THE ECONOMIC THEORY BEHIND INITIAL PUBLIC OFFERING (IPO) UNDERPRICING: AN EVALUATION OF THE PRICING MECHANISMS WHICH INFLUENCE THE ECONOMIC FORCES LEADING TO THIS PUZZLING OCCURRENCE.

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To my father for the guidance.
To my mother for the interminable support.
To my brother for the patience.
Declaration of authenticity

I, the undersigned, declare that to the best of my knowledge and belief, this thesis contains no material previously published or written by another person, except where due reference has been made.

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Andrew-Neal Farrugia
2nd day of September 2005
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Abstract

One of the big puzzles in finance is the systematic underpricing of shares being sold in an Initial Public Offering (IPO).

The primary objective of this paper is to utilise economic theory to understand what leads to this puzzling underpricing phenomenon and to propose a more efficient pricing mechanism.

By unfolding the workings of economic theory a deep understanding of the factors driving this phenomenon is achieved. This understanding is then used to evaluate the impact each IPO pricing mechanism has on this phenomenon. Thus revealing a pricing mechanism which could be used to mitigate or eliminate this inefficiency. The utilisation of the more efficient pricing method results in firms obtaining a price which reflects more closely the true value of their shares, resulting in Pareto improvements where funds would be put to better use.

The methodology used involves a critical evaluation of existing theory as well as additional insights into other economic theory which improve on existing explanations. This is followed by a thorough evaluation of pricing mechanisms available; and leads on to the recommendation of the ideal pricing method.

It is concluded that Auctions appear to be the most efficient of pricing methods. Auctions tend to mitigate most of the economic forces which instigate the underpricing phenomenon. In practice, however, auctions are seldom used. The major reasons behind this under-utilisation are outlined. Finally, it is recommended that, a variant of auctions known as ‘Dirty auctions’ should be used in IPOs.

This combination of microeconomics, financial economics and behavioural economics contributes to facilitating and promoting a more efficient initial public offering market.
The Economic Theory Behind Initial Public Offering (IPO) Underpricing: An Evaluation of the Pricing Mechanisms which Influence the Economic Forces Leading to this Puzzling Occurrence.

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List of Acronyms

BUS - Bank of the United States
CEO - Chief Executive Officer
CFO - Chief Financial Officer
DPO - Direct Public Offering
EMH - Efficient Market Hypothesis
ER - Expected Return
IPO - Initial Public Offering
IR - Initial Return
SEC - Securities and Exchange Commission
SEO - Seasoned Equity Offering
VOC - Verenigde Oost-Indische Compagnie (Dutch East India Company)
Chapter 1:
Introduction
Chapter 1: Introduction

1.1 A brief historical background

Whilst there is little official documentation, most financial historians point to the 1602 creation of the ‘Verenigde Oost-Indische Compagnie (VOC)’ (The Dutch East India Company) as the world's first public company. It was the very first company to issue stocks and bonds (Tschöpe). The US’s first great Initial Public Offering (IPO) is generally associated with the first Bank of the United States in July 1791. The BUS was the predecessor to the Federal Reserve System (Catanese 2005).

By 1669, the VOC was the richest private company the world had ever seen; until being dissolved, the VOC owned over 150 merchant vessels; 40 warships; employed some 20,000 seamen; 10,000 soldiers; nearly 50,000 civilians were in its service; and it paid out a dividend of 40% (Dutch East India Company n.d.).

According to Tschöpe spreading the ownership of the company to a wide public was the key to the accomplishment of raising the immense capital required to ensure the success of the VOC.

The shares were sold rapidly and the price of shares was not determined by the government but by an independent joint stock corporation motivated by profit; probably the first underwriting company in history.

1.2 Formulating the interesting phenomenon

All sellers share a common aim; they want to obtain at least a fair price for the asset or service they are selling. Understanding the factors that lead to systematic underpricing in initial public offerings (IPOs) pre-empts the devising of tools that
would allow entrepreneurs to extract a fair value for their shares and hence render the whole process *Pareto* efficient.

Underpricing is formally defined as the percentage difference between the offering price and the after market price that equilibrates demand and supply for the shares. The market equilibrium may be attained at the close of the first day of trading in well-developed markets or over a longer period for lethargic markets which take long to adjust to the equilibrium price.

One of the big puzzles in finance is the systematic underpricing of shares being sold in an Initial Public Offering (IPO).

This puts in question the efficiency of this method of raising funds. According to Welch (2000), underpricing is on average 10% with initial investors systematically making gains of 10% in one day. What is further baffling is that the issuers never complain to the underwriters about leaving money on the table\(^1\) and usually appoint those same underwriters for any subsequent issues. IPO underpricing is not limited to a particular country but is a world-wide phenomenon.

1.3 **IPO underpricing: a world-wide phenomenon**

Underpricing is not strictly a US phenomenon; there is enough empirical data available to indicate the contrary. The following figures summarise this data and provide evidence of underpricing in a range of countries.

Figure 1.1 illustrates the pricing of IPOs that took place in the US for the period 1960 to 2003. The US probably has the most active IPO market in the world, when assessed by number of companies going public and by the aggregate amount of

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\(^1\) Money left on the table is an alternative method for measuring underpricing using levels rather than percentages. This is defined as the difference between the offering price and the price of the shares after the first day of trading in the market; this is then multiplied by the number of shares sold.
capital raised. Underpricing in the US averages between 10 and 20 percent, however figure 1.1 also shows variation in pricing with some rare instances of overpricing. According to Ljungqvist (2005) in 1999 and 2000 IPOs were on average underpriced by 71% and 57%, respectively. In those two years the issuers left an aggregate of $62 billion on the table. These periods are also known as *hot market issues*\(^2\).

![Figure 1.1 – Initial IPO returns in the United States, 1960 to 2003.](Source: Ljungqvist 2005)

The European pricing behaviour is shown in figure 1.2 while figure 1.3 shows pricing in the Asia-Pacific and Latin America zones. Figures 1.2 and 1.3 report average initial IPO returns for 19 European countries over the period 1990-2003, and for eight Asia-Pacific and eight Latin American countries over the period 1990-2001.

\(^2\) Hot market issues are issues that take place when investors are bullish and hence the demand for shares is relatively higher than in cold markets.
The degree of underpricing varies from country to country. For example it is tremendously high in Poland whilst very low in Luxembourg; a possible reason for this might be that the financial market in Luxembourg is more developed than that in Poland. There is also a marked difference between Asia and South America. This difference could be due to the fact that the market in South America might be colder when compared to that in Asia, which has been experiencing a high level of growth.
1.4 Fundamental assumptions

Throughout this study there are a number of important assumptions one of which is the Efficient Market Hypothesis (EMH). This concept, proposed by Eugene Fama in the 1960s, states that in an active market with many well informed, intelligent investors the share prices reflect accurately all available information. This is assumed to hold for shares traded on the stock exchange. Thus, it is assumed that the price of the shares traded on the market after the issue indicate the true value of the company. This assumption permits the creation of a benchmark by which the true value is compared to the price of the IPO. This aids in assessing the level of efficiency of the issue.

It is also assumed that all the participants and players in the IPO are rational individuals that pursue utility maximisation. This assumption is relaxed when considering behavioural economic theory, since the interest here lies in assessing the effect on share prices of irrational or ‘sentiment’ investors.

1.5 A note on ‘Fair’ prices

When reference is made to ‘fair’ prices in this study, this is not referring to a fair system of distribution. Economics is not interested in fairness of distribution, unless economic policy is involved, but in efficiency. Fair prices, thus refers to the fundamental or true value of the shares. When an efficient market exists, sale of assets in that market will occur at their real value.
1.6 The objectives

The primary objective of this paper is to utilise economic theory to understand what leads to the puzzling underpricing phenomenon. By unfolding the workings of economic theory one obtains a deeper understanding of this phenomenon. This thorough understanding leads to the uncovering of an ideal pricing mechanism which could be used to mitigate or eliminate this inefficiency. This would result in firms obtaining a price for their shares which reflects more closely their true value, resulting in a Pareto improvement where funds would be put to better use.

A secondary objective is to provoke further research and discussion in this area especially in terms of the solutions that game theory may provide.

1.7 The methodology used

Initially, the study critically reviews the contributions that have been made to explain the conundrum of distorted share pricing and where appropriate puts forward alternative views. Economic theory helps to single out the drivers of this puzzling phenomenon. Following this, an analysis of alternative pricing methods is made. The properties of each method are evaluated in the light of providing a way to minimise this phenomenon. This leads on to the formulation of conclusions and recommendations.

