

## Herd behaviour in asset market booms and crashes: the role of monetary policy

**Stefano Micossi\*, Alexandra D’Onofrio\*\* and Fabrizia Peirce\***

\*Assonime; \*\*Arcelli Center for Monetary and Financial Studies

Robert Shiller’s influential book “Irrational Exuberance” (Shiller 2015) dealt powerful blows to the hypothesis of efficient capital markets by describing in remarkable detail the deep-rooted psychological and ‘irrational’ mechanisms driving investors’ decisions, on occasion developing into herd behaviour – ‘manias’ – and generating ‘bubbles’ in housing, bond and stock markets. One important conclusion of his work is that bubbles and manias are random exogenous phenomena that cannot be foreseen or, for that matter, explained by standard macro-economic analysis and, more specifically, do not depend on macro-economic policies. This view has been subscribed to by many influential scholars of financial crises, such as Blinder (2013) and Bernanke (2015).

Experience has repeatedly confirmed that, once bloated asset prices stop rising, they do not stand still but fall precipitously, occasionally, but not always, leading to widespread bankruptcies, bank crises and economic depression. Therefore, Shiller’s conclusions are important for understanding the root-causes of financial crises and the resulting depressions, and hence our ability to build effective defences against their repetition.

In this paper, we argue that Shiller may be overlooking the role that lax monetary policy plays in triggering financial bubbles and manias, notably by offering to investors’ expectations a perverse anchor of ever-increasing asset prices. To this end, we will review the two financial bubbles and the ensuing crashes in the United States during the 1920s and 2000s, drawing attention to the possible destabilizing role of the Federal Reserve, which not only maintained a highly expansionary monetary policy stance as asset prices perilously accelerated, but also promised investors that their expansionary stance would be maintained indefinitely.

The paper is organized as follows. In Section 2 we define bubbles and manias and show that the convergence of investors’ expectations of ever higher gains may be taken as the distinguishing

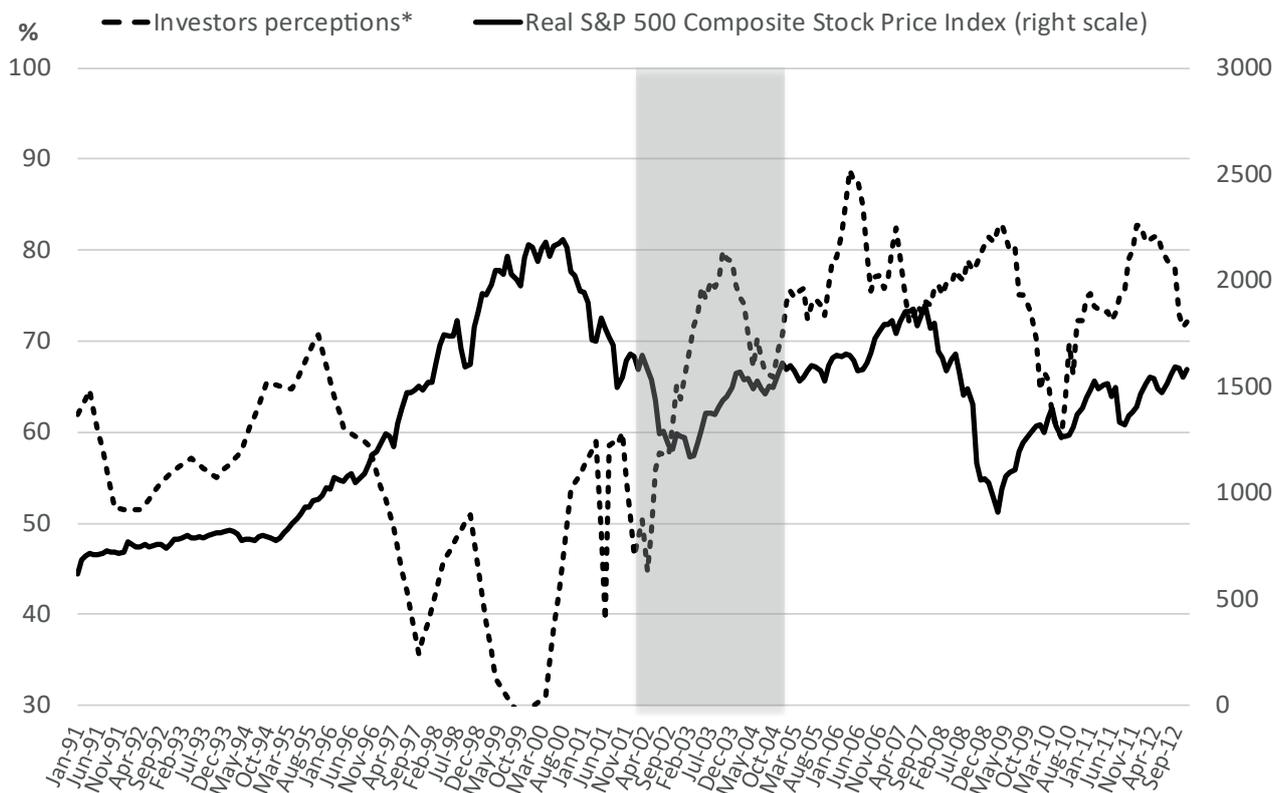
feature of manias. Section 3 shows that not all asset price bubbles turn into manias; it then describes the build-up of financial imbalances and the paper pyramids underlying the unfolding of manias, notably including the interaction between real estate bubbles, on the one hand, and bond and stock price increases, on the other, in cross-feeding financial excesses. Section 4 discusses the role of monetary policy in turning bubbles into manias, by offering an anchor to the convergence of investors’ expectation of ever higher gains. Section 5 summarises our conclusions.

