Counter-Cyclical LTV Limits: A Simple Method for Mitigating Future Housing Bubbles

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July 31, 2013
(update of June 12, 2010 presentation at AEI)

With suggestions & input from:
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Counter-Cyclical Down Payments

**THE CONCEPT:**

- Automatically lower LTV limits (or otherwise tighten underwriting requirements) when housing prices start to rise rapidly

→ Dampen or Eliminate Future Housing Bubbles

No attempt to regulate long term asset values, or frustrate affordable-housing goals.

→ just damp out boom-bust oscillations.
This is a Feedback Loop

• Well known from engineering controls theory

• Some examples:
  – Thermostat
  – The “governor” on a lawn mower engine
  – “Cruise Control” on an automobile
    • Regulates fixed speed as car goes up & down hills
  – Trailer Brake
    • Activates brakes on trailer by sensing load on the trailer hitch. *A one-sided feedback loop.*
Particle Accelerator Beam Damper Circuits

All-Coordinate Digital Damper

Transverse Dampers

Stripline Pickup

Power Amp

Stripline Kicker

Minimal Analog Filter

212 MHz

FAST ADC

53 MHz, TCLK, MDAT, ...

Identical X & Y

Resistive Wall Monitor

Power Amp

Longitudinal (Z) Damper

Broadband Cavity

FAST ADC

Monster FPGA

> 273 MHz

424 MHz

FAST DACs

CPU: VME/ VXI/ PCI/ PMC etc.

OR Serial LINK

DACs
Why Dampen Housing Bubbles?

• Housing dominates household net worth
  – We can survive a stock bubble but not a housing bubble
• Time scale of real estate bubbles is tractable
  – Develop over months to years
• Low volatility of intrinsic worth of housing
  – Not like stock valuations based on volatile earnings
  – Housing demand changes on demographic time scales
• Good statistical measures exist for feedback
  – Large numbers of public transactions in regional housing markets
Great Recession (Started Q3 2007)

Great Depression (1929-1934)

BUSH

HOOVER

FDR

Stimulus

OBAMA

Household Net Worth Compared to Peak

Years from Peak

Drop in Household Net Worth - Worse than Great Depression

Disproportionate Impact of Housing Bubble

- On Minorities
- On Low Income Families
- Real Estate Professionals
- Home Construction and Building Trades

*We cannot let this happen again!*
Outline of the Basic Idea

• Negotiate underwriting limits (LTV, DTI, FICO) that work under normal market conditions.

• Adjust LTV limit regionally based on recent changes in local housing index

This will allow affordable (high LTV) mortgages under normal market conditions while still protecting against systemic risk.

➔ It will also act to dampen housing bubbles.
A Simple Example Damping Formula

\[
LTV = \text{Lesser of:}
\]

A. Normal LTV Limit (e.g. 95%)

B. \((\text{real housing index 4 years ago}) / (\text{index today})\)

NOTES:
1. This is basically a rule that says that no mortgage can be larger than the value a property had 4 years ago. Easy to explain.
2. A weighted average of the current price and 4-years-ago price could be used. This controls how strong the damping of bubbles will be.
3. There is nothing magical about using the 4 year price rise ... anywhere between 2-5 years works OK. (see Excel spreadsheet)
4. Limit must be on Consolidated LTV so that Home Equity Loans, etc. would be similarly limited.
Can be thought of in several ways:

1. As a feedback mechanism.
2. As a prudent countercyclical principle:
   “All mortgages have to make sense even if housing prices retreat to where they were a few years ago”
3. As a simple underwriting rule:
   “I will give you a mortgage against 95% of the long-term value of the property, but against only a small fraction of the recently-appreciated value.”

→ Treat skeptically the value of recently-appreciated assets!
How This Would Have Worked

• The following plots show how this formula would have applied to LTV limits during price bubbles in regional markets over the last 20 years.

• In reality, lowering the LTV limits would have absorbed speculative capital and largely squelched the bubbles.

• There are also higher-order psychological effects since even the specter of counter-cyclical LTV limits would have discouraged any large inrush of speculative capital.
Input Data

• Housing Price Data \((S&P / \text{Case-Shiller})\)
  – **Seasonally Adjusted** to avoid yearly ripples
  – **Regional** since markets have individual bubbles

• Inflation Adjustment using CPI-U
  – excluding Food and Energy (less noisy)
Parameters

Mortgage Limit = \textbf{Lesser} of:

• 95% loan-to-value
• Reference price

Reference Price = 50-50 average of:

• current (purchase) price
• price deflated by 4-years-ago real housing index
Countercyclical Down Payment Based on Recent Rise in Regional Real Estate Price

Minneapolis, MN

5% Fixed Down Payment

Mortgage Limit (4 yr. Diff.) Fract.=50%

LTV
Countercyclical Down Payment Based on Recent Rise in Regional Real Estate Price

