Real Estate Valuation in the Open Economy
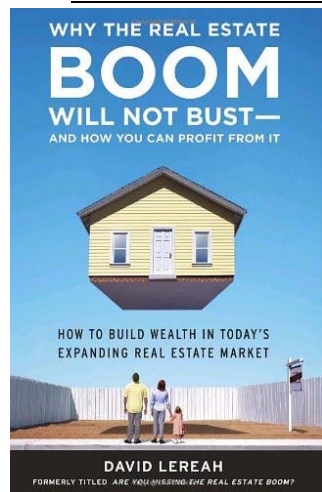## June 26, 2014
The 15th NBER-CCER Conference
CCER Beijing University
Joshua Aizenman
USC and the NBER
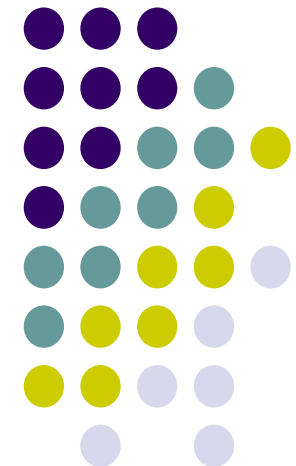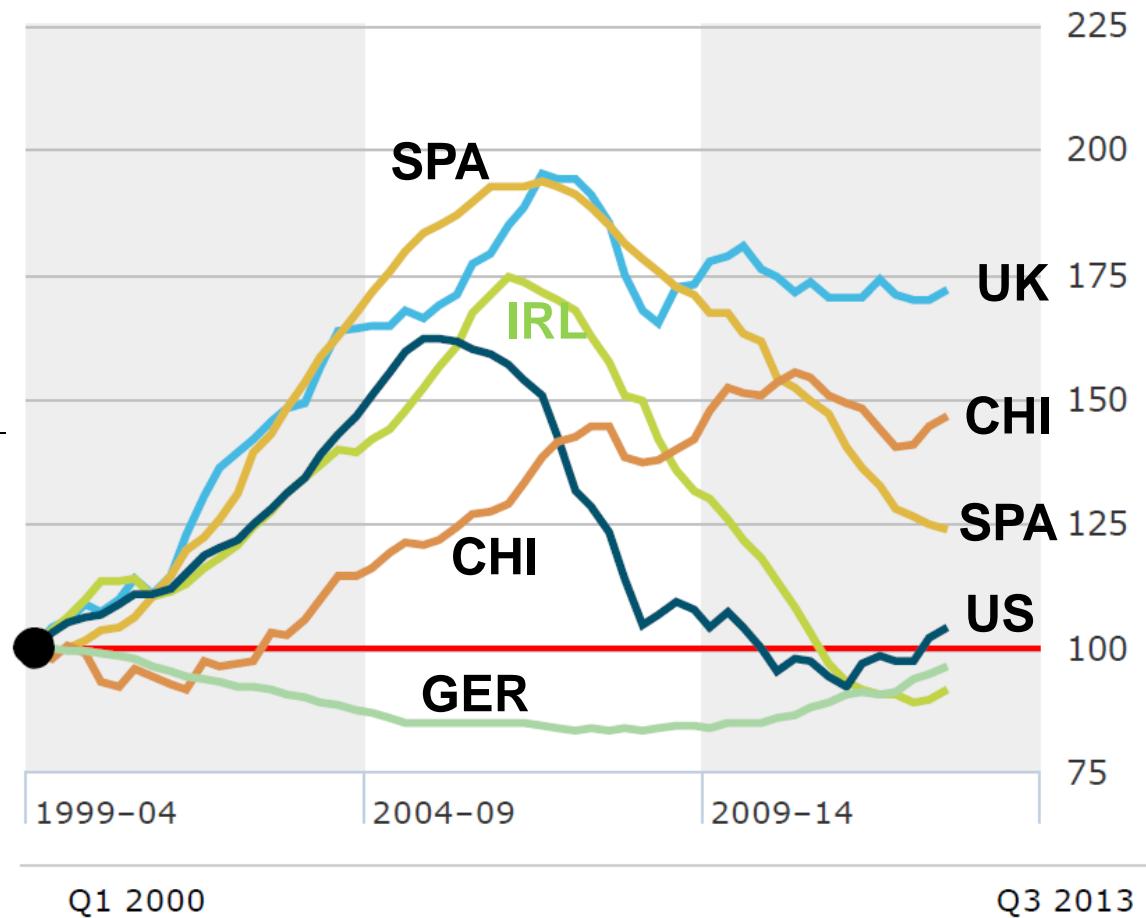

