

International Macroeconomics

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Borio and White (Jackson Hole conference paper, 2003)

At that time—that is: 4-5 years before the financial crisis—the **dominant consensus** was ‘*Keep inflation low and stable, and everything else is going to take care of itself ...*’

In particular, the **assumption of efficient financial markets** implied that

- the **financial sector** is **intrinsically stable**, and **cannot possibly become a source of instability** in itself;
- on the contrary, **financial innovation**—in the form of derivatives, etc.—allows to **spread macro risk around**, having it **borne** out by those **best able to do** it, that is: investment banks, hedge funds, etc. ...

Borio and White **questioned** all this, by **pointing out** something pretty simple ...

Historically, periods characterized by

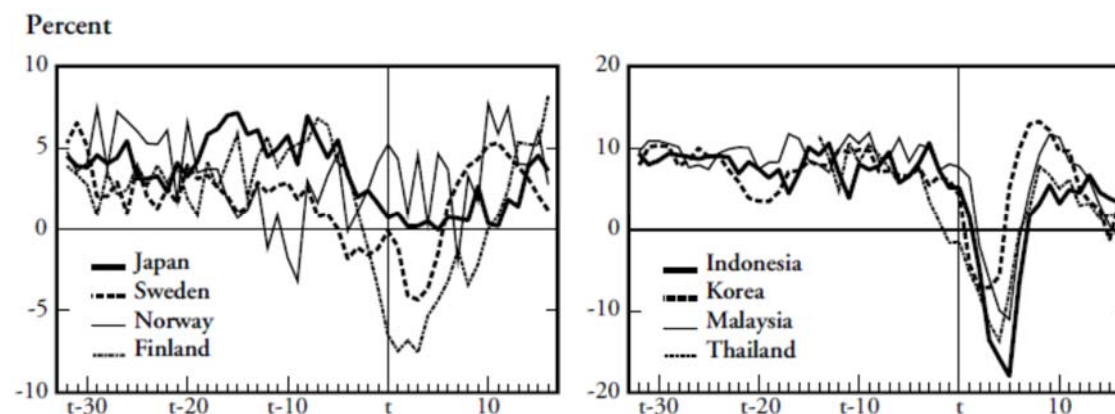
- strong price stability, and
- liberalized financial markets,

—such as the Classical Gold Standard, and the current environment—had also been characterized by an unusually high frequency of bubbles and disequilibria in financial and asset markets ...

Therefore, the notion that ‘*You keep inflation stable, and everything else is going to take care of itself ...*’ was contradicted by historical experience ...

In this, Borio and White were building on the analytical tradition of their institution—the Bank for International Settlements—which had been built decades before by the economic historian of financial panics, Charles Kindleberger ...

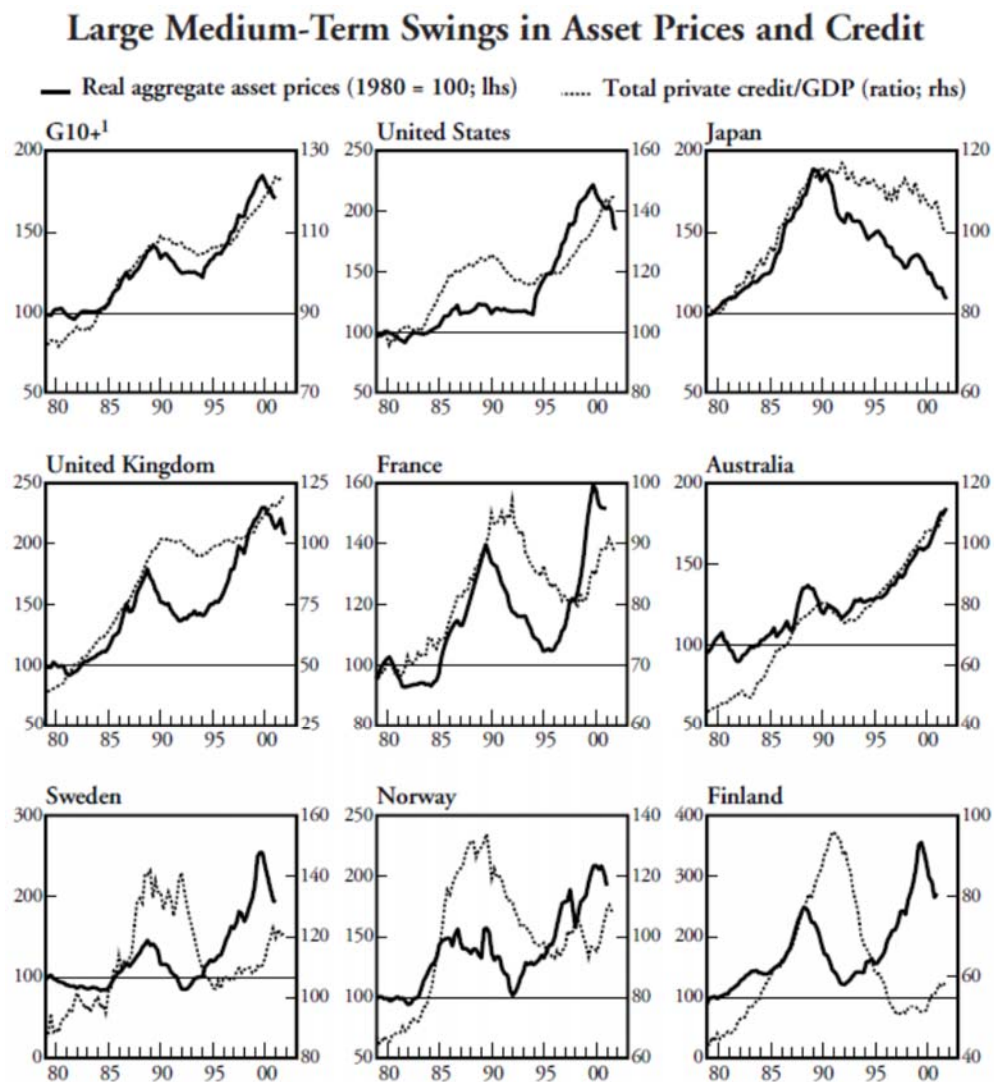
Let's see some of the **evidence** presented by Borio and White at **Jackson Hole**: they started by **highlighting** something we'll also



Output growth around banking crises

see later on: **financial crises** are typically **associated** with **deep** and **prolonged recessions** ...

So we better **pay attention** to them ...



Second, they stressed that, **since the mid-1980s**, there has been a **significantly greater frequency of credit and asset prices booms and busts** compared to the **previous post-WWII** period ...

On the left, **swings in asset prices and credit** in major **advanced economies** since the **end of the 1970s** ...

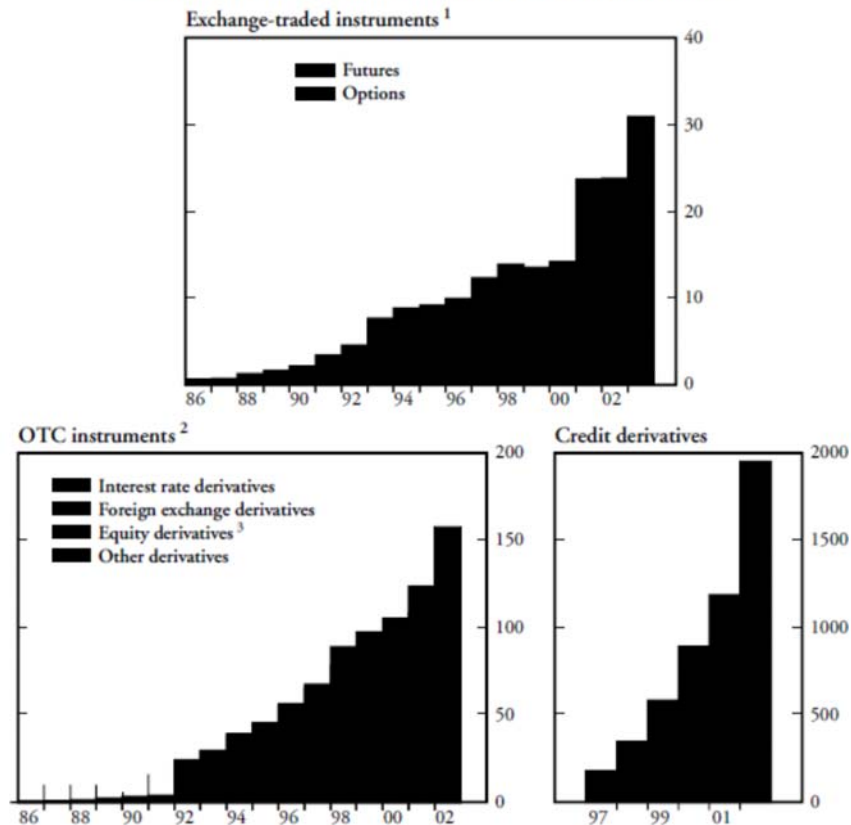
What is the **cause** of such an **increase** in the incidence of **asset prices booms and busts**? Borio and White suggested it was the **liberalization** of the **financial sector** ...