1.8 Chapter overview

Chapter Two: reviews the major participants to the IPO process and evaluates the pricing process itself. It moves on to evaluate the motivations for going public and the corresponding conflict of objectives that arises.
Chapter Three: uses economic theory to make sense of the phenomenon. The theories are split into four main sections:

- asymmetric information economic models;
- behavioural economics explanations;
- the macro economic environment, and
- ownership and control.

Analysing the driving forces behind underpricing provides the foundation from which further analysis can be made on the alternative pricing mechanisms that can minimise this phenomenon.

Chapter Four: describes the main IPO pricing mechanisms:

- Fixed price,
- Book-building, and
- Auctions.

The properties and mechanics of each method are clearly outlined. The study then evaluates the effects the pricing methods have on the economic factors and hence on underpricing.

Chapter Five: outlines the economic repercussions of underpricing and concludes that although the use of auctions would curtail these repercussions, this pricing mechanism is not the preferred one in practice. It comments on the reasons why auctions are not commonly used in practice and recommends that the ideal pricing mechanism should be a variant of auctions known as ‘Dirty Auctions’. The chapter than concludes by suggesting areas for further research.
References
Chapter 2:

IPOs: the Participants, the Objectives and the Mechanics
Chapter 2: IPOs: the Participants, the Objectives and the Mechanics

2.1 The major parties involved in an IPO

An Initial Public Offering (IPO) is a company’s first sale of stock to the public. It is the process by which a privately owned company is converted into a publicly listed company. Securities offered in an IPO are those of companies seeking outside equity capital and a public market for their stock. The major parties who participate in an IPO are mainly:

The initial shareholders: the people who own the shares of the issuing company’s stock prior to the IPO. They are the entrepreneurs who have decided to take the firm to the public. They are also referred too as the issuer.

The underwriter: the firm, usually an investment bank, which is responsible for co-ordinating the stock offering for the IPO firm’s managers. By virtue of the fact that issuing shares is a primary function of an underwriter; the underwriter knows the details of the process better than any other participant and utilises this experience to ensure the smoothness of the process.

The underwriter may choose to put together a syndicate of other underwriters to distribute the shares. The underwriter is responsible for selling and marketing the issue. The investment bank will conduct road-shows with the company's management, distribute the preliminary prospectus, and talk to potential investors about appropriate pricing. According to Welch (2000), part of the value investors attach to shares is directly generated by the marketing of the underwriters itself. The
underwriter is also responsible for finding investors who are willing to purchase the shares. Investors may be individual or institutional in nature. The underwriting firm determines the ratio of how shares will be distributed between these investors.

In addition to experience, reputation also plays an important role. The investment bank is legally liable and has ongoing dealings with most of the customers to whom he sells shares; the underwriter thus puts his standing on the line. By choosing to underwrite an issue, the underwriting firm endorses the issue and gives it its own mark of acceptance.

The investment banker is the principal player in the IPO, working with the issuing company’s management to draw up an offering prospectus as well as devising a price spread and subsequent offer price for the stock being issued. The price spread and offer price are of immense importance to the initial shareholders since it plays a central role in determining the amount of funds the IPO will generate.

The investment bank buys an issue of securities from a company and resells it to investors. The underwriters usually guarantee that all stocks will be purchased; this is known as a firm-commitment offering as opposed to a best-effort offering. Under the firm-commitment offering, the underwriter takes an active stance and formally agrees to buy any stock offered that might not be taken up by investors. Under the latter arrangement, the underwriter is simply an agent working on behalf of the issuing company taking on a more passive role.

The underwriter also offers aftermarket support and future services for a month after the offering; a good underwriter provides price stabilization. This protects investors and makes the offering more attractive. It is vital for the issuing firm to agree clearly on the level of support the underwriter is to provide. Firms who decide to go public usually tend to return to the market for a seasoned equity offering.
The same underwriter may be the most ideal candidate for this purpose thanks to the foundations he would have built when dealing with the IPO.

**Institutional investors:** a group of investors who have funds to invest as a consequence of the conduct of their businesses. The group includes insurance companies, depository institutions such as: banks, investment trusts and pension funds, as well as industrial companies who administer their own pension schemes or have other funds available.

**Individual investors (private or retail investors):** investors who buy and sell securities on their own behalf and not for an organization. Retail investors typically trade in much smaller quantities than institutional investors.

### 2.2 The issuer’s motivations for going public

After a brief description of each of the participants involved in an IPO, it is important to detail the reasons why shareholders decide to go public.

There are both financial and non-financial reasons for firms deciding to go public (Ritter & Welch 2002). The issuing company may wish to raise finance for a number of reasons:

The entrepreneur may wish to raise funds in order to invest in a profitable investment opportunity that has come the firm’s way; it is assumed that other sources of finance have been exhausted.

The owners might be thinking ahead towards future capital needs and this may

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1. A seasoned equity offering is a further issue of a public company’s shares to the general market; as opposed to an IPO the company doing the offering is already public. SEOs refer to any other issue of shares by a company that has already done and IPO.
only be possible by increasing the profile of their company. According to Welch (2000) on average a third of all IPO issuers return to the public market within 5 years, in the form of a seasoned equity offering (SEO), raising three times the amount raised in an IPO.

Entrepreneurs may wish to make their firm the target of mergers and acquisitions. The probability of being noticed and evaluated for potential synergies increases once the company is public. Also the added publicity obtained from going public might attract a higher calibre of managers to the firm.

On a personal basis, the initial shareholder may also wish to raise funds in order to satisfy his liquidity preferences and enjoy life. It is also a possibility that the entrepreneur might be following a diversification strategy; liquidating one investment would provide the funds for investing in another unrelated activity. However an entrepreneur might have tainted reasons for liquidating part of his wealth, selling off one’s share could be a method to jump ship or to rid oneself of, as Akerlof (1970) put it, a ‘lemon’.

The main non-financial reasons for going public would be to improve the company image. Public companies have a higher profile that tends to instil in suppliers and customers a sense of longevity. Firms may benefit from more thrust and thus enter into commitments that were previously inaccessible (Welch 2000). According to Ritter and Welch (2002) the first firm of the industry to go public occasionally enjoys a first-mover advantage. Floating one’s shares publicly also gives

\[ \text{A lemon is the term that Akerlof used to describe a car that is considered junk. Akerlof studied the effect of asymmetric information on the second hand market for cars. The lack of perfect information in this instant creates a problem since the difference between a good quality car and a lemon is hidden until purchased.} \]
rise to a further non monetary motive; it offers the possibility of compensating employees by giving them a share in the company.

### 2.3 The IPO pricing process

According to Lowry and Schwert (2004) the pricing process of an IPO can be broken down into three stages as illustrated in figure 2.1. In the first stage, the firm’s management and the underwriters agree on a price range within which they foresee to set the offer price. This price range is included in the preliminary prospectus that is filed with the Securities and Exchange Commission (SEC).

![Figure 2.1 – Timeline for the IPO pricing process. (Source: Lowry & Schwert, 2004)](image)

In the second stage of the process the company sets the offer price of the shares to be offered on the IPO. This usually occurs after the market closes on the day before the offering. This is the final price at which the stock is issued to the public.

The final stage is assessing the price at the close of the market, when the shares are traded freely on the secondary market after the issue has taken place. This would be the market’s assessment of the firm. The price update is the percentage change between the final price decided upon and the mid-point of the price range. The initial return on the other hand is the difference between the offer price (what investors paid
to purchase shares in the IPO) and the price of the shares at the following close of the market when traded in the secondary market (the first closing price).

The pricing process varies minimally, depending on the pricing mechanism adopted and on the country in which the IPO is being held.

### 2.4 Conflict of objectives

The parties to the issue can be grouped in terms of common objectives they share. The groups would consist of: the initial shareholders in one group and the investors and investment bankers in the other group. The two groups of participants in the IPO inevitably have different goals. This is bound to lead to the formation of conflicts of interest.

Initial shareholders want to float their company at the highest issue price possible since this will determine the amount of funds they will generate (Daily et al. 2005). At the same time they want the IPO to be seen as a success.

On the other hand investors in general, are interested in a relatively low opening price that would leave room for a capital gain to be made on the shares purchased.

