"Explain the merits and shortcomings of behavioural approaches to studies of asset markets, applying your analysis to (a) stock market prices in the period of 'irrational exuberance' beginning in the mid-1990s, and (b) housing finance in the period immediately before the financial crisis of 2007/09?"

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This paper will analyze the essence of behavioural finance, comparing it to orthodox theory and it will provide a behavioural approach to the period of irrational exuberance and the housing bubble of the 2000s.

In section I, I will review the underpinnings of behavioural finance, the set of heuristics that describe humans' decision-making processes, and I will evaluate the strengths and weaknesses of behavioural approaches in respect to orthodox financial theory.

In section II and III, I will describe the nature of asset price fluctuations during the dot.com bubble and the housing bubble respectively and I will apply a behavioural approach to the peculiarities of asset markets during these periods.

In section IV, I will assess the effectiveness of behavioural finance to understand asset markets by a comparison of the two case studies treated in section II and III.

Section I: Underpinnings of Behavioural Finance

In this section I will analyze the principal heuristics adopted by Behavioural Finance through the following subsections: (i) how individuals deal with past experiences when making decisions; (ii) how the current environment influences behavior; (iii) how individuals tend to conform to each other; (iv) what type of conclusions can be drawn on the effectiveness of behavioural finance.

I. Representativeness, Conservatism, Projection Bias, the Winner's Course and the Sunk Cost Effect

According to behavioural finance, humans tend to distort the value and relevance of past experiences when forming expectations about the future.

Firstly I describe the heuristics involving models' interpretation: representativeness and conservatism. Barberis and Thaler (2005, p.13) describe representativeness as the tendency of individuals to weight the probability for a model's outcome to belong to the data set from which it is extrapolated by comparing the characteristics of the former with the ones of the latter. This behavior may describe the inclination of individuals to rely on qualitative and story-type justifications to weight future outcomes rather than focus on objective and quantitative evidence.

Barberis and Thaler (2005, p.15) define conservatism as the humans' propensity to overestimate the future in the belief that it will unfold like the present. This concept portrays a naïve investor, who neither has knowledge of financial theory nor any critical awareness. Furthermore it clashes with the concept of representativeness: the two notions are mutually exclusive. On the one hand representativeness imply that individuals are critical of the models' predictive abilities, on the other hand conservatism states that humans not only believe that models' forecast are indisputably accurate, but that the future will look exactly like the present.

Below I revise how behavioural approaches describe humans' evaluation of the past while forming decisions at a broader level than simple model building. I do so through the notions of: projection bias, the winner's course and the sunk cost effect. Loewenstein and O'Donoghue (2003, p.1210) explain projection

biases as the propensity of individuals to make forecasts concentrating on a narrow spectrum of possible outcomes. This concept is a tautology in so far as the notions of human being and bounded rationality are inseparable. Despite its nature, this notion can be useful to refute the validity of models that assume individuals to be perfectly weighting all the information available.

Similarly, Biasis and Hilton (2004, p.24) describe the winner's course as the tendency to underestimate losses after a string of winnings. This concept overlaps with the idea of conservatism. Furthermore it may not consist in a behavioural bias in the area of investment trading: when agents form expectations about events with uncertain probabilities, they may profit from discounting the likelihood of older events to reflect a possible structural change, especially when investing in a new market.

Relatedly, Arkes and Ayton (1999, p.591) define the sunk cost effect as the tendency of individuals to take into consideration past actions when making future decisions. This behavior highlights human's propensity to optimize the past through today's actions, avoiding the feeling of regret. Taking in account this heuristic and strive to avoid taking into consideration sunk costs may both strengthen the objectivity of investments' evaluation and, in the medium term, lead to an improvement of individuals' decision-making processes.

II. Anchoring, Belief Perseverance, Sentiment Risk, Magical Thinking and Overconfidence

In this section I review how Behavioural approaches describe that the structure of the environment and human emotions affect the ability of individuals to make decisions.

Firstly I highlight the set of heuristics related to changes in the environment: anchoring and belief perseverance. Wheale and Amin (2003, p.122) describe anchoring as the tendency of individuals to over-rely on the available information when forming judgments. This concept is a broader notion of the idea of extrapolation bias as the former includes the effects of the individuals' perceptions of the environment and their preferences on decision-making. Anchoring may be a useful concept to understand how the presentation of information affects decision-making.