Financial Liberalization: Constraints on Credit Institutions' Balance Sheets and on Capital Flows

Countries	1980						1985						1991				
	Interest rates ¹		Quantities ²		Capital flows ³		Interest rates ¹		Quantities ²		Capital flows ³		Interest rates ¹		Quantities ²		Capital flows ³
	Loans	Deposits	Loans	Invest-ments			Loans	Deposits	Loans	Invest-ments			Loans	Deposits	Loans	Invest-ments	
United States		***						**						*			
Japan	*	***	***	*	***		*	***	***		**			*			
Germany														*			
France		***	***	*	**			**	***		**			*			
United Kingdom	*		*				*									*	
Italy			***	***	***				**	**	***						*
Canada																	
Australia	**	**	*	**	***		**			*	*						
Belgium		*			*			*			*			*			
Denmark		*	**		**					*	*						
Finland	**	**			**		*	**			*						
Netherlands			***		*				***						*		
New Zealand	***	***	***	***	***						***						
Norway	***	***	***		***						*						
Spain	*	**		***	***			*		***	**					*	
Sweden	***	***	***	***	***												
Switzerland	*	*					*	*									

This table shows the **lifting** of several **constraints** on **financial markets' transactions**—capital flows, caps on interest rates, ...—during the **1980s** across the **developed world**: in about a **decade**, a **dramatic liberalization** took place ...

Rapid Growth of Derivatives Markets
Notional amounts; in trillions of U.S. dollars



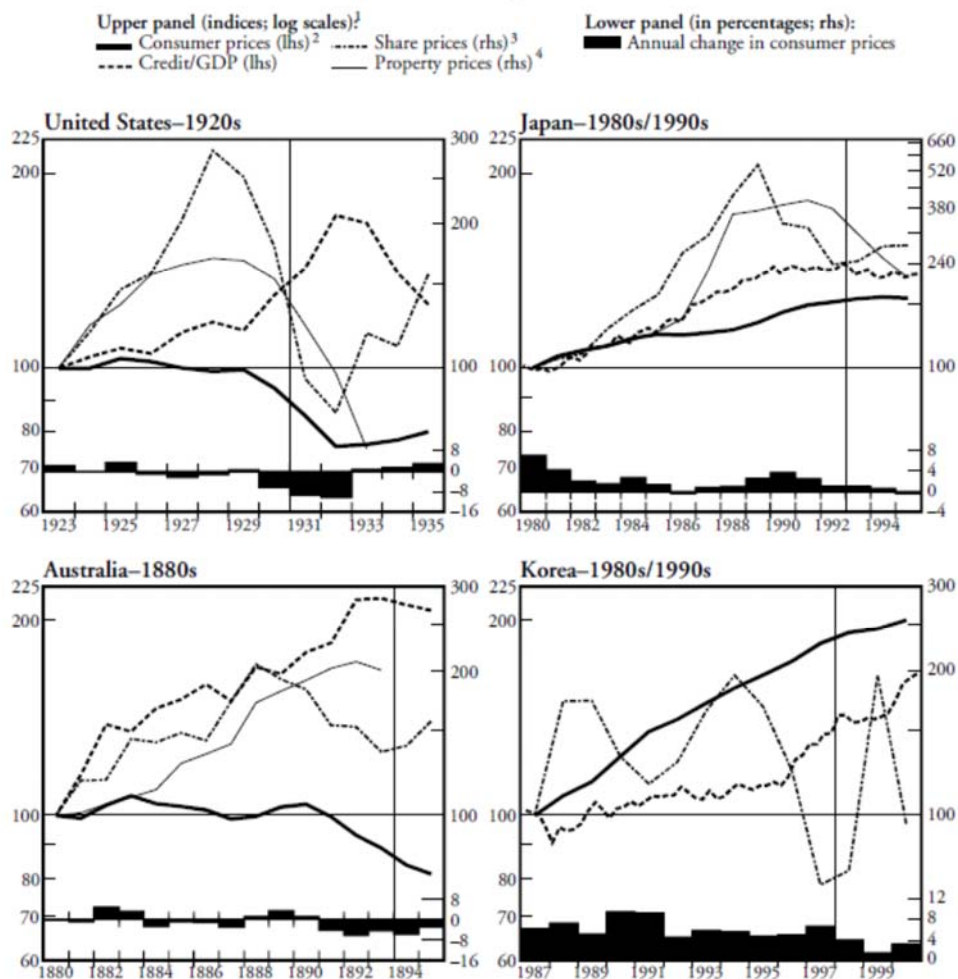
This **period** was also **characterized** by the **explosion** of **derivatives'** markets: on the left, the **growth**—between mid-1980s, and early 2000s—of the amount of several types of **derivatives' contracts** ...

Then, **question**: '**What** does **history** **tell** us about **periods** characterized by strong **price stability**, and **liberalized financial markets**?'

Answer: 'It tells us that they have been typically also **characterized** by **credit** and **asset** prices **booms** and **busts**, with associated **large swings**

in real **economic activity**: this was the case under the **Gold Standard**, and it has been the case **since early 1980s** ...'

Low and Stable Inflation and Financial Instability: Selected Episodes



Left: some selected **evidence** which illustrates this **general point** ...

(i) The **U.S.** in the ‘**Roaring 1920s**’ were characterized by **price stability** and **dramatic bubbles** in credit, stock, and housing markets ...

(ii) Same for **Japan** during the **1980s**, during the build-up of the **bubble** whose **effects** are **felt even today** ...

(iii) Same for **Australia** during the **1880s**, under the **Gold Standard** ...

Summing up

Jorda *et al.* (JME, 2015) thus sum things up:

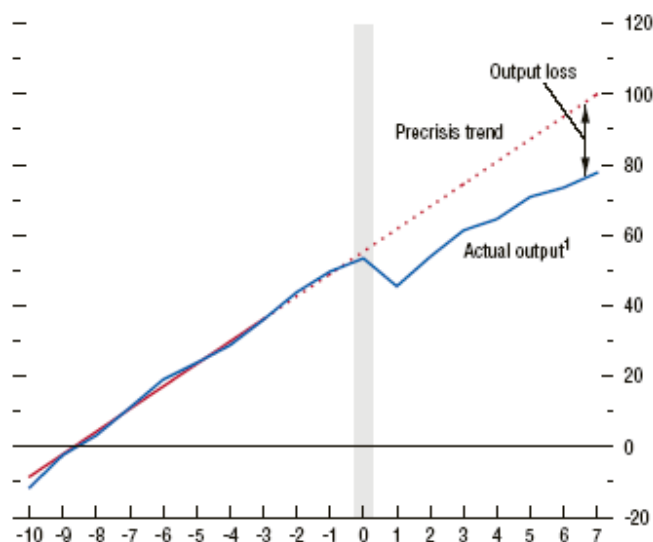
‘In the **pre-crisis consensus**, to a large extent, **policymakers** and **economists** preferred to **ignore bubbles**, arguing that they could **not exist**, or could **not be detected**, or not reliably, or that **nothing** could or **should be done**, or there might be unintended consequences, and so on. Researchers and central bankers imagined that the **problem** of **depressions** had been **solved** and that the **financial sector** would be **self-stabilizing**. The **financial stability** role of central banks was mostly regarded as **secondary**, if not quaintly vestigial. The **crisis exploded** these and other **myths** which had taken hold based on **very little firm empirical evidence**, and with **scant regard** for the **lessons of history**.’

Impact of financial crises on GDP

Reinhart and Rogoff, in their book on financial crises:

‘Financial crises have historically been associated with deep and prolonged recessions ...’

Starkest examples are associated with Asian crises of 1997 ...



Sources: World Bank, *World Development Indicators*; and IMF staff calculations.
Note: The precrisis trend is estimated up to year $t = -3$, and is extrapolated linearly thereafter. The dotted line indicates the extrapolation of the trend up to the year $t = 7$.
¹Output = logarithm of real GDP per capita; 100 equals trend in year 7.

This figure is from the *IMF's World Economic Outlook* of October 2009 ...

It shows, for **South Korea**, log real GDP *per capita* together with estimated pre-crisis trend ...

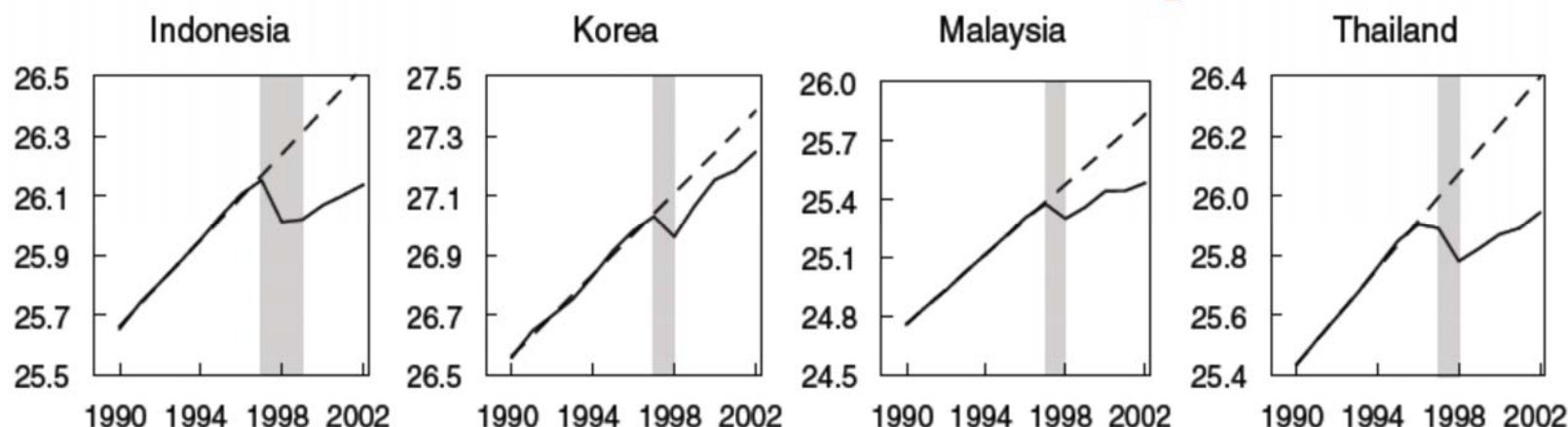
It is not based on any sophisticated econometrics, but **evidence** is **unmistakeable** ...