2005

2007

2010

Q1 2000=100

SPA

IRL

UK

CHI

SPA

US

CHI

GER

1999–04   2004–09   2009–14

225
200
175
150
125
100
75

Q1 2000   Q3 2013

**house-prices in real term index
Q1 2000- Q3 2013**

The Economist

http://www.economist.com/blogs/dailychart/2011/11/global-house-prices

The purpose

- Explore the stability of the key conditioning variables accounting for the real estate valuation before and after the crisis of 2008-9, in a panel of 36 countries, for the period of 2005:I -2012:IV, recognizing the crisis break.

- We evaluate the importance of changes of
    1. Current account,
    2. Credit market conditions,
    3. lagged real estate appreciation [proxy for momentum] and other variables in explaining the patters of real estate valuations.
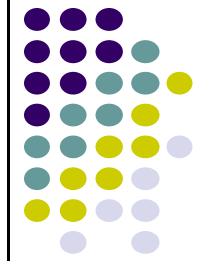
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Main results

The most economically significant variable in accounting for real estate valuation changes are

1. The lagged real estate appreciation (real estate inflation minus CPI inflation),

2. Changes of the current account/GDP,

3. Changes in domestic credit/GDP,

4. Equity market appreciation (equity market appreciation minus CPI inflation).
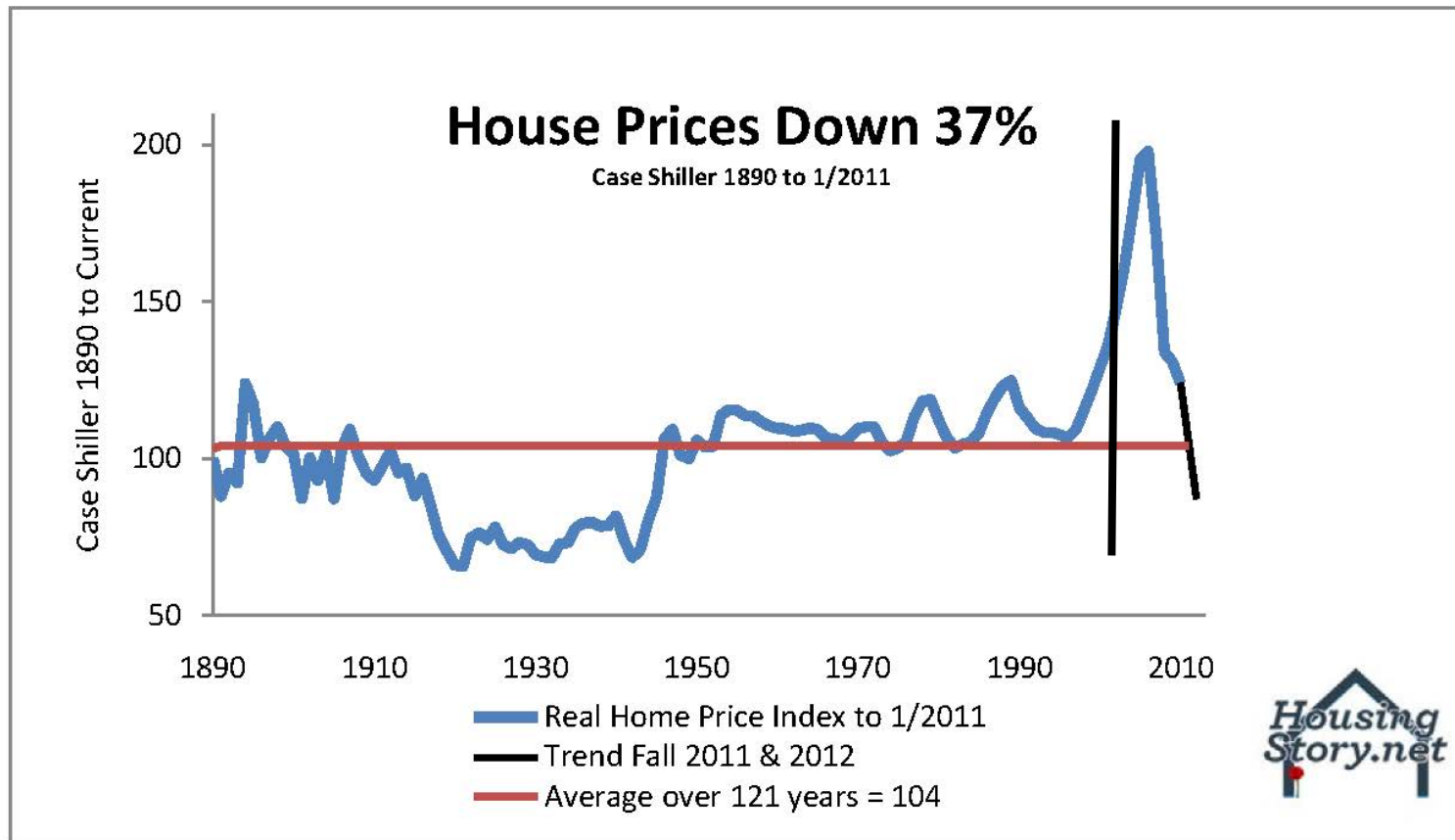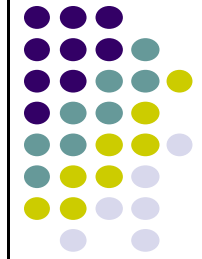
Results, cont.

The effects are economically substantial:

1. a 1 s.d. increase in lagged real estate appreciation (REA) is associated with a 10 % increase in REA;

2. a 1 s.d. increase in lagged current account deficit is associated with a 5% higher REA;