- Tampa, FL
- 5% Fixed Down Payment
- Mortgage Limit (4 yr. Diff.) Fract.=50%
- LTV

Inflation-Adjusted Regional Housing Prices (2000 = 100)

Loan-to-Value Limit (LTV)
Countercyclical Down Payment Based on Recent Rise in Regional Real Estate Price

FICTIONAL Tampa
5% Fixed Down Payment
Mortgage Limit (4 yr. Diff.) Fract.=50%

Inflation-Adjusted Regional Housing Prices (2000 = 100)

Housing Price
Loan-to-Value Limit (LTV)
Countercyclical Down Payment Based on Recent Rise in Regional Real Estate Price

Seattle, WA
5% Fixed Down Payment
Mortgage Limit (4 yr. Diff.) Fract.=50%

Housing Price
Mortgage Limit
LTV

LTV Limit →
Countercyclical Down Payment Based on Recent Rise in Regional Real Estate Price

**Inflation-Adjusted Regional Housing Prices (2000 = 100)**

- **Cleveland, OH**
  - 5% Fixed Down Payment
  - Mortgage Limit (4 yr. Diff.) Fract.=50%

**Loan-to-Value Limit (LTV)**
Excel File To Experiment With Parameters (attached to proceedings)
MORE DESIGN QUESTIONS
Key Design Questions

WHEN A BUBBLE STARTS:

A. How will it be detected
B. Who has to hold capital against the collapse
C. How much capital should be held

POSSIBLE CAPITAL HOLDERS:

A. Homeowners (LTV)
B. Mortgage Insurers (countercyclical capital buffers)
C. Banks (countercyclical capital buffers)
D. Securitization skin-in-the-game (QRM)
E. ALL OF THE ABOVE
Formula vs. Omniscient Regulator

• Similar feedback could be implemented via an omniscient and independent real estate market regulator (presumably the Fed).
  – Some countries are doing this today.
    → study results as source of calibration data?
• Our approach of using an LTV formula is:
  – More Transparent and Predictable
  – Simpler
  – Less prone to political interference

→ An Automatic Punch-Bowl Retractor
Continuous Feedback Damping or Emergency Brake?

When Bubble starts developing, we must consider tighter underwriting requirements.

Tighter underwriting requirements can be either:

1. “Emergency brake” to halt bubbles
2. Continuously-acting feedback loop to dampen even small price oscillations

Which mode we operate in depends on the feedback parameters (gain, threshold...).
More Optimizations of the Feedback Loop

• What variables are best for feedback sensing:
  – Housing prices: (national, regional, sectoral?)
  – Geographical smoothing?
  – Borrower DTI? FICO?
  – Price/Rent ratios?
  – Housing sales, construction, or inventory?
  – Subtract long term trends?

• What actuators are we using for feedback:
  – Loan-to-Value (LTV) limits
  – Borrower DTI or FICO limits
  – Capital Requirements for Banks, Insurers, Securitizers?
Optimizing the Gain of the Feedback Loop

(Ideas from Jonathan Reiss)

Q: What is the optimum fraction of the price rise to apply to the LTV limit (i.e. the gain of the feedback loop)?
   – Too small, and it will be ineffective
   – Too large, and it may over-correct and oscillate
   – Jonathan Reiss estimates ~ 40% (we used 50% here)
   – Needs modeling... is there calibration data anywhere?

→ Fortunately, damping feedback loops are very insensitive to the exact value of the feedback gain
→ Housing markets have large Landau Damping
Some Down Sides of Regulating Bubbles

1. Will slow down the re-deployment of capital in response to real changes in the economy
   – The misallocation of capital due to this effect is tiny compared to the recent housing bubble.

2. Will distort the economy by punishing one sector for a “nearby” bubble
   – “Gary is not Chicago”
   – Will be small under the non-bubble conditions that should be typical with bubble damping

3. Politicization of the housing indexes
A Final Lesson From Biology

• Critical Life Functions are regulated by Multiple Feedback Loops

• Example: Eating is regulated by:
  – Blood sugar
  – Fullness of stomach
  – Time since last meal
  – Habitual behavior (Pavlov...)
  – Watching and smelling other people eat
  – etc. etc. etc....

This is why it is difficult to make a diet pill!
A Lesson From Biology (cont’d)

• We should **copy biological systems** to **stabilize the (life-critical!) housing markets**

• Stabilize housing prices with redundant feedback loops:
  – Counter-cyclical Mortgage LTV Limits
  – Counter-cyclical Capital Requirements for Banks
  – Counter-cyclical Capital Requirements for FHA
  – Counter-cyclical Capital Requirements for Mortgage Insurers
  – Counter-cyclical Securitization Skin-in-the-Game (QRM)
  – etc. etc. etc….

*Each Feedback Loop Should Lean Against Bubble Formation!*