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Balance Sheet Crises: Causes, Consequences and Responses

Steven Gjerstad

Chapman University, gjerstad@chapman.edu

Vernon Smith

Chapman University, vsmith@chapman.edu

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Comments

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Steven Gjerstad and Vernon L. Smith

CHAPMAN UNIVERSITY

Based on S. Gjerstad and V. Smith, *Prosperity and Recession*

to appear, Cambridge University Press.

Balance Sheet Crises: Causes, Consequences and Responses

Steven Gjerstad and Vernon L. Smith¹

“[B]eing the managers rather of other people's money than of their own, it cannot well be expected, that they should watch over it with the same anxious vigilance with which ... [they] frequently watch over their own.”
(Adam Smith, *Wealth of Nations*, Vol. II, p. 741)

We propose that the severity of the Depression beginning in 1929, and that of the Great Recession starting in 2007 were twin household-bank balance sheet crises—events that were quite distinguishable from the recessions appearing between them. Each episode, we hypothesize, was preceded by unsustainable rises in expenditures on construction of new housing units and in mortgage credit for purchases of new and existing homes. In both cases housing values rapidly collapsed by over thirty percent but mortgage debt obligations fell only very slowly, so that housing equity fell sharply.²

Between these two economic calamities were twelve smaller recessions. Nine of the ten recessions between World War II and the Great Recession were led by declines in new housing expenditures and in all of those nine, the interaction between Federal Reserve monetary policy and the housing-mortgage market was a clearly discernable feature. Federal Reserve monetary policy between the fall of 1979 and the summer of 1982 is a prominent example of this interaction effect, and an excellent ‘natural experiment’ on the impact of monetary policy on the mortgage and housing markets. Examination of the normal impact of monetary policy and the contrast with economic conditions in the aftermath of the housing bubble demonstrates why monetary policy has had so little effect on the money

¹ This paper is based on S. Gjerstad and V. Smith, *Prosperity and Recession*, to appear, Cambridge University Press, 2013. We provide only a brief textual treatment of the longer discussion in our book, although the figures we include herein provide an account of much of the fuller story.

² Although the Depression data we present in Gjerstad and Smith (2013) support the hypothesis, we would be the first to recognize that it is hardly definitive. What we do see as definitive, in the light of the housing bubble and crash into the Great Recession, is the need to reevaluate the expansion period leading up to the Depression.

supply and the economy over the past 5 years. When households are awash in debt, banks face continuing solvency problems, and there is a large inventory of unsold and foreclosed homes hanging over the market, low short-term interest rates don't stimulate lending to nearly the extent that they do in normal times. Monetary policy doesn't have its normal effect during a balance sheet crisis; neither does fiscal stimulus for the same reason. Since the economic response to monetary and fiscal stimulus has been so muted over the past five years, we examine international evidence to assess the impact of three alternative responses to major balance sheet crises.

1. In principle bankruptcy-default is the basic process for balance sheet repair, and for this to be achieved no one is too-big-to-fail. We evaluate the effects of confronting balance sheet problems, especially in financial institutions, by contrasting Sweden, which aggressively addressed the impaired conditions of its banks, with Japan, which allowed its banks to conceal their bad assets. Sweden recovered quickly while Japan languished for over a decade.
2. Political processes seek to protect incumbent creditors/investors from default; we saw this in the Great Recession (too-big-to-fail) and in the Southern Euro zone where banks have been bailed out in Spain and the European Central Bank has indicated its willingness to acquire government debt when sovereign debt financing costs surge in response to an increasing risk of default.
3. Market currency depreciation is a prominent feature of recovery in many countries. We discuss and chart three disparate examples that illustrate and explicate their significant, and common reoccurring features: Finland, Thailand and Iceland.

Housing and Mortgage Credit in the Depression

Aside from the large inflows of foreign capital that supported the housing bubble during the Great Recession, the development of the Depression and the course of the Great Recession included many common elements. In the next two sections, we demonstrate the parallels between the housing expansion and early collapse phases of the two episodes.

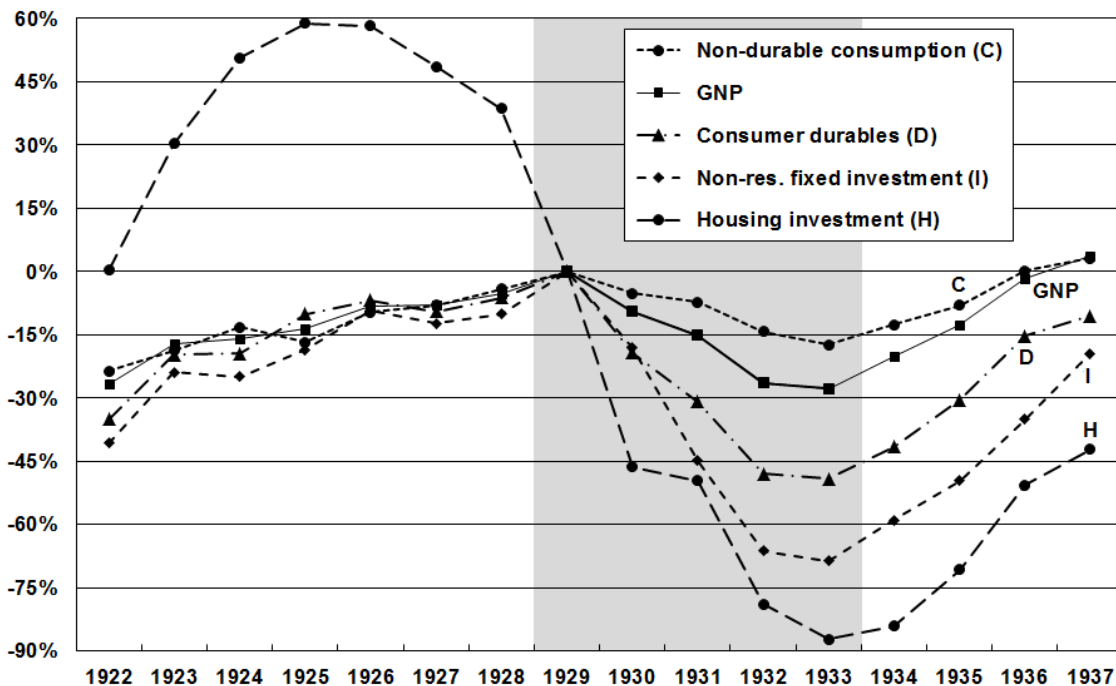
Proposition 1: The Depression and Great Recession were dis-equilibrating housing market and mortgage credit booms.

Figure 1 plots annual observations from 1922 through 1937 for the following expenditures.

1. Gross national product (GNP)
2. Non-durable consumption spending (C)
3. Consumer durable goods spending (D)
4. Non-residential fixed capital investment (I)
5. New housing construction expenditures (H)

As a vehicle for conveying the relative changes in each of the various measures, each point is plotted as a percentage of its level in 1929, the year the Depression started.

Figure 1: A major housing collapse preceded the Great Depression by over two years yet all other major expenditure categories continued to rise.



Most notably, housing expanded rapidly by nearly 60% from 1922 to 1925, leveling out in 1926 and then began its long descent, not bottoming out until 1933. In 1929 new housing expenditure had returned to its 1922 level before any

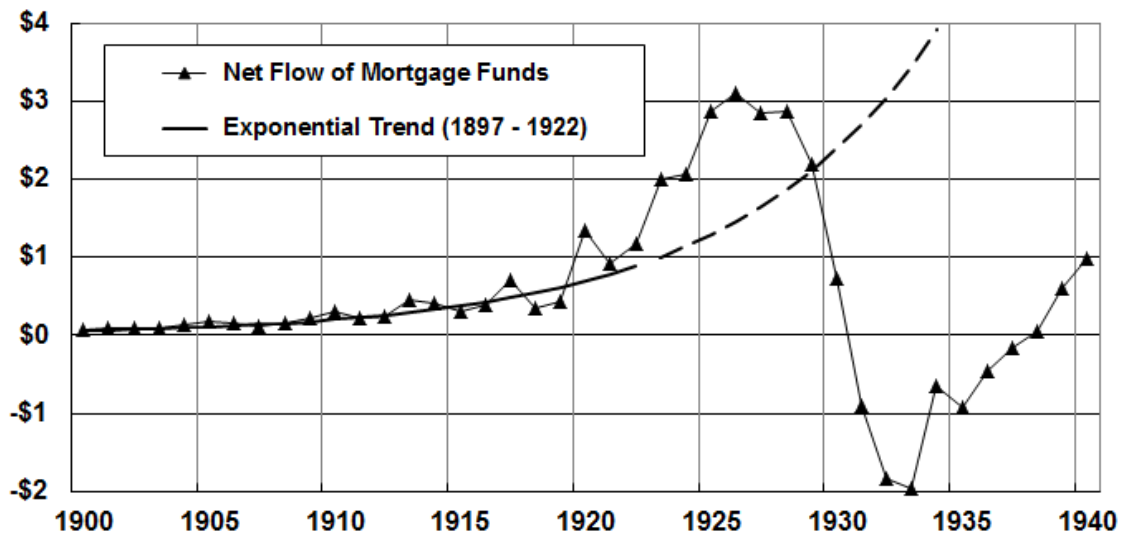
of the remaining expenditure categories had declined more than small temporary amounts. GNP and each of its major components declined in 1930. Uncharacteristically, as recessions play out, even non-durables declined, although less steeply than every other category of expenditure.

Figure 2 shows the net flow of mortgage funds from 1900 to 1940. The solid curve is the exponential trend growth of mortgage lending from 1897 through 1922. The dashed curve is the extension of the trend forward into the boom years of the 1920s and into the collapse during the Depression. In the residential mortgage lending data that we have from 1897 through 2012, the only collapse like that of 1929-1933 came in the second quarter of 2006 and has persisted through the second quarter of 2012 at low negative net flow rates.

The initial decline in housing construction from 1927 to 1929 (Figure 1) preceded the sharp decline in the net flow of mortgage credit beginning in 1930, indicating that the contraction in new housing expenditures came well in advance of the reduced flow of credit into the housing market. The suspended two-year lag of mortgage credit behind the decline in the rate of investment in new house construction would also have been indicative of a lagged impact of leverage on lender balance sheets.