Financial crisis **shifted** output growth **path downwards** ...

This is clear evidence of a **one-off** impact on **level** of output, whereas as far as impact on **growth rate** is concerned, statistical investigation is necessary to say anything ...

More evidence from **Cerra and Saxena (AER, 2008)**:

- paper based on extremely **simple methodology** (no sophisticated econometrics ...)
- it analyses impact of ‘traumatic events’—**financial crises, debt crises, civil wars, ...**—on level of **output**



These are the estimated **responses** of **GDP** to a **banking crisis** ...

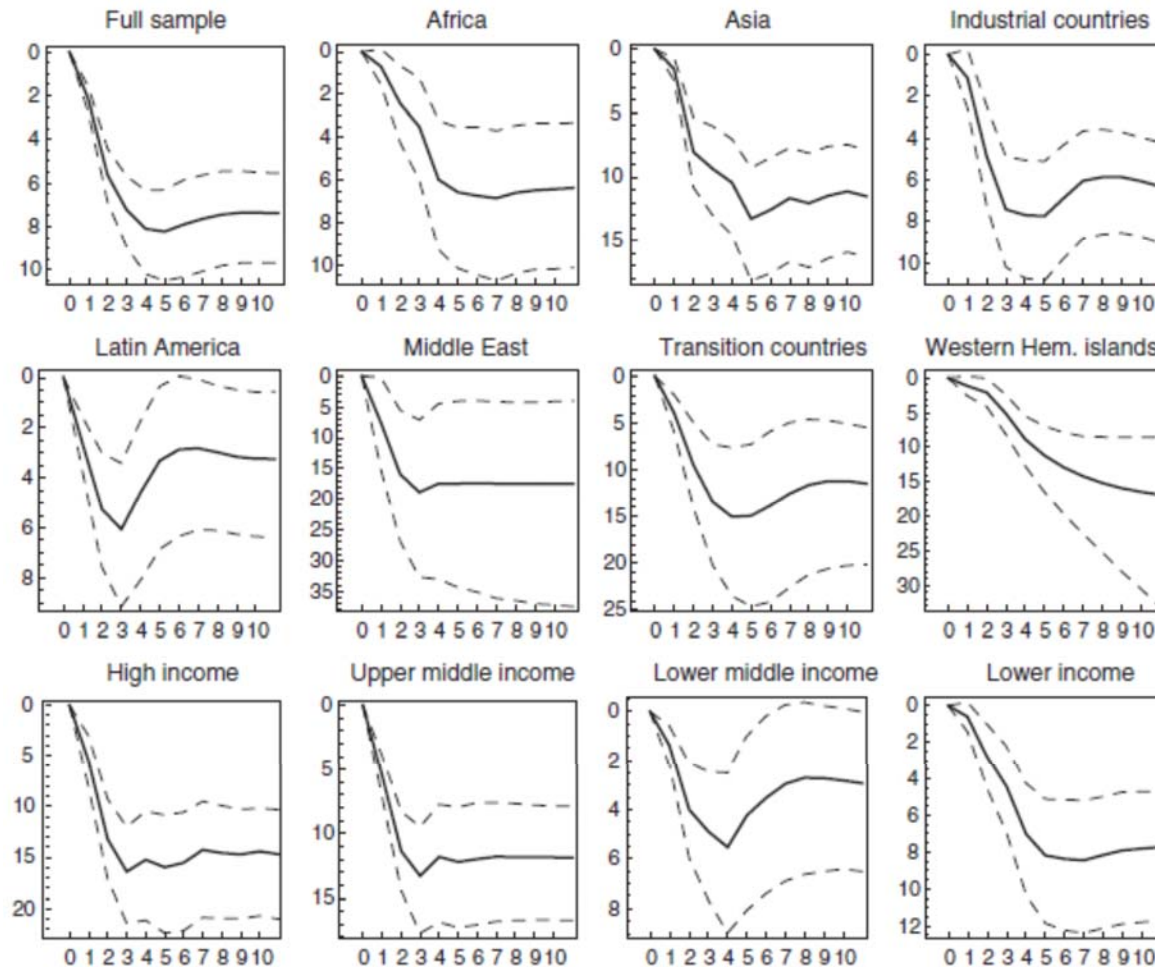


FIGURE 4. IMPULSE RESPONSES: BANKING CRISES

Evidence is remarkably **consistent** across geographical zones, country groups, etc.

Banking crises are associated with **large, prolonged falls in output**

Clear evidence of falls in **potential** output ...

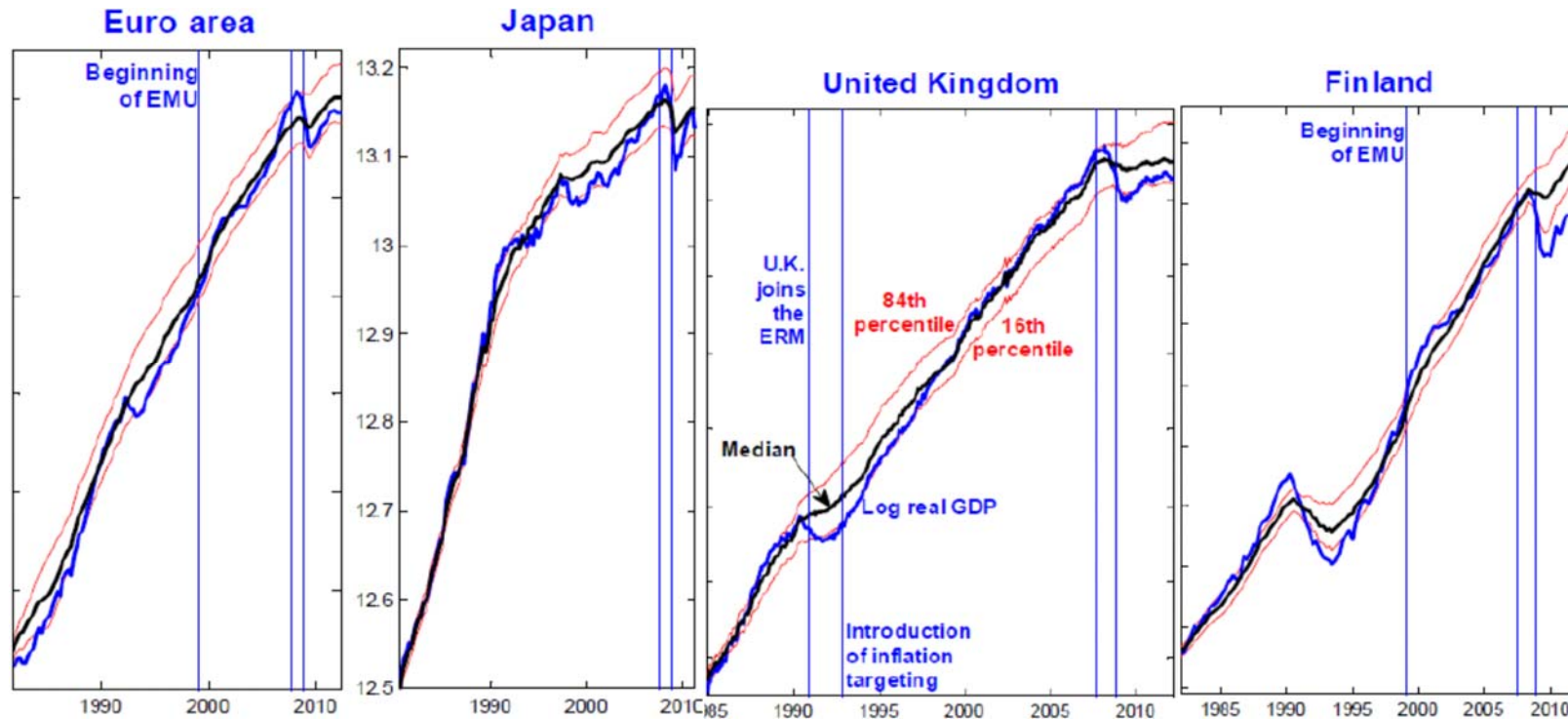
Summing up, a **general finding** is that **financial crises** seem to have had, historically, a large impact on **output** levels ...

All of this—**both** the evidence from **Cerra and Saxena**, **and** the one from the book by **Reinhart and Rogoff** ...—is based on an analysis of the **raw data** ...

Obviously of fundamental importance to highlight this key stylized fact, but ‘just looking at the raw data’ suffers from the obvious shortcoming that this evidence is only suggestive of an impact on potential GDP ...

So let’s see some **additional evidence** on this, based on a **methodology** that allows to **identify shocks** to **potential GDP** ...

