

## Chapter 2. The Fed, IMF and disregarded warnings

Abstract: The Fed, the IMF and Treasury lacked adequate tools, which might have indicated that asset values were vastly out of line with fundamentals. The Fed and the Fund were not searching for such tools because they did not believe that they could or should look for misaligned asset values or excess debt, The Fed was blind-sided by the Efficient Market Hypothesis (EMH), that current prices reveal all publicly available information. One cannot second-guess the market. There cannot be an ex-ante misalignment. Bubbles exist only in retrospect. The Jackson Hole Consensus gave them great comfort in adopting a hands off position by claiming that “As long as money and credit remain broadly controlled, the scope for financing unsustainable runs in asset prices should also remain limited....numerous empirical studies have shown that almost all asset price bubbles have been accompanied, if not preceded by strong growth of credit and or money”. Since the period preceding the crisis was the Great Moderation, there was no need to worry.

The theme of this chapter is to explain why the financial markets, the Fed, IMF, and economics profession failed to anticipate the mortgage housing and financial crisis. *I associate a bubble, such as in housing prices or agricultural prices, with an “excess debt”*. There were debt crises in the 1980s – the agricultural crisis and the S&L crisis. They were very similar to the 2007-08 financial crisis. The big difference was that the agricultural crisis was localized. On the other hand the housing sector and financial sectors were highly interrelated and leveraged. The Fed lacked a theoretical model with explanatory power to evaluate *systemic* risk and the probability of bankruptcy/ruin resulting from debt. The Fed and then Chairman Greenspan did not understand how to measure what is an “excessive” debt or leverage or unduly low capital requirement that will raise the probability of a crisis.

This chapter is organized as follows. First I discuss the Fed’s and Greenspan’s views. Second, I discuss the market anticipations, disregarded warnings and why the financial market failed to anticipate the crisis. Third, I discuss the controversy over deregulation. Fourth, I discuss the failures of the IMF and economics profession.

### *Greenspan’s Theme and the Fed*

Prior to the subprime crisis of 2007, there was a false sense of safety in financial markets. Alan Greenspan (2004a) said “...the surge in mortgage refinancings likely

improved rather than worsened the financial condition of the average homeowner”. Moreover “Overall, the household sector seems to be in good shape, and much of the apparent increase in the household sector’s debt ratios in the past decade reflects factors that do not suggest increasing household financial stress”.

The market and the Fed did not consider these mortgages to be very risky. In February 2004, a few months before the Fed formally ended a run of interest rate cuts, Greenspan (2004b) said that “...improvements in lending practices driven by information technology have enabled lenders to reach out to households with previously unrecognized borrowing capacity. This extension of lending has increased overall household debt but has probably not meaningfully increased the number of households with already overextended debt.” By 2007, a measure of risk, the yield spread (CCC bonds – 10 year US Treasury) fell to a record low.

Fed Chairman Ben Bernanke said (2005) in his testimony before Congress’s Joint Economic Committee that US house prices have risen by nearly 25 per cent over the past two years. However, these increases “largely reflect strong economic fundamentals” such as strong growth in jobs, incomes and the number of new households”.

The failure to realize that there was an unsustainable bubble that would damage the world economy was pervasive. As late as April 2007, the IMF noted that “...global economic risks *declined* since...September 2006...The overall US economy is holding up well ...[and] the signs elsewhere are very encouraging.” The venerated credit rating agencies bestowed credit ratings that implied AAA smooth sailing for many a highly toxic derivative product.

In 2008 Greenspan said “Those of us who have looked to the self-interest of lending institutions to protect stockholders’ equity, myself included, are in a state of disbelief”. In his retrospective he asks: could the breakdown have been prevented? The Fed was lulled into complacency about a bursting of the bubble and its aftermath because of recent history. First, they anticipated that the decline in home prices would be gradual. Second, there were only modestly negative effects of the 1987 stock market crash. The injections of Fed liquidity apparently helped stabilize the economy.

Greenspan’s paper (2010) presents his retrospective view of the crisis. His theme has several parts. First, the decline and convergence of world real long term interest rates

- not Federal Reserve monetary policy - led to significant housing price appreciation, a housing price bubble. This bubble was leveraged by debt. There was a heavy securitization of subprime mortgages. In the years leading to the current crisis, financial intermediation tried to function on too thin layer of capital – high leverage – owing to a misreading of the degree of risk embodied in ever more complex financial products and markets. Second, when the bubble unraveled, the leveraging set off a series of defaults. Third, the breakdown of the bubble was unpredictable and inevitable, given the “excessive” leverage – or unduly low capital – of the financial intermediaries. Fourth, the lesson for the future is that is imperative that there be an increase in regulatory capital and liquidity requirements by banks.

