# The Determinants of Underpricing for Initial Public Offerings of

# Shares in Privatised Companies

by

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A Thesis submitted for the degree of

Doctor of Philosophy

to the

Faculty of Economics and Commerce

The University of Adelaide

December 1995

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# Abstract

This thesis considers privatisation from a capital market perspective. Privatisation may be defined generally as the transfer of activities and assets from the public sector to the private sector. Previous research has documented the extent of underpricing of privatisation share issues and its global significance. However, it has not sought to identify the main factors involved in an empirical manner, except for the limited study by Menyah, Paudyal and Inyangete (1990). This thesis addresses this gap in the literature. The general purpose of this thesis is to investigate the factors affecting the capital market value of privatised companies.

In this thesis, data on issuing price, the market price on the first day of listing and other float details are gathered on 114 privatisation initial public offerings (IPOs) from six countries, including a sub-sample of 41 UK companies. A range of continuous and qualitative variables are measured and used to test a number of hypotheses flowing from the literature on initial public offerings and privatisation. In particular, the hypotheses relate to the influence of ex-ante uncertainty on the underpricing of the share issues; tests of the reputation building theory of Bös (1991) and Perotti and Guney (1993); and, the relevance to privatisation issues of the 'winners' curse' model of Rock (1986). Other hypotheses relate to the effect on pricing of some particular features of privatisation issues, including the regulatory framework, limits on shareholdings and restrictions on the behaviour of management.

Results obtained from this analysis support the proposition that the level of underpricing for privatisation issues generally follows the same pattern as private IPOs. Proxies for ex-ante uncertainty and underpricing are correlated and the results are found to be statistically significant. It is also found that issue size and risk

factors are key indicators of ex-ante uncertainty and important determinants of underpricing. The statistically significant risk factors are associated with changes in government policy, and the industry and country classifications. Underpricing in the UK privatised utilities is found to be higher than for UK manufacturing and oil and gas companies and the difference is statistically significant. In addition, underpricing in Malaysia is higher than for the other countries in the sample and the difference is also statistically significant.

The results of the tests also support the 'winners' curse' model of Rock (1986). Higher demand is found for the issues that are underpriced by the greatest extent; this is evidence of the participation of informed investors. Support for Rock is also found in the statistically significant correlation between interest rates and underpricing. This is in line with the findings of Koh and Walter (1989) who found the return to uninformed investors in IPOs to be the risk free rate after taking into account the probability of successful subscription and interest costs.

The following qualitative factors from the UK data are found to be statistically significant in explaining differences in underpricing: the existence of restrictions on individual shareholding levels; restrictions on the disposal of the assets of the company; and the existence of a 'golden' share held by the Government. The percentage of equity sold is also found to be correlated with underpricing and the correlation is statistically significant. This is evidence of uncertainty flowing from the value of any premium for corporate control.

A confidence building hypothesis of privatisation underpricing was proposed by Bös (1991) and Perotti and Guney (1993). The hypothesis suggests that issues early in the program are deliberately underpriced to build support for the overall

program and to enable the uncertainty faced by investors to be reduced over time. The hypothesis is not supported by the results from the UK.

Overall, the results of this thesis add to the body of knowledge in both the privatisation and the IPO literature. The thesis also provides a link between the literature on IPOs and privatisation. The results of the thesis provide a basis for explaining the underpricing of privatisation IPOs, building on the findings of Menyah, Paudyal and Inyangete (1990) and using factors unique to privatisation issues. The results also contribute to the understanding of the valuation process in general.

## Statement of Original Nature of Thesis

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the text of the thesis. I consent to the thesis being made available for photocopying and loan, if applicable, if accepted for the award of the degree.

26/8/96

## Acknowledgments

I acknowledge with sincere thanks the guidance and assistance of my colleagues throughout the course of this thesis. In particular, I am indebted to my supervisor, Professor Fred McDougall for his valuable support and encouragement, and to Associate Professor Philip Dawes, who provided valuable advice on the directions to take in empirical research. I also wish to thank my wife, Trish, for her support throughout the length of my candidature and my daughter, Jessica, who at many times must have felt fatherless. Finally, I would like to thank the staff at the libraries of the Stock Exchange of Singapore and the London Business School for providing access to the data necessary to undertake this thesis and Dr. Marty Davies for his help in editing the thesis.

# Chapter 1. Introduction

## 1.1  Introduction

Privatisation has been called the major issue in finance and public policy of the 1990s. The Economist in 1985 dubbed it 'the greatest exchange ever of money and property between private citizens and their governments' (*The Economist*, 21 1985). Given the general recognition that privatisation is a major issue it is surprising that very little research has been undertaken on the capital market effects of privatisation, in particular, the high initial returns made by investors in privatisation share issues. The previous research has documented the extent of privatisation underpricing and its global significance; it has not sought to identify the main factors involved in an empirical manner, except for the limited study by Menyah, Paudyal and Inyangete (1990). This thesis addresses this gap in the research.

Following the lead of the United Kingdom (UK) under the Thatcher government, privatisation has become high on the political agenda of most countries. Privatisation is being undertaken in both the developed and the less developed world. It is being seen as a key plank in microeconomic reform for developed nations and as essential in the economic development of developing nations. In countries that were previously communist or socialist, privatisation is providing a mechanism for the establishment and development of market-based economies. The world's major aid-granting agencies, the World Bank and the International Monetary Fund, are actively encouraging countries to undertake privatisation as a means of restructuring their economies. This process is intended to help develop market based economies and to encourage efficiency.

The early twentieth century saw the rise of communism and socialism, as people rejected the notion of private property rights in favour of collective

ownership. This was driven, in theory at least, by the desire to seek equity in the distribution of wealth and income. The introduction of communism was usually accomplished through revolution where private property was simply appropriated by the government. Privatisation is, in a sense, the reversal of this process -- it is the process whereby collectively owned assets are placed in the hands of private individuals. Privatisation is indeed a revolution; however, it is not characterised by a revolution of the masses using weapons and warfare, but through the processes of the capital, property and goods and services markets acting within largely democratic political systems. By the turn of the century the impact of privatisation on the world may be as globally significant as revolution in the former communist countries in the early twentieth century.

## 1.2    Objectives of the Thesis

Governments around the world have used a range of methods in the privatisation of public sector assets. One common method of privatisation has been through a public share offer, whereby the government sells its shares in the government owned company to the general public.[1] An equity issue by a company[2] where it is selling its shares to the general public for the first time in its history (hence there is no market price history available) is usually called an initial public offering (IPO). Jenkinson and Mayer (1988, p.483) noted that there are essentially three methods by which firms can make IPOs, offers for sale at a fixed price, offers for sale by tender or placings. Jenkinson and Mayer also noted that "...privatisations are particular examples of a

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1 Chapter Three reviews the literature on the definitions of privatisation and the various processes employed.

2 Many authors use the terms 'firm' and 'company' interchangeably. In this thesis, the term company will be used exclusively. A basic view of the privatisation process sees public enterprises become companies which are then sold to private owners.

general class of issues by companies, usually coming to the market for the first time (unseasoned new issues)". The essential elements of an IPO are that it is a public offer that is unseasoned. In other words, its shares have not traded in a market prior to issue. Privatisation by means of public share issues by governments may also be IPOs, where they involve a public float of unseasoned shares.[3]

Previous research of privatisation IPOs was undertaken by Jenkinson and Mayer (1988), Menyah, Paudyal and Inyangete (1990), and Perotti and Guney (1993). Jenkinson and Mayer (1988) documented high levels of underpricing for privatisation IPOs in France and the UK, while Perotti and Guney (1993) documented the underpricing of IPOs in the privatisation programs of ten countries. Both of these studies were more concerned with documenting the existence of underpricing and proposing models to explain it, rather than empirically testing the models proposed. Menyah, Paudyal and Inyangete (1990) found that underpricing of privatisation IPOs was greater than for private sector companies and rejected the relevance of the existing models of IPO underpricing to privatisation share issues. Menyah, Paudyal and Inyangete included only 13 issues in their study which raises doubts over the strength of their conclusions. Bös (1991) provided normative explanations for the underpricing of privatisation share issues, but once again, the models have not been subjected to rigorous empirical testing.

