GEST S 531

Bubbles...
Bubbles?

- Intuitively: a strong upward movement followed by a rapid decline (crash)
- In finance, large price volatility due to speculation and to a self-fulfilling effect
- Economic standpoint: a price movement disconnected from the “fundamentals” evolution

⇒ Divergence of stock prices from their fundamental value ⇔ Bubble

⇒ Santoni (1987), Speculative bubbles: time increasing deviation with respect to the fundamental value
Speculative bubbles

• Economists’ definition => possibility to model the fundamental (not always easy, example: art market)

• Many tests to determine the existence of a bubble (for a good review see Brooks & Katsaris, 2003)

• Causes of speculative bubbles?

• Are bubbles rational or not? Large literature (Flood and Hodrick, 1990, Keynes 1936)
“Rational” bubbles

• Dale, Johnson et Tang (2005) distinguish:
  • “Rational Bubbles” => asset prices continue to rise because investors expect to be able to sell the overvalued asset at an even higher price
  • “Intrinsic Rational Bubbles” => systematic and persistent mispricing of fundamentals (typically present when innovation is important)
  • “Extrinsic Rational Bubbles” => rational investors are affected by uncertainty regarding their environment
“Irrational” Bubbles

- For example concepts of “animal spirits” or herd behavior… investors behave like “imitative lemmings” (Avery and Zemsky, 1998)
- Reasons? Psychological factors with no connection to fundamentals
- Over-optimism, fads, fashion… => prices disconnected from fundamentals
- In case of limited information investors could also just use a simple model and just follow trends
Bubbles

• This course:
  1. Tulipmania (1634-1637): one of the most famous example in history, commodity
  2. Mississippi Bubble (1719-1720) and South Sea Bubble (1720): two very similar bubbles, complex schemes involving sovereign borrowing
  3. Stock Market Crash (1929), was it a bubble or not? Equity and effects in terms of Great Depression
Tulipmania

- The Netherlands, 1634-1637, bulbs of tulips experience a drastic price increase
- High peak: one bulb of Semper Augustus reaches 5,500 guilders (yearly average wage at the time = 150 guilders)
- Usually presented as THE example of irrational behavior: it’s just flowers!!!! Example of the influence of mass psychology on the economy
- Fame in economics (with apocryphal stories) but also taken over by moralists and artists
Men's folly?

Jan, the Younger Brueghel: "An Allegory Of The Tulipmania"

(c) Kim Oosterlinck
Chronology

• Arrive in The Netherlands in the 16th century, Adoption by the upper-class,
• 1620-1633: development of the tulip trade. Market for bulbs because non-perishable, Two markets common and rare bulbs (special flowers’ patterns)
• 1634: apparition of non-professional traders on the market
• 1635: Huge price increase people start buying on credit, purchases between September and June => forward contract

(c) Kim Oosterlinck
Chronology

- 1636: Development of formal “futures” market
  Usually compensation at maturity. Most of the speculation on rare bulbs.
- November 1636: begin of the heavy speculation on common bulbs
- Begin February 1637: peak of the “mania” one week after dramatic price decrease
- End February 1637: decision to honor only the contracts entered into before December 1636
- April 1637: States of Holland decision to suspend all contracts
- 1638: Cities suggest a final settlement = 3.5% of the original contract
Tulipmania

• Pure irrational speculative bubble or was there some rationality? Irrationality?
  ⇒ Just tulips (Not vital for human beings)
  ⇒ Uninformed traders (before 1634 mostly professionals)
  ⇒ Limited number of participants who knew each other (family links)
  ⇒ Gullible people ready to believe friends and family
  ⇒ High speculation reflected by the high number of repeated sales
Rationality?! 

• Garber (1990), first try to search for fundamental elements which may explain the movement before talking of bubbles…

• Garber (1989) & biology of the tulip:
  • Reproduction: seeds or buds
  • Bulb yearly increase 100 to 150% per year

• Importance of the “Mosaic” virus
  – Colors and patterns
  – Speed of reproduction (declines and only bulb)
Tulipmania

• Garber (1989): !!!
• Tulipmania concerns almost only bulbs with exceptional colors and patterns!!!
• Long Term Price Evolution ????
• One century later price between 0.005 and 1% of the 1637 price
### Guilder Prices of Tulip Bulbs Common to 1637, 1722, and 1739 Price Lists

