

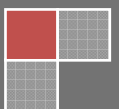
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# Dealing with Asset Bubbles: Knowing, Planning and Managing

A Case Analysis Approach

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## 1. EXECUTIVE SUMMARY

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Countless monetary systems have developed (and failed) over the past few thousand years, and have enabled managers means to openly speculate on the value of possessions. These speculative adventures have repeatedly resulted in formation of bubbles across different asset classes.

In my analysis, I have used the principle of predictive validity to determine structural similarities in the characteristics of Asset Bubbles. My analysis takes a case study approach towards determining the causes of Asset Bubbles, their impact on real economy and methodologies to manage through an abnormal asset inflation scenario.

The critical component of surviving Asset Bubble is its early detection and planning for impending crash. In my analysis, I have demonstrated a new approach, driven by asset fundamentals, for managing corporations and economies at large. To demonstrate its application, I have created a multivariate auto regressive model for US Housing Bubble with predictive validity of 74%.

I have also presented a framework for companies for managing risks during an Asset Bubble crash based on the principles of “Staying Liquid”, “Staying Profitable” and “Pursuing Selective Growth Opportunities”.

## 2. ANATOMY OF AN ASSET BUBBLE: LEARNINGS FROM THE PAST

There are multiple definitions of Asset Bubbles in existence. A common definition is that; bubble conditions arise when the price of an asset significantly exceeds the fundamental value determined by the discounted expected value of the cash flows that ownership of the asset can generate. Commonly, a bubble is defined as the “part of asset price movement that is unexplainable” by fundamentals, or factors that we believe drives asset price movements<sup>1</sup>. For example, if the market does not follow predictions based upon fundamentals, we might claim that a bubble exists in the market.

### 2.1. BUBBLES IN EARLY HISTORY

#### 2.1.1. THE TULIP MANIA (1636-37)

Among the most notable well-documented asset bubbles in history is the tulip craze of the early 17<sup>th</sup> century. At the height of the speculative craze, a futures market was created for tulips, and spot prices for the flowers commanded an average of four years’ salary for the average Dutchman. The chart below showcases the evolution of tulip prices towards the peak of the bubble in 1636-1637.

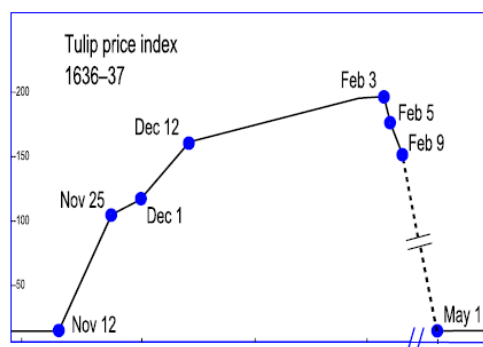


FIGURE 1: TULIP PRICE INDEX (1636-1637)

*Source: Thompson, Earl (2007), “The Tulipmania: Fact or Artifact?”*

#### 2.1.2. THE GREAT CRASH OF 1930

In the 1920s, American investors prospered from rampant productivity gains and began investing on a large scale in the stock market. Brokers, in an attempt to profit from the heightened interest in equities, instituted loans with margin requirements as low as 20%, making stock market accessible to the masses, triggering additional interest and a firm rise in share prices. In October 1929, the withdrawal of liquidity from financial markets by the brokerage industry in the form of increased margin requirements is what

<sup>1</sup> Garber, P.M. 2000. Famous First Bubbles: The Fundamentals of Early Manias, Cambridge, Massachusetts: The MIT Press, pg.4

ultimately likely sealed the fate of the stock market. Equities eventually tumbled over 80% before bottoming in 1932.

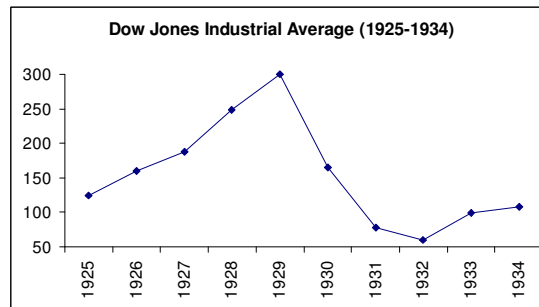


FIGURE 2: DOW JONES INDUSTRIAL AVERAGE (1925-1934)

*Source: Yahoo! Finance*

After the stock prices crashed in August 1929, production fell by 50% and the overall price level declined by 30% until March 1933.