Impact on potential output



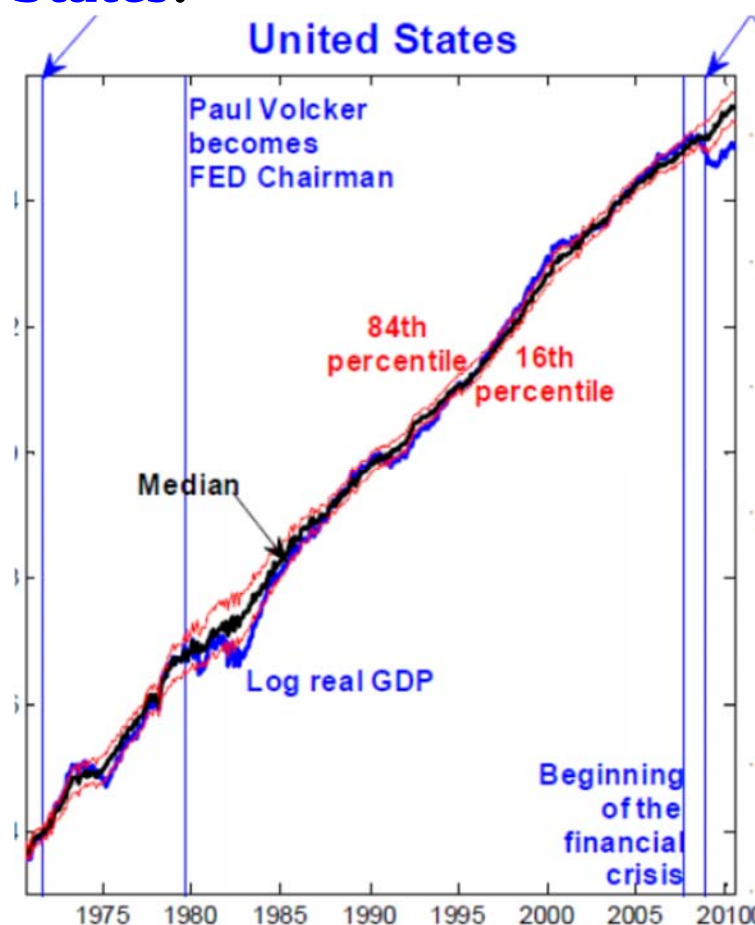
Evidence from *IMF* and *Cerra and Saxena* mostly pertains to **developing countries**, because **before 2007** they had been the countries **mostly affected** by this kind of crisis ...

What about advanced economies?

Figure in previous slide suggests that in **some cases impact** has clearly **been there**:

- for **Japan impact** of financial crises is so **obvious** you see it with the **naked eye**: this is **especially** the case with the **early 1990s's** crisis, which was associated with a **decrease in trend growth** ...
- For **Finland's** crisis of **early 1990s**, same thing: you see the **impact** in the path of **actual GDP**, exactly as in the case of **developing countries** ...
- For **Euro area**, impact is **less dramatic**, but still **detectable**
- For **United Kingdom**, impact post-2007 is very much **in line** with the **estimates** of the **U.K. Treasury**, which has **estimated** a dramatic **loss of potential GDP compared** to the **pre-crisis trend** (you can see this with the naked eye) ...

However, this does **not** appear to be the case for the **United States**:



On the left, you see the **evolution** of the logarithm of **U.S. real GDP** since early 1970s, together with the logarithm of estimated **potential GDP** ...

These estimates are **remarkably close** to those produced by the **U.S. Congressional Budget Office** based on a completely different methodology ...

So, **bottom line** is: they are **very reliable** ...

... and what you see is that there is **no discernible** significant **impact** on the evolution of **potential GDP** ...

The ‘financial hockey stick’: From the ‘Age of Money’ to the ‘Age of Credit’

This is largely based on **Jorda *et al.* (2016), ‘Macrofinancial History and the New Business Cycle Facts’**, which is forthcoming the *NBER Macro Annuals 2017* ...

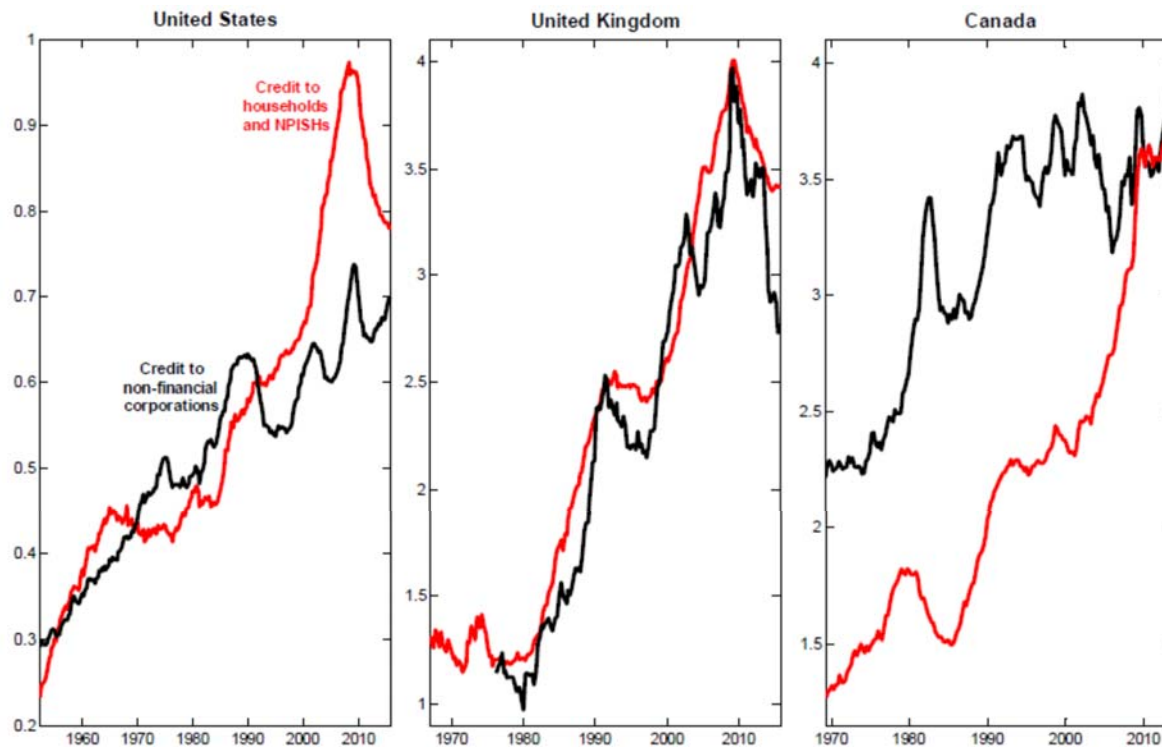
Based on a dataset covering **17 advanced economies since 1870**—essentially, all advanced economies—Jorda *et al.* (2016) explore the **evolution** of the relationship between **credit**, **monetary** aggregates, **asset prices**, and **macro fluctuations** ...

First **key finding**: since **1870**, the **world** has been moving **away** from the ‘**Age of Money**’ to the ‘**Age of Credit**’ ...

Until about the **1970s**, the **ratio** between **credit** and either **GDP**, or **broad money** had remained broadly **stable** ...

... but **since then**, it has been **increasing dramatically** ...

The evolution of leverage



This is evolution of **leverage**—defined as **ratio** between nominal **credit** and nominal **GDP**—for three countries ...

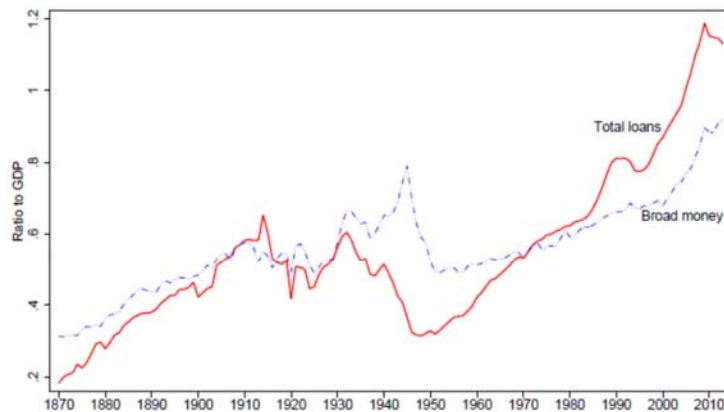
Evolution for **all advanced countries** is qualitatively **similar** ...

There are **differences** among them: in **U.K.**,

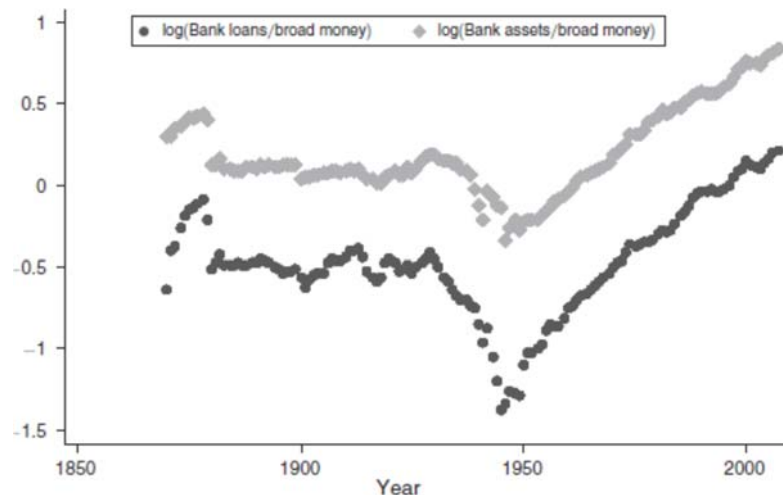
evolution of leverage for **households** and **non-financial firms** is closely linked; in **U.S.**, it is closely **linked until** the housing **bubble**; in **Canada**, it is pretty much **disconnected** ...