3. a 1 s.d. increase in lagged domestic credit/GDP growth is associated with 3% higher REA.

Both current account and credit growth channels are important, with the animal-spirits / momentum channels playing the most important role.

Motivation

Shiller's 2005 concerns that the US housing market is overheating.

House Prices Down 37%
Case Shiller 1890 to 1/2011

Legend:
- Real Home Price Index to 1/2011
- Trend Fall 2011 & 2012
- Average over 121 years = 104

Y-axis: Case Shiller 1890 to Current

HousingStory.net

Leamer (2007): "Housing is the US business cycle."

Background papers

- Aizenman and Jinjarak (2008) – The economic importance of current account variations, in accounting for the real estate valuation, exceeds that of other macro variables [41 countries, 1990–2005].

The global crisis of 2008-9 sparked a vibrant debate

- Borio and Disyatat (2011) - The main causing factor to the financial crisis was the "excess elasticity" of the international monetary and financial system;

- Obstfeld (2012) - External imbalances - a symptom that deeper financial threats are gathering."

- Gourinchas and Obstfeld (2012) "Domestic credit expansion and real currency appreciation have been the most robust and significant predictors of financial crises"

Shiller warns of "bubbly" global home prices Reuters Oct 14, 2013

- In June this year, he pointed to a potential new housing bubble in some of America's largest cities.

- "It is up 12 percent in the last year. This is a very rapid price increase right now, and I believe that it is accelerated somewhat by the Fed's policy," he said.

