FROM ASSET PRICE BUBBLES TO LIQUIDITY TRAPS

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Abstract:

This paper argues that it is useful to divide the cyclical behavior of modern mixed capitalist economies into an expansion, upper turning period, recession and lower turning period. This characterization of the business cycle is more complicated than the one currently followed by the National Bureau of Economic Research, which identifies the peak and trough of the cycle. However, the complexity of four phases compensates with additional insights. To illustrate the usefulness of this approach, the current global financial crisis is examined by first, reviewing the expansion with the development of the housing bubble. Then the beginning of the crisis is viewed as the upper turning period. The initial financial instability evolved into a full crisis during the Great Recession with its impact on unemployment. Finally, the ending of the crisis during the challenging period of the liquidity trap as the lower turning period is also analyzed. Orthodox economic analysis offers valuable insights for both the expansion and recession phases but can also benefit from behavioral finance and Minsky’s analysis. The upper turning period is Minskian and the lower turning period is an updated version of the Keynesian-Minskian liquidity trap. Also Taleb’s concavity and convexity properties of the upper and lower turning periods offer useful insights.

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INTRODUCTION

“We can model the euphoria and the fear stages of the business cycle. Their parameters are quite different. We have never successfully modeled the transition from euphoria to fear” (Alan Greenspan, Financial Times, March 26, 2009)

An enduring characteristic of many aggregate measures of economic activity across time and countries of different political ideologies is their cyclicality. Beginning with Biblical times, during Pharaonic Egypt’s Middle Kingdom (2000 – 1782 BC), 7 years of fat cows were followed by 7 years of thin cows; this cyclicality has persisted to today. For example, in our democratic U.S. economy, 5 years of exuberant housing construction activities from 2002 to 2006 have been followed by 5 years of very weak housing from 2008-2012. This cyclical behavior has impacted both the financial and real sectors of the U.S. and global economies.

Gottfried Haberler (1960), in his classic book *Prosperity and Depression: A Theoretical Analysis of Cyclical Movements*, exposit in detail numerous hypotheses that compete to explain the causes of the four phases of cyclical patterns: the economic expansion or prosperity; the
upper turning point or period from expansion to contraction; the economic recession or depression phase and, finally, the lower turning point from economic contraction to economic expansion again. However, the majority of the theories expounded apply to the prosperity or the recession stages; it seems difficult to develop satisfactory hypotheses for the transition from prosperity to recession and vice versa as Greenspan’s (2009) quote indicates.

Evidence of the profession’s inability to satisfactorily articulate hypotheses explaining major swings in aggregate economic activity is the intense surprise experienced by the utter unexpectedness of cyclical turning points. Put differently, although economic fluctuations are expected, there are no dependable theories that can guide us in our predictions about an economy’s transition from prosperity to recession and vice versa. Such surprise has surrounded the recent Global Financial Crisis and the Great Recession it has caused. When Queen Elizabeth II visited the London School of Economics in November 2008, she asked the assembled academics, “How come nobody could foresee it?”

Haldane (2012) traces the methodological evolution of economics during the last two hundred years and argues that early classical determinism was replaced during the 1950s by econometric modeling with its dual emphasis on a propagation mechanism and random shocks distributed normally. Such a scientific framework for modern economics seriously constrains prediction because measured variables follow random walks.

**PURPOSE OF THIS PAPER**

In this paper we propose four sets of hypotheses corresponding to the four phases of the most recent economic cycle. We distinguish four time periods: from 2002 to early 2007, we had the expansion phase; from early 2007 to September 2008, we had the upper turning period; from
September 2008 to June 2009, we had the contraction and then from July 2009, to the end of 2009 we had the lower turning period.

We immediately admit that these four periods are approximate and, unlike the NBER’s (2010) classification of recessions with exactly one point for upper turning (the peak) and only one point for lower turning (the trough), we allow for an upper and lower turning period rather than points. However, our deviations from the official NBER dating of a recession are minor to allow us to consider upper and lower turning periods. Recall that in the latest cycle, the expansion period lasted from December 2001 to the end of November 2001; the peak was in November 2007; the recession lasted from December 2007 to June 2009 with the trough occurring in June 2009. The new expansion began in July 2009. Several remarks and clarifications are in order.

First, there are numerous real and financial economic variables that exhibit cyclical patterns. A short list of some of these variables includes real GDP, disposable income, consumption, investment, housing, unemployment, equities, bonds, total wealth, mortgages, securitization of mortgages, interest rates, Fed funds rates, lending, debt, bank assets, liquidity and several others. Their significance varies from cycle to cycle. The Business Cycle Dating Committee of the NBER (2010) emphasizes in its definition the cyclical behavior of certain real economic variables. Specifically, it defines “a recession as a period of falling economic activity spread across the economy, lasting more than a few months, normally visible in real GDP, real income, employment, industrial production, and wholesale-retail sales”.

Second, cyclical behavior of real GDP is important but as the economy grows in complexity and as economists become professionally more sophisticated, other monthly
economic variables are considered in identifying recessions as just mentioned in the earlier remark. The National Bureau of Economic Research (2010) keeps a detailed record of the cyclical behavior of real business activities and has officially identified all past recessions with dates of peaks and troughs that frame economic recessions and expansions. It is interesting to record that since 1854 to date the NBER has recognized 33 cycles for the U.S. economy.

As noted earlier, there is no record of turning periods; if instead of identifying only peaks and troughs, one chooses to allow for turning periods --as we do in this paper-- these turning periods may overlap partially with the expansion or the contraction phases. We do so in our attempt to address Greenspan’s concern about the transition from expansion to recession and vice versa. If such periods are not identified, they cannot be the subject of investigation. Using the NBER methodology with only one month as the transition period restricts the duration and menu of possible developments.

Graph 1 illustrates the long-term logarithmic growth of real GDP with its cyclical behavior. It is important to note the severity of the most recent official recession that started in December 2007 and ended in June 2009.

Third, financial variables such as Fed funds, other interest rates, various money supply measures, inflation, equities, bonds, wealth, bank lending, debt, collateral and others play an important role but their cyclical behavior is not tracked nor considered always as critical. Graph 2 demonstrates the cyclical behavior of equities as represented by the S&P 500 Index to illustrate that equities are more than real variables. The S&P 500 Index peaked in December 2007 and after dropping about 50% bottomed out in March 2009 and then slowly grew to reach its former peak, four years later, in March 2013.
Fourth, the patterns of cyclical behavior of the mentioned and other related real and financial variables are complicated with unequal wavelengths, dissimilar amplitudes and unsynchronized frequencies. Even if we choose to limit our search for only the mutually reinforcing propagation and amplification relationships between the S&P 500 Index and real GDP, such an undertaking could not be easily accomplished. This is because equities exhibit many more cycles than real GDP; also, while the range of growth for equities is wide and changing over longer periods, equity prices often drop rapidly during shorter periods. In contrast, real GDP grows and drops much slower and its cyclical waves evolve over several years in contrast to equities that may exhibit corrections of up to 10% at least once or twice per year during certain periods. Thus, it is hard to list specific stylized facts for the cyclical behavior of the S&P 500 index while it is much easier to do so for the real GDP as described by the NBER record of U.S. recessions.

Fifth, in addition to the individual complex cyclical behavior of real GDP and the S&P 500 Index (in real or nominal prices), the relationships between these two variables are not clearly established as indicated above. For example, it is reasonable to hypothesize that increases in the values of equities contribute to increases in wealth and in turn, such wealth increases stimulate consumption and GDP. Conversely, asset price theories explain the level and changes of the S&P 500 Index being related to consumption and GDP. In particular, the canonical consumption capital asset pricing model hypothesizes that investors demand high expected returns when these returns co-vary strongly and positively with expected consumption growth which, in turn, is driven by expected real GDP growth. However, such a hypothesis connecting expected equity returns to the time-varying covariance between returns and consumption has not been confirmed and remains an active area of both theoretical research and
empirical testing. In other words, not only are the cyclical movements of several important
economic and financial variables complicated, their inter-relationships also remain intractable.

Sixth, the presence of monetary and fiscal policies further challenges our investigation.
Theoretically, the Fed is mandated to maintain both financial and economic stability. Financial
stability to be addressed shortly means that the financial sector and primarily the banks can
withstand major random risks. Economic stability means that the economy grows at its potential
without inflation. If we assume that the mixed capitalist system is inherently unstable then a
prescient Fed can adhere to counter cyclical policies to stabilize both the real and financial
sectors. But not only is the Fed incapable to foresee turning points or periods as Greenspan’s
quote clearly reminds us, but also its doctrines and derived policies are often deficient. For
example, prior to the 2007-09 Global Financial Crisis, the Fed postulated that price stability was
sufficient for financial stability. This conjecture turned out to be false since the Great Moderation
with its price stability failed to prevent the 2007-09 crisis. Therefore, as we trace the four phases
of cyclical behavior, the force of the Fed’s doctrines and policies need to be assessed. In our
discussion, we also address fiscal policy issues, however, it is clear that Fed policies are more
critical because monetary policy is less constrained than fiscal policy.

