-values in parentheses

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US and other economies' shocks correlated

	(1)	(2)	(3)	(4)
	US, EA, UK	US, EA, UK	All	All
One shock is for USA	0.06** (0.01)		0.08*** (0.00)	
USA-EA		0.14*** (0.00)		0.21*** (0.00)
USA-GBR		-0.07** (0.02)		0.02 (0.15)
USA-SWE				0.01 (0.71)
USA-CAN				0.15*** (0.00)
USA-AUS				0.06*** (0.01)
USA-NZL				0.06*** (0.01)
USA-ZAF				-0.07*** (0.00)
USA-KOR				0.09*** (0.00)
USA-CHN				-0.08*** (0.00)
USA-JPN				-0.07*** (0.00)
USA-ISR				-0.07*** (0.00)
USA-CHE				0.04 (0.14)
USA-CHL				-0.04 (0.14)
Constant	0.16*** (0.00)	0.22*** (0.00)	0.07*** (0.00)	0.10*** (0.00)
Adj. R-squared	0.11	0.21	0.17	0.25
Observations	666	666	2346	2346

p-values in parentheses

* *p* < 0.1, ** *p* < 0.05, *** *p* < 0.01

Descriptive analysis: Summing up

- MP shocks in database positively cross-country correlated
- Cross-country MP shock correlations particularly strong
 - ▶ for NK DSGE models
 - ▶ when one economy is the US

Does the cross-country shock correlation in standard DSGE models stem from failure to adequately account for financial spillover channels and the importance of the US for the global financial cycle?

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The role of financial integration

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Then, the cross-country correlation should rise with economies'

- overall financial integration with the RoW
- bilateral financial integration with the US

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Testing for the role of financial integration

We consider regressions of the form

$$\rho_{\ell_i, m_j} = \alpha_i + \gamma_j + \mathbf{x}_{ij} \cdot \boldsymbol{\beta} + u_{\ell_i, m_j}, \quad (2)$$

$$i, j = 1, 2, \dots, N, \quad i \neq j, \quad \ell_i = 1, 2, \dots, L_i, \quad m_j = 1, 2, \dots, M_j,$$

where

- ρ_{ℓ_i, m_j} : Correlation between shock time series ℓ_i of economy i and shock time series m_j of economy j
- \mathbf{x}_{ij} : Vector of bilateral country characteristics
 - ▶ Economy $i \times$ economy j overall financial integration
 - ▶ Economy $i \times$ economy j bilateral financial integration with US
- Only NK DSGE model MP shocks

Correlation higher for financially integrated economies

	(1)	(2)	(3)
Overall fin. integration country 1 x country 2 (CPIS)	0.70*** (0.00)		0.61*** (0.00)
Share of US in country 1 fin. integration x country 2		1.44*** (0.00)	1.23*** (0.01)
Country 1 dummies	Yes	Yes	Yes
Country 2 dummies	Yes	Yes	Yes
Adj. R-squared	0.12	0.11	0.12
Observations	1228	1176	1176

p-values in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

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Conclusion

- Standard NK DSGE models imply cross-country correlated MP shocks
- This can be rationalised by a lack of accounting for financial spillover channels in this class of models
- Possible/likely consequences
 - ▶ Inconsistent likelihood-based estimation of NK DSGE models
 - ▶ Mis-leading historical decompositions
- Need for structural macro-modelling to consider powerful financial spillover channels