- China, Brazil, India, Australia, Norway and Belgium, among other countries, were witnessing similar price rises. "There are so many countries that are looking bubbly," he said.
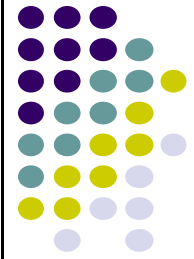
Nouriel Roubini
theguardian.com, 2 December 2013

Housing bubble 2.0 can only end badly

The global economy's new housing bubbles may not be about to burst just yet, because the forces feeding them – especially easy money and the need to hedge against inflation – are still fully operative.

Now, five years later, signs of frothiness, if not outright bubbles, are reappearing in housing markets in Switzerland, Sweden, Norway, Finland, France, Germany, Canada, Australia, New Zealand, and, back for an encore, the UK (well, London). In emerging markets, bubbles are appearing in Hong Kong, Singapore, China, and Israel, and in major urban centers in Turkey, India, Indonesia, and Brazil.
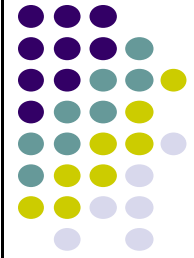
Cu. Act. and real estate linkages

1. Tomura (2010) Expectation-driven boom–bust cycles in house prices in the presence of uncertainty about the duration of high growth **occurs only if the economy is open to international capital flows.**

2. Laibson and Mollerstrom (2010) - **national asset bubbles may explain the international imbalances.**

A Conjecture: a two way feedback between asset valuation and current accounts.
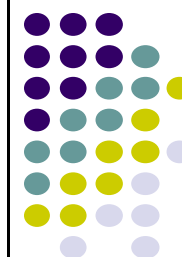
Cu. Act. and real estate linkages, cont.

3. Gete's (2010) - an increased demand for housing may generate trade deficits without the need for wealth effects or trade in capital goods. **Housing booms are larger if the country can run a trade / current account deficit.**

4. Adam et al. (2011) - an open economy with subjective beliefs about price behavior, updated beliefs using Bayes' rule. **Belief dynamics replicates the empirical association between Cu. Act. patterns and real estate valuations.**

Low interest rates → a house price boom.

The current account and credit growth may impact the valuation of national real estates via different but related channels
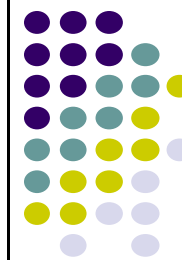
I. **Growing current account deficits is a signal of a growing gap between the spending of domestic residents [absorption] and their output.**

As long as the demand for non-traded durable assets is positively correlated with absorption, higher current account deficits tend to be associated with higher real estate valuation.
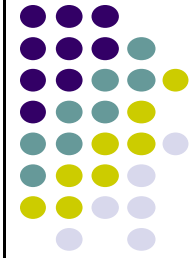
II. As most households co-finance the purchase of their dwelling thorough the banking system, **greater financial depth and accelerated growth rate of credit increases the demand for houses → increasing the real estate valuation.**
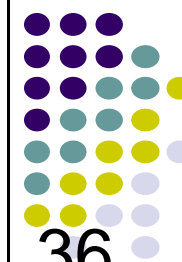
We explore the following issues

i. Stability of the key conditioning variables accounting for the real estate valuation before and after the crisis; the relative importance of the current account and credit growth patterns.

ii. The importance of 'momentum' in the pricing of real estate, controlling for other macro factors. This issue is related to concerns about possible bubble dynamics.

iii. Symmetry of the patterns during real estate appreciation versus real estate depreciation.

iv. Possible two way causality between current account and real estate valuation patterns.

v. The degree to which the valuation of equities is accounted by similar conditioning variables.

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Data and patterns

- 36 countries in the sample, both developed and emerging markets, 2005:I to 2012:IV.

- Based on the panel unit-root and panel co-integration tests, we apply dynamic panel data estimation in first-differenced series for the real estate and macro variables in our sample.