Comparing Figures 1 and 2, the key feature that requires emphasis is that the 60% increase in the rate of new home construction expenditures from 1922-1925 was matched by a 200% increase (from \$1B to \$3B) in the net flow rate of mortgage credit. Moreover, this large net credit flow continued through 1928 before it collapsed. Consistent with a relatively elastic supply of new home construction in the 1920s, the housing price data available from the years leading up to 1925-26 (before expenditures start to fall) do not show an increase comparable to the recent price bubble. But we suggest that large house price increases are not a necessary condition for severe subsequent household-bank balance sheet stress. A more elastic supply means that more units are being added to the stock to be impacted by a price turn, even if the impact on each unit is smaller; i.e., more balance sheets will be in distress although each will be less severely stressed than if the price run-up had been larger and housing output smaller. The large home price decreases came after 1930.

Figure 2: Disequilibrium was fueled by the flow of mortgage credit whose decline lagged behind new housing construction.



Housing, Mortgage Credit, Foreign Capital Inflows, and the Great Recession

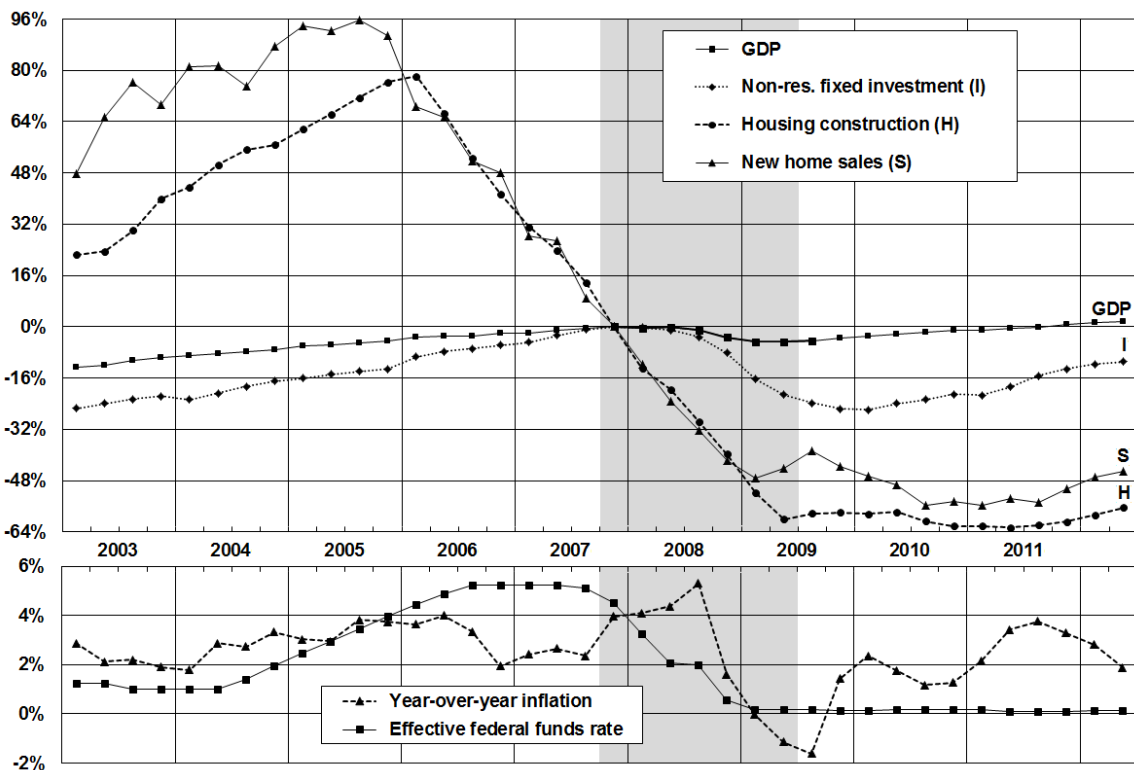
Much of the above Depression narrative was, and is in process of being, repeated in the Great Recession. The year 2012 marks the fifth year since the downturn, corresponding to 1934 in Depression clock time. Figure 3 charts the same measures as Figure 1, except that we report GDP for the Great Recession rather than the GNP measure of aggregate output that we reported for the Depression. We also drop non-durable consumption (C) from the chart since its behavior so characteristically follows a damped version of GDP in a slump.³ And we have added a plot of unit sales (S) of new homes. Again, housing provided substantial lead time for the impending recession that began in the fourth quarter of 2007: expenditures on construction of new homes peaked 7 quarters before the recession began, and unit sales peaked 9 quarters before the recession. The

³ Consumer non-durables and services have constituted just over 75% of private product (GDP less government expenditures) over the past 15 years, and do not constitute a root source of economic instability. In contrast the roots of private economic instability typically involve the remaining 25% of GDP, most prominently housing—the most durable and storable of all consumer goods and a highly volatile component of GDP. (See Figure 3 and Figure 8.) The demand for a more durable good like housing is more sensitive to future price expectations, and, when financed by credit, a collapse in the price of housing creates a banking system pathway through which a collapse is transmitted to the economy generally.

devastation that followed is apparent in that it was not until the third quarter of 2011 that GDP recovered to its recession peak—the longest GDP downturn in the U.S. during the post WW II period.

Unit sales of homes declined while expenditures continued to rise because prices and the flow of credit continued to rise unabated. Builders tend to cut back on their output as the inventory of unsold homes rises. Behaviorally, neither the builders or existing home sellers cut prices when demand softens; they at first simply stretch the time that their homes are listed for sale. Not shown in Figure 3 is that prices continued to rise until they leveled out in 2006 and then fell precipitously in 2007 and 2008.

Figure 3: Sales of new housing units (S) peaked 9 quarters before GDP; expenditures on home construction (H) peaked 7 quarters before GDP.



The great housing-mortgage market boom started in 1997 (not shown in Figure 3). New house expenditures reached their peak in early 2006 and began its long decline into 2011. After the financial crisis, the government stimulus and special programs to lower interest and to tax-subsidize new buyers had no sustained

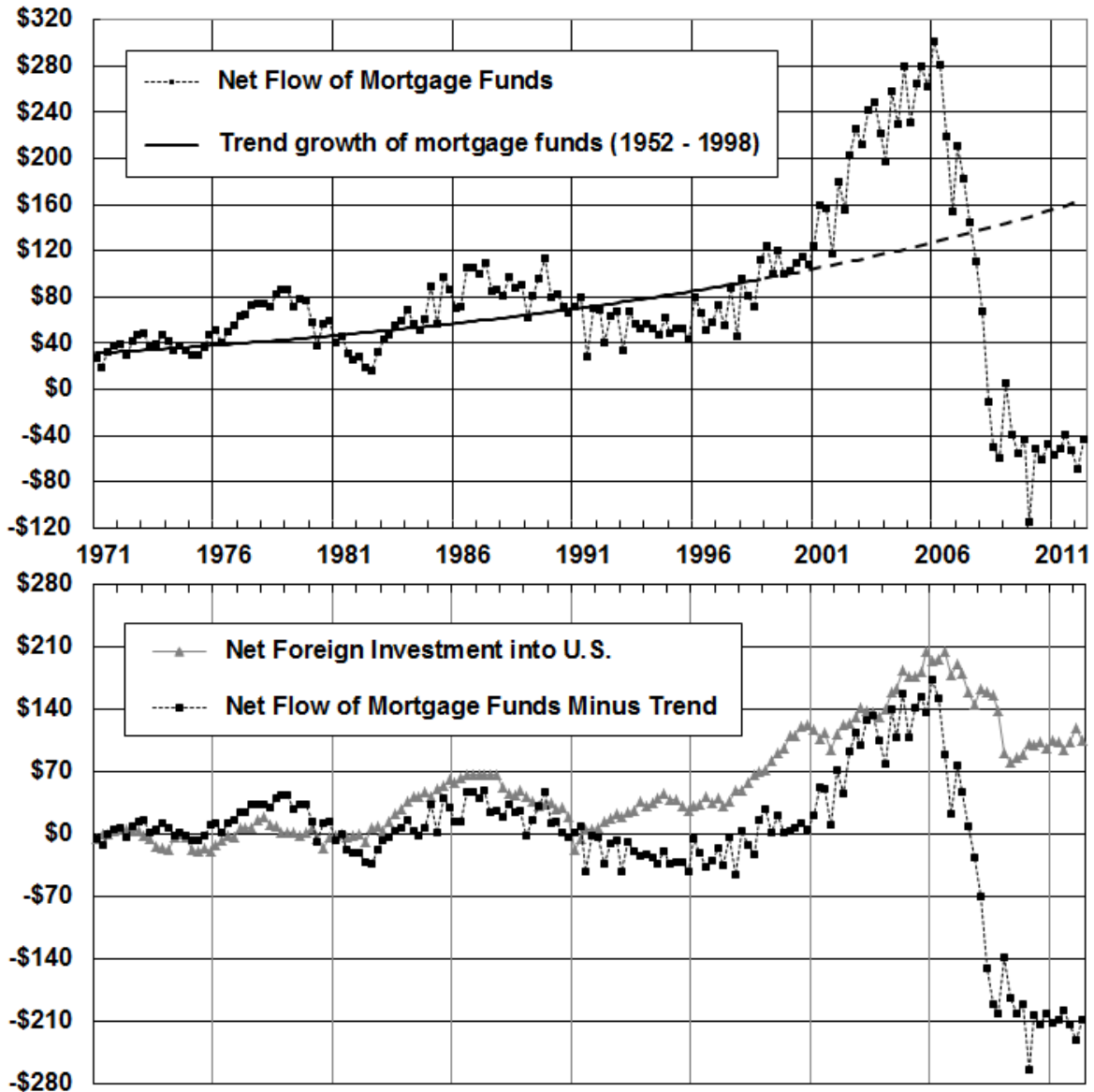
recovery impact on the housing market. Echoing the Depression, housing expenditures peaked in early 2006 almost 80% above their fourth quarter 2007 level when the Great Recession began; expenditures on new housing then fell to 64 percent below the Q4 2007 level in 2011. The five-year decline, if it is over, was almost as large as the seven-year decline from 1927 to 1934 in the Depression.