<table>
<thead>
<tr>
<th>Bulb</th>
<th>January 2, 1637</th>
<th>February 5, 1637</th>
<th>1722</th>
<th>1739</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admirael de Man</td>
<td>18</td>
<td>209</td>
<td>...</td>
<td>.1</td>
</tr>
<tr>
<td>Gheele Croonen</td>
<td>.41</td>
<td>20.5</td>
<td>...</td>
<td>.025*</td>
</tr>
<tr>
<td>Witte Croonen</td>
<td>2.2</td>
<td>57</td>
<td>...</td>
<td>.02*</td>
</tr>
<tr>
<td>Gheele ende Roote van Leyden</td>
<td>17.5</td>
<td>136.5</td>
<td>.1</td>
<td>.2</td>
</tr>
<tr>
<td>Switsers</td>
<td>1</td>
<td>30</td>
<td>.05</td>
<td>...</td>
</tr>
<tr>
<td>Semper Augustus</td>
<td>2,000*</td>
<td>6,290</td>
<td>...</td>
<td>.1</td>
</tr>
<tr>
<td>Zomerschoon</td>
<td>...</td>
<td>480</td>
<td>.15</td>
<td>.15</td>
</tr>
<tr>
<td>Admirael van Enchuysen</td>
<td>...</td>
<td>4,900</td>
<td>.2</td>
<td>...</td>
</tr>
<tr>
<td>Fama</td>
<td>...</td>
<td>776</td>
<td>.03*</td>
<td>...</td>
</tr>
<tr>
<td>Admirael van Hoorn</td>
<td>...</td>
<td>65.5</td>
<td>.1</td>
<td>...</td>
</tr>
<tr>
<td>Admirael Liefkens</td>
<td>...</td>
<td>2,968</td>
<td>.2</td>
<td>...</td>
</tr>
</tbody>
</table>

**Note.**—To construct this table I have assumed a standard bulb size of 175 azen. All sales by the bulb are assumed to be in the standard weight, and prices are adjusted proportionally from reported prices. When more than one bulb price is available on a given day, I report the average of adjusted prices.

* Sold in lots of 100 bulbs.

† This was the price of the Semper Augustus bulb on July 1, 1625.
Tulipmania

- Exceptional? No!
- Standard price evolution for flowers because after a short period the variety loses its novelty
- // Hyacinths in the 18th century
- And nowadays!!!
- A small quantity of lily sold for 1 million guilders in 1987!
Tulipmania

<table>
<thead>
<tr>
<th>Hyacinth Price Patterns (Guilders)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bulb</strong></td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>Coralijn*</td>
</tr>
<tr>
<td>L’Admirable</td>
</tr>
<tr>
<td>Starrekroon</td>
</tr>
<tr>
<td>Vredenrijck</td>
</tr>
<tr>
<td>Koning Sesostris</td>
</tr>
<tr>
<td>Staaten Generaal</td>
</tr>
<tr>
<td>Robijn</td>
</tr>
<tr>
<td>Struijsvogel</td>
</tr>
<tr>
<td>Miroir</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Bulb</strong></th>
<th>1788</th>
<th>1802</th>
<th>1815</th>
<th>1830</th>
<th>1845</th>
<th>1875</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comte de la Coste</td>
<td>200</td>
<td>50</td>
<td>1</td>
<td>.75</td>
<td>.5</td>
<td>.15</td>
</tr>
<tr>
<td>Henri Quatre</td>
<td>50</td>
<td>30</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Van Doeveren</td>
<td>50</td>
<td>...</td>
<td>1</td>
<td>2</td>
<td>1.2</td>
<td>.75</td>
</tr>
<tr>
<td>Flos Niger</td>
<td>60</td>
<td>20</td>
<td>10</td>
<td>...</td>
<td>.25†</td>
<td>...</td>
</tr>
<tr>
<td>Rex rubrorum</td>
<td>3</td>
<td>1.5</td>
<td>.3</td>
<td>1</td>
<td>.35</td>
<td>.24</td>
</tr>
</tbody>
</table>

* Krelage (p. 645) notes that the Coralijn bulb originally sold for 1,000 guilders, though he does not include a year.
† 1860.
Mania???