Finally, in contrast to the prosperity and recession periods that follow upward and
downward movements with added noise, the turning periods are more difficult to model
statistically and to validate with a credible narrative. The typical patterns of turning periods are
nonlinear but dissimilar; the upper turning period is concave while the lower one is convex.
Taleb (2013) has a much to say about these two shapes. The upper turning period has the
unwelcome property of instability, sometimes financial or economic and often both. It is this
instability attribute of the capitalist system that is so damaging. It is during such turning periods
that the “good times come to an end” without anyone knowing how bad the recession that follows will be or how long it will last. This is when “fear” replaces “greed” in the parlance of Wall Street or euphoria turns to fear as Greenspan characterizes it.

In contrast, the lower turning period eventually ushers the economy in better times with prospects for catching up in terms of pent-up demand, yet consumers and businesses do not easily discard the difficulties experienced during the recession.

Stated succinctly, we wish to give turning periods from prosperity to recession and from recession to prosperity special emphasis as integral components of the full business cycle. We do so by proposing that psychological ambivalence is the driving force during such transition periods. The top turning period unfolds when economic agents begin to doubt the endurance and prospects of the expansion but remain unsure about the actual probability of a recession. Similarly, during the lower turning period, economic agents fluctuate emotionally between the negative experiences of the most recent recession and the strength of certain indicators that suggest the seeds of recovery are sprouting. Our contribution does not lie only on psychology. During the upper turning period, the economy transitions from stability to instability. Economic and financial instability has been a cherished topic for both mainstream economists as well as unconventional Marxist philosophers. Since we plan to employ this concept, we offer below some definitions and descriptions to refresh the reader’s understanding.

WHAT IS FINANCIAL INSTABILITY?

Financial instability is only partially understood. A theoretical challenge remains to eventually integrate the real and financial sectors with sufficient quantitative details so that answers can be provided to the following questions: What is financial instability? Under what conditions is the
financial sector stable or unstable? What are the causes of financial instability? What can monetary and fiscal policies do, if anything, to stabilize both the financial system and the real economy? What role do asset bubbles and crashes play in causing financial instabilities? What are the relationships between asset bubbles and crashes, booms and busts, exuberance and panic, jubilant animal spirits and depressions, manias and financial crises? Finally, under what conditions do financial crises impact the real economy by reducing GDP and employment?

By listing these questions, the significance of financial instability is elevated along with the domain of this instability, which is the financial sector an economy. The financial sector includes the central bank, commercial and investment banks, non-bank financial institutions such as insurance companies, managed money flowing through financial markets for equity, debt, real estate, commodity, currency and other derivative instruments traded over the counter or on established exchanges. Alternatively, and perhaps an easier definition, is to say that the financial sector is the one that allocates financial resources efficiently in the domestic and global economies. Financial sectors may have their roots in a given country, but nowadays they extend globally. The concept of a financial sector is dynamic, global and evolving. As the recent crisis demonstrated, even the very best financial experts may not have a comprehensive understanding of all its financial and legal intricacies. During the recent financial crisis, a distinction made often was between the banks that had access to liquidity from the central bank and to the shadow banks, such as Lehman Brothers, that did not.

In the U.S. and in many advanced economies, the financial sector has total financial assets equivalent to several times the size of the country’s GDP. Adrian and Shin (2009) discuss the current financial system in the U.S. and its stability with emphasis on security brokers and dealers. Kaufman (2004) gives a detailed analysis of macroeconomic stability and links it to
bank soundness. The Federal Reserve Flow of Funds accounts describe how the share of assets of commercial banking as a percent of total financial assets in the financial sector has been declining for several decades while the share of assets held by other financial institutions and money managers often described as the shadow banking industry has been growing.

Let us begin with a definition of the stability of the financial sector. When is a financial sector stable? Financial stability can broadly be distinguished between ‘micro-stability’, which involves conditions of individual financial institutions, and ‘macro-stability’, which focuses on the efficient functioning of the financial system as a whole. In a more intuitive sense, financial stability means that the financial sector can withstand financial shocks that are large enough to cause economic loss to the real economy. Here we view macroeconomic financial stability as influenced not only by banks and other financial institutions, but also by the volatility of asset prices. For example, when the stock market crashed with prices dropping by 20% on October 19, 1987, the financial sector remained stable with not one financial institution collapsing and furthermore there was no recession in the real economy. Schinasi (2004) discusses the concept of financial stability in detail and proposes the following definition: “A financial system is in a range of stability whenever it is capable of facilitating (rather than impeding) the performance of an economy, and of dissipating financial imbalances that arise endogenously or as a result of significant and unanticipated events” (p.8).

Mishkin (2007) describes a financial system as stable if it performs the function of efficiently channelling funds to optimal investment opportunities. Friedman and Laibson (1989) focus on the role of stock markets with their extreme movements as part of the financial system allocating scarce capital resources. Suppose that financial stability means that the financial system allocates capital efficiently and the system becomes unstable when it fails to allocate
capital resources efficiently. When the system is unstable, two types of interrelated risks emerge. First, the system experiences valuation risk because the financial instability has increased uncertainty and traders have difficulty correctly measuring fundamental values of assets. Second, there is macroeconomic risk. This means that traders also need to assess the likelihood of a recession as a result of financial disruptions in investment and consumer spending. Thus, financial instability creates uncertainty, asset price volatility and misallocation of capital, all of which negatively impact the real economy.

Let us proceed to ask what economic policies may contribute to financial stability. A fundamental interplay arises immediately. If an economy is conceptually separated into a real and financial sector—a tradition that goes back to classical economists who viewed money as a veil—the issue of real economic stability becomes relevant. Real economic stability or just economic stability means that the economy grows at its potential without inflation. Thus, a real sector that grows with full employment (generating about 200,000 jobs monthly in the U.S.) and price stability (meaning inflation only between zero to 2.5%) and a financial sector that allocates capital efficiently, both characterize the ideal economic system. The goals of monetary policy are to ensure both economic and financial stability. So, economic and financial stability are mutually interdependent but not equivalent.

One important expectation of monetary policy during the ‘70s and ‘80s was that price stability would also bring financial stability. When inflation was high during the 1970s, asset prices were distorted. It was debated whether the stock market was a hedge against inflation. Housing prices increased in response to inflation in the late 1970s. The financial sector during this period of high inflation performed poorly. A monetary policy targeting inflation was believed to lead to financial stability. Taylor (2002) documents the long journey of monetary
policy from inflation and financial instability to price stability and the Great Moderation. He discusses how low and stable inflation rates reduce uncertainty and promote sound economic decisions. Price stability removes market distortions in price signals and, by anchoring inflation expectations, risk premia in interest rates are reduced, along with the likelihood of misperceptions about future asset returns.

In a seminal paper, Bernanke and Gertler (1999), develop a macroeconomic model and obtain the result that price stability and financial stability are complementary and mutually consistent objectives. Ferguson (2002), Papademos (2006) and Plosser (2008) examine the interplay between price stability and financial stability. Often, an economy simultaneously experiences price and financial stabilities, as during most of the 1990s. However, there have been periods of price inflation and financial stability, as during the 1970s. Between 2000 and 2004 there was price stability with financial instability. Currently, we have price stability but markets remain financially unstable. Borio and White (2003) tell us that episodes of financial instabilities with serious macroeconomic costs have taken place with greater frequency in the last thirty years than earlier in the midst of price stability, both in developed and emerging markets.

In other words, in the presence of price stability, financial markets have become more volatile recently than in the past. Once inflation was conquered, the challenge of financial instability arose again. Greenspan (2004, 2005) reflects on this issue of price stability producing a decrease in real volatility but paradoxically an increase in financial volatility. Rajan (2005) articulates in detail how the financial system has increased risk. Most of the time, central banks pursue their mandated price stability goal; however, during periods of financial crises, central banks give priority to stabilizing the financial sector in order to contain losses to the real sector. Thus, price stability is neither necessary nor sufficient for financial stability.
Borio and White explore this paradox and argue that, in order to resolve it, one must examine carefully the procyclicality of the financial sector. In an environment of economic growth, with a credible monetary policy that is achieving its primary objective of price stability, the financial sector may expand rapidly and asset prices may increase. Confidence based on sound economic performance tends to drive up both the amount of credit and asset prices. If monetary policy continues to only pursue price stability, the eventual decline in asset prices may destabilize the financial system and the economy.