Overall, while previous research has documented the extent of privatisation underpricing and its global significance, it has not sought to identify the main factors involved in an empirical manner, except for the limited study by Menyah, Paudyal

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3 A privatisation share float may differ, however, in that the proceeds of the issue may flow to the government and not to the company. The question of the use of the proceeds from the share float does not impact on this research, since the prospectus provides full disclosure of the proposed use of the proceeds for all IPOs. This matter, however, is discussed in the section outlining future research directions.

and Inyangete (1990). Previous published work has proposed models to explain the underpricing of privatisation issues but has not subjected the models to rigorous empirical testing.

This thesis considers the valuation of companies in the privatisation process. A review of the privatisation debate shows that valuation is a contentious issue. It is crucial from a political viewpoint that the privatisation process not be seen as a 'knock-down' sale of community assets. Opponents to privatisation have argued that the process results in the sale of government assets to a select group of investors at prices below their market values.

The valuation issue has a direct impact on the proceeds of a privatisation program. The value of sales of state-owned enterprises around the world exceeded $185 billion up to 1990 (Goodman and Loveman 1991, p. 26). This value does not include the sales taking place in the former communist countries and the acceleration in privatisation programs in the European community, which are estimated to be $30 to $40 billion per year in the period from 1994 to the year 2000 (Megginson, Nash and Van Randenborgh 1994, p. 417).

The broad objective of this thesis is to research the factors involved in the underpricing of initial public offerings of shares in privatised companies. The study by Perotti and Guney (1993) revealed that governments consistently offer shares in privatisations at prices below their opening market value. Perotti and Guney also found this result to be consistent over time and across countries. This underpricing results in high abnormal first day returns being earned by subscribers to privatisation issues. The magnitude of underpricing and the enormous size of privatisation plans around the world together indicate that privatisation has a huge impact on the distribution of wealth.

A major research question in this thesis is whether the determinants of underpricing for privatisation IPO issues conform with the general IPO models. The thesis focuses on the determinants of underpricing and other factors unique to privatisation issues. Why would the government choose to consistently sell its assets below market value? More specifically, this study will attempt to answer the research questions shown in Table 1.1.

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**Table 1.1**
**Some Research Questions Regarding the Underpricing of Initial Public Offerings of Privatisation Share Issues.**

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1. To what extent do the main variables used in valuation (risk, profitability and growth) affect the uncertainty surrounding the pricing of privatisation IPOs?

2. To what extent do the models of private sector IPOs explain privatisation IPO underpricing?

3. To what extent is underpricing explained by government policy?

4. To what extent does the market for corporate control affect pricing of privatisation issues?

5. Are there some periods when 'hot issue' markets exist for privatisation share issues?

6. Are there any underlying industry factors that explain differences in the extent of underpricing for different companies?

7. Is privatisation IPO underpricing related to the country of issue?

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The results of this thesis will lead to a greater understanding of the factors involved in the initial underpricing of privatisation IPOs. The research will also add to the understanding of IPOs in general and the factors associated with privatisation

share issues. The research also enables empirical testing of the models proposed to explain the greater underpricing of privatisation share issues compared to private sector companies.

The results of this research also have the potential to provide benefits to practitioners involved in the IPO process and to those involved in privatisation programs. From a public policy viewpoint, the research should identify factors relevant to pricing for future privatisation IPOs and assist governments in forming policies on privatisation. The research will also add to knowledge about the international differences in capital markets and should be of interest to investors considering subscribing to privatisation IPOs. From the perspective of a practitioner in finance and accounting, the research should provide additional insights into the process of valuation of unlisted shares, and the valuation of privatisation IPOs.

## 1.3    Initial Public Offerings

It could be argued that the underpricing of privatisation share issues occurs because many of the issues are initial public offerings. IPO issues are associated with greater uncertainty for investors than equity issues by established public companies. This is because there is no readily observable market price for the new shares. In addition, the accounting and other historical operating information about the issuing company may be difficult to obtain and interpret. In contrast, an established public company has an observable market price and a published accounting and operating history. Similarly, the issuing company and its advisers also face uncertainty in setting the issue price, having to balance between pricing to attract investors and maximising the proceeds of the issue.

The literature provides compelling evidence that IPOs are generally underpriced. That is, the offer price is lower than the market price once the shares are listed. Underpricing associated with the initial listing of shares was first reported by Ule (1937), who found initial returns averaging 25.5% for new issues for the period 1934-37. In a most comprehensive review of IPO performance in the United States, Ibbotson, Sindelar & Ritter (1994) reported underpricing averaging 15.26% over the period 1960-92. Chapter Two of this thesis outlines the evidence on IPO underpricing.

As previously mentioned, pricing an initial public offering is a difficult exercise because there is no observable market price for the shares and the companies involved often have little or no operating history. In the case of privatisation issues, the market price is also not observable, although there is usually a substantial history of the enterprises concerned. The operating history may be deceiving, however, since there have usually been major changes made prior to privatisation to the company's operations, its accounting and in many cases the structure of the industry in which it operates. These changes lead to uncertainty about the value of the privatisation IPO in much the same way as for an IPO by a private company.

A number of models have been proposed to explain IPO underpricing. These are also reviewed in Chapter Two of this thesis. In general, the models of IPO underpricing flow from the ex-ante uncertainty surrounding the valuation of share issues. Uncertainty is faced by all parties involved in an IPO issue, because the real market value will only be known when the shares are listed and traded on a stock exchange.

Baron (1982) developed a model based on the assumption that investment bankers have more information about investors' demand for securities than the

issuers. Therefore, underpricing is less likely with an IPO underwritten by an investment banker than would otherwise be the case. The issuer compensates the investment banker for the superior information in the form of letting it underwrite the issue of the security at a discounted price. However, Muscarella and Vetsuypens (1989) found self-underwritten issues by investment banks were underpriced by more than investment bank issues underwritten by another investment banker, raising doubts about the validity of Baron's model.

Rock (1986) argued that IPO underpricing was the result of asymmetric information between informed and uninformed investors. Rock's model was based on the existence of a group of investors whose information is superior to that of all other investors. The informed investors only apply to subscribe to issues that are significantly underpriced while the uninformed investors subscribe to all issues. Accordingly, demand for the more underpriced issues will be greater and the uninformed investors may miss out on the issue. For the less underpriced and overpriced issues, only the uninformed investors apply to subscribe and are successful, the so-called 'winners' curse'. Rock's model has received compelling empirical support from Koh and Walter (1989) and Levis (1990). These studies involved direct tests of Rock's hypothesis using data from the Singapore Stock Exchange and the London Stock Exchange, respectively.

Chapter Three provides an overview of the literature on privatisation with the aim of identifying factors unique to privatisation issues and providing an understanding of the processes involved. By means of introduction, the next section outlines the expected benefits from privatisation. The uncertainty about these benefits may add to the ex-ante uncertainty surrounding the valuation of

privatisation IPOs in the eyes of investors, the advisers and the government owned company.

## 1.4 The Expected Benefits from Privatisation

The debate over privatisation has had both political/ideological and economic dimensions. While it is impossible to separate purely political arguments from economic ones, it is convenient to consider the debate from each perspective. From the political perspective, privatisation leads to changes in the distribution of power within society. The major decisions on prices, investment and technology shift from public sector bureaucrats and policy makers to private sector managers and, indirectly, to the shareholders of the newly privatised company (Bös 1991). The transfer of power as a result of privatisation will affect various groups in different ways.

The political side of the privatisation debate also involves the international distribution of power. In the situation in which a large proportion of the shares are sold to overseas interests in the process of privatisation, foreign investors may acquire control over industries vital to the development of the domestic economy. Some of the main reasons for the development of public enterprises in the first place were to correct for market failure, to counter large scale multinational involvement in the economy and to develop strategic industries that would promote and facilitate economic growth. Ownership of such industries by foreign investors may mean a transfer of control and power over industries once considered to be vital to the development of the economy. In some cases, the government has protected its power and control through retaining a majority shareholding or a 'golden share', that gives it the right to veto hostile takeovers and changes in control.

