EC371 Term Paper

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Examine the distinguishing characteristics of 'bubbles' in asset prices and discuss their implications for government policies. Illustrate your analysis with reference to an episode that may be interpreted to constitute a financial bubble.

Introduction

Financial bubbles have long been an economic phenomenon. Events such as the Mississippi Bubble in the 18th Century and the Stock Market Crash in the 20th Century have been responsible for some of the worse periods of economic stability in history. Despite being well researched, there is still an element of mystery surrounding the emergence of bubbles and they are widely misunderstood. In this paper, I will provide an economic analysis of 'bubbles' in asset prices. The paper is split into four sections. The first section explores some of the popularised theories of financial bubbles with particular focus on the Net Present Value theory. Section two discusses the main characteristics of 'bubbles' in asset prices, in which I present four common characteristics. Section three, explores one of the most recent bubbles in asset prices: the dot-com bubble. Lastly, Section four draws on previous discussions in the paper to explore the implications of financial bubbles on government policy and introduces some suggestions for policymakers.

Theories of Financial Bubbles

Many describe a financial bubble as a large deviation of the price of an asset away from its 'fundamental' value. It is important to define 'fundamental' here. Although there are many ways of defining this, the Net Present Value is commonly used to define a fundamental

price, that is:

$$\boldsymbol{p}_t = \sum_{i=1}^{\infty} \frac{d_{t+i}}{(1+r)^i}$$

Where $1/(1+r)^i$ is the discount factor and d_{t+i} is that period's dividend. This essentially prices an asset as the present value of its future returns. One must pay some attention to the heroic assumptions the NPV suggests. Firstly, one assumes in the construction of the NPV, that all future payoffs are known with certainty: this is rarely true. Secondly, this relies on a constant discount rate r, again rarely known or simply untrue. Thirdly, it assumes all investors have heterogenous beliefs about a 'fundamental' price defined by the NPV. In truth, there is often no consensus of a fundamental value of an asset thus the difficulty in theorising or defining a financial bubble.

We can extend the NPV relationship to include a bubble term, giving us the NPV theory of bubbles. Supposing that p_t increases by an arbitrary amount $b_t > 0$ and the bubble grows at rate r, we have:

$$p_{t+n} = \sum_{i=n}^{\infty} \frac{d_{t+i}}{(1+r)^i} + b_{t+n} = \boldsymbol{p}_{t+n} + b_{t+n}$$

Where $\boldsymbol{p}_{t+n}$ represents the 'fundamental' price outlined above and b_{t+n} represents the bubble component which causes assets to be priced above the fundamental value. Despite this relationship being commonly used in the related literature, it is important to understand the shortcomings of the NPV as a theory of bubbles. The theory provides no explanation for the appearance of the bubble term b_{t+n} nor does it advise when the bubble will burst. Whilst it may be of some use for identifying the increasing prices typical of the preliminary stages of a speculative bubble there are most certainly limitations to its

usefulness in terms of the prevention and termination of such events. Whilst it may not be entirely justifiable as a theory, the NPV is most commonly used in the related literature as a benchmark for assessing whether a bubble has occurred or is under way. This is, of course, subject to various estimations and assumptions but can be a useful tool when analysing current financial markets for 'bubble'-like price changes.

Behavioural finance is often used to form a theory of financial bubbles. The noise trader approach suggests that there are two types of traders/investors: rational investors who use fundamental information in a rational way and noise traders who do not use information in such a way and respond to fashions or whims. Irrational Noise Traders push the price of an asset above the 'fundamental value'. In a situation without limited arbitrage, rational investors would short sell the asset, making a profit and pushing the price back down to the 'fundamental' value. However, when arbitrage is limited, rational investors cannot 'arbitrage away' this price increase, thus it stays at the inflated value. Arbitrage is often limited in this way due to the existence of fundamental risk and market frictions. This causes a gradual increase in price of an asset due to the irrational behaviour of the noise traders. Behavioural finance relies on the existence of some form of 'irrationality', critics of the branch may say this is too broad a term and often not specified well enough. Furthermore, this theory also relies on the existence of some 'fundamental' value, which as previously discussed is difficult to define. This appears to be the essential issue when developing theories of bubbles.

Characteristics of Financial Bubbles

What distinguishes a 'bubble' in asset prices from just a normal fluctuation? Often increasing asset prices can be a positive sign: an indication of increasing wealth and economic wellbeing. Financial bubbles, however, as we have seen in recent years are rarely a positive occurrence and can have devastating effects on the economy. Although each financial bubble throughout history displays unique properties of its own, there appears to be 4 common characteristics: A period of manic optimism, a crisis of confidence, evidence of fraudulent activity and intense pessimism.