The lower panel in Figure 3 charts the inflation and Effective Federal Funds rates, and tells only a piece of the story that constitutes the saga of the interaction between inflation, monetary policy and the housing cycle that plays out in the post WW II period; we will encounter it again in the double-dip recessions of 1980 and 1981-82 that we analyze later. The inflation rate moved up from under 2% in early 2004 to 4% in 2005; the Fed dutifully raised the target Federal Funds Rate, which slowed inflation only temporarily in late 2006; in 2007 inflation resumed. But the high and rising Federal Funds Rate served to help arrest and reverse the housing boom, bringing to an end the housing bubble of 1997 to 2006.

The upper panel of Figure 4 plots the net flow of mortgage funds from 1971 through the second quarter of 2012. Two pulses in credit fueled house price increases that peaked in the late seventies and the late eighties; both of these pulses were dwarfed by the outsized surge in mortgage credit between 2002 and 2006. The solid exponential curve in the top chart shows the trend growth in mortgage credit from 1952 to 1998; the dashed curve shows the extension of that trend into 2012. The lower panel of Figure 4 plots the excess flow of mortgage funds (relative to trend) on the same scale as the net inflow of foreign investment funds; this panel shows clearly that our growing foreign trade deficit from 1997 to 2006 found its way into mortgage credit and supported the great housing bubble after the stock market technology bubble ended in 2000.⁴

⁴ These data led us to modify our first report on the housing bubble where we had emphasized the role of monetary policy (Gjerstad and Smith, 2009), as we came to appreciate the important role that international capital flows play in many housing bubbles.

Figure 4: Disequilibrium was fueled by the surge in the net flow of mortgage credit which was facilitated by the massive foreign investment inflows.



The surge in the net flow of mortgage credit shown in Figure 4 and its impact on the level of residential construction shown in Figure 3 echo the surges in mortgage credit and residential construction during the Great Depression shown in Figures 1 and 2. The collapses of residential construction and the net flow of mortgage credit during the Depression and the Great Recession were both much larger than in any other downturn in the U.S. during the last 90 years, with the single exception of 1942-44 when building materials were unavailable due to the

war effort, and strict controls limited construction to essential needs in support of the war effort.

Figure 5: The housing-mortgage bubble had a phase of increased mortgage debt growth, from 1997 to 2001, then rapid growth, from 2002 to 2006, carrying over into 2007, well after the decline in new home construction.

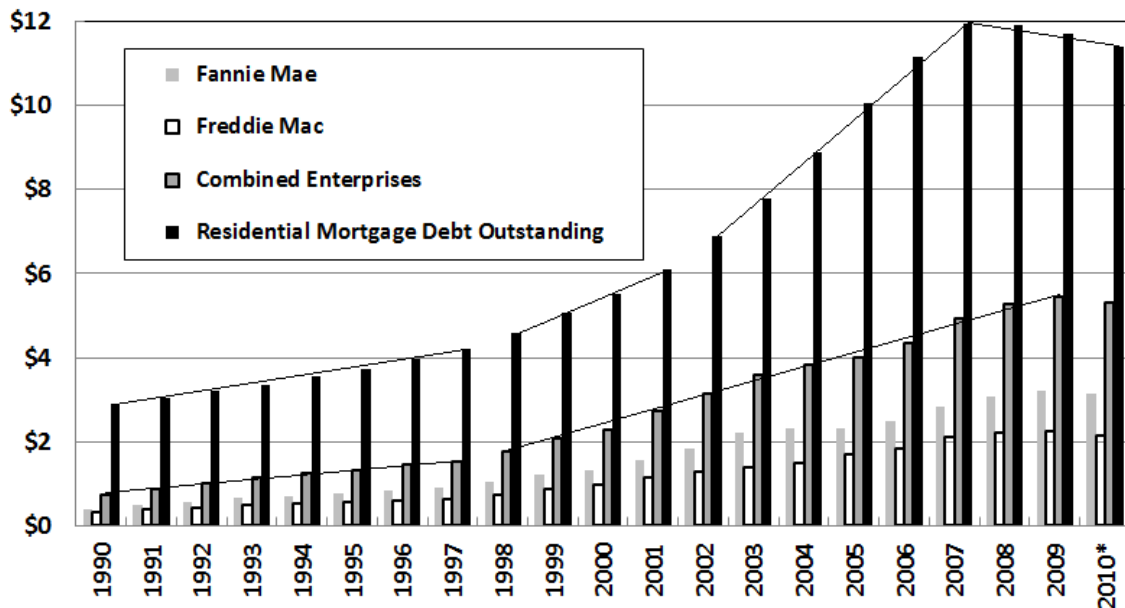


Figure 5 shows that the growth of mortgage credit has two clearly distinguishable phases during the housing bubble. Prior to the bubble, from 1990 to 1997, nominal mortgage credit outstanding was growing 5.5% per year, almost the same as the 5.3% annual growth rate of nominal GDP. From 1997 to 2001, the rates began to diverge: nominal mortgage credit grew 9.8% per year while nominal GDP grew only 5.4% per year. From 2001 to 2006, the separation accelerated. Nominal GDP again grew by 5.4% per year, but nominal growth of mortgage credit reached 12.8% of GDP. If we separate the growth of mortgage credit into the GSE and private mortgage credit components, we see that there was a distinctive shift in the growth of these two different sources of mortgage credit after 2001. For the combined government-sponsored enterprises (GSEs), mortgage credit outstanding grew 10.9% per year from 1990 to 1997, 15.5% per year from 1997 to 2001, and 9.7% per year from 2001 to 2006. Private mortgage credit outstanding grew only 3.1% per year from 1990 to 1997, 6.1% per year

from 1997 to 2001, but then it grew at 15.2% per year from 2001 to 2006. Just as 1997 was a pivotal year for the growth of mortgage debt, it was also a turning point for the rate of change of house prices.

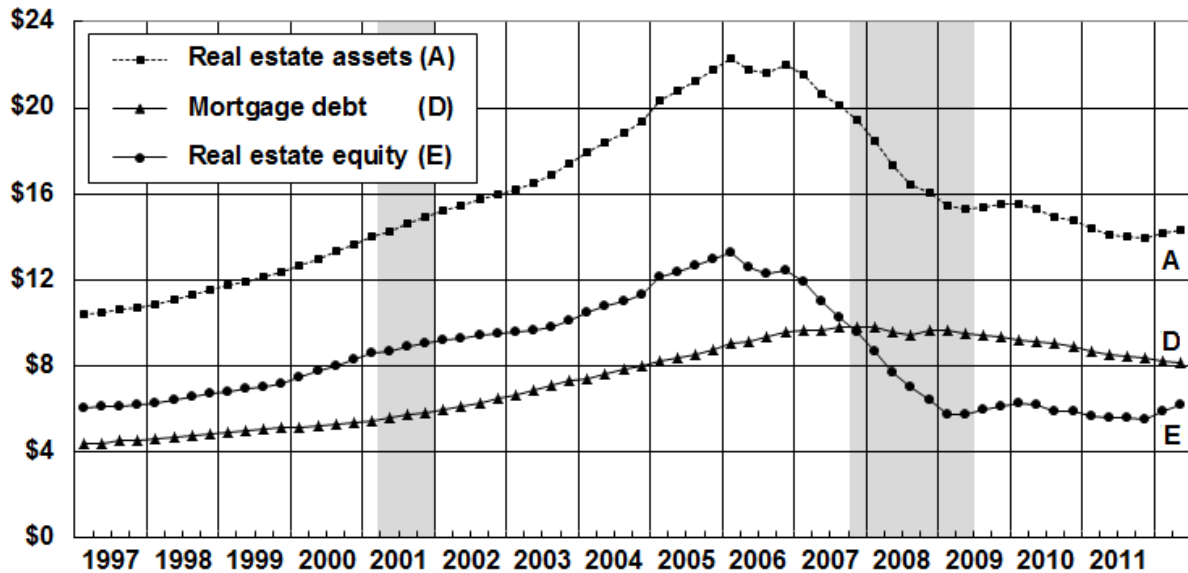
Proposition 2. The Value/Debt ratchet rule: Leverage cuts deeper on the downside than on the upside.

Figure 6 indicates the debilitating effect on home equity that followed the declines in house prices and mortgage lending that developed in 2006. From 1997 through the first quarter of 2006 we observe, unabated, an increasing total market value of households' residential real estate; this increase is due both to increases in the stock from rising construction rates, but also increases in the prices of new and existing homes.⁵ Aggregate mortgage debt is seen to rise steadily along with the increased asset value of all homes, unperturbed by the minor recession of 2001. Housing wealth reached a peak in the first quarter of 2006, flattened out, fell abruptly throughout 2007 and 2008, perhaps bottoming out in the last quarter of 2011. But mortgage debt continued its rise in 2006 and 2007, only gently declining in 2008 and afterward. Observe that by 2009, although housing value had declined to about its level of 2002, home equity had collapsed below its level of 1997, and has wavered around that level ever since. In 2012, over 22% of households lived in homes with negative equity.

The banks were on the other side of this home equity collapse, heavily invested in mortgages whose asset collateral (market) value had fallen below principal value owed to the banks. The unprecedented intervention by the Federal Reserve Bank and the Treasury in the last quarter of 2008 to rescue the largest banks from failure and to lift some \$1.3 trillion of shaky assets off bank balance sheets simply kicked the negative equity can from private to public balance sheets without removing the burden of debt claims on future output from the economy.

⁵ The value of households' real estate assets in Figure 6 comes from the Flow of Funds, Table B.100; households' mortgage debt comes from Table L.218 in the same document; households' real estate equity is the difference between these two series. For perspective on relative magnitudes we note that the homes owned by households now constitute just over one quarter of all U.S. wealth and the value of all corporate equity just under one half.

Figure 6: The Value/Debt ratchet: Housing value, mortgage debt and housing equity (value minus debt) grew steadily during the bubble, 1997-2006. Then, as housing value declined against fixed mortgage debt, equity collapsed more sharply.



