Seðlabanki Íslands

Small is beautiful

Working at a small central bank in a small currency area

Practitioner Seminar Adam Smith Business School University of Glasgow

2 December 2016

Thórarinn G. Pétursson

Chief Economist and Member of Monetary Policy Committee – Central Bank of Iceland

Roadmap for presentation

1. Background on the Bank and a bit about myself
2. Work at the Bank: A short description of a typical forecasting cycle
3. A short detour: Iceland and the financial crisis – from boom to bust and back again
4. Research at the Bank (if time allows)

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Background on the Bank and a bit about myself

Me, myself and the Bank

I'm from here …

Me, myself and the Bank

… or, to be more specific

A bit about the Bank

The Bank

- Established in its current form in 1961

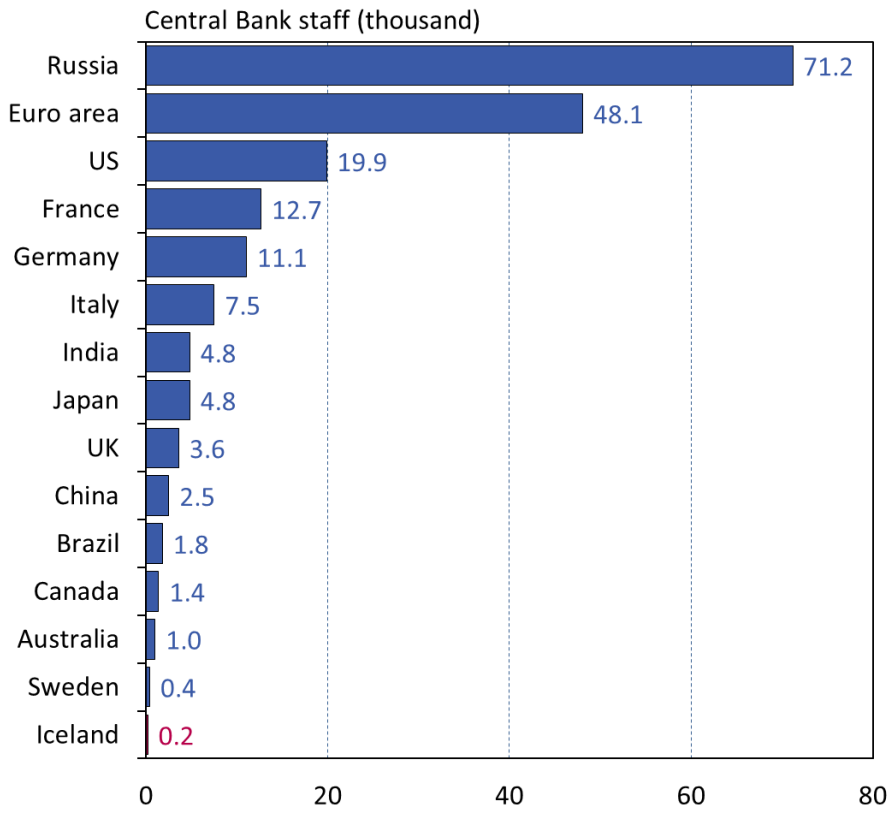
Its remit

- All the conventional Central Bank functions
- Conducts monetary policy independently with the aim og maintaining inflation at 2.5% over the medium-term

Its staff

- Its current staff level of 180 makes it one of the smallest central banks in the world …

Central Bank staff



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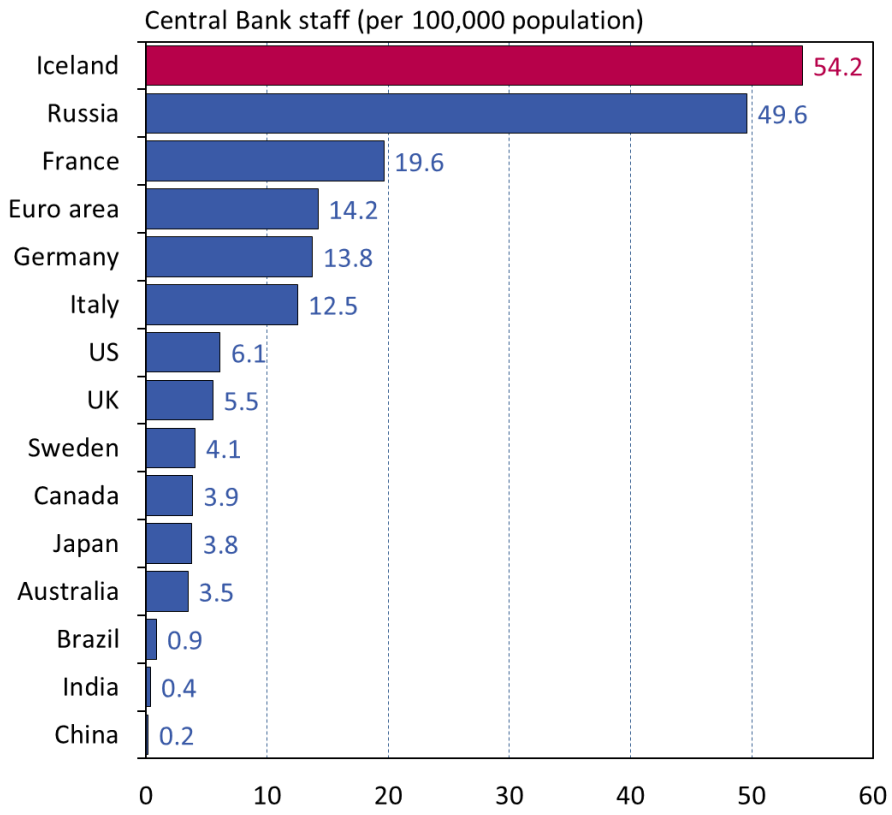
Central Bank staff



A bit about myself

Became interested in economics at an early age …

- Remember being fascinated by a newspaper article on hyperinflation in Germany in the 1920s (seems an appropriate start for a central bank economist)
- Got Samuelson's textbook as a present for my confirmation (is that normal?)

… before heading to university to study economics

- Obtained an undergraduate degree (a 4 year candidate degree) from University of Iceland in 1987 …
- … headed to the UK to obtain a masters degree from University of Essex …
- … before finally obtaining a PhD from Aarhus University in Denmark in 1998

A bit about myself

My job at the Bank

- Started as an economist in the mid-1990s before being promoted to Head of Research and Forecasting in 2002 and finally to my current position in 2009
  - Chief Economist and Director of the Economics and Monetary Policy Department – managing a staff of 20 economists
- A member of the Bank's rate setting committee since its inauguration in 2009

Other job-related things

- Have also held various university positions – currently Associate Professor at Reykjavík University (on leave)
- I also sit in the Board of International Journal of Central Banking and am a Council Member of SUERF (Société Universitaire Européenne de Recherches Financiéres) and CEBRA (Central Bank Research Association)

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Work at the Bank: A typical forecasting cycle