Relatedly, Barberis and Thaler (2005, p.15) define belief perseverance as the propensity of humans to resist changes in their opinions when new contradictory evidence emerges. This concept overlaps with the domains of conservatism and the winner's course. Arguably, belief perseverance can be a strength of humans' decision-making processes. If we admit that given bounded rationality, human beings are prone to projection biases, we can say that individuals are, in the long run, better off to resist changes in their opinion, up to a certain degree. A moderate resistance to change can be profitable to guard against one-off events and periods of extreme volatility.

Below I revise the heuristics that describe how sentiments affect decision-making: sentiment risk, magical thinking and overconfidence.

Rizzi (2008, p.89) describes sentiment risk as the positive correlation between the emotional status of financial agents and trading volumes. This

notion is useful to highlight that emotions influence decision-making but evidence suggests that sentiment risk is limited both in magnitude and in duration. It may be statistically valid to conclude that daily fluctuations in humans' sentiment have a correlation with the stock market but as the time horizon expands and the level of humans' emotions average out, this relationship will become negligible. A caveat may be present during prolonged periods of national catastrophes or wars, but at this point it may be difficult to control for the effect of sentiments on stock markets fluctuations.

Relatedly, Shiller (2005, p.155) describes the notion of magical thinking as the human tendency to rely on intuition to determine the likelihood of an investment's profitability. It is evident that given bounded rationality humans' cognitive processes necessitate a rule of thumb system to reach decisions, especially to connect and provide a sense to contrasting theories and overcome the lack of essential elements to reach fully informative decisions. On the other hand, magical thinking consists of a secondary indirect effect of emotions on decision-making. Although, given the boundaries of humans' scientific knowledge, it remains obscure to what degree emotions may affect magical thinking.

Lastly, Rizzi (2008, p.86) defines overconfidence as the tendency of individuals to have higher expectations of future outcomes than historical data predict: partly because of the humans' predisposition to take responsibility for success but blaming others for failures. However, in light of the previous heuristics, the notion of overconfidence falls short of consistency and factual evidence. Firstly, while the sunk cost effect claims that individuals tend to value more the past than the present, overconfidence states the opposite. Secondly,

events studies depicting the effect of sentiment risk on decision-making highlight that individuals are as much prone to overconfidence as to diffidence.

III. Group Think and Herding

Rizzi (2008, p.89) defines group think as the tendency of experts to conform to the leading ideas of their specific profession. This behavior is a tautology, as it represents the evident tendency of people from a similar profession or group, with alike educational paths, life experiences, daily routine and sources of information to hold fundamentally analogous ideas of their professional environment.

Closely relates is the notion of herd behavior. Schiliro (2012, p.102-3) defines the latter as a result of social pressure and loss avoidance that drive individuals to follow the decisions of others. This concept tends to assume individuals with a distinct lack of agency, which in the long run does not seem to resemble reality. Indeed, experiments describing herd-behavior have both a limited time frame and no real costs for humans' decisions that are comparable to an individual's salary or long-term career goals.

Despite the individual plausibility of the concepts of group think and heard behaviour, it may be argued that the two concepts are mutually exclusive. If we allow for herd behavior, then we state that there is no longer a boundary between the ideas held by different groups, which would imply their inexistence.

IV. Strengths and Weaknesses

From the analysis above it becomes evident that the intrinsic nature of behavioural finance allows for a real-world approach of asset markets, which may imply that the former has a greater potential than orthodox financial theory in developing models of actual trading behavior that stay apace with an ever-changing financial system. Although, it was shown that behavioural finance has not a consistent and unified theoretical skeleton, which lacks of the ability to identify the individual emotions underlying complex behaviors.

