
EXPLORING LINK BETWEEN MACRO AND FINANCIAL CYCLES

BY ADAM CAGLIARINI AND FIONA PRICE (RBA)

DISCUSSION BY

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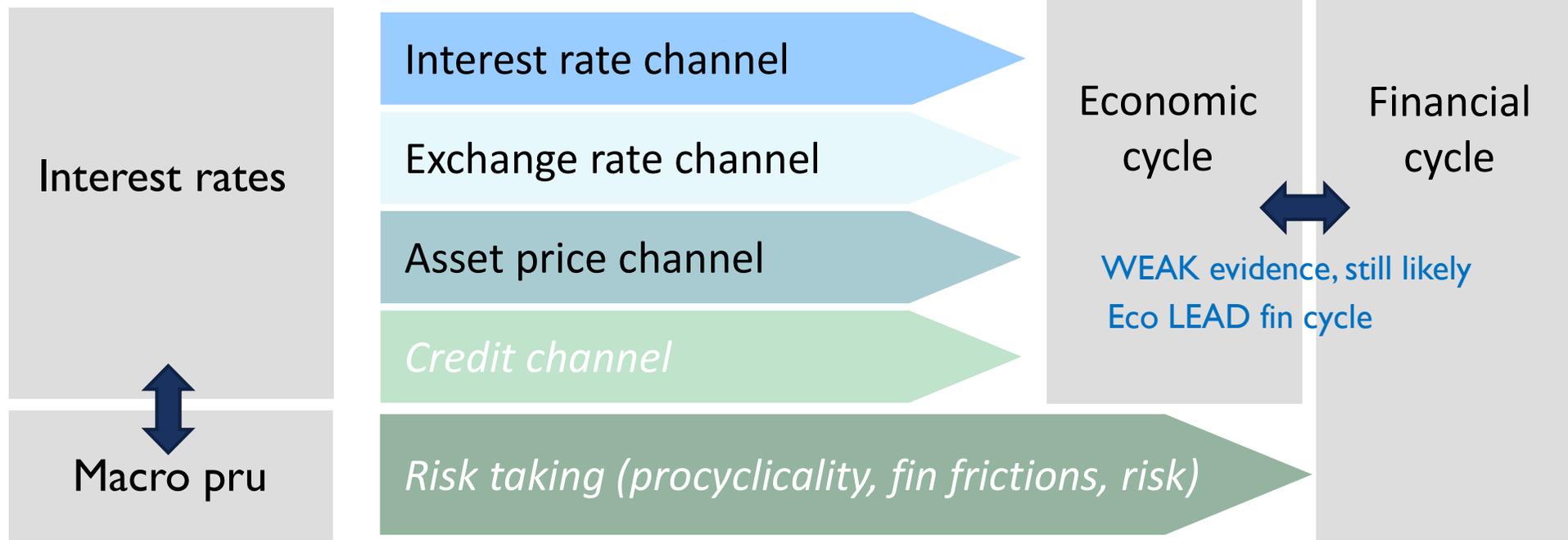
UNDERSTANDING THE NEXUS BETWEEN FINANCIAL AND BUSINESS CYCLE FLUCTUATIONS

- Very topical paper, longstanding debate, still (again) needed
- Research questions and answers
- Comments
 - Method
 - Data
 - Policy implications

RESEARCH QUESTIONS AND ANSWERS

Monetary Policy

Economy & Finance



CONSEQUENCE: macro pru needed

CONTROVERSIAL DEBATE IN THE LITERATURE

Broad literature - nicely reviewed in Cagliarini and Price (2017)

Is there an independent financial cycle?