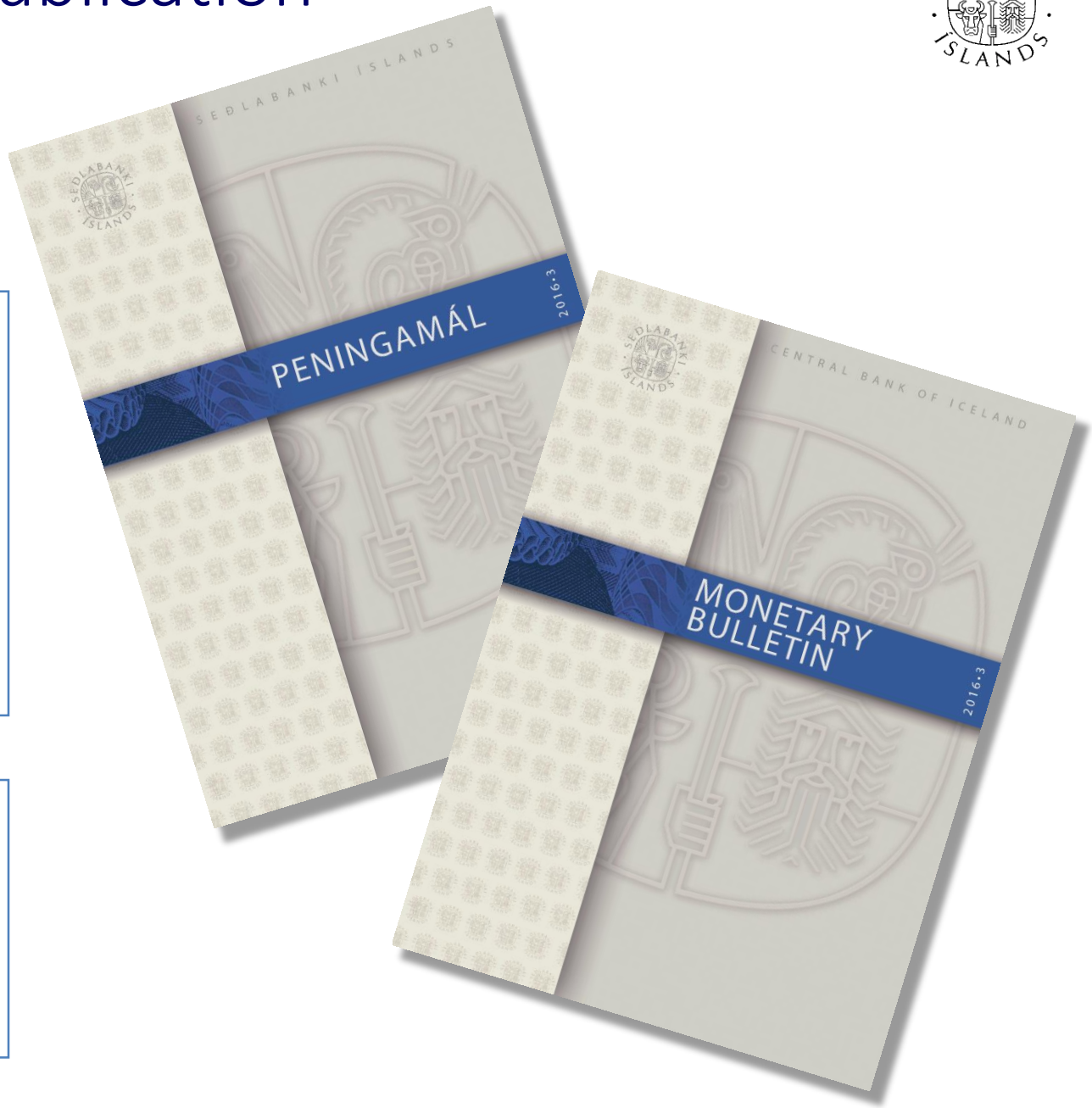
The forecasting cycle: the publication

The publication

- We publish our “inflation report” four times a year: two “full-blown” publications and two slightly shorter updates
- Contains a detailed analysis of macroeconomic developments and the outlook for the next 3 years
- Published simultaneously in 2 languages

What is published

- Publish a forecast for over 50 key macro variables
- Forecast based on extensive preparation and analysis with each cycle lasting six weeks



The forecasting cycle: preparing the forecast

Sectoral experts

- Sectoral experts start by preparing presentations on their sector
  - Key new developments: what has changed and why
- Extensive use of micro and macro data, survey data, and sectoral contacts
- Near-term outlook based on this information, often using simple models to organise data and forecast (e.g. PCs, ARIMAs, simple regressions, VARs, or VECs)

The forecasting team

- The info presented by sectoral experts is discussed in several extensive meetings …
- … focusing on what is new and what has changed from the previous forecast
- The information is then handed over to the forecasting team which feeds it into our key forecasting model

The forecasting cycle: models and judgement

The models

- The key forecasting model is a medium-sized macro model
  - It is forward-looking and mainly based on empirically estimated or calibrated model relations
- Also have a DSGE model … but it still hasn't replaced the workhorse model

The role of judgement

- The next step is another set of meetings discussing key expert judgements
  - Our forecasts are never pure model forecasts but forecasts made by us using models as a disciplinary devise
- A key part of the process is the overall story the forecast tells
  - The forecast is never just about the baseline numbers but storytelling …
  - … what is the main story, how credible is it, what has changed, and why?

The forecasting cycle: uncertainty and alternative scenarios

Forecast uncertainty

- Not only about the baseline outlook but risks surrounding it …
- … what are these risks and how do they shape the balance of uncertainty (and, ultimately, the probability distribution of inflation)?

Alternative scenarios

- Alternative scenarios represent an effective way of introducing uncertainty into the storytelling – with two scenarios typically published with each forecast
- These are typically key risks that are reasonably probable and can materially alter the baseline story should they be realised
- They can also represent different policy shocks or can serve to explain possible monetary policy responses to shocks

The forecasting cycle: some key challenges

Forecasting particularly challenging in a small economy …

- High noise-to-signal ratio in macroeconomic data and leading indicators
- Frequent large revisions of early data vintages
- High pass-through of exchange rate shocks to domestic prices … in particular with legacy of imperfectly anchored inflation expectations

… especially after the global financial crisis

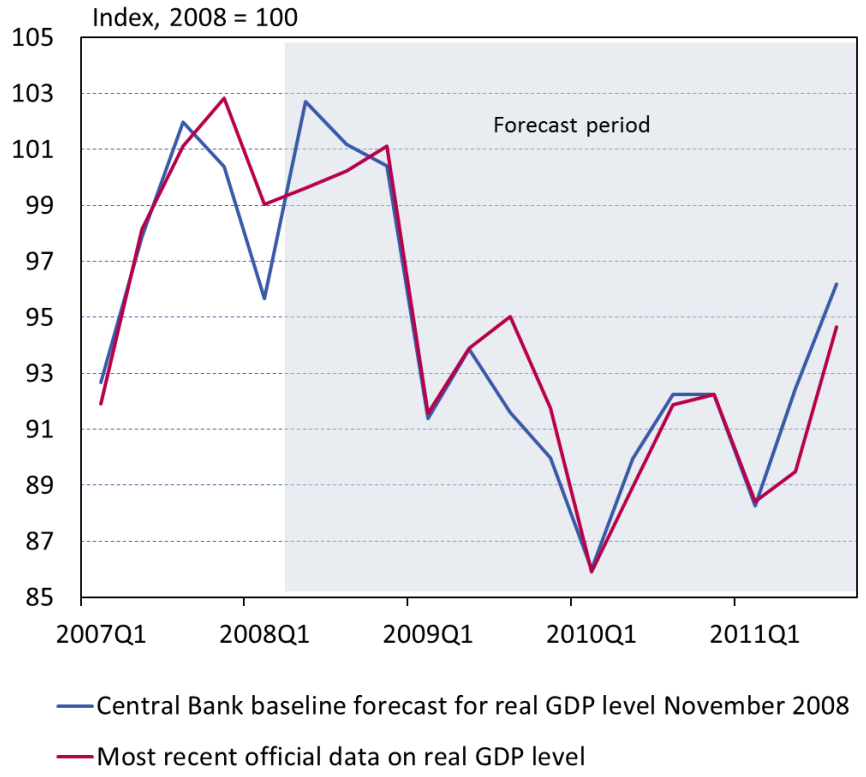
- Challenges in modelling the macro-financial nexus
- Modelling global spillovers of the “new normal”
- The post-crisis low domestic productivity growth and implications for long-term growth
- Structural changes in domestic economy, e.g. large shift of resources from non-traded sector to traded sector and the expansion of tourism industry

Doing forecasting: two examples

- Forecasting tends to be a continuous accumulation of hard-luck stories …
- … but sometimes they turn out quite well: the forecast in the midst of the crisis on the trough and turning point …
- … and sometimes less so: inflation has turned out much lower since 2015 following global oil shock

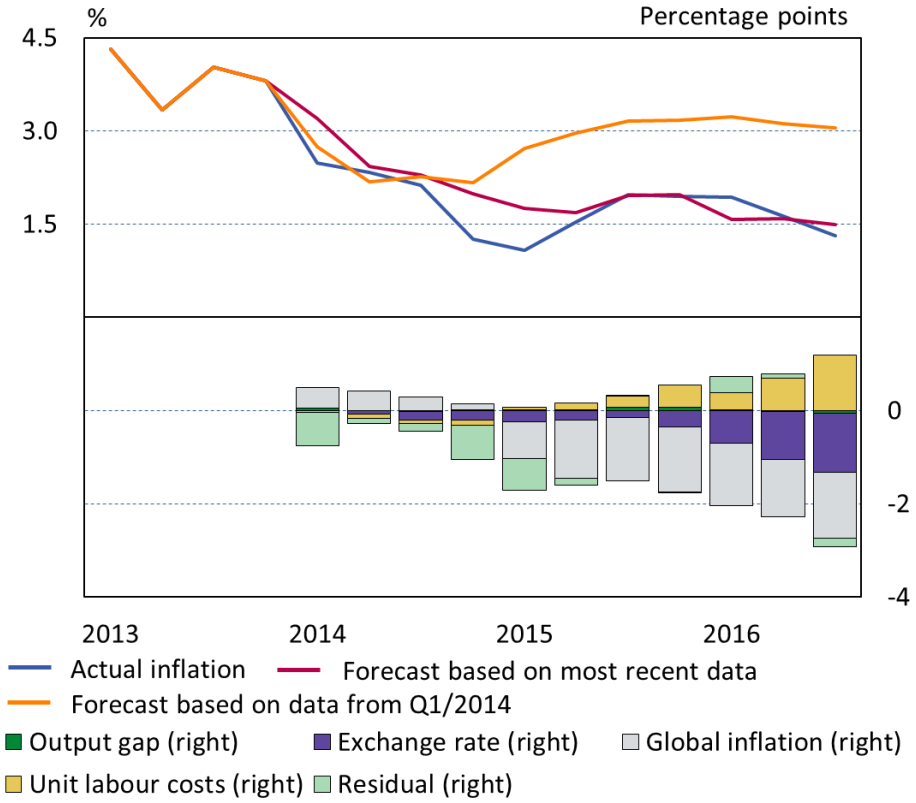
Financial crisis: forecast and outcome[1]

Q1/2007 - Q3/2011



Inflation surprises from Q1/2014[2]

Q1/2013 - Q3/2016



1. Comparison of actual GDP level (not seasonally adjusted) with forecast from *Monetary Bulletin* 2008/3. 2. Dynamic forecasts from Q1/2014 based on a forward-looking Phillips curve, based on data available at Q1/2014 and the most recent data, respectively. Contributions of underlying factors based on counterfactual dynamic simulations. See Box 5 in *Monetary Bulletin* 2016/2 for further detail.
Sources: Statistics Iceland, Central Bank of Iceland.