## 2.2. MODERN ASSET BUBBLES: A TALE OF TWO CRISIS

### 2.2.1. CASE STUDY 1: ARGENTINA (THE PAYMENT CRISIS)

During late 80s and early 90s Argentina had a dream run of high GDP growth of above 5%. As a result of the convertibility law, inflation dropped sharply, price stability was assured, and the value of the currency was preserved. This raised the quality of life for many citizens. This led to a massive investment boom and an over confident banking sector.

Banking sector started taking excessive risks due to

1. Insufficient bank supervisors
2. Weak government regulations
3. Moral hazard due to safety net

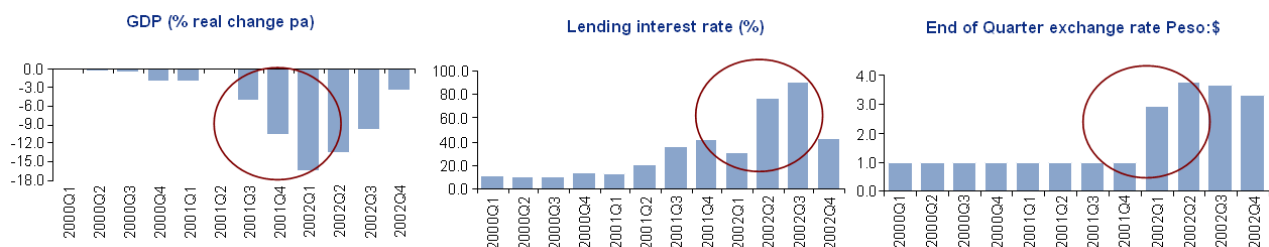


FIGURE 3: QUARTERLY GDP, LENDING INTREST RATE, EXCHANGE RATES (2000-2002)

*Data Source: Economist Intelligence Unit*

As the economic growth slowed down during 2001 (ref Fig 3), bank NPAs sky rocketed leading to massive rise in interest rates (ref Fig 3). Argentina quickly lost the confidence of investors and the flight of money away from the country increased. In 2001, people began withdrawing large sums of money from

their bank accounts, turning pesos into dollars and sending them abroad, causing a run on the banks. This led to the collapse of entire banking system in Argentina and devaluation of Peso (ref Fig 3)

### 2.2.2. CASE STUDY 2: JAPAN (THE LOST DECADE)

The bad loan problem began in the 1980s during what is known as Japan's bubble economy. From 1980 until 1987 Japan's discount rate was lowered from 9 percent to 2.5 percent. This steady loosening of the money supply helped to generate an unprecedented rise in Japan's stock and real estate prices during the same period (ref fig 4 and fig 5).

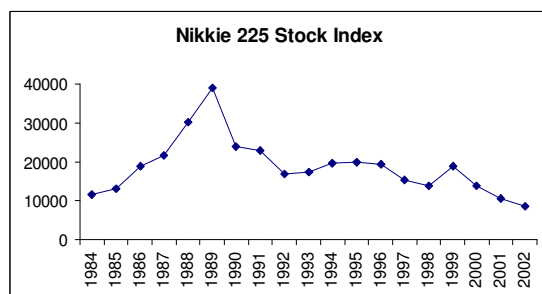


FIGURE 4

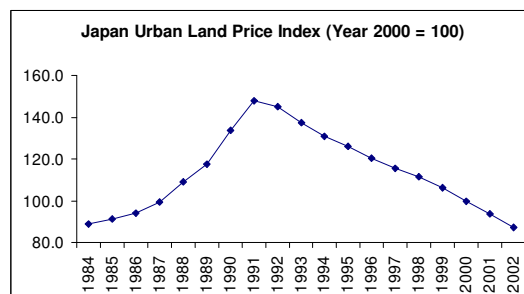


FIGURE 5

Data Source: Yahoo! Finance, <http://www.stat.go.jp/english/data/nenkan/1431-17.htm>

During the bubble years of the 1980s, credit corporations began funding the speculative finance of real estate entrepreneurs. The Bank of Japan persisted, however, and soon a rapid fall in the stock market, accompanied by a relentless drop in commercial and residential real estate value, took hold. In October 1992 newspaper headlines reported that Japan's 21 leading banks were holding ¥ 12.3 Trillion worth of bad debt.

