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# Asset bubbles, financial crises and the role of human behaviour

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Author: Shahin Kamalodin

*Economic Research Department*

# Table of contents

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<b>Table of contents</b>	2
<b>Crises &amp; Human Behaviour</b>	3
Abstract	3
Crises are nothing new	4
An economic theory of everything?	7
Key takeaways	18
<b>References</b>	21
<b>Colophon</b>	24

Author: Shahin Kamalodin  
S.A.Kamalodin@rn.rabobank.nl  
+31 (0) 30 2131106

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# Crises & Human Behaviour

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## Abstract

Every time we witness a collapse in asset prices or a financial crisis, we seem overwhelmed. Even the most experienced investors, economic forecasters and regulators are caught off-guard. But if we look closer at the historical data for the past two centuries, we see that asset bubbles and financial crises are nothing new to mankind. The first documented asset bubble happened in 1636-7 (the Dutch tulip mania) while the first documented global financial crisis goes back to 1825. Regrettably, in the following decades we went through numerous other bubbles and financial crises.

Against this backdrop, we must ask ourselves, why do we experience these events at such high frequency? Most market participants believe that (i) easy money (low interest rates and loose credit conditions), (ii) lack of proper regulation and (iii) greedy financial speculators (e.g. bankers, hedge fund managers, etc) lie at the heart of the problem. There is no doubt that these factors played an important role in most asset bubbles and financial crises in the past. But they are proximate causes nonetheless. In this report, we are more in search of the ultimate cause of these events. The only common denominator we can think of is **human behaviour**.

In our view, human behaviour offers the best and most comprehensive explanation for recurring financial crises and volatile asset price movements. This entails both good and bad news. The good news is that once we form a deep understanding of our own psyche, we should be slightly more successful in spotting impending crises. As for the bad news, until we carry on behaving like we do (i.e. as humans), **we will never have a crisis-free world**. No one should be under an illusion that we can ever win the *war on economic crises*. Reducing their frequency and severity is the most we can ever hope for.

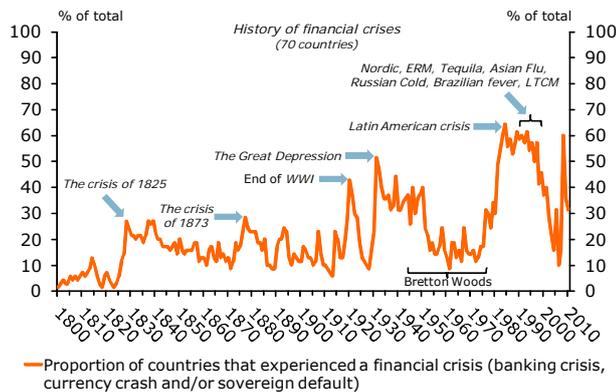
# Crises & Human Behaviour

## Crises are nothing new

Not a single year has gone by in the past two centuries where there was not a financial crisis somewhere in the world (see figure 1). It is important to note that financial crises are usually preceded by housing market and stock market

booms and busts (Bordo, 2003), which have been very recurrent episodes, unfortunately (see figures 2 and 3).

Figure 1: World economy is very crisis-prone



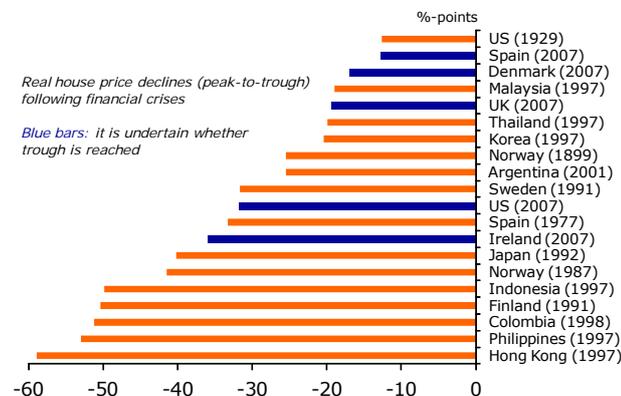
Source: Reinhart and Rogoff (2010), Rabobank

Arguably, the world witnessed its first international financial crisis in 1825 (Neal, 1998). The opening up of Latin America after the overthrow of the Spanish empire led to the opening up of international trade between England and the Latin American republics. The result was massive capital flows from London to finance infrastructure, mining and government deficits. This led to a boom on the London stock exchange. But once the capital outflows impinged on the Bank of England's (BoE) gold reserves, the policy rate was

raised, leading to a stock market crash and a banking panic. A sudden stop of capital flow from London resulted in debt defaults, banking panics, currency crashes across Latin America (Bordo and Landon-Lane, 2010).

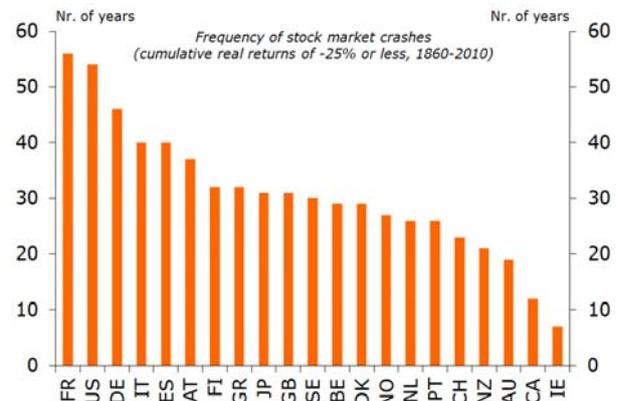
**The crisis of 1873** had a global reach too. It started with the collapse of a property boom in Germany and Austria (Kindleberger, 2005), then spread through the continent and affected the US as European investors dumped US railroad stocks. The US had a major panic associated with a corporate governance scandal in the railroad sector (Benmelech and Bordo, 2008). Subsequently, the crisis spread to Latin America via a sudden stop of capital

Figure 2: Housing markets crash very frequently...