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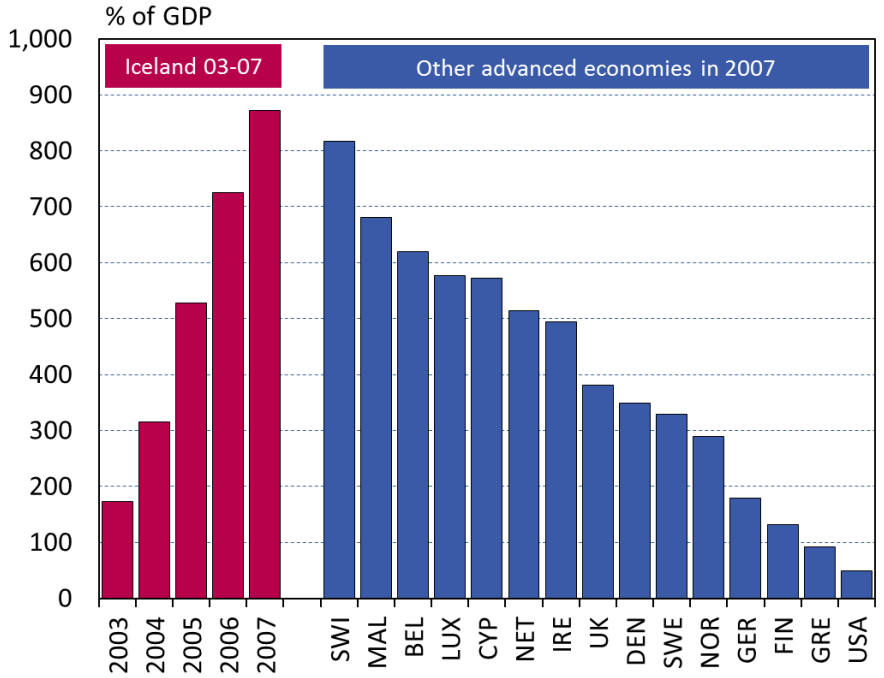
A short detour: Iceland and the financial crisis – from boom to bust and back again

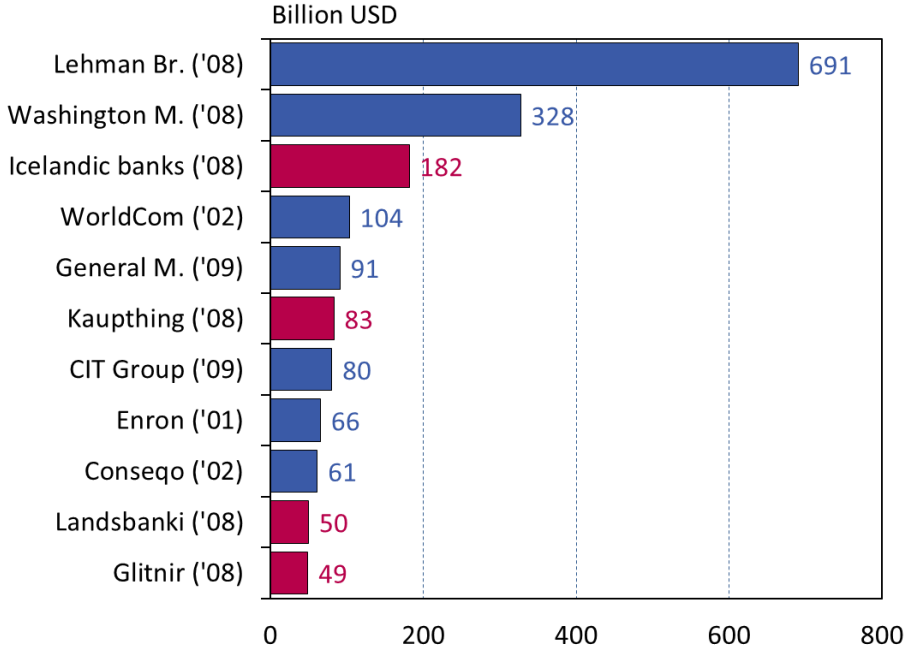
Rapidly expanding banks before collapsing with a thump

- The Icelandic banking system expanded rapidly following its privatisation in the early 2000s: increasing from less than 2 times GDP in 2003 to 10 times GDP by the time it collapsed in the autumn of 2008 – making it the largest banking system in the advanced world relative to GDP (except, perhaps, in Scotland) …
- … and among the largest bankruptcies in history – even in absolute terms

Banking system size in the run-up to the international financial crisis[1]



The largest bankruptcies in history



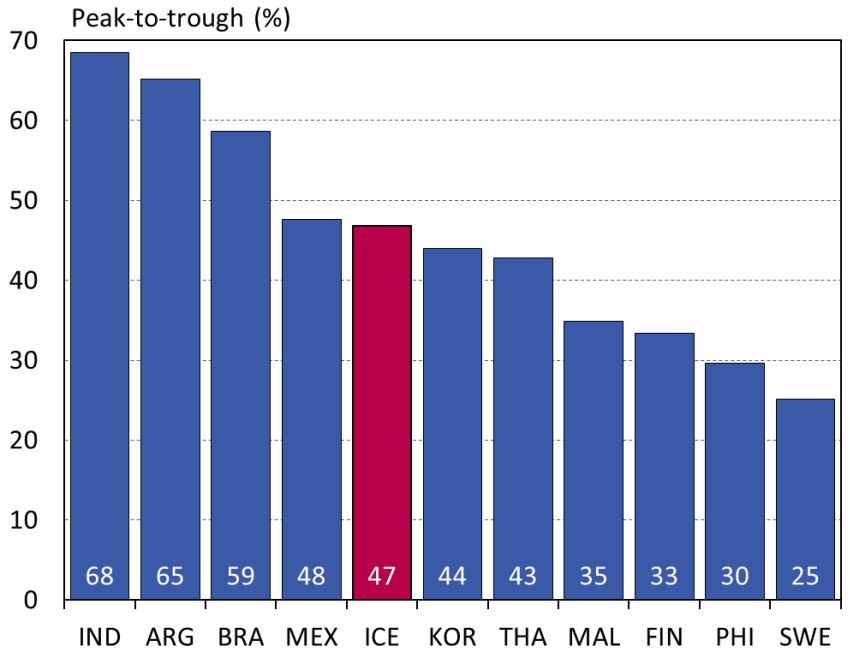
1. The figure shows the development in Iceland in 2003-2007 but the position in 2007 in other countries.

Sources: BankruptcyData.com, Interim Financial Statements of the Icelandic banks in September 2008, Central Bank of Iceland, T. T. Ólafsson & T. G. Pétursson (2011). Weathering the financial storm: The importance of fundamentals and flexibility. In *The Euro Area and the Financial Crisis*. Editors M. Bablavý, D. Cobham and L. Ódor. Cambridge University Press.

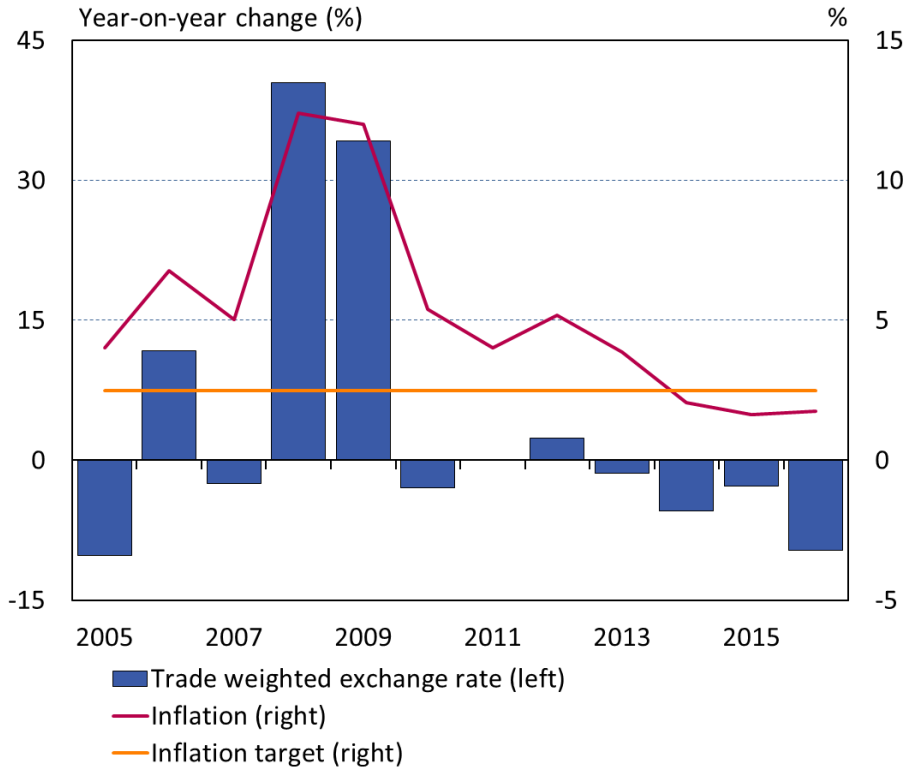
… made all the more complicated by the twin crisis