The underwriters want a more modest opening price too; since this would mean that they can get by with a smaller marketing effort due to the fact that a lower price would guarantee sufficient demand. Moreover, an oversubscribed issue will appear to be a successful issue whereas an undersubscribed issue may be interpreted as a failure and would lead to the underwriter being lumped with the unwanted stock under a firm-commitment offering.

According to some people interviewed by Lowry & Schwert (2004):

> "investment bankers deliberately set the price range low during the 1990s, with the hope of generating momentum and thereby increasing demand for the offering."
In addition to the direct gains that underwriters enjoy, there are also indirect gains. Since investors gain substantially from a lower offering price and since the majority of investors are institutional, this benefit helps to nurture the business relations between the underwriter and his major client, the institutional investor (Daily et al. 2005).
References


Chapter 3:

The Economic Theory behind Underpricing
Chapter 3: The Economic Theory behind Underpricing

After gathering an understanding of the workings behind IPOs we move on to analyse the economic theory which offers explanations for the factors leading issuers to leave tremendous amounts of money on the table. These can be broadly divided into four categories: asymmetric information economic models; behavioural economics theory; the macroeconomic environment and ownership and control.

3.1 Asymmetric information economic models

Prior to going public, companies are not normally in the public eye. The information regarding the company will be private and therefore not widely available. This gives rise to an asymmetry in the distribution of information; the most common being where the issuer is more informed than the investors about the general state of the firm and consequently the share price. There are other forms of asymmetric information. Ritter and Welch (2002), formalise the asymmetry of the information available to the investors and the issuers; where the investors know more than the issuers in terms of demand for the shares to be issued. According to Baron (1982), there might also be asymmetry in information where the issuer is less informed than the underwriter; this would give rise to principal-agent conflicts. Underpricing is directly related to the extent of asymmetric information.

A number of issues on underpricing arise due to asymmetric information the implications of which are discussed below.
3.1.1 The Winner’s curse hypothesis

The winner’s curse proposed by Rock (1986) arises, when apart from the asymmetry of information that exists between investors and the issuer, there is a whole spectrum of differentially informed investors. This is highly possible especially when one considers the access to information that institutional investors have as opposed to the information available to individual investors. Moreover, within these categories there may be further differences; for example individual investors vary in sophistication.

Taking as an example two issues, one in company A and one in U:
- The issue of company A shares is an attractive issue and shares are underpriced by 30%.
- The issue in company U is unattractive and shares are overpriced by 30%.
- We assume that the demand for shares in U is fully satisfied by the issue.
- Whereas the shares issued in A must be rationed to investors by 40%.

Taking two investors:
- Investor 1 an informed investor, and
- Investor 2 an uninformed investor

We obtain the following expected returns (ER) for the investors.

Investor 1 has only bid for the issue in company A:
\[ ER = 40\% \times (30\%) \]
\[ ER = 12\% \]

Investor 2 has bid for equal amounts in both issues:
\[ ER = 40\% \times (30\%) + 100\% \times (-30\%) \]
\[ ER = -18\% \]

Exhibit 3.1 – An illustrative example of the outcome of the Winner’s Curse.

The winner’s curse theory comes into play when winning is a Phyrreic victory and hence investors fear winning. It is assumed, that the investors that are relatively more informed will not bid for the shares they think are overpriced, whereas the uninformed investors will bid for all issues. This would mean that unattractive issues
would usually satisfy all the bids without rationing, whereas in attractive issues allocation of shares would have to make recourse to rationing. The uninformed investors would thus be allocated the most shares in issues that are overpriced whereas they will only obtain a pro-rata share, if any, of the shares they bid for in underpriced issues. An explanatory example is displayed in exhibit 3.1.

As can be seen from the exhibit above, it is very likely that the uninformed investors will be crowded-out by informed investors in the underpriced offerings. It is also very likely that the individual investors obtain no share in the attractive issue, because underwriters tend to preferentially allocate underpriced shares to their institutional investors. Hence, only if these shares have not been fully taken up by institutional investors will they be rationed to individual investors. If all the underpriced shares are taken up by the institutional investors, the individual, uninformed investors would see their expected return fall to a negative 30% (-30%).

There are two forces that come into play and affect investors. The first force is due to a lack of information; this can be referred to as the ‘information bias’ against the uninformed investors. The other is due to the preferential treatment that institutional investors obtain from underwriters; we can call this the ‘allocation bias’ against the individual investors.

Therefore, as things stand, the uninformed, individual investors should not participate in IPOs since the expected return is negative. This conclusion would break down the whole market since the institutional investors’ demand alone is not sufficient to clear the market. A way out to this impasse would be to underprice all share issues and thus encourage all investors to participate; since, even though the uninformed investors may be crowded-out from the most attractive issues, they would
still participate in the relatively less attractive, yet still underpriced, issues. Consequently, underpricing is a cost that the issuing firm must bear for using the IPO market. This ensures the continued proper functioning of this market.

However, although we know that underpricing persists, as seen in chapter one, this is calculated in averages and hence does not rule out the possibility of atypical issues being overpriced. These incidences may be explained in economic theory as companies attempting to free-ride the system by relying on other firms’ underpricing to ensure the market operates correctly.

In the light of the above, we conclude that in order to ensure the continued functioning of the system, IPOs must be either fairly priced or underpriced. I cannot agree with Welch (2000) who states that all issues must be underpriced otherwise fairly priced issues would result in investors making negative returns. If all issues are either fairly priced or underpriced investors would, at the very least, make zero expected returns in the short-run; any returns they make will be attributable to the companies’ activities that they have invested in and not due to market imperfections. This is in agreement with what Ljunqvist (2005) states; at the equilibrium uninformed investors, on average, earn no abnormal returns and informed investors returns should be exactly equal to the cost involved in becoming informed.

3.1.2 Principal-Agent conflicts of interest

When underwriters are more informed than the issuers, the principal-agent problem arises; this is when the underwriter’s objectives are not aligned to those of the principal, in our case, the issuer. Underwriters tend to obtain an informational advantage over issuers at an early stage of the IPO process since they gather vast
amounts of information during road shows. This is especially common under the pricing method known as Book-building\textsuperscript{1} since underwriters are authorised to allocate shares *quid pro quo*.

Some investors hold important information which is passed on to underwriters *quid pro quo* in what was called by Ritter (1998) as the *market feedback hypothesis* also referred to as the *information revelation theory*. Underwriters make use of all information gathered when setting an offer price (Benveniste & Spindt, 1989). Investors however would not tell underwriters how keen they are to invest in shares, since this would result in a higher offer price. Investors are obviously interested in obtaining the cheapest price possible, so in order for underwriters to acquire information on the investors’ willingness to purchase shares they must return the favour (pay for the information given) by offering them shares at a price lower than their real value (Welch, 2000).

One could argue that if investors claim that they are disinterested in the offer they would get the shares at an even lower offer price. However, this is a repeated game with incomplete information and multiple players, bluffing in one period would caution the underwriter to be on his guard making the strategy not optimal. Hence the equilibrium would be for investors to share information with the underwriter and the underwriter to compensate them by underpricing the issue or allocating a disproportionate large allotment of quality shares to those investors who are truthful in their revelations. This thus acts as an incentive to encourage investors to reveal information. This contributes to the explanation why institutional investors obtain preferential allocations over individual investors for the good quality issues.

\textsuperscript{1} Book-building refers to the pricing process by which the underwriters assess the demand for the shares by surveying institutional investors such as fund managers and assessing their response to the forthcoming issue. Underwriters then formulate an offer price based on that demand.
The informational advantage that underwriters have over issuing companies leads to a *moral hazard* situation, since the effort made by underwriters cannot be easily observed or monitored by issuers. Underwriters might be tempted to set the offer price conveniently lower than par as this would minimise the costs and effort required to market and sell the issue. This is a ‘zero-sum game’ and the costs saved by the underwriter are incurred by the issuer in the form of a loss in the potential capital that could have been raised. This view is shared by Habib and Ljungqvist (2001) who also argue that underpricing is a surrogate for costly marketing expenditures.

Baron (1982) says that issuers permit underpricing in order to induce underwriters to make an effort to market the shares, since the issuer cannot monitor the investment banker. However, in reality, this only encourages the opposite and leads to the underwriter to slacken and make less effort!