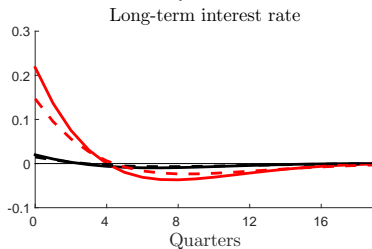
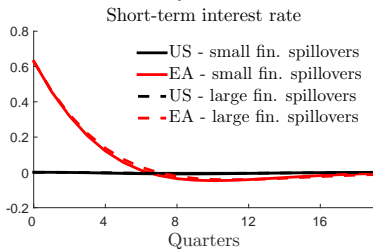
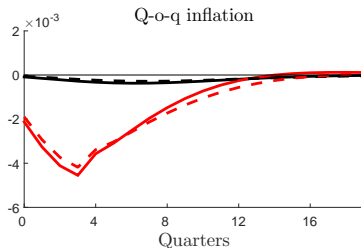
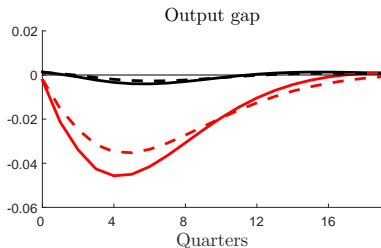
The data-generating process

- Consider the 3-country model of Coenen and Wieland (2002)
- Small, semi-structural model: IS/Phillips curves, Taylor rules
- Modify the model introducing financial spillovers

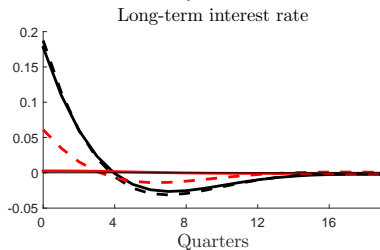
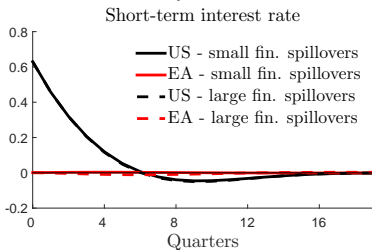
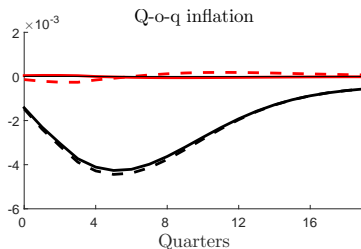
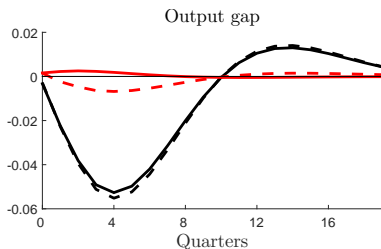
$$i_{it}^{(l)} = (1 - \vartheta_i) \cdot \left(\frac{1}{8} \sum_{j=0}^8 E_t i_{i,t+j}^{(s)} \right) + \vartheta_i \cdot \left(\sum_{j=1, j \neq i}^N \omega_{ij} i_{jt}^{(l)} \right) \quad (3)$$

- ▶ $i_{it}^{(l)}$: Long-term interest rate (appearing in IS curve)
- ▶ ϑ_i : Degree of international financial integration
- ▶ ω_{ij} : Rel. importance of economy j in economy i 's overall integration