The impact of these changes on balance sheet stress as distinct from income flows in severe crises is reflected particularly in a summary report from the Federal Reserve based on the Survey of Consumer Finances for 2001, 2004, 2007 and 2010. Table 1 summarizes the percent changes in median and mean family income and net worth (the difference between families' gross assets and their liabilities) compared with the previous three-year survey. Table 1 also includes data on the mean value of households' equity in their homes, which is calculated from the same tables in the Flow of Funds as the series in Figure 6.

Between 2001 and 2004, median and mean income changed very little. From 2004 to 2007 there was almost no change in median income, while the mean rose 8.5%. But the increase in median net worth, 17.9%, was substantially greater than the increase in the mean, 13.1%. Families with lower wealth levels were improving relative to richer families indicating that housing programs designed to help those of lesser means were working in the direction intended. But all this improvement was reversed between 2007 and 2010: both median and mean income fell to levels prevailing in the 1990s. But even more dramatically, median

net wealth declined 38.8%, much more than the mean, 14.7%. As indicated in (Bricker et al., 2012, p. 17): “Mean net worth fell to about the level in the 2001 survey, and median net worth was close to levels not seen since the 1992 survey.” Data on changes in the mean value of households’ equity in their homes fell even more dramatically than declines in total wealth, and the downturn came sooner. The timing of the declines is consistent with the hypothesis that a downturn in household wealth was a causal factor in the broader economic downturn.

Table 1: Changes in household income, net worth, and housing equity from 2001 through 2010.

Survey of Consumer Finances: Changes in Income and Net Worth Measured to Previous Survey						
Survey Periods Compared	2001 to 2004		2004 to 2007		2007 to 2010	
Measure	Median	Mean	Median	Mean	Median	Mean
Income Change	+1.8%	-2.3%	-0.4%	+8.5%	-7.7%	-11.1%
Net Worth Change	+1.0%	+6.2%	+17.9%	+13.1%	-38.8%	-14.7%
Federal Reserve Flow of Funds: Change in households’ home equity						
Change in housing equity	——	+24.0%	——	-2.1%	——	-43.1%

For the most recent years, 2007 to 2010, the report further elaborates these striking changes in the median and mean measures of income and net worth:

“The decline in median income was widespread across demographic groups, with only a few groups experiencing stable or rising incomes. Most noticeably, median incomes moved higher for retirees and other nonworking families. The decline in median income was most pronounced among more highly educated families, families headed by persons aged less than 55, and families living in the South and West regions...The decline in mean income was even more widespread than the decline in median income, with virtually all demographic groups experiencing a

decline between 2007 and 2010; the decline in the mean was most pronounced in the top 10 percent of the income distribution and for higher education or wealth groups.” (Bricker et al., 2012, p. 1)

These data reinforce the picture of households in Middle America as having achieved temporary gains in net wealth after 2000, only to see those median net wealth gains erode rapidly back to the 1990s baseline—mean gains returned to their 2001 level but were now encumbered by negative equity—leaving households, along with their banks, mired in disequilibrium. The early gains were the product of what may have been well-intended public and private programs to help those of lesser means, but being financed by the most dangerous form of OPM—credit—they were vulnerable to a rapid reversal if the value of the mortgaged homes fell substantially.

Stocks vs. Housing in Balance Sheet crises: The Exception that Proves the Ratchet Rule?

Ten trillion dollars came off the value of equity in U.S. firms during the technology sector crash between 2000 and 2002, with hardly a dent in bank balance sheets. Output was largely unaffected as well, with only a mild recession in 2001. Similarly, the stock market crash on Oct. 19, 1987 yielded no recession. Only \$2.2 trillion came off the value of homes between their peak in the first quarter of 2006 and the third quarter of 2007. In the last year before the crisis, the Federal Reserve undertook significant measures to enhance liquidity, and it also took the extraordinary step of bailing out a large financial institution (Bear Stearns), yet the financial system still buckled under the stress of a relatively small decline in housing asset values.⁶

⁶ From August 10, 2007 into September, 2008, the Fed implemented a policy of steadily increasing the size and term length of “liquidity enhancement” actions, implicitly playing out a policy the absence of which had long been thought to be the cause of the Depression. (Friedman and Schwartz, 1963) As we see it the Federal Reserve under Bernanke tested the Friedman-Schwartz hypothesis that liquidity moves by the Fed were sufficient to prevent a solvency crisis in 2007-2008. But from its inception in 2007, we faced a bank solvency crisis that liquidity moves would be powerless to confine to the financial sector. This recent history raises fundamental challenges to the Friedman-Schwartz reading of the Depression that in 1930 the Fed faced only a liquidity problem and not already a solvency problem in the banking system.

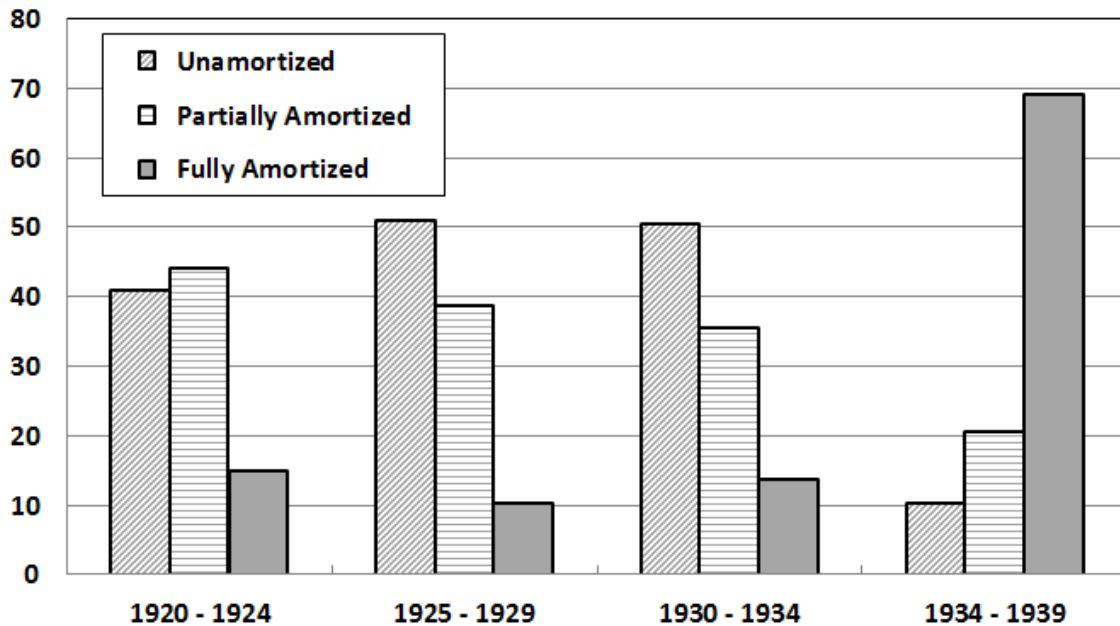
Why did the decline in the housing market between 2005 and 2007 have such a different result from the decline of the equity market between 2000 and 2002?

Securities Rules, found and (largely) retained. In the stock market, access to OPM is constrained by property right rules: beginning in April, 1928, brokers and their banks began raising minimum margin requirements to 50% on DJ stocks; the NYSE required all of its members to institute a 50% margin rule in 1933; the SEC Act codified it in 1934. These limits on OPM plus the fact that broker loans are “call” loans essentially eliminated the ratchet effect in securities markets.

Mortgage Rules, found but lost As shown in Figure 7, commercial banks in the 1920s made predominantly interest only and partially amortized mortgage loans of 3-4 years term, then rolled them over by refinancing, or otherwise a balloon payment was due. Then in the 1930s strong traditions emerged supporting amortization of mortgage loans; by 1934-1939 69% of commercial bank mortgage loans were amortized (Figure 7). In addition, traditions supported 30% down payments, and due diligence in mortgage originations. But by the 1990s these traditions had badly eroded; in 2005, 45 percent of first time home buyers (National Association of Realtors data) made zero down payments—100% OPM.

Similarly, we had the spectacle of upfront fees (OPM again) for mortgage origination. The latter is a prime example of a bad property right rule with a simple fix: whatever is the fee for origination, the rule would be that it has to be spread over time in proportion to the borrower’s payment of principal. If the loan is interest only for ten years, then there is no fee payment for ten years; on amortized loans the fee would be escrowed into monthly payments along with principal reduction. This would give the originator the same proportional risk exposure, and the same due diligence incentive, as a lender; the market would then determine the fee level and whether or not lending and origination is best combined or separated under this incentive compatible rule structure.

Figure 7: Commercial banks largely did not amortize mortgage loans until after the Great Depression.