In addition to the inter-party conflicts of interest that arise, there also are intra-party conflicts of interest where the underwriters know that too much underpricing will lose business from issuers whereas too little underpricing will lower ‘spinning’, the business obtained from investors in return for the allocation of shares in a hot issue. Investors compete for allocations of underpriced stock by giving investment bankers side payments or future business. Underwriters’ fees for issues are usually in the form of a commission over the total value of the issue sold. Therefore underpricing is inversely related to the fees. However underpricing is directly related to the benefits derived from the business relationship with institutional investors. Therefore, the trade-off between these two would indicate whether the issue would be
over or under-priced. Generally the loss in commission is more than made up for by the increase in business fees obtainable from the investors and hence, issues tend to be underpriced.

### 3.1.3 Underpricing: a ‘signal’ of quality

This refers to the case of asymmetry of information where the issuer is more informed than the investor. In this case the owners know whether their firm and hence their issue is a good quality one or just a ‘lemon’. However they also know that the investors cannot tell firms apart. This gives rise to *adverse selection* unless a method can be found to make the quality of the company evident to investors. This is what is known as ‘Spence signalling’ after Michael Spence who was the first to apply this concept in the labour market.

![Figure 3.1 – Spence signalling separating equilibria.](image-url)
Figure 3.1 and the short example below help to explain the economics behind this concept.

Suppose there are two categories of firms, B, better quality and P, poorer quality, which look indistinguishable to investors. The issue quality is represented by \( Q \) where \( Q_B \) is the quality attached to the better quality issue and \( Q_P \) is the quality attached to the poorer quality issue. \( U_B \) is the utility of the firms with the better quality issue whereas \( U_P \) is the utility of the poorer quality firms. Utility increases as the curve shifts upwards in a north-westerly direction. The amount the shares are underpriced by is denoted by \( A \); where \( A_2 \) is a more severe cut in the price than \( A_1 \). The separating equilibria are given by X and Y. X is the equilibrium for poorer issue firms and Y the equilibrium for the better quality issues. This is a separating equilibrium since, as can be seen from the diagram above, the lower quality firms have no intention of underpricing their stocks more than \( A_1 \) since they wouldn’t be gaining anything in terms of utility. While, if the good quality firms had to underprice by less than the amount \( A_2 \) the investors would not be able to distinguish between poor quality and good quality issues. It is also beyond the scope for the better quality firm to underprice by more than \( U_2 \) since this would only have the negative effect of shifting the \( U_B \) curve south-easterly, lowering utility. Hence, firms in the B category may utilise underpricing to signal their quality. The figure reflects what occurs in practice since all firms underprice issues even the lower quality firm in fact its equilibrium involves underpricing the issue by \( A_1 \).

Although signalling is an added cost, it ensures that all shares will be taken up, and a successful signalling exercise would allow the issuer to return to the market to raise funds in an SEO with lower signalling costs. It is noted, with curiosity, that
most research concentrates on the benefits that signalling might have in future issues (SEOs) often ignoring the effects signalling has on the present issue. Taking as an example the study by Jegadeesh, et al. (1993); the focus here is on whether companies utilise signalling in order to prepare the foundations for future SEOs that might be in the pipeline, rather than assessing the value of signalling in imminent IPOs.

There exist a number of alternatives to underpricing that a firm may adopt in order to signal quality of an issue. Signalling could take the form of prospectuses; road shows; underwriter kudos; auditor reports. Research by Daily et al. (2005) also mention board composition; board size; board prestige; firm size, age and profitability as factors which could affect the determining of the offer price and hence signal quality.

3.2 Behavioural Economics Theory

The forces behind information asymmetries are magnified by the way the different parties behave. The integration of behavioural economics to asymmetric information contributes to explaining underpricing. Behavioural studies attempt to understand what leads the irrational parties in the IPO process to behave as they do, allowing underpricing to persist.

3.2.1 Informational cascade

Although included under the behavioural heading, this first theory is a combination of behaviour and asymmetric information. This theory attempts to justify the presence of underpricing in terms of what Ritter (1998) referred to as the ‘fad-effect’, also known as ‘herding’. People tend to be influenced by what other
people around them are doing. If a multitude of people are buying into an IPO, people not buying the shares feel they are being left in the dark or their information about the issue is faulty. The fad-effect prescribes that people will discard their information if it recommends an action which is inconsistent to the action that the majority of people are taking. People will therefore proceed to jump onto the bandwagon and follow suit, mimicking the behaviour of a herd.

This effect leads to underpricing being initiated in two ways by different parties. In the first case underpricing could be the perfect marketing tool required to encourage people to buy into the issue. The more people buy into the issue, the more likely this will lead to a fad-effect and hence it is of ultimate importance for the underwriter and issuer to ensure that the price of the issue is cut by an amount that will kick off this effect.

In a second instance this effect gives early investors market power in negotiating an offer price (Ljunqvist, 2005). The better the standing of the investor, and the higher the ability to influence the rest of the investors, the larger the amount by which the issue will be underpriced.

### 3.2.2 Of Prospect Theory and issuer complacency to underpricing

According to research made by Loughran and Ritter (2002), share issues taking place in the US between 1990 and 1998 left more than $27 billion on the table. These companies paid out $13 billion in underwriters’ fees and made $8 billion profits in the year prior to going public. This means that they left more than 3 years of aggregate profits on the table.
On a priori, one would expect the issuers to be dissatisfied with their underwriters. In actual fact, not only are the issuers happy with the underwriters they appointed but they usually persist on appointing them to handle any subsequent issues. A clear case of this is Netscape’s 1995 IPO which left $151 million on the table; this didn’t hinder Netscape from appointing the same underwriters, Morgan Stanley, for its 1996 subsequent issue (Loughran & Ritter, 2002).

‘Prospect Theory’ provides a possible explanation to this puzzle. Prospect Theory was developed by Kahneman and Tversky in 1969 and was used to explain individuals’ irrationality when faced with a decision under conditions of uncertainty. This is equally applicable to our case where issuers are faced with a decision on the issue price but are uncertain about the outcomes of the situation.

![The Kanheman-Tversky value function.](Source: adapted from Kanheman & Tversky 1979)
Unlike the traditional utility function, the value function, depicted in figure 3.2 above, is defined over changes in total wealth. It is steeper in losses than in gains, concave in gains, and convex in losses. Prospect Theory is not concerned with the level of wealth but with changes in wealth relative to a reference point, the origin.

Prospect Theory stresses behavioural biases in decision making and emphasises the importance of ‘framing’\(^2\) in the underpricing puzzle. Since losses to issuers (due to underpricing) are usually accompanied by windfall gains, the issuer ‘closes an eye’ on the amount of money left on the table. We have seen in chapter one that the reasons for going public can be financial as well as non-financial. In the case of non-financial reasons, whether the shares are underpriced or otherwise does not really interest the initial shareholders. However, when the reasons are financial, Prospect Theory and framing kick in to explain how the unprecedented gain makes the issuer less conscious about the amount of money left on the table.

According to Loughran and Ritter (2002) the reference point is taken to be the mid-point of the preliminary price range. For our example, the price range is taken to be between 50 and 150 and the mid-point in the figure above is thus a 100. Prospect Theory predicts that the losses associated with leaving money on the table are offset against the aggregate of gains in net worth (from the price jump in shares for any retained stock) and the income from the public offering. If the gains are larger than the losses the issuer is complacent to underpricing.

Prospect Theory is useful when rewriting the underpricing problem in terms of bargaining theory. In this setting the bargaining problem arises in view of the fact that the underwriters want a lower issue price and the issuers want a higher offer.

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\(^2\) In economics, framing refers to the way a rational choice problem is presented. Kahneman and Tversky (1981) showed that changing the way a problem is presented can result in reversals in preference and contradict predictions of rational choice.
price. Loughran and Ritter (2002) argue that the stronger the demand prior to the issue the more likely the issuing firm will acquiesce to leaving more money on the table. The reason for this could be due to the investors making up for this loss through the increase in the value of the retained shares. When demand is unexpectedly weak, issuing firms negotiate more aggressively, leaving little money on the table.

Although offering a good explanation why the issuer is complacent to underpricing, the explanations still leave some issues unaddressed. Utility Theory offers a more convincing explanation to issuers’ submissiveness than Prospect Theory does.

3.2.3 Of utility theory and issuer submissiveness

The Theory of Utility and Marginal Utility in economics can help explain why underwriters are so complacent to underpricing. The Law of Diminishing Marginal Utility states that, the Marginal Utility of an additional good contributes less to total utility then the preceding addition. This is assumed to be the case in the IPO pricing process. The added marginal benefit obtained from an added increase in the issue price decreases with every increase.