True EA MP shock spillovers



True US MP shock spillovers



US MP shocks

Reference	Acronym	Type	Sample period	Frequency	Multi-country
Alpanda and Aysun (2014)	aya	DSGE	1996q1-2009q2	q	y
Bacchiocchi and Fanelli (2015)	bf	SVAR with identification through heteroskedasticity	1956q2-2008q3	q	n
Bacchiocchi et al. (2014)	bfc	non-standard SVAR	1961q1-2008q2	q	n
Barakchian and Crowe (2013)	bc	Financial market expectations	1988m12-2008m6	m	n
Bernanke and Kuttner (2005)	bk	Financial market expectations	1988m12-2008m6	q	n
Bernanke et al. (2005)	bbe	FAVAR	1960q1-2007q2	q	n
Bernanke and Mihov (1998)	bm	SVAR	1990m1-2007m11	m	n
Brayton et al. (2014)	frb	DSGE	1970q1-2010q4	q	n
Breuss and Fornero (2009)	forn	DSGE	1984q1-2015q3	q	y
Carabenciov et al. (2013)	gpm	DSGE	1994q1-2008q1	q	y
Ca' Zorzi et al. (2015)	jp	DSGE	1975q1-2013q3	q	n
Christiano et al. (1999)	cee	SVAR	1989q4-2007q3	q	n
Christiano et al. (2014)	cmr	DSGE	1981q1-2010q2	q	n
Claus and Dungey (2012)	cid	Financial market expectations	1994m1-2008m10	m	n
Consensus Forecast	cpf	Financial market expectations	1990q1-2013q1	q	n
Dungey et al. (2014)	dor	SVECM	1984q3-2008q1	q	n
Forni and Gambetti (2010)	fg	FAVAR	1990m1-2007m11	q	n
Fragetta and Melina (2013)	frm	SVAR	1965q4-2007q4	q	n
Gertler and Karadi (2015)	kg	Financial market expectations	1991q1-2012q2	q	n
Iacoviello and Neri (2010)	in	DSGE	1965q1-2006q4	q	n
Kamber et al. (2015b)	kst	DSGE	1954q3-2011q4	q	n
Kollmann et al. (2011)	quest	DSGE	1999q1-2015q1	q	y
Luciani (2015)	luc	Dynamic factor model	1983q1-2010q4	q	n
Merola (2015)	swrm	DSGE	1965Q1-2012Q4	q	n
Merola (2015)	swrmff	DSGE	1965Q1-2012Q4	q	n
Pragidis et al. (2013)	pgt	LSTAR	1980m1-2011m10	m	n
Romer and Romer (2004)	rr	Narrative	1988m1-2008m6	m	n
Rossi and Zubairy (2011)	roz	SVAR	1955q3-2006q4	q	n
Rychalovska (2013)	ryc1	DSGE	1954q1-2008q3	q	n
Sims and Zha (2006)	sz	SVAR	1989q4-2008q2	q	n
Smets and Wouters (2007)	sw	DSGE	1947q3-2015q2	q	n
Vitek (2015)	vit	DSGE	1999q3-2008q4	q	y
Voss and Willard (2009)	vow	SVAR	1985q2-2007q4	q	n

EA MP shocks

Reference	Acronym	Type	Sample period	Frequency	Multi-country
Alpanda and Aysun (2014)	aya	DSGE	1996q1-2009q2	q	y
Bank of Finland	ver	DSGE	1996q1-2014q3	q	n
Barigozzi et al. (2014)	bcl	Dynamic factor model	1984q1-2007q4	q	n
Benkovskis et al. (2011)	bbfw	VAR	1999q3-2010q3	q	n
Boivin et al. (2009)	bgm	FAVAR	1988q1-2007q3	q	n
Breuss and Fornero (2009)	forn	DSGE	1984q1-2015q3	q	y
Carabenciov et al. (2013)	gpm	DSGE	1994q1-2008q1	q	y
Ca'Zorzi et al. (2015)	jp	DSGE	1975q1-2013q3	q	n
Christoffel et al. (2008)	nawm	DSGE	1985q1-2011q4	q	n
Consensus Forecast	cpf	Financial market expectations	1990q1-2013q1	q	n
Dungey et al. (2014)	dor	SVECM	1984q3-2008q1	q	n
Gelain (2010)	gel	DSGE	1980q1-2008q3	q	n
Gerali et al. (2010)	ger	DSGE	1998q1-2009q4	q	n
Jannsen and Klein (2011)	jk	SVAR	1990q1-2008q4	q	n
Kollmann et al. (2011)	quest	DSGE	1999q1-2015q1	q	y
Kühl (2016)	kue	DSGE	1997q4-2013q3	q	n
Peersman and Smets (2001)	ovar	SVAR	1990q2-2011q2	q	n
Smets et al. (2013)	sww	DSGE	1970q2-2010q2	q	n
Vitek (2015)	vit	DSGE	1999q3-2008q4	q	y