- Iceland was the only advanced economy in the recent global crisis which not only experienced a systemic banking crisis but also a serious currency crisis – with the value of the currency falling by almost a half …
- … this had severe repercussions for domestic balance sheets and made monetary policy even more complicated as inflation shot up to almost 20% – before gradually easing to target (and below) in the last few years

Real exchange rate depreciation in selected currency crises[1]



Exchange rate and inflation 2005-2016[2]

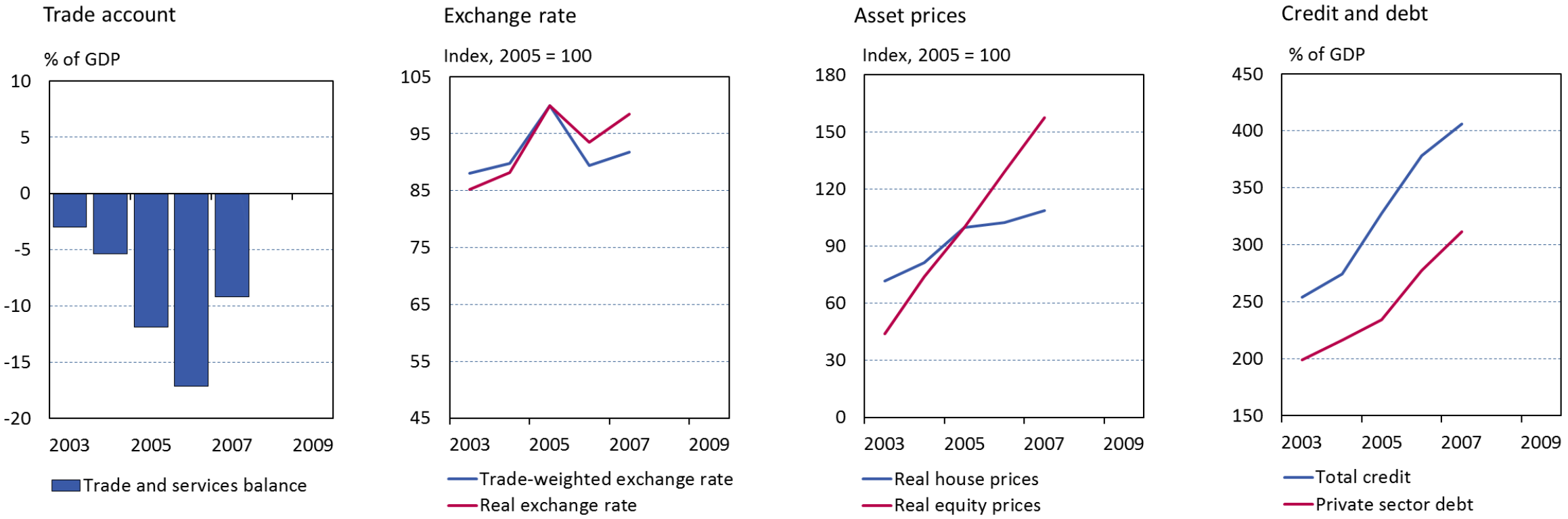


1. Real exchange rate depreciation from pre-crisis peak to post-crisis trough (using a 5-year post-crisis window). The dates are (peak/trough): Indonesia (Feb. '07/Jun. '08), Argentina (Oct. '01/May '02), Brazil (Jan. '98/Oct. '02), Mexico (Jan. '94/Mar. '95), Iceland (Nov. '05/Nov. '08), Korea (May '96/Jan. '98), Thailand (Mar. '97/Jan. '98), Malaysia (Mar. '97/Jan. '98), Finland (Aug. '90/Mar. '93), Philippines (Apr. '97/Nov. '00), Sweden (Sep. '92/Apr. '95). 2. Annual averages (increase in exchange rate index denotes a depreciation). Figures for 2016 are Central Bank of Iceland *Monetary Bulletin* 2016/4 forecast.
Sources: Bank of International Settlements, Central Bank of Iceland.

The boom-bust cycle: a build-up of large imbalances

- The boom period saw a large build-up of internal and external imbalances … with a record-high trade deficit, an over-appreciated currency, and a large asset price bubble, all being fed by a large credit boom …
- … thus, leading to a very large increases in private sector debt – which had reached over 300% of GDP in 2007

The boom-bust cycle 2003-2009

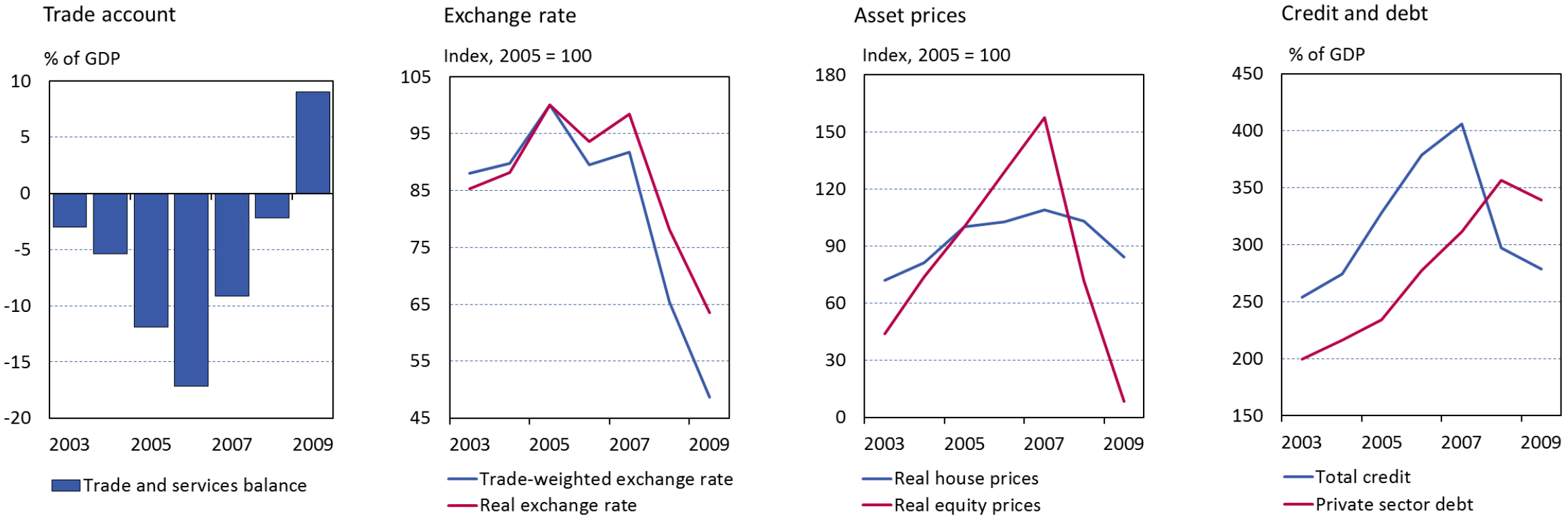


Sources: Statistics Iceland, Central Bank of Iceland.

The boom-bust cycle: a large and sharp correction

- The global financial crisis saw an abrupt stop to access to foreign credit to fund such a large trade deficit …
- … the sudden stop crisis led to a sharp reversal in the trade deficit as domestic demand became severely compressed, and a sharp correction in the currency, followed by collapsing credit and asset prices

The boom-bust cycle 2003-2009

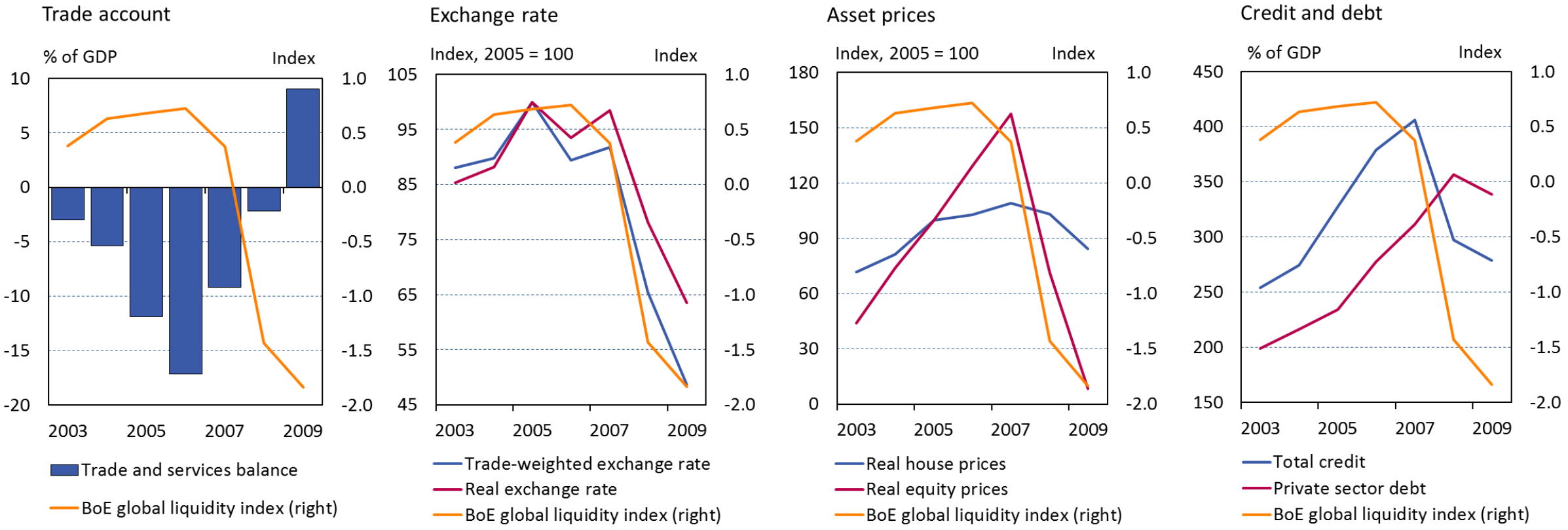


Sources: Statistics Iceland, Central Bank of Iceland.