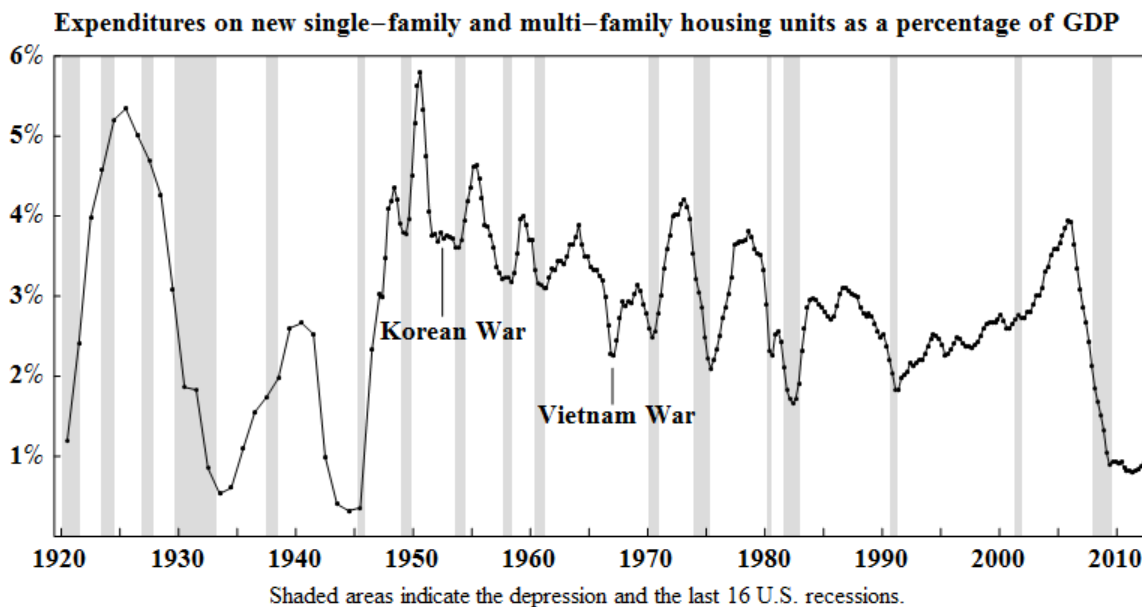


Proposition 3: Between The Depression and Great Recession occurred many housing-monetary policy inspired smaller recessions

But housing’s role in economic instability has been more persistent than indicated by the magnitude of two spectacular events in 80 years. This is conveyed most succinctly in Figure 8 showing new housing expenditures as a percent of GDP since 1920, with the last 14 recession intervals shown shaded. Eleven of the last fourteen recessions were preceded by declines in new housing expenditures. The Great Recession and the Depression are the housing collapse book-ends that bracket 12 other less devastating recessions. Yet nine of the ten recessions between the end of WWII and the Great Recession were preceded by a sharp decline in residential construction, as in the Depression and the Great Recession. And in the nine sustained recoveries that followed those recessions, residential construction increased sharply before any other sector of the economy and accounted for a large share of the recovery. The Great Recession has proven to be the most stubborn exception to the recovery rule, but the exceptionally

poor performance of the housing sector, an indicator of household-bank balance sheet distress, is a significant factor in the slow low-growth recovery.

Figure 8: Eleven of the fourteen downturns from 1929 to 2007 were led by sharp downturns in expenditure on new housing units.



Sources: Grebler et al. Table B-3 column 1 divided by Swanson and Williamson Table 4 column 1 (1920 – 1928)
 NIPA Table 5.4.5 line 36 divided by Table 1.1.5 line 1 (1929 – 1957)
 NIPA Table 5.3.5 line 19 divided by Table 1.1.5 line 1 (1958 – Q1 2010)

Given this persistent volatility of the housing cycle and its magnitude, as Leamer (2007) put it, “housing is the business cycle.” But why has there not been broader recognition of the role of housing and its associated mortgage financing as the key ingredient in understanding economic cycles? This failure perhaps stems from the observation that over the past 65 years expenditures on new housing units averaged only 3.0% of GDP. But as Figure 8 indicates, housing is incredibly volatile, varying from less than a half of one percent to nearly six percent of GDP. The Depression was preceded by a drop in new housing construction from 5.3% of GDP in 1925 to 2.9% in 1929. And the Great Recession was preceded by a decline in construction of new housing units from 3.9% of GDP at the end of 2005 to 2.1% by the end of 2007.

A benchmark for comparison is useful. Households’ real consumption of non-durable goods and services rose in every year between 1948 and 2011, with the

single exception of 2009 when they fell by 2.1% from \$8.22 trillion to \$8.05 trillion. On an annualized quarterly basis, consumption of non-durable goods and services peaked in Q2 2008 at \$8.29 trillion and bottomed out in Q1 2009 at \$7.99 trillion, a decline of about \$300 billion. The total decline to residential construction from its pre-recession peak to its recession trough was \$393.6 billion. Consumption of non-durable goods and services, which is about 19 times as large as expenditures on new residential structures, declined less in dollar terms than construction of new residential structures.

Volatility in the housing sector, however, interacts with two very powerful leverage/de-leverage factors that account for its high derived impact on both prosperity and recession in the economy: housing is (1) the most durable of all consumer goods, and (2) relies on mortgage credit financing by the banks. This is the twin source of the magnified impact on household and bank balance sheets, and it is from this epicenter of distress that trouble spreads to the wider economy.⁷ Thus, if 3% of the nation's resources are devoted to producing goods that last 50-100 years, and are financed predominantly by credit, the stability consequences are far different than where 3% of national resources are devoted to producing perishables (say, hamburgers and haircuts) paid for predominantly with cash.

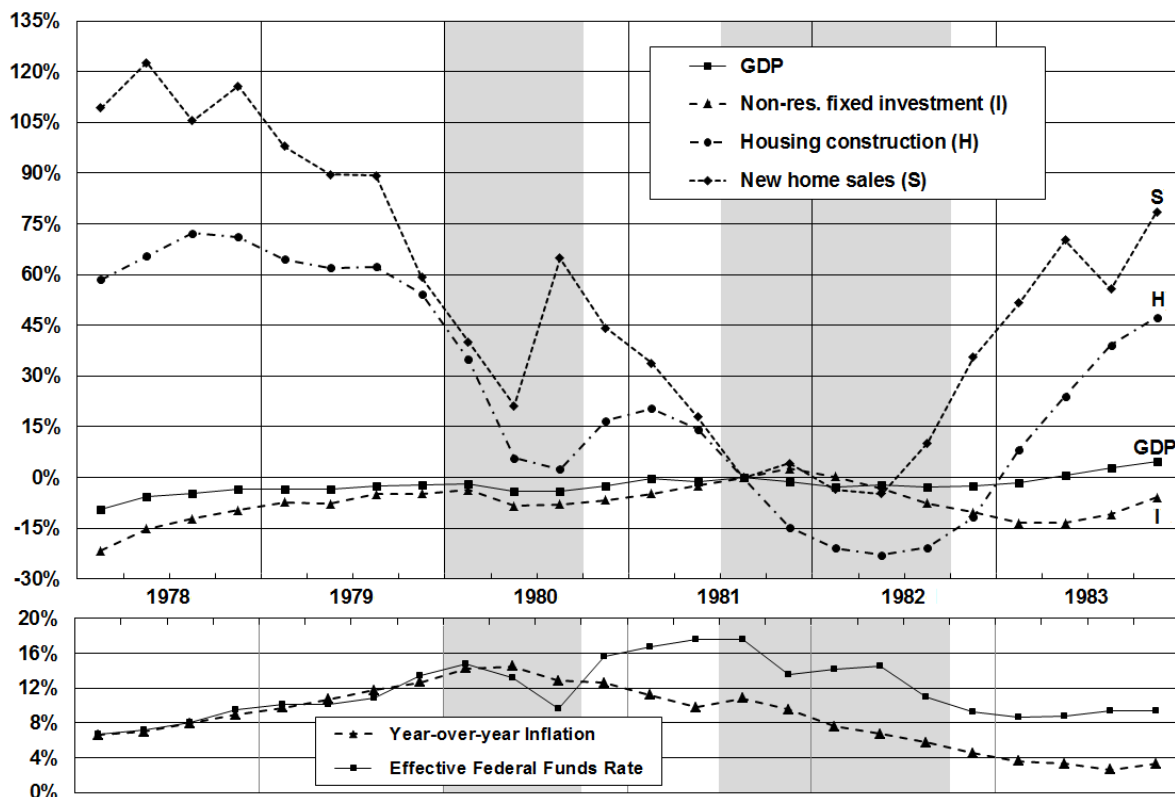
The clear imprint on real sector developments of monetary policy acting through its impact on housing is represented by the double dip recessions of 1980 and of 1981-82 shown in Figure 9.

When President Carter appointed Paul Volcker as Chairman of the Federal Reserve on August 6, 1979, the Fed targeted money supply growth rates, using the federal funds rate as its instrument to affect the money supply. Volcker increased the federal funds rate from 9.6 percent when he took office to 19 percent eight months later. Monetary tightening had a significant effect,

⁷ Others have recognized the role of housing in downturns. For example Leamer (2007) describes the role of residential construction in cyclical downturns. Reinhart and Rogoff (2008) note that house price declines are common in serious financial crises around the world. Others, such as Fostel and Geanakoplos (2008), have emphasized the role of deleveraging in cyclical downturns. Analyses of the role of real estate leverage and real estate downturns though have been less common.

especially on housing, which declined 34.8 percent between Q3 1979 and Q2 1980. By April 1980, the money supply was contracting rapidly, but the Fed had only sought to reduce its growth rate. In an adaptive response to its missed monetary growth target, the Federal Reserve reduced the federal funds rate from 19.4 percent in early April 1980 to 9.5 percent seven weeks later in late May; the Fed then kept the rate below 10 percent until the end of August. The effect on housing was a sharp reversal, and operated with only a one quarter lag on sales of new homes and a two quarter lag in construction expenditures.

Figure 9: The Federal Funds Rate was raised, lowered, raised again, then lowered again to yield the double dip recessions of 1980 and 1981–82.



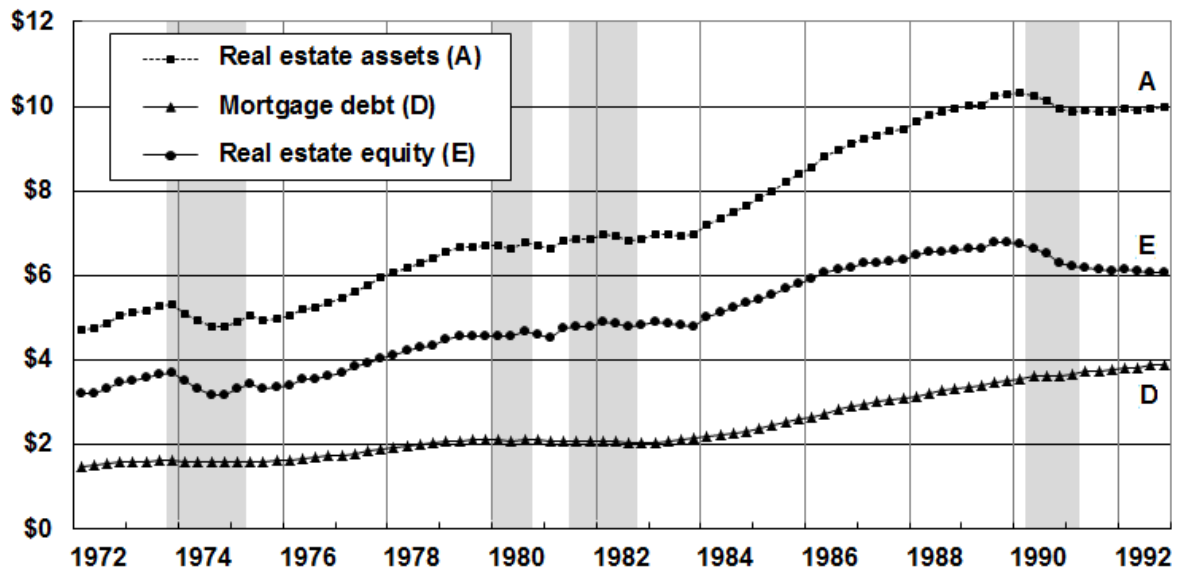
The housing decline ended in Q3 1980 and an upturn began the next quarter. Monetary policy, however, was once again tightened with an increase in the federal funds rate from under 11 percent at the end of September 1980 to over 20 percent at the beginning of January 1981. Housing started down again in Q2

1981, this time falling 36.0 percent in five quarters to a new post-war low of less than 1.7 percent of GDP in Q2 1982.