### *2.1. The Jackson Hole Consensus*

Otmar Issing (former chief economist for the European Central bank, ECB) discussed the Lessons to be learned by Central banks from the recent financial crisis. The main thrust of his argument was a criticism of the Jackson Hole Consensus (JHC, 2005) for the relation between asset price bubbles and the conduct of monetary policy.

During the boom years, abundant liquidity and low interest rates led to a situation of excessive risk taking and asset price bubbles. The JHC has been the prevailing regulatory approach taken by the Fed. It is based upon three principles. Central banks: (1) should not target asset prices, (2) should not try to prick an asset price bubble, (3) should follow a “mopping up” strategy after the bubble bursts by injecting enough liquidity to avoid serious effects upon the real economy. A justification for this policy was seen in the period 2000-02 with the collapse of the dot.com bubble. The “mopping up” seemed to work well and there were no serious effects upon the real economy from following the JHC.

Issing objects to the JHC because it constitutes an asymmetric approach. When asset prices rise without inflationary effects measured by the CPI, this is deemed irrelevant for monetary policy. But when the bubble bursts, central banks must come to the rescue. This, he argues, produces a moral hazard. He notes that although the JHC strategy worked well in the 2000-02 period it should not have justified the assumption that it would work afterwards in other cases. The JHC strategy certainly did not work in the 2007-08 crisis

that was precipitated by the bursting of the housing price bubble. He wrote: “Did we really need a crisis that brought the world to the brink of a financial meltdown to learn that the philosophy which was at the time seen as state of the art was in fact dangerously flawed?...we must conduct a thorough discussion as to appropriate strategy of central banks with respect to asset prices. ”

Issing favors giving the central banks a mandate for macro-prudential supervision. The ECB should be responsible for identifying macroeconomic imbalances and for issuing warnings and recommendations addressed to national policy makers. The “solution” proposed is one that monitors closely monetary and credit developments as the potential driving forces for consumer price inflation in the medium to short run. “As long as money and credit remain broadly controlled, the scope for financing unsustainable runs in asset prices should also remain limited.” He notes: “numerous empirical studies have shown that almost all asset price bubbles have been accompanied, if not preceded by strong growth of credit and or money”.

However, these studies such as reported by the BIS are vague, inconclusive and not helpful. Even their authors conclude that the existing literature provides little insight into the recent financial crisis. The key question that is of concern to central banks and supervisory authorities is: When should credit growth be judged “too fast”? Moreover, contrary to Issing and BIS, it is very difficult to find a relation between recent money growth and the 2007-08 financial crisis.

Table 2.1 contains the growth rates of narrow money, CPI inflation and house prices from the previous year. It is clear that in the years 2004-06 leading up to the crisis of 2008, money growth and inflation were moderate but the inflation of house prices – the asset bubble – was high. Issing’s “solution” does not have relevance for the recent crisis. High rates of growth of money and credit are sufficient, but not necessary, conditions for a financial crisis.

Table 2.1. Money, CPI, House Price Index, Real GDP,  
Percent change from previous year

Year	Narrow money	CPI	Real GDP	House price
1997	7.4 % pa	2.3	4.5	2.8
1998	11.6	1.5	4.4	5.22
1999	12.4	2.2	4.8	4.44
2000	8.1	3.4	4.1	6.2
2001	15.7	2.8	1.1	8.1
2002	12.8	1.6	1.8	6.5
2003	7.3	2.3	2.5	7.1
2004	3.8	2.7	3.6	8.21
2005	2.1	3.4	3.1	12.7
2006	4.3	3.2	2.7	12.2

Sources: Col. 1-3, Federal Reserve Bank St. Louis; Col 4, Office of Federal Housing Price Oversight.

The Jackson Hole Consensus explains to a considerable extent the Fed's behavior. Greenspan has great knowledge of financial markets and did have some qualms about the housing boom. I think that his behavior can be explained rationally. First he understands that the function of financial markets is to channel saving into investment in the optimal way to promote growth. Second, like most of the economics profession, he or his staff accepted the generality of the *First Theorem of Welfare Economics*. This theorem (Koopmans and Bausch) states that: a Competitive Equilibrium is a Pareto Optimum. A Competitive Equilibrium is a vector of prices, where (i) supply equals demand, (ii) consumers optimize demand and their supply of labor services, given their preferences and (iii) producers optimize by maximizing their profits, given the technology. A Pareto Optimum is a vector of choices such that (iii) supply equals demand and (iv) it is not possible to select vectors which would make some people better off without making others worse off. The implication is that "market regulation" is superior to regulation by bureaucrats or politicians. Do not try to second guess the markets.