- With 36 countries and over 20 quarterly periods for each country, the fixed-effect estimation are applicable.

- However, given that several series are highly persistent in the panel of countries, we focus in on dynamic panel estimation as our main econometric evidence.

We validates the robustness of the association between real estate valuation of lagged current account patterns both before and after the crisis.

The base regression is a dynamic panel estimate of 36 countries, 2005:I -2012:IV, recognizing the crisis break.

- It accounts for the appreciation rate of the real estate (real estate inflation - CPI inflation) by:

1. lagged appreciation rate of the real estate valuation,

2. lagged changes in the current account/GDP,

3. lagged changes in the domestic credit/GDP,

4. lagged changes in the equity market appreciation (equity market appreciation minus CPI inflation),

5. a vector of lagged changes of macro controls [inflation, growth of industrial production, TED spreads, sovereign spreads, VIX, and international reserves]
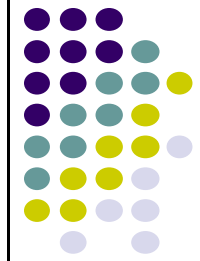
Empirical specification

$$\Delta\left[\text{Real estate appreciation} - \text{Inflation}\right]_{it} = \beta_0 + \sum_{\tau=1}^{4}\beta_{1,t-\tau}\Delta\left[\text{Real estate appreciation} - \text{Inflation}\right]_{it-\tau}$$

$$+\left\{\sum_{\tau=1}^{2}\beta_{2,t-\tau}^{0}\Delta\left[CAD/GDP\right]_{it-\tau}\right\}^{\text{Before Break}} + \left\{\sum_{\tau=1}^{2}\beta_{2,t-\tau}^{1}\Delta\left[CAD/GDP\right]_{it-\tau}\right\}^{\text{After Break}}$$

$$+\left\{\sum_{\tau=1}^{2}\beta_{3,t-\tau}^{0}\Delta\left[DCR/GDP\right]_{it-\tau}\right\}^{\text{Before Break}} + \left\{\sum_{\tau=1}^{2}\beta_{3,t-\tau}^{1}\Delta\left[DCR/GDP\right]_{it-\tau}\right\}^{\text{After Break}}$$

$$+\sum_{\tau=1}^{2}\beta_{4,t-\tau}\left\{\Delta\left[DCR/GDP\right]_{it-\tau}\times\Delta\left[DCR/GDP\right]_{it-\tau}\right\}$$

$$+\sum_{\tau=1}^{4}\beta_{5,t-\tau}\Delta\left[\text{Equity market appreciation} - \text{Inflation}\right]_{it-\tau}$$