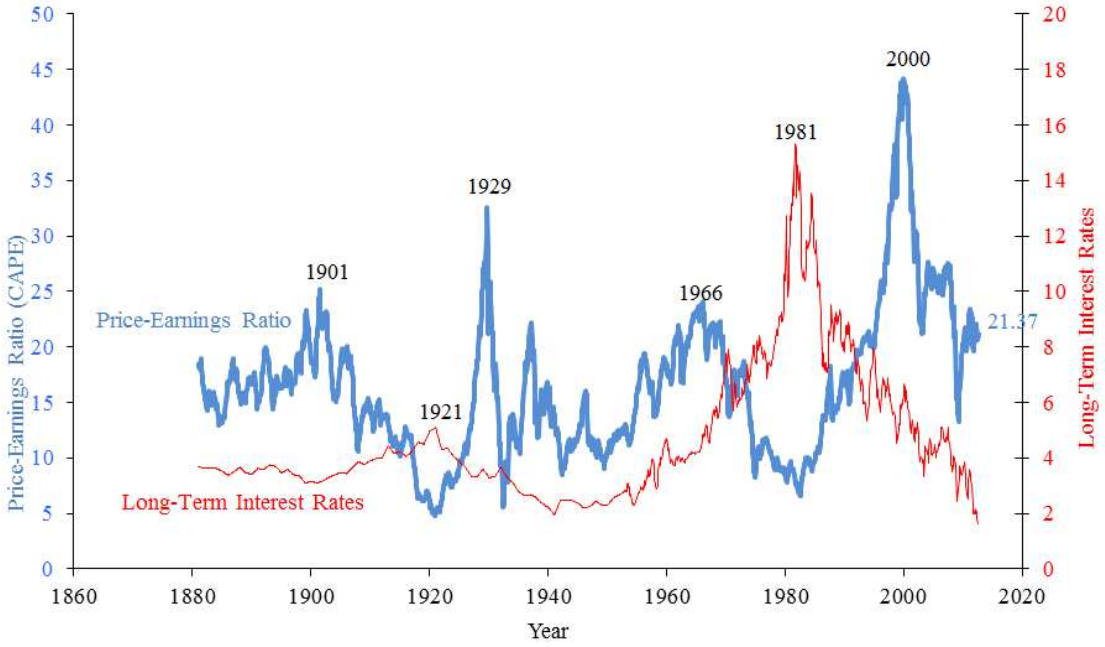
Section II: Irrational Exuberance

This section is divided in two parts: firstly I will describe the main features of the asset price fluctuations during the dot.com bubble; secondly I will explore the role of behavioural finance in explaining the movements in asset prices during this period.

I. Price Fluctuations

Shiller (2005, p.21) defines irrational exuberance as the self-fulfilling investment behavior that created the speculative dot.com asset bubble. Shiller (2005, p.16) argues that the validity of this argument lies in the fact that while the NASDAQ skyrocketed, during the late 1990s, fundamental values remained constant. As table 1 highlights, the price-earning ration (P/E), a comparative measure of stock valuation to the profitability of the market, increased by a ratio comparable only to the P/E trend in the late 1920s leading up to Black Friday.

Table 1: S&P 500 P/E and Interest Rates



Source: (Shiller, 2005, p.16)

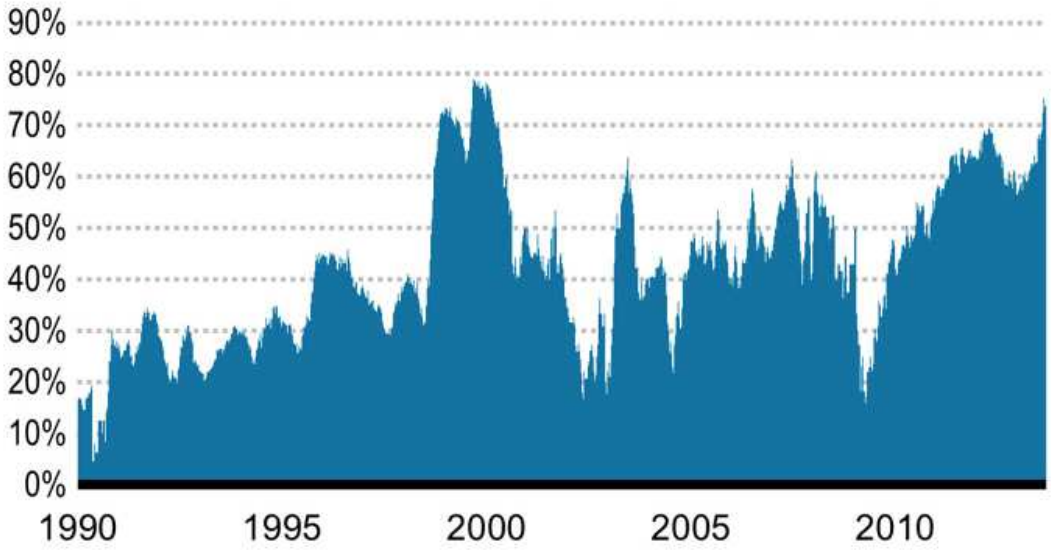
II. A Behavioural Approach to The Period of Irrational Exuberance

Rapid technological advances and the democratization of technology and communication characterized the beginning of the 1990s, touching every industrial and service sector. Companies' rise in productivity due to the implementation of computers with suits such as MS office and email communication created an environment of optimism for the rise of e-commerce in the mid 1990s.