A Period of Manic Optimism

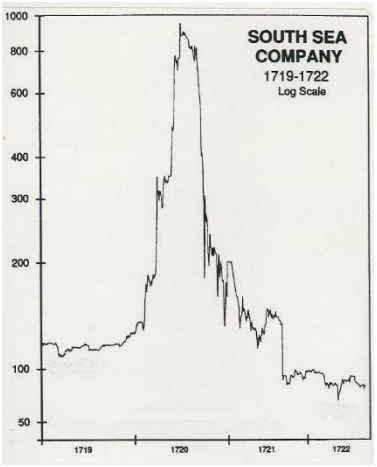
This is the primary stage of a financial bubble, in which there are rapidly rising prices along with high expectations for continuation of rapid price rises. Under the influence of market psychology, Investors frantically invest in an asset with rising prices in the belief they will profit from the asset in the future. Often the asset in question involves an innovative or newly popularised product (internet in the 1990s, the railway in the 1840s). Alan Greenspan, previous chair of the Federal Reserve Board, used the term 'Irrational Exuberance' to describe the manic behaviour of stock market investors in 1996 and this term has frequently been used to describe this period of manic optimism. Shiller (2014) describes this perfectly: '*Irrational Exuberance is the psychological basis of a speculative bubble. I define a speculative bubble as a situation in which news of price increases spurs investor enthusiasm, which spreads by psychological contagion from person to person, and, in the process, amplifies stories that might justify the prices increases and brings in a larger and larger class of investors, who, despite doubts about the real value of the investment, are drawn to it partly though envy of others' successes and partly through a gambler's excitement.'* Investors witness the price increase of an asset and believe it to be valuable or

do not want to miss out on the high returns from reselling the asset in the future. Consequently, they purchase the asset, driving up the price and demand even further. Some may even purchase the asset knowing it is priced far beyond the 'fundamental' value with the hope of selling it before other investors become aware. This cyclical turn of events is known as a feedback loop and some would consider it the crux of any financial bubble. In the last 20 years, the manic optimism witnessed during this phase has been amplified by the media, once business newspapers catch wind of rapidly increasing asset prices, the publication of this only serves to drive up demand and prices even further.

This period typically lasts for several years such as the United States Housing boom, where real home prices increased by 85% between 1997 and 2006. However, these periods can be much shorter: during the South Sea Bubble, the prices of South Sea shares Increased by almost 1000% between January and July 1720. These asset prices continue to rise until investors are no longer willing to enter at the higher price and then, there is a crisis of confidence.

A Crisis of Confidence

This is effectively characterised as a reverse of the feedback loop in the stage of manic optimism. Some holders of the highly-priced assets become aware that the asset is unsellable at the high price. They try to sell the assets immediately. Some are successful, however, as prices are dropping many of these assets become unsellable. Prices continue to drop, as more and more people sell and demand decreases. This process typically happens much faster than the rise in prices, probably why it is often referred to as a "crash". This can be seen below in the graphs of the South-Sea bubble and the Stock market crash of 1929.



Evidence of Fraudulent Activity

Evidence of fraudulent activity is often coupled with a crisis of confidence and can either precede or succeed it. When asset prices are unusually high investors are willing to take higher risks for larger returns. These higher risks often involve fraud. Francis (2010) argues this fraud is often associated with *a complex network of collusion between bankers, regulators and legislators.* For example, during the American housing crisis, banks repackaged high-risk sub-prime mortgages and sold them on as apparently low-risk mortgages. Regulators and legislators failed to stop this or some would say they actually approved this. Thus, when the sub-prime bubble burst and evidence of this fraudulent activity became apparent, asset prices dropped even quicker and economic conditions worsened further.

Intense Pessimism

As asset prices fall dramatically along with public confidence in financial markets, intense pessimism sets in. Levels of wealth decrease and debt increases. People become wary of spending and levels of consumption decrease along with aggregate demand. This chain of events can define or lead to an economic recession. It must be said, however, that some of

the most famous economic bubbles such as the Dot-Com bubble did not have severe negative macro-economic repercussions.

The Dot-Com Bubble

The Dot-Com bubble of the late 1990s is one of the most recent examples of investors frantically investing in assets with rising prices under the influence of market psychology. As the internet became increasingly popular, so did technology-based start-up companies. The early success of amazon.com and ebay.com did not go unnoticed by Wall Street analysts. Many investors and venture capitalists made speculative purchases of stocks in "dot-com" companies despite the majority displaying no form of business plan or capability for profit. Magazines and newspapers such as California Business and Forbes published articles encouraging purchases of the stocks. Spectacular U.S Corporate earnings growth in the years leading up to the bubble (8% in 1995 and 10% in 1996) and the low-interest rates at the time only served to further encourage irresponsible and uninformed investments.