As can be seen from figure 3.3 the utility function increases at a decreasing rate. In our example an issuer is faced with three possible prices for the issue: $P_1$, $P_2$ and $P_3$, where the difference between each price is equivalent. The utility changes, on the other hand, are not the same. The change from $U_1$ to $U_2$ is much greater than the change from $U_2$ to $U_3$. The Marginal Utility of an increase in the offer price thus decreases as the offer price increases.
Hence we conclude that the Marginal Utility and the issuer’s determination to seek a higher offer price are directly related. Then as the price increases, the marginal Utility falls and so does the issuer’s eagerness to negotiate a higher offer price with the underwriter. Therefore in our case this would lead to the issuer being satisfied to underprice the issue by an amount A, equal to \( P_3 \) minus \( P_2 \).

This theory aims to explain the areas that have not been very well explained by Prospect Theory. The majority of authors utilise Prospect Theory ignoring the importance simple Utility Theory plays in explaining underpricing.

### 3.3 The Macroeconomic environment

The macroeconomic environment in which IPOs take place plays an important role in explaining a portion of the underpricing phenomenon. The relevant economic
factors within the macro-environment are: the legal framework, the market structure and the method of taxation.

3.3.1 The legal framework

Following President Roosevelt’s policy for reform in the stock and bond market, Congress passed the Securities Act of 1933, known as the Truth in Securities Act of 1933, as a means for protecting investors. This Act required full disclosure by any issuing company for all new issues of securities. Since the participants on the selling side of an IPO are jointly and severally liable for each others’ actions, they are prone to being sued for various material omissions or misstatements in the prospectuses when the market valuation falls below the IPO issue price. In order to avoid being sued, participants intentionally underprice the issue (Ibbotson, 1975). The amount left on the table is a sort of insurance against any lawsuits. This may seem to offer a reasonable explanation for why participants intentionally underprice the issue.

However while underpricing is a world-wide phenomenon, liability laws are not. Such lawsuits are not common in Europe. For instance Ritter (2003) states that in Finland lawsuits are rare, and yet figure 1.2 in chapter one shows that Finland had share underpricing in excess of 20 per cent.

Furthermore the US passed a new law: The Private Securities Litigation Reform Act of 1995. This Act protects disclosure of firm projections reducing their legal liability, and forces the plaintiffs to have a substantial participation in the firm. As a result, the Act reduces the rate of successful suits thus influencing the terms of settlement (Welch 2000). However, as can be seen in figure 1.1 in chapter one,
although this law was passed in 1995 the amount of underpricing increased to unprecedented levels in the period 1999 to 2001.

Therefore legal liability may only be a secondary driver of underpricing, if any at all.

3.3.2 The market structure

The underwriters market power plays a huge role in justifying underpricing. Since, as described above, the quality of an IPO is shrouded in asymmetric information; an issuing firm wanting to prove the quality of the IPO would need to select an underwriter with a strong reputation for good quality IPOs. As described in chapter two, this is one of the major qualities sought for in underwriters. Only a few large underwriters, with enough status to manage an IPO, are available. In the words of Tunick (2004), small underwriters can

“never compete with the syndicate desks and investor ties of the bulge brackets”.

This means that the market for underwriting is in fact an oligopoly, maybe at times a monopoly, if particular expertise is required in certain industries. This is bound to push prices up for their services. The prices for their services are not only interpreted as higher commissions but also in terms of more severe underpricing.

If the market was more competitive, underwriters would have to offer a lower price for their services which would probably translate into lower commissions and less underpricing. This is seconded by Ritter (2003) who says that a decrease in competition in the underwriting industry in the 1990s led to an increase in underpricing.
3.3.3 The method of taxation

This theory states that the method adopted by a country to tax may play a role in explaining part of the underpricing conjecture. If a country taxes solely income or else taxes income at a higher rate than capital gains, this creates an incentive for the issuer to transfer as much income taxable under the higher rate, to capital gains taxable under a lower rate or not taxable at all. In fact companies in countries with this sort of scenario have an incentive to pay their employees by allocating them underpriced stock through an IPO.


A contrasting view is offered by Guenter and Willenborg (1999). This study examined the aftermath of the US tax law changes in 1993 where capital gains tax was reduced on small business shares. This resulted in issue prices for qualifying firms to increase rather than decrease when compared to issue prices before the change in tax law. In this case the tax benefit was retained by the company rather than passed on to the investors.

This appears to contradict the study by Rydqvist. However, it is important to remark that the direction of the cause and effect (causation) may not be clear. One can argue that the sequence of events plays a very important role in determining the direction the effect will take. In the Swedish case, the tax changes went from no capital gains tax to taxing capital gains. On the other hand, in the US case, the movement took place from capital gains being taxed to a reduction in capital gains. The latter sequence of events yields the effect of increasing the net benefit accruing to
those issued with underpriced shares in view of the revision in tax laws. Therefore
the share price can be undercut by less to ensure that the same net benefit accrues to
those employees who have been allocated shares in lieu of salaries.

3.4 Ownership and Control

The general assumption is that prior to going public the ownership and control is
generally vested in the same individuals. There are two opposing theories in this
respect. The first states that underpricing could be used as a method to ensure the
owner retains control. The other theory, on the other hand, portrays underpricing as a
way to encourage large investors to take over ownership, hence severing the links
between ownership and control and providing the monitoring of agents’ actions.

3.4.1 Underpricing as a means to avoid dilution of control

Underpricing results in an excess demand for stocks and serves to encourage a
varied type of investors to subscribe for shares. This excess demand ensures that
current owners and managers have a wide choice available for ‘placement’ of shares.
The issuer is thus able to avoid dilution of control and hence retain the ability to
maximize their private utility as opposed to the utility of the shareholders as a whole.
According to Brennan and Franks (1997), allocating shares to small investors reduces
their monitoring capabilities allowing initial owners to retain control. This is due to
the fact that monitoring is a public good, hence shareholders will only invest a sub-
optimal amount in monitoring management. Moreover, the fact that each shareholder
only possesses a small amount of shares means that the control they can apply is weak
unless they co-ordinate successfully with other small shareholders. However co-
ordination is in itself an arduous task; the effort of which may not be justified by the amount of shares owned.

The claims by Brennan and Franks (1997) that underpricing may be a tool to retain control have been refuted by Zingales (1995) who claims that an IPO is only the first stage of a complete sell out, where initial shareholders will eventually transfer all their shares to new shareholders. Empirical evidence tends to prove Zingales right.

3.4.2 Underpricing as a means to reduce agency costs

An opposing view to Brennan and Franks is provided by Stoughton and Zechner (1998). The latter observe that, contrary to Brennan and Franks, it may be beneficial to allocate shares to large shareholders, as these will monitor and ensure that decisions taken reflect the goal for maximizing the firms’ value as opposed to personal value.

Nonetheless since monitoring involves costs, in order for the investor to accept the monitoring role it must be compensated economically. Underpricing thus plays the role of an incentive to ensure investors buy a large share in the company in order to warrant them to exercise supervision.

In order to see which of the opposing theories is applicable, one must assess each case on its individual merits. Assessing whether the emphasis is placed on maximizing personal value as opposed to maximizing shareholder value, offers an indication on which theory is applicable. For example, if the latter exceeds the former, than underpricing could be used as a means to reducing agency costs and hence maximise shareholder value. In the converse case, underpricing is a means for initial shareholders to retain control. Ownership and control is a new field in the
study of IPO, hence few empirical studies are available. However it appears that this area takes on a secondary role in offering explanations to underpricing.
References


Chapter 4:
Alternative IPO Pricing Methods
Chapter 4: Alternative IPO Pricing Methods

4.1 Introduction to pricing mechanisms

There are three main pricing mechanisms for companies deciding to go public and a multitude of hyrbrids of these mechanisms. The three main methods are the fixed price, the book-building and the auction (Ritter 2003). A summary of their properties is displayed in the following table:

<table>
<thead>
<tr>
<th>IPO Pricing Mechanism Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td><strong>IPO Pricing Mechanism Properties</strong></td>
</tr>
<tr>
<td><strong>Fixed Price</strong></td>
</tr>
<tr>
<td>Price set before/after demand</td>
</tr>
<tr>
<td>Price clears market</td>
</tr>
<tr>
<td>Rationing rule</td>
</tr>
</tbody>
</table>

Table 4.1 – A summary of IPO pricing mechanism properties.
(Source: adapted from Biais & Faugeron-Crouzet 2002)

4.1.1 The Fixed Price method

This method is also known as the public offer or universal offer. This is a relatively low cost offering method.