In the first two quarters of 1980 when Volcker’s tightened monetary policy first began to have a strong effect on housing, the inflation rate averaged 14.4 percent. By Q4 1982 when the recovery began, inflation averaged 4.7 percent. Monetary policy had been tight in ten of eleven quarters from Q4 1979 to Q2 1982, bringing inflation under control. When monetary policy was finally eased sharply in Q3 1982, housing again responded almost immediately: housing increased 92.0 percent between Q3 1982 and Q2 1984.

This episode demonstrates a key argument in Friedman and Schwartz (1963): monetary policy has a clear impact on the real economy – an argument that has been widely accepted for 30 years. But this natural experiment, in which monetary was tightened and then eased twice in quick succession, demonstrates another, and more specific proposition: *monetary policy operates primarily through interest rate sensitive components of household consumption, especially housing.*

Figure 10: Real estate assets fell in value in the 1973-75 recession, were flat in the double dip recession, and fell again in the 1990-91 recession. They rose in value sharply in the two expansions between the recessions.



In contrast with Figure 6 showing the severe impact of household-bank balance sheet damage in the Great Recession, Figure 10 shows the same value, debt and equity plots for 1972-1992, illustrating the proposition that if there is no serious balance sheet crunch, the recession will be smaller.

Over the past twenty years many countries have tried a variety of policy responses—both monetary and fiscal—to downturns comparable to the Great Recession; they have also tried a variety of measures undertaken to deal with problems in their banking sectors. With regard to fiscal policy, some countries, such as Japan and the U.S. have followed standard Keynesian prescriptions of government deficit spending to “fill the gap” left by a collapse of fixed investment and household durable goods consumption. Others, such as Finland (1992), Thailand (1997), and Iceland (2008) have taken steps to reduce government spending and increase tax revenue in order to reign in government deficits.

Attempts to address the damaged financial sector have also varied widely. Banks in Japan accommodated distressed borrowers, and the Japanese government aided distressed banks. In Sweden (1992), the response was swifter. Failing banks were not bailed out, and were required to recognize losses and recapitalize.

Our objective in the remainder of this paper is to compare the results of these approaches. We then conclude with a summary of the causes and consequences of a balance sheet recession, indicate the problems with extreme monetary easing, fiscal stimulus, and regulatory forbearance and bailouts as remedies, and review the evidence on alternative policies that have been part of successful recoveries from troublesome and persistent balance sheet recessions in the aftermath of collapsed real estate bubbles.

A. Bankruptcy and Default as a Repair and Reboot Process

We’ve outlined in the preceding part of this document the impact of unusual credit flows on asset prices, and the problem of loan losses that develop especially when a credit and real estate bubble bursts. Once borrowers’ losses on their assets are transmitted to lenders, their distress is transmitted into the financial system due to the prevalence of high leverage loans and the general

illiquidity of real estate markets. When bank losses grow large enough to wipe out their capital, recognition of loan losses is essential in order to raise new capital, for at least two reasons. Loan losses of ten to fifteen percent of GDP are not unusual in serious banking crises. For example, in Sweden from 1990 to 1994, loan losses amounted to 10.6% of GDP and a slightly larger percentage of total loans. At many banks, losses significantly exceeded capital. In these cases, protection from default for existing shareholders and bondholders reduces the incentive of potential new capital investors to recapitalize the banking sector, and the economy suffers from the absence of new lending.

The extreme case of completely privatized losses illustrates the benefits from achieving a write-down of bad loans and requiring the losses to be borne by shareholders and bondholders. If all bad loans are written down to market value, the losses wipe out a bank's capital, and bondholders are forced to take a haircut until liabilities equal assets, then the balance sheet of the bank is clean. When new investors provide new capital for the bank, that capital doesn't need to be applied to fill in old holes in the balance sheet, and the return on new investment isn't diluted by claims on it from the previous shareholders. The alternative in which loan losses aren't fully recognized is much less favorable to new capital investors. For then new capital investments must be applied to filling in the old holes in the balance sheet. If the previous shareholders are protected from loss, they too have a claim on the capital investment of the new investors. Obviously, the objective of restoring the financial system to health and reviving its capacity to lend is facilitated by requiring historical loan losses to be borne by incumbent shareholders. In Sweden, the state took over many of the bad assets rather than requiring losses to be extended to the bondholders. That works to restore the bank's balance sheet, but it transfers to the government losses that incumbent bondholders were legally and justly responsible for as part of the risk they voluntarily accepted to bear after equity holder capital was exhausted. The point is that any loss not borne by all incumbent investors shares a claim on future public or private revenue, diluting the return on new capital and dampening the recovery.

The result of the Swedish approach was that loan losses fell sharply after they spiked from 1991 to 1993. By 1994 they were at a level only slightly above their more normal levels prior to the crisis. Once the bad loans were written off and new capital was raised, banks could begin lending again. Bank lending bottomed out at the end of 1994, and rose slowly until 1999 when it began a sharp rise that continued unabated for ten years.⁸ Banks recapitalize through private markets with new capital going into the restructured balance sheets unencumbered by the liability claims and investors of the past. The consequence is to greatly facilitate recovery and the restoration of growth in the economy.

Swedish stock market and house price indices both increased sharply once lending recovered. This price increase would have helped to restore the damaged balance sheets of households. Although the 29.2% fall in house prices in Stockholm was almost as great as the U.S. national decline, house prices had recovered to their pre-crisis peak by 1998, only five years after the trough. Recovery in the stock market was faster yet.

The Swedish contrast with Japan, where bank losses were papered over, is stark.

B. Protect creditors/investors from default

Protecting incumbent investors from the consequences of excesses in housing-mortgage markets has been the centerpiece of U. S. policy since the inception of the downturn: first, when the Fed moved to relieve the banks of large amounts of their toxic loans, and second when Treasury implemented a too-big-too-fail program.⁹ The Japanese response to bad loans and to bank insolvency in the 1990s is generically similar to the U.S. approach but contrasted sharply with that of Sweden. Hence, the path followed by Japan provides evidence relevant to understanding why the U. S. economy is mired in a low-growth rut and the potential for that continuing distress to endure.

⁸ For credit market lending, see, for example, Table H in Sveriges Riksbank (2007).

⁹ Opposite policies were pursued by the Federal Deposit Insurance Corporation (FDIC). The failure of over 440 small-to-medium-sized regional banks was managed by the FDIC from 2008 to June 2012. The FDIC's management of these failures takes a form most similar to the procedures implemented by Sweden in our discussion above.

House prices in Japan peaked in the fall of 1990 and fell 25% within 2 years. After fourteen consecutive years of decline, house prices had fallen 65% by 2004. Although house prices began to fall in 1990, non-performing loans continued to escalate throughout the decade. Various types of distressed loans remained large in 1998, many years after the initial downturn in the real estate market. One category of loans, which Packer (2000) calls “support loans,” were extended to distressed borrowers so that they could continue to make their loan payments.¹⁰ In 1998 these loans amounted to about 6.5% of all loans issued by major Japanese banks. After a support loan was issued, the original loan could technically avoid classification as a distressed asset. This and other forms of forbearance allowed Japanese banks to stretch out write-downs of ¥95 trillion in loan losses – about 20% of annual GDP – over a period of 12 years, from 1993 to 2004. One objective of this strategy was to allow Japanese banks to offset their losses from bad assets with earnings from sound assets as those earnings arrived. The serious consequence of this strategy, however, is that Japanese banks remained hunkered down and unwilling to lend for more than a decade. Whether it was the supply of loans or the demand for them that collapsed, the contrast between outcomes in Sweden and Japan suggests that regulatory forbearance is the much less effective policy. The Japanese Flow of Funds indicates the severity of the downturn in Japanese lending: total lending by private financial institutions fell at an annual rate of 1.7% per year between 1992 and 2007. This decline in lending is an important cause of the extremely sluggish economic growth over this period.

**C. Learning from market currency depreciation in three of many countries:
Finland (1990-1993), Thailand (1994-2003), and Iceland (2007-2010)**

Countries with flexible currency regimes, or whose reserves are inadequate to defend the currency from depreciation, provide a record of market adjustment to balance sheet crises that help to inform a pathway to recovery that addresses both the need for balance sheet repair and the need to divert resources into new

¹⁰ Figure 6.1 in Packer (2000) shows various types of distressed loans from 1993 through 1998 for Japanese banks.

sources of growth. We briefly review Finland, Thailand and Iceland as three of many examples that illustrate this market correction process; the process is correctional because in all cases the original excesses were a consequence of large unsustainable inflows of fixed investment that ultimately led to a reversal. The resulting decline in GDP would ultimately lead to depreciation and in consequence to a turnaround in the current account deficit.