The boom-bust cycle: significant global spillovers

- An important feature of the boom-bust episode is the role of global financial conditions: how easy access to global funding fed the boom and how its sharp curtailment following the Lehmann collapse contributed to the bust
- Suggests there is a domestic financial cycle that is to a large extent driven by variations in global financial conditions

The boom-bust cycle 2003-2009

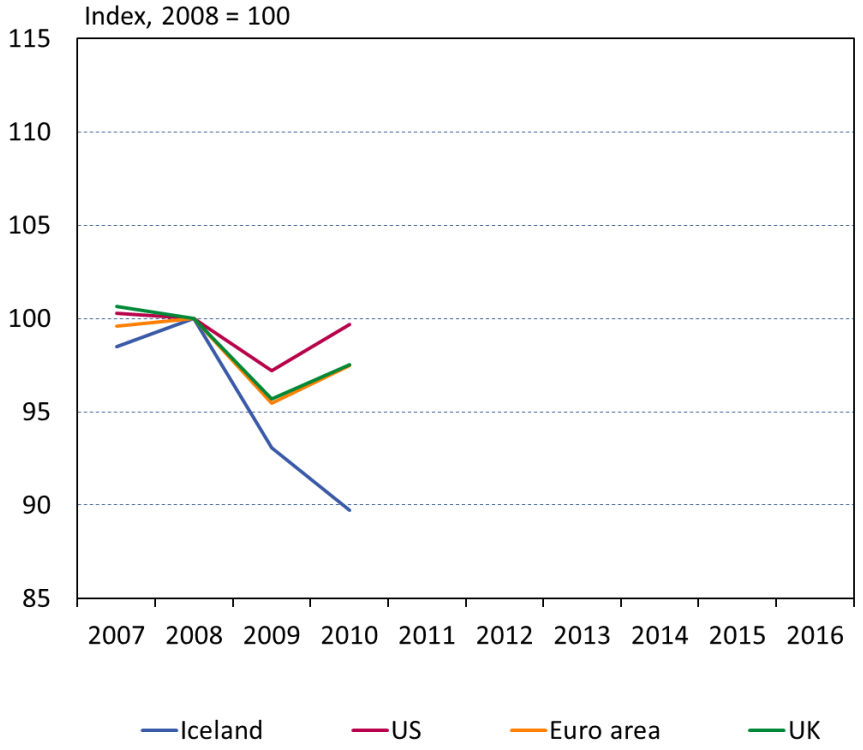


The Bank of England global liquidity index shows the number of standard deviations from the mean (exponential moving average) from a simple unweighted average of nine liquidity measures, normalised on the period 1999-2004.
Sources: Bank of England, Statistics Iceland, Central Bank of Iceland.

The crisis hit the real economy hard …

- GDP fell by 13½% from peak to trough: roughly twice as much as in the euro area and the UK … and it was still falling into 2010 at the same time GDP was starting to recover in most other advanced economies
- Unemployment also rose sharply: from about 2% pre-crisis to 8% in late 2010 – also a large increase in long-term unemployment which rose from almost zero to 2%

GDP in Iceland and its main trading partners 2007-10



Unemployment

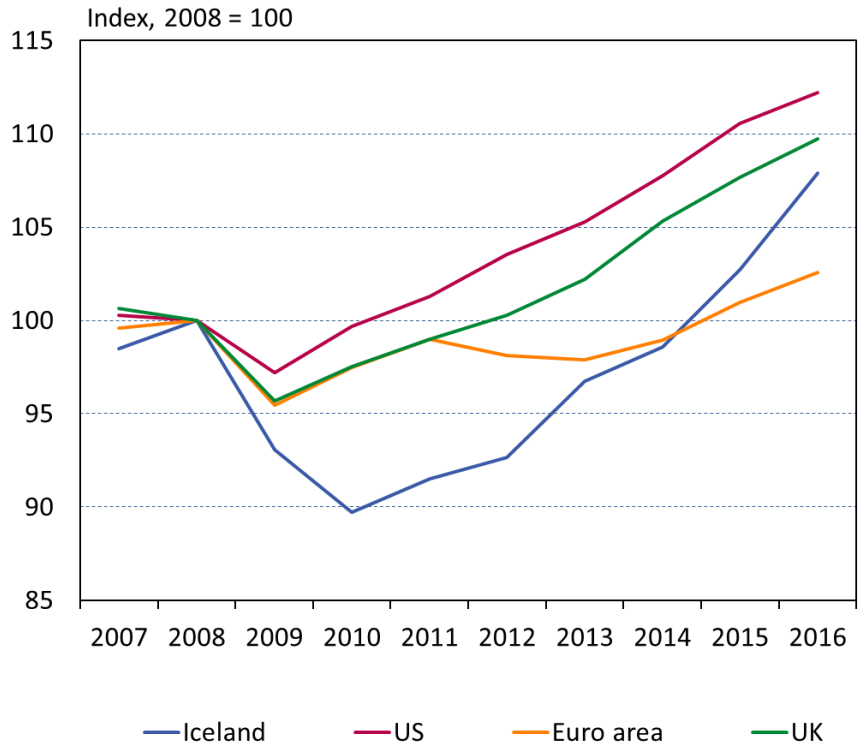
Q1/2005 - Q4/2010

Sources: Macrobond, Statistics Iceland, Central Bank of Iceland.

… but a strong recovery from mid-2010 …

- But since mid-2010 the economy has been recovering … a recovery that has gained momentum as time has passed: GDP has risen by 22% from its post-crisis trough and was almost 6% above its pre-crisis peak in Q2/2016 …
- … while unemployment has declined substantially and measured 3.1% in Q3/2016 – and long-term unemployment has all but disappeared

GDP in Iceland and its main trading partners 2007-16[1]



Unemployment

Q1/2005 - Q3/2016

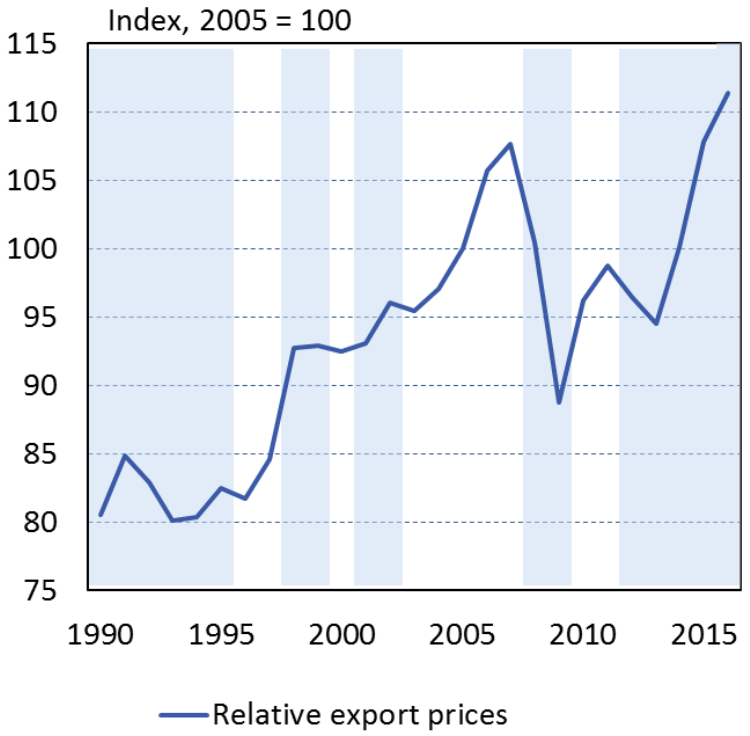
1. Central Bank baseline forecast for 2016.

Sources: Macrobond, Statistics Iceland, Central Bank of Iceland.

