Asset Prices Bubbles and Inflation Targeting

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In the days when equity and property ownership was concentrated among the very wealthy, the fluctuations in the asset values posed little problem for the economy as a whole. Booms and crashes occurred, but the burden was borne largely by the rich owners. For public policy aimed at improving the welfare of the population at large, this was relatively unimportant.¹

At the dawn of the 21st century, things have changed. In developed and emerging countries alike, both property and equity ownership are spreading more broadly across the population, so the impact of price bubbles is on general welfare. As a result, policymakers have a stronger interest in asset price stability. And, to quote Malcolm Edey, Assistant Governor for Economics at the Reserve Bank of Australia, “Asset markets have taken on a bigger role in driving business cycles in countries that have deregulated their financial systems.”²

Given the risks, it is surprising that so many central bankers are hesitant to address the potential risks to their stabilization objectives that are created by asset bubbles. The evidence is not in dispute. Bubbles – by which I mean booms followed by crashes – increase both the volatility of growth and inflation, and threaten the stability of the financial system. The 2003 IMF World Economic Outlook estimates that the average equity price bust lasts for 2½ years and is associated with a 4 percent GDP loss that affects both consumption and investment. While less frequent, property (or housing) busts are twice as long and are associated with output losses that are twice as large.³

In the remainder of this essay, I will argue that modern central bankers have no choice but to incorporate asset price booms and crashes into their monetary policy frameworks. The risk management perspective, where policymakers strive to avert disasters, requires it. This is true of inflation targeters and nontargeters alike.

¹ The view that the Great Depression was precipitated by the stock market crash of 1929 has not borne the test of time. Instead, the consensus today is that proximate cause was flawed monetary policy, combined with the gold standard. See, for example, Bernanke (1995) and Cecchetti (1998).
² Comments made at the annual research conference of the Reserve Bank of Australia in Sydney, July 2005.
³ See the excellent essays in Chapter II of IMF (2003) for a summary of the evidence.
I will organize my examination of the challenges posed around the following four questions:

1. Should central bankers care about bubbles?
2. Can we identify bubbles as they occur?
3. Should policymakers react to bubbles?
4. What is the role of bubbles in an inflation targeting framework?

To foreshadow my conclusions, my answers will be:

1. *Yes, central bankers should care.*
   Bubbles influence virtually every aspect of our economic life. They distort consumption and investment decisions as well as fiscal policy, and threaten solvency of financial intermediaries.

2. *There are times when it is obvious that bubbles are developing.*
   When prices move far from historical norms for no apparent fundamental reason, it is prudent to assume that at least a portion of the movement is a bubble.

3. *Interest rates are unlikely to be the right tools for the job.*
   Getting the timing exactly right – reducing interest rates in anticipation of a bubble bursting in a way that does not encourage the bubble to inflate further – is extremely difficult. The conclusion is that we should be investigating alternatives.

4. *Integrating bubbles into an inflation targeting framework requires adjusting the horizon over which policymakers strive to meet their inflation objective.* Bubbles tend to have a larger impact on growth than on inflation. For an inflation targeter, stabilizing the output gap in the short term, means lengthening the horizon over which inflation will return to its target.
I. Should Policymakers Care About Bubbles?

In a sense, the answer to the question in the title of this section is obvious. Since asset price bubbles jeopardize central bankers’ stabilization objectives, they have to care. A necessarily incomplete list of the real and financial distortions focuses on the impact of equity, property, and exchange rate bubbles on households, firms, fiscal policymakers, and financial intermediaries.

Households

Starting with households, changes in the value of equity and housing have direct implications for household balance sheets. Booms in either stock or property prices drive up the wealth of individuals. The natural response to an increase in wealth is to raise consumption. If you are rich, you can buy a fancy car, purchase a bigger and flatter television, go on nicer vacations, eat in expensive restaurants, and the like. And, the data show that this is exactly what happens.

While they both create consumption responses, equity and housing should be viewed quite differently. The primary reason is that in some countries equity markets are quite small. While the capitalization of publicly traded companies is over 100% of GDP in the US and the UK, in most countries (even developed ones) it is closer to one-half or less. But even in the US, the a one percent increase in stock-market wealth increases consumption by only 0.02 percent, while the elasticity of consumption with respect to housing wealth is more probably more than five times as big. One possible explanation for this large disparity is that stock-market wealth continues to be highly concentrated among the wealthy. By contrast, a significant proportion of the population own property.