The belief in the generality of the *First Theorem of Welfare Economics* may have provided a basis for Greenspan's position. The Theorem does not hold in financial market for several reasons. First, financial assets are not arguments in the utility function of households so that it makes little sense to say that the relative asset prices equal marginal rates of substitution. There is no tangency of indifference curves with the price line. Second, the assumption of atomistic agents operating in perfectly competitive markets with full information and stable preferences is wildly unrealistic. The Efficient Market Hypothesis EMH was a major foundation of Greenspan's view and that of the finance profession. This hypothesis and its use by the Quants and beta as a measure of risk is discussed in chapter three.

## 2.2. *Desirable Leverage, Capital requirements*

When the crash occurred, Greenspan wrote (2008) "Those of us who have looked to the self-interest of lending institutions to protect stockholders' equity, myself included, are in a state of disbelief". It is now widely believed that "excessive" leveraging, or an "excessive" debt ratio, at key financial institutions helped convert the initial subprime turmoil in 2007 into a full blown financial crisis of 2008. The ratio of debt  $L(t)$ /net worth

$X(t)$  is the debt ratio, and is denoted  $f(t) = L(t)/X(t)$ . Leverage is the ratio of assets/net worth  $A(t)/X(t)$  and is equal to one plus the debt ratio. Although leverage is a valuable financial tool, “excessive” leverage poses a significant risk to the financial system. For an institution that is highly leveraged, changes in asset values highly magnify changes in net worth. To maintain the same debt ratio when asset values fall either the institution must raise more capital or it must liquidate assets.

In his Retrospective Greenspan has qualified his unquestioned faith in the financial markets to allocate saving optimally to investment. The question is what should be done to rectify the problem? Regulation per se cannot be an improvement. Regulators are inclined to raise capital requirements to lower risk without considering expected return. He argues that there are limits to the level of regulatory capital if resources are to be allocated efficiently. A bank or financial intermediary requires significant leverage if it is to be competitive. Without adequate leverage, markets do not provide a sufficiently high rate of return on financial assets to attract capital to that activity. Yet, at too great a degree of leverage, bank solvency is at risk. The crucial question is what is a “desirable” degree of leverage? Since this is a main question of concern, I present Greenspan’s views that I shall relate later in chapters 5-7 to my Stochastic Optimal Control (SOC) analysis.

Greenspan suggests that the focus be on desirable capital requirements for banks and financial intermediaries. He starts with an identity, equation (i) or (ii) for the rate of return on net worth  $r(t)$ . This is income/equity. Net worth and equity are used interchangeably here. I will use my notation instead of his for the sake of consistency. Leverage is assets/equity =  $A(t)/X(t)$  or capital requirement is  $X(t)/A(t)$ . Net income is  $Y(t)$ . Define net income/assets  $Y(t)/A(t) = b(t)$ .

(i) net income/equity = (net income/assets)(assets/equity).

(ii) rate of return on equity  $r(t) = b(t) A(t)/X(t)$

He observes, that over the long run, there has been a remarkable stability in the ratio of net income/equity. It has ranged around 5%pa. Call this long run value  $r$ . Greenspan considers the long run ratio  $r$  without a time index as a required rate of return to induce the US banking system to provide the financial sector with the resources to promote growth. Equation (iii) must be satisfied. The minimum rate of return at any time  $r(t)$  should be equal to the long run value  $r$ .

$$(iii) \min r(t) = b(t)A(t)/X(t) = r$$

Alternatively the maximum capital requirement  $X(t)/A(t)$  should satisfy (iv) or the minimum leverage should satisfy (v). If the capital requirement exceeds  $b(t)/r$  then – given the return on assets  $b(t)$  - the return on net worth falls below the required rate  $r$ .

$$(iv) \max X(t)/A(t) = b(t)/r.$$

$$(v) \min A(t)/X(t) = r/b(t).$$

Given the estimate  $r = 0.05$ , and the ratio  $b(t)$  of income/assets in the years prior to the crisis  $b(t) = 0.012$ , the maximum capital requirement should satisfy (vi) or minimum leverage should satisfy (vii).

$$(vi) \max X(t)/A(t) = b(t)/r = 0.012/0.05 = 0.24$$

$$(vii) \min A(t)/X(t) = 0.05/0.012 = 4.17.$$

The maximum capital requirement  $X(t)/A(t)$  is 0.24, or minimum leverage is 4.17. A capital requirement greater than 0.24 depresses the rate of return  $r(t)$  below the required rate  $r$ .