As it became evident that the profitability of e-commerce ventures would have crucially depended on whether they became big enough to establish themselves as market leaders, Internet businesses quoted in the stock market to acquire resources for marketing campaigns. Investors did not have any similar historical event to draw on to form plausible evaluation of this new market

segment. Therefore as table 2 highlights, the raising trend in the proportion of IPOs with negative earnings did not affect the confidence in the market as investors were affected by belief perseverance. Indeed, Peterson and Valliere (2004, p.15) state that traders invested in portal companies just in order to create a portfolio diversified enough to incorporate a likely profitable venture. Investors were convinced of the eventual profitability of e-commerce companies, they were just unsure which business model would have succeeded.

Table 2: *Percentage of IPOs with negative earnings*



Source: (Russolillo, 2014, p.1)

Given the different nature of e-commerce businesses respect to traditional ones and the recent successes on business productivity derived from the implementation of new technologies, investors were affected by availability bias and anchoring: they had to rely on rules of thumbs as historically documented models and trends for this type of market were not available. This drove investors into magical thinking and overconfidence in the bull market. Finally,

the development of new vehicles of communications conformed experienced and noise traders alike into group thinking and eventually, the rapid rise in stock prices functioned as an informational cascade and exacerbated herding behavior, leading to a self-fulfilling feedback loop and the dot.com bubble burst.

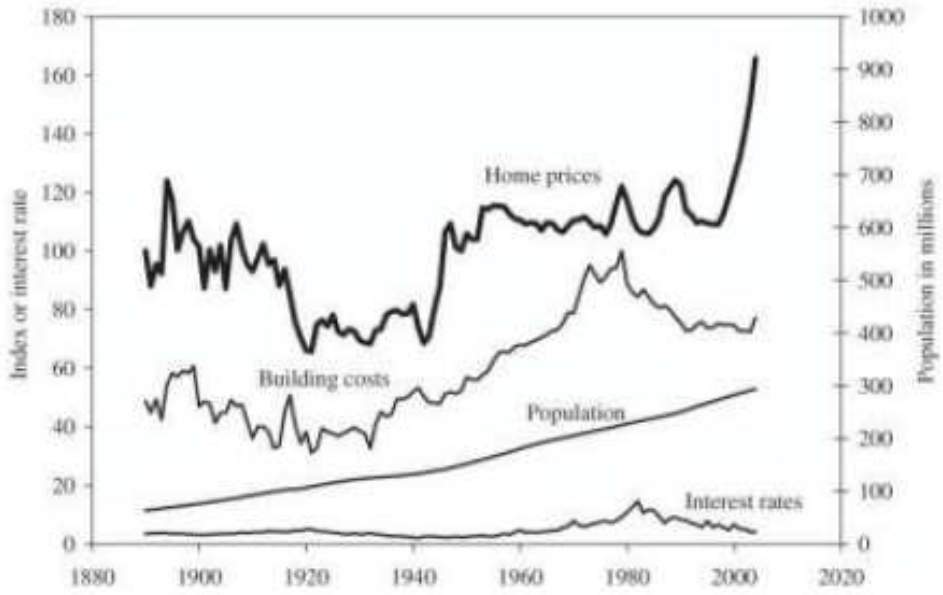
Section III: The Housing Bubble

This section is divided in two parts: the first part will describe the central features of the asset price fluctuations during the housing bubble of 2000s and the second part will provide a behavioural approach to the asset price movements of this period.

I. The Unfolding of The Housing Bubble

The early 2000s were characterized by an inflating housing bubble in the US market: as table 3 highlights, while housing prices surged by over 60% in the early 2000s, the main determinants of their fundamental values maintained their long run trends. This housing bubble was driven by both real and behavioural factors: a surge in financial innovations and distorted invectives in the sectors of mortgage issuance, asset securitization and credit rating practices in the US market.