### Bubbles and manias

The standard definition of an asset price bubble is a large and long-lasting deviation of the price of some assets – such as a stock, a bond or a house – from their fundamental value, which is the expected discounted income or other benefit and valuation increase over the holding time-horizon (Kindleberger & Aliber 2005; Blinder 2013).

While the definition is conceptually clear, in practice it is very difficult to identify a bubble: what may appear ex-post as a bubble, after an ensuing price crash, may have been seen ex-ante as a rational investment by many sophisticated investors. Peter Garber (2000), for instance, famously argued that even the tulip mania in the Netherlands in the early 17th century was rational, more or less in line with what happens with other rare objects craved by collectors. While his arguments are not fully convincing (cf. Chancellor 1999, Shiller 2015), they point to the wide margins of appreciation involved in any attempt at judging the fundamental value of an asset. This argument played an important role in convincing Alan Greenspan, then Chairman of the Federal Reserve, that it was none of his business to try to stop an emerging asset bubble (Greenspan 2007).

Shiller (2015), on the other hand, offers many examples of ‘obvious mispricing’ of real and

**Chart I.** Stock prices and investors' perceptions (monthly data, 1991-2012)

\*Percentage of investors believing market is not too high. Source: Shiller

financial assets, sometimes lasting a long time. His empirical evidence leads him to conclude that “stock prices clearly have a life of their own; they are not simply responding to earnings or dividends. ... In seeking explanations of stock price movements, we must look elsewhere” (p. 208). He maintains that these other factors are mainly psychological and not related to policy actions; therefore, he somehow agrees with Greenspan that macro-financial policies are not the right tool to prevent asset mispricing.

Manias may be characterized as a general atmosphere of euphoria, simultaneously boosting asset prices, consumption and investment spending, and the broad participation of all social layers in the speculative wave. Typically, spending surges because credit is plentiful and ready to accommodate most extravagant undertakings. Thus, in the past century, real estate bubbles were repeatedly and significantly related to the multiplication of super-skyscrapers. With the real estate bubble in full swing in Japan in the second half of the 1980s, the Mitsui Real Estate company paid US \$625 million for the Exxon Building in New York (its initial asking price had been \$325 million), their motivation being that they wanted to get into the Guinness Book of World Records for

paying the highest price ever for an office building (Kindleberger & Aliber 2005).

Charles Mackay – who provided the first popular account of the Tulip mania and the Mississippi and South Sea bubbles in his book *Extraordinary Popular Delusions and the Madness of Crowds* (1841) – described speculative manias as a “manifestation of the occasional tendency of societies to succumb to delusion and mass madness” (quoted by Chancellor 1999: xiii). In his classical work on the Great Depression, Galbraith (1954: 99) noted that “by the summer of 1929 the [stock] market not only dominated the news. It also dominated the culture”. He described how simple people, even housewives normally excluded from trading on the exchange, became active investors. Shiller (2015) offers rich evidence to confirm that this was indeed a widespread phenomenon both in 1928-1929 and in 2007-2008. Akerlof & Shiller (2009: 65) provide a fitting description of a mania, which they dub an overheated economy, “a situation in which confidence has gone beyond normal bounds, in which an increasing number of people have lost their normal scepticism about the economic outlook and are ready to believe stories about a new economic boom”.

Shiller himself has built a data set (available since the early 1990s) on investors' expectations of stock price developments that may help us distinguish more precisely a stock market bubble from a mania.<sup>1</sup> In Chart 1 a main stock market price index<sup>2</sup> has been depicted, together with Shiller's measure of investors' perception of current stock prices, i.e. the percentage of investors expecting prices to go up, over the January 1991 – September 2012 period.

As Chart 1 demonstrates, once stock prices started to rise since the mid-1990s, the share of investors considering them likely to increase further diminished steadily and reached its trough more or less at the time of the market peak. As may be recalled, this was the period of the so-called dot.com bubble, when the price of IT stocks rose to unbelievable heights before falling back in the following two years. The behaviour of the expectation curve seems to point to an environment in which investors' opinions differ and do not move in herd.

Compare this with the behaviour of investors' expectations in the ensuing period up to 2008, when stock prices recovered to lesser heights, but in a frenetic environment not dissimilar to that observed in the late 1920s. One can see that, sometime after 2003, a rising share of investors start expecting prices to continue going up despite already substantial increases, and that the phenomenon of convergence in expectations persists in 2009 even after stock prices turn downward rather dramatically. In this environment, investors start basing their decisions on the actions of others, rather than on their own independent information. Such a convergence in investors' expectations may be taken as the distinguishing feature of manias, in which not only do stock prices lose contact with underlying fundamental values but also investors start dreaming of ever-increasing prices of a broad range of assets.

We will argue that this distinction is useful in order to appreciate the quality and the consequences of financial excesses, whereby bubbles are frequent but less harmful, while manias are rarer but lead to more dramatic dislocations in the financial system and the real economy.

Shiller (2015) tables 25 episodes of extraordinary stock price increase and decrease (over one-year and five-year time horizons) in the three decades from the 1970s to the 1990s (cf. Tables 8.1 to 8.4 in

Chapter 8), seeking evidence of potential bubbles, while Kindleberger & Aliber (2005) devote special attention to the two episodes in the late 1920s and 2000s, which they consider the sole examples of manias.