TABLE 1: LOAN ADJUSTMENTS AND WRITE-OFFS (ALL BANKS - BILLIONS OF YEN)

	1992	1993	1994	1995	1996	1997	1998	1999	2000
<b>Loan adjustments and write-offs</b>	1,640	3,872	5,232	13,369	7,763	13,258	13,631	6,944	6,108
<b>Bad Debt reserve Allowances</b>	945	1,146	1,402	7,087	3,447	8,403	8,118	2,531	2,732
<b>Write-offs</b>	424	2,090	2,809	5,980	4,316	3,993	4,709	3,865	3,072
<b>Other Expenses</b>	271	636	1,022	302	0	863	804	548	304
<b>Accumulated Bad Debt (1992 and after)</b>	1,640	5,512	10,744	24,113	31,877	45,135	58,766	65,710	74,818
<b>Accumulated Write-offs</b>	424	2,514	5,322	11,302	15,618	19,611	24,320	28,185	31,256

Source: Japan's National Association of Bankers

After Japanese stock prices peaked in 1989, stocks lost roughly 60 percent of their value in the next three years. Commercial land prices fell by roughly 50 percent after their 1992 peak over the next 10 years.

Essentially, all loans that were secured by property became worth far less than anticipated. As a result, **Japan's banking system failed to record a net operating profit for more than 10 years.**

### 3. ASSET BUBBLES: HAVE THEY STRUCTURALLY CHANGED?

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Although the large gains and losses associated with asset bubbles have been well documented, surprisingly little consensus exists about the causes, characteristics, and behavior of asset bubbles.

An important characteristic of the bubble phenomenon is that during both the run up and run down periods the asset is subject to high volume trading<sup>2</sup> in which the direction of change is widely anticipated (and relied upon).

Looking at the cases of Asset Bubbles, learnings have been widespread. For example:

- Tulip mania is a classic example of irrational exuberance and speculative manipulation<sup>3</sup>
- Great crash of 1930 demonstrates the danger of leveraging of financial assets and creation of monetary bubbles bringing market liquidity risk to the fore
- The Argentinean crisis illustrated the dangers of weak regulatory framework and the dangers of relying on the international interbank market for finance.
- The Japanese experience showed that resolution of a banking crisis is best undertaken rapidly; generous deposit insurance and forbearance can lead to worse problems.

#### 3.1. STRUCTURAL SIMILARITIES IN ASSET BUBBLES

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A primary issue, that I am trying to address, is the nature of financial crisis. As highlighted in **Table 2**, there are both exogenous and endogenous aspects<sup>4</sup>. The process often starts with a primary shock to the economy and financial system. This leads to a process of propagation, whereby there is a build-up of vulnerability in the economy and financial system leading to a crisis when a secondary (adverse) shock occurs. In turn, there is further propagation in a crisis period (systemic risk) that typically entails policy reactions if the crisis is sufficiently severe, and considerable adverse economic consequences (the “costs of instability”).

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<sup>2</sup> White William R. 2008, The Need for a Longer Policy Horizon: A Less Orthodox Approach, Pg. 3

<sup>3</sup> Thompson, Earl (2007), “The Tulipmania: Fact or Artifact?”

<sup>4</sup> Davis E Philip and Karim Dilruba, 2009, Macroprudential Regulation – The Missing Policy Pillar, Pg. 2

TABLE 2: ASPECTS OF FINANCIAL CRISIS

Phase of crisis	Nature	Example of features
Primary shock	Diverse*	Deregulation, monetary or fiscal easing, invention, change in market sentiment
Propagation - build-up of vulnerability	Common^ –macro prudential surveillance	New entry to financial markets, Debt accumulation, Asset price booms, Innovation in financial markets, Under pricing of risk, risk concentration and lower capital adequacy for banks, Unsustainable macro policy
Secondary (adverse) shock	Diverse	Monetary, fiscal or regulatory tightening, asymmetric trade shock
Propagation – crisis	Common	Failure of institution or market leading to failure of others via direct links or uncertainty in presence of asymmetric information – or generalized failure due to common shock
Policy action	Common – crisis resolution	Deposit insurance, lender of last resort, general monetary easing
Economic consequences	Common – scope depends on severity and policy action	Credit rationing and wider uncertainty leading to fall in GDP, notably investment

\* Diverse: Characteristics vary across different asset bubbles

^ Common: Characteristics are similar across different asset bubbles

## 4. DEALING WITH ASSET BUBBLES

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The economics profession is divided with regard to whether a central bank should react to asset price bubbles directly or indirectly. The first difficulty is that economists have not established a workable method that can, with sufficient confidence, identify asset price bubbles at early stage and real time<sup>5</sup>. Hence, it should not be an overstatement that appropriate monetary policies can never be materialized as long as the issue of identification is unsettled.