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4 See Case, Quigley and Shiller (2005).
5 It is worth noting that it is unclear whether there should be any aggregate response to housing price increases, fundamental or otherwise. When housing prices rise, old homeowners become wealthier and can
Returning to bubbles, the fact that wealth influences consumption means that spurious changes in the value of equity and housing create unwarranted movements in consumption. And since consumption accounts for 70 percent of GDP, when consumption is unstable, so is the economy as a whole.

**Investment**

Equity bubbles distort investment decisions. In his excellent book *Dot.con* John Cassidy (2002) recounts a series of stories about the issuance of stock in companies with little or no commercial viability and subsequent inefficient use of the funds. From an economic point of view, prices provide signals for the allocation of resources in the economy. Higher priced items are more valuable and so attract more resources. Prices determined in the stock market are supposed to provide signals about a firm’s future. High prices mean better prospects down the road.

In theory, the system will efficiently allocate capital to its most socially productive uses. But the theory only works when prices correctly reflect fundamental values. That is, when markets are efficient (as discussed earlier). Bubbles distort the information content of the price system reducing the efficiency of the resource allocation system.

During the internet bubble in the late 1990s, American investment was clearly allocated inefficiently. High technology firms were able to raise fund easily, while traditional companies had a difficult time. When the crash came, equipment and buildings were abandoned, and people lost their jobs. In retrospect the equipment should never have been purchased; the buildings should not have been built; and the people should have kept their previous jobs. And when it was all over, the investment boom became an investment bust.
Turning briefly to exchange rate misalignments, it is easy to see how non-fundamental movements will distort the relative allocation of investment resources. If a country's currency is overvalued, for example, import-competing industries will be decimated. When things return to normal, the industrial structure will have to go through a costly adjustment.

**Fiscal Policy**

Political environments differ around the world, but there is one constant: It is always easier to cut taxes than to raise them. Bubbles have a tendency to raise government revenue. Mechanisms differ across countries, but in a typical case income and consumption rises, increasing tax revenue from most sources. When the government is flush, politicians increase spending and cut taxes. And following the bursting of the bubble, tax revenues fall and fiscal deficits emerge that are very difficult to correct.

In the US case, a particularly dramatic example is the increase reported taxable capital gains. Comparisons are made difficult by the changes in the tax law, but during 1999 and 2000 reported capital gains reported on by individuals for the purpose of the personal income tax were roughly twice what they were in both 1996 and 2001. The difference between 2000 and 2001 resulted in a revenue decline on the order of $60 billion, which is roughly 4 percent of US Federal Government revenue at that time. At this writing, the necessary American fiscal consolidation has not yet occurred.

**Commercial Banks**

Banking is critical to the operation of modern economies. Without financial intermediaries to channel funds from savers to investors entire economic system would collapse. And, we know from hard experience that a healthy banking system is indispensable, but that it is fragile.
Asset price bubbles can bring out banking system fragility. This is true even when banks are precluded from owning equity directly, as they are in many countries. The problem is that assets often serve as collateral for loans. In the developed world, housing is the classic example. When housing markets boom, banks lend. When housing market crash, borrowers default and banks are left with collateral that is worth less than the outstanding principal of the loan.

In the emerging market countries, exchange rate misalignments can result in similar problems. This is either because of the currency mismatch on the balance sheet of the intermediaries themselves (something that I hope we have learned how to avoid), or because of the currency mismatch between the revenues and expenses of the banking system’s debtors.

In recent years, financial regulators have worked very hard to set up both rules and oversight mechanisms that insure bank solvency. And in the aftermath of the internet bubble, US commercial banks faired quite well. After building up significant capital during the 1990s, they barely felt the collapse of the stock market. The same may not be true for housing.

Again focusing on the US, since there is data and I know the case the best, we can look at recent experience. From 2000 to 2005, the level of mortgage debt in the US increased by just over $4 trillion – a 66% rise. Of this, $1.5 trillion, or nearly 40%, has landed on the balance sheets of commercial banks. So, by early 2005, mortgage loans plus marketable securities backed by mortgages accounted for 43.7% of total bank assets – a dramatic increase from the 37.5% at the beginning of 2000. While the risk inherent in this balance structure may be hedged, it could also create a large problem should house prices crash.