To an extent, their different approaches reflect different research questions. Shiller is looking for evidence of irrational behaviour, identified by persistent and lasting deviations of stock prices from their fundamental value. His conclusion is that stock prices, while being in general highly variable, display "quite a substantial, though imperfect, tendency for major five-year stock price movements to be reversed in another five years, for both up movements and down movements" (p. 161), indicating the likelihood that they had previously moved too far. His general picture is one in which stock markets on occasion run too high, reflecting exogenous events that are temporarily amplified by investors' self-fulfilling psychology ('emotions') and are not explained either by fundamental values or macro-policies. Blinder (2013) takes the same view; he accordingly concurs with Shiller that the real estate boom of the 2000s cannot be explained by the lax monetary policy that followed the implosion of the dot.com bubble since, as he argues, the house price increase had already taken off in the mid-1990s.

Kindleberger & Aliber (2005) on the other hand, point out that, after imploding, certain waves of asset price increase subsequently lead to much deeper financial dislocations and economic depressions, and they associate these cases with manias. In their view, bubbles and manias are monetary phenomena, liable to be explained by the intrinsic instability of the capitalist systems (as in Minsky 1984), but also by massive excess liquidity wandering around in international markets and being attracted, as if by a magnet, to the prospects of extraordinary yields. These prospects, as we will argue, are sometimes created by misguided monetary policies offering an anchor to speculative investors and triggering the convergence of investors' expectations that are typical of manias.

Before turning to this issue, our next paragraph will examine in greater detail the main ingredients of the broad-based asset price boom that equally characterized the late 1920s and the 2000s.

1 Created under the Yale University Investor Behaviour Project, directed by Prof. Shiller, the data set provides four stock market confidence indices derived from survey data, collected since 1984, on the behaviour of US investors. The four Stock Market Investor Confidence Indices are measured as the percentage of respondents who report holding a certain view. Each index is derived from the responses to a single question that has been continuously posed since 1989 to a large sample of respondents. In Chart 1 data are drawn from the Valuation Confidence Index for institutional investors, reporting the number of respondents who think that the market is not too high. The dataset is available at <http://icf.som.yale.edu/confidence.index/>.

2 The real S&P 500 Composite Stock price index is calculated by Shiller and consists of monthly stock price data deflated by the consumer price index (to allow conversion to real values). Stock price data are monthly averages of daily closing prices.

## When investors go crazy

A theory of financial instability, that with ex-post hindsight fits pretty well the events that, in 2008-2009, led the capital markets in the main financial centres to a near meltdown, had been developed in the 1950s by Minsky (1984). Charles Kindleberger took his analytical framework as a basis for his classical work on bubbles, crashes and manias, but most economists, fully convinced by the efficient capital market hypothesis, did not pay much attention to Minsky's analysis until after the crash set in motion by the failure of Lehman Brothers in September 2008.

Minsky underlined the role of pro-cyclical changes in the supply of credit. During the expansion phase, investors revise upwards the expected profitability of a wide range of investments and accordingly raise their demand for credit. At the same time, lenders take an increasingly benign view of the risk of individual investments and become more willing to lend. When economic conditions worsen, both investors and lenders retrench. In this process, the behaviour of heavily indebted borrowers assumes special importance: when the economy slows down and asset prices go into reverse, those who borrowed short to purchase real and financial assets, seeking quick gains from valuation increases, may become distressed sellers and transform the downward price adjustment into a rout.

An important ingredient in the pro-cyclical expansion of credit is a 'displacement', i.e. some exogenous shock sufficiently large and pervasive to improve perceived profit opportunities and the economic outlook at least in one important sector of the economy. Examples of such shocks are the rapid rise of the automobile industry and of radio broadcasting in the 1920s in America and the worldwide IT revolution in the 1990s. A common feature of phases of financial excesses is the emergence of 'new era' stories, meant to reassure investors that ever higher gains are within reach, even after asset prices have started looking perilously high (Chancellor 1999, Shiller 2015).<sup>3</sup> This is where 'euphoria' or mania might manifest themselves.

Kindleberger & Aliber (2005: 64) have described how "speculative manias gather speed through expansion of money and credit". They conclude that, while most expansions of credit do not lead to a mania, every mania appears associated with a strong expansion of credit.

This 'credit view' has classic precursors in the Austrian School (Ludwig von Mises and Friedrich von Hayek), Irving Fisher, and Knut Wicksell, who saw the divergence between current and 'natural' interest rates as the main source of cyclical oscillations. Lionel Robbins (1934) popularised the view of the Great Depression being a consequence of the unsustainable credit expansion of the 1920s. An empirical analysis of the credit view extended internationally to the experience of advanced countries in the 1920s and 1930s was provided by Eichengreen & Mitchener (2003). They emphasized the role that the hybrid gold exchange standard of the interwar period and the attendant large increase in foreign exchange reserves had played in increasing the pro-cyclical elasticity in the supply of money and credit during the boom and bust. They also underlined the role of the accommodating monetary policy conditions in the 1920s in fuelling the credit boom, as well as the role played by financial innovation in increasing the impact of lax credit conditions.