### 4.1. KNOWING THE LIKELIHOOD OF BUBBLE FORMATION

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Identification of bubbles should not look directly at how much asset prices have inflated but instead examine whether the market meets both the necessary condition and the sufficient condition for bubbles to emerge.

#### 4.1.1. THE NECESSARY CONDITION

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The necessary condition for bubbles to emerge is the **existence of non-material demand for asset**, i.e., the average earning rate from an asset is lower than interest rate<sup>5</sup>.

The necessary condition for bubbles to emerge is:  $Y < r - p$ , where  $Y$  is asset yield,  $r$  is the interest rate and  $p$  is inflation rate.

For an asset market as a whole,  $Y < r - p$  means that there is a possibility for bubbles to emerge but bubbles will not become reality until the market meet the sufficient condition as well.

#### 4.1.2. THE SUFFICIENT CONDITION

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The sufficient condition for bubbles to emerge is that there are invigorate credit activities in the market. However, only when the market meets the necessary condition invigorate credit activities mean that bubbles are reality.

We analyse the relationship between  $Y$  and  $(r-p)$  and credit activities to identify bubbles. When  $Y > r - p$ , there is no bubbles in the market even if there are invigorate credit activities. When  $Y < r - p$ , there are bubbles in the market if there are invigorate credit activities and the proportion of credit-funded transaction in total transaction is increasing.

**In the next section, I will discuss the application of this approach for predicting asset bubbles.**

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<sup>5</sup> Sheng, Yuming 2009, A Macro And Rational Approach To Asset Price Bubbles: Definition And Early Identification At Real Time, Conference On Credit Risk, Financial Crises, And The Macroeconomy, Venice, Italy, Pg. 2

## 5. CONTROLLING ASSET BUBBLES: MACROECONOMIC PERSPECTIVE

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### 5.1. STANDARD POLICY RESPONSE

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The Standard Monetary Policy responds to an asset price only insofar as it conveys information to the central bank about the future path of **output and inflation**—the goal variables of monetary policy<sup>6</sup>. For example, a booming stock market is usually followed by stronger demand and increased inflationary pressures, so tighter policy would be needed to offset these consequences.

The inflation targeting approach dictates that central banks should adjust monetary policy actively and preemptively to offset incipient inflationary and deflationary pressures<sup>7</sup>. Traditional view is that monetary policy should do no more than follow the standard precepts of inflation targeting. Proponents of this view would acknowledge that rising asset prices often have expansionary effects on the economy, so that some tightening of monetary policy might be appropriate<sup>8</sup>. According to this view, however, policy should only respond to observed changes in asset prices to the extent that they signal current or future changes to inflation or the output gap. There should be no attempt to use policy either to gently lean against a suspected asset-price bubble while it is growing or, more aggressively, to try to burst it.

### 5.2. THE NEW PARADIGM

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Even for the Standard Policy response, it would probably be useful to identify—if possible—the separate fundamental and bubble components of the asset price. In particular, the bubble component may exhibit more volatile dynamics and be a pernicious source of macroeconomic risk, so optimal monetary policy may react more to bubbles than to movements in the fundamental component.

In my new approach, I argue that rather than targeting the asset price, monetary policy can target the fundamental drivers of Asset price and thus control abnormal deviations in the value of an asset.

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<sup>6</sup> Rudebusch, Glenn D, 2005, FRBSF Economic Letter

<sup>7</sup> Bernanke Ben and Gertler Mark, Monetary Policy and Asset Price Volatility, Pg 85

<sup>8</sup> Gruen David, Plumb Michael and Stone Andrew, Nov 2003, How Should Monetary Policy Respond To Asset-Price Bubbles, Research Discussion Paper, Pg. 4

### 5.2.1. CASE OF THE US HOME PRICES

I analyzed the Home prices in US from 1964-2008 to determine the key drivers of house as an asset. The results of which are presented below:

*Percentage change in median house prices = 0.711 X Percentage change in Personal Disposable Income + 3.097 X Percentage change in Civilian Labor Force + 0.095 X Percentage change in Index of Industrial Production – 0.032 X Change in effective mortgage rate + 0.014 X Change in federal funds rate – 0.058*

Looking at these results we can predict that to control house price bubble the most effective monetary policy response would be to control mortgage pricing policies rather than Fed Funds Rate.