Source: Reinhart and Rogoff (2010), Rabobank

Figure 3: ...but not as frequently as stock markets

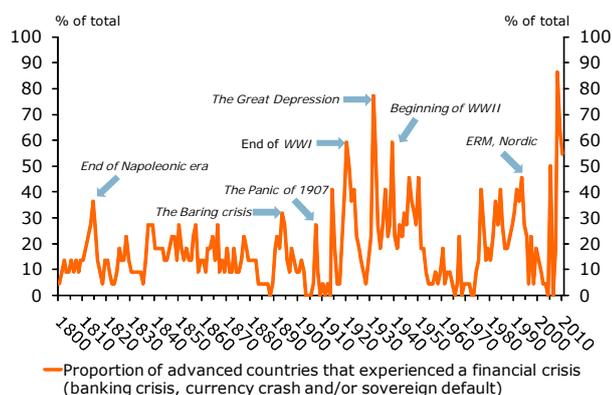


Source: Reinhart and Rogoff (2010), Rabobank

# Crises & Human Behaviour

flows as the BoE raised its policy rate once again to offset gold outflows. This led to a series of debt defaults across the region and a banking crisis in Peru.

**Figure 4: Crises in the industrialised world**



Source: Reinhart and Rogoff (2010), Rabobank

A few years later **the Baring crisis** started (1890), which was the worst crisis the advanced countries suffered since the end of the Napoleonic era (see figure 4). In the 1880s, the Western European countries exported capital to the Latin American countries for infrastructure investment. Major recipients of these funds were Argentina, Uruguay and Brazil. The associated land boom financed by generous bank lending conditions ended in a bust when the BoE and other European central banks began raising their policy rates to stem losses in their gold reserves. The sudden stop of capital flows led to a banking crisis, debt default and currency crisis in Argentina.

Barings Brothers (a leading London merchant bank at the time), which was heavily exposed to Argentine debt, became insolvent. Subsequently, panics did occur in numerous European countries, Japan, the US, Australia and New Zealand. In addition to Argentina, other Latin American countries affected were Brazil, Chile, Uruguay and Paraguay.

As soon as we stepped foot into the 20<sup>th</sup> century, the advanced countries were hit by the **panic of 1907**, which started in the US after the stock market fell close to 40% from its peak (end-1906). Countries that were hit were France, Italy, Denmark, Sweden and Japan. Almost a decade later, the world experienced another major financial crisis. The **crises at the end of WWI** reflected the attempts by central banks around the world to unwind the inflation that had built up during the War. Disinflation impinged upon the balance sheets of many European countries leading to banking crises in the Scandinavian countries, the Netherlands, Italy, Japan, Mexico and elsewhere.

Then came the mother-of-all-financial-crises – **the Great Depression**. This episode was preceded by stock market booms (*‘the Roaring 20s’*) that crashed in the US and UK in the late 1920s. A series of banking panics in the US beginning in October 1930 were not successfully allayed by the Federal Reserve (Friedman and Schwartz, 1971) and this turned the situation from bad to ugly. The depression was transmitted around the world by the fixed exchange rate links of the gold exchange standard and numerous protectionist measures. Many countries across the world were finally hit by debt and currency crises.

After WWII, the world economy entered a period of relative calm. This was primarily due to the Bretton Woods (BW) system. In this era, currencies were

# Crises & Human Behaviour

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kept fixed, capital controls were widespread and financial regulation was strictly designed to prevent a reoccurrence of the financial chaos of the interwar period. Once the BW system broke down in 1971, the global financial economy re-opened and capital flows surged. In addition, amid high inflation rates many controls on the financial system began to crumble. So the financial crisis problem of earlier eras made an unfortunate comeback.

Banking crises erupted in both advanced and emerging countries in the 1970s. In 1974 in the US, Franklin National bank was bailed out while in Germany Herstatt bank was not. But neither of these events was considered to be a classic banking crisis. Other European countries witnessed significant bank failures as did other parts of the world. In the emerging countries there were scores of currency crises. At the end of the 70s the US and other advanced countries shifted to a very tight monetary policy to break the back of inflationary expectations. Tight monetary policy and the ensuing recession in the West led many countries in Latin America and elsewhere to default on debts built up in the preceding inflationary era. **The Latin American debt crisis** beginning in 1982 (countries directly affected were Mexico, Argentina, Chile and Ecuador) triggered financial difficulties for banks across the world. In the US, key banks like Chase and Citibank needed to be bailed out (Bordo and Landon-Lane, 2010).

The last decade of the 20<sup>th</sup> century was full of crises. In the early part of the 1990s, Sweden and Finland experienced a property boom. The bust was triggered by the breakdown of the Soviet empire. These forces produced the **Nordic financial crisis** (Jonung and Hagberg, 2005). Banks also failed in Norway. Other countries like Italy and Australia also had banking crises in this period. Around the same time, the **European currency crisis** started after George Soros, a hedge fund manager, speculated against the sterling and forced the UK to exit the ERM. Subsequently, a number of currencies in Europe came under attack by speculators. Two years later, the tight policy of the Fed triggered a massive devaluation by Mexico, which led to a banking crisis. The contagion resulted in other Latin countries being hit (**the Tequila effect**).

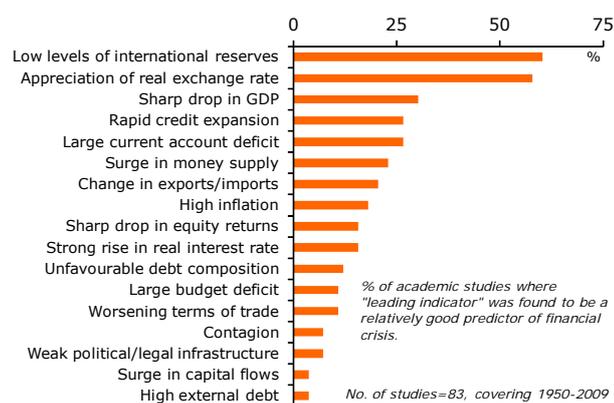
In the second half of the 1990s, crisis made land-fall in the East. **The Asian Flu** started when external debt-financed boom came to an abrupt halt amid mounting speculation against the Thai Baht in 1997. The devaluation of the baht increased pressure on the rest of the currencies in the region and finally resulted in currency and banking crises in Thailand, Indonesia, Korea as well as less dramatic disruption in Hong Kong, Malaysia, the Philippines and Taiwan. The Asian Flu had contagion effects on other emerging countries partly reflecting tighter lending conditions of Western banks. Two prominent countries were Russia which defaulted on its debt in 1998 (**the Russian Cold**) and Brazil which had a serious currency crisis (**the Brazilian Fever**) in the same year. The Russian crisis also managed to push Long-term Capital Management, a hedge fund, towards bankruptcy as it was greatly exposed to Russian debt (**the LTCM crisis**).

