BANK OF ENGLAND

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Would macroprudential regulation have prevented the last crisis?

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The views expressed are solely those of the authors and should not be taken to represent those of the Bank of England.

Motivation

- The creation of bodies charged with macroprudential remits and powers has been a key response to the crisis, eg UK's Financial Policy Committee
  - The effectiveness of these bodies remains an open question

- We ask: what difference would such regimes have made if they existed prior to the last crisis?

- Issues to consider in addressing this question:
  - In one sense, it's an artificially easy test: we're asking whether we've designed frameworks that can win the last war
  - In another, it's artificially tough: we assume away Basel 3 and all other post-crisis structural reforms and suppose a similarly-sized "resilience gap" opens up in the future
  - Counterfactuals are obviously tough!

Our approach

1. Fault lines and their impact: what made the crisis so bad – what were the key channels?

2. Required intervention: what macroprudential policy package would have been required to address those fault lines?

3. Institutional constraints: are existing US and UK macroprudential authorities equipped to take the necessary steps?

Fault lines: what made the crisis so bad?

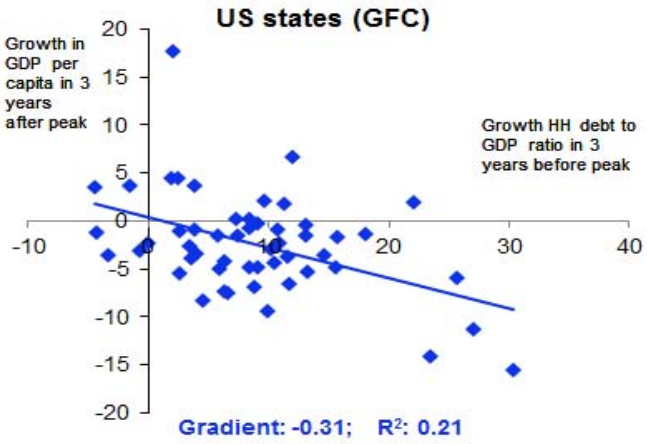
- The financial system was fragile
  - Total assets of the financial system doubled between 2001-2007; 70% of growth in “shadow” banks
  - High leverage: assets of broker-dealers reached 45x equity by 2007
  - High liquidity mismatch: repo liabilities more than doubled between 2001 - 2007
  - Structural vulnerabilities: incentives to run on MMFs

- Households were highly indebted
  - Mortgage debt doubled to $11trn between 2001 and 2007
  - Twin reinforcing booms in house prices and debt: “HELOCs” tripled
  - Loose credit supply meant more marginal borrowers: ≈ 10 million subprime originations from 2003-2007

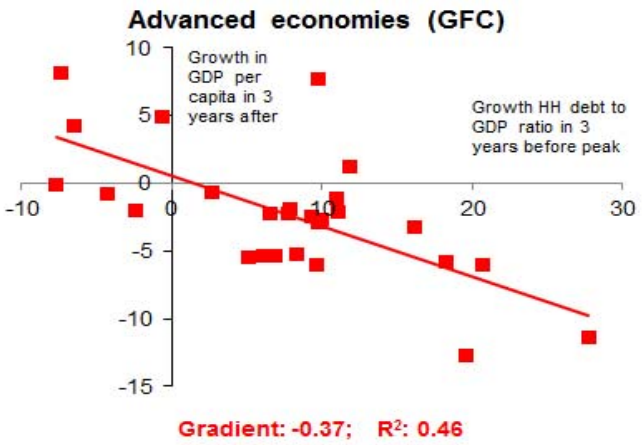
Fault lines: what made the crisis so bad?

A bigger build-up in household debt is associated with a more severe bust:

