

“A bubble involves the purchase of an asset, usually real estate or a security, in anticipation that the asset or security can be sold to someone else at an even higher price; the term ‘the greater fool’ has been used to suggest the last buyer was always counting on finding someone else to whom the stock or the condo apartment or the baseball cards could be sold. The term ‘bubble’ suggests that when the prices stop increasing, they are likely – indeed almost certain – to decline.

The term ‘mania’ describes the frenzied pattern of purchases, often an increase in prices accompanied by an increase in trading volumes; individuals are eager to buy before the prices increase further.”

Kindleberger, Charles P.. Manias, Panics, and Crashes (p. 22). Palgrave Macmillan UK. Kindle Edition.

“During a crisis, many firms that recently appeared robust suddenly become bankrupt because the failure of a few lenders often leads to a decline in the prices of securities and a slowdown in the economy. When the prices of securities decline sharply, government intervention may be desirable to provide the public good of stability. During a banking crisis, the decline in prices of securities may be so large and abrupt that the price changes become self-justifying. At such times a lender of last resort can provide financial stability or attenuate financial instability. The policy dilemma is that if investors know in advance that governmental support will be forthcoming when the prices of securities fall sharply, investors will be less cautious in their purchases of securities and crises might develop more frequently.”

Kindleberger, Charles P.. Manias, Panics, and Crashes (p. 23). Palgrave Macmillan UK. Kindle Edition.

Kindleberger is an economic historian, that is a kind of historian, so his book is full of details. Only the introduction is assigned reading. I don’t expect you to learn the details of the Tulip Mania in Holland or of the South Sea Bubble, I ask you to reciprocate and not expect me to remember them, because I don’t. We are concerned with the general story and the fact that it corresponds to many facts recorded in many historical cases.

Much of Kindleberger’s story corresponds to this course’s main theme – that people sometimes extrapolate recent trends. Thus if an asset price has recently increased and increased and increased, many (most?) people predict that it will continue to increase, so they buy the asset. This causes its price to increase and, for a while, there is positive feedback.

This is a general property of asset value equations, Q models, dynamic programming, optimal control and all that. To solve models which have a single solution we need to also consider an infinite horizon budget constraint (also called a transversality condition). When presenting models, I always argue that people often ignore the transversality condition and, when they do, bad things happen. The bad things I have in mind are those described by Kindleberger.

A tendency to (sometimes) believe in trends (and more often believe in levels and that variables are mean reverting) implies occasional bubbles. That is enough to generate time series which look like asset prices with a bubble/mania and then a crash and a panic. In the second numerical part of the course, I will present such a very very simple model (running it on a computer because it is simple but much too complicated for me to find a closed form solution).

Today I will say much more – words not numbers. While I will ignore much of the detail presented by Kindleberger, I will present much more than appears in the numerical models. Maybe I hope that you

will extend the model to capture the interesting and important aspects which I will later omit (but more likely I don't hope that you will I sure don't hope that I will).

The lecture will follow the narrative of

- 1) start of the bubble
- 2) period of mania
- 3) peak and beginning of the price decline
- 4) panic

5) possible general crash

6) possible financial crisis.

Before going on, note the word “possible”. Many bubbles are not followed by depressions or even recessions. Bubbles followed by recessions may be followed by a recession with low demand and output but no general financial crisis or may be followed by a financial crisis with a widespread loss of faith in banks. Bubbles followed by financial crises are followed by much more economic suffering than bubbles not followed by financial crises.]

This is the main point of



Leveraged bubbles

Oscar Jordà, Moritz Schularick, and Alan M. Taylor

u

t

h

Journal of Monetary Economics **Volume 76, Supplement**, December 2015, Pages S1-S20

r

OK the story. A bubble can start when an asset price happens to increase repeatedly for ordinary stochastic accidental reasons. Often the bubble is preceded by privatization or deregulation which makes increased speculation possible. Very often (almost always) it is accompanied by a story about why “This time It's Different”

<https://www.amazon.it/This-Time-Different-Centuries-Financial/dp/0691152640>

k

One example which I am old enough to remember very clearly is the .com bubble of the late 90s. The idea is that the internet was new (it really was new once) and would change the world (as indeed it did) so huge amounts of money could be made by firms which provided internet services including firms which had zero sales to date (including the infamous pets.com). There was a huge increase in US stock prices, especially on the tech heavy NASDAQ index (itself once new tech as it was the first stock exchange where bids and offers were matched by a computer not by people shouting to each other and writing on pieces of paper).

o

v

e

r

l

Then the bubble burst. Later it turned out that some internet firms were hugely profitable – the story wasn't all wrong. It was over enthusiastic and a bit premature.

NASDAQ figure here

Importantly, the burst bubble was followed by a very mild recession.

Another (or rather several) would be the BitCoin bubbles with the characteristic pattern. Crypto bubbles have not been followed by recessions – painful for some investors but without noticeable impact on the general economy. This is true even though total crypto capitalization at the last peak surpassed \$3 Trillion and over \$ 2 Trillion of that vanished when the bubble burst.

Another bubble which I am old enough to remember (and old enough to have personally lost a lot of money by buying at the peak) was the international housing bubble of the 0s. This was followed by the great recession (which became the main topic of macroeconomic research until 2020 and Covid 19 and I don't predict on which the field will focus now that there are vaccines).

US house price index. Italian House price index.