Predicting the house price bubble through my model:

Year	Actual House Price Change (YoY)	Modeled House Price Change (YoY)	Difference	Bubble/ Bust
1997	6.78%	6.80%	-0.02%	<b>Period of Stability</b>
1998	4.77%	5.35%	-0.57%	
1999	5.18%	4.22%	0.96%	
2000	4.19%	4.98%	-0.79%	
2001	3.64%	0.54%	3.10%	<b>Building up of bubble</b>
2002	7.19%	-3.23%	10.42%	
2003	8.44%	2.81%	5.63%	
2004	13.81%	1.23%	12.58%	
2005	7.53%	5.64%	1.89%	
2006	3.78%	5.12%	-1.34%	<b>Bubble Bust</b>
2007	0.28%	3.69%	-3.41%	
2008	-5.59%	-5.55%	-0.04%	
2009	<b>House Price Bubble bust</b>		<b>23.83%</b>	

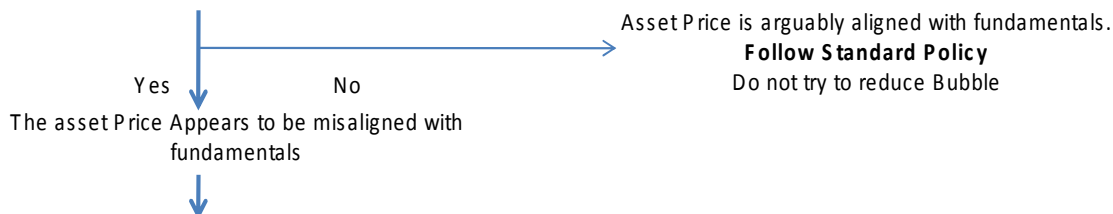
*Source: Self Analysis, excel data and regression model in appendix*

**Thus my model predicts (with 74% validity, i.e. R<sup>2</sup>=.742) that the home price should bust around 23% from 2009 onwards for the US housing bubble to bust based on fundamental drivers.**

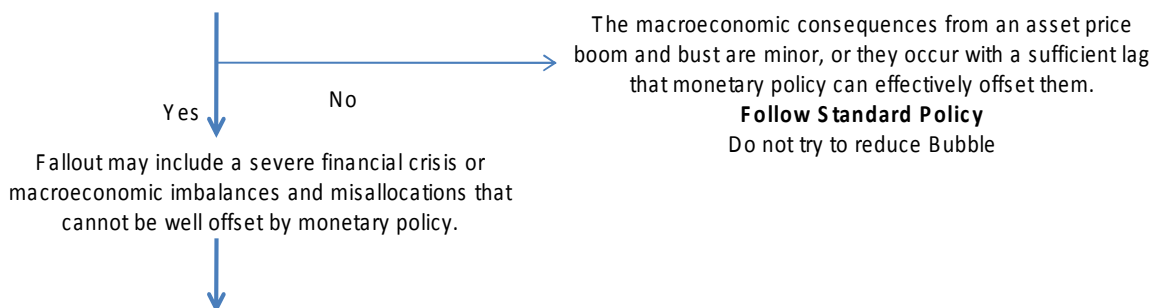
The next question for consideration is whether we should apply this approach in all cases? I have presented a framework for application of this approach:

### A Decision tree to choose between The New Approach and Standard policies

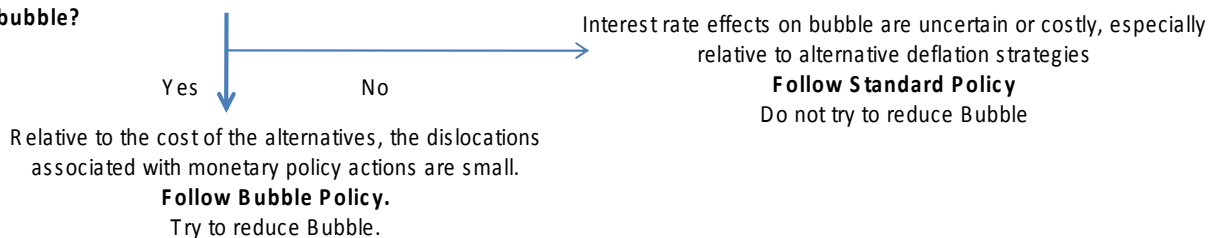
**Question 1. Can a Bubble - or Asset price misalignment - be identified?**



**Question 2. Would bubble fluctuations result in significant macroeconomic problems that policy could be readily offset?**



**Question 3. is Monetary policy a good tool to deflate the bubble?**



*Source: Self Analysis*

## 6. PLANNING FOR AN IMPENDING ASSET BUBBLE

Once bubbles are identified, for a quantitative analysis of their seriousness, the excess of  $(r-p)$  over  $Y$  can be the first measurement. The bigger the size of the excess, the more serious the bubbles will be<sup>9</sup>. The proportion of credit-funded transactions in total transactions of the asset market can also be used as a measurement of the seriousness of bubble. In the next section I have presented a framework for companies to manage their risks during asset bubbles.