$$+X'_{t-1}\theta + \varepsilon_{it}$$

where *t* denotes time (quarterly); *i* country; **CAD/GDP: current-account deficit/GDP; DCR/GDP: domestic credit/GDP; and *X* denotes a vector of controls in changes, including -- CPI inflation, growth of industrial production, TED spread, VIX, Sovereign CDS spread, and foreign reserve accumulation.**
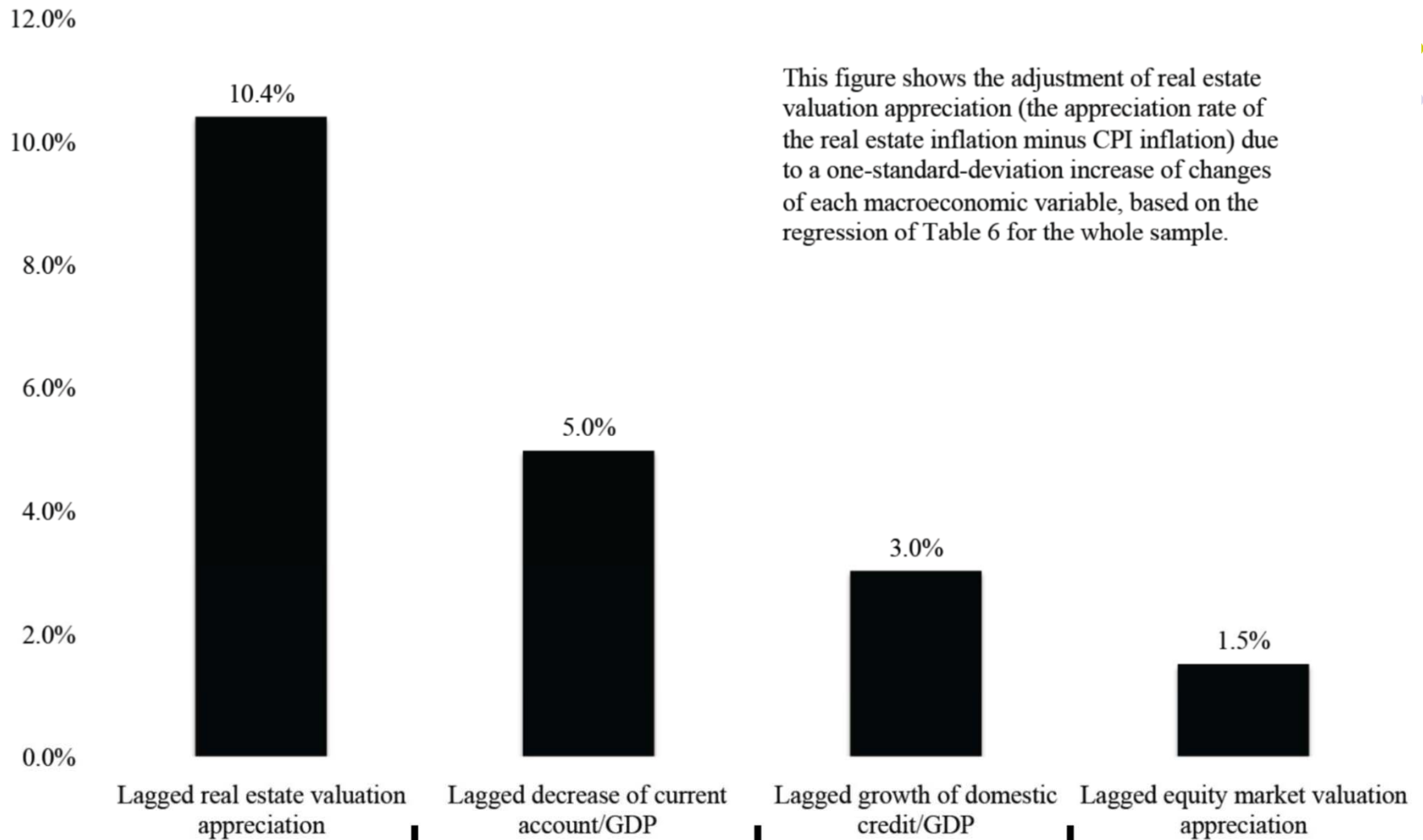
The most economically significant variable in accounting for real estate valuation changes

1. The lagged real estate appreciation,
2. Current account deficit/GDP,
3. Domestic credit/GDP,
4. Equity market appreciation.

The first three effects are economically substantial:

- a one standard deviation increase in lagged real estate appreciation is associated with a 10 % increase in the present real estate appreciation,

- much larger than the impact of a one standard deviation increase in the current account deficit (5%) and that of domestic credit/GDP growth (3%).
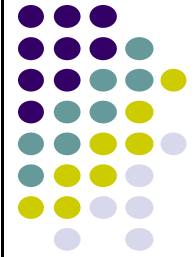
This figure shows the adjustment of real estate valuation appreciation (the appreciation rate of the real estate inflation minus CPI inflation) due to a one-standard-deviation increase of changes of each macroeconomic variable, based on the regression of Table 6 for the whole sample.

The animal-spirits and expectations channels playing the most important role in the boom and bust of real estate valuation

- The results are also supportive of both current account and credit growth channels.