If a successful monetary policy, as the one during the Great Moderation, cannot produce long-term financial stability, can financial instability impact monetary policy? Yes. Papademos (2006) argues that a reduction of interest rates, for example, may have weaker effects than under normal conditions if the financial system is unstable, because increasing risk premia may prevent most lending rates from falling, or because of credit rationing arising from a general unwillingness on the part of banks to lend. A striking example of this sort has been the asset price bubble in Japan in the late 1980s. Plummeting asset prices and rising non-performing loans have undermined the solvency position of banks, making them unwilling to lend, or perhaps incapable of lending. The extremely accommodating policy stance, with interest rates close to zero percent, did not reopen the bank lending channel. Currently, the U.S. has used an essentially zero Fed funds rate and three rounds of aggressive quantitative easing to address the serious unemployment problem that resulted from the financial crisis. The very slow improvement in the job market is evidence that financial instability constrains the effectiveness of monetary policy.

Domestic financial stability is also closely interrelated to the global monetary system. Mishkin (1999, p. 6) carefully develops a conceptual framework for global monetary instability
and concludes by proposing the following definition: Financial instability occurs when shocks to
the financial system interfere with information flows so that the system can no longer do its job
of channeling funds to those countries with productive investment opportunities.

Beyond the definitions of stability given above, Brock and Malliaris (1989) present a
comprehensive exposition of the technical concept of stability and its applications to economics.
They define stability as a special property of an economic system that allows it to return quickly
to its original state after an exogenous or endogenous shock. These authors view an economic
system as a group of relationships between endogenous variables represented as a vector X,
exogenous variables as I and random shocks as U. Furthermore, one can decompose the vector
X into real variables R and financial variables F, so that X = R + F. Suppose that GDP is one key
real endogenous variable that is used to monitor the stability of the system. Disturbances in such
a system may occur because of shocks to X, real or financial, or I or U. One may wish to
characterize the source(s) of instability arising endogenously (drop in productivity, technology)
or exogenously (decline in foreign trade or foreign currencies) or from random shocks (terrorist
attacks, wars, natural disasters). What we are interested in is disturbances in the financial sector
F or in any other variable that immediately involves F.

A system f( X, I, U) is stable if such shocks to any of the variables R, F, I or U do not
translate to deviations from trend GDP. If such shocks cause deviations from trend GDP (say a
recession) then we say the system is unstable. In particular the system is financially unstable if a
shock in some financial variable F causes a recession and prevents the economy's GDP from
recovering quickly. It remains a formidable analytical challenge to develop a sufficiently
complete macroeconomic model that is capable of addressing factors contributing to
macroeconomic instability. Such a model needs to distinguish between endogenously caused
instability due to real or financial factors and exogenously due to random shocks. Asset price bubbles straddle between the real and financial sectors with their fundamentals driven by the real sector and the bubble component by the financial sector. If the fundamentals disappoint, the bubbles burst. When the bubble bursts, the financial sector, because of excessive credit and leverage, becomes unstable and transmits this instability to the real sector. How can a theorist decompose these interrelated feedback mechanisms?

This brief bibliographical discussion leads to the observation that, when asset price bubbles burst, they often cause financial instability. This instability in turn diminishes the effectiveness of the financial sector to allocate capital efficiently and it may also reduce the effectiveness of monetary policy. Furthermore, it is not known how long such instability could last or to put it differently, it is not known how quickly both the financial and real sectors can recover.

**METHODOLOGY**

As we proceed to analyze the four phases of economic cycles for a variety of economic and financial variables, we follow a selective methodology that includes elements of conventional economics, behavioral finance and Keynesian-Minskyan-Kindleberger views about financial crises. These various methodologies have been employed in numerous narratives of the most recent crises without clarifications when authors make implicit methodological transitions. To avoid potential confusion we describe each methodology briefly to facilitate our purpose to eclectically rope elements of each in the formation of our four hypotheses.
Prior to the Global Financial Crisis, conventional economics as a discipline was founded on certain well accepted premises. Chief among them were (and continue to be): rational consumers with explicit utility functions who choose among various goods and with producers who are profit maximizers. Both trade in a price system that correctly forms prices that act as signals for the optimal allocation of resources and distribution of goods. Such a price system reaches an equilibrium that has the property of being stable. Growth is driven by labor growth and labor productivity that depend upon capital and technology. In such a system, the banking sector and more generally the financial sector facilitate the process of intermediation; collecting savings from agents that forego today’s consumption and allocating these savings to entrepreneurs for investments. The financial sector and asset prices fully reflect all publically available information, so markets are efficient and prices follow random walks. Agents form rational expectations by correctly assessing all available information and knowing the functioning of the economic system. The role of monetary policy is to make sure prices remain stable and this stability is achieved via a Taylor rule that determines Fed funds. Haldane (2012) expands this topic and traces its historical foundations.

What the system does not allow are agents violating rationality that may in turn cause the deviation of prices from fundamentals. So asset bubbles are not widely recognized in conventional economics (there are some minor exceptions). In addition, instabilities are not possible because the system is self-regulated and prices are very flexible so if housing demand collapses, prices automatically drop as low as needed to clear the market. More importantly, this view of the economy does not accommodate the reality of economic crises since most crises are triggered by instabilities and the free market paradigm does not admit instabilities. It was this
conventional economics that dominated the Fed’s doctrines and policies reported by the New York Times on October 23, 2008:

"I have found a flaw" in free market theory, Greenspan said under intense questioning by Representative Henry Waxman, the Democratic chairman of the Government Oversight Committee of the House of Representatives. "I don't know how significant or permanent it is," Greenspan added. "But I have been very distressed by that fact."

In comparison to conventional economics, behavioral finance considers deviations from rationality. The deviations allowed are not drastic to move economic theorizing into the irrational domain of human behavior; rather, behavioral finance admits the ontological economic realities and invokes psychology to explain deviations of prices from fundamentals. Asset price bubbles are viewed by behavioral finance as the consequence of deviations from rationality due to overconfidence by investors, herding, extrapolation from limited samples and other reasons to be discussed in the next section. Once asset price bubbles are introduced into a modified conventional economic system, asset bubble crashes can be admitted and the possibility of a crisis can be seriously entertained.

Lastly, there is a Keynes-Minsky-Kindleberger line of economic arguments that begins with the fundamental axiom that the capitalist system is unstable. Keynes (1936) connects this instability to investment that is driven by “animal spirits”. Koppl (1991) explains this concept in a manner that is truthful to Keynes’ conception. Akerlof and Shiller (2009) generalize the idea of animal spirits and give numerous novel illustrations. Minsky attributes the instability of the capitalist system to the financial sector by formulating his famous “financial instability hypothesis” and Kindleberger adopts the Minskyan hypothesis as a theoretical framework to analyze historical economic crises. Therefore it is important to clarify the concept of “animal spirits” and the “financial instability hypothesis”.
The concept of animal spirits was introduced in Keynes’ book *The General Theory* (1936, chapter 12). In this chapter, Keynes explores the determinants of long-run expectations. These are the expectations that drive economic action and Keynes identifies animal spirits as their critical determinant. The concept of animal spirits appears only three times in the book, and all three times in the following passages from chapter 12:

“Even apart from the instability due to speculation, there is the instability due to the characteristic of human nature that a large proportion of our positive activities depend on spontaneous optimism rather than on a mathematical expectation, whether moral or hedonistic or economic. Most, probably, of our decisions to do something positive, the full consequences of which will be drawn out over many days to come, can only be taken as a result of animal spirits—of a spontaneous urge to action rather than inaction, and not as the outcome of a weighted average of quantitative benefits multiplied by quantitative probabilities. Enterprise only pretends to itself to be mainly actuated by the statements in its own prospectus, however candid and sincere. Only a little more than an expedition to the South Pole, is it based on an exact calculation of benefits to come. Thus if the animal spirits are dimmed and the spontaneous optimism falters, leaving us to depend on nothing but a mathematical expectation, enterprise will fade and die;—though fears of loss may have a basis no more reasonable than hopes of profit had before. It is safe to say that enterprise which depends on hopes stretching into the future benefits the community as a whole. But individual initiative will only be adequate when reasonable calculation is supplemented and supported by animal spirits, so that the thought of ultimate loss which often overtakes pioneers, as experience undoubtedly tells us and them, is put aside as a healthy man puts aside the expectation of death. (Keynes 2008 [1936]: 144, our emphasis of underlined sections).