- NO

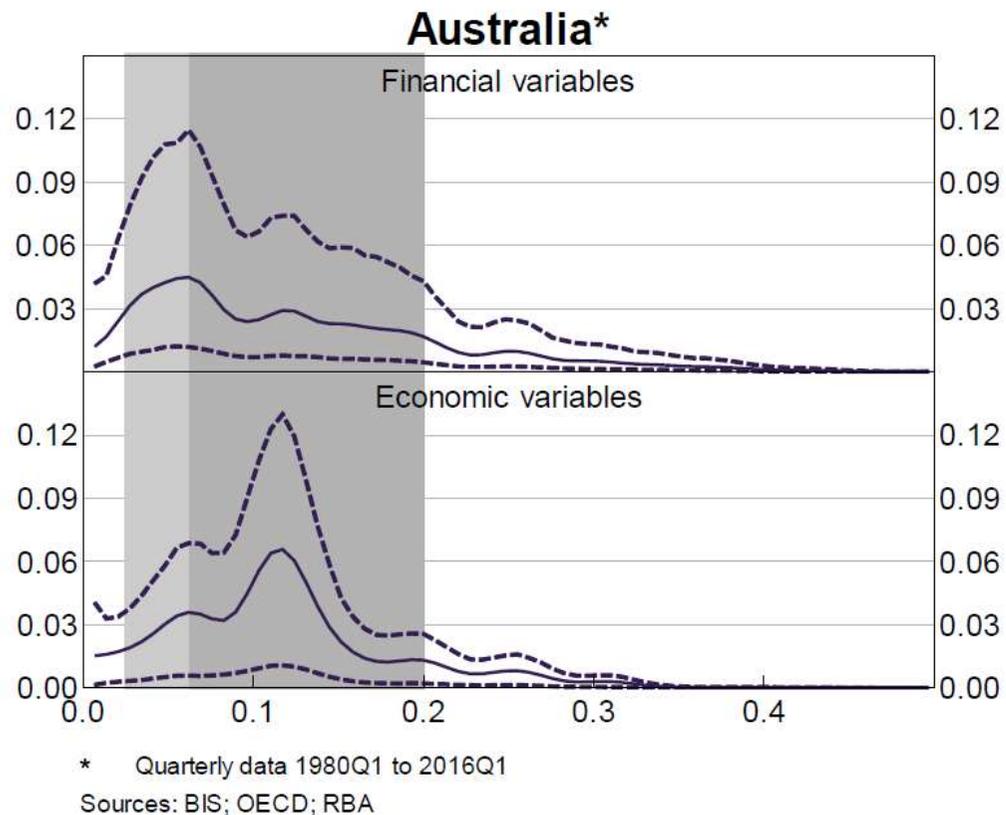
- Irrelevance principle (Modigliani and Miller, 1958)
- Finance as a veil - a factor that, as a first approximation, could be ignored when seeking to understand business fluctuations (e.g. Woodford (2003)).

- YES

- “it is not possible to understand business fluctuations and the corresponding analytical and policy challenges without understanding the financial cycle” ... “Macroeconomics without financial cycle is like Hamlet without Prince” Borio (2012); Drehmann et al. (2012)

- “SMOKING GUN” – challenge to estimate but real.

METHOD: MULTIVARIATE SPECTRAL ANALYSIS



- No pre - filtering of data (except from a Parzen window to smooth cross-spectral densities)
- **Dominant cycle length** (frequency with greatest contribution to the cross covariance)
- Test on separate FC: **little overlap** in the confidence intervals for the dominant frequencies

METHOD (I)

MULTIVARIATE, **EX ANTE** DEFINITION OF “FINANCIAL CYCLE”

- **Multivariate** approach find higher correlation between eco and financial cycles (e.g. Chen et al. (2013) and literature therein)
- “Most papers make ex ante assumptions about the length of a business cycle” CP (2017), resulting in longer financial cycles and shorter business cycles **by construction**” (CP, 2017)

Definition in frequency domain	The CP(2017) definition in time domain	Combined / nested models
2 - 8 years business cycle	gdp, employment, unemployment rate	dynamic factor model in frequency domain (Forni et al [2000, 2005])
8 - 30 years financial cycle	credit, housing prices, equity prices, 10-year bond yields	multivariate structural time series model (STSM) introduced by Harvey and Koopman (1997) (e.g. used by Ruenstler Vlekke [2016])