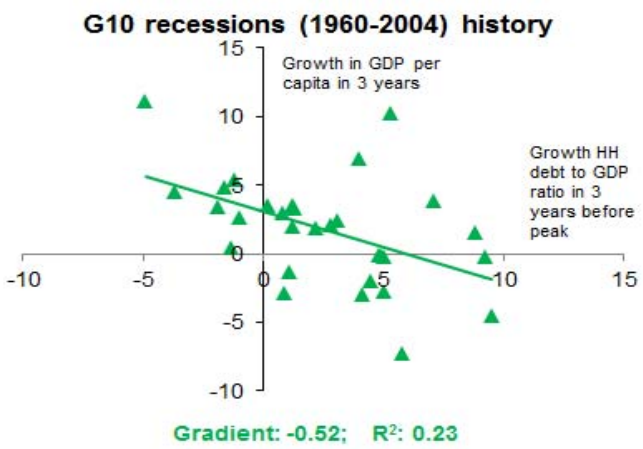
Across U.S. states…



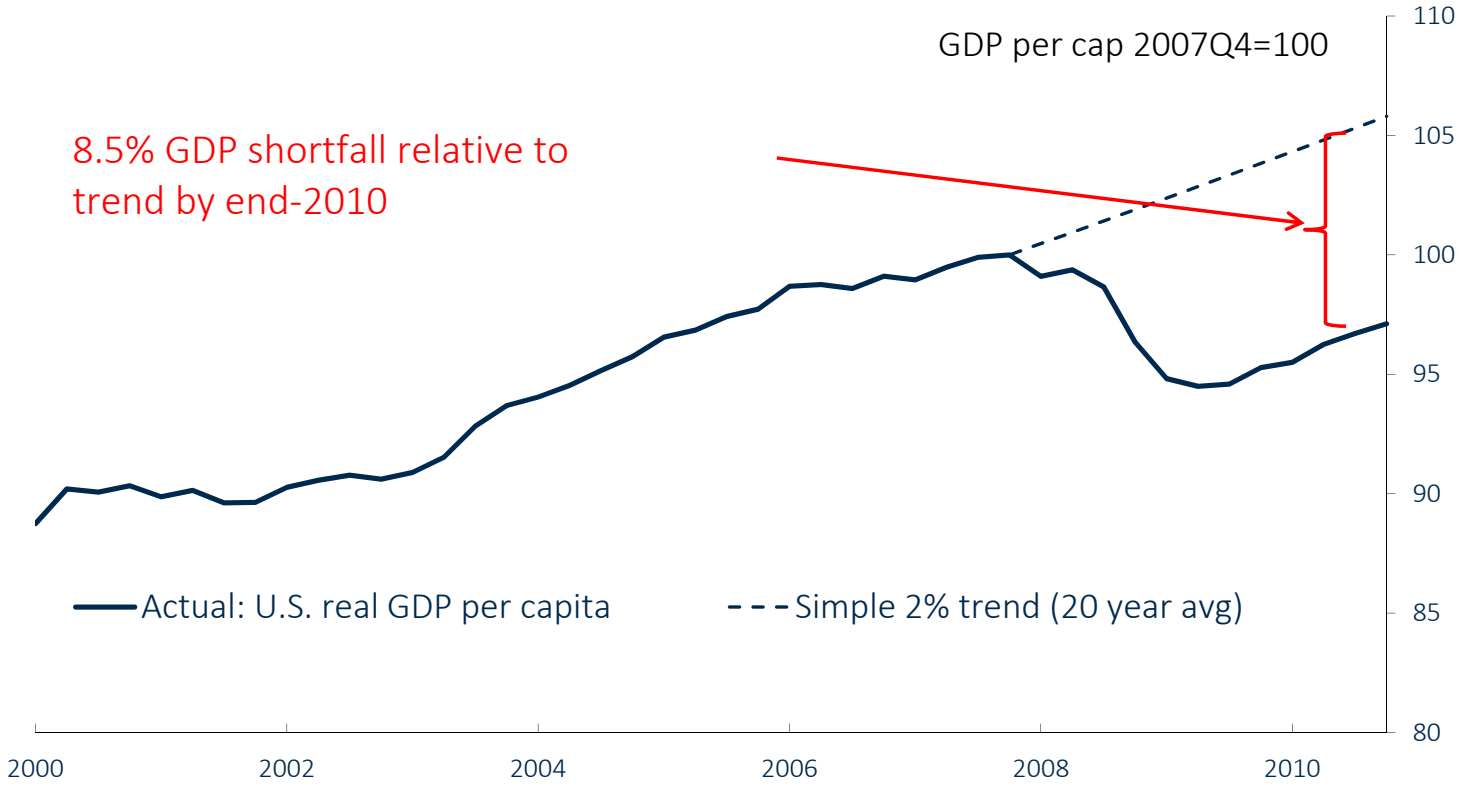
Across countries…



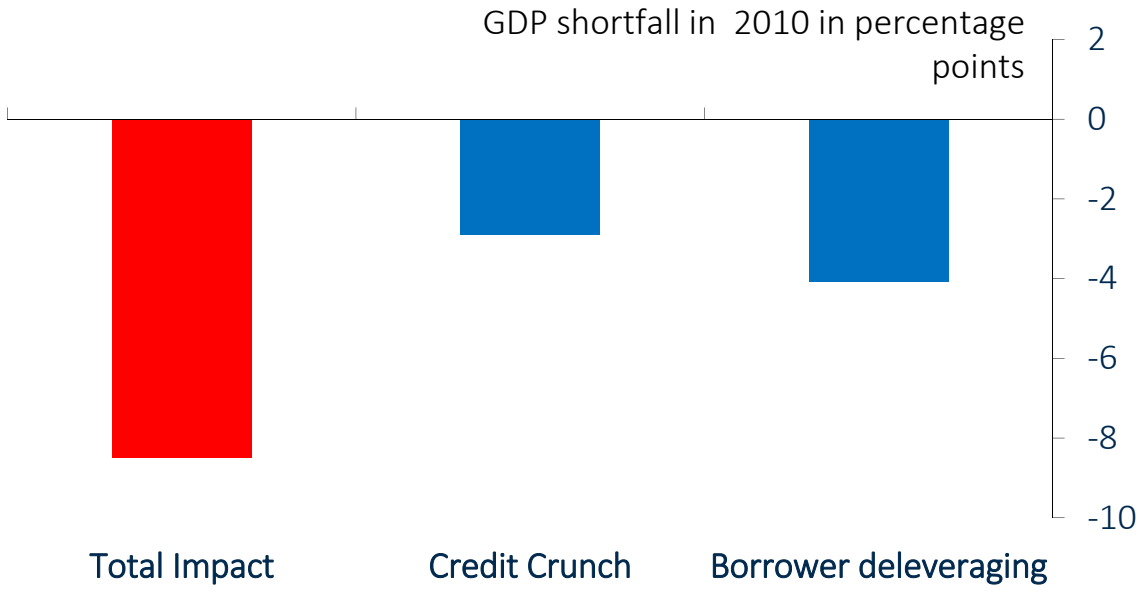
Across time.



Dimensioning the fall-out: how much did these fault lines matter?



Dimensioning the fall-out: how much did these fault lines matter?



Credit crunch estimate draws on:

Chodorow-Reich (2014); Greenlaw et al. (2008); Basset et al. (2014); Guerrieri et al. (2015); Hall (2012)

HH deleveraging estimate draws on:

Jorda et al. (2013, 2016); Bridges et al. (2017); Mian & Sufi (2010, 2012)

Our thesis:

Lender fragility led to 'credit crunch'

Borrower indebtedness led to 'aggregate demand' externalities

Together, they can explain the majority of total GDP shortfall

Successful macroprudential policy would have had to address both fault lines

What macroprudential policy would have been required to address these fault-lines?

- Step 1: Identify the build-up of risk in real-time
- Step 2: Take action to reduce financial system leverage
- Step 3: Take action to reduce funding mismatches
- Step 4: Take action to reduce the build-up in household debt

Step 1: Identify the build-up of risk in real-time

Could policymakers have spotted the fault-lines?

- Overvalued House Prices: Yes – in 2005 the FOMC was briefed that house prices were 20% overvalued
- Household debt: Yes in aggregate…but spotting risks from marginal borrowers harder (e.g. FOMC transcripts)
- Stress testing of banks and shadow banks could have revealed many fault lines…