But **main point** is the **same**: an **explosion** of **leverage** across the board—also, the **numbers** are **staggering** ...

The relationship between money (M_2) and credit



Notes: Total loans refers to bank lending to the non-financial private sector expressed as a ratio to GDP. Broad money refers to M_2 measures of money expressed as a ratio to GDP. Both series are averages across the countries in the sample.



- (i) Until about WWI—period of ‘financial deepening’—credit grows somehow faster than M_2 ;
- (ii) between WWI and the 1950s, collapse in credit following the Depression, huge spike in M_2 during WWII, so ‘equilibrium’ reached before WWI is destroyed;
- (iii) equilibrium between credit and M_2 is restored between early 1950s and the 1970s;
- (iv) since then, however, credit has been growing much faster than M_2 , this causing growing disconnect between them ...

This has the following **crucial implication** ...

In the **‘Age of money’**, the **central bank**, by controlling monetary aggregates, was **implicitly preventing** an **excessive expansion of credit** ...

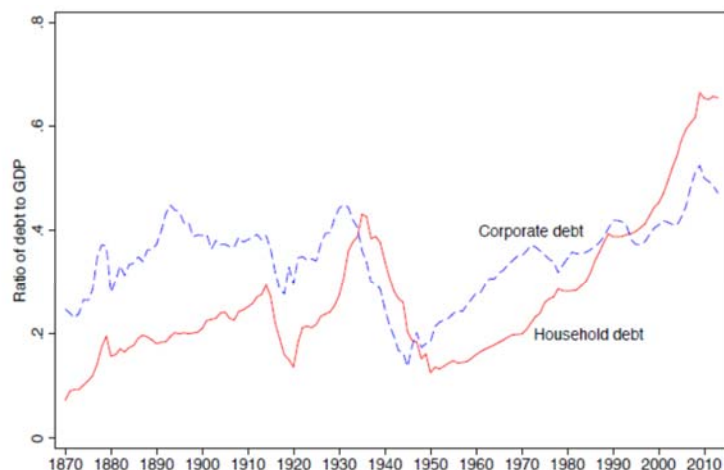
In the **‘Age of credit’**, however, the **link** between broad **money** and **credit** has been **breaking down** more and more ...

As a result, the **central bank** can **no longer** effectively **control credit** expansion, which has largely taken **‘a life of its own’** ...

Intuition: the **financial system** has become **more** and **more self-referential**, and **credit** is **backed**, more and more, by financial **instruments created** by the **financial system itself** ...

We will see that an **implication** of this is the **growing synchronisation** between **credit fluctuations** and macro fluctuations ...

The expansion of credit has pertained to households



Notes: Business and Household lending expressed as a ratio to GDP averaged over the 17 countries sample. See text.

The huge **expansion** of credit since the **1970s** mostly **pertained** to credit to **households**, as **opposed** to credit to **non-financial corporations** ...

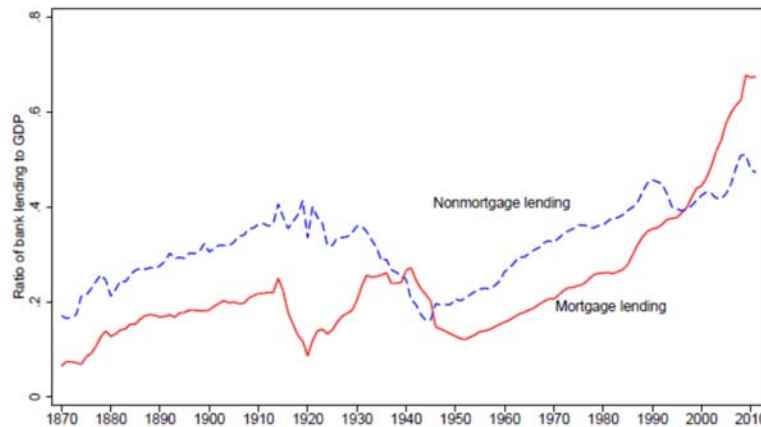
In the early 2000s, the **ratio** between **credit to non-financial corporations** and nominal **GDP** was essentially the

same as **before WWI**: only in the most **recent years** it has somehow **spiked up** ...

Credit to **households** has been **continuously increasing** since the **1950s**: first, it **'made up'** for the **collapse** following the Depression, and since the end of the **1970s** it **skyrocketed** ...

Question: **What** did **households do** with all this **credit**?

The expansion of credit has largely pertained to the housing market



Notes: Mortgage and Nonmortgage lending expressed as a ratio to GDP averaged over the 17 countries in our sample. Mortgage lending is to households and firms. Nonmortgage lending is unsecured lending primarily to businesses. See text.



Figure 4. Aggregate share of real estate lending in total bank lending

Notes: Share of real estate lending to total lending averaged across 17 countries. Before 1880 the sample size is too small for use. See text.

Dividing credit into **‘mortgage’** and **‘non-mortgage’**, you see that the recent **credit explosion** has been driven by **mortgage lending** ...

At the **beginning** of the **XX century**, **mortgages** made up only about **30 %** of overall **bank credit**, so that **banks performed their statutory function of channeling funds to non-financial corporations to finance their investments** ...

Today, almost **60%** of **banks’ loans** have to do with **housing** ...

This means that **banks** have largely **become mortgage institutions** ...

Jorda et al. (2016): ‘The *main business of banks in the early 20th century* consisted of making unsecured *corporate loans*. Today, however, the main business of banks is to *extend mortgage credit*, often financed with short term borrowings.’

Evolution of house prices also exhibits a ‘hockey stick’ pattern

Figure 15: Mean and median real house prices, 14 countries.

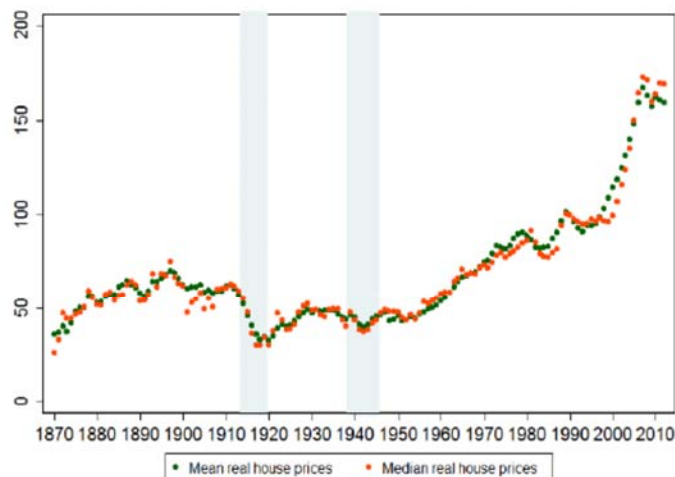
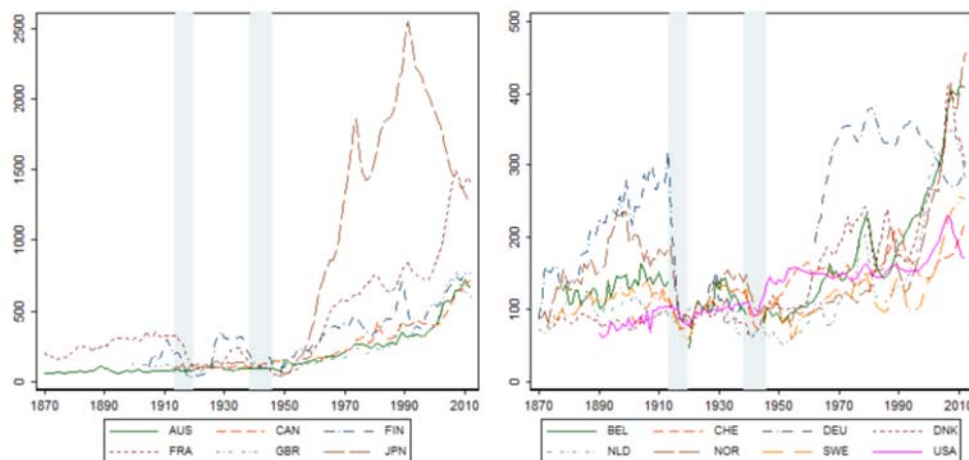


Figure 17: Real house prices, 14 countries.



Between 1870 and 1970 they exhibited **little variation** in real terms ...

Since then they have **skyrocketed**: **variation across countries** is **huge**—look, e.g., at Japan in bottom-left figure—but **overall trend** has been **strongly upward** ...

Summing up:

Jorda et al. (2016): ‘The central development of the second half of the 20th century is the rise of household debt, mostly of mortgages. Corporate debt has increased as well, but at a slower pace. Home ownership rates have climbed in almost every industrialized economy and with them, house prices. Debt has increased much faster than income. Even though households are wealthier, debt has grown faster even than the underlying wealth. Households are more levered than at any time in history.’