Schularick & Taylor (2012) extended the empirical analysis for 14 advanced countries to the 1870-2008 period. They found that after WWII credit started to decouple from broad money and to an extent could expand independently via a combination of increased leverage and augmented funding by banks with non-monetary liabilities. Their conclusions are straightforward: their long-term, cross-country data set "lends support to the idea that, for the most part, financial crises throughout modern history can be viewed as credit booms gone wrong" (p. 1057).<sup>4</sup>

Chart 2 sheds further light on the distinction between bubbles and manias. It portrays the (cyclically adjusted) real price/earnings ratio, or CAPE, developed by Shiller,<sup>5</sup> together with GDP growth rates over the 1880-2012 period. The price/earnings ratio offers a convenient normalisation of

3 "Stock prices have reached what looks like a permanent high plateau", declared eminent Yale Professor Irving Fisher in the fall of 1929. He truly believed that America had entered a new era of limitless prosperity. A few weeks later the Dow Jones Industrial Average had declined by more than a third and by July 1932 it had dropped by 90% from its 1929 peak. In those years there was also an important change in the yardsticks of valuation of stocks, from the traditional approach valuing stocks at roughly 10 times the yearly earnings and dividend yields, to a new methodology based on the discounting of expected future earnings. This method is highly speculative since it relies on uncertain estimates of future earnings which are very much subject to changing market sentiment. Cf. Chancellor (1999) pp. 191-96.

4 Reflecting, of course, the very different regulatory and financial structure, along with the shift from gold-backed to fiat money, the expanded role of lending of last resort, associated with growing emphasis on bank supervision and deposit insurance, and the greater role of activist macro-economic policies – all changes that were introduced with Roosevelt's New Deal but took their full effects after WWII.

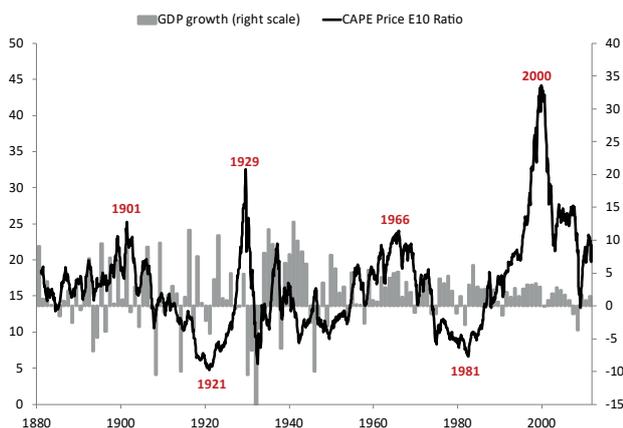
5 The cyclically adjusted price-earnings ratio (CAPE), also known as the Shiller PE Ratio, is the "inflation-corrected S&P Composite Index divided by the 10-year moving average of real earnings on the index". Monthly data. The Shiller price-earnings ratio "is a measure of how expensive the market is relative to an objective measure of the ability of corporations to earn profits" (Shiller 2015).

stock price cycles, making them comparable over a very long time-horizon.

The first observation is that the US stock market is characterised by long cycles of sustained appreciation followed by sustained depreciation; between 1880 and 2012 there were four such cycles. The Chart shows that the rise in stock prices builds up slowly, lasting years and even decades; this rise in stock prices was occasionally interrupted by sharp drops, but then resumed in earnest, subsequently reaching new peaks. In this regard, it appears that the upward phase of the latest cycle did not end with the implosion of the dot.com bubble in 2000 but continued through the ensuing decade to a new peak, until the final crash in 2008. The second stock market peak is dampened in the CAPE index, owing to the concomitant cyclical expansion of earnings and dividends, but is well visible in the stock price index in Chart 1.

The drop in the CAPE after 1929 and 2008 is much more dramatic than in the other two cycles in the chart: from 32 to 6 between the peak in 1929 and the trough in 1931, and from 44 to 13 between the peak in 2000 and the trough in 2009. In both cases the drop brought the entire financial system close to a meltdown. The unwinding of the bubbles from their peak was more gradual after 1901 and 1966, without similar financial dislocations, in the main responding to the fall in returns after periods of exceptional increases (Shiller 2015).

**Chart 2.** US Price/earnings ratio and GDP growth (1880-2012)



Sources: Shiller and Conference Board

Another feature worth noting in Chart 2 is that the variability of GDP growth has diminished markedly after WWII, while the oscillations in stock prices – relative to earnings – have widened. Both phenomena may be related to the rise in macro-policy activism; in particular, monetary policy was used aggressively to cushion

stock market falls and their impact on economic activity, indeed more aggressively over time. We will come back to this aspect in the next section.

The increased variability of stock market prices since WWII may also be linked to the “implicit and explicit insurance of financial systems by governments”, which may have “encouraged the massive expansion of leverage after the war” (Schularick & Taylor 2012: 1032). Indeed, the build-up of abnormal leverage in the financial system is frequent in the years leading up to the crashes of 1929 and 2008 but looks more conspicuous in the most recent cycle.

The increase in leverage exploited similar tools in the two eras, namely lending on collateral with tiny margins of own invested capital and wholesale funding by the banks with very short-term instruments renewable monthly, weekly or daily. A specific device that allowed the multiplication of leverage was banks and other financial institutions resorting to off-balance sheet vehicles – called investment trusts in the 1920s and special purpose vehicles or conduits in the 2000s – to raise money for speculative investments, free of the capital requirements normally imposed on financial institutions (Galbraith 1954, Di Noia & Micossi 2009, Blinder 2013). They combined the marvels of leveraging with those of borrowing on collateral; in the recent crisis, they were the essential vehicle for the new originate-to-distribute model of (mortgage) financing, whereby loans would be instantly securitized by originating banks and passed onto their investment vehicles. When ‘the music stopped’ and prices started to precipitate, the assets of these vehicles turned out to be illiquid, often lacking any active market for their negotiations; their valuations had been set by their sponsors and validated by rating agencies that were paid by the sponsors to rate these securities.<sup>6</sup>

Stock market speculators, in turn, were generously financed by Wall Street financial institutions with broker loans (Chart 3): in the 10 years preceding the market peaks, the value of these loans increased by 6 times in the 1920s and by over 4 times between 1996 and 2006.