There is also a political rationale for privatisation based on the notion of 'peoples' capitalism'. The small investor is able to buy shares in major industries, replacing the government as the sole shareholder. This ensures that any distributional effects of the privatisation are spread widely amongst the citizens of the country. It also builds a barrier to potential renationalisation by a future government, because it may prove politically unpopular where shares are held by a large percentage of the electorate. Expectations of underpricing on the share issue price may be used as an incentive for small investors to participate in the privatisation issue and encourage more of the population to become shareholders -- the greater the breadth of share ownership the greater the extent of 'peoples' capitalism'.

The economic justification for privatisation derives from considerations of efficiency, wealth distribution and fiscal constraint. There are two main efficiency reasons proposed in the literature: technical and allocative efficiency. One of the most common arguments is that the technical efficiency of a company is improved as a result of privatisation. This is largely a result of improved management behaviour which can be seen as being driven by three factors. Firstly, privatisation reduces government intervention in the operations of a business. Management decisions can then be made entirely from the point of view of value to the company and can ignore other political and social factors that may have been important under the previous public sector governance structure. Secondly, by providing instant feedback on the assessment of company performance by investors -- by means of share price -- the stock market can discipline company management. Poor management performance will result in a falling share price. Management may respond with improved processes and projects designed to enhance the capital market value of the

company's shares. Finally, privatisation may be accompanied by deregulation in the company's product and labour markets which will lead to a more competitive operating environment and the need to improve operating efficiency to survive. The technical efficiency argument sees the value of a company as being greater post-privatisation than before. The extent of the potential increase in value adds to the ex-ante uncertainty faced by all parties involved in the privatisation share issue.

Allocative efficiency arguments are centred on the issue of the natural monopoly situation of some public enterprises. This exists where it is cheaper to produce goods and services as a single producer and supplier because of the existence of economies of scale or scope. Where there are significant barriers to entry, the monopoly can sustain its position and maximise its profits. If the producer is unregulated it may exploit the situation through higher prices and the rationing of output. Hence it is often argued that natural monopolies must be either in government ownership and control (where political processes can curb excessive behaviour) or be heavily regulated. Where companies operating as monopolies are privatised a regulatory framework is usually established. This framework may involve a price cap regulation, such as the 'RPI minus X' formula (retail price index less a factor of X%) employed in the UK, or the rate of return regulation used in the US (Littlechild 1983). There have also been attempts at deregulating areas of industries that are not natural monopolies to allow for competition. An example of this is the deregulation of some elements of telecommunications and electricity generation while maintaining the natural monopoly elements of the networks as regulated monopolies (Yarrow 1986).

The extent of deregulation in an industry prior to privatisation may affect the sales value of the public enterprise. The price of an unregulated monopoly is likely

to be higher than the same company operating in a competitive environment. This creates a dilemma for governments seeking to privatise. Sales proceeds may be maximised where the monopoly is left intact; however, leaving a monopoly in place may mean that the expected efficiency gains will not be realised. The investors in such a situation also face the possibility of future deregulation and government policy changes that directly affect the company and its value. This adds to the uncertainty faced by potential investors in the IPO issue, and these policy risk factors affect the investors' valuation of the assets being privatised. Investors may require the issue to be underpriced to provide a return in line with the policy risks involved.

Distributional arguments typically centre on who wins and who loses as a result of privatisation. Some argue that privatisation brings about a transfer of wealth from public to private hands. However, if it is accepted that both efficiency and value are increased as a result of privatisation, aggregate wealth increases as a result of the transfer of assets. In deciding the offer price in a privatisation, the government is, in effect, deciding the distribution of the gains from privatisation between investors and taxpayers. The key issue in the distributional argument is, therefore, the method of valuing the assets to be privatised. If the assets are under-valued, in essence, capital flows to private investors from the government; if the assets are over-valued the reverse is true. Further, since the value of the assets is expected to be higher in private hands, as a result of efficiency and profit improvements, the issue arises of who should profit from these gains.

The fiscal motive for privatisation is quite clear-cut. Privatisation serves to raise large amounts of capital for the government and increases the number of tax paying companies in the economy. The cost to the government is lost dividends and lost control over public enterprises for economic and social policy purposes. If

privatisation issues are underpriced, the government clearly fails to maximise on the fiscal benefits. This leads to a common criticism of privatisation where the government is accused of 'selling the family silver' at discount prices.

The motives for privatisation and the processes employed are likely to differ between developed and developing nations. There are a number of possible reasons for this. Different forms of privatisation may rely heavily on the stage of development of a country and its capital market. Indeed, even in the UK with its highly developed capital market, concern was expressed over the ability of the market to absorb the major share floats that were a feature of the Thatcher program (Moore 1992). Perotti and Guney (1993) reported on the structure of privatisation across a range of countries, however, they did not test for differences in underpricing between the countries.

The literature on privatisation provides evidence of significant underpricing in privatisations undertaken through share issues. Buckland found that 'some privatisation sales have been made at prices which are more heavily discounted than is normal for private sector sales.' Buckland also offered some explanations of the determinants of the discount but failed to provide evidence supporting them:

> This 'cost' is certainly partly explicable in terms of the inducement necessary to encourage new shareholders, to generate goodwill amongst them, to market large quantities of equity quickly and to promote an active aftermarket in the share' (Buckland 1987, p. 245-6).

Kay and Thompson argued that:

> ...the gain or loss from a sale depends on whether the price paid is more or less than the present value of prospective shareholders earnings from the asset, the theoretical market value. Thus the critical question is whether the

assets concerned have been sold at a discount or a premium to the market's assessment of their value' (Kay and Thompson 1986, p.28).

Kay and Thompson calculated the discounts involved (as measured by the change in price from the issue price to the closing price after one week's dealings in the market), after allowance for market-wide share price movements. The discounts ranged from 98% for Associated British Ports and 91% for British Telecom, to 8% for Jaguar and 6% for British Petroleum. The authors concluded that the degree of discount was generally high compared to private sector floats.

Studies by Jenkinson and Mayer (1988), Menyah, Paudyal and Inyangete (1990) and Perotti and Guney (1993) reported significant underpricing in privatisation programs that exceeds the widely reported underpricing for IPOs by private companies. Menyah, Paudyal and Inyangete noted that the extent of the discount was about 31% greater than that expected for private sector issues, implying a large wealth transfer to the successful subscribers to the issues. It can be concluded that there are factors involved in privatisation issues in addition to those for private initial public offerings. These factors may relate to the uncertainty surrounding the economic benefits expected from privatisation and from political factors, such as an objective to promote 'peoples' capitalism'.

## 1.5    Research Issues and Methodology

Chapters Two and Three will demonstrate that there is underpricing of public enterprise shares when they are first issued to investors. It will be argued that the extent of underpricing appears greater in privatisation IPOs than in private company IPOs. If this is the case, then there may be some factors affecting value that are

either unique to privatisation issues or are more extreme in these cases. The central research question is what are the determinants of underpricing of privatisation IPOs?

To test this question prospectus information and underpricing data is collected for a number of privatisation public issues for six countries: France, Malaysia, Spain, Singapore, Turkey and the United Kingdom. Then a range of quantitative techniques are to be employed to examine and identify the particular characteristics of the issues. These techniques will include analysis of variance and multiple regression. The UK privatisation program has been one of the most far-reaching to date; no study is complete without taking the data from the UK into account. However, this study also hopes to be comprehensive by considering both developed and developing countries from eastern and western regions.

The methodology employed is common to most IPO cross-sectional analyses, dating back to Logue (1973) and used most recently by Ibbotson, Sindelar and Ritter (1994), Clarkson (1994) and How (1995). Briefly, the hypotheses are tested by identifying cross-sectional variations in means using standard $t$ and $F$-tests in analysis of variance, and through the use of multiple regression to test hypotheses and build models of IPO underpricing, as in Jog and Riding (1987).

Surprisingly, given the significance of the issues involved, little prior research has been undertaken on these aspects of privatisation IPOs.

## 1.6    Organisation of the Thesis

Chapter One has introduced the background of this thesis, the objectives of the research and an introduction to the privatisation and initial public offering (IPO) literature. The chapter summarised the IPO models of Rock and Baron and

considered some elements of the debate on privatisation that might set privatisations apart from private company IPOs.