Then, questions:

- Has this explosion of leverage left an ‘imprint’ in the properties of macroeconomic fluctuations?
- In particular, have macro fluctuations become more prone to ‘tail events’, that is: especially large drop in activity?

We will now see that the answers to both questions is Yes ...

Fluctuations in GDP and credit have become more synchronized

Let's start from the **increased synchronization** between expansions and contractions in **GDP** and **credit** ...

With annual data, simplest way to check this is to check the **fraction of times** that **GDP** and credit have been **both increasing** or both decreasing from one year to the next ...

Before WWII this was equal to **61%** of the times, but **after WWII** it has increased to **79%** of the times ...

Jorda *et al.* (2016): 'On average, there is a ***much tighter connection*** between growth in the ***economy*** and growth in ***credit after WW2.***'

A **more precise** way, however, is to look at the **correlation** of **credit** with key variables ...

Below: correlations of credit and money with output, consumption, investment, and asset prices ...

Table 10: Money and credit: cross-correlations with real variables

Real money growth								
	Full sample		Pre-WW2		Post-WW2		Float	
	U.S.	Pooled	U.S.	Pooled	U.S.	Pooled	U.S.	Pooled
Δy	0.47	0.38	0.50	0.33	0.44	0.45	0.45	0.42
Δc	0.32	0.20	0.35	0.09	0.50	0.37	0.48	0.32
Δi	0.20	0.17	0.26	0.10	0.10	0.31	0.18	0.32
Δhp	0.16	0.31	0.12	0.24	0.26	0.35	0.23	0.28

Real credit growth								
	Full sample		Pre-WW2		Post-WW2		Float	
	U.S.	Pooled	U.S.	Pooled	U.S.	Pooled	U.S.	Pooled
Δy	0.50	0.36	0.39	0.22	0.80	0.60	0.81	0.56
Δc	0.22	0.25	0.19	0.11	0.66	0.53	0.81	0.49
Δi	0.18	0.26	0.12	0.15	0.62	0.49	0.68	0.53
Δhp	0.00	0.38	-0.17	0.29	0.40	0.46	0.55	0.50

Notes: All variables expressed in first differences of the log and in per capita terms. Correlations between real money growth and real credit growth (measured with total bank lending to the non financial sector) with: the growth rate of output (Δy); consumption (Δc); investment (Δi); and house prices (Δhp). Full sample: 1870–2013; Pre-WW2: 1870–1938; Post-WW2: 1948–1971; Float: 1972–2013. See text.

Main findings:

(i) Since **WWII**, the correlations between credit and real variables have significantly increased. This holds not only for **GDP**, but to an even greater extent for investment and consumption.

(ii) Same thing for the correlation between credit and house prices.

(iii) Corresponding correlations for money growth also increased, but they are, **post-WWII**, uniformly lower than those based on credit ...

(iv) Before WWII, money growth was more correlated with GDP

Table 11: The correlation of money and credit with inflation

Country	Money growth (M2)				Credit growth (bank loans)			
	Full	Pre-WW2	Post-WW2	Float	Full	Pre-WW2	Post-WW2	Float
AUS	0.52	0.27	0.40	0.49	0.51	0.23	0.40	0.44
BEL	-0.07	–	-0.07	-0.07	0.41	0.39	0.32	0.49
CAN	0.57	0.51	0.51	0.70	0.50	0.46	0.33	0.65
CHE	0.35	0.33	0.13	0.10	0.29	0.30	0.20	0.22
DEU	0.49	0.59	0.17	0.48	0.22	0.32	0.08	0.52
DNK	0.42	0.33	0.39	0.38	0.43	0.35	0.39	0.47
ESP	0.61	0.25	0.54	0.74	0.29	-0.20	0.36	0.45
FIN	0.34	0.20	0.41	0.66	0.41	0.36	0.40	0.52
FRA	0.48	0.44	0.41	0.45	0.39	0.16	0.68	0.63
GBR	0.61	0.46	0.38	0.44	0.58	0.45	0.38	0.49
ITA	0.51	0.47	0.38	0.73	0.48	0.49	0.28	0.66
JPN	0.43	0.01	0.58	0.61	0.54	0.47	0.72	0.53
NLD	0.33	0.36	0.14	0.31	0.66	0.65	0.41	0.49
NOR	0.57	0.43	0.49	0.60	0.60	0.61	0.33	0.48
PRT	0.70	0.81	0.64	0.71	0.33	0.19	0.42	0.50
SWE	0.53	0.60	0.26	0.29	0.65	0.66	0.44	0.56
USA	0.53	0.61	0.21	0.27	0.51	0.67	-0.02	0.25
Pooled	0.51	0.43	0.46	0.55	0.42	0.33	0.44	0.54

Notes: Correlations between money growth and credit growth (measured with total bank lending to the non financial sector with CPI inflation. Full sample: 1870–2013; Pre-WW2: 1870–1938; Post-WW2: 1948–1971; Float: 1972–2013. See text.

growth than **credit** growth (**0.33** versus **0.22**), whereas **after WWII** the **opposite** is true (**0.45** versus **0.60**).

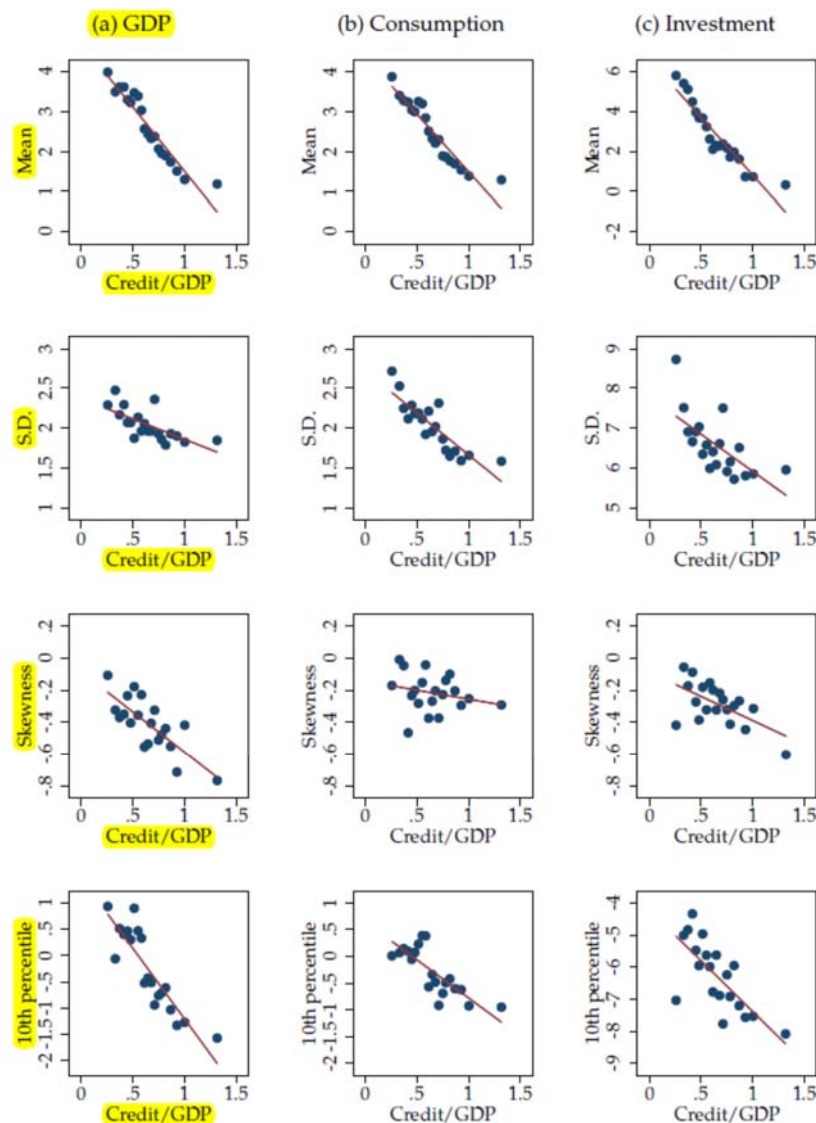
For the **United States**, the contrast is even starker ...

(v) Same broad pattern holds if you only focus on the post-Bretton Woods period (**‘Float’**)

Finally (table above), **correlation of inflation** with **credit** growth has **increased**, and it is today **comparable** to that with **M₂ growth** ...

So you see that we have truly moved to the **‘Age of Credit’** ...

Did leverage affect business-cycles' moments?



A **crucial question** is then whether the **increase in leverage** affected the nature of **macro fluctuations** ...

In particular: Do we see **more negative 'tail events'**—that is: **deeper** and more violent **recessions**—at **higher levels** of credit leverage?

The answer is **Yes** ...

Jorda *et al.* (2016) consider, for all countries, **10-year rolling samples**, and for **each sample** they compute simple moments (mean, standard deviation, skewness, ...) ...

The **previous figure** shows how these **moments** change with **leverage** (the observations have been grouped in 20 ‘bins’—i.e., groups—to make the figure more readable) ...

Main findings:

- **leverage** is **strongly negatively correlated** with **mean GDP growth** ...

The **interpretation** of this finding is however **not clear**: real **GDP growth** has been **slowing** in all **advanced countries**, but this **may** or **may not** have to do with the increase in leverage ...

- **Leverage** is **strongly negatively correlated** with **skewness** ...
Higher leverage is associated with deeper recessions ...

- **Leverage** is strongly negatively correlated with the **lowest 10 percentile of GDP growth** ...