The Chart draws our attention to a second important feature in the build-up of financial imbalances, which is the real estate bubble that preceded both financial crises, and the attendant increase in real estate loans, which went up in line with the extraordinary expansion of broker loans – but could not come down as rapidly when the stock market collapsed. This was a major source of strain in the balance sheets not only of the originating

<sup>6</sup> Thus, it was that, while there were only 12 Triple-A rated companies in the NY stock exchange, by 2007 there were 64000 structured products with top ratings. The anomaly was belatedly recognized by Lloyd Blankfein of Goldman Sachs in his article “Do not destroy the essential catalyst of risk” published by the Financial Times on February 9, 2009. Similarly, Galbraith (1954) reports colourful stories from the 1920s about the valuation miracles performed by investment trusts, whose securities were valued well more than the total value of their assets – at times up to twice as much.

financial institutions but also of the owners of the mortgaged houses that had been bought with those loans, whose equity value dropped well below the value of the loans (Shiller 2008)

**Chart 3.** Real estate loans and broker loans (volumes, monthly data, 1918-1934; 1996-2012, beginning of the period = 100)



Source: data for 1918-1934 are from Historical Statistics of the United States – Colonial Times to 1970; data for 1996-2012 are from Federal Reserve Bank of St. Louis database (FRED). Notes: broker loans for 1918-1934 are loans to brokers by principal groups of lenders—New York City banks, outside banks, and other lenders (foreign banking agencies, corporations, other brokers, and individuals); the figures cover primarily loans to brokers and dealers in New York City, most of whom are members of the New York Stock Exchange, but they also include loans to certain investment banking houses that do not have Stock Exchange seats and to brokers and dealers belonging to other stock exchange broker loans. Broker loans for 1998-2012 are Security Brokers and Dealers, Debt Securities and Loans.

Indeed, both in the 1920s and in the decade preceding the recent crisis, a main component of credit on collateral was represented by mortgage loans that were granted against the rising value of homes, which were well beyond the capacity of their owners to service, in the belief that the houses could be sold later at higher prices. These loans became the fuel for higher consumer spending and speculative investments in the housing market (Galbraith 1954, Greenspan 2007); they were also the prime material underlying a swelling pyramid of structured products.

Thus, the real estate bubble was intimately connected with the stock market bubble (Kindleberger & Aliber 2005; Shiller 2008); once stock markets started to fall, mortgage loans played an important role in deepening the market crash, forcing banks to dispose of their more liquid assets and to cut the supply of credit.

In sum, for the two major financial crises highlighted in Chart 2, stocks, bonds and real estate markets were all part of the same madness. As prices rose rapidly, increasing shares of the population became involved, hoping to partake

in the enormous gains seemingly at hand and compounding mounting financial imbalances with their leveraged investments. The interconnections between intermediaries and markets aggravated the subsequent financial crises, as well as the fall in economic activity.

Recent studies examining the Great Depression have highlighted the role played by monetary policy mistakes in aggravating and prolonging the economic crisis (cf. Bernanke 2004), providing late confirmation for the original view espoused by Friedman & Schwartz (1963). However, there is little doubt that the dramatic fall in GDP was initially detonated by the financial crash. Monetary and fiscal interventions that halted the financial meltdown and supported domestic demand could not stop the US economy from entering the sharpest downfall since the Great Depression.

### Monetary policy anchors for investors' expectations

As already mentioned, Shiller (2015) attributed the acceleration of price rises for houses and other assets in the decade between the late 1990s and 2006-2007 to psychological factors.

Blinder (2013) examined in detail the house price boom in that fateful decade, trying to find an answer to why it had happened. He came to the conclusion that several factors had been at work – including extrapolative expectations, high leverage in home purchases, lax lending standards, and homeowners using borrowing on home equity to raise consumption or investment in other assets – among which he saw monetary policy as only “a minor contributor to the boom” (p. 38). His main argument – that the house boom had started before the aggressive policy easing in the early 2000s – apparently overlooks the fresh outburst of speculative house purchases around the middle of the decade.

Bernanke (2015) also discusses the same matter extensively. He acknowledges that many Fed Board members, including himself, had underestimated the extent of the housing bubble and the risks it posed but belittled the role of monetary policy in generating the boom. He notably pointed to the role of the worldwide savings glut in bringing hot money to US capital markets and lowering long-term interest rates, perhaps overlooking that the domestic speculative fever was acting as a magnet to pull foreign capital in, as suggested by Kindleberger & Aliber (2005).

Moreover, in other parts of his memoirs Bernanke (2015) readily acknowledges the role of Federal Open Market Committee (FOMC) Communiqués in driving down long-term interest rates. For

instance, he reports that the statement issued after the May 2003 FOMC meeting included a new sentence to the effect that “the probability of an unwelcome substantial fall in inflation, though minor, exceeds that of a pick up of inflation from its already low level”. The Committee was, in effect, announcing that it had an inflation target and that low inflation could be as bad as high inflation. Markets understood that monetary policy would become more expansionary and “traders bid down longer-term interest rates, adding more stimulus to the economy” (p. 77).