- Garber (1989):
  - Few mentions of economic distress (but for moralists!)
  - Price decrease after: not specific (see before)
- BUT strong price increase (x 20) of common bulbs in January 1637 could reflect pure speculation …
- Influence of the black death (1635-1637): gambling binge ?
Thompson (2007)

- Thompson (2007): // made by Garber with other flowers is valid in general but the decline is too steep for the tulipmania (99.99% annual rate) to be compared directly with other episodes (40% annual rate max)

- Stresses the importance of the contractual change happening in February 1637: transformation of futures into calls with a strike price equivalent to the futures original value, Apparently already understood in December 1636
Why?

• Thompson (2007): first crash in October 1636
• Framework of the Thirty Years War (1618-1648) in Germany, one of the biggest producer and consumer market for tulips
• Unexpected Swedish victory at Wittstock => decrease in German demand and increase in supply!
• Dutch market threatened and public reaction: transformation of the contracts because public officials were to lose…
Why?

Source: Thompson, 2007
18th Century Bubbles

- In a very limited period of time the world experienced three major crises:
  - South Sea Bubble (UK),
  - Mississippi Bubble (France),
  - and Windhandel Bubble (The Netherlands)
- World First Global Financial Bubble (Frechen, Goetzmann and Rouwenhorst, 2013)
- The three episodes share common features but have also idiosyncratic elements. The two first ones are the most analyzed.
South Sea Bubble

• Neal (1990): starts with the refinancing of sovereign debts namely the British debts following the wars of Spanish succession

• Financial innovation: Debt-equity swap! Uncertain and Experimental!

• In exchange of their debts, bondholders receive equity In 1710: suggestion to convert 9.47 millions of GBP of short term debts in shares from a new company the South Sea Company
South Sea Bubble

- South Sea Company: Monopoly on exchanges with the Spanish empire and revenues from the debts (annuity)
- Idea: allow to reduce the risk of the debt (short term) by extending its maturity (transforming it in long term debt)
- Bondholders: swap between depreciated debts and liquid shares => 97% of short term debts transformed
- BUT government rapidly late on its payments
South Sea Bubble

- Monopoly: negative NPV => decision to focus on the conversions
- 1719: Conversions of the 1710 Lottery Loan (LT loans with a complex management)
- Win, Win, Win operation (Neal, 1990)
  - State: reduction of the annuities to pay (lower interest rate, (Gain +/- £310,000))
  - Bondholders: Gain difference between bond price and SSCy share prices (Gain +/- £324,000)
  - SSCy: Augmentation of value by the increase of state payments (Gain +/- £76,000)
South Sea Bubble

- 1720 British debt = £50 millions held by the Bank of England (£3.4 millions), the East India Cy (£3.2 millions), the South Sea Cy (£11.7 millions) and the public (Bonds £16.5 millions and annuities £15 millions)
- 1720: Refunding Agreement. Right acquired for £7.5 millions (competition with the Bank of England)
- Refinancing of £31 millions (at 5% then 4%)
- To realize this authorization to issue new equity
South Sea Bubble

• Liberty to set the Debt/Equity ratio
• Debt/Equity ratio?
• Example (Neal, 1990): conversion of £20 millions of debts⇒ authorization to issue an amount of £20 millions in equity
• If market price of equity = 135 then conversion \(\Rightarrow\) to \(20/1.35 = £14.81\) millions and \(20-14.81 = £5.19\) millions remain as own equity in the hand of the SSCy
South Sea Bubble

- April 28, 1720: 1st exchange, non-unredeemable debts (annuities 99 and 30 years)
- Government promises SSCy annuities during 20 years for the 1st and 14 years for the 2nd
- SSCY proposes 32 and 17 years to bondholders BUT exchange at a 1/3.75 ratio (one £100 SSCy share for £375 of debts, market price = £335-343)
- Result: 63% of exchanges!!!
South Sea Bubble

- April 29th 1720: 2nd subscription. Share of nominal value = £100 sold at £400 (market price £340!!). Very positive results but generous terms in terms of payment (buy on margin)
- Loan against share deposit, Loan of 250 £ against deposit of a 100 £ share
  - Decrease in supply (because less shares on the market, estimation £400,000 )
  - Augmentation of amounts to invest (estimation £1M)
South Sea Bubble

• Quickly, share price increase whereas annuities remain constant
• Loan against deposit => creation of money (banking activity)
• But, SSCy not authorized to act as bank however directors SSCy also own the Sword Blade Cy
• Sword Blade Cy: default on September 24th 1720
• Overall price evolution?
Figure 3
South Sea Shares