### 6.1. FRAMEWORK FOR COMPANIES FOR SUCCEEDING DURING BUBBLE CRASH

TABLE 3

Risk Triggers	Implications	Response	Action Points
<ul style="list-style-type: none"> <li>• Geo-Political Events</li> <li>• Foreign Exchange Fluctuations</li> <li>• Financial Markets</li> </ul>	<ul style="list-style-type: none"> <li>• Cash flow volatility</li> <li>• Increased provisions on Balance sheet</li> <li>• Lower liquidity in financial markets</li> </ul>	Rebuild Capital Base	<ul style="list-style-type: none"> <li>• Raise capital, e.g., through private placements, rights issues or secondary offerings</li> <li>• Reduce dividends and increase capital through retained earnings</li> <li>• Exit businesses with unattractive expected risk-adjusted returns</li> </ul>
<ul style="list-style-type: none"> <li>• Demographic changes</li> <li>• Rapid technology changes</li> </ul>	<ul style="list-style-type: none"> <li>• Workforce rationalization</li> <li>• Adoption of lost cost technology</li> <li>• Rapid go-to-market business model</li> </ul>	Reduce Cost Structure	<ul style="list-style-type: none"> <li>• Review businesses with excessive capacity given market outlook (e.g., mortgages, structured credit)</li> <li>• Redesign operational model and core processes</li> <li>• Reduce overhead and external (e.g., purchasing) costs</li> </ul>
<ul style="list-style-type: none"> <li>• Viability of vendors / customers</li> <li>• Regulatory compliance</li> </ul>	<ul style="list-style-type: none"> <li>• Higher liquidity requirements</li> <li>• Minimizing loss a key priority</li> </ul>	Strengthen Risk Management	<ul style="list-style-type: none"> <li>• Create early-stage loss mitigation capabilities and enhance late-stage mitigation/collection capabilities</li> <li>• Upgrade risk management across all businesses and risk types and work with regulators to address systemic effects</li> </ul>
<ul style="list-style-type: none"> <li>• Low/Negative growth</li> <li>• Valuations</li> </ul>	<ul style="list-style-type: none"> <li>• Diversification of growth opportunities</li> <li>• Low valuation of strategic acquisition targets</li> </ul>	Capture Strategic Opportunities	<ul style="list-style-type: none"> <li>• Companies with strong balance sheets and capital positions, selectively pursue the strategic opportunities that this situation offers (exploit market entry, market share gain and industry consolidation opportunities)</li> </ul>

*Source: Self Analysis*

<sup>9</sup> Sheng, Yuming 2009, A Macro And Rational Approach To Asset Price Bubbles: Definition And Early Identification At Real Time, Conference On Credit Risk, Financial Crises, And The Macroeconomy, Venice, Italy, Pg. 2

## 7. CONCLUSION

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A workable, reliable, early stage and real time identification method

The extant prediction methods for bubbles have the following drawbacks:

1. **Excessive information requirements:** Most of these methods need a massive amount of data, many of which are not available at real time and some of which are not observable at all and can only be estimated through sophisticated econometric process without sufficient confidence.
2. **Ambiguity of prediction:** The prediction results have noises and miss out errors and thus are far from being sufficient to build a policy maker's confidence.
3. **Too late prediction:** The criteria used in these studies to identify bubbles are information from previous bubbles. When these criteria are met, the bubbles would be too mature for policymakers to do anything.

**This paper has put forward identification and planning mechanism that can overcome all these drawbacks.**

## 8. APPENDIX 1: DATA ANALYSIS

### Multivariate (Linest) Regression Model

	Change in	Change in	Percentage Change in	Percentage Change in	Percentage Change in	
	FFO RATE	Mortgage Rate	Change in S&P 500	Change Labour Force	Personal Disposable Income	Constant
<b>Coefficient of Regression</b>	0.01365106	-0.03222515	0.09463271	3.09720775	0.7117847	-0.05881696
<b>Standard Deviation</b>	0.00421359	0.009949564	0.04492961	1.19486439	0.30424675	0.026692759
<b>R<sup>2</sup> for Equation</b>	<b>0.74219872</b>	0.035354979	N/A	N/A	N/A	N/A