This one was followed by a loss of faith in big banks as revealed by the TED spread

TED spread

As the asset price increases two important things can happen (but don't always). The bubble can become what Kindleberger calls a mania with extreme excitement, a widespread perception that something new (and different this time) is happening and participation by people who don't normally invest actively (in old histories they are “widows and clerics” in the ultra stock market bubble in the USA in the 1920s a financier noted that he received stock tips from the boy who was shining his shoes – I hope the kid didn't put his money where his mouth was).

Sometimes some people sell before the crash (Isaac Newton did this once during the South Sea bubble then bought again, lost a lot of money and proved that even very smart people are vulnerable to manias – he said “I can plot the motion of the planets but I can not plot the madness of crowds” then refused to discuss the matter ever again in his life).

This fact brings up one point in psychology noted in this course. It is important that the average person thinks he is smarter than the average person. This means that even if it is clear that there is a bubble and clear to many that this time it isn't different, those people may still buy into the bubble. They pay a price which they believe to be higher than fundamental value (“fictitious” in this op-ed) because they expect to be able to sell to a “greater fool” before the bubble bursts. It is very important that most people who expect prices to peak believe that they will sell before the peak. Otherwise, they would prevent the bubble from inflating.

The particular subjective overconfidence of those who expect to detect the peak in prices before others and sell to those others is critical for the development of bubbles (and it is left out of the numerical models of the second and numerical half of the course)

Importantly, usually, some people borrow in order to buy the asset. This can lead to severe trouble later.

Like the initiation of the bubble, peaks have many different causes. None easily explains the huge drop in prices in models with fully rational agents. It can be one crook getting caught or one small firm failing for idiosyncratic reasons.

It is possible to write models in which the peak is followed by a crash just because people are extrapolating. Paul DeGrauwe writes such models and, following him, so do Barbara Annicchiarico, Silvia Surricchio and I. In the models people decide to extrapolate recent trends, this causes extreme instability (which tends to generate data which support extrapolation). The same process drives prices up and down (in the models price increases and decreases are symmetric).

In the real world, there are at least two reasons why price decreases are sharper than price increases (both left out of the numerical models).

One is the above mentioned borrowing. If someone has bought on margin (borrowing most of the price of shares purchased) then that person must sell when the price falls (the broker automatically sells when the client is left with zero, so the broker does not risk losing money). More generally indebted investors may have to liquidate (sell) their asset holdings to pay their debts. This can force people to sell for very low prices (distress selling or fire-sale selling). People may have to sell even though, if they had spare money, they would definitely buy at that price.

This is an economic/accounting/balance sheet issue and is not strictly behavioral.

Another demonstrated factor is that the peak and price decline scares people. It is conventional to say that the stock market is governed by greed and fear. This is not obvious in simple formal models in which one can make money off of price declines by selling short (promising the value of the stock paid in the future for money now). In those models it is greed and greed.

The fear in greed and fear is not risk aversion as conventionally modeled as depending on the decreasing marginal utility of consumption – it is definitely a statement about the change in wealth (winning or losing) not the level.

Market participants report intense fear during market crashes.

It is possible to determine the effect of fear itself on asset purchases. By fear itself I mean fear which is not associated with information about the probabilities of different payoffs from an investment nor with the marginal utility of consumption in different states.

This was proven in one of the most beautiful economic experiments ever. Luigi Guiso, Luigi Zingales (and research assistants) showed experimental subjects one of two movies, then offered a choice between risky and safe bets. One of the movies was a romantic comedy. The other was an extremely frightening horror film featuring kidnapping and torture.

The films communicated no information about payoff probabilities or marginal utilities of consumption.

Subjects showed the horror film displayed greater risk aversion. QED

So the peak and panic phase includes the same extrapolation as the bubble but also includes selling due to financial distress and selling due to emotional distress.

The burst bubble can depress the economy generally. One thing is that people's perceived wealth increases then decreases. This causes increased then decreased consumption (recall the graph). Importantly different assets have different euro of consumption per euro of perceived wealth effects. Most wealth of most people is the value of their house. Most stock (azioni) is owned by a fairly small number of rich people. Housing wealth has (euro per euro) a larger correlation with aggregate demand than stock.

Also and very importantly, many many houses are constantly being built while only a small number of new firms make initial public offerings in a normal month. This means that the relative price of houses determines the profitability of house construction. The relative price of stock does not (and is not much correlated with investment in reality even if it is the critical determinant in theory).

More importantly (especially according to Jorda, Schularik and Taylor) a crash might or might not be followed by a financial crisis. A financial crisis occurs when people lose faith in previously trusted financial institutions (basically banks). An economy in which people don't trust banks does not function smoothly or well.

The connection between a bubble bursting and a financial crisis depends on a few things (but I don't think anyone can predict the next financial crisis). One is whether the financial institutions own a lot of the asset whose price falls. 2008 was such a severe recession in large part because large US investment banks had kept residential mortgage backed securities rather than creating them and selling them. So they lost money when the housing bubble burst. Importantly no one knew how much they had lost. Hence the loss of trust which was followed by the great recession.

Another connection is that investors who own the asset whose price has fallen may have borrowed from the important financial institutions. The bankruptcy of those investors can cascade as the critically important institutions who lent to them lose money when the investor defaults and then are at risk of bankruptcy.

Needless to say, preventing bubbles which are always with us from causing financial crises is a major public policy issue.