Source: Garber (1990)
Table 1: Comparison of stock price increases and declines, 1719-21 and 1998-2001

<table>
<thead>
<tr>
<th>Stock</th>
<th>Price increase*</th>
<th>Peak-to-trough**</th>
<th>St. dev. of daily returns</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>South Sea bubble</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Sea Company</td>
<td>843.0%</td>
<td>-88.0%</td>
<td>6.3%</td>
</tr>
<tr>
<td>East India Company</td>
<td>45.0%</td>
<td>-68.0%</td>
<td>12.8%</td>
</tr>
<tr>
<td>Bank of England</td>
<td>51.0%</td>
<td>-54.0%</td>
<td>15.8%</td>
</tr>
<tr>
<td><strong>Dotcom mania</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amazon</td>
<td>188.0%</td>
<td>-79.9%</td>
<td>5.9%</td>
</tr>
<tr>
<td>Cisco</td>
<td>220.0%</td>
<td>-76.5%</td>
<td>3.4%</td>
</tr>
<tr>
<td>Microsoft</td>
<td>86.0%</td>
<td>-65.0%</td>
<td>3.0%</td>
</tr>
</tbody>
</table>

Note: * from minimum during 12 months prior to peak  
** 12 months subsequent to peak

Temin and Voth (2005)
South Sea Bubble

- Price decline?
- Neal (1990) compares SSCy share prices with underlying annuities and share prices of the EICy and of the Bank of England: general decline => “credit crunch”?
- Exchange rate UK/Netherlands => liquidity squeeze (increase in spring of the £, mid-May: halt, then alternatively sharp increase followed by impressive drops)
- Ashton => sharp changes in exchange rates sign of financial crises)
South Sea Bubble

- Irrationality?
- Many contemporaneous anecdotes mentioning the madness of crowds.
- Kindleberger => classic example of madness, speculation reaching all classes even the less-informed ones
- However, Hoppit (2002), strong opposition to the scheme already before the price rise. Seems to indicate that some market participants were questioning the fundamentals early on
South Sea Bubble

- Rationality?
- For a time the scheme may have seemed credible: support of the King, endorsement by the parliament (// institutions literature) and mainstream investors such as the Bank of England or the East India Company were also investing in the venture.
- Neal (1990) price rise linked to the financial innovations’ prospects (debt/equity swap) but cannot rule out some form of “Intrinsic Bubble”
South Sea Bubble

- Garber (2001): Share value at the beginning of September 1720 five times higher than tangible assets (valuation on basis of the NPV of the financial claims)
- Price could be explained by investors’ (wrong) belief that commercial ventures would eventually pay off. If bubble probably “Intrinsic Bubble” => wrong valuation of one asset
South Sea Bubble

- Investors? Low classes as suggested by Kindleberger?
- Mostly wealthy individuals as average first payment ranged from 330£ to 920£ to be compared with a yearly wage of £60 for clergymen (Hoppit, 2002)
- Many people politically connected
- Consequences on the real economy: very limited
- Other companies affected?
Royal African Cy

• Carlos, Moyen & Hill (2002): Impact of the 1720 bubble on a company which did not create money the Royal African Cy

• Royal African Cy:
  – UK Cy created in 1672
  – Monopole of exchanges with Africa
  – Beginning OK, then troubled period but around 1720 +/-OK.
FIG. 1. Prices of Royal African Company senior and engrafted shares.

Source: Carlos, Moyen, Hill (2002)
Royal African Cy

• Evolution of prices in 1720
• Comparison of share prices with their fundamental value: DDM used but should be viewed with caution (few dividends paid).
• In theory if one works with a fundamental value approach (here DDM) then
  • Market price = Fundamental value + bubble
  • If market price equal fundamental value: no bubble!
• Conclusion: No irrationality
Other UK stocks

Price Indices of Major London Stocks, 1720

Source: Frehen et al. (2013)
Louis XV France

- Accession to the throne of Louis XV (aged 5) in 1715, Philippe II Duke of Orleans acts as Regent
- France, as the UK, plagued by huge amounts of state debts following the many wars waged by Louis XIV
- Velde (2003), in total 2,800 million livres of debts out of which:
  - 1,068 million in perpetual annuities
  - 830 million in sold offices
  - 920 million in floating debt
Military and non-military spending