The list of distortions created by bubbles doesn’t end with consumption, investment, fiscal policy and banks. Another, more subtle, difficulty comes from the fact that higher

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6 Data are all from the Flow of Funds, tables L10 (line 22) and L109 (lines 1, 7, and 13).
investment during the boom can drive up observed real growth, raising the apparent productive capacity of the economy. The problem is that some portion of the investment during the boom should not have been undertaken. That is, if prices had been correct these projects would not have had positive internal rates of return. When prices fell, many of these investments were abandoned – we all recall the pictures of warehouses piled high with discarded computer equipment. This makes potential GDP look higher than it actually is. For policymakers this creates the risk of trying to stabilize growth at too high a level. For the rest of us it means overly optimistic expectations about growth of income and consumption.

In summary, bubbles clearly compromise the stabilization objectives of central banks. They create volatility in consumption, investment, fiscal policy, financial intermediaries’ solvency, and more. In most cases, asset prices misalignments influence aggregate demand driving inflation and output up during the boom, and down during the bust. It seems obvious that monetary policymakers – even those whose primary objective is price stability – have no choice but to care.

II. Can We Identify Bubbles As They Occur?

On 3 June 2005 a 1918 postage stamp with a face value of 24 cents sold at auction for $577,500 – nearly 3 times its November 1988 sale price of $192,500. This was obviously no ordinary stamp. It was one of the finest examples of the 80 to 90 surviving examples of a misprinted airmail stamp – the image of a biplane in the middle of the stamp is upside down. (It’s called the “Inverted Jenny” and is one of the most famous American postage stamps.) Since the US Postal Service has never cancelled any of its stamps, we know that the stamp will still be honored at its face value – 24 cents. In the language of financial economics, an asset with a fundamental value of 24 cents sold for $577,500. Why would someone be willing to pay this much for something with so little fundamental value? Especially since any prudent person would surely put the stamp into a temperature and humidity controlled bank vault immediately.
Why would anyone pay so much for something with virtually no intrinsic value? While it is possible that preferences for having this specific stamp in one’s vault (out of sight) have shifted enough to justify a 16.5% compound annual return between the sales in 1998 and 2005, this seems extremely improbable. What is likely is that the stamp’s buyer believes that in a few years someone else will pay more. As LeRoy (2004) forcefully argues, there is a strong presumption in favor of bubbles.7

The criticism of the bubble view is based on the efficient markets logic that markets incorporate all available information and this automatically eliminates bubbles. But there are many circumstances under which the argument fails. The dynamic stories that we tell to explain market efficiency are based on the arbitrage. And when arbitrage fails, so does market efficiency. While the arguments for failure of arbitrage in equity markets are subtle, those for property markets are not. I know of no simple and low cost mechanism for short-selling a residential home.8

So much for theory; what about evidence? Thanks to Robert Shiller we have over 100 years of data for American equity and housing prices, so I will start with those. Shiller’s data are plotted in Figures 1 and 2. As you look at these pictures, keep in mind that the US experience is the norm. I will come back to that in a moment.

The last 10 years clearly stands out. During the late 1990s real equity prices were well above historical levels. And for housing prices, the recent numbers are even more striking. In 2005, US house prices (deflated by the CPI) were 67% above there 1950-1995 average. Since the standard deviation of real house prices during that 45 year periods was a mere 5 percentage points, the 2000-2005 move is 13 standard deviations in size!

7 The criticism of the bubble view is based on the efficient markets logic that observed prices incorporate all available information.
8 For a discussion of how arbitrage fails in equity markets see Stein (2004).
It is important to note that moving from raw price data to price-earnings ratios does not change the story. For example, in December 1999 the S&P 500 index peaked at over 44.
With a risk-free interest rate, measured from Treasury inflation-indexed securities, of nearly 4 percent, this means that any P/E ratio over 25 implies a negative risk premium!

Something similar has happened for housing in recent years. In 2005, US housing wealth was nearly 14 times estimates of the value of housing services. This is roughly 30% above the 10.6 average of the previous 20 years. As in the case of equity in 1999, this suggests that a decline in housing values is on the way.