Table 3: *US home price index, building costs, population and interest rates*



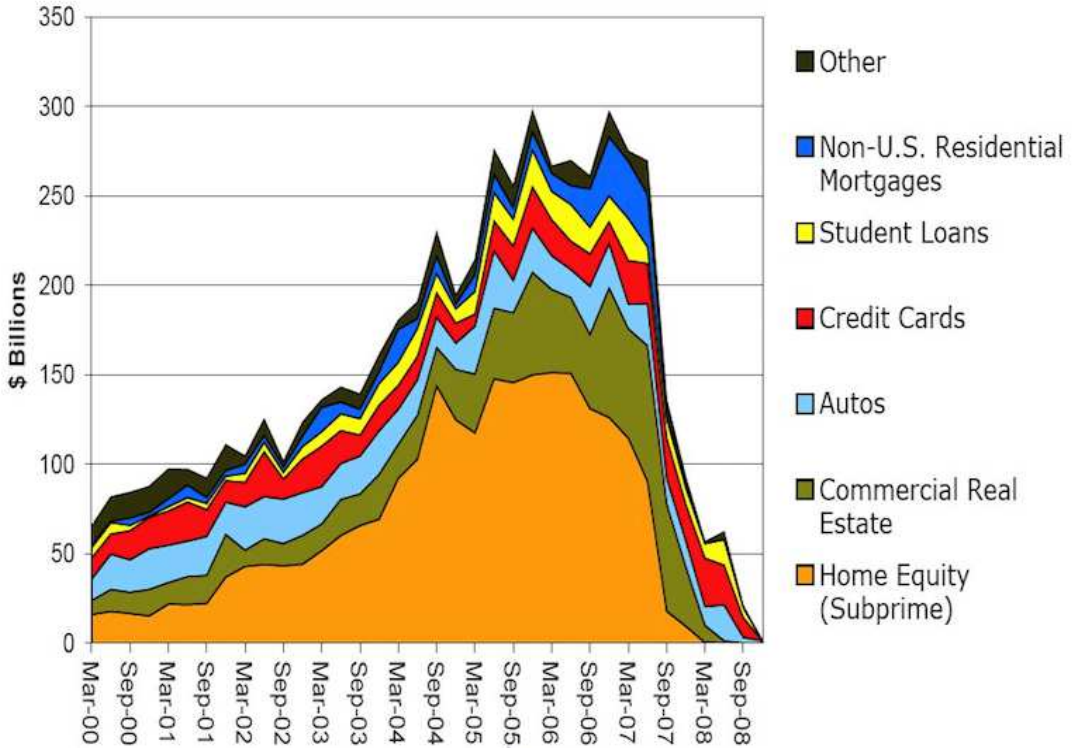
Source: (Shiller, 2005, p.24)

In the first years of 2000s, the new profit opportunities derived from mortgage issuance through Asset Backed Securities (ABSs), led banks to lower their underwriting standards and heavily invest in marketing of easy to get mortgages to perspective applicants with poor credit history, large outstanding debts, small deposit on their houses and high leverage ratio. As interest rates were low, mortgage issuance increased and banks' profits rose. This pushed further down underwriting standards, created excess demand for housing, pushing their prices up, alluring investors and first-home buyers alike to the market, creating a self-fulfilling housing bubble.

On the other side, financial institutions bought, securitized and resold banks' mortgages to investors. Credit rating agencies, often financed by the financial institution themselves, failed to realize the quality of the banks underwriting standards. Finally investors poured increasingly in the market for US ABSs as rising house prices and low credit risk spreads in the housing market signaled

high yield and low risk investments. As table 4 highlights, the US market for ABSs increased from roughly $70bn in 2000 to $300bn in 2005, driven exclusively by subprime mortgages securitization.

Table 4: *US ABSs issuance by asset class*



Source: (Durden T. 2009, p.1)