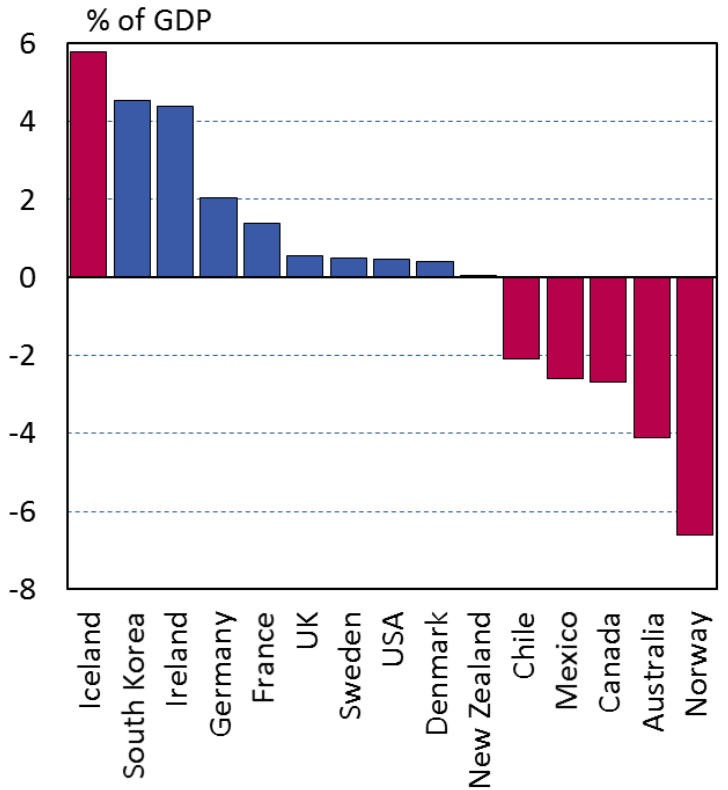
… with some help from two good-luck stories …

- A strong terms of trade improvement has supported the recovery by raising domestic income levels – not only through declining import prices but also through rising relative export prices …
- … adding to strong exports performance (especially given weak global trade growth) – tourism in particular

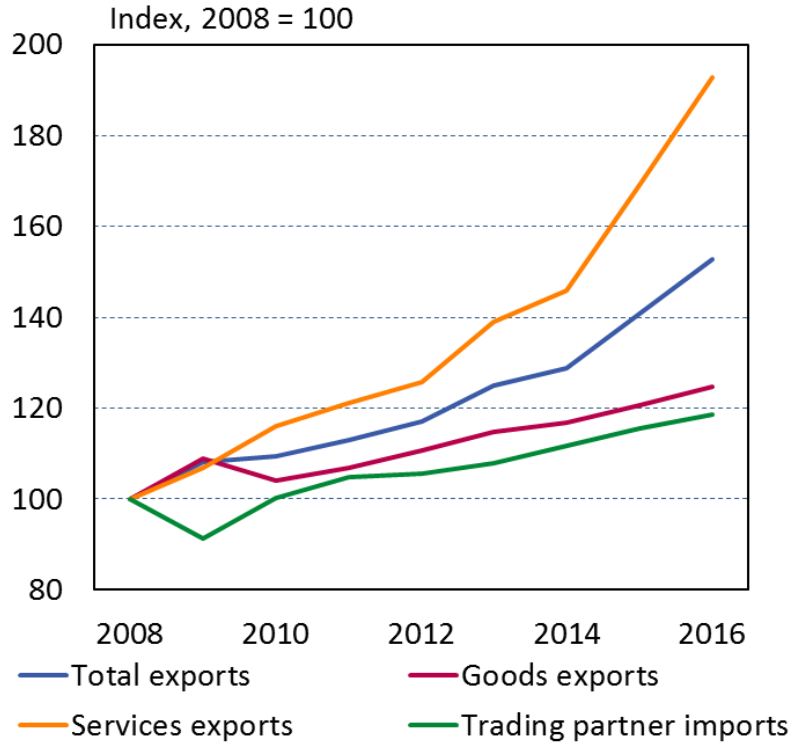
Export prices and global growth 2000-2016[1,2]



Terms of trade effect in 15 OECD countries 2014-2015[3]



Exports and external demand 2008-2016[2]



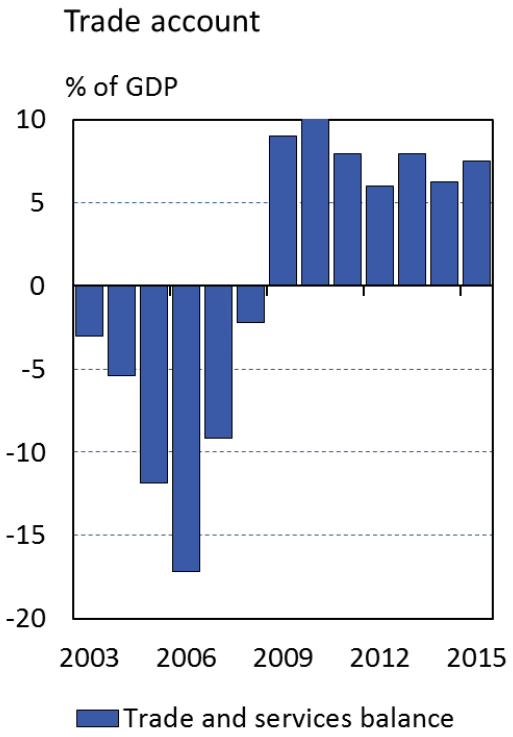
1. Prices of Icelandic exports relative to trading partners' export prices (converted to the same currency using the trade-weighted exchange rate index). Shaded area denotes years where global GDP growth is below its trend average (25 year period, 1992-2016). 2. Central Bank baseline forecast for 2016 (IMF's WEO forecast for global growth). 3. The difference between the purchasing power of exports and export volumes relative to the previous year's GDP. Cumulated effect for 2014-2015. Countries classified as commodity exporters in terms of the weight of commodities in net exports are denoted by red columns.

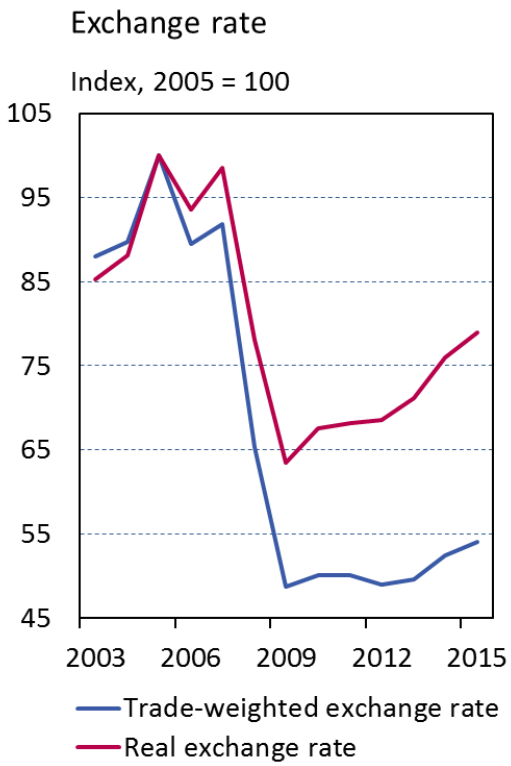
Sources: Macrobond, International Monetary Fund, OECD, Statistics Iceland, United Nations (UNCTAD), Central Bank of Iceland.

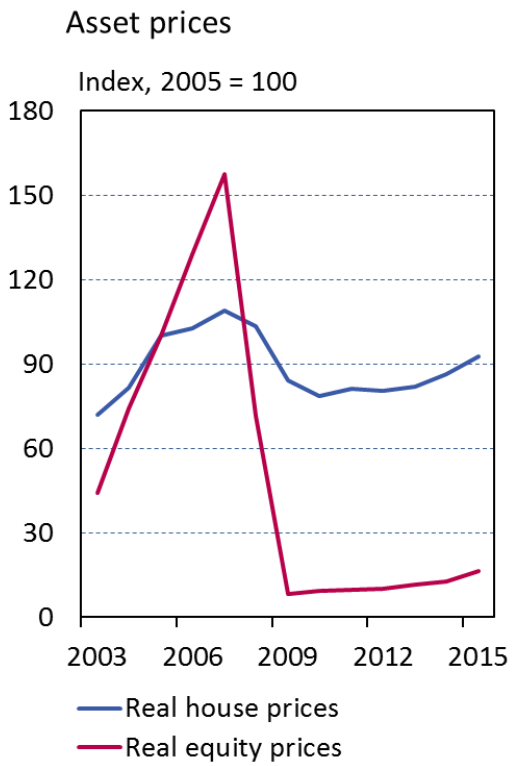
… but without a return of pre-crisis imbalances …

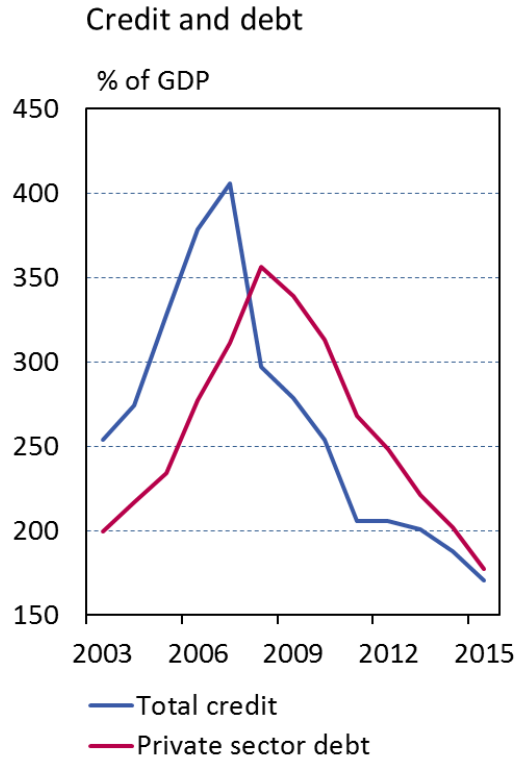
- Unlike previous booms – the current one seems to be built on better foundations: the economy is still running sizable trade surpluses and although the currency has appreciated, a large part of that is driven by fundamentals …
- … and although asset prices have picked up again, the deleveraging process continues – resulting in lower debt levels than prior to the last credit boom, and private savings continue to rise despite strong demand growth