UK MP shocks

Reference	Acronym	Type	Sample period	Frequency	Multi-country
Andreasen (2011)	and	DSGE	1990q1-2008q3	q	n
Burgess et al. (2013)	boe	DSGE	1987q3-2007q4	q	n
Ca'Zorzi et al. (2015)	jp	DSGE	1975q1-2013q3	q	n
Cesa-Bianchi et al. (2016)	ctv	Financial market expectations	1997m7-2015m6	m	n
Cloyne and Hürtgen (forthcoming)	clh	Narrative	1975m1-2007m12	q	n
Consensus Forecast	cpf	Financial market expectations	1990q1-2013q1	q	n
Ellis et al. (2014)	mum	TV-FAVAR	1976q1-2005q4	q	n
Faccini et al. (2013)	fmz	DSGE	1971q1-2009q4	q	n
Harrison and Oomen (2010)	harr	DSGE	1958q1-2007q1	q	n
Kamber and Millard (2012)	km	SVAR	1979q4-2007q4	q	n
Mumtaz and Theophilopoulou (2016)	mut	BSVAR	1976q2-2009q1	q	n
Vitek (2015)	vit	DSGE	1999q3-2008q4	q	y

Other economies

Reference	Acronym	Country	Type	Sample period	Frequency	Multi-country
Kamber et al. (2015a)	ado	SWE	DSGE	1980q2-2007q3	q	n
Adolfson et al. (2013)	rams	SWE	DSGE	1995q2-2015q2	q	n
Argov et al. (2012)	moi	ISR	DSGE	1992q1-2011q4	q	n
Bong et al. (2016)	dpd	AUS, NZL	DSGE	1989q2-2006q4	q	n
Bong et al. (2016)	dpd	CAN	DSGE	1989q2-2006q4	q	n
Melecky and Buncic (2008)	bud	AUS	DSGE	1984q1-2005q4	q	n
Melecky and Buncic (2008)	buv	AUS	SVAR	1984q1-2005q4	q	n
Kamber et al. (2015a)	gpm	JPN	DSGE	1993q1-2007q1	q	y
Ca'Zorzi et al. (2015)	jp	AUS	DSGE	1975q1-2013q3	q	n
Ca'Zorzi et al. (2015)	jp	CAN	DSGE	1975q1-2013q3	q	n
Cuche-Curti et al. (2009)	cdn	CHE	DSGE	1995q2-2015q4	q	n
Dorich et al. (2013)	tot	CAN	DSGE	1990q1-2014q4	q	n
Gervais and Gosselin (2014)	lens	CAN	DSGE	1993q1-2014q4	q	n
Gupta and Steinbach (2013)	gs	ZAF	DSGE	1981q2-2010q4	q	n
Hirose (2014)	hir	JPN	DSGE	1983q2-2013q1	q	n
Jiang and Kim (2013)	jkc	CHN	SVAR	1993q1-2009q3	q	n
Kamber et al. (2015a)	nzsim	NZL	DSGE	1993q2-2013q1	q	n
Kim (2014)	tbk	KOR	DSGE	2000q2-2012q4	q	n
Milani and Park (2015)	mil	KOR	DSGE	1991q2-2012q4	q	n
Ncube and Ndou (2011)	nd1	ZAF	SVAR	1976q1-2009q4	q	n
Ncube and Ndou (2013)	nd2	ZAF	SVAR	1983q3-2010q1	q	n
Raghavan et al. (2016)	ras1	CAN	VARMA	1974m3-2007m12	m	n
Raghavan et al. (2016)	ras2	CAN	SVAR	1975m1-2007m12	m	n
Rees et al. (2015)	rsh	AUS	DSGE	1992q1-2013q4	q	n
Rudolf and Zurlinden (2014)	ruz	CHE	DSGE	1983q2-2015q4	q	n
Steinbach et al. (2009)	sms	ZAF	DSGE	1990q1-2007q4	q	y
Sveriges Riksbank	bvar	SWE	BVAR	1995q4-2014q4	q	n
Vitek (2015)	vit	NZL, AUS, SWE, CAN, ZAF, KOR, CHN, JPN, CHE, ISR	DSGE	1999q3-2008q4	q	y
Voss and Willard (2009)	vow	AUS	SVAR	1985q2-2007q4	q	y