This process contrasts sharply with the plight of Portugal, Ireland, Italy, Greece, and Spain that no longer have a separate currency, and whose idiosyncratic economic excesses cannot lead to a market currency response independent of the stronger economies, such as Germany, also on the common Euro. The US analogy is California, a state whose economic contribution is overvalued by the dollar, and North Dakota whose contribution is undervalued by the dollar. Hence, adjustment can only occur through exit-entry decisions by businesses and people with no moderating effects resulting from market price level adjustment.

Our point is not about exchange rate regime policy—whether any country should or should not be on some flexible currency—rather it's about understanding the work accomplished by the depreciation adjustment process in cases of severe balance sheet crises.

Finland

Finnish fixed investment (including housing) started to collapse in the first quarter of 1990 after a long rise accompanied by rising capital inflows and an increasing current account deficit. (Figure 11) Investment had peaked in the previous quarter at 30.4% of GDP, declining almost 30% by the autumn of 1991 when a banking crisis ensued from major deterioration in bank balance sheets. In a typical pattern, suggesting nervous investors, capital inflows diminished before the crisis. Government expenditure continued its long and rapid rise for another six quarters into the downturn; then, coinciding with the bank crisis in the last quarter of 1991, government expenditures leveled off before its subsequent decline, having no discernible impact on declining GDP. With the sharp depreciation of the Finnish markka between August of 1992 and February of 1993, exports—long declining gently as a percent of GDP—surged from 20% to

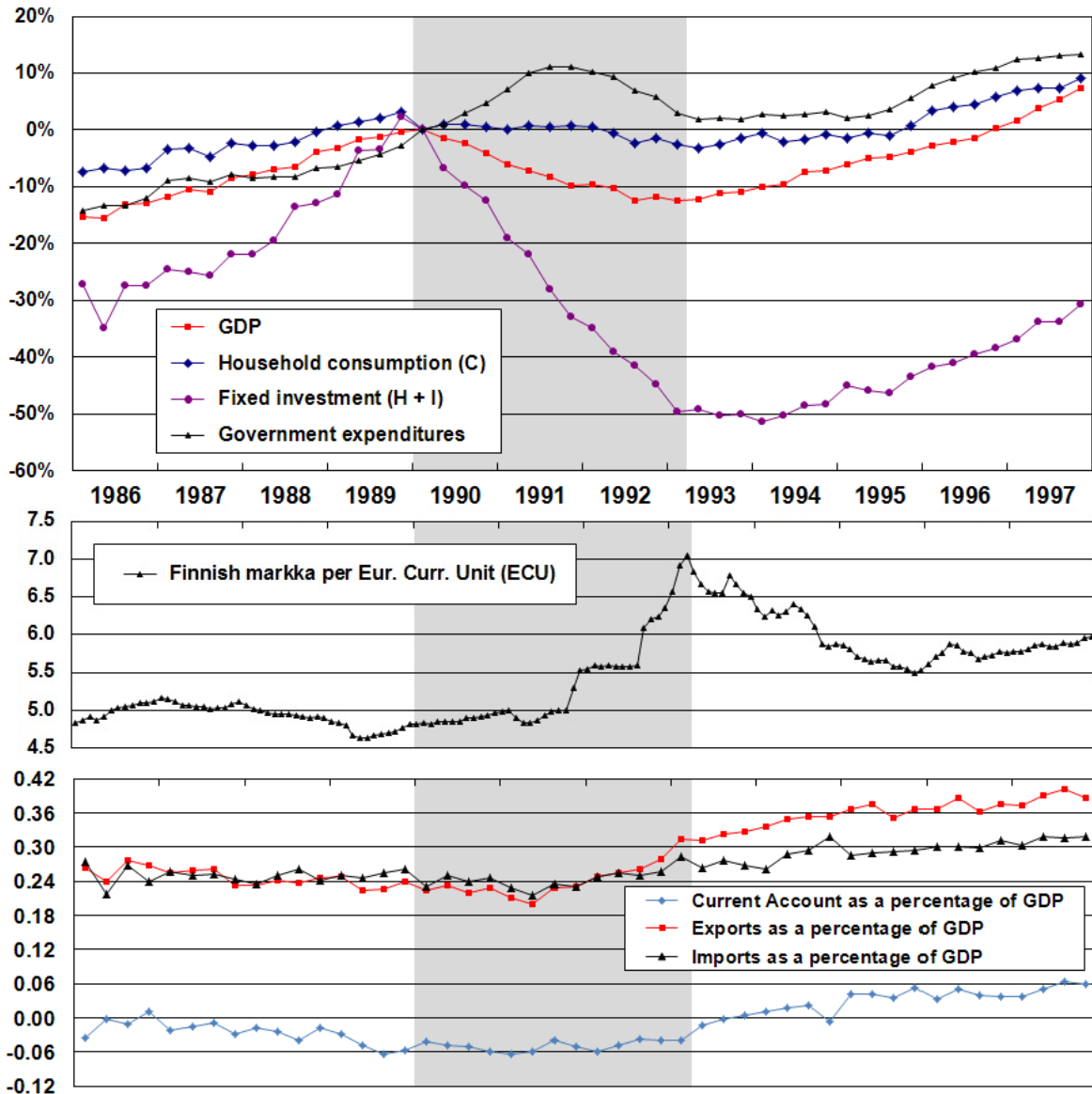
35% of GDP and continued upward. In a pattern that we have documented over and over in financial crises, when government expenditures were curtailed, the country's currency depreciated sharply and the growth rate of exports moved sharply ahead of the growth rate of imports.¹¹ The reduction in government expenditures came half way through the depression, but even after the depression ended there was a modest decline in government expenditures that continued until the recovery was well underway.

The fundamental dislocation during the crisis and depression was a collapse of fixed investment; the recovery consisted primarily in filling the gap from the reduction to fixed investment with export growth.

A common objection to “depreciation” is that it will set off a series of competitive devaluations that essentially constitute a zero-sum game in which countries in succession follow a beggar-thy-neighbor strategy, taking export market share away from other countries. The argument seems to presuppose a government policy decision to devalue a currency, but depreciation driven by currency market responses has not followed this formulaic argument. In any case it is not what we see in the Finnish data: imports into Finland rose along with exports after the depreciation of the markka. In the eight years preceding devaluation, real imports in Finland grew 4.1% (only 0.5% per year); in the first four years after depreciation real imports grew 38.2% (8.4% per year) and in the first eight years after depreciation they grew 73.2% (7.1% per year). In most of the serious downturns that we've examined, including Thailand, Korea, Malaysia, Argentina, and Mexico, imports have increased as a percentage of GDP following depreciation, so this objection to depreciation has no empirical support in the crisis countries that we have evaluated.

¹¹ These events typically coincide with IMF fiscal consolidation, but as we see it the critical operant condition is a currency depreciation that coincides with a sharp reduction in capital inflows from abroad into both private and public debt instruments. Currency depreciation then fuels a net export surplus. The opposite of “fiscal consolidation” is a deficit financed government stimulus which tends to stimulate imports and reduce exports as with the Obama administration's stimulus. (See Buchanan et al., 2011.)

Figure 11: The top panel of this figure shows changes in GDP and several of its major components in Finland from 1986 to 1997. The series show the levels of these variables compared to their levels at the peak of the economic cycle. The bottom panel shows exports, imports, and the current account as percentages of GDP.

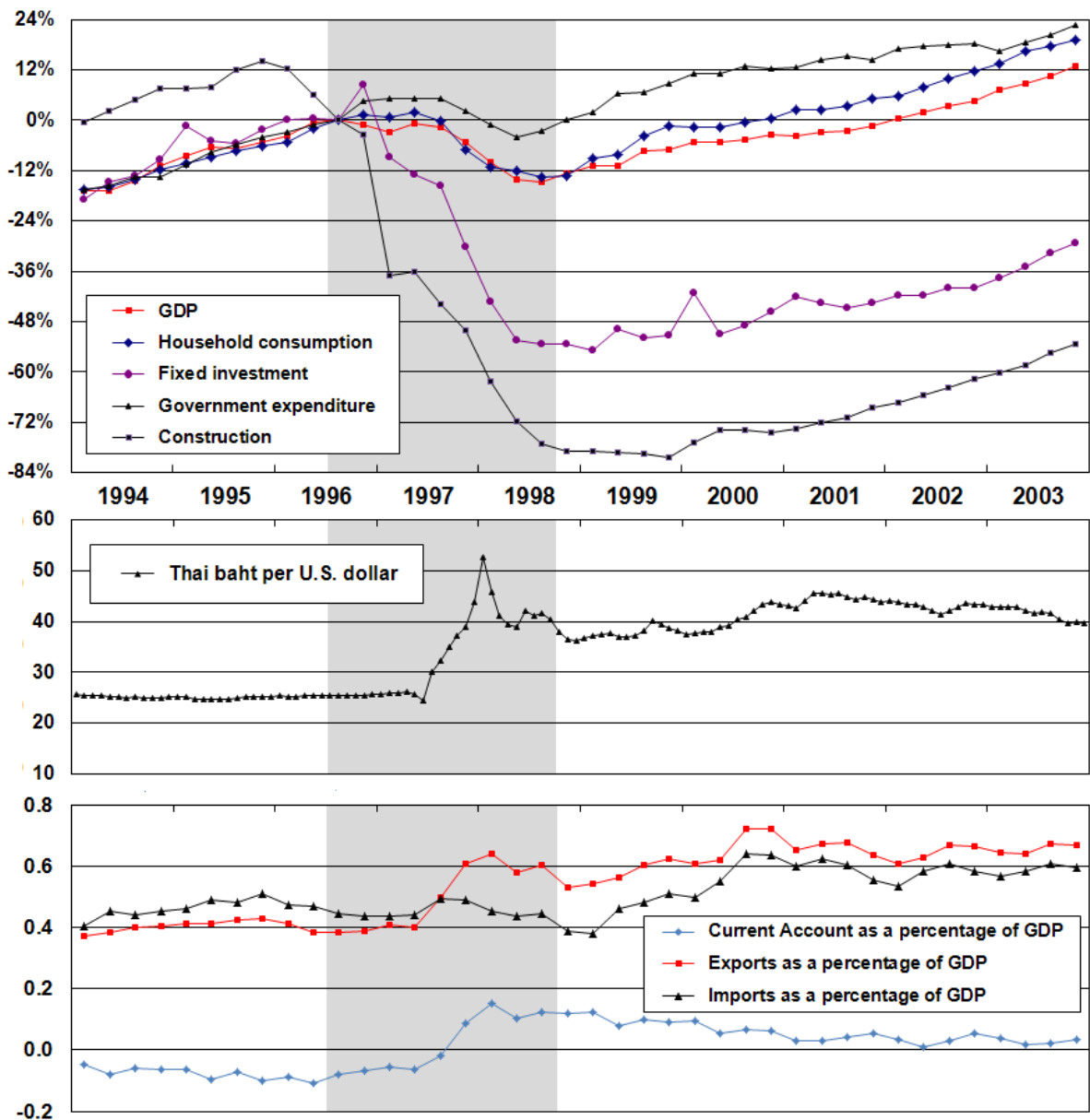


Thailand

In the years leading up to mid-1996 Thailand went through a long period of continuing current account deficits; investors eventually grew skittish and withdrew. (Figure 12) The collapses in construction (down 44% by the time of the currency collapse) and fixed investment (down 13.3% by the time of the currency

collapse) were very pronounced and appeared in advance of the financial and balance-of-payments crises. After asset values fell and international financial inflows ceased, the International Monetary Fund (IMF) assistance was sought. Loan funds from the IMF were provided with the stipulation that government finances remain on a solid foundation.