### Data for Multivariate Regression Model

Year	Y/Y Percentage change in yearly (average of 12 months) median house prices (OFHEO Data)	Y/Y Percentage change in yearly (average of 12 months) Personal Disposable Income	Y/Y Percentage change in yearly (average of 12 months) Civilian Labour Force Numbers	Y/Y Percentage change in yearly (average of 12 months) Index of Industrial Production Numbers	Y/Y Absolute change in Yealy (average of 12 months) effective mortgage rate 1	Y/Y Absolute change in Yearly (average of 12 months) federal funds rate 2
1964	5.66%	4.94%	0.01761656	0.161	-0.05	0.32
1965	6.15%	8.80%	0.018429128	0.085	-0.03	0.57
1966	6.82%	7.70%	0.017744052	-0.045	0.45	1.04
1967	5.42%	7.91%	0.02116433	0.091	0.13	-0.89
1968	9.44%	7.03%	0.017618502	0.069	0.52	1.44
1969	2.99%	8.64%	0.025341838	-0.010	0.80	2.55
1970	-7.98%	7.84%	0.025909149	-0.145	0.56	-1.04
1971	7.15%	9.15%	0.019084035	0.177	-0.69	-2.5

1972	9.25%	8.98%	0.031227223	-0.218	-0.16	-0.23
1973	18.72%	8.39%	0.027578888	0.230	0.44	4.3
1974	10.11%	12.56%	0.028690648	-0.235	0.99	1.77
1975	8.95%	9.54%	0.0195042	0.069	0.17	-4.69
1976	12.85%	10.81%	0.025390184	0.180	-0.06	-0.77
1977	10.61%	9.69%	0.029469374	-0.052	-0.05	0.49
1978	13.90%	10.23%	0.032824273	-0.021	0.57	2.4
1979	12.47%	12.02%	0.026677557	0.082	1.26	3.26
1980	3.12%	11.52%	0.019182598	0.157	1.99	2.15
1981	6.36%	12.02%	0.015909629	0.069	2.07	3.04
1982	0.69%	11.80%	0.014429753	-0.059	0.40	-4.15
1983	8.89%	7.80%	0.011531987	0.336	-2.58	-3.15
1984	6.04%	7.73%	0.018081954	-0.313	-0.25	1.14
1985	5.32%	11.64%	0.017048816	0.179	-0.84	-2.13
1986	9.44%	6.78%	0.020595998	0.264	-1.46	-1.3
1987	13.49%	5.65%	0.017032883	0.197	-0.88	-0.14
1988	8.29%	5.27%	0.015167212	-0.063	0.00	0.91
1989	6.20%	8.40%	0.017917219	0.217	0.83	1.64
1990	1.57%	7.28%	0.016196925	0.020	-0.08	-1.11
1991	-1.85%	6.57%	0.003939005	0.147	-0.71	-2.41
1992	1.07%	4.16%	0.013823769	0.093	-1.23	-2.17
1993	3.99%	6.43%	0.008479764	0.087	-0.98	-0.5
1994	3.38%	3.38%	0.01440824	0.216	0.36	1.19
1995	2.32%	4.88%	0.009679758	0.187	0.36	1.62
1996	4.75%	4.98%	0.012365048	0.234	-0.11	-0.53
1997	3.78%	5.18%	0.01754183	0.298	-0.06	0.16
1998	4.77%	5.28%	0.010116091	0.242	-0.58	-0.11
1999	5.18%	6.80%	0.012348093	0.223	0.15	-0.38
2000	4.19%	4.68%	0.023000683	0.067	0.71	1.27
2001	3.64%	7.45%	0.008297931	-0.165	-0.93	-2.36

2002	7.19%	4.07%	0.007561903	-0.166	-0.52	-2.21
2003	3.44%	4.59%	0.011354948	-0.021	-0.78	-0.54
2004	13.81%	4.25%	0.006026697	0.172	0.01	0.22
2005	7.53%	6.35%	0.012971798	0.065	0.16	1.87
2006	3.78%	4.39%	0.014182707	0.092	0.03	1.75
2007	0.28%	6.39%	0.011349746	0.121	0.01	0.05
2008	-5.59%	5.50%	0.008337057	-0.178	0.18	-3.1

Data Sources:

*Source for House Price: OFHEO House Price Monthly Data*

*Source for Labour Force: BLS Website*

*Source for Personal Disposable Income: BEA, Personal Income and Outlays Data*

*Source for S&P 500 data: Yahoo! Finance*

*Source for Mortgage Rate: <http://www.fhfb.gov/Default.aspx?Page=53>*

*Source for FFO Rate: US Federal release*

## 9. APPENDIX 2: REFERENCES

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**Data Sources: As given in Appendix 1 and with graphs**

# VARUN SINGH

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## SCHOLASTIC RECORD

2010	PGDIM	NITTE	8.38/10.0	<b>Rank 12</b>
2006	B. E. (Chemical)	National Institute of Technology, Surat	72.1	Distinction
2002	XII (CBSE)	SSS X, Bhilai	79.2	Distinction
2000	X (CBSE)	SSS X, Bhilai	81.8	Distinction

## SUMMER INTERNSHIP

HDFC Bank Ltd.	Retail Banking	Apr'09 – June '09
<ul style="list-style-type: none"><li>Analysis of <b>Wallet Share</b> in Panel Banking Corporate among HDFC Bank Existing Customers</li><li>Investigation on <b>vital aspects</b> for selection of a bank for salary accounts</li><li>Mapping of the <b>HDFC SWOT</b> analysis vis-à-vis the findings of <b>survey for low penetration</b></li></ul>		

## WORK EXPERIENCE

IBM India Pvt. Ltd.	Associate Systems Engineer (Advanced Developer)	June'06 – June'08
<ul style="list-style-type: none"><li>Interacting with client, understanding requirements, and coordinate with offshore team.</li><li>Managing a team of 4 people</li><li>Interpreting Client requirements to technical specifications</li></ul>		

## CORPORATE PROJECTS

American Express	Financial Strategy	Sep'08 – Nov'08
<ul style="list-style-type: none"><li><b>To devise a growth strategy for AXP in India through mapping payments industry in India</b><ul style="list-style-type: none"><li>➤ Macroeconomic Analysis</li><li>➤ Potential Threat and Opportunity Analysis</li></ul></li><li><b>Analysis of key financial trends in Credit Card Industry to optimize AXP investments</b></li></ul>		
KPMG India	Logistics	Jan'09 – Mar'09
<ul style="list-style-type: none"><li><b>Integrated Logistics</b> Solutions to Help Create Efficiency</li><li>Efficiency through <b>Route Optimization</b> for Hub and Spoke Models</li><li>Efficient <b>Benchmarking</b> and <b>Optimal Resource Deployment</b> in Logistics Operations</li></ul>		

## CERTIFICATION(S)

<ul style="list-style-type: none"><li><b>IBM Certification for Service Oriented Architecture and Web Services</b></li><li><b>IBM Certification for Quality assurance in Software development</b></li></ul>
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## ACHIEVEMENTS

<ul style="list-style-type: none"><li>➤ <b><u>Academic Achievements</u></b><ul style="list-style-type: none"><li>Secured <b>Highest Marks</b> in “<b>Financial Management</b>”</li><li>Secured <b>Highest Marks</b> in “<b>Investment Analysis and Portfolio Management</b>”</li><li>Secured <b>Highest Marks</b> in “<b>International Finance and FOREX Management</b>”</li></ul></li><li>➤ <b><u>Positions of Responsibility:</u></b><ul style="list-style-type: none"><li><b>Chief Event Convener</b>, Bulls and Bears, Mindbend 2005</li><li><b>Head</b>, Technical Committee, Chemical Department, Mindbend 2005</li><li><b>Coordinator, Finance Committee</b> -- Sparsh 2005, Cultural festival at NIT Surat</li><li><b>Cultural Secretary</b>, Hostel Administration Committee, NIT Surat (2004-05)</li></ul></li><li>➤ <b><u>Professional Achievements:</u></b><ul style="list-style-type: none"><li><b>Awarded Innovation@Work: Hall of Fame</b> for IBM Export Blue Account</li><li><b>Winner of IBM Gems Of Export Blue (Iolite Award)</b> - Q3 2007</li></ul></li><li>➤ <b><u>Scholastic Achievements:</u></b><ul style="list-style-type: none"><li>Paper Presentation, <b>International Conference</b>, Jaipur, March 2006</li><li><b>Winner</b>, Paper Presentation, Kshitij 2005, National Technical Symposium</li><li><b>Winner</b>, Paper Presentation, Collision 2003, National Technical Symposium</li></ul></li><li>➤ <b><u>Extra Curricular Achievements:</u></b><ul style="list-style-type: none"><li><b>Founder 'Photographix'</b> - Photography club of NIT Surat</li></ul></li></ul>
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