Several conclusions follow immediately from these passages:

First, animal spirits describe the spontaneous urge for action rather than inaction. Put differently, animal spirits are the invisible force in humans that drives thought, feeling and action. Second, animal spirits describe human emotion that drives optimism; third, in the face of future long-term uncertainty, careful mathematical calculations become unreliable and thus are not sufficient for action. Action is taken only when probable mathematical expectations are supplemented and supported by animal spirits. Fourth, animal spirits, for Keynes, are both the trigger for action as well as the root of instability. The trigger for action is prompted by mass
psychology, described in Keynes’ illustration of the beauty contest. Animal spirits are also the root of instability when waves of optimism are replaced suddenly by pessimism.

Minsky (1975, 1986) unwearyingly opined that financial crises have been coupled with capitalism throughout history. He has also argued that Keynes’s principal contribution was his hypothesis that capitalism is inherently unstable. Furthermore, such instability originates in the financial sector that allocates capital to investment decisions driven by animal spirits. Minsky (1986) develops these Keynesian ideas into his famous financial instability hypothesis. He argues that in a modern capitalist economy with expensive capital assets and a complex and sophisticated financial system, actual economic activity is greatly influenced by firms’ expectations of future profits and financing decisions by banks and other financial institutions. Minsky proposes a credit cycle model of five stages: displacement, boom, euphoria, profit taking and panic. There is an active interplay between the real economy and the financial sector in this process. Minsky (1968) describes how asset managers become optimistic with a new technology, such as the internet, and are willing to finance it. Gradually, this sector grows and an asset boom develops. As the sector attracts new funding further technologies are developed and the financial and technological euphoria grows. Certain triggering events, such as disappointing earnings, lead to profit taking. Further deterioration in fundamentals translates into a panic. The bursting of an asset bubble leads to financial instability that causes real sector instability.

In spite of Minsky’s concerns about the inherent financial instability of capitalism, the Great Moderation doctrine, supported by empirical evidence, led to the conclusion that “this time is different.” Reinhart and Rogoff (2009) document that this assessment is a recurring theme. They offer comprehensive narratives and analysis of the connections between the financial and real sectors of an economy, how financial crises impact both sectors and how financial crises
appear idiosyncratic. Details may differ because of the rapidly evolving financial sector, but the essential mechanisms of positive feedback initially, followed by negative feedback later, persist.

THE RECENT GLOBAL FINANCIAL CRISIS

The financial crisis that began in August 2007 as a subprime mortgage lending difficulty evolved to become one of the worst since the Great Depression. It quickly impacted the real economy. The economic recession started in December 2007 and lasted until June 2009. During this period, more than 15 million workers were permanently displaced from their jobs, the unemployment rate increased from about 4.8% to about 10%, real GDP dropped by about 4% from its previous cyclical peak during the 4th quarter 2007 to the trough of the 2nd quarter of 2009 and the S&P 500 declined from its peak of 1561 on October 12, 2007 to 676 on March 9, 2009, that is a drop of 57%. Kolb (2011) gives a clear and comprehensive overview of considerable research conducted during the past several years exploring the causes of the financial crisis.

The likely causes can be categorized in several subgroups including factors rooted in the microeconomics of housing supply and demand (such as increases in housing prices or bubbles, the formation of expectations of further increases in housing prices, subprime lending, opaque derivative securities, excessive risk taking, failed risk management strategies); macroeconomics and monetary policy (low interest rates during 2002-4, the decline in housing prices in late 2006); government deregulation (the abolishment of the Glass-Steagal Act, absence of regulation for credit derivatives); institutional issues (problems with rating agencies, originate to distribute); global considerations (saving glut, fixed exchange rates for certain countries such as China); and ethical violations (greed and corruption). To this large list of groups of factors some authors
have also introduced psychological attributes such as animal spirits and we also plan to add to this literature in this paper and indeed in this conference and forthcoming volume.

The intensity, complexity and length of the crisis justify the multiplicity and interrelatedness of causal factors. These factors are now weaved into analytical frameworks and empirical scenarios to facilitate our understanding of why and how it happened and to help us both discover ways to get out of it and avoid its reoccurrence. In this essay, we refocus the spotlight on the cyclical nature of the business cycle beginning with the recovery from the previous recession, identifying the formation of a housing bubble as an important driver of the expansion phase of the cycle, then moving to discuss the top turning point and the Great Recession and concluding with the lower turning point characterized by the current liquidity trap phase. We actually hypothesize the idea of a sequence of asset bubbles that were an integral part of the financial and economic landscape during the last decade and argue that their investigation can give us valuable clues, both about the occurrence of the crisis and its ultimate resolution. Another way to describe the contribution of this paper is to say that the global financial crisis of 2007-2009 has multiple subsets of causes, all contributing to an overall complex system.

THE EXPANSION PHASE

As already noted the most recent cycle began in December 2001 and lasted until the end of November 2007. To motivate the discussion of this section, we briefly describe the 2001 recession.

According to the National Bureau of Economic Research, the recession began in March 2001 and ended by the end of November in the same year. Compared to historical averages, it was short and shallow. There are numerous detailed analyses about this recession; in this paper
we follow Kliesen (2003) to highlight some important characteristics. To begin with, the recession of 2001 lasted about 8 months in comparison to the average duration of 11 months for all post WWII recessions; also it was milder with real GDP growing at about .2% during the recession in contrast to an average decline of about 2.6% for all post WWII recessions.

Consumer spending remained above average but residential construction declined more than the average of past recessions because conventional mortgage rates had risen from about 6.75% during December 1998 to 8.5% by April 2000. The increase in these long-term rates was impacted by a restrictive monetary policy. From June 1999 to May 2000, the FOMC had increased Fed funds from about 4.75% to 6.50%. During the recession, the US suffered the historic terrorist attack of 9/11 and dramatic declines in equities: The Nasdaq Composite Index, after it had reached a historic peak of about 5,050 in early March 2000, proceeded to decline until it hit about 2,000 in November 2001, when the recession officially ended, but continued to decline until September 30, 2002 when it stood at 1140, a decline of about 80% from its historic peak. The broader S&P 500 Index peaked at 1527 in mid-March 2000, declined to about 2,000 at the end of the recession and continued its decline until the end of September 2002 when it closed at about 800, that is a total decline of about 50%. The most probable trigger of these dramatic declines in equity prices, called the crash of the tech bubble was the difficulty to sustain what Chairman Greenspan called “the irrational exuberance” in high tech hardware and software in 2000, after it became apparent that the exaggerated Y2K fears were unfounded. To reduce the risks from the bursting of the tech bubble, also called the dot-com bubble, the 2001 Recession and the terrorist attack of 9/11, the FOMC started reducing in January 2001 Fed funds that stood then at 6.50% and by December 2001, Fed funds had dropped to 1.75% where they remained for most of 2002 and were further dropped to 1.25% during 2003 and then to 1% for about half of
2004 before they began again increasing. This expansive monetary policy helped the 2001 Recession to be shorter and milder; also, monetary policy remained stimulative because the recovery was very weak and perhaps unexpectedly it contributed to the development of the housing bubble.

During the December 2001 to November 2007 expansion, the seeds on the Global Financial Crisis were planted. Yet, Bivens and Irons (2008) give a list of key characteristics of this expansion that offer only limited evidence of what was to follow. In particular, the 2001-07 expansion ranks last in terms of average growth of GDP, investment, employment growth, and employee compensation when compared with the 10 expansions since 1949. Only corporate profits were stronger during this expansion when compared to the previous average corporate profits of the last 10 expansions. This underperformance becomes a puzzle when we recall that the Bush administration and the Congress enacted two major tax cuts in 2001 and 2003 that added over $1 trillion in federal deficit spending. In addition to very stimulative fiscal and monetary policies during the first years of the expansion and until the Fed proceeded to increase the Fed funds in mid-2004, housing price increases added to household wealth. These wealth increases, the record levels of residential investment spending, the ability of households to withdraw equity from their homes for consumption purposes and the foreign saving glut contributed to the formation of the housing bubble without accelerating real GDP growth and employment.

What is an asset price bubble? Do bubbles exist in financial markets? Why do they form? Why do they grow? Why do they burst? The term “bubble” was first introduced to describe the famous price run-up and crash of the shares in the South Sea Company in 1720 in
England. Since then, numerous financial episodes described as bubbles have occurred and are described in Kindleberger (1978).