- Support for a positive feedback of real estate appreciation to equity market appreciation, consistent with the wealth effects from real estate valuation to equity investment.
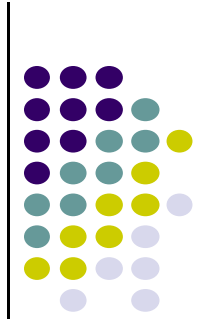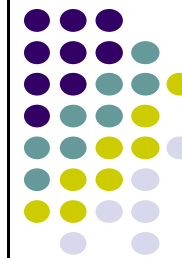
Sensitivity Analysis

- The main results hold using either 2007:III (Northern Rock event) or 2008:III (Lehman Brothers event) as an alternative turning point.

- We find that a reverse and positive feedback of real estate appreciation to current account deficit is not supported by the data over the crisis period.

- *Asymmetric adjustment between appreciation and depreciation:*

For the real estate appreciation episode, estimation results are largely consistent with the results from the whole-sample estimation.

- For the real estate depreciation episode, only lagged real estate valuation appreciation and equity market valuation appreciation are found statistically significant in the association with the real estate valuation.

- When real estate markets were on the rise, the real estate valuation adjusts with respect to macro variables differently from when the markets were declining.

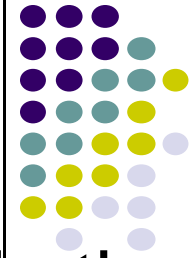- Asymmetric bubbly dynamics are evident in the real estate valuation.
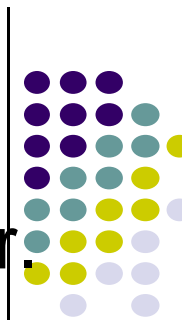
Concluding remarks

- We confirmed a robust positive association between the appreciation of real estate valuation and increases in current account deficits and the growth rates of credit (both as fractions of the GDP) in 36 countries, covering the OECD and emerging markets, before and after the global financial crisis.

- While the relative impact of the current account deficit is larger than that of credit growth in our sample, one should recognize that the growth of credit/GDP is a noisy measure of the effective credit growth in the real estate market.

Cont.

- Data limitations prevented us from controlling directly for the credit conditions in the real estate markets [like the stringency of credit standards, required down payment, the effective spreads in the mortgage markets, etc.]

- There is no reason to expect that the relative ranking of the importance of the current account versus the credit channels in accounting for real estate appreciations should be stable overtime. Yet, as theory suggests, both channels are potent and should not be ignored.
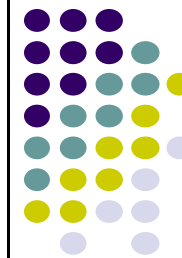
- The most important factor accounting for the appreciation: the impact of momentum: the lagged quarterly appreciations in the past year.

- A real estate appreciation of 1% in a given quarter was associated with a projected real appreciation of more than 1% in the next three quarters.

- This is in line with Shiller's (2000) concerns regarding Irrational Exuberance in the USA in the early 2000s, with Case, Shiller, and Thompson (2012)'s, and Glaeser, Gottlieb, and Gyourko (2013)'s questioning the role of cheap credit on real estate boom.

- Shiller's concerns apply globally.

- The effects of CAD prevails both before and after the crisis.

Follow up agenda
Aizenman, Jinjarak and Huanhuan Zheng (2014) work in progress
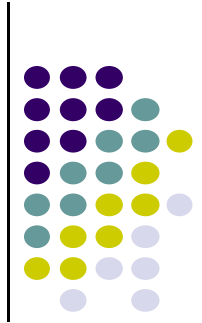
Added controls: LTV, stringency of credit standards, required down payment, the effective spreads in the mortgage markets, house price/rent

I. What are the output and growth costs associated with corrections of bubbly real estate, and what factors determine these costs.

II. Endogeneity issues

Preliminary findings: 'small corrections' don't have significant growth effects, faster corrections are associated with faster recoveries.

http://memegenerator.net/instance/31669615