**International Comparisons**

While less extensive than the US data, quarterly equity and housing price information exists for a number of countries. I have taken the available series and done the following exercise. First, I deflated them using each country’s consumer price index, and then I plotted the results. For each country I looked for a boom followed by a bust – these are paths that follow the profile of the bubble. Then, I synchronized the peaks and constructed the ratio of the real equity and housing price levels to the peak. Using this method I identified 42 peaks in 19 country markets, and 14 peaks in 17 country housing markets.

The results are plotted in Figures 3 and 4. Since the technique generates distributions of bubble paths, I plot the median and the interquartile range of the values for the 5 years (20 quarters) before and after the peak. The profile of a typical equity bubble is as follows: Real prices double in over a period of 3½ years, and a return to the original level 4 years later. The full cycle is 7 to 8 years long.

Housing bubbles are less severe and somewhat shorter, typically involving a 50 percent increase in prices over 3 years, followed by a 25% decline over the following 3 years. The full cycle is approximately 6 years long and at the end of the crash, housing prices are roughly 10% higher than where they started.

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9 Each one of these peaks appears in the list in appendix to Chapter 3 of the IMF’s April 2003 *World Economic Outlook*. See Cecchetti (2005) for details on the data sources and dates.
Figure 3: Equity Bubbles Across Countries

The plot uses quarterly data for 19 countries from 1957 to 2004. Using the technique described in the text, 42 bubble paths are identified. See the appendix for sources and dates.

Figure 4: Housing Price Bubbles Across Countries

The plot is based on 14 housing bubbles identified from quarterly data on 17 countries from 1970 to 2003. Data sources and dates are described in the appendix.
I draw two conclusions for all of these data. First, bubbles clearly exist. There are times when asset prices deviate from any reasonable notion of fundamentals. Second, it is possible to be relatively sure when these deviations are occurring. While there will always be uncertainty about the size of the bubble, it should be possible to identify nonfundamental asset price movements as they occur.10

III. Should Policymakers Respond to Bubbles?

I will examine the following five possible answers to the question posed in the section heading:

1. Take them into account only insofar as they influence forecasts of future inflation.
2. Act only after the bubble bursts, reacting to the fallout of the bubble.
3. Lean against the bubble, raising interest rates in an attempt to keep it from enlarging.
4. Include housing prices directly in the price index that the central bank targets.
5. Look for regulatory solutions to both keep the bubble from developing and to reduce the impact of a crash should one occur.

Bernanke and Gertler (1999, 2001) are the primary proponents of the first strategy: The central bank should only respond in so far as the bubble changes forecasted inflation. They note that directly reacting to asset price booms carries with it the risk of destabilizing both real output and inflation. Cecchetti, Genberg, Lipsky and Wadhwani (2000) take issue with this conclusion, noting that Bernanke and Gertler study only very simply monetary policy rules. Once the universe of possible policy rules is expanded, they note, there are cases in which reacting to asset price bubbles is stabilizing.11

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10 Cecchetti, Genberg and Wadhwani (2002) note that estimating the fundamental value of equities is both necessary for forecasting GDP and unlikely to be any harder than estimating the output gap. Furthermore, Detken and Smets (2004) note that asset price booms are normally accompanied by general credit booms, which are much easier to measure.

11 Dupor (2002) provides a theoretical basis for the conclusion that optimal monetary policy entails reaction to nonfundamental asset price movements.
When addressing the property bubbles, the Bernanke and Gertler argument has another possible flaw. The difficulty is a technical one that arises in price indices like the US Consumer Price Index. The American CPI includes a roughly 30% weight on rent or its equivalent. This is the cost to shelter to both renters and homeowners. In both cases, the estimated inflation is based on a survey of rental units. As Peach and McCarthy (2000) note, when the market for owner-occupied housing booms, rents tend to be depressed. The result is that a housing boom will keep measured inflation artificially low. While it is possible that consumption increases will drive output above potential generating inflation pressures by increasing aggregate demand, the effect is likely to be muted.

Alan Greenspan (2002) has articulated the view that there is really nothing to be done ex ante, so the only policy prescription is to clean up the mess ex post. Chairman Greenspan’s argument has two parts. First, he argues that only after it burst can a policymaker be sufficiently certain that a bubble was present. And second, “that no low-risk, low-cost, incremental monetary tightening exists that can reliably deflate bubble.” (Greenspan 2002, pg. 5). The only remaining option is to mop up in the aftermath of the collapse.