- … but spotting funding flows outside the core system would still be difficult

Implications:

- **Systematic risk monitoring framework needed (eg GDP-at-risk?)**

Step 2: Take action to reduce leverage

What increase in capital requirements would have been necessary to address a resilience gap akin to 2007?

- TARP injection of ≈$200bn of equity was transformative
- Countercyclical Capital Buffer (CCyB) the obvious tool to provide that capital ex-ante
  - **3%** CCyB could have replaced TARP
  - **4.2%** could have replaced TARP+SCAP
  - **4.7%** could have replaced TARP and continued financed balance sheet growth
- Ample capacity: between 2005-08, dividend payments and buy-backs were c. $300bn

Implications:

- Need CCyB strategy that could get to 3-5% by peak cycle

Step 3: Action to reduce funding mismatches

What intervention would have been needed to address maturity mismatch in pre-crisis financial system?

- Fed liquidity facilities provided around $1.5trn of liquidity to banks and non-banks
- During the boom, a macroprudential regulator could have required firms to replace $1.5trn of short-term funding with longer-term debt
  - — Similar to effect of introducing Basel 3 Net Stable Funding Ratio
  - — Funding costs would have risen, but not materially so (20bps WACC)

Implications:

- Importance of maintaining / testing funding & liquidity standards

Step 4: Action to reduce household debt build-up

Could macroprudential policy have materially dampened the mortgage boom?