Greenspan's derivation of desirable leverage has several advantages but leaves open several questions. First, the advantage of (vi)-(vii) is that it is an attempt to find a capital requirement or leverage that is sufficient to attract capital into the financial system. Second, it is a time varying ratio that takes into account  $b(t)$  the return on assets. However, risk is not explicit in his formulation. There is no explicit trade off between growth and risk. Third, the required minimum return on equity  $r$  is arbitrary and lacks theoretical foundations. Fourth, it says nothing about the effects upon risk and growth of leverage or capital requirements that deviate from the value in (vi)-(vii). The SOC analysis attempts to rectify these difficulties where the objective is to find a debt ratio, leverage or capital requirement that optimally balances expected growth against risk. The context is that the future is unpredictable, stochastic.

### *2.3. Market Anticipations of the Housing – Mortgage Debt Crisis*

The subprime market was the trigger for the crisis because the income from the highly leveraged financial intermediaries was ultimately based upon the ability of the mortgagors to service their debts. I now turn to the market anticipations of housing prices: the methods used and why they were so erroneous.



*Gerardi et al* (Brookings Papers) explore whether market participants could have or should have anticipated the large increase in foreclosures that occurred in 2007. They decompose the change in foreclosures into two components: the sensitivity of foreclosures to a change in housing prices times the change in housing prices. The authors conclude that investment analysts had a good sense of the sensitivity of foreclosures to a change in housing prices, but missed drastically the expected change in housing prices. The authors do not analyze whether housing was overvalued in 2005-06 or whether the housing price change was to some extent predictable.

The authors looked at the records of market participants from 2004-06 to understand why the investment community did not anticipate the subprime mortgage crisis. Several themes emerge. The first is that the subprime market was viewed as a great success story in 2005. Second, mortgages were viewed as lower risk because of their more stable prepayment behavior. Third, analysts used sophisticated tools but the sample space did not contain episodes of falling prices. Fourth, pessimistic feelings and predictions were subjective and not based upon quantitative analysis. Hence, they were disregarded.

Analysts were remarkably optimistic about Housing Price Appreciation (HPA). Those who looked at past data on housing prices, such as the four-quarter appreciation, could construct the histogram below. In the aggregate, housing prices never declined from year to year during the period 1980q1- 2007q4. The mean appreciation was 5.4% pa with a standard deviation of 2.94% pa. The optimism could be understood if one asks: on the basis of this sample of 111 observations, what is the probability that housing prices will decline? Given the mean and standard deviation, there was only a 3% chance that prices would fall.

The best estimates of the analysts were that the rates of housing price appreciation CAPGAIN or HPA in 2005 - 2006 of 10 to 11 % per annum would be unlikely to be repeated but that it would revert to its longer term average. A Citi report in December 2005 stated that "...the risk of a national decline in home prices appears remote. The annual HPA has never been negative in the United States going back at least to 1992." Therefore no mortgage crisis was anticipated. There was no economic theory or analysis in this approach. It was simply a VaR value at risk implication from a sample based upon

relatively recent data. More fundamentally, no consideration was given to the economic determinants of the probability distribution of capital gains or housing price appreciation.