# Crises & Human Behaviour

## An economic theory of everything?

So it is clear that collapse in asset prices and financial crises occur quite regularly and mostly have devastating macroeconomic consequences for the countries involved. Millions of jobs are lost when countries experience crises and

Figure 5: Many variables explain financial crises



Source: Frankel and Saravelos (2010), Rabobank

billions of dollars worth of wealth are wiped-out within a very short period of time. What is less clear, however, is the reason why they take place. Forming a sound understanding of their underlying causes is of utmost importance to investors, policymakers and all other stakeholders.

The explanations offered by experts often boil down to three causes: (i) easy money (low interest rates and loose credit conditions), (ii) lack of proper regulation and (iii) greedy financial speculators (e.g. bankers, hedge fund managers, etc). There is indeed a long laundry list of factors (variables) that can explain failing asset prices and financial crises (see

figure 5). But we believe these reasons serve as proximate causes. The **ultimate cause**, in our view, is human behaviour. After all, without our *animal spirits* there will be no asset bubble or financial crisis (Akerlof and Shiller, 2009).

### From homo economicus to homo sapiens

Throughout most of the second half of the 20<sup>th</sup> century, **the efficient market hypothesis** (EMH) was broadly accepted by economists. The idea was that humans (or more specifically homo economicus) act completely rationally and follow the principle of maximising utility, for which we possess and process seamless information. This assumption enabled macroeconomists to model rational behaviour through sophisticated and elegant mathematical equations. And issues such as pride, jealousy, fear, greed, lack of knowledge as well as incomplete information were left out since they could not be modeled.

It goes without saying that if we all would be behaving like a homo economicus, there would be no financial crises or large swings in asset prices (Abreu and Brunnermeier, 2003). The failures of the EMH, therefore, gave birth to a new discipline, which has come to be known as behavioural economics. This relatively new branch of economics attempts to understand the behaviour of *homo sapiens*. In this report, therefore, we will take stock from behavioural economics to shed light on volatile asset price movements and financial crises. Note that some of the theories proposed are closely linked to one another.

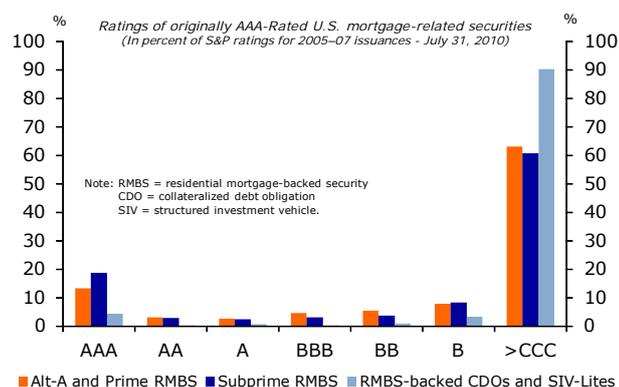
### Have you ever met Mr. Know It All?

In its 'pure' form, the EMH postulates that homo economicus is fully informed at all times, abstracting him from the existence of uncertainty and information

# Crises & Human Behaviour

costs. This does not mean that we actually foresee the future. It merely implies that we are all fully informed of the alternative courses of action and can assess the consequences of those actions, weighted by probabilities of occurrence.

**Figure 6: Rating downgrades**



Source: S&P

However, we can see that poor knowledge and lack of proper/costless information lay at the heart of the current mess we find ourselves in. As Ben Bernanke (2010), Chairman of the Federal Reserve, noted in his speech: *"during the worst phase of the financial crisis, many economic actors –including investors, employers, and consumers– metaphorically threw up their hands and admitted that, given the extreme and, in some ways, unprecedented nature of the crisis, they did not know what they did not know. The profound uncertainty associated with the 'unknown unknowns' during the crisis resulted in panicky selling by investors, sharp cuts in payrolls by employers, and significant increases in households' precautionary saving."*

Even the most experienced investors, the math whizzes of Wall Street and financial regulators did not fully understand what was going on in the marketplace. Information seemed readily available, but it was totally useless at times. Institutional investors, for example, would need to read 30,300 pages worth of information for every collateralised debt obligation<sup>1</sup> (CDO) purchased to be aware of everything that was being acquired. For understanding the risks of a CDO-squared, 1,250,000,300 pages had to be read (Haldane, 2009). Since almost no one had the time to read that many pages, investors either (i) blindly believed the ratings given by rating agencies or (ii) decided to hedge their risk. As for the former, it was clear after multi-notch rating downgrades during the crisis (see figure 6) that rating agencies had been as unaware as all other investors. The latter case is even more interesting. Financial institutions very often opted to purchase credit default swaps (CDSs) to hedge their positions on asset-backed securities (ABSs). This makes sense if the counterparty, that is deemed reliable, simply assumes that role. It only becomes problematic when the counterparty decides to hedge many other positions without asking anyone's permission. For example, the AIG, an American insurance firm, assumed the role of *hedger-of-last-resort* by betting that nothing would go wrong *at once*<sup>2</sup>. This is similar to insuring all houses in your neighborhood against damage. You will

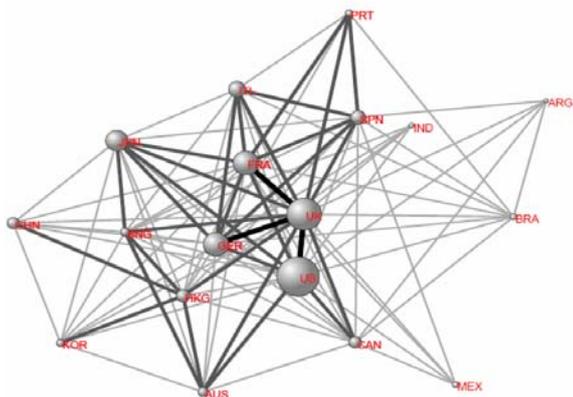
<sup>1</sup> CDOs are a type of structured asset-backed security (ABS) whose value and payments are derived from a portfolio of fixed-income underlying assets. These assets could be company loans, student loans, home mortgages, etc.

<sup>2</sup> The AIG had written over USD 400bn of CDSs on subprime mortgage securities. Therefore, the US government had to extend USD 170bn of loans to keep the firm afloat.