Higher leverage is associated with **worse ‘negative tail events’** ...

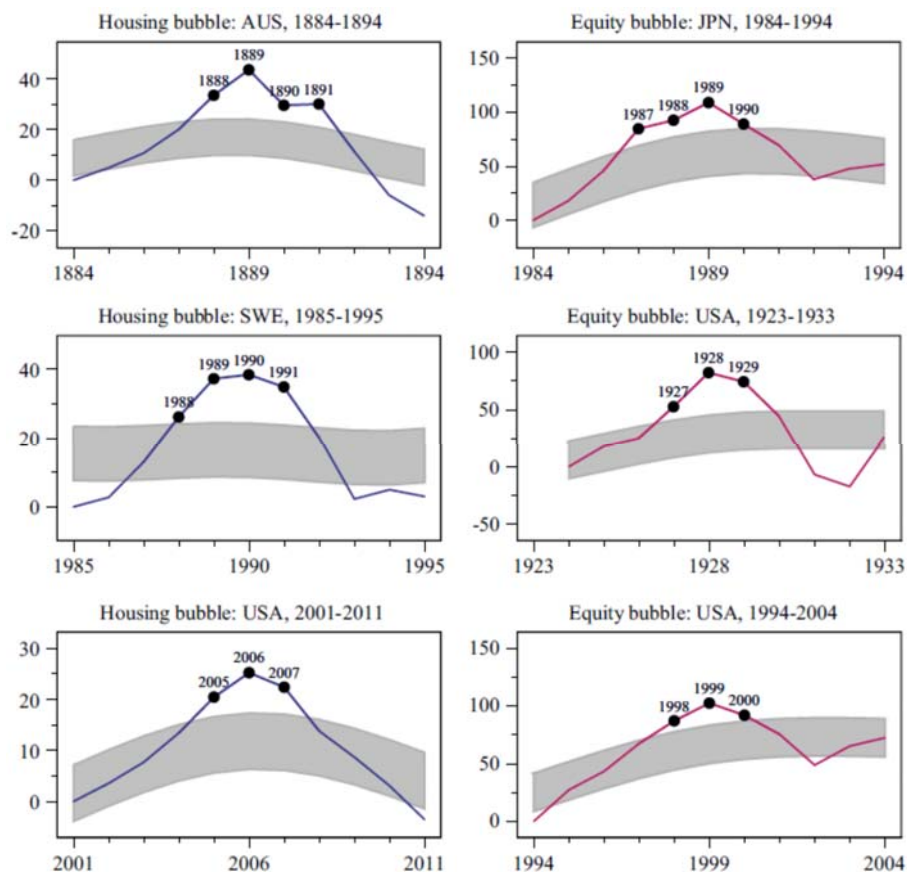
With **higher leverage**, the **worst recessions** become even worse ...

All of this suggests that a more **highly leveraged** economy runs the **risk** of steeper downturns and **deeper recessions** ...

Let’s therefore **‘zoom in’** on the **relationship** between **credit** expansions, **bubbles** in **stock** and **house prices**, and subsequent **recessions** ...

Jorda *et al.* (JME, 2015): ‘Among **policymakers** and economists a **post-crisis consensus** seems to be **emerging**, and this new view **worries** a lot about **leveraged bubbles**.’

Recessions associated with the bursting of bubbles and previous large credit expansions are especially deep



Best reference is Jorda *et al.* (JME, 2015), ‘Leveraged Bubbles’ ...

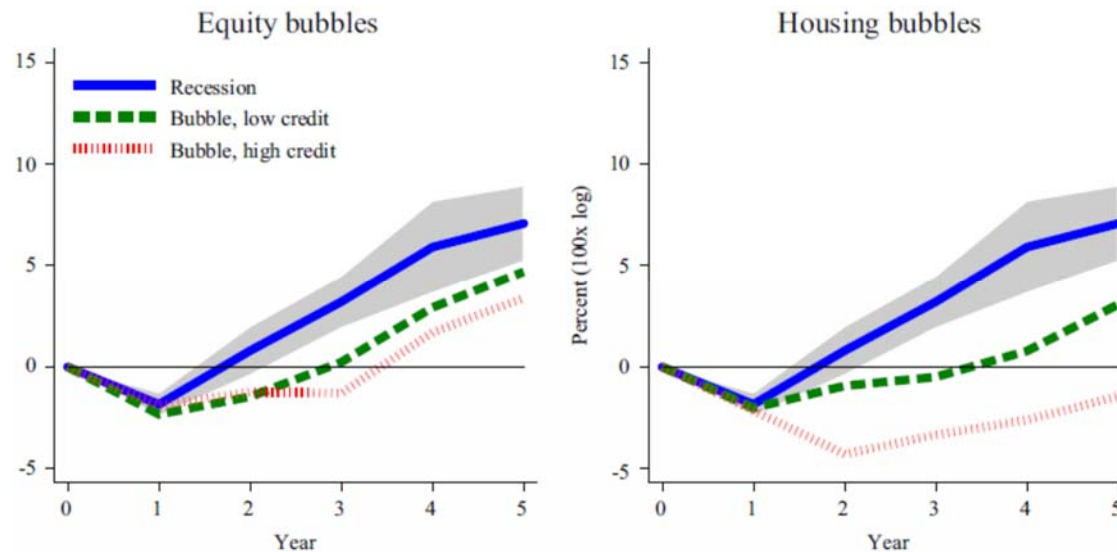
The dataset is essentially the same we just discussed ...

They use a statistical algorithm to detect bubbles in stock and house prices ...

Then, they explore whether (i) recessions associated with leveraged bubbles are worse than

‘normal’ recessions; and (ii) whereas the bubble being associated with stocks or housing makes a difference ...

These are the results for the **full sample** ...



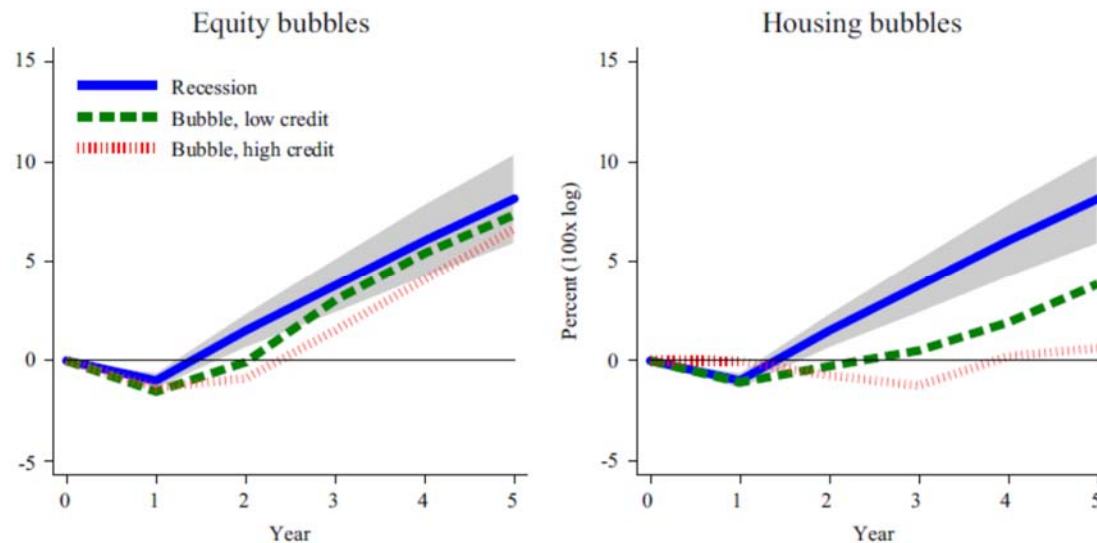
The main findings may be summarized as follows:

(i) recessions associated with **leveraged bubbles** are indeed **worse** than **‘standard’** recessions ...

Shaded grey areas are the **90%-coverage intervals** associated with **standard recessions**: **Recessions** associated to either **equity** or **house prices bubbles**, and with either **high** or **low** previous **credit growth**, are uniformly **more severe** ...

(ii) Recessions are **more severe** **(a)** if associated to **housing bubbles**, rather than equity bubbles, and **(b)** is associated with previous **high credit growth** ...

This is for the **post-WWII** period ...



Recessions associated with **equity bubbles** are **not** markedly **different** from ‘**normal** recessions’ ...

Recessions associated with **housing bubbles**, on the other hand, are **significantly deeper** than ‘normal recessions’ ...

Jorda *et al.* (JME, 2015) thus sum up their findings:

‘The **detrimental effects** of an asset price **bubble depend** on two factors: whether the bubble happens in **equities** or in **houses**, and whether the bubble happens to coincide with **rapid growth** in private **credit** as well. Our **results clearly show** that [...] the **worst outcomes** are clearly when the **bubble** is in **housing** prices and there is a **credit boom**.’