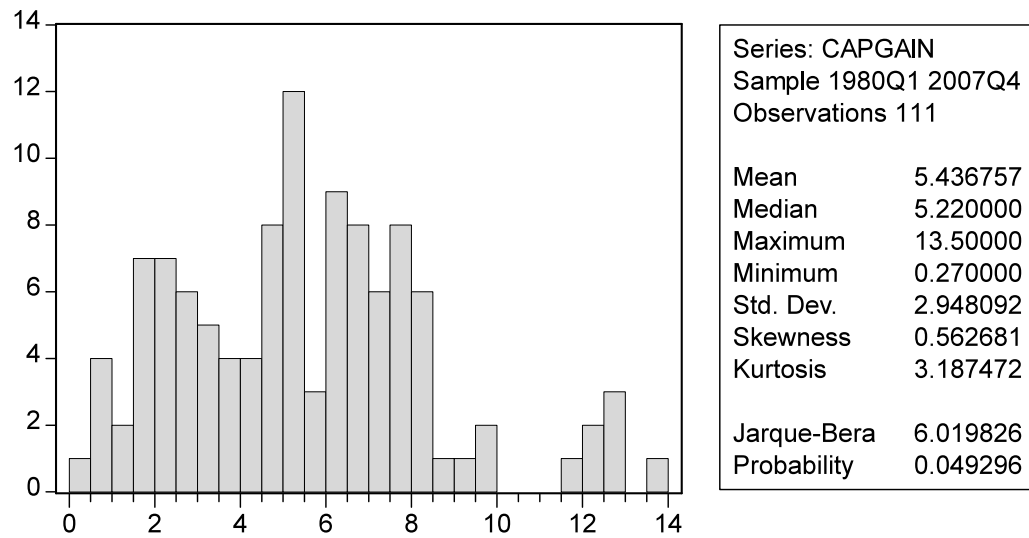


Figure 2.1. Histogram and statistics of CAPGAINS = Housing Price Appreciation HPA, the change from previous 4-quarter appreciation of US housing prices, percent/year, on horizontal axis. Frequency is on the vertical axis. Source of data: Office of Federal Housing Price Oversight.

#### *2.4. The Disregarded Warnings*

Greenspan, Bernanke and the IMF were insouciant, but there were Cassandras who warned of the housing price bubble and likelihood of a collapse. Shiller (2007) looked at a broad array of evidence concerning the recent boom in home prices, and concluded that it does not appear possible to explain the boom in terms of fundamentals such as rent and construction costs. Instead he proposed a psychological theory or social epidemic. This “explanation” is not convincing theoretically, and was not able to overcome the Jackson Hole Consensus. One can do much better than invoke vague phrases such as “epidemic”, “contagion”, “irrationality”.

From 1998-2005 rising home prices produced above average capital gains, which increased owner equity. This induced a supply of mortgages, and the totality of household financial obligations as a percent of disposable personal income rose. Figure 2.2 graphs the ratio of housing prices/disposable income  $P/Y = \text{PRICEINC}$  and the debt service  $\text{DEBTSERVICE}$ , which is interest payments/disposable income. In figure 2.2, both variables are normalized, with a mean of zero and standard deviation of one.

The rises in housing prices and owner equity induced a demand for mortgages by banks and funds. In about 45-55% of the cases, the purpose of the subprime mortgage taken out in 2006 was to extract cash by refinancing an existing mortgage loan into a larger mortgage loan. The quality of loans declined. The share of loans with full documentation substantially decreased from 69% in 2001 to 45% in 2006 [Demyanyk and Van Hemert (2007)]. The ratio of debt/income rose drastically. The only way to service or refinance the debt was for the capital gain to exceed the mean interest rate. This is an unsustainable situation since it implies that there is a “free lunch” or that the present value of the asset diverges to infinity.

The fatal error was to ignore the fact that the quality of mortgages declined and that it was ever less likely that the mortgagors could service their debt from current income. Sooner or later the defaults would affect housing prices and turn capital gains into capital losses. The market gave little to no consideration of what would happen if the probability distribution/histogram would change. Both the supporters and the critics of the Jackson Hole Consensus agree that asset price bubbles are a source of danger to the real economy if the financial structure is fragile and not properly capitalized. The danger from

“overvaluation” of housing prices is that the debt used to finance the purchase is excessive, which would lead to defaults and foreclosures.

It is seen in Figure 2.2 that the ratio  $PRICEINC = P(t)/Y(t)$  and the  $DEBTSERVICE$  ratio were stable, almost constant from 1980 almost to 2000. Then there was a housing bubble, the price/income shot up from 2000 to 2006. As a result of the rise in homeowner’s equity the debt ratio rose – to finance consumption. The debt service ratio rose to two standard deviations above the longer term mean. The great deviation of the price/income ratio from its long term mean would suggest that there was a housing price “bubble” and that housing prices were greatly overvalued. A housing crisis would be predicted, when the ratio  $P(t)/Y(t)$  would return to the long term mean, which is the zero line. Households would then default on their mortgages and leverage would transmit the shock to the financial sector. The market – as well as the Fed – discounted that apprehension. There was no theory that could identify an asset price bubble and its subsequent effect upon the economy. The Jackson Hole Consensus ignored the microeconomy.