# Crises & Human Behaviour

make quick and easy money until natural disaster strikes. What's more, the counterparty very often re-hedged the position with another financial institution. This pass-the-hot-potato game went on and on until it became almost

Figure 7: Global financial network (2005)



Source: Haldane (2009)

impossible for *anyone* to know where risk was eventually parked. At the end of the day, as Haldane (2009) notes, knowing your ultimate counterparty's risk became like solving a high-dimension Sudoku puzzle given the complexity of the financial system (see figure 7).

Not only are complex financial products difficult to understand, but so are the simplest concepts. In the Netherlands, the AFM (financial regulator) forced credit providers to place the sentence *Let op! Geld lenen kost geld* on their ads from April 2009 onwards. The literal English translation is "Attention! Borrowing money costs money". Interestingly, the survey of the AFM conducted in Dec. 2009, shows that 77% of respondents found the

sentence useful as it made them rethink about the costs associated with borrowing money. This means that it is very difficult for people to correctly assess all the risks involved with borrowing money. The US subprime crisis also made this point painfully clear, as people opted to purchase houses even though they had no jobs, no incomes nor any assets. Many clearly committed themselves to ill-understood financial contracts on the premise that house prices can only go in one direction, namely upwards.

This finding should not come as a surprise to behavioural economists, however. Berthoud and Kempson (1992) argued that we mostly lack information about the exact costs of credit use, and we know neither exactly which interest rates would be reasonable nor how many charges ought to be paid. The authors also report that, excluding credit cards and other sources of revolving credit, 8% of consumer credit decisions are made in the spur of the moment. So this brings us to this question: why do we buy what we cannot afford? Below are a number of explanations.

## Buy now, pay later

Research has consistently shown that immediate rewards loom larger than delayed rewards (Garling et al., 2009). This means we usually have a **present-bias preference** –we focus more on the present and prefer to spend our money immediately rather than later (Frederick et al., 2002). This feeling becomes even stronger when we are more optimistic (Van Raaij and Gianotten, 1990). Present-bias preference can be better understood through the following example. Assume that Mr. Smith derives a utility (U) equal to €190 for

# Crises & Human Behaviour

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purchasing a TV that costs (C) €200. In this case, he will abstain from purchasing the product (since  $U < C$ ). Now let us assume that Mr. Smith gets an opportunity to pay €46 every year for the coming 5 years. Again Mr. Smith would not buy the TV if the interest rate in the five year period was 5% or less. This is because the present value<sup>3</sup> (PV) of the TV would be at least €200.

But studies show that Mr. Smith is much more likely to purchase the TV with a loan if he has a present-bias preference (Meier and Sprenger, 2008). This is because the reward is immediate and the price is payable at a later point of time. Experiments show that the costs of a product appear to be even smaller as periodic installments are rather low amounts (Garling et al., 2009).

## Get rich or die tryin' (by choking on debt)

Besides individual motives to increase indebtedness, social motives, such as social comparisons resulting in the desire to possess what others have, play an important role (**keeping up with the Joneses** – Haldane, 2009). Research shows that we compare ourselves with others. If we have fewer financial resources available to buy assets, goods or services compared to the others, we may try to close this financial gap by simply borrowing. As Kindleberger and Aliber (2005) argue “*there is nothing as disturbing to one’s well-being and judgment as to see a friend get rich.*” So this results in the society being divided into two classes—the haves, and the have-not-paid-for-what-they-haves.

One important reason why we borrow more to increase spending is because credit use has become socially acceptable in most parts of the world (Gross and Souleles, 2002). For that matter, it is no longer shocking to see our neighbor stepping out of his mortgaged-home to drive his leased car with credit-card gas. Another reason for borrowing is greater credit availability (Soman, 2001). We usually have difficulty refusing money when offered on very lax conditions. And, unsurprisingly, our propensity to consume increases when borrowing is made possible. Research has shown that tipping, the amount spent in department stores and the willingness to increase offers in an auction for event tickets increase if we pay by *credit card* instead of *cash* (Feinberg, 1986; Prelec and Simester, 2001). What is disturbing though is that we take no account of the fact that over indebtedness causes serious problems in the household (DeVaney and Lytton, 1995; O’Neill, 1995). For instance, Brown et al. (2005) found that households with outstanding debt are likely to report lower levels of psychological well-being than are households without debt.

## Get rich or die tryin' (by finding a bigger fool)

History has shown that overconsumption and, especially asset price bubbles, occur even when credit is *not* readily available. Asset bubbles, which sadly have

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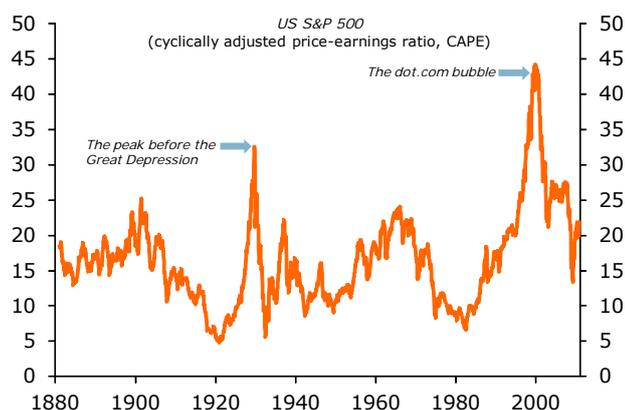
<sup>3</sup> The calculation of the PV is done through the following formula.

$$PV = \frac{46}{(1+0.05)^1} + \frac{46}{(1+0.05)^2} + \frac{46}{(1+0.05)^3} + \frac{46}{(1+0.05)^4} + \frac{46}{(1+0.05)^5} \approx 200$$

# Crises & Human Behaviour

a very long history, have been an interesting topic for behavioural economists. Bubbles are formed when some event, expectation, or development leads to a rise in the asset price<sup>4</sup>. As asset prices rise, those who had held back at first

**Figure 8: Valuations matter!**



Source: Robert Shiller's dataset, Rabobank

cannot resist anymore when they witness the rise in wealth of their friends and relatives.

Eventually everyone wants a piece of the pie.

So a vacuum is generated that sucks in more investors that try not to fall behind. By now, we mostly ignore the original stimulus for the boom, and we only buy with the intent of selling at a profit to "a bigger fool" who is expected to come along soon.