METHOD (2): OVERLAPPING CONFIDENCE INTERVALS – MORE FORMAL TEST

Table 1: Estimates of financial and business cycles

Peaks in multivariate spectral density

	Financial cycle estimate	Confidence interval	Business cycle estimate	Confidence interval
	Years	95%	Years	95%
US	8.2	[5.3, 22.6]	5.7	[4.5, 11.3]
Australia	8.1	[2.9, 18.1]	4.3	[3.6, 10.4]
UK	5.2	[4.3, 94.0]	8.5	[4.5, 15.7]
France	12.6	[3.5, 17.7]	9.8	[3.1, 14.8]
Germany	7.5	[5.7, 22.6]	9.1	[4.7, 18.1]

Sources: Bank of England; BIS; INSEE; OECD; RBA

- **Very wide** confidence intervals point to **regime change** in financial cycle – financial innovation?
- More formal test needed: dummy variable, markov switching model
- Only criteria is differences in the **average duration** of cycles (no amplitude)

METHOD (3): MULTIVARIATE BRY-BOSCHAN TURNING POINT ALGORITHM

Table 2: Estimates of financial and business cycles
Average cycle lengths using Bry-Boschan quarterly algorithm

	Financial variables ^(a)			Economic variables ^(b)		
	Contraction	Expansion	Cycle	Contraction	Expansion	Cycle
US	2.1	3.7	6.5	1.2	4.7	6.4
Australia	3.1	2.5	5.8	1.8	7.4	9.8
UK	3.4	3.0	6.4	1.8	5.2	7.0
France	4.6	2.8	7.3	1.6	6.0	8.5
Germany	2.3	2.3	4.6	2.0	2.9	5.1

(a) Includes credit, housing prices, equity prices and 10-year government bond yields

(b) Includes GDP, employment and unemployment rate

Sources: Bank of England; BIS; INSEE; OECD; RBA

- Test on separate FC: large differences in the average **duration** of cycles
- **Similar cycle length BUT longer contraction.**

METHOD (4): SYNCHRONISATION – WEAK ECO CYCLE, STRONG FIN CYCLE

Table 3: Synchronisation between cycles

Average cycle lengths and concordance statistics using Bry-Boschan quarterly algorithm

	Credit growth		GDP growth		Degree of synchronisation
	Contraction	Expansion	Contraction	Expansion	Concordance statistic
Longer cycles					
Australia	4.8	6.1	5.2	5.2	0.73
US	5.8	4.4	4.4	4.3	0.77
UK	5.0	4.2	5.0	4.7	0.57
France	4.3	4.7	4.7	4.3	0.65
Germany	5.1	4.4	6.2	4.6	0.64
Average	5.0	4.8	5.1	4.6	0.67
Shorter cycles					
Australia	1.6	1.5	1.8	1.5	0.61
US	2.3	1.7	2.2	1.8	0.55
UK	2.3	1.9	2.1	1.9	0.60
France	1.7	1.5	1.8	1.6	0.51
Germany	1.9	1.9	2.1	2.1	0.54
Average	2.0	1.7	2.0	1.8	0.57

Notes: Longer cycles correspond to cycle frequencies between 8 and 30 years; shorter cycles correspond to cycle frequencies between 2½ and 8 years; concordance statistics represent the proportion of time the cycles are in the same phase

Sources: BIS; OECD; RBA

DATA (I): STRONGER EVIDENCE WITHOUT EQUITY PRICES (DESPITE SHORT SAMPLE)

	Financial cycle estimate	Confidence interval	Business cycle estimate	Confidence interval
	Years	95%	Years	95%
US	8.2	[5.3, 22.6]	5.7	[4.5, 11.3]
Australia	8.1	[2.9, 18.1]	4.3	[3.6, 10.4]
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Sources: Bank of England; BIS; INSEE; OECD; RBA