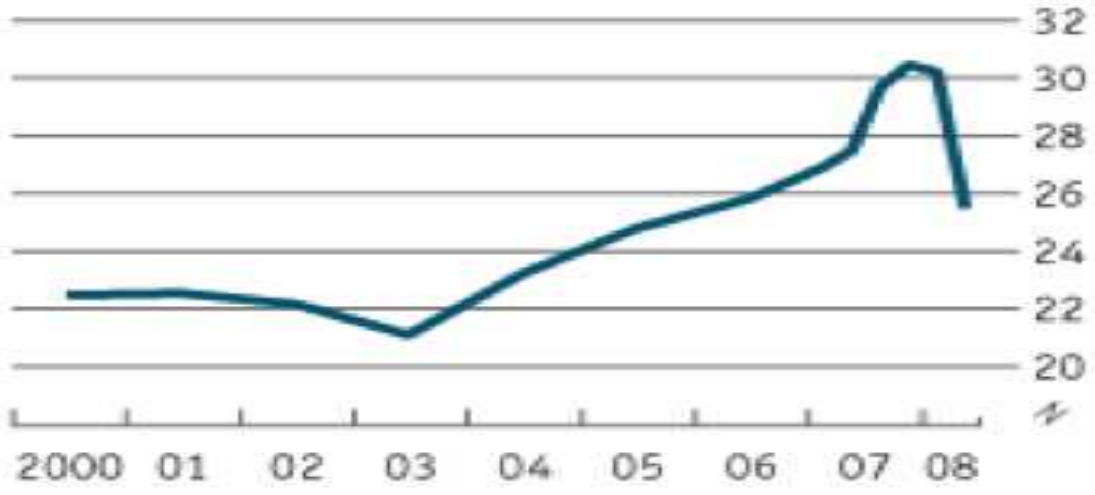
II. A Behavioural Analysis of The Housing Bubble

This section will firstly analyze the incentives and behavior of banks, financial institutions and stock market investors and secondly it will investigate the peculiar behavior of homebuyers.

A. Banks and Financial Institutions and Investors

The surge in housing prices and the novel nature of securitization practices left a knowledge gap that affected the ability of investors to make informed decisions. The lack of historical data on subprime mortgages securitization distorted investors' ability to form decisions through availability bias and disaster myopia. Furthermore the absence of regulatory instruments and the inefficiencies of credit rating agencies created a far-fetched environment of sustainable profitability. Indeed, as table 5 highlights, the steep rise in banks leverage ration by over 50% in the period 2003/07 did not affect investors' confidence in the stability of the market.

Table 5: *Brokers' dealers leverage ratio*



Source: (The Economist, 2008, p.2)

As investors profited from rising house prices, they began to be affected by the winners course, they paid increasingly less attention to the composition of ABSs, overestimating future results in a way resembling conservatism. In

addition accounting practices allowing banks to write off mortgages from their balance sheets increased the effect of narrow framing, raising the magnitude of wishful thinking, inflating house prices further. Consequently, the resulting behavior of individuals and companies quickly homogenized through the new media and exacerbated herd behavior.

Finally, as financial institutions were able to insure their ABSs through credit default swaps (CDS) and could finance eventual losses from mortgage defaults through repurchase agreements, they were able to spread the burden of the housing bubble throughout the whole financial system before it eventually collapsed. Therefore the housing bubble continued unfettered for a longer period than a bubble of belief such as the dot.com bubble, creating larger distortions in the economic system.

B. Home Buyers

The envy for the profit of others and the over-reliance of the general population on the financial judgment of regulators and banks, drove first-home buyers into the housing market. Their level of over confidence and magical thinking led them to overlook the seriousness of their leverage ratio and their lack of assets diversification. Homebuyers anchored to the comments of financial experts and affected by disaster myopia and wishful thinking herded into the housing market. Furthermore property investors which first entered the market for short-term profit, were affected by the winner's course and increased their investments in the housing market, exacerbating excess demand and housing

prices. These behaviours fuelled the self-fulfilling feedback loop of the housing bubble and its subsequent burst.

Section IV: Conclusion

In section I, I argued that behavioural finance allows us to gain a more realistic approach to asset markets than does orthodox finance: firstly because the former highlights that investors distort the past when forming expectations of the future; secondly because investors' decisions are determine by the way in which information is presented; finally because individuals tend to homogenize their opinions despite their validity. Therefore I showed that individuals are not the rational entities that the expected utility hypothesis assumes. Throughout this section I also emphasized that behavioural approaches frequently overlap and contradict each other, due to the subject's failure to identify the underlying emotions of each human behavior. This lack of consistency determines that behavioural finance function rather as a complement to orthodox financial theory than as a substitute.

In Section II and III, I exposed the characteristics of asset prices fluctuations during the period of irrational exuberance and the build up of the recent housing bubble. I also applied behavioural approaches to analyze asset markets during this periods. Firstly, the dot.com bubble demonstrated that behavioral biases influence expert and novice investors alike and that the formers are powerful enough to outgrow sound financial judgment. Secondly, the behavior of central bankers and financial regulators throughout the housing bubble proved that

market frenzy and irrationality does not only affect profit-making incentives but it can bias regulators' and central bankers' decision-making processes.

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