The view that monetary policy did not play an important role in the asset market boom of the second half of the 2000s also seems at odd with Greenspan’s account of events in his memoirs (Greenspan 2007). He describes at length how lower interest rates in credit markets boosted demand for residential real estate and pushed their prices higher and higher through 2006, with new constructions but also secondary sales surging to unprecedented heights. “Capital gains,” he wrote, “especially gains realized in cash, began burning holes in people’s pockets. Soon statisticians could see a bulge in consumer spending that matched the surge in capital gains... [showing up] in the demand for all manner of goods and services. ... This pick up in outlays was virtually all funded through increases in home mortgage debt”(p. 230).

Thus, he surely believed that looser monetary policy since 2000 had boosted the expansion of credit, and that cheap credit had played a paramount role in feeding the real estate boom and the associated consumption spree. In his account of those times, he stressed that the main concern of the Fed through 2003 was how to avert deflation, as the economy was still reeling from the twin shocks of the implosion of the dot.com bubble and the Twin Towers terrorist attack. He was fully aware of the mounting speculative fever in the housing market but believed that the balance of risks still required aggressive monetary expansion. Thus, he pushed the Fed funds rate down to 1% in the summer of 2003, and kept it there through the first quarter of 2004 (Chart 4). The subsequent increase was rather rapid, but nonetheless it lagged behind the accelerating rise in the prices of houses, bonds and stocks, which only came to a halt in late summer 2008.

Two further components in his approach must be underlined, as they may be a key factor in fostering the convergence in investors’ expectations that are typical of manias.

The first component was the conviction he drew from his experience in the late 1990s whereby moderate changes in monetary conditions would not be effective in halting an asset price bubble; of course, this could be done by raising interest rates

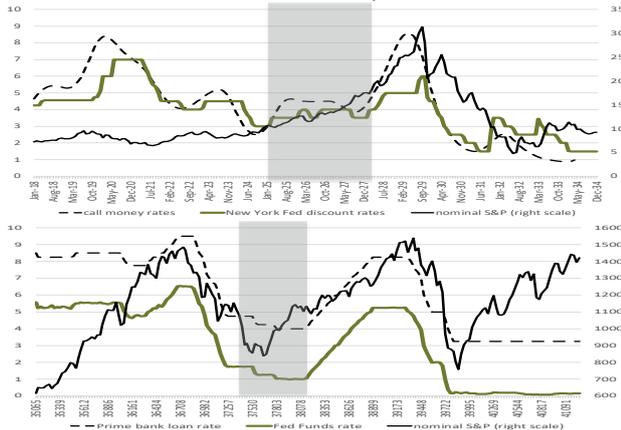
to destructive heights for the economy, but this possibility could not be seriously considered.

As readers may recall, in a speech at the American Enterprise Institute, held on December 5, 1996, Greenspan (2007) used the expression ‘irrational exuberance’ with reference to the price of stocks and other earning assets to voice his preoccupation that the build-up of financial risks was going too far. In March 1997, the Board proceeded to raise short-term rates by 25 basis points. However, after a short respite, the stock market charged again, rising close to 7800 in June (it had been around 6000 in October 1996 when Greenspan had started to worry). He concluded that “investors were teaching the Fed a lesson: ... you can’t tell when a market is overvalued, and you can’t fight market forces. ... We looked for other ways to deal with a risk of a bubble. But we did not raise rates any further, and we never tried to rein in stock prices again” (p. 179). In reality, stock prices continued to rise between mid-1999 and March 2000, when they peaked; Fed funds rates, in the meantime, rose gradually from 4.75 to 6.5%, eventually helping to prick the bubble.

Greenspan’s attitude was reinforced by another lesson from his experience. He had been in his new post as Chairman of the Board for only a few weeks when, in October 1987, the stock exchange dived and then recovered without much damage to the economy, seemingly thanks to a hefty provision of liquidity from the Fed. Aggressive injections of liquidity were also engineered to meet the savings and loans crisis in the 1980s, the Gulf war, the Asian financial crisis and the Long Term Capital Management (LTCM) crisis in the 1990s, and yet again at the beginning of the 2000s after the burst of the dot.com bubble and the 9/11 terrorist attack. All these episodes concurred to reinforce Greenspan’s confidence that he could meet adverse shocks in financial markets with liquidity injections.

He left no doubt in the public’s mind about his approach: “After thinking a great deal about this, I decided the best the Fed could do would be to stay with our central goal of stabilizing product and services prices. By doing this job well, we would gain the power and flexibility needed to limit economic damage if there was a crash. That became the consensus within the FOMC. In the event of a major market decline, our policy would be to move aggressively, lowering rates and flooding the system with liquidity to mitigate the economic fallout. But the idea of addressing the stock market boom directly and preemptively seemed out of our reach” (Greenspan 2007: 201).

**Chart 4.** Interest rates and stock prices (monthly data, 1918-1934, 1996-2012)



Sources: Shiller and Federal Reserve Bank of St. Louis database (FRED).

Notes: Prime bank loan rate is the average base rate used by banks to price short-term business loans; it is posted by the majority of top 25 insured US-chartered commercial banks. The call money rate is the interest rate on the loans banks give to brokerage firms that are borrowing to fund transactions in their clients' margins accounts.

This position was reflected not only in a number of speeches delivered around the country,<sup>7</sup> but also in the Communiqués issued after the FOMC meetings, which since the mid-1990s have been used increasingly by the Committee to communicate its leanings without necessarily committing to a specific action. These statements have played an important role in guiding market expectations.