From the 1960s to the mid-1990s, the market efficiency paradigm of Fama (1970) argued that financial markets reflect all publically available information regarding the fundamental factors that drive asset prices. Using this precise definition of market efficiency, changes in asset prices occur because of changes in information about fundamentals. Rational investors quickly evaluate new information about the fundamentals of an asset and by taking appropriate positions formulated by the assessment of new fundamentals, market prices are formed. This market efficiency hypothesis with an exact definition and appropriate empirical testing methods resulted in a large number of scientific studies during the 1970s and 1980s to such a degree that market efficiency remains the most tested hypothesis in financial economics. Therefore, since observed market prices equal fundamental values, asset bubbles cannot exist. Thus, according to the market efficiency hypothesis, asset bubbles cannot exist and consequently public policy issues to address such asset bubbles are not pertinent.

In contrast to market efficiency advocates, a group of economists led by Kindleberger (1978) and Minsky (1986) argued that asset prices could be driven by factors other than fundamentals. In their scenarios, such valuations resulted in asset bubbles. The critical motivation of these authors was to explain the rapid increase of asset prices followed by even faster declines. Such behavior is also described as asset booms and busts and economic historians have documented several such episodes in advanced industrialized countries. Kindleberger also cites several such events with the boom during the late 1920s that resulted in the Great Crash of October 1929, being the most famous one. The argument is that if an asset
price exceeds its price as determined by “fundamentals” by a significant amount and persists for some time; such a scenario cannot easily be explained by market efficiency.

Can a phenomenon of asset prices exceeding their fundamentals for several months, perhaps few years, demonstrate that financial markets are inefficient? But this is not all. Often, as in 1929, after asset prices deviate positively and substantially from fundamentals for few years, a certain triggering event causes asset prices to decline very rapidly. Thus, if the price of an asset exceeds its fundamentals by a large amount for several months or years, and then suddenly, price increases reverse quickly, some economists define this phenomenon as an asset bubble.

It is worth noting that market efficiency has difficulty explaining both price increases, unjustified by fundamentals, as well as sudden reversals, also unjustified by fundamentals. Clearly, this definition lacks precision since the exact meaning of “fundamentals,” “significant amount,” “persistence,” and “some time” is not described with accuracy. If the price of an asset exceeds its fundamentals only by a very small amount, the differential may only represent noise instead of a bubble. If the deviation from fundamentals lasts for only a very short trading interval, this may represent temporary mispricing.

Currently, an increasing number of financial economists are pursuing the study of financial bubbles unconvinced by the theory and empirical evidence of market efficiency. These behavioral financial economists are attempting to develop theories for several financial anomalies, including asset bubbles. Kindleberger (1978) and Brunnermeier (2008) describe a bubble as an upward price movement over an extended range that suddenly implodes. These authors do not introduce the notion of fundamentals in their definition. They argue that bubbles
form because the purchase of an asset is made not based on the rate of return on the investment, but in anticipation that the asset can be sold to a “greater fool” at an even higher price.

Not all bubbles are alike; each asset bubble has certain unique characteristics. For example, the internet bubble of 1994-2000 and the housing bubble of 2002-2007 are not the same. Greenspan (2002) summarizes the central features of asset bubbles:

“Bubbles thus appear to primarily reflect exuberance on the part of investors in pricing financial assets. If managers and investors perceived the same degree of risk, and both correctly judged a sustainable rise in profits stemming from new technology, for example, none of a rise in stock prices would reflect a bubble. Bubbles appear to emerge when investors either overestimate the sustainable rise in profits or unrealistically lower the rate of discount they apply to expected profits and dividends. The distinction cannot readily be ascertained from market prices.”

For new innovations, whose future earnings are very uncertain, the pricing of fundamentals can have a particularly large margin of error. Thus, historically, when new technologies were introduced, bubbles developed, and then crashed for stocks of railroad, electricity, aviation, automobile, radio, pharmaceutical, internet, and bio-technology firms. This uncertainty may also explain the internet crash that started in early 2000 with the NASDAQ dropping from about 5000 to 1140 by mid-2002; a decline of over 75%.

Following Kindleberger, if a bubble develops because of the high uncertainty surrounding the fundamentals of a new innovation, say railroad, electricity or internet, such bubbles have very special characteristics because each innovation differs substantially from previous ones. As already indicated, this implies that each bubble is very special and very hard to discern in its initial development when the uncertainty about the longrun fundamentals has a very wide range of outcomes. If the idea that asset bubbles grow because of new technological innovations or major policy changes, such as federal housing policies, is acceptable then the claim that bubbles exist and are frequent makes sense.
Up to this point, we have described conceptual issues about asset bubbles. There is a large and evolving economics literature that addresses these conceptual issues and investigates conditions for the emergence of asset bubbles, reasons for growth and their eventual bursting. Brunnermeier (2008) and Scherbina and Schlusche (2011) organize carefully the asset bubble literature and describe rational and behavioral models. Barberis (2013) describes how psychology can help explain bubbles and relates these ideas to the recent Global Financial Crisis.

More specifically, Barberis distinguishes asset price bubbles forming on the basis of either investor beliefs or on investor preferences. Let us first discuss bubbles that are driven by investor beliefs. First, in certain situations like new technological innovations, investors may disagree strongly about the asset’s future fundamentals; if in situations of such disagreement we also add short-sale constraints, the bearish investors become constrained while the bullish are left to drive the price high. Of course, a large pool of bullish investors is needed; such investors buy because they hope to sell higher to future bullish investors. But, one may ask, where does such bullishness come from? Second, psychology can also be used to explain why some investors’ beliefs may be very bullish; suppose that investors carefully research a certain investment; often such research leads to overconfidence as investors overestimate the accuracy of their predictions. Furthermore, following Kahneman and Trevsky’s (1974) representative heuristic that claims agents expect small samples to represent well the characteristics of larger population, a relatively small sample of initial successes can easily generate overconfidence and thus bullishness can be extended into the future. Suppose next that some initial success leads to overconfidence that is extended into the future; if investors materialize certain profits, psychology indicates that investors become less risk averse with their gains.
Behavioral economist Shiller (2002) argues that a key factor influencing the formation of bubbles, and their eventual bursting, is the feedback mechanism. A price increase for an asset leads to investor enthusiasm, which further causes increased demand and additional price increases, and so on. The high demand is supported by the public’s memory of high past returns or by optimism that this new asset will generate high future earnings. Different bubbles have different positive feedback mechanisms, but since price increases driven by factors other than the asset’s fundamentals cannot be sustained indefinitely, a negative feedback pattern will eventually replace the positive one—i.e., the bubble will eventually burst. Usually, the initial price increases are slow; it takes a long time for the bubble to grow. In contrast, bubble crashes take place quite quickly. In this spirit, Akerlof and Shiller (2009) stress the role of Keynes’ animal spirits and demonstrate its importance in creating, fueling and leading to the bursting of bubbles.

How can the ideas expressed thus far be formulated into a set of hypotheses describing the expansion from December 2001 to November 2007?

--Clearly the most distinctive economic episode of the 2001 expansion was the formation of a housing bubble. We hypothesize that this bubble was fueled by several factors. Easy monetary policy during 2001-2004 may have contributed to the formation of the housing bubble; recall that we emphasized that the bursting of the dot-com bubble, the major decline in the S&P 500 Index and the subsequent declines in U.S. wealth, along with the terrorist 9/11 attack, the low inflation and the subpar economic recovery made such easy monetary policy suitable for the conditions that prevailed. During the 2001 to the mid-2004 period the Fed’s actions of an expansionary monetary policy were in accord with its mandate to pursue maximum employment. Taylor (2007) argues that monetary policy caused the housing bubble. Bernanke (2010) supplies detailed evidence that the housing bubble cannot be attributed to monetary policy. We offer a
milder hypothesis that the expansionary monetary policy may inadvertently have contributed to the housing bubble. Parenthetically, Hayford and Malliaris (2004, 2005) find similar evidence for the impact of monetary policy during the stock market bubble of 2006-2010.

--A second factor that may have contributed to the housing bubble is global imbalances. Bernanke (2005, 2007, and 2011) has articulated the role of global imbalances, their impact on long-term interest rates and their influence on housing prices.

--The size and intensity of the housing bubble is evidenced not only from its sharp increase but also subsequent decline and stagnation over a period of about 5 years, calls for both a behavioral finance hypothesis and a broader Keynes-Kindleberger-Minsky hypothesis. The behavioral finance concepts of short sale constraints, the representative heuristic, and overconfidence are all relevant hypotheses in the formation of the housing bubble. Keynes-Kindleberger-Minsky will go further and hypothesize that the housing bubble was fueled not only by investors driven by behavioral finance arguments but by the entire financial sector that produced securitization vehicles, asset backed commercial papers, money market funds, investment banks, mortgage companies, various shallow banking entities, provided inconsistent incentives, followed deficient risk management practices, allowed excessive leverage and in the end misallocated capital. In particular, Minsky (1986) elaborates in detail the role of the financial sector in destabilizing the real economy.