- Adolfsson, M., Laséen, S., Christiano, L., Trabandt, M., Walentin, K., 2013. RAMSES II - Model Description. Sveriges Riksbank Occasional Paper 12.
- Alpanda, S., Aysun, U., 2014. International Transmission of Financial Shocks in an Estimated DSGE Model. *Journal of International Money and Finance* 47 (C), 21–55.
- Andreasen, M., 2011. An Estimated DSGE Model: Explaining Variations in Term Premia. Bank of England Working Paper 441.
- Argov, E., Barnea, E., Binyamini, A., Borenstein, E., Elkayam, D., Rozenshtrom, I., 2012. MOISE: A DSGE Model for the Israeli Economy. Bank of Israel Discussion Paper 2012.06.
- Bacchiocchi, E., Castelnuovo, E., Fanelli, L., 2014. Gimme a Break! Identification and Estimation of the Macroeconomic Effects of Monetary Policy Shocks in the US. Dipartimento di Scienze Economiche "Marco Fanno" Working Paper 0181.
- Bacchiocchi, E., Fanelli, L., 2015. Identification in Structural Vector Autoregressive Models with Structural Changes, with an Application to US Monetary Policy. *Oxford Bulletin of Economics and Statistics* 77 (6), 761–779.
- Banerjee, R., Devereux, M., Lombardo, G., 2015. Self-Oriented Monetary Policy, Global Financial Markets and Excess Volatility of International Capital Flows. NBER Working Paper 21737.
- Barakchian, M., Crowe, C., 2013. Monetary Policy Matters: Evidence from New Shocks Data. *Journal of Monetary Economics* 60 (8), 950–966.
- Barigozzi, M., Conti, A. M., Luciani, M., October 2014. Do Euro Area Countries Respond Asymmetrically to the Common Monetary Policy? *Oxford Bulletin of Economics and Statistics* 76 (5), 693–714.
- Bekaert, G., Hoerova, M., Lo Duca, M., 2013. Risk, Uncertainty and Monetary Policy. *Journal of Monetary Economics* 60 (7), 771–788.
- Benkovskis, K., Bessonovs, A., Feldkircher, M., Wörz, J., 2011. The Transmission of Euro Area Monetary Shocks to the Czech Republic, Poland and Hungary: Evidence from a FAVAR Model. *Focus on European Economic Integration* (3), 8–36.
- Bernanke, B., Boivin, J., Eliasz, P., 2005. Measuring the Effects of Monetary Policy: A Factor-Augmented Vector Autoregressive (FAVAR) Approach. *Quarterly Journal of Economics* 120 (1), 387–422.
- Bernanke, B., Kuttner, K., 2005. What Explains the Stock Market's Reaction to Federal Reserve Policy? *Journal of Finance* 60 (3), 1221–1257.
- Bernanke, B., Mihov, I., 1998. Measuring Monetary Policy. *The Quarterly Journal of Economics* 113 (3), 869–902.
- Boivin, J., Giannoni, M., Mojon, B., December 2009. How Has the Euro Changed the Monetary Transmission Mechanism? In: NBER Macroeconomics Annual 2008, Volume 23. NBER Chapters. National Bureau of Economic Research, pp. 77–125.
- Bong, K. S., Doh, T., Park, W. Y., 2016. Yield Curve and Monetary Policy Expectations in Small Open Economies. Federal Reserve Bank of Kansas City Working Paper 14-13.
- Brayton, F., Laubach, T., Reifschneider, D., 2014. The FRB/US Model: A Tool for Macroeconomic Policy Analysis. FEDS Notes 2014-11-21, Board of Governors of the Federal Reserve System.