The Fed's pattern of providing ample liquidity when stock prices fell resulted in the investors' perception of a 'put' protection on asset prices – the famous 'Greenspan put'. Investors increasingly believed that in a crisis or downturn, the Fed would step in and inject liquidity until the problem improved. As the Fed did so repeatedly, the perception became firmly embedded in asset pricing in the form of higher valuation, narrower credit spreads, and excess risk taking. Stiglitz (2010: 7) harshly criticized the put for inflating the speculative bubble in the lead-up to the 2008 financial crisis: the markets mispriced and misjudged risk, he said, and "the seeming mispricing and misjudgement of risk was based on a smart bet: they believed that if trouble arose, the Federal Reserve and the Treasury would bail them out, and they were right". In his view, the Greenspan put was followed by a 'Bernanke put', after the latter took over from Greenspan in February 2006 and basically continued with the same policies.

If you observe Shiller's investors' expectation curve in Chart 1, the Fed's ultra loose monetary policy in 2003-2004 is highlighted by the grey-shaded area. As can be seen, the first large upward jump in the expectation curve coincides with the early phase of the Fed expansion, in 2002 and 2003; further

jumps accompanied the continuing rise in the stock price index, as monetary policy was tightened moderately, but never enough to dampen the speculative fever. Euphoria found further fuel when Bernanke stepped in as Chairman of the Fed Board and confirmed his predecessor's policy approach. Thus, there is good ground to suspect that the Greenspan put provided the anchor needed by investors to bet on ever higher gains up until well into 2008; when the housing market started to cool down, after 2006, hot money turned back to the bond and stock market, until the entire paper pyramid crashed.

Comparison with the experience of the 1920s provides some confirmation for this interpretation. Similarly to what had happened since the mid-1990s, the 1920s were years of buoyant growth and abundant liquidity, feeding widespread optimism and beliefs that a new era of permanent prosperity had begun (Bernanke 2004, Shiller 2008 and 2015). The monetary policy stance was greatly influenced by two concomitant developments. The first one was the subdued pace of inflation, both for wholesale and consumer prices, in spite of strong real economic growth (3.5% per year in 1920-1929; this growth rate was just short of that of the money stock, allaying concerns about financial stability (Friedman & Schwartz, 1963). The second was that, after the United Kingdom re-entered the gold standard at its 1914 parity, with an overly appreciated real exchange rate, the Federal Reserve became wary of raising interest rates for fear of compromising the UK's ability to maintain its gold anchor.

As the decade went on, this second feature became an overriding concern for the Federal Reserve Board, as gold started to flow increasingly to France and Germany. However, neither country was willing to act autonomously to help ease the pressure on the sterling. In order to mitigate gold flows, in the spring of 1927 Montagu Norman, the governor of the Bank of England, Hjalmar Schacht, then governor of the Reichsbank, and Charles Rist, the deputy governor of the Banque de France came to see Benjamin Strong, governor of the Fed of New York, to push for an easier monetary policy. Accordingly, Strong convinced the Fed Board to lower the rediscount rate from 4 to 3.5% (Clarke 1967; cf. Chart 4), de facto shifting the burden of adjustment onto the United States. At the time, the decision was very controversial, albeit not necessarily in contrast with the weakening conditions of the US economy.

But the message was clear to investors in the increasingly excited stock exchange markets: the Federal Reserve would be constrained not to raise interest rates for an indeterminate future. Professor

<sup>7</sup> See for instance his speech at the Jackson Hole symposium on August 30, 2002, and his remarks at the annual meeting of the American Economic Association in San Diego, California, on January 3, 2004.

Lionel Robbins concluded that “from that date, according to all evidence, the situation got completely out of control” (quoted by Galbraith, 1954: 39).<sup>8</sup> Indeed, the subsequent months saw an acceleration of speculative purchases, both in real estate and in the stock market, turning feverish in 1928. The run continued, despite the increases in federal funds rate in 1928-1929; as had been the case in the 2000s, the Fed was lagging behind the accelerating expectations of rising gains in asset markets (Chart 4).

In sum, while Professor Shillers’ data on investor expectations are not available for this period, here too we recognise evidence seemingly confirming that, at some late stage in the asset price upswing, monetary policy may have provided an anchor to mounting speculation, thus encouraging excessive risk taking and the build-up of financial imbalances that later on aggravated financial dislocations and the economic depression. Quoting Bernanke (2004: 47) once more: “The seriousness of the problem in the Great Depression was due not only to the extent of the deflation, but also to the large and broad-based expansion of inside debt in the 1920s”.

## Conclusions

This paper provides conjectural evidence on the role possibly played by monetary policy in triggering the asset price booms in the years preceding the 2008 and 1929 financial market crashes and the ensuing gigantic financial and economic dislocations.

On the events prompting the bulls to charge, Robert Shiller argued in his best-seller *Irrational Exuberance* that “person-to-person contagion of thought spurred by an initial stock market price increase can lead to the amplification of optimistic new era stories. The investor excitement itself propagates such stories” (Akerlof & Shiller, 2009: 66). This view had been subscribed to by other prominent academic economists, including Alan Blinder and Ben Bernanke. According to this view, asset price bubbles and manias are unpredictable exogenous events, independent of monetary policy.

Our analysis, mainly of a historical nature, starts from the premise that asset price bubbles are intrinsically monetary phenomena, fed by credit booms that develop when monetary conditions are lax. The view whereby severe financial crises and the ensuing economic depressions are the result of ‘credit booms gone wrong’ is widely shared by economic historians and has been confirmed by recent quantitative analysis of data spanning 140

years and fourteen advanced countries (Schularik & Taylor, 2012).