--A related hypothesis addresses the potential relationship between the Nasdaq and to a lesser extent the S&P 500 bubbles of 2005-2010 with the housing bubble. After all, it was the crash of the dot-com bubble that partially induced the easy monetary policy of the early 2000s. Is there a connection between the stock market and subsequent housing market bubbles? Jalinvand
and Malliaris (2010) elaborate this possibility of a sequence of bubbles. Related is the issue of the efficient allocation of capital during asset bubbles. In conducting a welfare analysis, consider, for example, the internet bubble of the late 1990s, and the 2000s housing bubble. Again, these bubbles resulted in significant price run ups and consequential declines in the respective assets (internet firms and housing), only to be repriced at substantial discounts after the bubbles burst during the financial crisis. Given such volatility, one has to wonder whether capital allocation based on such price bubbles was efficient.

The internet bubble pushed the NASDAQ index to a record level of nearly 5,000 in early 2000, only to have it drop below 1,140 in September 2002. For the housing bubble, the S&P/Case-Shiller National Home Price Index reached a peak of 190 in 2006 only to drop to about 130 in 2008. Although it is not often considered, they could have resulted in significant welfare implications. As both bubbles were growing, scarce capital was increasingly allocated to the booming sectors. Indeed, Chirinko and Schaller (2012) find evidence that is consistent with a misallocation of capital.

--In summary, traditional economic analysis, behavioral finance, a broader Keynes-Kindleberger-Minsky perspective, government policies for housing, regulation, monetary policies and global imbalances, all together present a more comprehensive perspective of the housing bubble and the otherwise subpar expansion of 2001-07.
This analysis leads us to realize certain facts that just few years ago, at the high period of the market efficiency hypothesis, traditional economists would express serious skepticism. These are: (1) theoretical models and empirical evidence support the existence of bubbles; (2) asset bubbles are more likely when new technologies, financial innovations, major changes in regulation and other significant events generate great uncertainty in valuations; (3) bubbles are hard to discern because each bubble appears to have very unique characteristics and conditions for its emergence, and (4) despite the unique characteristics of each bubble, there appears to be a uniform pattern of its evolution. This evolution is described in some detail by Kindleberger (1978), Minsky (1986) and more recently Dudley (2010). The approximate evolution involves: initial triggers such as new technological or financial innovations, major shifts in social preferences, unanticipated political and economic changes, all offering very uncertain valuations; asset price increases in the initial stage are slow; biased beliefs about future profitability and returns are formed with a divergence of opinion between optimists and skeptics; optimists drive
prices higher and market expectations are driven by exuberance; positive feedback drives prices higher; constraints and risks to short selling cannot moderate price increases; the proportion of traders that are optimists increases relative to the pessimists; overconfidence increases; at some point exuberance, beliefs and overconfidence are contradicted or challenged by facts; and finally, the proportion of optimists declines sharply and the positive feedback turns negative causing the bubble to deflate rapidly.

Thus, in the view of a large number of financial economists, bubbles do exist, regardless of how tentative our comprehension of them is. In fact, we argue they need to be further studied to get a better grasp of the issues we know so little about.

THE UPPER TURNING PERIOD

We propose that the upper turning period spans from January 2007 to September 2008. Why? First, prior to January 2007, some data signaled that the expansion was faltering but there was no solid evidence that it was in serious trouble. For example, by mid-2006 the S&P/Case-Shiller U.S. National Home Price Index had peaked and later in that year started its decline. These price declines caused the U.S. Home Construction Index to also decline during 2006. Second, in general, 2006 was a challenging year for the housing industry because during that year, the housing market slowed down, home prices fell, construction declined and an inventory upsurge of unsold homes took place. Third, subprime mortgages that barely existed in 1995 had grown to about 8% of all mortgages in 2004 and up to 20% by 2006. Also, most of these subprime mortgages –90% by 2006—were adjustable rate. These products were riskier and grew because
of lower lending standards. By 2006, subprime mortgage delinquencies were growing. Finally, U.S. households had become increasingly overburdened with debt. The debt to disposable income ratio had increased to about 125% by 2006.

These facts contributed to increased uncertainty about the future of the housing bubble. Monetary policy had also become tighter with Fed funds increasing from about 1% in mid-2004 to 5.25% by mid-2006. However, during 2006, even towards the end of the year there was no clear evidence that the housing boom had come to an unambiguous end. This uncertainty increased during 2007 and reached its highest level in mid-September 2008 when Lehman Brothers failed. Thus, it was during the January 2007 to September 2008 that it became highly probable that the expansion had ended and the uncertainty of instability had increased. As was reported numerous times the NBER peak in December 2007 which is approximately the mid-point of our turning period.

Let us now consider some of the most relevant events that took place during the January 2007 - September 2008 turning period. Broadly speaking, it is during this period that the financial crisis takes shape. It was not known then that this crisis would spread to become a global crisis. Also, there were worries about a recession, but again no one anticipated its severity.

Some key events that will guide us in formulating our hypotheses include: in early April 2007, New Century Financial, which specializes in sub-prime mortgages, files for Chapter 11 bankruptcy protection; in June 2007, two of Bear Stearns hedge funds with large holdings of subprime mortgages experience large losses and are forced to sell assets affecting other firms such as Merrill Lunch, Goldman Sachs, Citigroup and J.P. Morgan; in October 2007, Merrill
Lynch’s chief executive resigns after the bank reported a $7.9 billion exposure to bad debt; it was reported in December 2007 that 1 million homeowners were facing foreclosure; in March 2008, Bear Stearns is bought by J. P. Morgan; also in March 2008, the Federal Reserve makes a $200 billion of funds available to banks and other institutions to try to improve market liquidity; in July 2008 IndyMac becomes the largest thrift ever to fail in the U.S. During September 2008, the crisis escalates: mortgage lenders Fannie Mae and Freddie Mac, accounting for about half of the outstanding mortgages in the U.S. are rescued by the U.S. government in one of history’s largest bailouts; Lehman Brothers files for bankruptcy; the share price of the Reserve primary money market mutual fund falls below the $1 mark because $785 million of its $64.8 billion was issued by the bankrupted Lehman Brothers; Bank of America takes over Merrill Lynch; Morgan Stanley and Goldman Sachs give up their status as investment banks and become traditional banks with access to the Fed’s discount window. A full Timeline of Events and Policy Actions may be found in Federal Reserve Bank of St. Louis web site http://timeline.stlouisfed.org/

Next, we proceed to formulate certain hypotheses about the Upper Turning period.

--Price asset bubbles exhibit various patterns: some deflate on their own without any economic or financial consequences to the economy; other crash with minimal impact on the real economy. For example, the bursting of the dot-com bubble in 2000 had only a limited impact on the economy during the brief 2001 recession. In contrast, some bubbles cause serious problems. Here, we hypothesize that what started as a housing bubble in the late 1990s and accelerated during 2001-2005 because of public policies encouraging home ownership, low interest rates and the global saving glut, progressed into a credit bubble supported by both the banking and shadow banking sectors, financial innovations and loose financial regulations. Recognizing the strong interdependence between the housing bubble and the credit bubble and the positive feedback
between the two of them helps explain the intensity of the crisis. It was during January 2007 to September 2008 that the housing bubble was associated with a credit bubble mostly in the form of mortgage backed securities.

--Traditional economic analysis can easily explain that the bursting of the housing bubble had an immediate impact by causing an increase in housing inventory and quick declines in new home construction, with workers formerly employed in the housing industry becoming unemployed.

--Behavioral finance claims that the disutility of losses is more than the utility of equivalent gains. So once the housing bubble could not be supported any longer and housing prices began to drop, prospect theory would argue that the disutility of homeowners from initial losses (beginning in the middle of 2006), caused these homeowners to sell. This was particularly true for households with mortgages bigger than the value of their home. These households became delinquent in their mortgage payments and subsequently underwent bank foreclosures.