Chapter Two traces the IPO literature back to the first evidence published on anomalies associated with the initial listing of seasoned shares on a stock exchange (Ule 1937) and the first published evidence of underpricing for unseasoned issues (Reilly and Hatfield 1969). Recent studies include Ibbotson, Sindelar and Ritter (1994), a comprehensive study of IPOs that provided overwhelming evidence of IPO underpricing over four decades in the US. Studies of IPO underpricing around the world and the growing number of studies of cross-sectional patterns in underpricing are also reviewed. The chapter also outlines the models proposed to explain IPO underpricing and the results of the empirical tests of these models. The chapter concludes with a review of the four studies on privatisation IPOs.

While there is very little published on privatisation IPOs, there is a large body of literature on privatisation in general. Chapter Three provides an overview of the privatisation literature. The objectives and process of privatisation are outlined to demonstrate the importance of pricing to the success of a privatisation program. The political and economic factors involved in privatisation are also reviewed, and finally the chapter summarises the debate over privatisation. The overall aim of the chapter is to search for the factors likely to influence the pricing of privatisation IPOs. A number of political and economic factors are identified that may add to the uncertainty faced by investors, the government and the government's advisers. Increased uncertainty may be linked to increased underpricing.

In Chapter Four the broad elements of valuation are discussed. These are found to be risk, growth and profitability. From these basic building blocks, and incorporating lessons from the IPO and the privatisation literature, a general model

of privatisation valuation is developed. From the general model a number of hypotheses are developed for testing using a range of statistical techniques.

Research design and methodological issues are outlined in Chapter Five. The results of the analysis of the empirical data are reported in Chapter Six; discussion of the results is undertaken in Chapter Seven. Chapter Seven also considers the limitations of the thesis, areas for further research and a summary of the main contribution of this thesis to the literature on privatisation and on initial public offerings.

# Chapter 2.  Review of the Initial Public Offerings Literature

## 2.1    Introduction

In this chapter the literature on the initial public offering of shares in capital markets is reviewed.  Privatisations by means of public share offers are usually initial public offerings (IPOs).  The review will demonstrate there has been very little empirical research on privatisation IPOs even though there is a large volume of literature on IPOs in general.

The next section clearly demonstrates that IPOs are significantly undervalued and provide positive returns to subscribers in the initial aftermarket.  Twenty-one studies are reviewed that document the price behaviour of IPOs in the United States from 1937 to 1992.  Further, there is clear evidence that such underpricing is a global phenomenon, with 14 studies reviewed documenting IPO pricing in Australia, Canada, Europe, Latin America and South East Asia.  The literature on IPOs proposes three possible sources of explanation for underpricing: the role of institutional and procedural factors, the possibility that the market is inefficient, and a range of models purporting to explain the apparent underpricing in an efficient market[1].

The third section in this chapter considers the processes involved in an IPO and whether any procedural or institutional issues may affect the underpricing involved.  The issue procedures employed in a number of countries are examined.

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[1] An efficient market refers to the efficient market hypothesis where prices of securities fully reflect available information.  In such a market, investors expect to obtain an equilibrium rate of return and companies expect to receive the "fair" value of the securities they sell (Ross, Westerfield and Jordan 1993).

## Table 2.1 : Studies of Underpricing of New Security Issues in the United States

| | N | Period | Average initial underpricing[a] % |
|---|---|---|---|
| **Seasoned Issues** | | | |
| Ule (1937)[c] | 29 | 1934-37 | greater than market average |
| Furst (1970)[c] | 198 | 1960-65 | negligible |
| Van Horne (1970)[c] | 140 | 1960-67 | negligible |
| Ying et al. (1977)[c] | 248 | 1966-68 | 4.4 |
| McConnell & Sanger (1987)[c] | 319 | 1966-77 | 3.8 to 5.8 |
| | | | |
| **Initial Public Offerings** | | | |
| Reilly and Hatfield (1969) | 53 | 1962-64 | 9.9 |
| McDonald & Fisher (1972) | 148 | 1969-70 | 28.5 |
| Logue (1973) | 250 | 1965-69 | 20.8 |
| Neuberger & Hammond (1974) | 816 | 1960-69 | 17.0 |
| Ibbotson (1975) | 120 | 1960-69 | 11.4 |
| Ibbotson & Jaffe (1975) | 2,650 | 1960-70 | 16.8 |
| Reilly (1977) | 486 | 1972-75 | 10.9 |
| Block & Stanley (1980) | 102 | 1974-78 | 5.9 |
| Neuberger & La Chappelle (1983) | 118 | 1975-80 | 27.7 |
| Ritter (1984a) | 5,162 | 1960-82 | 18.8 |
| | 1,028 | 1977-82 | 26.5 |
| | 325 | 1980-81 | 48.4 |
| Chalk and Peavy (1987) | 649 | 1975-82 | 21.7 |
| Beatty (1989) | 2,215 | 1975-84 | 22.1 |
| Muscarella and Vetsuypens (1989)[d] | 38 | 1970-87 | 7.0 |
| Aggarwal & Rivoli (1990) | 1,598 | 1977-87 | 10.7 |
| Ritter (1991) | 1,526 | 1975-84 | 14.3 |
| Ibbotson, Sindelar & Ritter (1994)[b] | 10,626 | 1960-92 | 15.26 |
| | 2,661 | 1960-69 | 21.25 |
| | 1,658 | 1970-79 | 8.95 |
| | 5,155 | 1980-89 | 15.18 |
| | 1,152 | 1990-92 | 10.85 |
| Jain and Kini (1994) | 682 | 1976-88 | 7.25 |

a. Returns are either risk-adjusted, market adjusted or unadjusted. Raw returns are computed over various lengths of holding periods. The recent studies focus on the first day returns. Full details for each study are discussed in the text.

b. Updates Ibbotson, Sindelar & Ritter (1988)

c. These studies are based on seasoned issues and are only included because they represent early interest in valuation of new share listings.

d. Includes only IPOs of shares in investment banks.

Section four considers the long run performance of the shares issued in IPOs. If the initial market for IPO shares is inefficient the gains from underpricing will not be maintained in the long run, where the market in general is efficient. In the fifth section of this chapter the models proposed to explain IPO underpricing are reviewed. The IPO literature review concludes with discussion of the recent studies of privatisation IPOs. The studies to date have been more concerned with documenting the existence of privatisation underpricing and less concerned about developing models to explain the phenomenon. This gap in the literature provides the major impetus for this thesis.

## 2.2    The Underpricing of Initial Public Offerings

In this section, the literature review documents the evidence on IPO underpricing. The studies reviewed provide compelling evidence that investors in IPOs have earned positive returns in the initial aftermarket. Further, there is clear evidence that underpricing is a global phenomenon. A number of factors that may explain the underpricing are identified.

Table 2.1 lists a number of the studies that document the existence of underpricing of IPOs in the United States. The successful subscribers to these IPOs have consistently made initial gains greater than that necessary as a reward for the level of risk involved.[2] In the absence of risk factors, these gains represent a transfer

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[2] The risk involved here relates to the systematic risk of the shares only. All other risk is diversifiable for investors holding efficient portfolios and investors should not be rewarded for bearing it in an efficient market. No matter how much total risk an asset has, only the systematic portion is relevant in determining the expected return on that asset (Ross, Westerfield and Jordan 1993, p. 383).

of wealth from the issuers to the successful subscribers to the issues. The table summarises the main details from the studies, sample size (N), the time period involved and the average initial underpricing. Details from each of the studies reported in Table 2.1 are discussed below. Generally the underpricing of IPOs has been found to range from 5.9% in the period 1974-78 to 48.4% in the two year period 1980-81.

As previously mentioned, underpricing in privatisation share issues may take on increased political significance and may represent a transfer of wealth from public into private hands. This has the potential to favour vested interest groups or to achieve political favour for a government undertaking a privatisation program. This may occur where underpricing is accompanied by the allocation of shares to particular groups, for example, supporters of the government.

The earliest studies of IPOs focussed on whether the listing process itself created value[3]. That is, they focused on whether listing on an exchange is valuable to shareholders. The earliest studies also tested the proposition with data from shares that were floated publicly after initially trading in the over-the-counter market.[4] The

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[3] Listing is the process whereby securities are admitted to trading privileges on an established stock exchange (Kohler 1975, p. 293). Prior to listing the shares may have been issued but not trading in an organised market or the initial offering of the shares may coincide with listing.