Therefore, we have concentrated on an alternative explanation of the events triggering the bulls’ charge in asset markets. For this purpose we used Shiller’s survey data on investors’ expectations of future stock prices to establish a clearer conceptual distinction between asset price bubbles, when the prices of some assets diverge from their fundamental value, and manias, situations in which all asset prices start rising together and speculation becomes a widespread behaviour of societies. We define manias as situations in which there is an unnatural convergence of opinions that prices will continue to rise indefinitely, despite exceptional recent gains.

Our detailed review of monetary policy developments in the years preceding the two major financial crises in the past century confirms that investors reacted in earnest to falling interest rates, that they contributed to the bringing down of long-term interest rates when they expected monetary policy to remain lax, and that they exploited lax monetary and credit conditions to overborrow when asset prices started to accelerate their climb.

Our last piece of evidence is that during both the 2000s and the 1920s, at some stage monetary policy authorities signalled in unambiguous terms that excessive asset price rises would not be considered a reason to tighten monetary conditions. The Greenspan put is the main case in point: our charts show that once that policy became explicit and was recognized by investors, the investors’ expectation curve jumped upwards. A similar event in the 1920s may have been represented by the visit to New York by three prominent European central bankers who managed to convince the Federal Reserve that looser monetary conditions in the United States were essential for preserving the Gold Standard internationally.

## Bibliography

- Akerlof, G. A. and R. J. Shiller (2009), *Animal Spirits How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism*, Princeton University Press.
- Bernanke, B. S. (2004), *Essays on the Great Depression*, Princeton University Press.
- Bernanke, B. S. (2015), *The courage to act. A memoir of a crisis and its aftermath*, Norton.

<sup>8</sup> Galbraith did not agree with this assessment, which he considered ‘formidable nonsense’. He maintained that speculation was not out of control after 1927, “except that it was beyond the reach of men who did not want in the least to control it” (p. 39)

Blinder, A. (2013), *“After the Music Stopped: The Financial Crisis, the Response, and the Work Ahead”*, Penguin.

Chancellor, E. (1999), *“Devil take the hindmost. A history of financial speculation”*, MacMillan.

Clarke, S. V. O. (1967), *“Central bank cooperation: 1924-31”*, Federal Reserve Bank of New York.

Di Noia, C., S. Micossi with J. Carmassi and F. Peirce, (2009), *“Keep it simple. Policy responses to the financial crisis”*, CEPS Paperback, 24 March.  
Eichengreen, B. and K. Mitchener (2003), *“The Great Depression as a Credit Boom Gone Wrong”*, BIS Working Paper 137.

Friedman, M. and A. J. Schwartz (1963), *“A Monetary History of the United States 1867-1960”*, Princeton University Press.

Galbraith, J. K. (1954), *“The Great Crash 1929”*, Penguin Economics History.

Garber, P. (2000), *“Famous First bubbles: the Fundamentals of Early Manias”*, MIT Press.

Greenspan, A. (2007), *“The Age of Turbulence”*, Penguin Allen Lane.

Kindleberger, C.P. and R. Aliber (2005), *“Manias, Panics, and Crashes. A history of financial crises”*, Wiley Investment Classics.

Minsky, H. P. (1984). *“Can “it” happen again? An essay on instability and finance”*, M. E. Sharpe Inc.

Robbins, L. (1934), *“The Great Depression”*, MacMillan.

Schularick M. and A. M. Taylor (2012), *“Credit Booms Gone Bust: Monetary Policy, Leverage Cycles and Financial Crises, 1870-2008”*, *American Economic Review*, 2012 102(2): 1029-1061.

Shiller, R. J. (2008), *“The Subprime Solution”*, Princeton.

Shiller, R. J. (2015), *“Irrational Exuberance”*, Princeton.

Stiglitz, J. (2010), *“Freefall - Free markets and the sinking of the global economy”*, Allen Lane.

## About the authors

**Stefano Micossi** is Director General of ASSONIME, a business association and think tank in Rome; he was formerly a Director General in the European Commission (1995-99), director of economic research in Confindustria (1988-94) and an economist in the Research Department of the Bank of Italy (1973-88), where he rose to the rank of Director of International research; in 2016 he was appointed Honorary Professor at the College of Europe, after teaching there as visiting professor for almost twenty years; he founded the LUISS School of European Political Economy, together with Proff.s Marcello Messori, Gianni Toniolo, Carlo Bastasin and Fabrizio Saccomanni, and he now Chairs the Scientific Council of the School.

**Alexandra D'Onofrio** holds a Ph.D. in Money and Finance from the University of Rome "Tor Vergata". She is also a Research Fellow of the Arcelli Center for Monetary and Financial Studies of Luiss Guido Carli University. She was an economist in Assonime at the time of writing the paper.

**Fabrizia Peirce** is Senior Officer on European Union economic and institutional affairs at Assonime since 2004. Her research activity focuses on the European economic crisis with regard to macroeconomic imbalances, the sovereign debt crisis and the economic governance. Other prominent fields of analysis are the structure and the performance of the European and Italian productivity.

The **Centre for Economic Policy Research (CEPR)** is a network of over 1,300 research economists based mostly in European universities. The Centre's goal is twofold: to promote world-class research, and to get the policy-relevant results into the hands of key decisionmakers. CEPR's guiding principle is 'Research excellence with policy relevance'.

A registered charity since it was founded in 1983, CEPR is independent of all public and private interest groups. It takes no institutional stand on economic policy matters and its core funding comes from its Institutional Members and sales of publications. Because it draws on such a large network of researchers, its output reflects a broad spectrum of individual viewpoints as well as perspectives drawn from civil society.

CEPR research may include views on policy, but the Trustees of the Centre do not give prior review to its publications. The opinions expressed in this report are those of the authors and not those of CEPR.