Source: Velde (2003)
Monetary system

- Monetary System Ancien Régime (Murphy, 1997) complex based on units of account (livres tournois) and real coins.
- Prices were expressed in the unit of account (livres)
- King regulated the relation between unit of account and coins fixing the number of coins per unit of account and the price at which the mint had to provide a coin in exchange for quantities of precious metal (silver or gold)
Monetary system

- High level of debts => Interest payment on debts was extremely high compared to revenues and the debt burden even higher than in the UK
- To improve situation, government passed a series of law in a financial repression style:
  - Monetary reform of the livres
  - Partial defaults on the debts (reduction of short term debt from 900 million to 200 million livres) and conversion into short term notes (billets d’état) which quickly traded at a 37% discount (Velde, 2003)
  - Levy on “wartime profiteers”
  - By 1718 finances more or less balanced
John Law

- John Law flees Scotland
- Arrives in France in 1715 willing to set up a bank
- Will gradually get involved in French public finance
- His vision: in an environment in which some resources are unemployed, emission of paper currency should increase real trade. On top of that possibility to limit inflation via augmentation of demand for the currency
Schumpeter (1954): “He worked out the economics of his projects with brilliance and, yes, profundity which places him in the front ranks of monetary theorists of all times”
Mississippi Bubble

• John Law => Important to create a Bank to favor the economic development

• June 1716: creation of the “Banque générale”
  – Beginning hard… Willing to create a state bank but has to settle for a private one
  – 1,200 shares at 5,000 livres each payable in part by using billets d’état at face value (market price 60% of par)
  – Promise to hold 100% of species exchanged against bills
Mississippi Bubble

- April 10th, 1717 decree makes banknotes legal tender
- Banknotes protected against livres manipulation as they were exchangeable against a number of coins (not livres)
- Bank transformed into the Royal Bank in December 1718 (nationalization). Regent acquires all shares of the new Bank (Velde, 2003)
Mississippi Bubble

- August-September 1717: creation of the “Compagnie d’Occident” with a monopoly for the development of a commercial activity in Louisiana and Canada
- Emission of 100 millions represented by 200 000 shares worth 500 livres
- Financing: subscriptions under the form of short term state bills (face value even though traded between 28 and 32% of par). Initial price: +/- 150 livres
Mississippi Bubble

- Resources:
- Payment of a 4% dividend (conversion)
- Commercial activity should increase it in the long run (thanks to privileges)
- // Leveraged Buyouts => emission of debts to buy back the equity of a company
- Here: equity issue to buy back the public debt <=> Debt-Equity Swap
Mississippi Bubble

Evolution:

1. At first: monopoly of commerce with Louisiana and trade of beaver skins
2. In August 1718, acquisition of the monopoly on tobacco
3. In December 1718 acquisition of the Company if the Senegal (slave trades with Africa)
4. In May 1719, acquisition of the “Compagnie des Indes orientales” and of the “Compagnie de Chine”
Mississippi Bubble

Evolution:

5. In July 1719 receives the privilege to trade with North Africa and acquisition of the Mint (right to coin money)

6. In August 1719, right to run the Fermes Générales (collect indirect taxes). Lease for 9 years representing 30% of tax revenues (Velde, 2003)

7. Late August 1719, right to collect all direct taxes representing 55% of tax revenues (Velde, 2003)
Mississippi Bubble

Evolution:
8. February 1720, takes over the Royal Bank
9. September 1720, buys the Company of Santo Domingo (monopoly of slave trade in Guinea)

• Despite privileges, necessity to create a system facilitating the placement of the securities
• Early on possibility to pay only a down-payment with the remainder payable within a fixed time period
Mississippi Bubble

- Law project of forced conversion of state bills in “rentes” or equity of the Cie on 1/1/1718
- Every time funds are required by Cie: emission of new shares (rights offering preemption system: “mothers”, “daughters” etc…)
- Three successive issues in September-October 1719 (facilities of payment with rentes and money issues)
Mississippi Bubble

- Conversion of government debts into liabilities of the Company
- August 1719, Law proposed the Cie to refinance the totality of the public debt
- Reduction of the interest paid by the state to 3%
- Payments in rentes or bills of the Banque Royale
- Idea: Acquisition of the public debt will guarantee a continuous financial flow allowing to develop commercial activities
Mississippi Bubble

Garber (2000)

- October 1719: Nominal amount of shares equals 5.4 billion livres
- $\leq$ a bit less than 4 x the nominal amount of debts held by the company
- Estimation (made by Law) of the fortune of France as a whole = 30 billion
- May 1720: Bills = 2.7 billion (out of which 2.1 held by the public, 1.2 billion authorized)
Price?