[4] The over-the-counter market is essentially a dealer market, where dealers buy and sell for themselves at their own risk. This is in contrast to an auction market on an organised stock exchange where dealers play a limited role and usually buy and sell for clients and not on their own account (Ross, Westerfield and Jordan 1993, p. 19).

initial period of trading prior to the float enabled the shares to be 'seasoned'.[5]

The later IPO studies confined themselves to initial public offerings of unseasoned shares and found high levels of initial returns to investors. The next two sections review the literature on seasoned and unseasoned issues.

## 2.2.1 Seasoned Issues

Ule (1937) was the first to observe anomalies associated with new listings of shares. Ule identified ninety-five new listings on the New York Stock Exchange and the New York Curb Exchange between 1934 and 1937, a bullish period in the market. This number was reduced to sixty after Ule imposed the following restrictions: (1) the issue had to be between 1934 and 1937, (2) the shares being issued had no exchange trading experience prior to listing, and (3) there was a relatively free over-the-counter trade prior to listing. Further screening reduced Ule's sample to 29 issues.

Ule then collected data on the over-the-counter prices for the securities six months prior to listing and the monthly prices of the securities for the six month post listing period. The aim of Ule's study was to consider the effect on the share price of the broadening of the market through listing. He also sought to compare the price movements of the securities before and after listing with industrial averages derived from the New York Stock Exchange Bulletin. Ule also sought to make inferences about the behaviour of brokers and speculators towards the newly listed shares.

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[5] Seasoning refers to the period of time required for the stabilisation or market acceptance of a security. The term "seasoned security" often refers to a listed stock having a market price, yielding regular dividends and backed by net assets and an earning capacity adequate for the protection of the investor (Kohler 1975, p. 419).

Ule found that the speculative community reacted favourably to the news that a security was to be listed. Further, the price reaction to the news occurred in the period prior to listing. This reaction was evident in the over-the-counter market. Ule did not offer an explanation for the phenomenon.

Furst (1970) also considered the impact on the prices of previously issued or seasoned shares of listing on the New York Stock Exchange. Furst sought to determine the validity of the argument of Merjos in a series of articles in the investment magazine, Barrons. Merjos concluded that the listing of shares on the stock exchange pays off in the form of higher prices. In forming these conclusions, Merjos simply compared the prices of newly listed securities three months before listing with the prices thirty days after listing, with the returns from the Dow Jones Industrial Average over the same period. Merjos's methodology was heavily criticised by Furst. Furst argued that there was no attempt to test for statistical significance, the study was only over an eight month period, and only one stock market index was used as a basis of comparison.

Furst proposed that other variables should be taken into account, to determine what might have brought about the observed price movements. Furst developed a multiple regression model based on the Gordon valuation model where price was a 'function of the income stream' (the dividend and its rate of growth) and 'the capitalisation rate' (with the rate being influenced by leverage, size, and the instability of earnings) (Furst 1970, p.175).

Furst obtained data for 198 companies that were newly listed on the New York Stock Exchange between 1960 and 1965. A dummy variable was then added to the valuation model to measure the effect of the listing. Furst found that listing did not have a statistically significant effect on the market price of the shares. In

order to increase the performance of the model, Furst divided the companies into eight industry groups. The result was the same: in all industry groups the effect of listing was not statistically significant in the valuation model.

Van Horne (1970) was also motivated to study new share listings by the media attention it had received. Van Horne sought to ascertain whether the listing of shares on the stock exchange provided an opportunity for gain. On Van Horne's analysis, the investors' strategy for seasoned issues would be to buy once an announcement of listing has been made and to sell when the actual listing occurred. The study also tested whether listing itself was a thing of value.

Van Horne analysed the prices of newly listed shares over four dates: four months prior to registration with the Securities Exchange Commission (SEC); two months prior to registration; the registration date; the listing date when the shares were first traded on the exchange; and two months after listing. Closing share prices on these dates were expressed as indices. The Standard and Poor's industry averages were used to adjust for the effect of general market movements.

Van Horne found that the difference between the indices was consistent with profit-taking occurring after the shares had been listed. However, once transaction costs and the biases in the use of industry averages were considered, it was concluded that the pattern of prices over the five dates was not statistically significant. Accordingly, it was concluded that there was no support for the proposed trading strategy of buying seasoned issues once an announcement of listing has been made and selling when the actual listing occurred. Further, there was no support for the proposition that listing was a thing of value.

Van Horne partitioned the sample to test for differences in the performance of the newly listed shares when the overall market moved up or down. It was found

that the new shares did much better in markets where prices were rising or stable, relative to the overall market, than in downturns. These results were consistent with the initial study by Ule (1937); however, Van Horne attributed the results to biases in the use of industry averages.

Ying et al. (1977) focussed on a sample of 248 companies that listed on either the New York Stock Exchange or the American Stock Exchange during the period 1966 to 1968. The authors improved on the earlier studies by Furst and Van Horne by incorporating risk into their measurement of excess initial returns. They estimated the systematic risk for each security in their sample and calculated any excess returns flowing from the listing process. Their results showed positive investment returns for the newly listed shares. Although some of the return was subsequently surrendered, the correction was modest. Overall, Ying et al. found a net positive annualised return approximately 17% above that earned by comparable securities of similar systematic risk. The authors concluded that listing did have value, but they felt that the real source of value was in the positive information contained in the decision to list.

McConnell and Sanger (1984) examined companies which were listed on the New York Stock Exchange after trading in the over-the-counter market. They found positive returns after adjustment for market movements. Moreover, these returns were found to be statistically significant. They also found that excess returns were negative for five of the first six weeks after listing. In a later study, McConnell and Sanger (1987) also found that since 1926 shares that were listed on a major stock exchange experienced negative returns over the four to six week period following listing. McConnell and Sanger failed to provide an answer to this phenomenon.

These studies were concerned with whether the listing process itself added

value and hence focussed on seasoned issues. In these instances, the companies were trading over-the-counter and had elected to apply for and receive listing on a stock exchange. The decision to list in these cases was made by management and may be seen as a signal to the market that the company was accepting the stricter monitoring regime of being publicly listed. Accordingly, there may be value created in the form of lower agency costs; that is, lower costs to investors of monitoring the performance of the company in the future.

This literature review now considers the issue of unseasoned shares -- the initial public offering of privately owned or untraded shares. In these cases, the listing decision and the decision to issue securities to the public are made at the same time.

## 2.2.2 Initial Public Offerings (IPO)

Reilly and Hatfield (1969) presented the first study concerned with the pricing of new share issues, that is, unseasoned issues, or what was previously defined as initial public offerings (IPOs). They found that for 53 initial public offerings between 1963 and 1965, the average one week return was 9.9% and the average one month return was 8.8%. When compared with the overall market performance over the initial listing period, the new issues outperformed both the over-the-counter (OTC) average and the Dow Jones Industrial Average. Reilly and Hatfield also found that even though a number of shares failed to perform as well as the average, the average gains overall were good.

> These results indicate that, while the investor in new issues may not do so
>
> well as the market with approximately half the issues acquired, the average
>
> losses relative to the market is small compared with the average of his

relative gains (Reilly and Hatfield 1969, p. 76).

The results were found to be positively skewed, with 8 of the 53 issues returning one week gains over 25%. Their overall results supported the contention that subscribers to initial public offerings receive, on average, higher returns than the overall market.

McDonald and Fisher (1972) examined 142 unseasoned IPOs in the first quarter of 1969. They sought to test a number of hypotheses based on the efficient market model, as discussed by Fama (1970). Returns were measured for each share over five time periods: offering to first week after offering (0-1); end of first week to one year after offering (1-3); offering to one month after offering (0-2); end of first month to one year after offering (2-3); and offering to one year from offering (0-3). The over-the-counter (OTC) average of the National Quotation Bureau was used to adjust for market movements. Excess returns for each share for each period were calculated as the return for the share less the market return. These returns were not adjusted for risk because there were insufficient observations to estimate the parameters necessary to use the capital asset pricing model[6]. The use of the OTC market return in calculating excess returns was justified in that the OTC index was seen to be representative of the population from which new issues were drawn; hence it roughly adjusted for market effects on the new issue returns to investors.