Table I

	Financial cycle estimate	Confidence interval	Business cycle estimate	Confidence interval
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Australia	14.5	[4.3, 18.1]	4.3	[3.6, 10.4]
UK	13.4	[4.7, 23.5]	8.5	[4.5, 15.7]
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Germany	12.9	[7.5, 22.6]	9.1	[4.7, 18.1]

(a) Only using credit growth and housing price inflation as financial variables

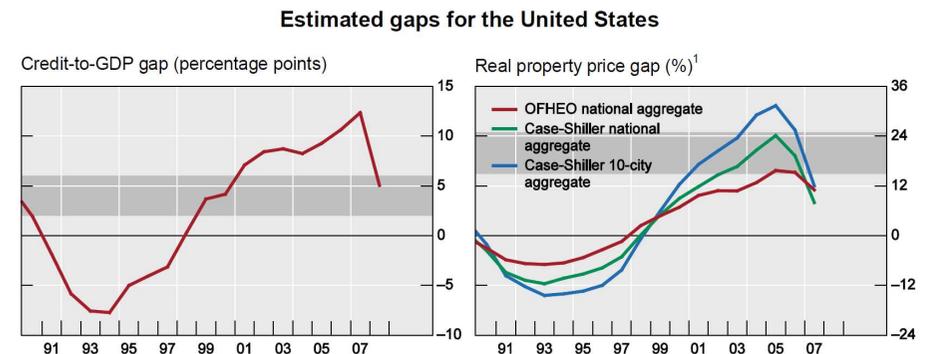
Sources: Bank of England; BIS; INSEE; OECD; RBA

Table C3:
Stronger evidence
for longer
Fin.cycle

DATA (2)

FINANCIAL CYCLE AS “BUILD UP OF RISK”

- “While the **credit gap** and **credit-to-GDP** gap have been commonly used to measure the financial cycle, there is **little theory** behind these measures. In contrast to the output gap, it is not clear what the level of potential credit is or what distortion makes credit deviate from its potential.” (CP, 2017)
- Explore credit gap or credit-to-gdp as **robustness check**
 - is a rough measure of **leverage** in the economy
 - Provides indirect indication of the **loss absorption capacity** of the system
 - Adds **leading** property (granger tests), (Drehmann, 2012)
 - Not more prone to more revisions than GDP



The shaded areas refer to the threshold values for the indicators: 2–6 percentage points for credit-to-GDP gap; 15–25% for real property price gap. The estimates for 2008 are based on partial data (up to the third quarter).

¹ Weighted average of residential and commercial property prices with weights corresponding to estimates of their share in overall property wealth. The legend refers to the residential property price component.