- "Leaning" effects of higher capital likely to be small
- A loan to income limit of 4x would have reduced pre-crisis mortgage debt by >$100bn
- Documentation required to meet LTI limit would have had a large additional effect: about $360bn non-prime originations (8% of loans granted) had low or no documentation
- Affordability tests at stressed mortgage rates could have materially reduced the $360bn expansion of subprime lending on teaser rates

Implications:

- Importance of tools to limit household debt vulnerabilities in macropru toolkit

Could the necessary steps have been taken?

- Of 41 countries with financial stability committees, only 11 have formal powers

- This seems to matter: countries with powerful FSCs are more likely to act that those that have to rely on others

- We consider two polar examples:
    - The **Financial Stability Oversight Committee** (FSOC) in the US has no formal powers other than the power to designate SIFIs
    - The **Financial Policy Committee** (FPC) in the UK is arguably the most powerful authority in the world, with a large set of 'hard powers'

What could the FSOC and FPC have done?

FSOC

No hard legal powers beyond power to designate systemic importance

Case law (eg proposed reforms of money market mutual funds) suggests **other regulators are reluctant to listen** to soft recommendations.

Nobody in the US has clear **jurisdiction over loan-to-income ratios**: to whom would recommendations to moderate the housing boom be directed?

FPC

Power to set a range of **(bank) capital requirements, make comply-or-explain recommendations over liquidity requirements** , and to set **loan-to-income limits** & **affordability tests**

Would **have required political backing to extend perimeter** of regulation, but process for this is in place

Would have had to use tools **actively and fairly aggressively**: 5 years of case law give some precedent: CCyB at 1%; 4.5x LTI; 3pp affordability test

So would macroprudential regulation have prevented the last crisis?

Summary: 'Maybe…'

- Need suitably strong mandate
- Powers to adjust financial system leverage and maturity/liquidity transformation
- Powers to limit household sector indebtedness

With all of this, reducing the macroeconomic fall-out from the real estate collapse would have been possible

But in practice, macropru authorities would have required political backing to widen the perimeter of regulation and to use powers quite aggressively

Open questions and challenges

Risk assessment: How much faith should we have in the ability to identify problems in real-time? Build 'slack' into framework?

Scope: How wide should the remit of a macroprudential regulator be? Are targeted borrower interventions in scope?

Hard powers: Which powers does a macroprudential regulator require to function? When does recommendation suffice?

Activism: How actively and forcefully should the macroprudential regulator be using its powers? How should it weigh the costs and benefits of its intervention?

Accountability: How do societies ensure that macroprudential regulators have the power to act, but are sufficiently accountable to sustain legitimacy in the long-run, given that crises are rare events?

Questions?

Additional material

Table 2

Financial Stability Terms Appearing in Discussions of the Federal Open Market Committee

	2001	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*
General							
"Financial stability"	0	1	2	9	5	9	13
Financial System:							
"Bank"	502	429	449	302	284	309	1,024
"Capital"/"Leverage"	454	308	340	208	183	177	402
"Shadow"/"Broker"/"Money market"	17	21	40	10	17	28	59
"Fund"/"Liquid"/"Repo"	1,226	962	1,150	1,058	932	1,110	1,779
"Commercial paper"/"Securitization"	23	22	15	3	14	2	133
Housing Market							
"House price"	2	23	4	41	160	85	83
"Bubble"	6	15	14	19	114	4	8
"Loan"/"Lend"/"Debt"/"Credit"/"Borrow"	413	442	452	269	409	251	1,563
"Mortgage"	84	100	96	67	176	118	481
"Subprime"	0	3	1	0	8	15	314
"LTV"/"Heloc"/"Teaser"/"Alt-A"	2	1	1	0	40	0	45

Note: For each year, transcripts of the eight FOMC meetings and any Conference Calls were searched. All transcripts available here: https://www.federalreserve.gov/monetarypolicy/fomc_historical_year.htm. A simple count of all words containing the stem words listed in the table above was conducted.

Table 3

Countercyclical Capital Buffer Rate (CCyB) That Would Have Been Necessary to Avoid the Troubled Asset Relief Program

	Calculation	
Baseline: Replacing bail-outs		
Total capital injections		$198bn
Total risk-weighted assets (RWAs)		$8,409bn
Bailout in percent of RWAs	$198bn/$8,409bn	2.4%
Domestic assets in percent of total assets		76%
Required CCyB rate	2.4%/76%	3.1%
Variant 1: Replacing bail-outs and private sector capital raising		
Additional private sector capital raising		$70bn
Required CCyB rate	3.1% × ($198bn + $70bn)/$198bn	4.2%
Variant 2: Replacing bail-outs, and supporting additional lending		
Additional RWAs if credit growth had continued along pre-crisis trend		$1,050bn
Assumed stressed target capital ratio		10%
Additional capital to support credit growth	$1,050bn × 10%	$105bn
Required CCyB rate	3.1% + $105bn/($8,409bn × 76%)	4.7%

Source: US Treasury, Published Accounts; New York Fed Quarterly Trends for Consolidated US Banking Organizations; Financial Accounts of the United States; Avraham et al. (2012).
Note: For variant 2, we assume that banks balance sheets had grown by 7 percent rather than 1 percent per year over two consecutive years. This is in line with the difference in the commercial bank credit growth rate between the 20 years before the crisis and the crisis (Q4 2007 to Q4 2009).