The boom-bust cycle 2003-2015







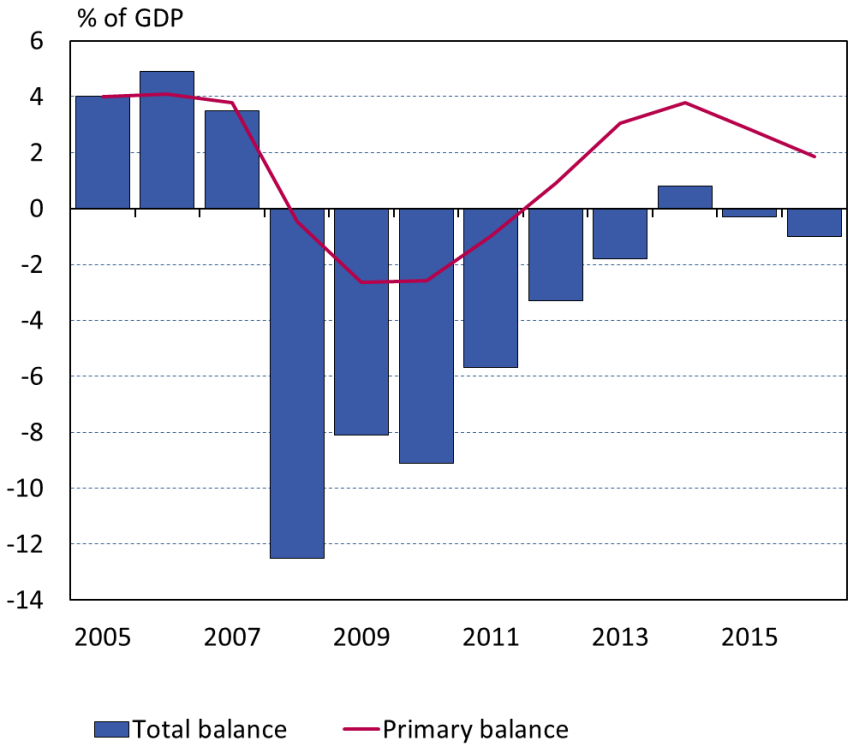


Sources: Statistics Iceland, Central Bank of Iceland.

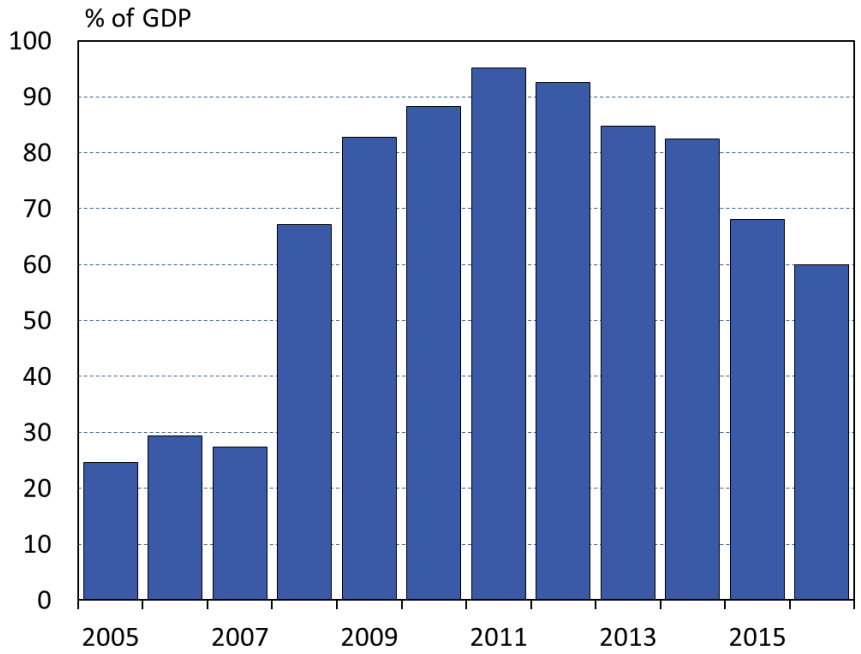
… and with public finances back on a sustainable path

- An important element in the crisis-management phase was to put public finances back on a sustainable path
- Treasury finances were hit hard by the crisis – but sizable (albeit declining) primary surpluses in recent years …
- … and government debt expected to decrease to 60% of GDP this year from its peak of 95% of GDP in 2011

Treasury finances 2005-2016[1]



General government debt 2005-2016[2]



1. Total and primary balance adjusted for one-off items. 2. Gross debt excluding pension obligations and accounts payable. 2016 data are from the Central Bank of Iceland baseline forecast in *Monetary Bulletin* 2016/4.
Sources: Ministry of Finance and Economics, Statistics Iceland, Central Bank of Iceland.

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Research at the Bank

Research at the Bank

Why do research?

- Central bank research is very important for doing monetary policy: provides better understanding of how the economy works and to build models to describe its key features …
- … including the monetary policy transmission mechanism
- … and to make forecasts to support forward-looking monetary policy

How is it organised?

- A small central bank and therefore no pure research department but most of the staff at the Economics and Monetary Policy Dep. participate in some research projects (big and small)

Two recent research projects that I have been working on

- I have less time now to do research (which I find a big shame)
- Two examples that could be of interest and relevance for a Scottish audience irrespective of whether “Scexit” (is that a word?) will ever happen

How are currency regimes chosen and does it matter?

Being small can be (vertically) challenging

- Small countries tend to be more specialised and less diversified … therefore making them more exposed to external shocks …
- … they are also less able to bear the fixed costs associated with building up institutional capacity and to exploit economics of scale
- Small countries therefore tend to be more volatile than their larger siblings

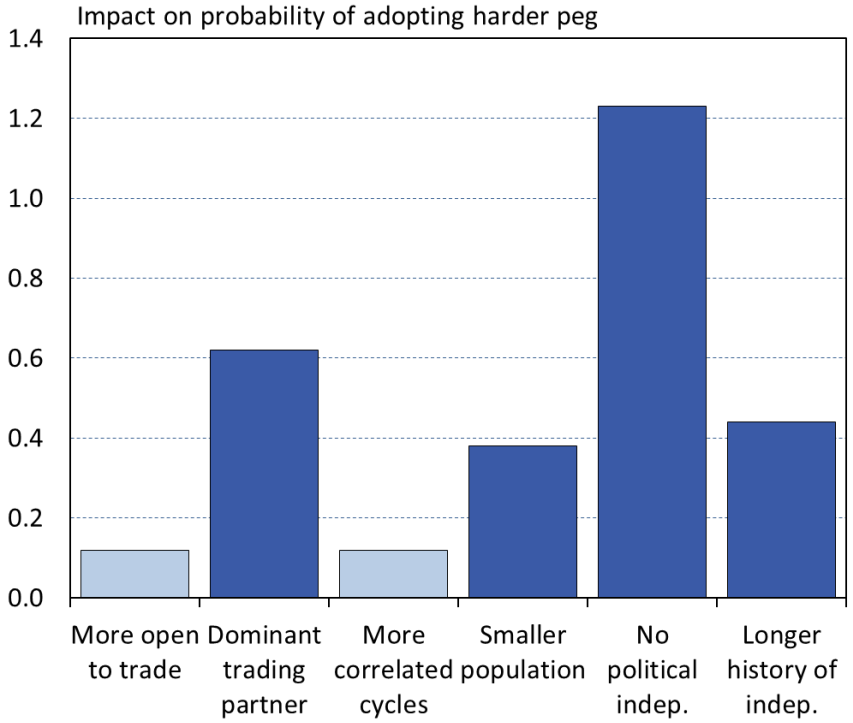
The aim of this study

- Look at currency regime choices of 37 small rich economies over the period 1970-2008
- What kind of currency regime do they tend to choose – and why?
- Does this choice affect economic outcomes in these countries?
  - Remember what conventional macro theory tells us: exchange rate acts as a shock absorber, so greater exchange rate flexibility should coincide with lower real economy volatility
- Joint work with Francis Breedon (Queen Mary, London) and Andrew K. Rose (Berkeley)

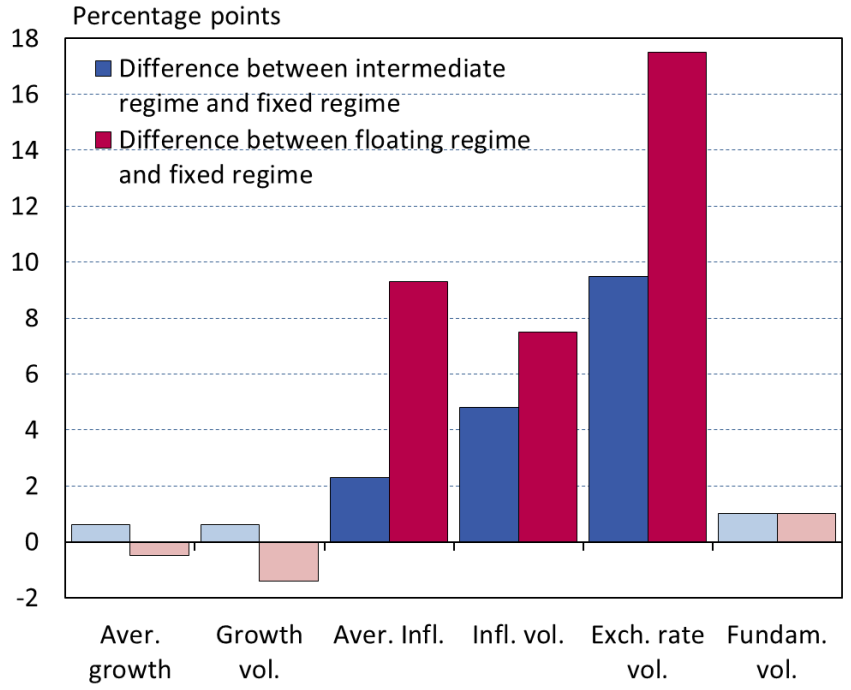
How are currency regimes chosen and does it matter?