McDonald and Fisher found that there were significantly large returns for initial subscribers in the first week following the offering after adjustment for market effects. The average one week excess return on the issues was 28.5%. Further, the efficient markets hypothesis of information efficiency appeared to hold as the market

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[6] The Capital Asset Pricing Model is an equilibrium asset pricing theory that shows that equilibrium rates of return on all risky assets are a function of their covariance with the market portfolio (Ross, Westerfield and Jordan 1993).

prices adjusted quickly to the available information. Returns from the end of the first week to the end of the first year were no different for issues with high initial returns compared to new issues as a whole. For investors buying after listing the high initial returns for some shares did not contain predictive value, that is, they did not indicate the shares likely to yield different longer term returns.

Logue (1973) selected a sample of 250 unseasoned issues during the period March 1965 to February 1969. This period experienced a wide variety of market conditions. The short run performance of the issues was measured relative to the market index, in this case the OTC index. The returns were calculated as the difference between the offering price and the quoted price on the first day in the month following the month of issue. This meant that there could be differing time periods for different issues depending on the day of the month on which the shares were listed, however, it was the only data available for that period. The average short run performance for the whole sample was a 41.7% gain, while returns for the sub-samples for issues underwritten by prestigious and non-prestigious underwriters averaged 20.8% and 52.1% respectively.

Neuberger and Hammond (1974) used a similar method to McDonald and Fisher in calculating the excess price appreciation for the new issues as the difference between the return on the issue and the return on the over-the-counter average for the same period. Three time periods were considered: date of issue to one week following date of issue; date of issue to one month following; and one week to one month following date of issue. The average one week return for the 816 issues studied was 17.0%, with the one month return averaging 19.1%. These results were consistent with those of Reilly and Hatfield, McDonald and Fisher and Logue, with the minor differences attributed to the different time periods and sampling

techniques employed.

Ibbotson (1975) was the first to rigorously document the underpricing of IPOs. Ibbotson criticised the methodology of the previous studies on the grounds that the results were difficult to interpret. It was noted that returns from identical time periods are not independent events even after subtracting an overall market factor. Ibbotson contended that all of the previous studies had either taken more than one return from each calendar month or measured multiple monthly returns that overlapped. According to Ibbotson, the previous studies then made probability statements about their results that assumed independent observations. Ibbotson concluded that if the authors had recognised that their observations were not independent, the number of independent time periods in their samples would have been too small to draw meaningful conclusions.

The Ibbotson study examined the returns on 112 IPOs from 1960 to 1969. To overcome the methodological problems of the previous studies, only one observation was drawn from each month and that selection was made randomly from within each month. Data was collected for offering price and for end of the first calendar month price. Ibbotson's preference was to measure initial performance from offering price to first trade, but the data was not available. The study also adjusted the observed returns for risk using the capital asset pricing model.

Ibbotson found that the distribution of returns was not a normal distribution, but highly peaked and positively skewed with a fat tail. The study found 56 IPOs with negative initial returns. Overall, the average first month return was 11.4%. It was also found that there were no departures from market efficiency in the aftermarket, which lead to the conclusion that the cause of the initial positive returns was a mispricing of the issue. Further, the systematic risk of the new issues was

found to be higher than the systematic risk of the market. Also, the systematic risk of the securities was not stable over time, in that the risk dropped as the shares became seasoned. The sheer magnitude of the initial returns was large enough for Ibbotson to conclude that it would have been uncovered even if the risk factors had not been included in the model.

Ibbotson and Jaffe (1975) expanded the data set used by Ibbotson (1975) to include 2,650 IPOs during the period 1960-1970. Their aim was to examine the predictability of 'hot issue' markets for new issues. A 'hot issue' market was defined as a period when the initial returns on new issues were abnormally high. Ibbotson and Jaffe tested whether the returns on new issues in a particular month were dependent on returns from new issues in previous months. They also studied the relationships between new issue premia, aftermarket performance, the frequency of offerings, and the performance of the market.

Ibbotson and Jaffe included all IPOs from the period 1 January 1960 to 31 October 1970 in their sample. They used the Standard and Poor's 500 Index as their measure of market performance. They then calculated excess initial returns as the difference between the return on the security from the date of issue to the end of the first month and the return on the market over the same period. They did not use a risk adjustment mechanism such as the capital asset pricing model because: (1) they had difficulty in measuring the risk of individual securities when there was no prior data; (2) there was only monthly data available to estimate the capital asset pricing model parameters which was not compatible with the daily data in their study; and, (3) the results from Ibbotson (1975) showed that the market risk adjustment has only a slight effect on results. Overall, Ibbotson and Jaffe found an average initial return of 16.83% relative to the market in the first month of trading.

Reilly (1977) observed the results of the studies of IPO underpricing and noted that all of them focussed on the late 1960s to the early 1970s time period. Accordingly, Reilly sought to update the research with data from 1972 to 1975. Reilly measured the price movement from the issue price to the first Wednesday of trading for 228 issues. He also adjusted the results to remove the effect of market movements, using the Dow Jones Industrial Average (DJIA) and the National Association of Securities Dealers Automatic Quotations Industrial Index (NASDAQ). Reilly found that the average excess price change was 10.8% (DJIA) and 10.6% (NASDAQ). The distribution of returns was found to be highly skewed and quite dispersed. In addition, Reilly found support for the efficient markets hypothesis in that the market appeared to adjust for the underpricing almost immediately.

Block and Stanley (1980) examined 102 issues between 1974 and 1978. They adjusted the returns for market movements using the NASDAQ index and found first week excess returns of 5.96%. As in the previous studies, they also found a highly skewed pattern of returns and a large dispersion in the data. Their results were somewhat lower than the previous studies, a factor that they considered to be due to their use of the NASDAQ rather than the more narrow NQB over-the-counter index used in many of the earlier studies. They also felt that the companies approaching the IPO market were stronger than in the past. They suggested other factors including the increasing size of the issues and the associated breadth of distribution that increases liquidity. Competition within the investment banking industry was also felt to provide for a better market mechanism.

Neuberger and La Chappelle (1983) followed the methods employed in the previous studies in looking at the period 1975 to 1980. They found the excess

returns on the 118 IPOs in their sample to be 27.7% from the point of issue to the end of the first week of listing, after adjustment for market movements using the NASDAQ index. While this was different to previous studies, in particular, the study by Block and Stanley, the authors felt that the differences were largely due to different time frames and sampling techniques.

Ritter (1984a) used the entire population of IPOs between 1977 and 1982, except a number with special characteristics that were excluded. There were 1,028 observations included in the study with the initial percentage return calculated as the difference between the offering price and closing price on the first day after listing. There was no adjustment made for market movements, which was justified on the grounds that the results were so dramatic that they could withstand some minor errors in the data. Ritter found average underpricing of 26.5% for the period 1977 to 1982 and 48.4% for the 'hot issue' period between 1980 and 1981.

Ritter also collected data for the period 1960 to 1976, allowing for a study of the period 1960 to 1982. Over this period, 5,162 IPOs were identified and since only monthly data was available, returns were adjusted for market movement using the same methodology as Ibbotson and Jaffe (1975). The average initial (end of first month) excess return was found to be 18.8%. A high degree of autocorrelation of returns was evident, as were strong cycles in the volumes of IPOs, casting doubts on market efficiency.

Chalk and Peavy (1987) examined initial returns from 649 companies that went public during the period 1975 to 1982. They calculated a daily return for each of the securities in the sample and found an average first day return of 21.7%, after adjustment for market movements using the NASDAQ index. They also found that the 'best efforts' offerings provided substantially higher returns than the 'firm

commitment' offerings[7], a factor confirmed by Ritter (1986). They acknowledged that the results may have been affected by a sampling bias. They also noted a size effect. For the 'best efforts' offerings that offered the highest initial returns, over 70% of the issues were for shares priced at $1 or less. For 'firm commitment' offerings, only 21% were priced at $1 or less.

Beatty (1989) calculated initial returns for 2,215 companies going public between 1975 and 1984. He reported an average initial return of 22.1%. This return was calculated as the first day gross return to an investor who acquires a share and sells at the first day closing price.

Muscarella and Vetsuypens (1989) examined the initial public offering of 38 investment banks over the period 1970 to 1987. They found an average first day return of 7.1%. Although smaller than many of the other studies, this was none-the-less statistically significantly different to zero at the 5% level.