In fixed price offerings, the share price is set prior to assessing the demand for those shares. The value of the firm’s fundamentals must be assessed in order to fix a price.

According to Ritter (2003), there are mainly two general approaches for valuation. The first approach involves the use of discounted cash flows or
comparable-firm accounting-multiples such as net present values and price earnings ratios (Welch 2000). The second approach does not deal with the level of valuation but with long-term returns which are the changes in valuation over time.

The pay in advance feature allows orders to be collected from many unknown investors without a risk of subscriber defaults, and it often has the added benefit of generating float for the issuer.

This method does not rely on long term relationships between the underwriter and investors, as with book-building.

4.1.2 The Book-building mechanism

Book-building refers to the process through which investment bankers build up their order book for a share issue. By doing this, the underwriters assess the demand for the issue and therefore the value that investors attach to this issue. Bearing in mind the demand for the issue, the underwriter would arrange a price accordingly. The key difference between book-building and other methods is that book-building gives the underwriters control over the allocation of shares.

In the US, the process of book-building starts with the setting of a price range. The underwriters then organise a road show in which they canvass institutional investors hence gauging what the demand for the issue is. If the demand for the issue is particularly strong they may revise the price range upwards, if the demand appears to be particularly weak the price range may be revised downwards. The revision must be filed with the commission overseeing IPOs, in the US this is the SEC. The actual offer price is then established on the day prior to the issue. The offer price may vary from the price range at most by 20% without the need to file a pricing amendment (Ritter 2003).
This process varies from country to country; for example in Germany the price range is set after book-building has started (Ritter 2003).

4.1.3 The Auction mechanism

Another method of pricing is via auctions. The bid in an auction is the offered price. In economics an auction is seen as a method for determining the price of a commodity which has an indeterminate price. The advantage of an auction is that it reveals information about the bidders’ valuation. Individuals have independent private valuations of an object (in our case the share on issue) but they are also interested in common valuations, the value others are attaching to the issue. Common values influence the price that a share will have in the secondary market. There are typically four main types of auctions (Anwar 2004): the English Auction, the first-price sealed-bid auction, the second-price sealed-bid auction also known as the Vickrey Auction and the Dutch Auction.

- The **English Auction**: participants bid openly against each other. The person with the highest bid wins and pays the amount in the bid. Rational investors will bid for the shares up until the bidding price is lower than their valuation of that share. This is an ascending bid auction.

- The **First-price sealed-bid Auction**: participants submit their bids, the highest bidder will win the auction, and the price will be the winning bid. Under this system, unlike the English auction, only private values come into play since there is no way of finding out the valuations of the other participants in the auction.

- The **Vickrey Auction**: very similar to the first-price sealed-bid auction, with the only difference that the person who wins the auction, the person
with the highest bid, will end up paying the second highest bid. This is theoretically equivalent to the amount paid under the English auction.

- Another form of auction is the one used to sell tulips in the Netherlands. This is known as the **Dutch Auction**. Under this form of auction, the auctioneer starts from the highest price and starts calling lower prices until a bidder accepts the price. This is a descending bid auction as opposed to the ascending bid English auction (Anwar 2004). The term Dutch Auction is also used to describe online auctions where several identical goods are sold simultaneously to an equal number of high bidders. This is also known in economics as a multi-unit English ascending auction.

In actual fact the auction used for selling shares is actually more like a variant of the Vickrey auction even though it is mostly referred to as a Dutch auction, probably because of its second meaning. The price set is based on the bids made by investors; the highest price that will fill all the orders is selected, though the bankers and issuing company may agree on a discount. The following exhibit illustrates how the auction works in practice:
Finding Netherlands

In most initial public offerings of stock, Wall Street underwriters gauge interest by soliciting bids and picking who gets to buy shares, often favoring their best customers. A Dutch auction IPO, named for the Dutch method for selling tulips, is different. Here’s how it works:

Company going public sets number of shares to be sold—say, 5 million—and suggests a price range:

$26 $24 $23 $22 $21

Underwriters and company executives assemble bids, starting with the most expensive first, and count down until they reach 5 million shares.

Everyone who bids $23 or more gets to buy 1/9 of the shares they wanted, for $23 each.

Exhibit 4.1 – The mechanics behind a Dutch auction for selling shares.

(Source: The Wall Street Journal)

4.2 The effect of alternative pricing mechanisms on underpricing

The economic theories reviewed in the previous chapter provide a detailed insight on the reasons of underpricing prevalence. After understanding the varied
pricing mechanisms one notes that the pricing mechanism chosen may either magnify or mitigate the factors fuelling the underpricing phenomenon.

4.2.1 The Fixed Price method

The efficiency of this pricing method is heavily dependent on the method chosen to value the firm. If the pricing method is precise in its measurement this would mean that the share price would reflect their true value.

Whichever valuation method is selected, if the starting point is not correct this could lead to an incorrect price being selected. Since these valuation approaches may appear dubious in nature, underpricing could be used by management as a safeguard in case of contingency. This would mean that whatever estimate of the price is obtained a discount would be applied to that price leading to a high level of underpricing when finalising the offer price.

Also the fact that the price is fixed well before the issue means that market feedback about demand will be outdated by the time the issue date arrives. This increases the risk of failure and hence the need to underprice the issue.

According to Ritter (2003), this pricing method has become uncommon in recent times.

4.2.2 The Book-building mechanism

Book-building is more expensive than the fixed price public offer method. Another key difference of book-building compared to other methods is that offers may be refused for any arbitrary reason, which means that underwriters have wide discretion over the allocation of shares. Under this method information is acquired
usually by the underwriter prior to the issue. However there is a cost to acquiring this information and this is in terms of a lower issuing price.

This mechanism gives more power to the person in possession of information. Asymmetric information thus creates an imbalance in power which leads to inefficiencies in pricing in the forms of:

- ‘Flipping’, this refers to encouraging the taking up of stocks by investors who are interested in the shares for speculation and not as a long term investment.
- ‘Spinning’, refers to the allocating of shares of a hot initial offering by a securities firm to the personal account of a corporate executive in anticipation of gaining future business from the executive's firm.

Underpricing is mostly due to book-building which seems to widen the divide in information available to the parties in the issue.

4.2.3 The Auction mechanism

In theory using auctions for IPOs should help to abate the part of underpricing that asymmetric information is responsible for.

If an English auction is used, such as in Chile, this could help to reduce the problems associated with the winner’s curse. Since the winner’s curse arises from the fact that, some investors are more informed then others. This means that investors have different private share valuations. By utilising an English auction private valuations are revealed and investors use the common valuation to reassess their private valuations. This can be seen as a market-led, as opposed to underwriter-led,
information revelation theory; information is revealed to all investors participating in
the auction rather than to a select few.

This implies that principal-agency forces will be minimized through use of
auctions since the underwriter will no longer be more informed than the issuer about
investors’ valuations. Underwriters would therefore lose underpricing as a tool for
reducing marketing costs.

Since the price of the issue and the allocation are now determined by the market
forces at play, there are no interferences from underwriters. Therefore, the allocation
cannot be meddled with to support the underwriters’ objectives which usually mean
allocating underpriced shares to institutional investors to allow spinning and flipping.

However, unless using a hybrid of this pricing mechanism that allows for price
cuts, the signalling properties of underpricing will have to be forfeited. The issuer
will have to rely on other signalling tools available, namely the prospectus and the
road shows.

Depending on the type of auction chosen a certain level of asymmetric
information will still exist. For instance one of the main properties of a Vickrey
auction, the sealed-bid, implies that investors would not learn about other valuations
since they are unable to obtain feedback from other participants’ bids. This is not the
case for an English auction.

On the other hand, auctions alleviate the macroeconomic environment factors
that effect underpricing. The underwriters’ market power is rendered irrelevant to the
pricing decision. And the issuers cannot be held legally liable for a price that has
been set by the investors. However, the tax arguments made in favour of underpricing
are lost.
With respect to the dilution of ownership and control it is totally dependent on the market forces, no external party can interfere with it. An issue can go both ways in this kind of scenario. Although it might be more likely for the shareholding to be dispersed, an institutional investor may still bid for a high number of shares at a high price and hence obtain a large shareholding. However for this scenario to take place a premium would need to be paid in order to obtain this benefit unlike under book-building where this would be a ‘gift’ from the underwriter who has full discretion over the allocation.
References


Chapter 5:
Conclusions and Recommendations
Chapter 5: Conclusions and Recommendations

5.1 Economic repercussions of the underpricing phenomenon

An underpriced or overpriced issue suggests, by implication, that the IPO pricing process is not efficient. The fact that shares prices are undervalued means that only part of the information available is incorporated into the offer price since the extent of information incorporated into the offer price contributes to a more accurate pricing of the new issue. Underpricing could also be due to manipulation by one of the parties to the issue. Biais et al. (2002) conclude that asymmetric information and the discretion that participants have in pricing and allocating an IPO result in sub-optimal outcomes.