This raises two obvious questions:

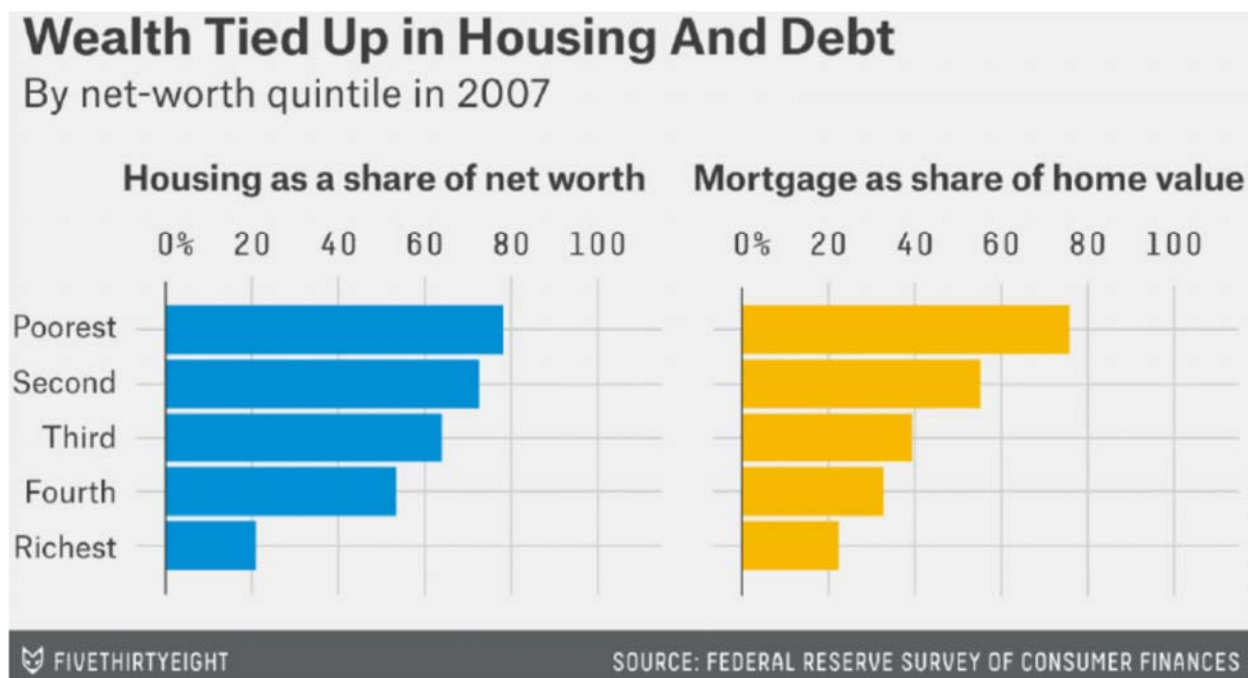
- **Why** are **recessions** associated with **house prices bubbles deeper** than those associated with **stock prices bubbles**?
- **Why** does **previous credit expansion** make the **recessionary impact** of a bubble bursting **worse**?

This leads us to the work of **Mian** and **Sufi**, who have provided one of the **most influential interpretations** of the **Great Recession** ...

The **best introduction** to their work is **Atif Mian** and **Amir Sufi** (2014), ***House of Debt***, The University of Chicago Press ...

There are **two key themes** in the work of **Mian** and **Sufi**:

- **Stocks** are for the **rich**, **housing** is the main component of the **poor**'s wealth ...



Left: **housing** as a **share of net worth**, and **mortgage** as **share of home value**, by net-worth quintiles based on Federal Reserve data ...

Poorer households (i) have a **larger fraction** of **wealth** tied up in **housing**, and **(ii)** have **larger mortgages** (as a fraction of the value of the house) ...

- **Therefore,**

(i) the **collapse** of a **bubble** in **stock prices** mainly **affects** the **rich**, who—**precisely** because they are **rich**—will most likely **not** be **compelled** to **cut** their **consumption** in order to **deleverage** (that is: **pay off** their **debt**) ...

This **explains** why **recessions** associated with the **bursting** of **stock prices bubbles** are **not markedly deeper** than **‘normal’** recessions—see in particular top-left of **slide 37** ...

A **typical example** is the shallow recession of the **early 2000s**, which followed the **collapse** of the **dotcom bubble** ...

(ii) The **collapse** of a **bubble** in **house prices** mainly **affects** the **poor**, who will likely be **compelled** to **cut** their **consumption** in order to **deleverage** ...

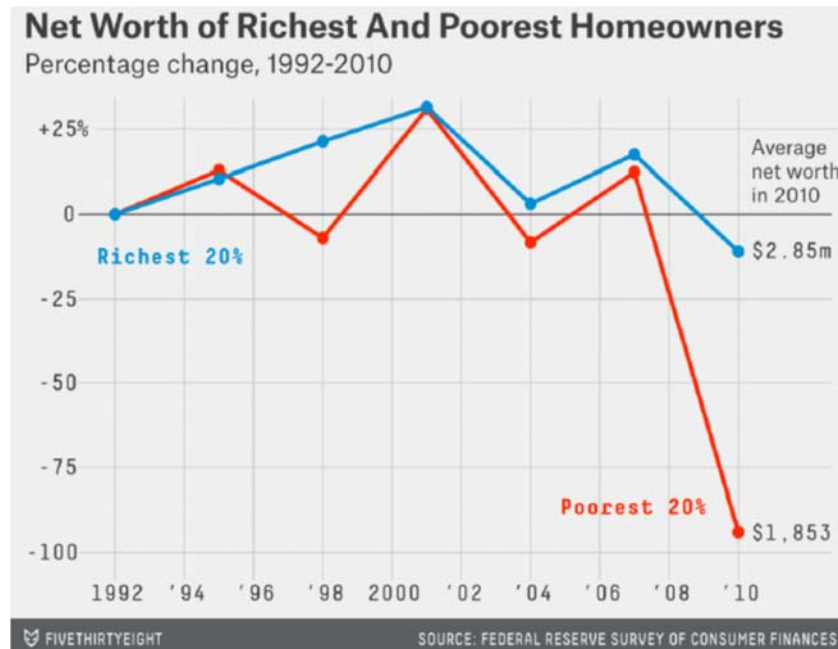
The **reason** why the **poor** will **need** to **cut** their **consumption** in order to **deleverage**—i.e., pay off their debt—is very **simple** ...

The amount of **debt** is **fixed** in **nominal terms** ...

During the **bubble** in **credit** and **housing**, **debt** could be simply ‘**rolled over**’—that is: it could be **re-financed** each period, leading to it **increasing** at a rate equal to the interest rate on lending ...

After the **crash**, **debt cannot** be **rolled over** any longer, and it has to be paid down ...

Problem is: The **crash** in **house prices** has **wiped out** a significant fraction of the **wealth** of the **poor**, who now have **no option** other than **contracting consumption** in order to pay down the debt ...



The **devastating effect on poor homeowners** can be seen in the chart at the left, which tracks the **evolution of homeowners' net worth** from 1992 to 2010 for the **poorest and richest quintiles** ...

The **poor** were **hammered**, whereas the **rich** experienced a comparatively **mild fall in their new worth** ...

Mian and Sufi:

*'The **sharp decline in home prices** starting in 2007 **concentrated losses on people with the least capacity to bear them, disproportionately affecting poor homeowners who then stopped spending.**'*

Most of the **empirical evidence** produced by **Mian** and **Sufi** is based on **comparing the recessionary experience** of **U.S. states, counties**, or even **ZIP code areas** which **differ** by

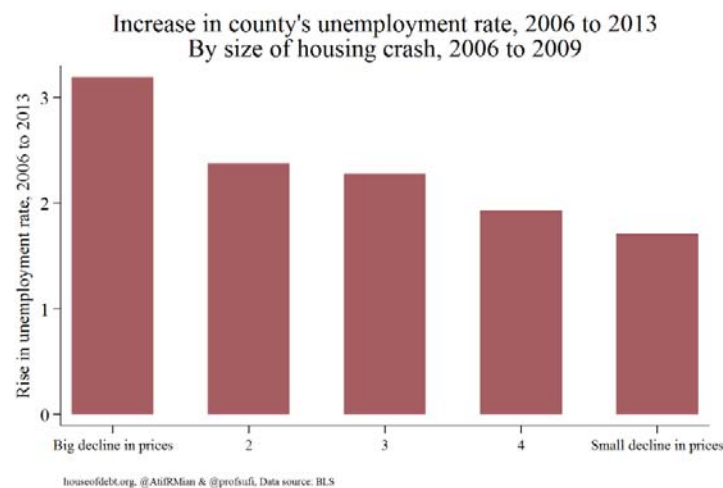
(i) the extent of **mortgage credit growth before** the housing **crash**, and

(ii) the size of the **collapse in house prices** ...

If their **explanation** is **correct**, we should indeed **expect to see** that, *ceteris paribus*:

- the **larger** the **crash in house prices**—and therefore the **larger** the ‘**wipe-out**’ of the **wealth** of the **poor**—the **greater** the extent of the **deleveraging**, and therefore the greater the **contraction in spending** ...

- By same token, the **larger** the **growth** in **credit** before the **crash** in **house prices**—and therefore the **larger** the extent of the **debt** which ought to be **paid down**—the **greater** the extent of the **deleveraging**, and therefore the **greater** the **contraction** in **spending** ...
- When household deleverage, the **fall** in the **expenditure** on **durables** should be **greater** than the fall in expenditure on **non-durables** such as **food** ...



Indeed, this is what you **see** in the **data** ...

First, the **increase** in the **unemployment** rate has been **larger** in counties with **larger** **crashes** in **house prices** ...

Second, U.S. states which experienced the larger house prices declines also experienced the larger contraction in consumption ...

Third, the fall in the expenditure on durable goods was starkly greater than the fall in the expenditure of non-durables ...