Greenspan’s view is clearly shared by a large number of central bankers around the world. For example, in January 2004 in address here in Christchurch, Governor Alan Bollard of the Reserve Bank of New Zealand (2004) enumerates the uncertainties surrounding direct reaction to asset prices bubbles while they are developing and concludes that it is almost always inadvisable.

Taking the Greenspan strategy has clear risks. First, the mess after the bubble can be very big. Second, as we have seen the past few years, address the imbalances caused by a bursting bubble can lead to another bubble. To some, the 2000-2005 housing boom in the US looks like a direct consequence of cleaning up the mess of the 1995-2000 equity bubble.

12 Homeowners are assumed to rent their homes from themselves.
While Cecchetti et. al have argued in favor of leaning against asset price bubbles, and Cecchetti (2003) presents results suggesting that the Federal Reserve did raise interest rates modestly in reaction to the stock price boom of the late 1990s. Gruen, Plumb, and Stone (2003) make a very powerful argument against this. These authors note that a practical difficulty arises from the fact that interest rates influence economic activity with a lag, but affect the bubble immediately. Because of the first of these, as output falls following the bursting of a bubble, policymakers would like to have interest rates low for some period before a crash. But lowering interest rates reduces the probability of the bubble bursting, causing it to become larger. Gruen et. al proceed to show that successful stabilization policy requires the central bank to detect the bubble when it is just developing – something that most people agree is nearly impossible. This very convincingly line of reasoning leads to the inevitable conclusion that interest rates are not the right instrument for the job!

Next on the list is the inclusion of housing prices directly into the price index used to formulate the central bank’s long-term objective. The inclusion of asset prices in aggregate price indices goes back at least to Alchian and Klein (1973). Bryan, Cecchetti, and O’Sullivan (2002) suggest that housing prices, that is the sale price of existing homes, should have a weight in the price index used to measure aggregate inflation.13 And in some countries, like Ireland, that weight should be large. Such a change could have a substantial impact on measured inflation and hence on policy. I would argue that this is appropriate.

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13 Bryan, Cecchetti, and O’Sullivan (2002) argue that policymakers should be stabilizing the cost of lifetime consumption, not just per period consumption. This leads to the immediate consideration of assets which are the prices of entire streams of consumption over a lifetime. It then naturally follows that something like housing, which provides a lifetime of housing services, should be included in the price index at its current market price.
To see how big the impact might be, I have taken the US personal consumption expenditure price index and replaced the housing component with an index of home sale prices.\textsuperscript{14} The results are plotted in Figure 5.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure5.png}
\caption{Including House Prices in the Inflation Measure}
\end{figure}

Over the five years from 2000 to 2005, recomputed inflation based on the Personal Consumption Expenditure price index has averaged three-quarters of a percentage point higher than the conventional index. For core PCE, excluding food and energy, a similar computation gives a full percentage point difference. And since housing has roughly twice the weight in the US CPI that it has in the PCE (30\% vs. 15\%), the difference between those two gauges of inflation would be even bigger.

\textsuperscript{14} These results are approximations as they are based on assuming the weight on housing is the average weight over the 1990 to 2005 sample period.
Finally, are there any alternatives to interest rate policies? The answer to this is surely yes, and it is time to start studying them. To get things started, let me frame the problem as I see it.

First, financial development is unambiguously a good thing. It promotes economic development, raising the level of growth. A well-functioning financial system is an essential precondition for high, sustain real growth.\textsuperscript{15} It also increases the ability to share risk, providing mechanisms for smoothing consumption and investment in the fact of volatile income and sales. The result is lower volatility of growth as well.\textsuperscript{16}

But financial development is a two-edged sword. By providing households with a mechanism for increasing leverage, especially through mortgage lending, the financial system could be increasing the chances of catastrophe. Ready access to loans allows individuals to bid up the prices of existing homes has the potential to create frenzies that result in booms followed by crashes – e.g. bubbles. The risk is that when the bubble bursts there will be a large number of defaults. And as we think about housing bubbles, it is important to keep in mind that they tend to be geographically concentrated.