- The (1) the stronger the ties to its main trading partners, (2) smaller the country, (3) the less politically independent it is, and (4) the longer since it gained independence – the greater the probability of choosing a hard currency peg
- A more flexible regime is not associated with a more stable real economy … only with more volatile exchange rates (and inflation rates) and differences in exchange rate volatility are not matched by a similar differences in fundamentals volatility

Ordered-response probit model for currency regime choices[1,2]



Macroeconomic performance of 37 small countries by currency regime[1,3]



1. The country sample includes 37 small and rich economies (with populations between 300 thousand and 3 million and real PPP-adjusted GDP per capita above 11,500 USD) for the period 1970-2008. The exchange rate regime classification is based on the Levy-Yeyati and Sturzenegger classification. 2. *Trade openness* is measured as exports plus imports as a share of GDP. *A dominant trading partner* is the trade share of the largest trading partner. *Business cycle correlation* is the correlation of each country's output gap with its trade weighted output gap. *Population* is the log of population size. *Political independence* is a dummy variable that equals 1 is a country is defined as politically independent in the CIA Factbook and 0 otherwise. *Years since independence* is the number of years since gaining independence, based on the CIA Factbook. 3. Fundamental volatility is the volatility of relative money, output, and interest rates, based on the monetary model of the exchange rate. Lighter shaded columns denote parameters or group differences that are not statistically significant at the 5% critical level.

Source: F. Breedon, T. G. Pétursson & A. K. Rose (2012), "Exchange rate policy in small rich economies", *Open Economies Review*, 23, 421-445.

The financial cycle and global spillovers

The financial crisis in 2008

- The previous discussion on the experience from 2008 suggests that variations in global financial conditions played a huge role in the financial boom-bust cycle in Iceland associated with the crisis in 2008

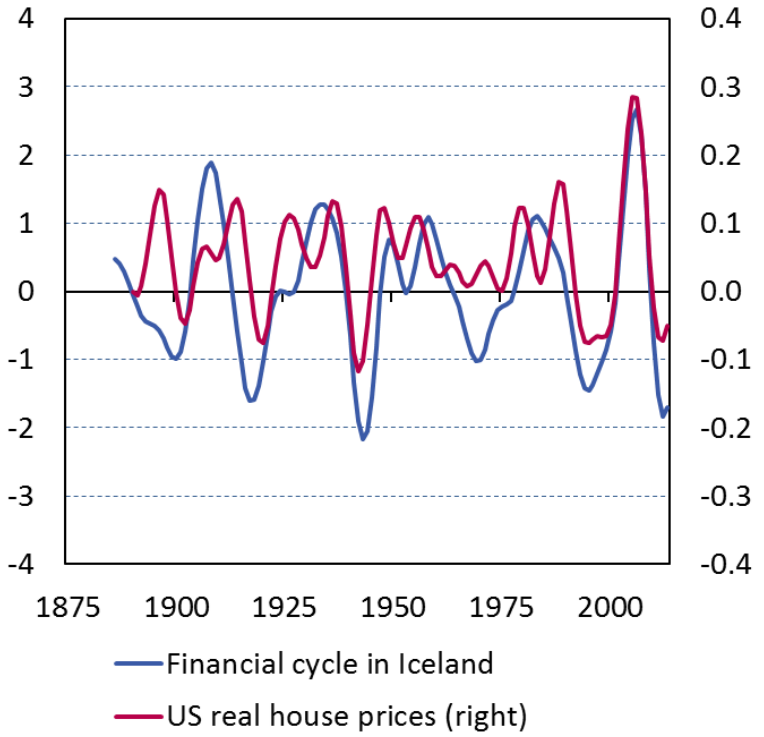
The aim of this study

- Document that this is a regular feature of Icelandic boom-bust cycles over a period spanning more than a century …
- … thus surpassing a whole spectrum of currency regimes chosen
  - Consistent with recent influential findings by Hélène Rey of LSE
- Joint work with Bjarni Einarsson (Univ. Pompeu Fabra), Kristófer Gunnlaugsson (CBoI), and Tjörvi Ólafsson (IMF)

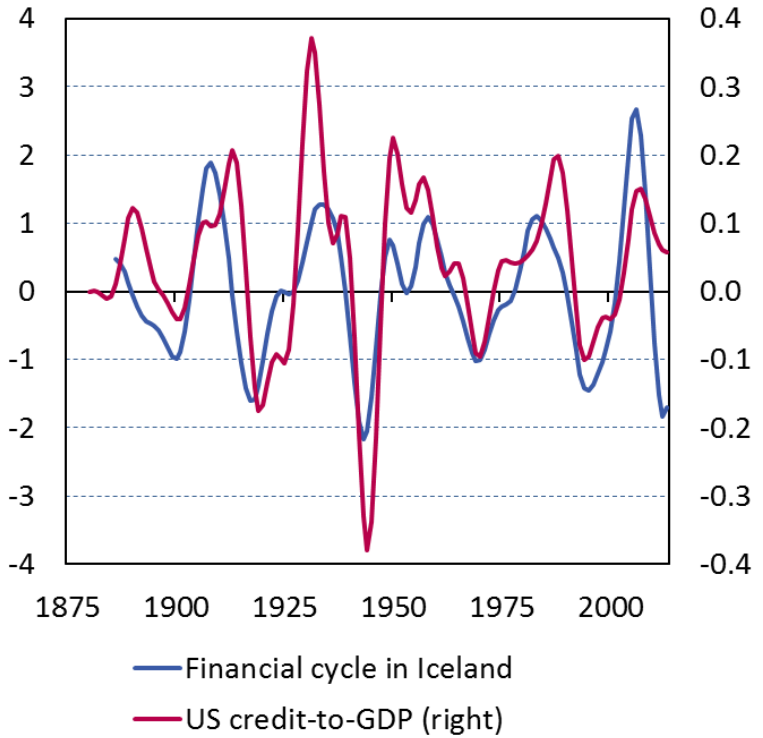
The financial cycle and global spillovers

- We find evidence of strong low-frequency co-movement of a whole set of financial variables: the "Financial Cycle" … with huge implications for macroeconomic performance (both growth and probability of financial crises)
- Also find strikingly strong ties between the Icelandic financial cycle and medium-term cycles in US financial variables – and a simple measure of the aggregate US financial cycle: cycles highly correlated and almost all peaks coincide

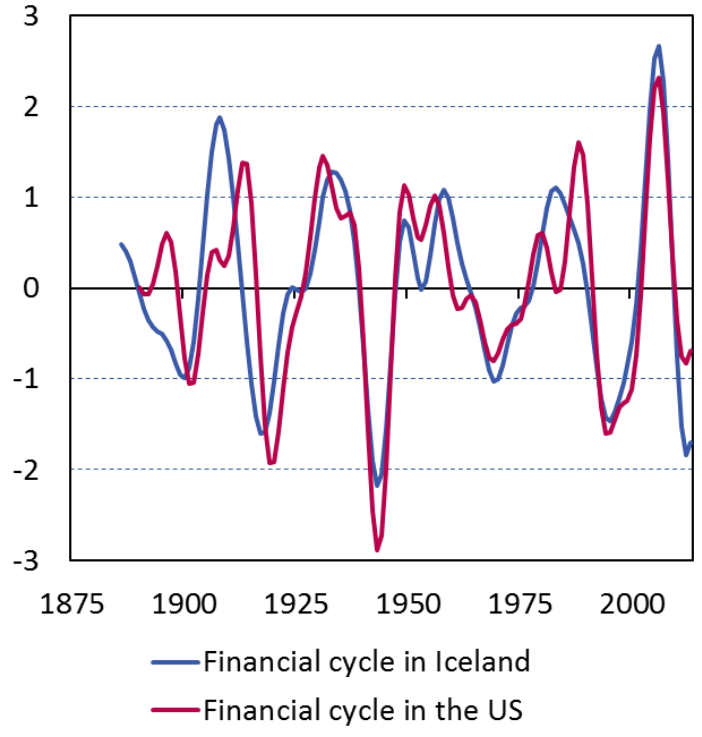
Financial cycle in Iceland and US house price cycle[1]



Financial cycle in Iceland and US credit cycle[1]



Financial cycles in Iceland and the US[2]



1. Medium-term cycles in US real house prices and the credit-to-GDP ratio. 2. US composite financial cycle is obtained as the first principle component of the medium-term cycles in US real house prices and the credit-to-GDP ratio.
Source: B. G. Einarsson, K. Gunnlaugsson, T. T. Ólafsson & T. G. Pétursson (2016), "Small open economies in the vast ocean of global high finance", Central Bank of Iceland *Working Paper* no. 73.

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Thórarinn G. Pétursson

Chief Economist and Member of Monetary Policy Committee – Central Bank of Iceland