--The central episodes of the upper turning period were both the financial and economic instability. Our earlier background analysis of instability can be applied at this point. When it became clear in 2007 that the initial declines in housing prices were not temporary but indicative of the housing bubble having burst, the financial system that had supported the housing industry with the expectation of continued increases in prices suddenly froze; it no longer allocated any financial resources to this sector of the economy. Thus, while during periods of financial stability, the financial sector efficiently allocates capital to productive investment opportunities, during a period of instability the financial sector does not allocate any capital. The reason is clear: if the financial sector has allocated capital in housing with inflated prices, price declines
decrease the values of the assets held by the financial sector in the form of mortgages, losses are incurred and, if the declines are large, insolvencies arise. Minsky’s financial instability hypothesis is the most elaborate theory that addresses this phase of the crisis. It has remained outside the orthodox market economics paradigm but the current crisis has brought much attention to these ideas.

--Financial instability involves, first, certain events that initiate the crisis, often called triggers. Second, there is a rapid propagation and amplification of the crisis from some financial firms to the entire financial sector and eventually to the real economy. Finally, structural weaknesses in the financial sector that were not apparent during the boom become apparent and complicate the crisis. In addition to these elements of the crisis, the speed and force of responses by the regulating and political authorities become critical because the expectations of economic agents become fragile and uncertainties are magnified. During such periods of panic, there is a wide range of multiple unstable equilibria.

--The most likely triggers of the crisis during the upper turning period were the price declines in the housing that accelerated during 2007 and the accompanied significant losses on residential subprime mortgages. The pool of these mortgages was about $1 trillion and the losses were substantial but in the end the amplification of the crisis generated significantly much bigger losses. Gorton (2008) documents how these initial mortgage losses caused lenders in the commercial paper market to withdraw their funds than to invest in risky assets. This caused the initial subprime mortgage crisis to spread into various channels of short-term funding for both banks and the shadow banking sector, cash was hoarded instead of being invested, liquidity dried up, risk management systems failed generating further losses and thus amplifying the magnitude
of the crisis because of the high levels of leverage. Bernanke (2010) gives a detailed exposition of the process of propagation and amplification.

--The hypothesis of financial amplification motivates a corresponding psychological amplification. Barberis (2013) and Krishnamurthy (2010), among others, reason that margin spirals, fire sales cycles and accumulating losses contribute to significant loss aversion and ambiguity aversion to investors with large positions in risky assets. Behavioral finance has considered these concepts and applications to the recent crisis can further contribute to our understanding of psychological amplification.

--The upper turning period begins with some ambivalence whether growth will continue or is coming to an end; as evidence increases that the bubble has no further momentum, it becomes clearer that difficult adjustments lie ahead. Taleb (2013) discusses the two main patterns of transition periods: concave and convex. Naturally, the upper turning period is concave and once it is confirmed at some point past the maximum, investors recognize that the prospects for further gains have evaporated; with a much greater probability for losses rather than profits, the concavity property of the upper turning period implies losses and sales of assets, ultimately initiating the recession.

THE GREAT RECESSION OF 2007-09

We have already indicated that, according to the NBER the Great Recession began in December 2007 and ended in June 2009. In its September 20, 2010 announcement at the end of the Great Recession, the NBER described it as the longest and deepest since the Great Depression. It lasted for 18 months and real GDP decreased by more than all other recessions since WWII. In an earlier section we gave some general characteristics of this Great Recession. Ohanian (2011)
gives a detailed analysis of this recession and asserts that it was much different from other recessions, particularly in terms of its impact on labor markets. The data below indicate that in terms of output, consumption, investment employment and hours worked, changes from the peak of the cycle were greater for all measures during the 2007-09 recession than the corresponding measure of the average of all other postwar recessions.

### Table 1: 2007-09 Recession versus Postwar Recessions, United States

<table>
<thead>
<tr>
<th></th>
<th>Output</th>
<th>Consumption</th>
<th>Investment</th>
<th>Employment</th>
<th>Hours worked</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007-09 recession</td>
<td>-7.2</td>
<td>-5.4</td>
<td>-33.5</td>
<td>-6.7</td>
<td>-8.7</td>
</tr>
<tr>
<td>Average of other postwar recessions</td>
<td>-4.4</td>
<td>-2.1</td>
<td>-17.8</td>
<td>-3.8</td>
<td>-3.2</td>
</tr>
</tbody>
</table>

(Ohanian (2011) Percent Change in per Capita Values)

Why was the Great Recession of 2007-09 so severe? Reinhart and Rogoff (2009) address this question by offering a comparative historical analysis that focuses on the aftermath of systemic banking crises. They focus on three dimensions of financial crises: asset market crashes, banking crises, and increases in the real value of government debt. Their evidence is not provided to prove a specific hypothesis; it is presented as empirical evidence to motivate the hypothesis that when recessions are accompanied by financial crises they are more severe.

Financial crises are associated with banking crises when credit booms become credit busts. This means that banking crises occur when the value of their portfolios of assets and loans decline in value. This may or may not lead to bank runs when depositors who are concerned with the quality of a bank’s assets withdraw their deposits. Such runs need not occur because of depositors insurance provided by the FDIC but loan and asset defaults do occur. For example, investments made in mortgage backed securities and construction loans to developers lost value because of the housing crisis in the U.S. while banks that invested in sovereign debt in certain Eurozone
countries also experienced big losses. Such bank losses discourage banks from lending for some time and prolong economic recessions.

Ohanian (2011) considers the hypothesis that the Great Recession was made more severe because of the financial instability and in the end concludes that this hypothesis cannot be supported. However, he finds that the Great Recession was made more severe because of poor government policies. What were these policies by the government and how successful were they?

Blinder and Zandi (2010) and Auerbach, Gale and Harris (2010) give a detailed presentation of the various fiscal programs and offer an evaluation of their effectiveness. Here we briefly mention some of the leading fiscal initiatives, including: a stimulus package of $152 billion in tax rebates for 2008; tax credits for first-time homebuyers enacted in July 2008 and later extended and expanded in November 2009 and July 2010; the Troubled Asset Relief
Program enacted under Bush in fall of 2008, allocating $700 billion for the recapitalization of insolvent financial institutions which included transfer of funds into banks, purchases of mortgage-backed securities and other private debt from banks and the nationalization of AIG, the insurance company; the American Recovery and Reinvestment Act of February 2009, which allocated $787 billion for a combination of tax cuts, transfers to individuals and states, and government purchases; the cash for clunkers program in summer of 2009; among others. These fiscal measures pooled with aggressive monetary policy brought the Great Recession to an end. Below, we formulate some key hypotheses for the severity and duration of the Great Recession.

--During normal times, housing construction contributes about 5% of employment and output. However, during the housing bubble this sector increased substantially in significance because of its numerous inter-linkages, the proliferation of home equity loans, the many financial innovations associated with mortgages and the impact of these innovations to the growth of the financial industry. Thus the bursting of the housing bubble had a bigger impact than the bursting of the dot-com bubble. Two recent studies by Tcherneva (2012) and Boldrin, Garriga, Peralta-Alva and Sanchez (2012) explore this issue.

--Ohanian (2011) is inclined to attribute the difficulties of the Great Recession to insufficient government policies. Going beyond traditional economics and invoking Keynes’ animal spirits, we hypothesize that fiscal policies perform poorly after major housing bubbles burst because of two reasons: first, households reduce their spending since they experience substantial loss in their housing equity and thus decrease the magnitude of fiscal multipliers and second, simultaneously, entrepreneurs face increased uncertainty as they anticipate the swelling of future public debt. For fiscal policy to be effective, it needs to address both the short term
weaknesses of the economy and to also clarify the future reduction in public debt. Only when both issues are addressed, uncertainty is reduced and animal spirits turn fear to optimism and action.

THE LIQUIDITY TRAP: THE LOWER TURNING PERIOD

In its September 20, 2010 announcement, the NBER (2010) Business Cycle Dating Committee reported that it chose June 2009 as the end of the Great Recession. It said it “did not conclude that the economic conditions since that month have been favorable or that the economy has returned to operating at normal capacity”. So even after more than a year passed since the end of the recession, the economy was growing slowly and unemployment remained above 9% for both 2009 and 2010. This underperformance has persisted through 2011 and 2012. These facts lead us to describe the lower turning period as an unusually long period that began on April 1, 2009 and will extend until the Fed begins to increase the Fed funds rate. We choose April 1 as the beginning of the lower turning period because the S&P 500 Index had reached its lowest point of 683 in early March and started climbing very decisively. There were numerous articles during March 2009 speculating that equities had reached their bottom. So there was some evidence that equity declines had run their course. But there was no credible evidence that the recovery was going to be strong. The defining characteristic of a lower turning period is the difficulty to calculate rationally future business prospects and in view of such uncertainty animal spirits continue to be stuck in a state of pessimism.