A pricing process which leads to underpricing is not efficient since the returns are not recurring to the rightful owners; new investors are allowed to benefit from these gains without effort. This outcome would mean that more “lemons” would issue shares at an IPO and good quality firms would avoid the issue of shares if this would mean selling their company at a cheaper price than its value. An important assumption, mentioned in Chapter One, is that other sources of raising funds are not available. This means that profitable opportunities would have to be postponed or forfeited in favour of dubious projects that the poorer quality companies would undertake with the funds raised from the IPO.

The economic repercussions of this are that the companies being financed through IPOs would be raising funds to be put to poorer use. Thus this would be a waste of available, but limited, resources and better uses of those funds would be lost or put on hold. Hence there are clearly Pareto improvements to be made if a pricing mechanism which has the effect of reducing underpricing is adopted.
Utilising a better pricing method (such as auctions) should result in a shift to a Pareto equilibrium where a greater number of quality firms will go public. This would lead to a more efficient utilisation of the funds being raised.

5.2 Conclusions

This study has set out to identify the economic theories that facilitate the explanation of the underpricing puzzle in finance. This thorough understanding is used in evaluating the pricing mechanisms to identify which mechanism tends to minimise the underpricing phenomenon. Auctions and their hybrids are singled out as tending towards a more efficient pricing of IPOs that can avoid the aforementioned economic repercussions. The following analysis continues to emphasise auctions as the preferred pricing mechanism.

5.2.1 Analysis of an auction-based pricing mechanism

It was shown in the previous chapter that using an auction pricing mechanism would mitigate the factors driving underpricing. There are additional advantages to be reaped from the use of this method:

- Better pricing; the IPO offer price reflects the company’s true value, since the offer price will be based on the fair market valuation of the firm. This valuation will derive from the information the market holds about the firm which affects the demand for the shares. The demand will in turn interplay with market forces until coming to rest at the price at which all the company shares are cleared. Traditional pricing methods just approximate the value in the open market.
- Better allocation of funds; not only fair but more importantly efficient. Efficient allocation means that limited resources will be put to their best use; a natural selection will take places since auctions facilitate market forces in allocating funds to be invested in the better projects.

- Equal access to shares and fair allocation; qualified investors whether individual or institutional have the same right to bid for shares and allocation depends solely on the bid made. This means that the winner’s curse is avoided. A subsidiary positive externality to the above is the attraction of investors who are willing to hold the shares for a longer term as opposed to speculators who are merely interested in flipping the shares to make a quick profit in the short term (Hambrecht n.d.).

- According to Hambrecht (n.d.), auctions involve lower costs thanks to the prolific use of technology. Hence, the auction mechanism is more cost effective and a larger share of the funds raised are actually put to the use they are raised for rather than dissipated into wasteful underwriting commissions and other issue expenses that arise under book-building.

- The size of the issue is driven by the requirements of the issuing company and not by the cost structure of the underwriting investment bank, which might deem fit to vary the size of issue to match the demand at the fixed offer price.

- Avoids price discrimination; one share price is charged and this is applicable to all investors.

On the other hand an auction pricing mechanism may give rise to disadvantages in a number of situations; some of these disadvantages are listed below:
Auctions are more risky than book-building. This is due to the fact that the issuing company is unaware of the information the market has about the company value. This is only learnt once the auction actually takes place and as a result, no remedies are available then. Under book-building the underwriter gathers enough information about demand for the issue and thus adopts the optimal strategy based on the information gathered. With auctions there is a chance that the bidding price is lower than expected, this is equivalent to an undersubscribed issue. Moreover there are no safety measures present under book-building; agreements where the underwriters concur to manage the offering in terms of a firm-commitment and the provision of analyst coverage to minimise risk.

Auctions might not be suitable in instances where the company is not well-established. In this case auctions might lead to a lower offer price since a non-established company will find it hard to create a positive perception in investors’ heads to generate sufficient demand at a reasonable offer price. Furthermore, underwriters would not market the issue or release a favourable ‘buy’ recommendation to investors. This is a demand side issue which mirrors the supply side issue mentioned above.

Sherman (2004) claims that auctions offer a ‘one size fits all’ solution that is not as flexible in adjusting to the needs of a variety of issuers whereas book-building allows for customized solutions.

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1 This has been described in chapter two within the section that describes the underwriter.
Underwriters are less actively involved in after-issue-support, such as ‘price stabilization’, for auctioned issues when compared to book-built IPOs (Degeorge et. al. 2004).

Albeit auctions have gross advantages over book-building, the latter still seems to dominate in practice.

5.2.2 Book-building dominance over auctions in the real world

Even though the auction method has been so extraordinarily popular in so many other settings within the IPO scene, it is not as popular as the book-building pricing mechanism. The choice of pricing mechanisms in a number of countries is displayed in table 5.1 below.

The main reason for this persistent dominance is the fact that the majority of investment bankers dissuade issuers directly from utilising auctions as a pricing mechanism. This was clearly the case with Morgan Stanley, who even though leading Google’s IPO-by-auction, it ended up resigning as lead underwriter in Morningstar Incorporation’s IPO, when the latter decided to persist using auctions as the mechanism for their issue. The May 2005 Morningstar IPO issue-by-auction went on to be a smooth success (Smith 2005).

Loughran and Ritter (2003), second this by claiming that they suspect underwriters favour book-building partly because it allows them to take advantage of risk-averse issuing firms.
### Table 5.1 – Summary of book-building dominance over other pricing mechanisms.
(Source: Sherman 2004)

<table>
<thead>
<tr>
<th>Region</th>
<th>Book-building Used</th>
<th>Dominant or Gaining Popularity</th>
<th>Hybrid BB/FP Used</th>
<th>Fixed Price Used in Past (not incl. hybrids)</th>
<th>Auction Used Today</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Europe</strong></td>
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<tr>
<td>Austria</td>
<td>yes</td>
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<tr>
<td>Czech Republic</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td>Finland</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td>France</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>occasionally</td>
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<tr>
<td>Germany</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>occasionally</td>
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<tr>
<td>Hungary</td>
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<td>Netherlands</td>
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<td>Norway</td>
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<td>Portugal</td>
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<td>Switzerland</td>
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<tr>
<td>United Kingdom</td>
<td>yes</td>
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<tr>
<td><strong>North and South America</strong></td>
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</table>

- 59 -
Issuers might also be intimidated indirectly from utilising auctions due to the implicit threat that underwriters would not recommend the purchase of the issue even though the investment would carry all the requisites that make it recommendable.

5.3 Recommendations

The selection of a suitable IPO pricing method is a very hot topic in this area of economics. The current discussion on which pricing method is the better is as deep and divided as the Great Rift Valley.

Apart from concluding that the use of Auctions should be favoured over book-building, this study advocates the use of a variant of auctions known as ‘Dirty Auctions’. Besides the advantages attached to auctions this method also benefits from some advantages available under book-building but otherwise unavailable to pure auctions.

Dirty auctions would elicit information from investors in the same way as book-building does, thereby alleviating the risk of selecting a strategy that is incompatible with market information. This form of auction will also ensure that enough interest is generated for the issue even in the absence of underwriters’ recommendations. In essence the risk of an undersubscribed issue will be reduced. The slight discount in offer price will also ensure success for share-trading in the aftermarket whilst avoiding the negative externality associated with book-building, that of collusion among bidders which results in more severe underpricing. Thus, Dirty auctions appear to be the more efficient of IPO pricing processes.

A dirty auction is an auction where the final price chosen is slightly below the price that clears the market. The price is deliberately set below the maximum level that would allow all shares to be sold meaning that shares must be rationed. This variation of the auction method eliminates the winner’s curse.
This conclusion is not intended to be finite. Nothing gives more meaning to a conclusion then the ability to instigate further thought, discussion and research. Any puzzles, no matter how daunting, can be solved through healthy discussion. By no means has the underpricing puzzle been solved in this paper, yet it has been brought closer to comprehension allowing further research to be clearer in its objectives.