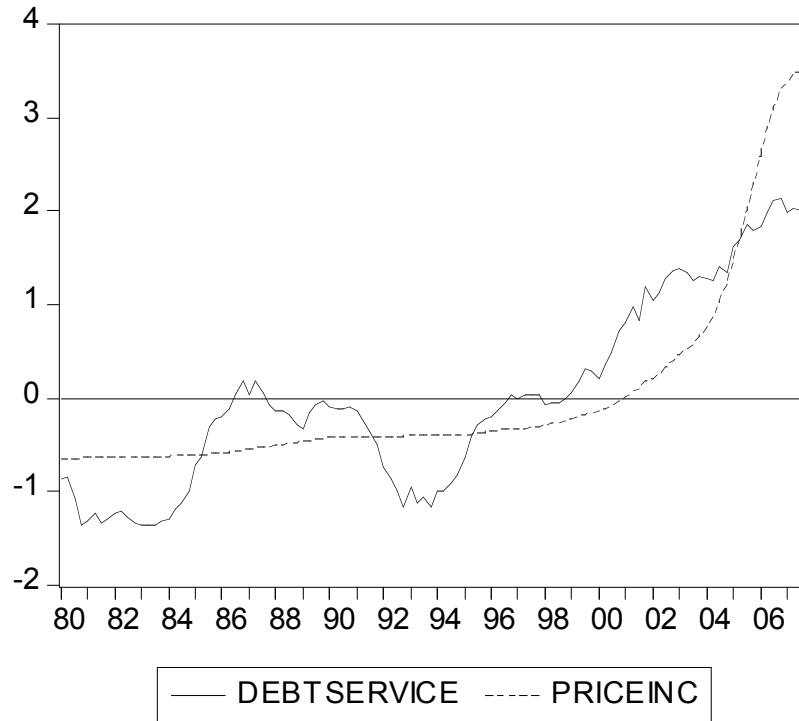


Figure 2.2. PRICEINC = Ratio of housing prices/disposable income. DEBTSERVICE = Debt service/disposable income. Both variables are normalized. FRED data set of the Federal Reserve Bank of St. Louis, Office of Federal Housing Enterprise Oversight.

There were financial firms who may have had qualms about the sustainability of the housing price appreciation, but they assumed that they would be able to anticipate the onset of a crisis in time to retrench. Charles Prince's remark is emblematic: "When the music stops, in terms of liquidity, things will be complicated. But as long as the music is playing, you've got to get up and dance". They certainly were mistaken, because they ignored systemic risk that the negative shock could be pervasive, and liquidity and capital would disappear in the wake of a mass exodus from the markets for derivatives.

There were a few hedge firms such as Scion Capital (SC) that anticipated the crash and took appropriate actions. Michael Burry (2010) of SC realized in 2005 that the bubble would burst and acted upon that view. He purchased credit default swaps (CDS) on billions of dollars worth both of subprime mortgage backed securities and bonds of many financial corporations that would be devastated when the real estate bubble burst. Then as the value of the bonds fell, the value of CDS would rise. The investors in his hedge fund still "wanted to dance" and profit from the rising house prices. Despite pressure from the investors, Burry liquidated the CDS at a substantial profit. But since he was operating in face of strong opposition from both his investors and from the Wall Street community, he shut down SC in 2008. Greenspan responded negatively to Burry's predictions and suggested that Burry was just lucky. Lowenstein (2010) ch.7 describes the divergent opinions in the market where the pessimists were in the minority.

### *2.5. The controversy over regulation and deregulation*

In the years prior to the crisis there was a controversy concerning the regulation of Over the Counter (OTC) markets for derivatives in particular. The warnings and issues raised were disregarded and strongly opposed by the Fed and Treasury. The warnings were public information. After the crisis, the disregarded policies were embodied in the Dodd-Frank bill. The errors of Greenspan, Rubin were of those of commission not omission.

I draw upon the FCIC report to explain the controversy. Derivative markets are organized as exchanges and as OTC markets. Exchanges are regulated by Federal law and play an important role in the price discovery process. They reveal as public information market anticipations of commodity prices and of interest rates underlying

futures and derivatives. See Stein (1986) for the economics of futures markets. OTC derivatives are traded by large financial institutions – traditionally bank holding companies, investment banks – which act as derivatives dealers, buying and selling contracts with the customers. Unlike futures and options exchanges, the OTC market is neither centralized nor regulated. The price discovery process is limited. The OTC market is opaque.

In May 1998 Commodities Futures Trading Commission (CFTC) chairman Brooksly Born said that the agency would reexamine the way it regulated the OTC derivatives market. The US General Accounting Office (GAO) issued a report on financial derivatives that found systemic risks and dangers in the concentration of OTC derivative activity among 15 major dealers. The GAO concluded that “the sudden failure or withdrawal of any one of these dealers could cause liquidity problems in the markets and could also pose risks to the others, including federally insured banks and the system as a whole”.