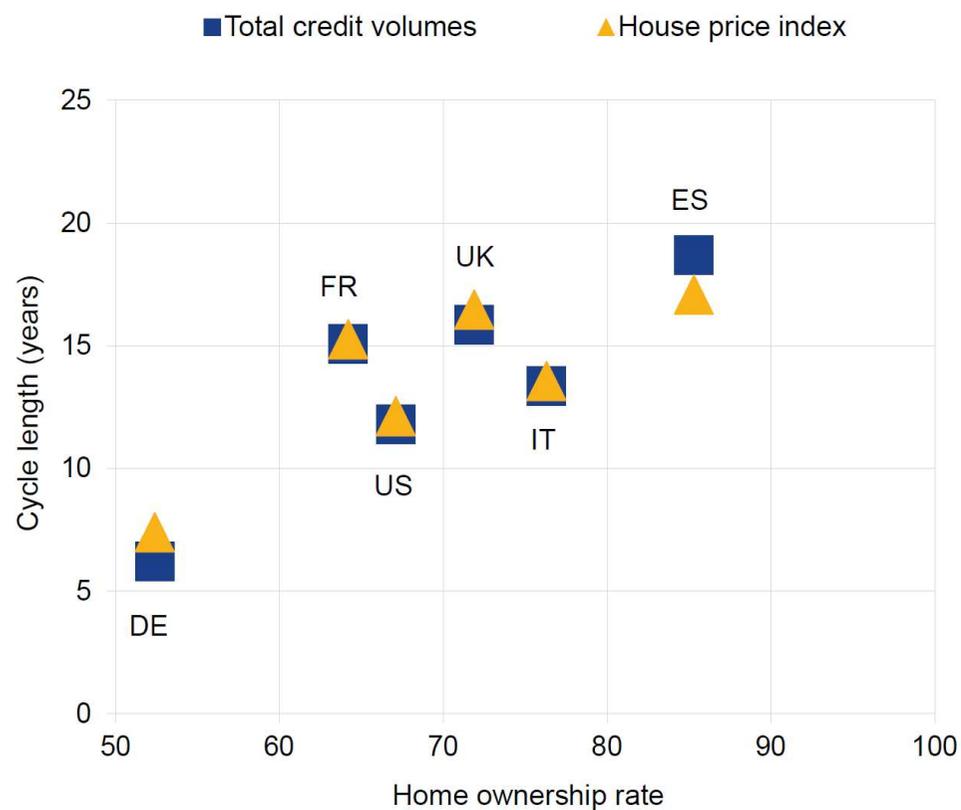
Source: Borio and Drehmann (2009).

COMMENT ON DATA (3)

DOES THE FINANCIAL CYCLE - FULLY - SHOW IN TRADITIONAL BANKING?

- CP (2017) and others use credit growth, housing price growth, equity price growth, change 10 year government bonds.
 - Reasonable but may be not sufficient to reflect FC
- Does the financial cycle - fully - show in traditional banking?
 - **Banks as buffer for long-standing** customers with pre-arranged credit lines. Mentioned as possible reason for **inconclusive finding** for credit channel. ... and maybe also financial cycle?
 - Consider including “**shadow banking**”: total assets of the market based intermediaries
 - As a prominent example: Adrian, Estrella, Shin (2010) link monetary, financial and business cycles. “... **total assets of the market-based intermediaries**, such as the shadow banks, can be seen to hold **more reliable information on overall credit conditions**”

POLICY (I): THE ROLE OF HOMEOWNERSHIP – EXPLAINS COUNTRY DIFFERENCES



Financial cycles are larger and longer for countries with higher shares of private home ownership.

Source: Rünstler and Vlekke (2016): “Business, housing and credit cycles”, *ECB working paper series No 1915*, June 2016.

POLICY (2): TARGETED CCB

- "monetary policy 'gets in all the cracks' (Stein, 2013).

Disadvantages of CCBs:

- For example, Guibourg et al (2015) suggests that countercyclical capital requirements **would not have been sufficient** to stop rapid credit growth in the lead up to the financial crisis in the UK and Spain.
- some viable, albeit riskier, investments may be denied funding, which could result in **less funding for innovation** that would have otherwise helped to drive higher productivity growth

However:

- CCB can be designed in such a way that it can be implemented on a **broad basis** or can **target specific segments of the credit market only**
 - relate only to the **domestic mortgage** and **residential real estate** markets.

POLICY (3): MACRO PRU “NOVICES” VERSUS “VETERANS”

- Sample of countries: US, Australia, UK, France, Germany - more recent experience with macro-pru measures.
- Does FC show more in countries where LTV were earlier introduced?
 - What about differences in European countries:
LTV measures are in place in CY, EE, FI, IE, LV, LT, NL, SI, SK,
LTI/DSTI measures are in place in CY, EE, IE, LT, NL, SI, SK.
 - and of course SG and HK.

THANKS!

- Very topical and important
- Results show more evidence for financial cycle than write-up (w/o equity, contraction lengths)
- More formal modelling approach
- No Airtight Alibi - Prince is likely in Hamlet