Figure 12: This figure shows, for Thailand, the same information that Figure 11 shows for Finland. The key patterns are similar, as are the magnitudes of changes in the two economies.



By mid-August 1997, about six weeks after the collapse of the baht, the government had implemented tax increases and finalized spending cuts as the first steps in its fiscal consolidation plan. By the time the fiscal consolidation program was undertaken, the baht had fallen from 25 to the dollar to about 32 to the dollar. Over the next five months, it fell to about 52 to the dollar before improving over the course of 1998 and settling in a range around 40 to the dollar.

In Thailand the same sequence played out as in Finland: from fiscal consolidation to currency depreciation, and from depreciation to a shift toward export-led growth. If we examine the changes in Thai output from the peak of the economic cycle in the third quarter of 1996 to when the economy reached its peak output level again in the third quarter of 2002, we find that, as in Finland, the decline in fixed investment accounted for most of the fall in output, and the increase in net exports accounted for most of the recovery of output. Moreover, as in Finland, the baht depreciation led to an increase in imports. Between the peak of the economic cycle in the third quarter of 1996 and the recovery to the peak in the first quarter of 2002, Thai imports grew from 43.7% of GDP to 54.3% of GDP.

Iceland

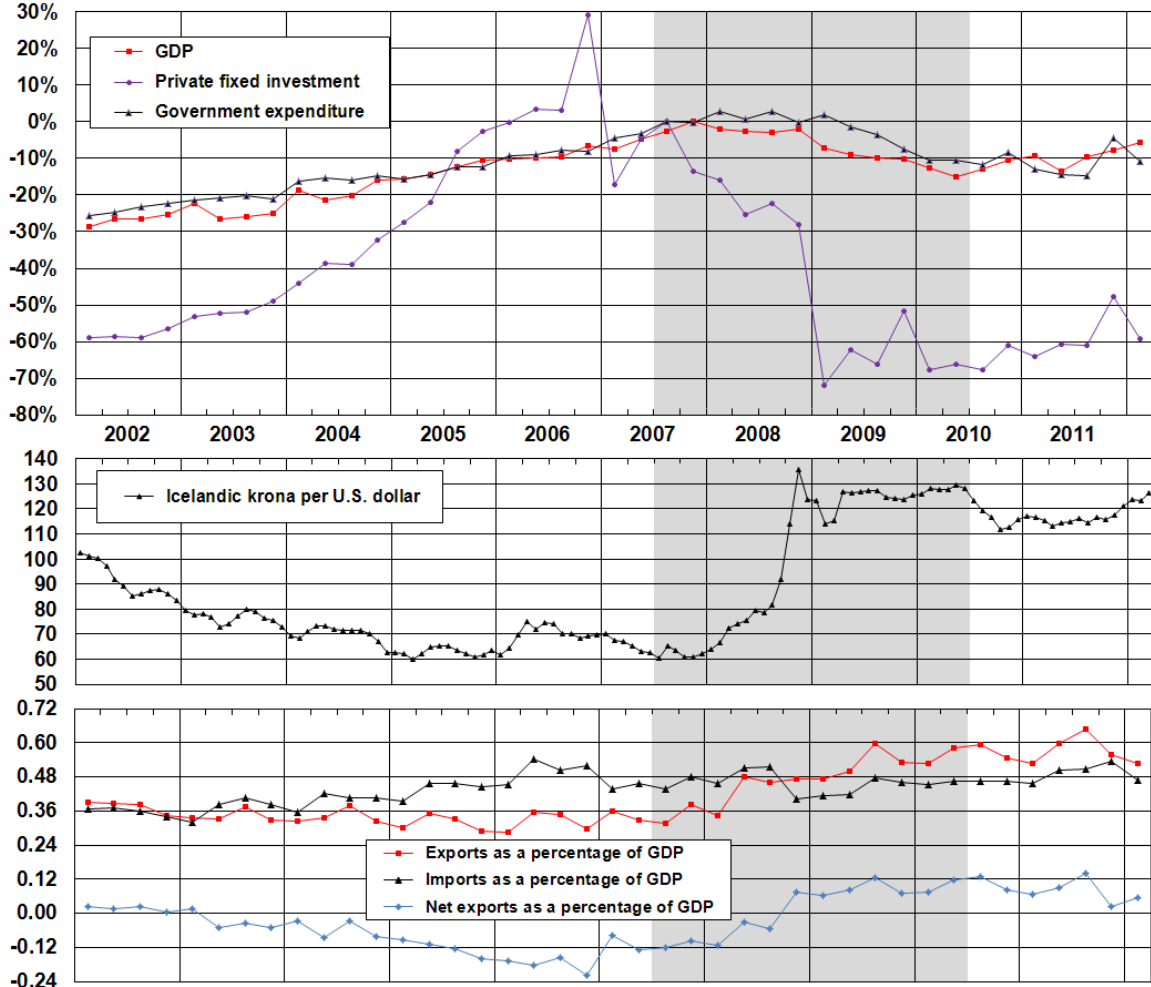
The Icelandic crisis was preceded by several years of extraordinary capital inflows. (Figure 13) At its maximum, the gap between imports and exports reached 19.6% of GDP in the second quarter of 2006. These capital inflows supported equally extraordinary growth of fixed investment. Between the first quarter of 2002 and the fourth quarter of 2006, the annual growth rate of fixed investment in Iceland was 26.8%. For perspective, growth of fixed investment exceeded total growth of the Icelandic economy during that period. When this investment bubble burst, the collapse was even faster than the expansion had been – real fixed capital formation fell 78.2% in only 9 quarters from the last quarter of 2006 to the first quarter of 2009 to below its level when the rapid expansion began.

The rapid expansion of fixed investment was fueled by the large increase in deposits in the Icelandic banking system. According to the Central Bank of

Iceland, the liabilities of the Icelandic Banking system reached 12.9 times GDP just before the financial crisis. (U.S. banks had liabilities 1.19 times GDP in the third quarter of 2008 when the financial crisis struck).

Soon after the financial crisis entered its final stage in the U.S. conditions deteriorated sharply in Iceland. The value of the illiquid assets of the Icelandic banking system fell sharply in the last quarter of 2008. Iceland turned to the IMF for loans, and the IMF required fiscal consolidation as a condition of the loans.

Figure 13: The Icelandic depression was 2¼ times deeper than U.S.; fixed investment fell 27% of GDP. Iceland’s growth rate has exceeded that of U.S. since the two recoveries bottomed out.



The krona began to depreciate just before fiscal consolidation was undertaken, and exports quickly overtook imports. As in Finland and Thailand, the

improvement in net exports has been the major contributor to the recovery into 2012. Over the five years since fixed investment peaked in the fourth quarter of 2006, fixed investment has fallen from 34.8% of GDP to 14.4% of GDP – a decline of 20.4% of GDP. In that same period, exports have increased by 28.0% of GDP and imports have increased by 1.6% of GDP, so net exports have increased by 26.4% of GDP. The improvement in net exports can account for the entire recovery of Icelandic output to a level that it first attained just three quarters before the peak of the economic cycle.

References

Bricker, Jesse, Arthur B. Kennickell, Kevin B. Moore, and John Sabelhaus (2012). “Changes in U.S. Family Finances from 2007 to 2010: Evidence from the Survey of Consumer Finances,” *Federal Reserve Bulletin*, Vol. 98.

Buchanan, Joy A., Steven Gjerstad, and Vernon L. Smith (2012). “Underwater Recession,” *The American Interest*, VII: 5, May/June 2012, pp. 20 – 29.

Fostel, Ana, and John Geanakoplos. 2008. "Leverage Cycles and the Anxious Economy." *American Economic Review*, 98: pp. 1211 – 1244.

Friedman, Milton, and Anna J. Schwartz (1963). *A Monetary History of the United States*. Princeton: Princeton University Press.

Gjerstad, Steven and Vernon L. Smith (2009). “From Bubble to Depression?” *Wall Street Journal*, April 6.

Grebler, Leo, David M. Blank, and Louis Winnick (1956). *Capital Formation in Residential Real Estate*. Princeton: Princeton University Press.

Leamer, Edward E. (2007). “Housing is the Business Cycle,” Federal Reserve Bank of Kansas City, Jackson Hole Symposium.

Packer, Frank (1999). “The disposal of bad loans in Japan: The case of the CCPC.” In *Crisis and Change in the Japanese Financial System*, Takeo Hoshi and Hugh Patrick, editors, Boston, MA: Kluwer Academic Publishers, pp.137 – 157.

Reinhart, Carmen M. and Kenneth S. Rogoff (2009). "The Aftermath of Financial Crises," *American Economic Review*, **99**, pp. 466 – 472.

Sveriges Riksbank (2007). "[The Swedish Financial Market 2007.](#)"

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