For some time these bigger fools do actually come by. At the peak of the **tulip bubble**, February 1637, an auction of tulips netted 90,000 guilders. For comparison, this was around 100 times the annual salary of a prosperous merchant at the time.

The stock of the **South Sea company** soared almost ten-fold in a matter of months.

Valuations also went crazy before the burst of the **dot.com bubble** (see figure 8). For instance, Priceline.com, which was a travelling agency selling airline tickets below their purchasing price (an unsustainable, if not crazy, business model), went public in 1999 and saw its share price rise from \$16 to \$85 (+530%) in a single day. A month later, the share price reached \$120, which made the firm more valuable than the three largest American airlines (Continental, North West and United) put together (Rapp, 2009).

Valuations were also out of whack in **Japan during the 1980s**. At their peak in December 1989, Japanese stocks had a total market value of about \$4 trillion, around 1.5 times the value of all U.S. equities (even though Japanese GDP was less than half of US GDP at the time) and close to 45% of the world's equity-market capitalisation. Within this period of euphoria, the price/earnings (P/E) ratio jumped from under 25 to over 60 in 1989. The result was highly overvalued companies. Of the ten largest companies in the world, according to market capitalisation, seven were Japanese in 1989 (in 2007 only one company, Toyota motors, remained in list). The value of NTT Corporation, Japan's

<sup>4</sup> Consider the following examples: The first documented asset bubble, the "tulip craze" that took place in the Netherlands in 1636–1637, started when some bulbs became infected with a nonfatal virus that produced rather bizarre contrasting colored stripes. The South Sea bubble started when the company was given a monopoly over all trade to the South Seas. The advent of widespread electrification, the lowered cost and greater distribution of automobiles, and the technical advances in industrialization, gave rise to the 1920's bubble in the US stock market. At one point in time, almost everyone in America was turned on to stocks and checking with local brokers became part of everyday life. Similarly, the advent of microelectronics, the personal computer, e-mail, the internet, the laser, and other advanced technologies made many believe that productivity was reaching to new levels. This resulted in the dot.com bubble.

# Crises & Human Behaviour

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telephone giant, which was privatised during the boom, exceeded the value of AT&T, IBM, Exxon, General Electric, and General Motors combined. The boom in real estate prices was as dramatic. From 1955 to 1990, the value of Japanese real estate increased more than 75 times. Before the burst of the bubble, the Japanese could have bought all the property in America by only selling metropolitan Tokyo (Rapp, 2009).

All these events show that we are not necessarily 'fools', in the real sense of the word, but we get sucked in by bubbles when we see others (be it our own friends or competitors) become wealthier by the day. Put differently, we do not want to miss the train to prosperity even if we are aware that there is a chance that it might blow up in one of the next stations.

## **We just love positive stories...**

One of the primary reasons why we get sucked into bubbles is because of the nice stories we tell each other. Behavioural economists have long argued that stories and storytelling are fundamental to human knowledge (Akerlof and Shiller, 2009; Schank and Abelson, 1995). Just as diseases spread through contagion, so does confidence, or lack of confidence. The medium in this case is storytelling by individuals throughout society (it becomes a social contagion). Apart from conversations, the media, books and magazines further amplify the enthusiasm for the boom.

The past bubbles were, by and large, fueled by positive storytelling. Every crisis, in that sense, boils down to a crisis of success. For example, during the boom years of the 1920s, there were many articles and press releases encouraging the bubble. An article from Ladies' Home Journal in 1929 was titled "*Everybody ought to be rich*". Not only were waitresses, taxi drivers, barbers and shoeshine boys giving stock advice, but also well-known economists were sucked in by the hype. A few days before the stock market crash of 1929, Irwing Fisher insisted: "*Stock prices have reached what looks like a permanently high plateau. I expect to see the stock market a good deal higher than it is today within a few months.*"

Another example was the book "*Japan as Number One—Lessons for America*", which became a 1979 bestseller that launched a thousand other efforts in Japan humping. In the decade prior to the burst of Japanese bubble, many rooms in the Western world were filled with people willing to hear a speaker tell of the wonders of Japanese management schemes that were supposedly far ahead of the rest of the world. A couple of years later (1996), the World Bank published a book titled "*The East Asian Miracle*" right before the Asian crisis erupted. And then again a number of years later (before the burst of the dot.com bubble), we witnessed a glut of articles arguing that there was a "*New Economy - one in which the old rules of economics no longer applied*". Michael Mandel, who served as Business Week's economics editor, wrote articles entitled "*The Triumph of the*

# Crises & Human Behaviour

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*New Economy*" and "*The New Growth Formula*" in which he argued that high-technology was now the driving force in the US economy.

You may wonder what causes us to tell positive stories. One reason is that we form subjective judgments and make judgments solely in terms of observed similarities to familiar patterns (Tversky and Kahneman, 1981). Thus, the **illusion of patterns** makes us expect past price increases (even if for a very short period) to continue. We all ignore the historical experience that all skyrocketing asset prices eventually succumb to the laws of economic gravity. Another explanation is that **we simply like to believe in positive stories**. This is evident from structural bullishness of equity analysts. McKinsey's (2010) study shows that equity analysts covering the US S&P 500 have been persistently overoptimistic for the past 25 years, with earnings estimates ranging from 10-12% a year, compared with actual earnings growth of 6%. Over this time frame, actual earnings growth surpassed forecasts in *only two years*, both during the earnings recovery following a recession. On average, analysts' forecasts have been almost 100% too high. This 'positive thinking' is also visible if one looks at the number of *buy* and *hold* ratings in equity research departments, which usually far outnumber *sell* ratings. Of course, all is easy with hindsight and next year's forecast is still a tough job even if we are aware of our historical errors.