- Breuss, F., Fornero, J., 2009. An Estimated DSGE Model of Austria, the Euro Area and the US: Some Welfare Implications of EMU. FIW Working Paper 034.
- Bruno, V., Shin, H. S., 2015. Cross-Border Banking and Global Liquidity. *Review of Economic Studies* 82 (2), 535–564.
- Burgess, S., Fernandez-Corugedo, E., Groth, C., Harrison, R., Monti, F., Theodoridis, K., Waldron, M., 2013. The Bank of England's Forecasting Platform: COMPASS, MAPS, EASE and the Suite of Models. Bank of England Working Paper 471.
- Canova, F., 2005. The Transmission of US Shocks to Latin America. *Journal of Applied Econometrics* 20 (2), 229–251.
- Carabenciov, I., Freedman, C., Garcia-Saltos, R., Laxton, D., Kamenik, O., Manchev, P., 2013. GPM6 - The Global Projection Model with 6 Regions. IMF Working Paper 87.
- Ca'Zorzi, M., Kolasa, M., Rubaszek, M., 2015. Exchange Rate Forecasting with DSGE Models. mimeo.
- Cesa-Bianchi, A., Thwaites, G., Vicendoa, A., 2016. Monetary Policy Transmission in an Open Economy: New Data and Evidence from the United Kingdom. mimeo.
- Christiano, L., Eichenbaum, M., Evans, C., 1999. Monetary Policy Shocks: What Have We Learned and to What End? In: Taylor, J. B., Woodford, M. (Eds.), *Handbook of Monetary Economics*. Amsterdam: Elsevier Science, pp. 65–148.
- Christiano, L. J., Eichenbaum, M., Evans, C. L., 2005. Nominal Rigidities and the Dynamic Effects of a Shock to Monetary Policy. *Journal of Political Economy* 113 (1), 1–45.
- Christiano, L. J., Motto, R., Rostagno, M., 2014. Risk Shocks. *American Economic Review* 104 (1), 27–65.
- Christoffel, K., Coenen, G., Warne, A., 2008. The New Area-Wide Model of the Euro Area: A Micro-Founded Open-Economy Model for Forecasting and Policy Analysis. ECB Working Paper 0944.
- Claus, E., Dungey, M., 2012. US Monetary Policy Surprises: Identification with Shifts and Rotations in the Term Structure. *Journal of Money, Credit and Banking* 44 (7), 1443–1453.
- Cloyne, J., Hürtgen, P., forthcoming. The Macroeconomic Effects of Monetary Policy: A New Measure for the United Kingdom. *American Economic Journal: Macroeconomics*.
- Coenen, G., Wieland, V., 2002. Inflation Dynamics and International Linkages: A Model of the United States, the Euro Area and Japan. ECB Working Paper 0181.
- Cuche-Curti, N. A., Dellas, H., Natal, J.-M., 2009. A Dynamic Stochastic General Equilibrium Model for Switzerland. *Swiss National Bank Economic Studies* 2009-05.
- Dedola, L., Lombardo, G., 2012. Financial Frictions, Financial Integration and the International Propagation of Shocks. *Economic Policy* 27 (70), 319–359.
- Dedola, L., Rivolta, G., Stracca, L., 2015. When the Fed Sneezes, Who Gets a Cold? mimeo.
- Dorich, J., Johnston, M., Mendes, R., Murchison, S., Zhang, Y., 2013. ToTEM II: An Updated Version of the Bank of Canada's Quarterly Projection Model. Technical Reports 100, Bank of Canada.