The Treasury, Fed and SEC - Greenspan, Rubin, Levitt and Summers opposed regulation. Greenspan said “...regulation of derivatives transactions that are privately negotiated by professionals is unnecessary”. He continued to advocate deregulation of the OTC market and the exchange traded market. Greenspan’s believed that: “By far the most significant event in finance during the past decade has been the extraordinary development and expansion of financial derivatives.”

In 1999 the President’s Working Group on Financial Markets, a committee of the heads of the Treasury, the Federal Reserve, SEC and CFTC charged with tracking the financial system, chaired by Summers, essentially adopted Greenspan’s view. The group issued a report urging Congress to deregulate OTC derivatives broadly and reduce CFTC regulation of exchange traded derivatives as well. In December 2000, in response, Congress passed and President Clinton signed the Commodities Futures Modernization Act (CFMA) of 2000. This act in essence deregulated the OTC derivatives market and eliminated oversight, regulation by both the CFTC and SEC.

The Act let derivatives traders, including large banks and investment banks, increase their leverage. A key OTC derivative in the financial crisis was the Credit Default Swap (CDS). This is a type of “insurance” against capital losses on assets. I



discuss the role of CDS in chapter six. After the CFMA was passed, the N.Y. State Insurance Department determined that “naked” CDS did not count as insurance and therefore was not subject to regulation.

When an insurance company sells a policy, insurance regulators require that the company set aside reserves in case of loss. In the housing boom, CDS were sold by firms that failed to put up any reserves, or collateral to hedge their exposure. In the run up to the crisis of 2007-08, AIG – the largest US insurance company – accumulated one-half a trillion dollar position in credit risk through the OTC market without being required to post even one dollar of initial capital or making any other provision for loss. AIG was not alone.

The value of the underlying assets for CDS outstanding worldwide grew from \$6.4 trillion at the end of 2004 to \$58.2 trillion at the end of 2007. A significant portion was apparently speculation in “naked” CDS. In addition, much of the risk of CDS and other derivatives were concentrated in a few of the very large banks and others such as AIG Financial Products.

Among those who warned of systemic problems was Sheila Blair, Chairman of the FDIC. She focused upon the ultimate source of the problem – the mortgages - and the banking sector. She said: “Subprime lending was started and the lion’s share occurred in the nonbank sector. But it clearly created pressures on the banks...I think nipping this thing in the bud in 2000 and 2001 with some strong consumer rules applying across the board that just simply said you’ve got to document a customer’s income to make sure they can repay the loan...just simple rules like that”. At the Fed, it was well known that Greenspan was not interested in increased regulation.

The danger of systemic risk, resulting from the financial structure of derivatives, was public information that was disregarded by the markets, the Fed and Treasury and the regulators. I discuss these issues in chapter three on the Quants.

Ex-post the Dodd-Frank (D-F) bill tried to rectify the earlier disregard of the warnings. The main provisions of the D-F bill are as follows. First, it aims to create transparency and accountability for derivatives. Second, it aims to close “Regulatory Gaps”. It provides the SEC and CFTC with authority to regulate over-the-counter derivatives so that excessive risk-taking can no longer escape regulatory oversight. Third,

it requires central clearing and exchange trading for derivatives that can be cleared and provides a role for both regulators and clearing houses to determine which contracts should be cleared. Fourth, it concerns market transparency. It requires data collection and publication through clearing houses or swap repositories to improve market transparency and provide regulators important tools for monitoring and responding to risks. Fifth, it concerns financial safeguards. It adds safeguards to system by ensuring that dealers and major swap participants have adequate financial resources to meet responsibilities, and provides regulators the authority to impose capital and margin requirements on swap dealers. It aims to end the possibility that taxpayers will be asked to write a check to bail out financial firms that threaten the economy, by creating a safe way to liquidate failed financial firms and imposing new capital and leverage requirements that make it undesirable to get too big. It updates the Fed's authority to allow system-wide support but no longer props up individual firms. It establishes rigorous standards and supervision to protect the economy and American consumers, investors and businesses.

Finally, it seeks an advance warning system. It creates the Financial Stability Oversight Council to identify and address systemic risks posed by large, complex companies, products, and activities before they threaten the stability of the economy. The Council is chaired by the Treasury Secretary and includes the Federal Reserve Board, SEC, CFTC, OCC, FDIC, the new Consumer Financial Protection Bureau, and an independent appointee with insurance expertise. Nonvoting members include state banking, insurance, and securities regulators. The D-F bill attempts to reverse the policies of Geenspan, the Fed and Rubin.