## **...and hate doom-mongers**

Even if there are positive stories circulating before crises begin, there surely are also a few 'realists' who do not get carried away by the irrational exuberance of the markets and instead give warnings before disaster strikes. Contrary to common view, a number of respectable economists even predicted the current crisis up to a certain point. In 2005, Prof. Raghuram Rajan presented his controversial paper in the Jackson Hole Symposium titled "*Has financial development made the world riskier?*". Disappointingly, though not unexpected, Mr. Rajan was instantly attacked by Donald Kohn, vice-chairman of the Fed, who thought the idea was too interventionist and by Larry Summers, the former US Treasury Secretary, who dismissed the warnings as "misguided" (Spaventa, 2009). Around the same time Prof. Nouriel Roubini of New York University argued that US house prices were overvalued. Investors and home-buyers called him Dr. Doom and instead continued to listen to Mr. Bernanke who stated in a testimony to the US congress a year before (2005) that "*at a national level [house] price increases largely reflect strong economic fundamentals.*" Even when the housing market started to show signs of weakness in 2006, some economists did not believe it end in a nationwide drop in prices. In a 2007 interview, Prof. Eugene Fama, the father of the EMH, declared that "*the word 'bubble' drives me nuts,*" and went on to explain why we can trust the housing market: "*Housing markets are less liquid, but people are very careful when they buy houses. It's typically the biggest investment they're going to make, so they look around very carefully and they compare prices. The bidding process is very detailed*<sup>5</sup>."

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<sup>5</sup> This quote is taken from Krugman (2009).

# Crises & Human Behaviour

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But why do we ignore the stories that contradict our view even though it can save us money? There are two explanations. First, Karlsson et al. (2009) observed in their research that we suffer from what has become known as the '**Ostrich effect**'. This means we wish to avoid contradictory information as much as possible. What's more, when processing information to help us make a decision, we often fall prey to a far more fundamental problem, that of **confirmation bias**. This implies that we try to find new information that confirms our own view while ignoring contradictory information. Rajan would probably have received a standing ovation had his paper been titled "*Why we should thank regulators who made the financial markets a safer place?*". Second, experiments show that while we assume non-rational behaviour by others, we rule this out for ourselves. For example, when asked to rate our own driving ability, 90% of us regularly describe ourselves as exceptionally proficient drivers (Svenson, 1981). Evidence of this **illusory superiority** can also be found in our own assessment of our intellectual abilities. Ask any portfolio manager why you should give your money to them and s/he will probably tell you that they are more likely to beat the benchmark than their competitors. Moore et al. (1999) show this in an investment experiment with MBA students. The overconfidence and false optimism of the students caused them to over predict the rise of their portfolios.

## Are we all herd animals?

According to the EMH, market prices are always right because they reflect the *independent* choice (or private signals) of market participants<sup>6</sup>. It is, in fact, statistically proven that under conditions of independent random sampling, an aggregate collective judgment is more accurate than individual judgments (Surowiecki, 2004). An empirical illustration is an experiment by Treynor (1987). The author made 56 participants make *independent judgments* of the number of jelly beans in a jar (there were 850 in total). The estimate of the group as a whole was 871, and only one of the participants made a more accurate judgment. This shows that a combined judgment by a group can outperform that of the average individual (Martin et al., 2002; Larrick and Soll, 2006). So it must come as no surprise that individuals very often follow the '*wisdom of the crowd*'.

But the history of financial crises shows that the herd can very often head in the wrong direction and we decide to follow them regardless. The reason, according to behavioural experts, is that we regularly suffer from **information cascades** –we make choices based on the observations of choices made by others preceding us even if our private information differs (Smith and Sørensen, 2000). This happens because our judgment becomes clouded when we observe the decisions of others (i.e. our decisions are no longer independent). To appreciate this, consider the following experiment usually conducted by psychologists:

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<sup>6</sup> Note that even if some investors behave irrationally, there will be a sufficient number of rational participants in the market to assure that no profitable arbitrage opportunities remain unexploited.

# Crises & Human Behaviour

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- A number of candidates are told that when they see an 'apple', they should say it is an 'orange'.
- Subsequently, one single candidate (A) is randomly invited into the room without having any knowledge of the rules of the game.
- The researcher asks *all* candidates what they see after showing an apple.
- When everyone replies 'orange' (as dictated by the researcher), very often candidate A also says 'orange', even though s/he clearly sees it is an 'apple'.

The morale of this experiment is that we tend to find '*safety in numbers*'. Why is this the case? An important reason is that we dislike being the only sucker (Dawes, 1999). Portfolio managers often exhibit this behaviour since their reward is for a large part based on relative performance (i.e. beating a benchmark). Thus, they are cautious to deviate from consensus because a lot is at stake if things go awry (their bonus, promotion, job and reputation is often on the line).

Experiments with professional equity analysts have demonstrated reputational herding as well. In one study (Cote and Sanders, 1997), participants' task was to predict future returns. After each prediction, the average prediction was shown to the participants, giving them an opportunity to adjust their own predictions. The results showed that presenting the average prediction had a significant conforming influence on participants' predictions in the next round.

Note that herd behaviour plays a major role when markets shift from a period of euphoria towards periods of excessive scepticism. As far as bubbles are concerned, when the 'bigger fool' does not arrive, a panic is set in motion and asset prices take a nosedive<sup>7</sup>. Generally speaking, our panicky reaction (e.g. selling assets at fire-sale prices, withdrawing money from a bank or refusing to rollover debt) can ultimately result in greater losses than if we would just stay put.

The reason why we follow the herd when things turn south is due to another factor – **lack of coordination**. Put simply, in the *game of musical chairs*, no one wants to be the last one left standing. Everyone is individually aware that taking action can lead to more losses than if they would stay put. But as Keynes' noted in his beauty contest analogy, an individual's private information is less important than his/her evaluation of other peoples' expectations (also known as **higher order beliefs**). Given the *uncertainty* concerning the latter, second-guessing is an inferior strategy to immediate action. So when everyone starts selling their stocks or bonds, we are better off to immediately follow suit even if

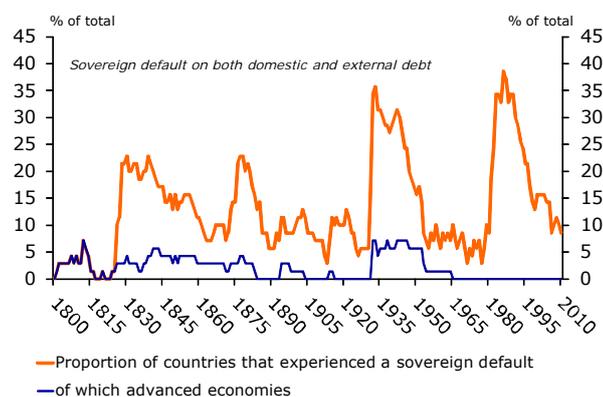
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<sup>7</sup> Once the tulip mania came to an end in the spring of 1637, tulip prices started dropping at a rampant pace. Many of the relatively common tulips sold for no more than the price of a common onion (Rapp, 2009).