Table 4

Impact of Different Loan-to-Income Limits on Gross Mortgage Lending for Owner-Occupier House Purchase (First Lien Loans Only)

	Loans granted (number, millions)	*Number of loans (millions) impacted by loan-to-income limit of:*				*Loans granted (value, $ billions)*	*Impact on value ($ billions) of mortgages originated assuming all impacted loans reduced in size:*			
		2x	*3x*	*4x*	*5x*		*2x*	*3x*	*4x*	*5x*
2003	4.1	2.9	1.3	0.4	0.1	755.8	189.6	59.0	16.1	6.0
2004	4.6	3.2	1.5	0.5	0.1	906.6	245.8	81.9	21.7	6.1
2005	4.8	3.4	1.6	0.5	0.1	1,031.5	288.6	95.8	23.7	6.0
2006	4.2	2.9	1.4	0.4	0.1	939.5	245.9	75.0	18.7	6.0
2007	3.4	2.4	1.2	0.4	0.1	755.9	204.4	67.8	17.7	4.8
Cumulative total: 2003–2007	**21.1**	**14.8**	**7.0**	**2.2**	**0.6**	**4,389**	**1,174**	**379**	**98**	**29**

Source: Home Mortgage Disclosure Act (HDMA) data.

Note: The left panel identifies the *number* of mortgage originations for owner-occupier house purchase that would have been affected by loan-to-income limits set at the levels labelled. The right panels give the *value* reduction in gross lending that would have resulted if all those affected mortgages were reduced in size such that they just met the listed loan-to-income limit.

Table 5

Potential Impact of a 4× Loan-to-Income Limit and Accompanying Affordability Test on Household Debt Boom

Mortgage debt stock	
Total mortgage debt stock (2007)[a]	$10,638bn
Gross flow of new mortgages (for owner-occupier house purchase)	
Total value of loans granted (2003 to 2007)[b]	$4,389bn
Direct impact of 4× loan-to-income limit (2003 to 2007)[b]	
Lower-bound estimate: all loans still originated at maximum size within limit:	- $98bn
Upper-bound estimate: all loans with loan-to-income > 4× excluded altogether:	- $622bn
Potential upper-bound impacts on non-prime lending (2003 to 2007)[c]	
If income requirement excluded all low- or no-documentation subprime loans	- $359bn
If affordability test excluded all non-prime originations on teaser rates	- $366bn

[a] Financial accounts of the United States.

[b] Home Mortgage Disclosure Act (HDMA) data; gross flow of first lien owner-occupier purchase loans. Impact estimates do not include potential reduction in second lien loans, investor loans, or loans for refinance.

[c] Number of non-prime first lien owner-occupier purchase loans estimated based on Mayer et al. (2009) and share in total value of loans assumed to be a proportionate. Exclusions for low- or no-documentation loans and teaser-rate loans would have overlapped; taken together these borrowers accounted for about $580bn of lending from 2003 to 2007.

Table 6

Survey Data on Usage of Macroprudential Tools

	Use of bank-focused tools *(positive countercyclical capital buffer, forward-looking provisions, caps on credit growth)*	**Use of household-focused tools** *(loan-to-income or debt-service-to-income limits)*	**Both**
All advanced economies (18)	44% of countries	33%of countries	22% of countries
Advanced economies with financial stability committee with formal powers (5)	60% of countries	40% of countries	40% of countries
Other advanced economies (13)	38% of countries	31% of countries	15% of countries

Note: We consider the 19 advanced economies covered in Edge and Liang (2017), minus South Korea, for which no data on tool usage is available. Numbers are based on country classification in Edge and Liang (2017) and survey responses on tool usage in IMF (2018a) that consider tools in use at the date of the survey. "Formal powers" refers to powers to act unilaterally or to issue "comply-or-explain" recommendations. Results for the United Kingdom have been adjusted to account for measures that had been agreed but were not yet binding at the date of the survey.