- Dungey, M., Osborn, D., Raghavan, M., 2014. International Transmissions to Australia: The Roles of the USA and Euro Area. *The Economic Record* 90 (291), 421–446.
- Ellis, C., Mumtaz, H., Zabczyk, P., 05 2014. What Lies Beneath? A Time-varying FAVAR Model for the UK Transmission Mechanism. *Economic Journal* 124 (576), 668–699.
- Faccini, R., Millard, S., Zanetti, F., 2013. Wage Rigidities in an Estimated Dynamic, Stochastic, General Equilibrium Model of the UK Labour Market. *The Manchester School* 81, 66–99.
- Feldkircher, M., Huber, F., 2015. The International Transmission of US Structural Shocks: Evidence from Global Vector Autoregressions. *European Economic Review* 81, 167–188.
- Forni, M., Gambetti, L., 2010. The Dynamic Effects of Monetary Policy: A Structural Factor Model Approach. *Journal of Monetary Economics* 57 (2), 203–216.
- Fragetta, M., Melina, G., 2013. Identification of Monetary Policy in SVAR Models: A Data-oriented Perspective. *Empirical Economics* 45 (2), 831–844.
- Gelain, P., 2010. The External Finance Premium in the Euro Area: A Dynamic Stochastic General Equilibrium Analysis. *The North American Journal of Economics and Finance* 21 (1), 49–71.
- Georgiadis, G., forthcoming. Determinants of Global Spillovers from US Monetary Policy. *Journal of International Money and Finance*.
- Gerali, A., Neri, S., Sessa, L., Signoretti, F. M., 2010. Credit and Banking in a DSGE Model of the Euro Area. *Journal of Money, Credit and Banking* 42 (1), 107–141.
- Gertler, M., Karadi, P., 2011. A Model of Unconventional Monetary Policy. *Journal of Monetary Economics* 58 (1), 17–34.
- Gertler, M., Karadi, P., 2015. Monetary Policy Surprises, Credit Costs, and Economic Activity. *American Economic Journal: Macroeconomics* 7 (1), 44–76.
- Gervais, O., Gosselin, M.-A., 2014. Analyzing and Forecasting the Canadian Economy through the LENS Model. *Technical Reports* 102, Bank of Canada.
- Gupta, R., Steinbach, R., 2013. A DSGE-VAR Model for Forecasting Key South African Macroeconomic Variables. *Economic Modelling* 33, 19–33.
- Harrison, R., Oomen, O., 2010. Evaluating and Estimating a DSGE Model for the United Kingdom. *Bank of England Working Paper* 380.
- Hirose, Y., 2014. An Estimated DSGE Model with a Deflation Steady State. *CAMA Working Paper* 2014-52.
- Iacoviello, M., Neri, S., 2010. Housing Market Spillovers: Evidence from an Estimated DSGE Model. *American Economic Journal: Macroeconomics* 2 (2), 125–64.
- Jannsen, N., Klein, M., 2011. The International Transmission of Euro Area Monetary Policy Shocks. *Kiel Institute for the World Economy Working Paper* 1718.

- Jiang, J., Kim, D., 2013. Is China's Monetary Policy Effective? Evaluating the VAR Evidence. *China Economic Policy Review* 2 (2), 1–21.
- Kamber, G., McDonald, C., Sander, N., Theodoridis, K., 2015a. A Structural Model for Policy Analysis and Forecasting: NZSIM. Reserve Bank of New Zealand Discussion Paper 2015/05.
- Kamber, G., Millard, S., December 2012. Using Estimated Models to Assess Nominal and Real Rigidities in the United Kingdom. *International Journal of Central Banking* 8 (4), 97–119.
- Kamber, G., Smith, C., Thoenissen, C., 2015b. Financial Frictions and The role of Investment-specific Technology Shocks in the Business Cycle. *Economic Modelling* 51, 571–582.
- Kim, S., 2001. International Transmission of U.S. Monetary Policy Shocks: Evidence from VAR's. *Journal of Monetary Economics* 48 (2), 339–372.
- Kim, T. B., 2014. Analysis on Korean Economy with an Estimated DSGE Model after 2000. *KDI Journal of Economic Policy* 36 (2), 1–64.
- Kollmann, R., 2013. Global Banks, Financial Shocks, and International Business Cycles: Evidence from an Estimated Model. *Journal of Money, Credit and Banking* 45 (2), 159–195.
- Kollmann, R., Pataracchia, B., Raciborski, R., Ratto, M., Roeger, W., Vogel, L., 2011. The Post-Crisis Slump in the Euro Area and the US: Evidence from an Estimated Three-Region DSGE Model. mimeo.
- Kühl, M., 2016. Government bond purchases and their transmission through the financial sector in an estimated banking model of the euro area. mimeo.
- Luciani, M., 03 2015. Monetary Policy and the Housing Market: A Structural Factor Analysis. *Journal of Applied Econometrics* 30 (2), 199–218.
- Melecky, M., Buncic, D., 2008. An Estimated, New Keynesian Policy Model for Australia. *Economic Record* 84 (264), 1–16.
- Merola, R., 2015. The role of financial frictions during the crisis: An estimated DSGE model. *Economic Modelling* 48 (C), 70–82.
- Milani, F., Park, S. H., 2015. The Effects of Globalization on Macroeconomic Dynamics in a Trade-dependent Economy: The Case of Korea. *Economic Modelling* 48 (C), 292–305.
- Mumtaz, H., Theophilopoulou, A., 2016. The Impact of Monetary Policy on Inequality in the UK: An Empirical Analysis. Queen Mary University of London Working Paper 738.
- Ncube, M., Ndou, E., 2011. Monetary Policy Transmission, House Prices and Consumer Spending in South Africa: An SVAR Approach. African Development Bank Working Paper 317.
- Ncube, M., Ndou, E., 2013. Monetary Policy and Exchange Rate Shocks on South African Trade Balance. African Development Bank Working Paper 448.
- Passari, E., Rey, H., 2015. Financial Flows and the International Monetary System. *Economic Journal* 125 (584), 675–698.