Ibbotson, Sindelar and Ritter (1988 and 1994) have provided the most comprehensive studies of IPO returns to date. Their 1994 study includes 10,626 IPOs from 1960 to 1992. They reported average underpricing for all issues of 15.26%. For the offerings between 1960 and 1976, initial returns were calculated as the return to the end of the first month less market movements. For the period 1977 to 1992, initial returns were calculated as the percentage return from offering price to end of day one bid price without adjustment for market movements.

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[7] The 'best efforts' method involves the issuer and underwriter negotiating an offer price. The underwriter then uses its 'best efforts' to raise the desired capital at this price, but with no guarantee of a successful issue. Under the 'firm commitment' approach, the underwriter guarantees to sell all of the shares at a set price. The process of an IPO is discussed further in Section 2.3.

Table 2.2 : Some Studies of IPO Underpricing Outside the United States

|  | N | Period | Average initial underpricing[a] % |
|---|---|---|---|
| **Australia** | | | |
| Finn and Higham (1988) | 93 | 1966-78 | 29.2 |
| How (1990) | 649 | 1979-89 | 20.9 |
| Taylor and Walter (1991)[2] | 139 | 1977-86 | 22.5 |
| How et al. (1995) | 340 | 1980-90 | 19.7 |
| | | | |
| **Canada** | | | |
| Shaw (1971) | 50 | 1956-63 | overpriced |
| Jog and Riding (1987) | 100 | 1971-83 | 9.0 to 11.5 |
| Krinsky and Rotenberg (1989) | 115 | 1971-83 | 11.6 |
| | | | |
| **France** | | | |
| Jenkinson and Mayer (1988) | 11 | 1986-87[b] | 25.1 |
| | | | |
| **Hong Kong** | | | |
| Dawson (1987) | 21 | 1978-84 | 13.8 |
| | | | |
| **Malaysia** | | | |
| Dawson (1987) | 21 | 1978-84 | 166.6 |
| | | | |
| **Singapore** | | | |
| Dawson (1987) | 39 | 1978-84 | 39.4 |
| Koh and Walter (1989) | 66 | 1973-87 | 27.2 |
| Saunders and Lim (1990) | 17 | 1987-88 | 45.4 |
| Koh, Lim and Chin (1992) | 53 | 1975-87 | 37.6 |
| | | | |
| **United Kingdom** | | | |
| Davis and Yeomans (1976) | 174 | 1965-71 | 7.9 |
| Buckland et al. (1981) | 297 | 1965-75 | 9.7 |
| Jenkinson & Mayer (1988) | 20 | 1979-87[b] | 22.2 |
| Levis (1993) | 712 | 1980-88 | 14.3 |

a. Returns are either risk-adjusted, market adjusted or unadjusted. Raw returns are computed over various lengths of holding periods. The recent studies focus on the first day returns. Details for each study are discussed in the text.
b. These studies only include privatisation IPOs.

Ibbotson, Sindelar and Ritter reported that IPOs have been continually underpriced over time. In addition, there have been cycles in the volume of IPO activity. They also found that underpricing was greater and more volatile for smaller

companies, where size was measured by sales volumes in the year prior to listing and by issue price.

Jain and Kini (1994) took a sample of 682 IPOs from between 1976 and 1988. Their sample included only issues where the issue price was over $5 per share, hence they excluded the smaller issues. The mean issue price in their sample was $12.59. Jain and Kini found a raw initial return of 7.25% for their sample.

In summary, there is overwhelming evidence that initial public offerings are, on average, underpriced. While there were negative returns for issues in all major studies, the average return was positive and statistically significant. Ibbotson (1975, p. 264) concluded that the main explanation was that the issuers wanted to 'leave a good taste in investors' mouths so that future underwriting from the same issuer could be sold at attractive prices.' The findings of Ibbotson have given rise to literature seeking explanation of IPO underpricing. Before discussing the models, this literature review looks at the studies undertaken in markets outside the United States and considers whether IPO underpricing is a global issue.

## 2.2.3 IPOs in Markets Other than the United States

Table 2.2 clearly shows that IPO underpricing is a global phenomenon, with underpricing evident in all of the markets studied. In most of these markets there is not a well-developed over-the-counter market, hence the decision to list is often simultaneous with the decision to raise new equity capital.

Table 2.2 outlines studies of IPO underpricing in Australia, Canada, France, Hong Kong, Malaysia, Singapore, and the United Kingdom. For each country, the table summarises the main details from the studies, sample size (N), the time period involved and the average initial underpricing. The table shows that underpricing

appears to be greater in Malaysia, and to a lesser extent Singapore, than in the other countries. Details of the studies involved are discussed below.

**Australia**

In Australia, Finn and Higham (1988) examined all new listings on the Sydney Stock Exchange from July 1966 to June 1978 and found an average market adjusted return on the first day of trading of 29.2%. Only 11 of the 93 issues showed negative market adjusted returns. After listing, the average performance was negative, but it was not statistically significant. They also noted that the inclusion of an explicit risk variable in measuring performance accounted for only a small part of the gains and hence risk was not a critical issue. They sought to explain the underpricing using a number of variables, but they were unable to find any factors that were statistically significant. They concluded that institutional factors provided a market structure that facilitated the underpricing.

How (1990) examined 649 Australian IPOs between 1979 and 1989. The average return was 20.87% on the first day of listing. This was marginally lower at 20.33% after adjustment for risk. The standard deviation for both measures was high. How also found that the average underpricing varied between industries -- 27.8% for mining, 29.10% for high technology and 16.40% for other industries. A 'small firm' effect was also found with issues for the Australian Second Board (24.94%) being underpriced by more on average than issues for the Main Board (19.10%).[8]

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[8] The Australian Second Board was established to encourage smaller less mature companies to list their shares, with less stringent listing requirements than for companies on the Main Board (Bruce et al., 1991, p. 90). The Australian Second Board was abandoned in 1992.

Taylor and Walter (1991) studied 139 industrial IPOs in Australia from July 1977 to June 1986 and found average first day raw returns of 22.5%. In contrast to the results of Finn and Higham, 30.9% of the IPOs earned a negative return. Adjustment for market movement reduced average returns by a fifth. The Taylor and Walter study was undertaken after a period of institutional change in the Australian market, compared to the institutional framework in force for the Finn and Higham study.[9]

How, Izan and Monroe (1995) examined the evidence on underpricing in Australia using 340 industrial IPOs between 1980 and 1990. They found an average first day raw return of 19.74%, where raw return was calculated as the difference between the offer price and the last sale price on the first day of listing. After the return was adjusted for market movements from the day of prospectus registration to listing date, the average return was 8.72%. This return was still statistically significantly different to zero. The standard deviation of returns for both measures was high (48.08% and 32.19%), providing a rationale for How, Izan and Monroe to further explore cross-sectional factors affecting IPO underpricing. These factors are discussed below in the subsection on cross-sectional variations.

## Canada

The earliest study of Canadian IPOs was by Shaw (1971), who examined both seasoned and unseasoned issues for a number of periods between 1926 and 1969. Shaw found that the after-market performance of seasoned new offerings indicated

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[9] These factors are discussed in the section below that looks to institutional reasons for IPO underpricing.

that they were overpriced after adjustment for general market movements. For unseasoned issues, Shaw found that their returns were poor in comparison, although the variability of returns was much greater than for the seasoned cases, reflecting the increased risk through the lack of seasoning.

Jog and Riding (1987) found high levels of unseasoned IPO underpricing, which was in contrast to the findings of Shaw. Their study concentrated on new issues on the Toronto Stock Exchange between 1971 and 1983. Jog and Riding calculated raw returns for 100 IPOs. They also calculated returns adjusted for market movements but only for 51 IPOs, because a daily market index prior to 1976 was not available. They found that during the first 10 days of trading the average underpricing was between 9 and 11.5%, with the day 1 raw return having a mean of 9.33%.

Krinsky and Rotenberg (1989) studied 115 IPOs on the Toronto Stock Exchange for the period 1971-1983 and found the average initial market return on the first day of trading to be 11.6%.