- Increase linked to privileges’ extension
- Importance of credibility (In 1720: Law becomes “Contrôleur et superintendant général” => control the country’s finances)
- Bill issues become uncorrelated with capital increases
- Imposition of measures guaranteeing the bills and the shares’ prices
- For Law high share price reasonable in view of development opportunities
Figure 1
Compagnie des Indes Stock Price

Source Garber (1990)
Mississippi Bubble

• To be profitable to the government share prices had to remain high enough. Conversion of debts into highly priced shares was the way profits were made (Velde, 2003)

• Down payment system was specific as investors could stop paying the subsequent parts of the share and only lose the share itself (// South Sea case in the UK)

• Law issues loans against shares as collateral and buys shares back on the market
Mississippi Bubble

- December 1719: creation of an office to buy back the shares for 5,000 livres. Gradual monetization of the debt. By mid-February approximately 15% of capitalization had been bought back
- January 1720: price decrease following attempts to exchange bills for gold
- Simultaneously: bullion forbidden for transactions of amounts higher than 100 livres
Mississippi Bubble

- February 22\textsuperscript{nd} 1720: Overtaking of the Banque Royale => its bills become legal tender for amounts higher than 100 livres
- Limits on future issues of bank notes
- In // resale of the shares held by the king at a price of 9,000 livres per share
- Price support for the shares stopped prices drop and Law reverses course and willing to buy shares at 9,000 livres
Mississippi Bubble

- Bills’ circulation doubles in a few months
- But also devaluation of species when expressed in “livres tournois” and suggestion that banknotes do not suffer from such changes
- Then change in position: decision to replace bullion by paper
- 21 May 1720: Law proposes a dramatic devaluation $\rightarrow$ price drop from 9,000 to 5,000 livres
- End May: Law dismissed and put into jail
Mississippi Bubble

- June 1720:
  - Law: The Come-Back!
  - Creation of rentes to soak-up the money
- July 1720: Creation of “Bank accounts”
- August 1720: Demonetization of bills with a high face value (1,000 and 10,000 livres)
- September-October 1720:
  - Reduction of bank accounts to a 1/4
  - Bills no more legal tender
- End 1720: price at 1,000 livres, 1721 at 500.
Complexity?

Source: Velde (2003)
Bubble??

- Bubble? Irrationality?
- At the time perceived as such and as a swindle from Law (not credible in view of the investments made by Law himself)
- Law first Keynesian?
- Velde (2003) system not absurd at all!
- Garber (1990) suggest rational motives:
  1. Increasing power of Law
  2. Credible Plan
Bubble??

- Velde (2003) compares expected revenues and prices. Prices in 1718 and 1722 similar (adjusting for changes in capital structures) but meanwhile prices peaked at 40 times the 1718 price!
- Dividend of 200 livres OK to justify a price of 9,000 livres
- Law’s estimate => need of 80 million livres to pay the dividend. Sustainable? Velde (2003) estimates the revenues within 10% of Law’s projection. But enough? P/E of 45?
Internationally

![Graph: International Timing Share Price Indices](image)

(c) Kim Oosterlinck
18th Century Bubbles

- Bubble in France, UK and The Netherlands. Common features, differences and potential sources
- Frehen, Goetzmann and Rouwenhorst (2013): Importance of the role of Innovations and list three major ones
- First: Financial innovation in terms of government finance => Mississippi and South Sea Bubbles were both characterized by the “debt-equity” swap system but nothing of the sort happened in the Netherlands
18th Century Bubbles

- Second innovation: Shift in global trade. New companies set up to exploit trade with the Americas (Mississippi and South Sea). Future of these ventures function of the evolution of the geopolitical situation.

- Third innovation: Risk management. Creation of the first joint-stock insurance corporation, first in the UK but very soon followed in The Netherlands (in the 1720s many IPOs).
18th Century Bubbles

- Frehen, Goetzmann and Rouwenhorst (2013): investors distinguished between companies based on the prospect of international trade and insurance
- Atlantic trade => one of the factors driving the bubble
- Speculation in insurance other factor influencing the bubble
- Innovation-based explanation most important