IPOs (initial public offerings) played a huge role in the dot-com crash. IPOs are the first sale of stock by a private company to the public: effectively, new start-ups were approaching investment banks to value their businesses and sell part of them off to public investors. Ljungquist and Wilhelm (2002) write: *In 1996, first-day returns on IPOs averaged about 17 percent. In 1999, first-day returns averaged 73 percent before tapering off to 58 percent in 2000. Internet IPOs averaged a stunning 89 percent during 1999 and 2000. These average returns dwarf those from earlier periods and are the most widely recognized feature of what is now commonly referred to as the "dot-com bubble".*

Consequently, between 1995 and 2000 the technology-dominated NASDAQ index rose from under 1000 points to more than 5000. On March 10 2000, at the market's maximum, several of the leading high-tech companies, such as Dell and Cisco published large sell orders on their stocks. This lead to panic selling amongst traders and in the following months, NASDAQ composite lost 78% of its value as it fell from 5046.86 points to 1114.11. 'Dotcom' companies that boasted market capitalisation in the hundreds of millions of dollars became worthless and by the end of 2001, the majority of publicly traded 'dotcom' companies had declared bankruptcy.

So, what were the reasons for the crash? The initial overvaluing of the stocks by investment banks and the fraudulent actions of individual entrepreneurs were of course to blame. Despite some of the start-up companies having profitable ideas or products many were simply hoping to profit from the manic investment at the time without a good product or business plan. Furthermore, several companies (such as WorldCom) were found to be engaging in illegal accounting practices to exaggerate potential profit levels. Wall Street analysts were advising investment without proper information. Ljungquist and Wilhelm (2002) stipulate that the over-pricing of assets and ultimately, the panic that ensued during the crash was caused by *informational frictions that arose among the various parties to the transactions.* Investor's lack of information about the companies they were investing in, be this on a financial or functional level, could be argued was the ultimate cause of the dot-com crash.

The Dot-Com Bubble displayed all the four characteristics of a financial bubble previously discussed. A period of manic optimism in which stocks were hugely overpriced but many

traders invested in technology-based start-up companies in the hope they would one day become profitable. A Crisis of confidence after several companies published large sell orders on their stocks. Evidence of fraud emerged as the markets realised many of the start-up companies' business plans were non-existent and they had no capability for profit. Finally, a period of intense pessimism as an increasing number of investors tried to sell their stocks and prices plummeted. Luckily, this bubble did not cause a major economic recession like the U.S housing bubble several years later. One argument for why this is, is that most of the stocks in the dot-com bubble were held by households and not large financial institutions like during the housing bubble, thus the losses were absorbed by households and did not require government bailouts. As a result of the crash, however, investors are now famously cautious when investing in new technology ventures.

Implications for Government Policy

The economic consequences of a financial bubble often call for the employment of substantial government policies to offset the damage. For example, after the 2008 Housing bubble, the Federal Reserve lowered interest rates and carried out heavy quantitative easing to stimulate investment and spending. However, the focus for policymakers need not be on the employment of retrospective policy but on the prevention of asset price bubbles in the first place through better monetary and financial regulation policies. There are, however, difficulties with implementing these sorts of policies. Firstly, as previously mentioned it is often hard to identify a bubble until after it has collapsed, without recognising the preliminary stages of bubble, consideration of these policies is useless (or perhaps the identification of a bubble should be the focus of governmental attention). Furthermore, many of the tools a central bank can use in the prevention of asset price

bubbles have major macroeconomic consequences, so preventative economic policies often cause more damage than they avoid.

Two primary focuses of economic policy must be the regulation of credit and the monitoring of fraudulent behaviour. Lax credit regulations, although not responsible for all financial bubbles, certainly play a large role in many (such as the U.S Housing Bubble and the Japanese bubble economy in the early 1990s). Laws and regulations should promote responsible lending through stricter credit checks and greater monitoring of loans. Fraudulent financial behaviour, such as that seen in the dot-com crash should be closely monitored by financial regulations authorities and harshly punished as a deterrent to others.

Conclusion

This paper first explored theories of financial bubbles and highlighted the importance of critical analysis of the different theories. It discussed the difficulty in identifying the 'fundamental' value of an asset and therefore the difficulty in identifying an asset price bubble. The paper outlined four main characteristics of asset price bubbles: a period of manic optimism, a crisis of confidence, evidence of fraudulent behaviour and intense pessimism. Investors' and analysts' excitement over a certain type of asset fuels an increase in speculative investment and thus price. Prices eventually collapse as traders realise the assets are overpriced, this is generally coupled with evidence of fraud and causes a period of economic depression. The dot-com crash was explored as a recent example of a financial bubble which was mainly caused by over-pricing of IPOs and informational friction. The implications for Governmental policies were explored with a suggestive focus on regulation of credit and monitoring of fraudulent behaviour.

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