- Peersman, G., Smets, F., 2001. The Monetary Transmission Mechanism in the Euro Area: More Evidence from VAR Analysis. ECB Working Paper 91.
- Pragidis, I., Gogas, P., Tabak, B., 2013. Asymmetric Effects of Monetary Policy in the US and Brazil. Democritus University of Thrace Research Papers in Economics 7-2013.
- Raghavan, M., Athanasopoulos, G., Silvapulle, P., 2016. Canadian Monetary Policy Analysis Using a Structural VARMA Model. Canadian Journal of Economics 49 (1).
- Rees, D., Smith, P., Hall, J., 2015. A Multi-sector Model of the Australian Economy. Reserve Bank of Australia Research Discussion Paper (2015-07).
- Rey, H., 2015. Dilemma not Trilemma: The Global Financial Cycle and Monetary Policy Independence. NBER Working Paper 21162.
- Romer, C., Romer, D., 2004. A New Measure of Monetary Shocks: Derivation and Implications. American Economic Review 94 (4), 1055–1084.
- Rossi, B., Zubairy, S., 2011. What Is the Importance of Monetary and Fiscal Shocks in Explaining U.S. Macroeconomic Fluctuations? Journal of Money, Credit and Banking 43 (6), 1247–1270.
- Rudolf, B., Zurlinden, M., 2014. A Compact Open-Economy DSGE Model for Switzerland. Swiss National Bank Economic Studies 2014-08.
- Rychalovska, Y., 2013. The Implications of Financial Frictions and Imperfect Knowledge in the Estimated DSGE Model of the US Economy. CERGE-EI Working Paper 482.
- Sims, C., Zha, T., 2006. Were There Regime Switches in U.S. Monetary Policy? American Economic Review 96 (1), 54–81.
- Smets, F., Warne, A., Wouters, R., 2013. Professional Forecasters and the Real-time Forecasting Performance of an Estimated New Keynesian Model for the Euro Area. ECB Working Paper 1571.
- Smets, F., Wouters, R., 2003. An Estimated Dynamic Stochastic General Equilibrium Model of the Euro Area. Journal of the European Economic Association 1 (5), 1123–1175.
- Smets, F., Wouters, R., 2007. Shocks and Frictions in US Business Cycles: A Bayesian DSGE Approach. American Economic Review 97 (3), 586–606.
- Steinbach, R., Mathuloe, P., Smit, B., 2009. An Open-Economy New Keynesian DSGE Model of the South African Economy 09/01.
- Vitek, F., 2015. Macrofinancial Analysis in the World Economy : A Panel Dynamic Stochastic General Equilibrium Approach. IMF Working Paper 15/227.
- Voss, G., Willard, L., 2009. Monetary Policy and the Exchange Rate: Evidence from a Two-country Model. Journal of Macroeconomics 31 (4), 708–720.