# Crises & Human Behaviour

we are sure this is unjustified given the fundamentals – this is also known as the **sell-first-ask-questions-later rule** in the marketplace.

**Figure 9: Sovereign defaults are nothing new**



Source: Reinhart and Rogoff (2010), Rabobank

Some wonder why 'rational' investors do not buy when they realise the panic is unjustified given the fundamentals. The reason why they cannot is because of *limited collateral* (Krugman, 2009). For example, when a stock of a company is purchased, the share price can continue to fall and stay low for a very long period. This can eventually force the investor to file for bankruptcy. This is why Keynes noted "*markets can remain irrational a lot longer than you and I can remain solvent*" (Lowenstein, 2000).

So selling amid market panic is a rational response for everyone individually. The collective outcome is, unfortunately, far worse

in comparison to the situation where everyone would have coordinated their actions by deciding to stay put. Against this backdrop, any entity (bank, company or sovereign) that is suffering from illiquidity can be forced to file for bankruptcy if everyone believes the entity in question is insolvent (i.e. it becomes self-fulfilling).

## Does history matter?

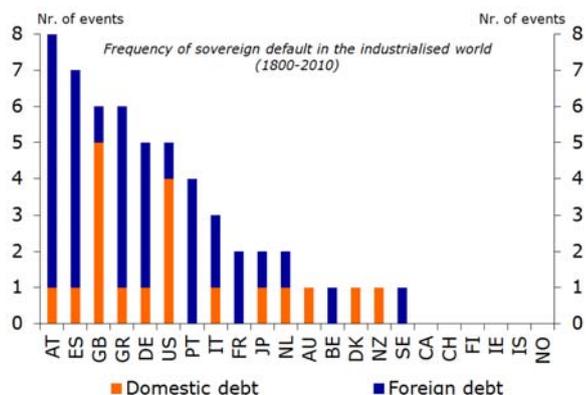
We are not only myopic but we also have short memories (or **ignorance of history**) that makes us oblivious of previous financial disasters (Galbraith, 1993). This cannot be truer than for the recent European sovereign debt crisis. In the past decade, market participants were charging almost the same amount to lend to Greece, Italy, Portugal, Ireland, Spain and Germany. The whole notion of sovereign risk was deemed to be a joke in the Western world. In fact, if anyone would speak about it a few years ago, their economic understanding, and even possibly their sanity, would be questioned by all. Sovereign debt crisis was a thing of the past, or so the argument went. And if it did occur, it would most probably be in a 'third world' country. The simple reason was that industrialised countries had 'graduated' from periodic bouts of government insolvency given that they did not opt for a default since the 1960s (see figure 9). Thus, the entire history of sovereign default, which goes back at least to the fourth century B.C. when 10 out of 13 Greek municipalities in the Attic Maritime Association defaulted on loans to the Delos Temple (Winkler, 1933), was deemed irrelevant. So was the fact that governments in most advanced countries had defaulted on numerous occasions on their domestic and foreign-owned debt in the past 200 years (see figure 10).

# Crises & Human Behaviour

But then the moment of truth arrived. Financial markets found out in November 2009 that the Greek government had “cooked the books” (Pisani-Ferry et al., 2010). The announcement of authorities in Dubai, around the same time, that they wished to postpone the repayment of their bonds, further concentrated investors’ minds. All of a sudden, bond vigilantes woke up to the fact that all this time they had been suffering from what Reinhart and Rogoff (2010b) call the **this-time-is-different syndrome** –the belief that financial crises are something that happens to other (emerging) countries at other times because the industrialised countries have the right policies, have learned from their past mistakes, and are built on sound fundamentals. We now realise that public debt of the industrialised countries is not as safe and ‘special’ as some cheerleaders had been arguing. Against this backdrop, default probabilities that were hovering around zero before the crisis, have now shut up to 30%-75% in some of the European countries (see figure 11). What was perceived as *unimaginable* (sovereign default in the West) has suddenly become *imaginable*.

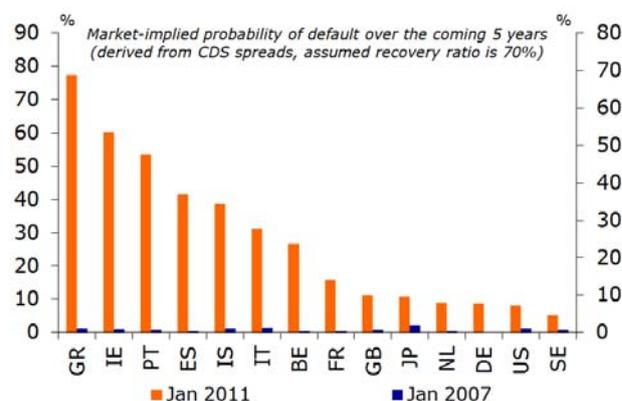
Once again, behavioural economists are not surprised by this outcome. Glaser et al. (2004) have shown that risk perception is particularly susceptible to **overconfidence**. We usually believe that our abilities are above average (Svenson, 1981), may have an illusion of control (Langer, 1975), may be excessively optimistic about the future (Weinstein, 1980), or may think our knowledge is more accurate than it really is (Lichtenstein et al., 1982). As a result of our overconfidence, we are prone to underestimate the actual risks (i.e. ignore historical lessons) and overestimate our abilities to overcome unforeseen problems (March and Shapira, 1987). This was perhaps the reason why European financial regulators and governments thought before the crisis that there was nothing wrong, and if there was, they could easily solve the problem. What’s more, market participants were overconfident in the ability of governments and regulators in taking control of a given situation (even though history

Figure 10: Some governments defaulted more



Source: Reinhart and Rogoff (2010), Rabobank

Figure 11: Sovereign default probabilities



Source: Reuters EcoWin, Bloomberg, Rabobank

# Crises & Human Behaviour

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has shown that this is rarely the case). Against this backdrop, most investors decided to have blind faith in 'efficient markets' and 'capable' authorities instead of doing their own homework.