We described in the previous section that fiscal policy during 2009 attempted aggressively to stimulate the economy. In addition, monetary policy took several forceful steps to reduce the unemployment hovering around 9%. By early 2009, Fed funds were dropped to
essentially 0.25% and remained essentially zero during 2009-2013 and are expected to remain low even further. With short term rates at zero, the U.S. economy experienced Keynes’ characterization of “a liquidity trap”.

What is a liquidity trap? A liquidity trap is defined as an economic condition in which the short-term nominal interest rate is zero while the real economy operates below capacity with high unemployment, currently around 7.7% and a significant output gap. Keynes (1936) observed this situation of interest rates close to zero during the Great Depression of the 1930s and concluded that monetary policy had become ineffective because further increases in the money supply had no effect on interest rates that had already reached their lowest bound. Therefore, if monetary policy cannot influence the nominal short-term interest rate any further, it becomes ineffective because it cannot stimulate spending and output any further.

The Keynesian liquidity trap as a theoretical tool was very limited because it was static and ignored expectations. The monetary policy ineffectiveness that followed the liquidity trap condition led Keynes to advocate fiscal policy as an alternative tool to reduce the output gap that prevails during the liquidity trap. But what if, as in today’s U.S. economy, fiscal policy becomes constrained because of political considerations? What policy options are available to an economy such as the U.S. during the current lower turning period?

A modern view of the liquidity trap has emerged from the experience of Japan during the 1990s, several recent seminal papers and the FOMC published discussions and deliberations during the past few years. The seminal papers include Krugman (1998), Eggertson and Woodford (2003), Werning (2012), and Woodford (2012), among numerous others. These authors argue that if expectations are introduced in a liquidity trap model, such expectations
under certain conditions become additional tools of the central bank that may allow monetary policy to become effective. So, if a central bank wishes to conduct an effective monetary policy, it must change the agents’ expectations about future interest rates when the zero bound will no longer hold. In other words, monetary expansion becomes a tool when the central bank goes beyond the traditional “open market operations” and instead commits to keeping lower future nominal interest rates for a pre-specified period into the future. The application of these tools became known as Quantitative Easing and was implemented by the Fed in three programs known as Q1, Q2 and Q3.

As already mentioned, in early 2009, the Fed had lowered Fed funds to essentially zero without being able to accelerate growth and reduce unemployment. During Q1, the Fed purchased large quantities of mortgage backed securities and bank debt; this lasted from early 2008 to early 2010. Q2 began in mid-2010 when there was evidence that the economic recovery remained weak. During this phase, the Fed purchased $600 billion of long-term Treasury bonds. The Fed’s goal was to signal to market participants that it was pursuing expansionary monetary policy even if long-term interest rates were not impacted. Q3 was announced in September 2012 with a new novelty: the Fed switched to buying $40 billion mortgage backed securities per month with no time limit and no maximum amount specified.

Under these circumstances what can be hypothesized about the lower turning period?

--Neoclassical economics has characterized the 2007-09 recession as “great” because the bursting of the housing bubble, the financial crisis that followed because of initial losses in mortgage backed securities, the spreading of the financial crisis, the substantial losses in wealth, the unusually high level of unemployment that has persisted over 5 years and the subpar growth
of the economy, all of which have contributed to a very slow recovery. One hypothesis argues that economic recessions that result from the bursting of real estate bubbles, equity crashes and financial and banking crises take an average of 5 years for the economy to recover. Others can hypothesize that while monetary policy has been aggressively expansionary, fiscal policy has not been sufficient.

--From the case of Japan during the 1990s, the U.S., England and the Eurozone during the Great Recession and various other countries that have experienced asset booms and busts, financial crises and liquidity traps, what can be hypothesized about asset bubbles and liquidity traps? It is known that not all asset bubble crashes bring about liquidity traps, but some do. If the financial costs of mopping up after the bursting of an asset bubble with serious difficulties for the financial sector and an economy ending up in a liquidity trap, is the Fed prepared to consider macroprudential regulation to moderate and if possible to contain asset bubbles before they grow? This topic has received much attention and before the Great Recession the view that was held was that the central bank should not attempt to control a bubble because of difficulties to diagnose the bubble. Dudley (2010) acknowledges that bubbles exist, although they are hard to identify particularly in their early stages of development. Suppose that with some degree of probability a bubble has been identified. The costs versus the benefits of taking action against such a bubble and to limit its growth depend on the available tools and their effectiveness. There is a consensus that using Fed funds is not the appropriate tool; using macroprudential regulation to contain the growth of credit may be a more effective tool. Issing (2009) and Malliaris (2012) discuss the prevailing ideas prior to the Great Recession on bubbles and monetary policy and Jeanne and Korinek (2013) develop an appropriate strategy to deal with a bubble.
-- What are the current hypotheses proposed by leading scholars and selectively applied by the Fed? First, during a liquidity trap with a short term nominal interest rate at zero, the real rate of interest is negative and needs to be partially offset by some inflation, say 2% to 3%. This means the central bank needs to avoid deflation at all costs. The experience from Japan tells us that if deflation materializes, it is difficult for the economy to get out of the liquidity trap. Suppose the real interest rate is -3% and deflation is 2%. Adding these two negative numbers means that consumers will be reluctant to spend with such a real interest and deflation totaling a negative 5%; this would imply further drops in output and employment leading to a depression. So, avoiding deflation is the first step which has been achieved by the Fed so far. But the Fed has done and is doing more. It has articulated that, although eventually the economy will return to its potential at some future time, and Fed funds will increase then, the Fed has committed now to keeping the Fed funds at zero for a period that will overlap with the strong recovery. Currently, the Fed has committed to keeping Fed funds at close to zero till 2015. The logic of such a strategy is to ensure that the economy recovers its lost output during the liquidity trap and consumers and businesses do not postpone their spending because of the uncertainty surrounding higher nominal interest rates in the future.

-- What else can be hypothesized beyond orthodox economic theory? Behavioral finance has not proposed a hypothesis about the liquidity trap. Its main contributions lie in asset pricing, risk management and corporate finance. But both Keynes and Minsky’s ideas may be helpful for formulating a hypothesis that highlights the importance of expectations. Minsky’s financial instability hypothesis articulates the interplay between investment and the financial sector and claims that the financial sector is structurally unstable. Minsky’s financial instability may result in a liquidity trap. Both Minsky and Keynes consider monetary policy to be ineffective and
propose expansive fiscal policy. Currently, fiscal policy is entangled in conflicted political debates. Beyond these debates, it is known that the increases in the national debt are not sustainable. So fiscal policy appears severely constrained. Thus, we are left with monetary policy which is also constrained during a liquidity trap. But as constrained as the central bank may be it still has tools available to influence expectations. According to Keynes (1936, p. 162) the state of long term expectations of all economic agents is often steady. People believe that the future will be favorable. Human psychology is largely optimistic about the future. Additionally, this sentiment of hope for the future is stable. It is the short term expectations that are triggered by the bursting of asset bubbles and financial panics that are volatile and pessimistic. So, we can hypothesize that as the economy slowly recovers and short term expectations improve, the stable and optimistic long term expectations exert positive influence on spending and economic growth. It is during the lower turning period that nonlinear returns can be expected because of the convexity property that describes the bottom of the cyclical behavior.

CONCLUSIONS

This paper argues that it is useful to divide the cyclical behavior of modern mixed capitalist economies into an expansion, upper turning period, recession and lower turning period. This characterization of the business cycle is more complicated than the one currently followed by the National Bureau of Economic Research, which identifies the peak and trough of the cycle. However, the complexity of four phases compensates with additional insights. To illustrate the usefulness of this approach, the current global financial crisis is examined by first, reviewing the expansion with the development of the housing bubble. Then, the beginning of the crisis is viewed as the upper turning period. The initial financial instability evolved into a full crisis
during the Great Recession with its impact on unemployment. Finally, the ending of the crisis during the challenging period of the liquidity trap as the lower turning period is also analyzed. Orthodox economic analysis offers valuable insights for both the expansion and recession phases but can also benefit from behavioral finance and Minsky’s analysis. The upper turning period is Minskian and the lower turning period is an updated version of the Keynesian-Minskian liquidity trap. Also Taleb’s concavity and convexity properties of the upper and lower turning periods offer useful insights.

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Gross Domestic Product
Billions of 2005 dollars

Sources: Bureau of Economic Analysis and Congressional Budget Office

Center on Budget and Policy Priorities | cbpp.org
Real S&P: Confidence Interval for Trend (Log Scale)

95% CI for Predicted Values
95% CI for Mean Growth Rate
Log (Real S&P)