5.4 Scope for further research

The secondary aim for this paper is to provoke further study, this paper inspires a number of alternative routes for further research, and the following is a sample:

- Devising hybrids of current pricing methods in order to achieve increases in IPO pricing efficiency.
- Analysing the actual impacts and repercussions of underpricing inefficiency.
- The use of game theory to understand relationships and solve conflicts between IPO players. Namely a study could be undertaken utilising game theory to minimise the conflict of interest that exists between the underwriters and the issuers and hence reducing the underpricing phenomenon.
- Devising economic policy that would ensure more transparency and efficiency in the IPO pricing process.

(This list is limited solely by the fact that it is meant to be indicative and not comprehensive.)
References


Bibliography
Bibliography

Books

Electronic information – World Wide Web


Journal articles


**Newspaper articles**


**Other**


# Glossary of terminology

<table>
<thead>
<tr>
<th>A</th>
<th>Aftermarket</th>
<th>All share trading activity subsequent to the new issue offering from the underwriters.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allocation</td>
<td>A specific amount of stock in a new issue that is given to an investor.</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Best-Effort</td>
<td>A method of securities distribution or underwriting in which the securities firm agrees to sell as much of the offering as possible and returns any unsold shares to the issuer.</td>
</tr>
<tr>
<td>Bid</td>
<td>Represents the price at which someone is willing to buy stock on a market order.</td>
<td></td>
</tr>
<tr>
<td>Broken IPOs</td>
<td>If an IPO trades under its IPO price in the aftermarket, it is said to be a broken IPO. This is not a good thing. Regardless of fundamentals, investors regard breaking issue price as a bad omen. In the old days of Wall Street, syndicates of underwriters would prop up the IPO price with a stabilizing bid, often for days.</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Closing Price</td>
<td>A stock's last transaction price for the day.</td>
</tr>
<tr>
<td>Co-Manager</td>
<td>Underwriters that appear on the cover of a prospectus and help the lead manager with the distribution of the offering but do not make the final decisions.</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Delivery</td>
<td>Referring to the actual delivery of the stock certificates from the seller to the buyers. This completes the transaction.</td>
</tr>
<tr>
<td>Direct Public Offering (DPO)</td>
<td>The sale of shares offered directly to the buyers by the issuing company without the intervention of an underwriter. Many times these offerings are done via the internet. As a generalization, they are usually companies that are not large enough to undergo a firm commitment offering.</td>
<td></td>
</tr>
<tr>
<td>Due Diligence</td>
<td>A process of verifying all information about a company including but not limited to, financials, management, market share and risks.</td>
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<tr>
<td><strong>F</strong> Firm-Commitment</td>
<td>A guaranteed or fixed price sale, where the underwriter agrees to sell a specific number of shares (with the securities firm holding any unsold shares in its own account if necessary).</td>
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<tr>
<td><strong>G</strong> Flipping</td>
<td>Buying shares in an IPO and immediately selling them for a profit.</td>
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<tr>
<td><strong>G</strong> Go Public</td>
<td>The process of taking a private company and converting it to a publicly owned company. This is done via an Initial Public Offering – IPO.</td>
<td></td>
</tr>
<tr>
<td><strong>I</strong> Indication of Interest</td>
<td>An expressed interest in buying or selling a security that encompasses quantity and price. This is given to a broker who then in turn passes this on to the syndicate department.</td>
<td></td>
</tr>
<tr>
<td><strong>I</strong> Initial Public Offering (IPO)</td>
<td>The first time a company offers its shares to the public. This can also apply to a company that was previously public but went private through a buy-out. If the company decides to once again come public, it is still considered an IPO.</td>
<td></td>
</tr>
<tr>
<td><strong>L</strong> Issue Price</td>
<td>The price at which a new security will be sold to the public.</td>
<td></td>
</tr>
<tr>
<td><strong>L</strong> Lead Underwriter</td>
<td>The underwriter who, among other things, is in charge of organizing the syndicate, distributing member participation shares and making stabilizing transactions. The lead underwriter will appear on the left side of a prospectus cover.</td>
<td></td>
</tr>
<tr>
<td><strong>O</strong> Offering Date</td>
<td>The first day a security is publicly offered for sale.</td>
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<tr>
<td><strong>O</strong> Offering Price</td>
<td>The price for which a new security issue will be sold to the public.</td>
<td></td>
</tr>
<tr>
<td><strong>Over-allotment</strong></td>
<td>Often referred to as the ‘green shoe’. An amount of shares, generally no greater than 15% of the original shares issued, that is reserved for issuance at the underwriters’ option at the original price. This is used by the underwriter to cover some, if not all, of the short position the brokerage firms may have created in pursuit of maintaining a stable market by meeting aftermarket demand once the stock has begun to trade. The shares get issued at the IPO price which goes to the issuer, less fees. The difference between the IPO price and the price the firm sold those shares to the aftermarket buyers goes to the underwriter.</td>
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<tr>
<td><strong>Oversubscribed</strong></td>
<td>When investors want to buy more shares of a new security than will be available. Under this condition, the price of the security has a greater likelihood of opening at a premium to the offering price and going up once trading begins.</td>
<td></td>
</tr>
<tr>
<td><strong>Preliminary Prospectus</strong></td>
<td>Often referred to as a 'red herring'. A prospectus printed with red print on the front page on the left margin which explains that the prospectus is incomplete. There may be several such filings for a new issue as amendments are filed prior to the issuance of the offering and a final prospectus.</td>
<td></td>
</tr>
<tr>
<td><strong>Price Spread (Price Range)</strong></td>
<td>The tentative minimum and maximum prices within which the IPO will probably be priced. This can be subject to upward and downward revisions as deemed necessary by both the underwriter and the issuer.</td>
<td></td>
</tr>
<tr>
<td><strong>Prospectus</strong></td>
<td>Formal written document to sell securities that describes the plan for a proposed business enterprise or the facts concerning an existing one that an investor needs to make an informed decision. It completes the process of full disclosure.</td>
<td></td>
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<tr>
<td><strong>Road Show</strong></td>
<td>Also called the 'Dog and Pony Show'. The company makes its pitch to the institutional investors on invitation by the underwriters. The shows, which include a series of lunches, breakfasts and dinners, are conducted in many of the major population centres throughout the country. There can also be shows overseas if there is an international allocation in the offering.</td>
<td></td>
</tr>
<tr>
<td><strong>S</strong> Securities and Exchange Commission (SEC)</td>
<td>The US government agency that regulates and supervises the securities industry. The commission administers federal laws, formulates and enforces rules to protect against malpractice, and seeks to ensure that companies provide the fullest possible disclosure to investors.</td>
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<tr>
<td><strong>Secondary Market</strong></td>
<td>Market where securities are bought and sold subsequent to the original issue.</td>
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<tr>
<td><strong>Spinning</strong></td>
<td>The practice by which investment banks allocate favourable IPO shares to certain clients in the hope of getting future investment banking business.</td>
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<tr>
<td><strong>Stabilization</strong></td>
<td>After the IPO begins trading, the lead manager may decide that the members of the syndicate need to support the stock price with aftermarket purchases, and they make a stabilizing bid to ensure that the IPO doesn't fall below its offer price.</td>
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<tr>
<td><strong>Syndicate</strong></td>
<td>A group of investment bankers (brokerage firms) that underwrites and distributes a new securities issue.</td>
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<tr>
<td><strong>Syndicate Manager</strong></td>
<td>The lead underwriter who, among other things, is in charge of organizing the syndicate, distributing member participation shares, and making stabilizing transactions once the new issue begins to trade.</td>
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<tr>
<td><strong>U Underpricing</strong></td>
<td>Issue of securities at a discount to their market value.</td>
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<tr>
<td><strong>Undersubscribed issue</strong></td>
<td>Having received fewer offers to buy than there are securities available for sale.</td>
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<tr>
<td><strong>Underwriter</strong></td>
<td>Investment bankers that assume the risk of buying new issues of securities from a corporation and distributes them to the public. The underwriter will profit from the fees generated by the offering which are borne completely by the issuing company.</td>
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</tbody>
</table>

Sources: Compiled and adapted from:

(IPOfn Online Highlights, 2005 accessible at http://www.ipofinancial.com/glossary.htm),


(Special Investor financial dictionary 2005 accessible at http://www.specialinvestor.com/terms/2731.html)