As I have argued, interest rates are likely the wrong instrument for addressing the risks housing bubbles create. This means looking toward solutions that focus on the lending that propels the bubble. There are two possibilities. Either try to restrain the lenders through regulatory mechanisms or restrict the borrowers. The first would involve supervisory adjustments to risk-based capital requirements. This is likely to be both complex and ripe for evasion – banks could simply sell the loans to willing investors.

The alternative is to adjust borrower loan qualification requirements to the environment. For example, maximum loan-to-value ratio could depend on deviations rent-to-sale price ratios from their lagged moving average (or on the rate of recent increase). Alternatively,

\textsuperscript{15} See Ross Levine’s (1997) survey.
income coverage tests could depend on long-term interest rates rather than short-term interest rates. There are many possibilities, and we need to explore them.

IV. Asset Prices in an Inflation Targeting Framework

Integrating asset prices booms and busts into an inflation targeting framework is straightforward.\textsuperscript{17} We can start with what various authors refer to as flexible inflation targeting, where central bank objectives include weight on both inflation and output variability. That is, policymaker chooses the interest rate path that minimize a loss function of the form

\begin{equation}
L = E[(\pi - \pi^*)^2 + \lambda(y - y^*)^2]
\end{equation}

subject to the constraints imposed by the structure of the economy. That structure relates inflation and the output gap to the central bank's instrument (the interest rate) and the fundamental shocks that hit the economy. The result is an interest rate rule in which the central bank sets its instrument in response to these shocks.

Asset price misalignments or bubbles are just another form of destabilizing shock to which policymakers need to react. As I emphasized in the earlier discussion, equity, property or exchange rate movements shift aggregate demand driving the output gap and inflation up or down together. In principle, monetary policy can neutralize these shocks since it too can move the output gap and inflation in the same direction.

As Svensson (1999) notes, the rate at which an inflation-targeting central bank strives to return \(\pi\) to \(\pi^*\) depends on the weight (\(\lambda\)) policymakers place on output deviations in the objective. The more important output fluctuations in the objective (the bigger \(\lambda\)), the longer the time it will (optimally) take to return inflation to its target following a deviation. While asset price bubbles may destabilize inflation, the primary impact of

\textsuperscript{17} The term “inflation targeting” is unfortunately somewhat ill defined. Following Mishkin (2001), I will use it here to mean a monetary policy framework in which the policy authority’s primary goal is the attainment of a publicly announces a medium-term inflation numerical inflation objective.
bubbles is to create volatility in output. Reacting means keeping output near potential and allowing inflation to deviate from its target. Incorporating this into flexible inflation targeting is to make it more flexible and lengthen the horizon over which policymakers are expected to return inflation to its target. Technically, we can think about this as making $\lambda$ larger during bubble periods.

In summary, integrating asset price bubbles into an inflation targeting framework does not require any change in policymakers’ objectives. Instead, it means adjusting the horizon over which the central bank strives to attain its medium-term inflation goal.

V. Conclusion

Monetary policymakers have no choice but to face the risks posed by asset price bubbles head on. While equity markets are small in most countries, and so stock-price bubbles are not of any significance in most of the world, bubbles in housing markets have the potential to wreak havoc in developed and emerging market countries alike. And significant deviations of exchange rates from fundamentals create problems as well.

Severe boom-bust cycles have the potentially to dramatically destabilize both inflation and output in an economy. They affect consumption, investment, fiscal policy, and the health of financial intermediaries. Importantly, the down-side risks that they pose are significant. As the risk managers of the economic and financial system, central bankers are bound to focus on these.

But caring about asset price bubbles is only the first step. Policy is not abstract, it is practical. Reacting to equity, property, or exchange rate misalignments means estimating their numerical size. This is surely difficult, but as I argue in Cecchetti, Genberg, and Wadhwani (2002), it is both essential to forecasting inflation and growth, and is unlikely to be more difficult than estimating other critical but elusive quantities like potential GDP. Policymakers usually do not shy away from important issues just because the solution is difficult. They should do it here, either.
References


Cecchetti, Stephen G. “What the FOMC Says and Does When the Stock Market Booms,” in A. Richards and T. Robinson, eds., Asset Prices and Monetary Policy,