### *2.6. The failures of International Monetary Fund Surveillance*

The Independent Evaluation Office (IEO, 2011) of the IMF found that the IMF provided few clear warnings about the risks and vulnerabilities associated with the crisis before its outbreak. I basically quote directly from this important report. The IMF economists tended to hold in the highest regard macro models of the academic economics profession. These models proved inadequate for analyzing financial linkages. Specifically, they introduced money and asset markets in the most rudimentary way,

completely unrelated to economic reality. The failure of the IMF surveillance, discussed in this section, is in fact *prima facie* evidence of the failure of the dominant macroeconomic models.

The Fund missed key elements that underlay the developing crisis. In the US it did not discuss, until the crisis already erupted, the deteriorating lending standards for mortgage financing nor did the Fund adequately assess the risks and impact of a major housing price correction on highly leveraged financial institutions. As late as April 2006, shortly before US housing prices peaked, the Fund Surveillance reports explained away the rising share of non-traditional mortgages in the US by writing “Default rates on residential loans have been low historically. Together with the securitization of the mortgage market, this suggests that the impact of a slowing housing market on the financial sector is likely to be limited.”

The Fund’s reading of the financial sector was remote from reality. In 2007 the Fund concluded that the financial sector was sound: “Core commercial and investment banks are in a sound financial position, and systemic risks appear to be low. Profitability and capital adequacy of the banking system are high by international standards....market measures of default risk have remained benign”.

A remarkable failure of the Fund concerns Iceland before its major financial crisis. In spite of a banking sector that had grown from about 100% of GDP in 2003 to almost 1000% in 2007, this was not noted as a vulnerability that needed to be addressed urgently. The staff reports about Iceland were sanguine. The report stated “Iceland’s medium-term prospects remain enviable.” In fact, “the banking sector appears well-placed to withstand significant credit and market shocks”.

The IEO explains why the IMF failed to give clear warnings. There was *groupthink*, a tendency among homogeneous cohesive groups to consider issues only within a certain paradigm and not challenge its basic premises. They were in awe of the dominant macroeconomic models mentioned above. The basic premises were that market discipline and self-regulation would be sufficient to stave off serious problems in financial markets. Crises were unlikely to happen in advanced economies where sophisticated financial markets could thrive with minimal regulation. The Fund accepted the same inappropriate macroeconomic model that dominates the academic profession.

Added to groupthink was the *confirmation bias* which is the tendency of people to only notice information consistent with their own expectations and ignore information that is inconsistent with them.

### 2.7. Conclusions

The crucial ultimate variable is the household debt, the mortgage debt. The rest of the financial system rested upon the ability of the mortgagors to service their debts. *Systemic risk* relates the effects of the failure of the mortgagors to service their debts upon the financial structure based upon the income from mortgages. The leverage of the financial system transmitted the housing market shock into a collapse of the financial system.

*A bubble is in effect a large positive unsustainable excess debt.* Detection of a bubble corresponds to the detection of an “excess debt”. The latter is equal to the difference between the actual and the optimal debt. The fundamentals are reflected in the optimal debt. The aim of this book is to derive an optimal leverage, debt or capital requirement. The technique of analysis is Stochastic Optimal Control (SOC). This analysis balances the expected growth against risk. Thus an excess debt corresponds to a situation where asset prices deviate from the derived fundamentals. There is no use of an arbitrary jump process where a crash occurs. Instead the SOC analysis implies that the probability of a crisis is directly related to the measured excess debt.

The housing price bubble, its subsequent collapse and the financial crisis were not predicted either by the market, the Fed, the IMF or the regulators in the years leading to the current crisis. Warnings, based upon publicly available information, were not only disregarded but the Fed and Treasury rejected the warnings. They successfully advocated deregulation of OTC markets. As a result, transparency of prices was reduced, risk was concentrated in a few major financial institutions and high leverage was induced. These were basic ingredients for the subsequent crisis.

The Fed, the IMF and Treasury lacked adequate tools which might have indicated that asset values were vastly out of line with fundamentals. The Fed and the Fund were not searching for such tools because they did not believe that they could or should look for misaligned asset values or excess debt, despite warnings from Shiller, some people in the

financial industry, the GAO, state bank regulators and FDIC. The Fed was blind-sided by the Jackson Hole Consensus which gave them great comfort in adopting a hands off position. So it was not just a lack of appropriate tools which undid the Fed; it was a complete lack of appreciation of what its role should be to head off an economic catastrophe. Peter Clark wrote that there are two separate but related questions: Are identification and containment of a financial bubble legitimate activities of the Fed, and if they are, what are the best tools to carry out this analysis? As the Fed answered "No" to the first question, it saw no need to address the second question.

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