Overall, when we are overconfident we always believe, for some reason or another, that history no longer applies to the present situation. When asset prices rise, we try to explain it by fundamentals. When banks become too large (with respect to a country's GDP), we explain it through globalization of finance. When countries live beyond their means (i.e. run a massive current account deficit), we think the reason is higher growth potential (i.e. higher return)<sup>8</sup>. And when reality smacks us in the face, we come to realise that all this time we were dreaming. Unfortunately, as soon as the next boom starts rolling, historic lessons become forgotten again and the similar arguments will be presented.

## Key takeaways

Asset bubbles and financial crises have been with mankind for centuries because we do not act like homo economicus. Indeed, as Krugman (2009) notes "*many real-world investors bear little resemblance to the cool calculators of efficient-market theory: they're all too subject to herd behavior, to bouts of irrational exuberance and unwarranted panic*". But given the huge human and financial costs associated with these crises, everyone wants to find ways to prevent them. But that is wishful thinking at best, and dangerous at worst since under such illusion we will be overly exposed to the new and unexpected (**Black Swans** – Taleb, 2007). In fact, in his Nobel-prize acceptance lecture, Hayek (1974) warned us about this **pretense-of-knowledge syndrome** by stating: "*To act on the belief that we possess the knowledge and the power which enable us to shape the process of society entirely to our liking, knowledge which in fact we do not possess, is likely to make us do much harm.*"

Overall, behavioural economists have shown throughout the years that as long as we behave like we do (i.e. like humans), financial crises will always be with us. This is because we

- **do not have limitless knowledge and information.** Even Noble prizewinning economists have trouble understanding the economy's complex system. The collapse of LTCM with two Nobel laureates in economics on its board (Robert Merton and Myron Scholes) serves as a good example. Similarly, portfolio managers can never have complete knowledge of all the stocks and bonds available in the world. Since we face an information overload in the world (aggravated by the internet), we become very selective with the information we acquire. And given the confidence we have in our own ability, we are more likely to selectively seek information that confirms our own view.
- **are by nature optimistic, overconfident and greedy.** Everyone loves

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<sup>8</sup> This was, for example, the rationale for sending money to the Latin American, Eastern European and Asian countries in the past until everything blew up.

# Crises & Human Behaviour

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to hear a success story. That is why those who have lost tons of money are usually not invited to cocktail parties. This is just human nature. 'Positive thinking', overconfidence and greed are the reasons why we have achieved so much. Without these attributes we could not fly in an airplane, let alone land on the moon. As Gordon Gekko, the fictional character in the movie 'Wall Street' famously proclaimed: "*Greed, for lack of a better word, is good. Greed clarifies, cuts through, and captures the essence of the evolutionary spirit.*" Yet we must stress that overconfidence and greed, especially in the financial markets, have also shown their uglier side time and again. These attributes can be so powerful that they make us myopic, with short memories and an ignorance of history. Hence, we must appreciate that overconfidence and greed can sometimes push us towards great inventions while other times they can cause great suffering.

- **hate to be the only suckers.** When everyone is getting rich, we usually get sucked in as we do not like to fall behind. Studies have shown that our well-being is not determined by our absolute income, but rather by our relative income. Our social standing in a community is extremely important. At the same time, when everyone panics and rushes for the exit, we usually panic and do the same even if we are not sure of the reason. An important reason is that we do not want to be the only one suffering from losses. As such, we tend to follow the herd even if the herd heads in the wrong direction (either in period of excessive optimism or pessimism).

So we should be under no illusion that we will ever prevent asset bubbles and financial crises from taking place. They will be with us as long as we roam on this planet. But there are certainly ways to fight them. Contrary to conventional wisdom, the best way is not through monetary policy or heavier financial regulation (although they might slightly help). To solve a problem, one has to find its root-cause. If humans bring about crises, then learning about our own psyche can be the most effective tool to fight crises. This means adding courses like finance, psychology and economic history to high school curriculums can prove to be very helpful. As for those who have already graduated from school, receiving training in these fields should be a must regardless of profession. At the end of the day, we need such knowledge for taking economic risks<sup>9</sup>.

Hopefully, an increase in our 'knowledge' will help us understand that

- **the world economy is a large complex, dynamic and unstable system.** One day people are optimistic about the future and they buy houses, cars, and other durables, while consuming more luxury services, such as visiting restaurants and going on vacation. And then the next day confidence vanishes in a puff of smoke for one reason or another. This can exert enough downward pressure on asset prices to cause a financial crisis. Therefore, before taking economic risks, we should be

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<sup>9</sup> We take economic risks when taking a loan, purchasing an asset or even accepting a job.

# Crises & Human Behaviour

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aware that one or more factors can suddenly turn something that seemed profitable/sustainable today into something unprofitable/unsustainable tomorrow<sup>10</sup>. This is why the most sophisticated banks, regulators and rating agencies have difficulty predicting crises and crashes. So uncertainty concerning the future will remain with us forever.

- **history matters!** Quite often history repeats itself (albeit not exactly in the same way) but we tend to ignore it because we think it is useful information for historians only. That is plain wrong! A better appreciation of our past makes us aware that paradigm shifts do not happen frequently. Against this backdrop, we should be aware that asset prices do not always go up even if they have been rising for an extended period. Being constantly on the lookout is a far more profitable strategy (i.e. valuations should never be ignored).
- **there is no return without risk.** We must understand that whenever a return is made on anything (even government bonds), there is risk involved. *Risk-free return simply isn't.*

These lessons will, with a bit of luck, help us reduce the frequency and severity of asset bubbles and financial crises. The key is coming to terms with the fact that we are **boundedly rational** (Simon, 1956, 1982). In other words, we need to understand that some situations exceed our capacity to judge probabilities and make good decisions. Isaac Newton, the famous physicist, painfully learned this after losing £20,000 (more than a million dollars in today's money) in the South Sea bubble. He stated afterwards: *"I can calculate the motions of heavenly bodies, but not the madness of people"*.

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<sup>10</sup> This is what economists mean by *multiple (Nash) equilibria*

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Text contributor:

Shahin Kamalodin, S.A.Kamalodin@rn.rabobank.nl, 0031 30 2131106

Editor-in-chief:

Allard Bruinshoofd, head International Macro Economic Research

Production coordinator:

Christel Frentz

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**Postal address**

Rabobank Nederland

Economic Research Department (UEL A.00.02)

P.O. Box 17100

3500 HG Utrecht

The Netherlands

**Office address**

Rabobank Nederland

Eendrachtlaan 10

3526 LB Utrecht

The Netherlands



**Rabobank**