**United Kingdom**

In the United Kingdom, studies of IPOs have found underpricing ranging from 7.4% to 22.2%. Davis and Yeomans (1976) examined a cross-section of 275 companies undertaking new issues in London between April 1965 and March 1971. Only 172 of the 275 companies studied were undertaking IPOs. The remainder was comprised of placements and tender offers. The average initial return for the 172 IPOs was 7.9%. This was calculated as the difference between the average of the first five days closing prices less the issue price, adjusted for market movements between the date of price setting and the first five days of listing.

Buckland, Herbert and Yeomans (1981) sought to test the efficiency of the primary issue market in the UK. They studied 297 issues between April 1965 and March 1975 which included the sample period studied by Davis and Yeomans (1976). The data was used to calculate the raw price discount as the difference between the issue price and the observed price in the opening market. This was then adjusted for market movements using industry-specific indices. The overall discount was 9.7%.

Jenkinson and Mayer (1988) reported the highest initial returns in the UK, however, their study included only privatisation IPOs between 1979 and 1987. The study period was similar to the study period of Levis (1993) but Jenkinson and Mayer focussed purely on privatisation issues. They found average initial returns of 22.2%, compared to Levis's result of 14.3%. Levis's results were for all IPOs over the period 1980 to 1988. Jenkinson and Mayer also found that if tender offers were excluded from the analysis the average discount rose to 32.8% on the first day of listing or 31.5% over the first week of trading. Jenkinson and Mayer included in their measure of underpricing the present value of any loyalty bonus shares, for long term shareholders, as a percentage of the price. They did not adjust for market movements or risk.

## South East Asia

Studies of IPOs in the developing South East Asian capital markets have found underpricing to be greater on average than in the UK and the US, indicating that a global model of IPO underpricing may need to include factors specific to such emerging capital markets.

Dawson (1987) studied Asian IPOs from 1978 to 1984 and found

underpricing in Singapore (39.4%), Hong Kong (13.8%) and Malaysia (166%). The underpricing in both Malaysia and Singapore was substantially higher than that found in the studies of IPOs in other markets. Dawson collected data on 21 issues in Hong Kong, 39 in Singapore and 21 in Malaysia over the period 1978 to 1983. Prices were collected at fifteen points in time: for each of the first five days trading; for one and two weeks; for each of the first six months; and, at nine and twelve months. Market adjustments were made using the Hong Kong Far East Stock Exchange 62 Index, the Singapore Stock Exchange Index and the Kuala Lumpur Stock Exchange Industrial Index. Cash dividends were not included in the returns as they were not included in the indices used. The market model for risk adjustment was not used because of the absence of historical data for the new issues.

For Singapore and Hong Kong there was no evidence of market inefficiency and prices responded rapidly to the IPO underpricing. In Malaysia, however, high levels of underpricing were detected on the first day and prices continued to rise over the year following listing. Dawson observed that although a tentative conclusion of market inefficiency was possible, some mitigating factors were evident. There was no comprehensive market index available at the time of the study. In addition, the secondary market increases were small at 18.2% over the first twelve months, relative to the initial underpricing of 166.6%.

The Singapore IPO market has been the focus of a number of recent studies. Koh and Walter (1989) studied 66 IPOs during the time period between the incorporation of the Singapore Stock Exchange in 1973 and June 1987. They found that of these 66 issues; 57 were underpriced as measured by the difference between the last sale price on the first day of listing and the subscription price. The average underpricing was 27% after adjustment for the risk free rate of return. The issues

were oversubscribed 29.4 times on average. Only seven issues were undersubscribed; three of these were also overpriced.

Saunders and Lim (1990) focussed their study on the period between 1987 and 1988. Their sample included 17 issues, 8 on the Singapore Stock Exchange Big Board and 9 smaller companies on the SESDAQ[10]. They found underpricing of 45.4% overall, after adjustment for market returns.

Koh, Lim and Chin (1992) examined 53 IPOs on the Singapore Stock Exchange between June 1975 and June 1987. They calculated the average initial underpricing to be 37.63% after adjustment for market movements.

### 2.2.4 Long Run Performance of IPOs

A number of studies have considered the long run performance of the shares issued in an IPO to determine whether the observed underpricing was only a short term phenomenon. The implication here is that if the excess returns were only in the short term then the market had been 'fooled' by the issue and initially priced the shares above their intrinsic value. The initial pricing of shares above their intrinsic value would violate notions of an efficient capital market.

Table 2.3 summarises the results of the studies on the long run performance of IPOs in Australia, the UK, the US and South East Asia. For each study the table summarises the sample size (N), the time period involved, the short run initial underpricing in percentage terms and the long run performance of the shares (also in

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[10] At the time of this study the SESDAQ and the Big Board differed in that the SESDAQ was a 'scriptless' trading system using authorised market makers while the Big Board used a paper system and traded through an auction system (Saunders and Lim 1990, p. 293).

percentage terms). It can be seen that IPOs typically underperform compared to market averages after initial returns are excluded. A number of explanations have been proposed for this.

## Table 2.3 : Long Run Performance of IPOs

|  | N | Period | Short run % | Long run % |
|---|---|---|---|---|
| **Australia** | | | | |
| Finn and Higham (1988) | 93 | 1966-78 | 29.2 | -6.5 |
| | | | | |
| **United Kingdom** | | | | |
| Levis (1993) | 712 | 1980-88 | 14.3 | -30.6 |
| | | | | |
| **United States** | | | | |
| Reilly & Hatfield (1969) | 53 | 1962-64 | 9.9 | +11.0 |
| McDonald & Fisher (1972) | 148 | 1969-70 | 28.5 | -18.1 |
| Ibbotson (1975) | 120 | 1960-69 | 11.4 | +4.6 |
| ˙Bear and Curley (1975) | 140 | 1969 | n.a. | -25.0 |
| Reilly (1977) | 486 | 1972-75 | 10.9 | -11.6 |
| ˙Block & Stanley (1980) | 102 | 1974-78 | 5.9 | -3.1 |
| ˙Neuberger & La Chappelle (1983) | 118 | 1975-80 | 27.7 | +38.6 |
| Ritter (1984) | 786 | 1977-82 | 17.3 | underperformed |
| ˙Chalk and Peavy (1987b) | 649 | 1975-82 | 21.7 | -3.7 |
| Aggarwal & Rivoli (1990) | 1,598 | 1977-87 | 10.7 | -13.7 |
| ˙Ritter (1991) | 1,526 | 1975-84 | 14.3 | -29.1 |
| | | | | |
| **South East Asia** | | | | |
| Dawson (1987): | | | | |
|   Hong Kong | 21 | 1978-83 | 13.8 | -9.3 |
|   Malaysia | 21 | 1978-83 | 166.7 | +18.2 |
|   Singapore | 39 | 1978-83 | 39.4 | -2.7 |

The long run results by Kunz and Aggarwal (1993), Levis (1993) and Ritter (1991) are for a three year period, while a one year period is used for the other studies, except for Ibbotson (1975) and Neuberger & La Chappelle (1983) where a six month period is used. All long run results are exclusive of the initial returns and are adjusted for market movements.

Generally the studies summarised in Table 2.3 saw mispricing resulting from the initial lack of publicly available information about the company, which led to the market mispricing the shares. Accordingly, true company value will take some time to be established in the marketplace since investors will refine their expectations about the company as new information is made available over time. That is, the IPO shares are not initially priced at their intrinsic value in early aftermarket trading. Initial underpricing would infer that investors initially overvalue the company and subsequently revised their valuation of the company downwards. Aftermarket performance of the IPOs would be poor as a result of the initial overvaluation.

Reilly (1977) found that IPOs underperformed market averages when they were purchased in the early aftermarket and held for one year. Reilly's result was in contrast to the earlier study by Reilly and Hatfield (1969) which found aftermarket performance to be positive. Reilly (1977) concluded that the IPOs had higher systematic risk than the market. The higher risk led to the shares underperforming the market averages in the 1973-74 falling market, and overperforming in the 1962-64 bullish market. Reilly concluded in both cases that the evidence was consistent with the existence of an efficient market.

McDonald and Fisher (1972) also concluded that the aftermarket performance of IPOs was consistent with market efficiency. However, their tests only found that there was no correlation between underpricing and aftermarket returns. Their results suggested that the initial market price was too high. The IPOs underperformed compared to the over-the-counter index. The authors concluded that the poor long run performance could be seen as the market correcting for initial over-optimism.

Ibbotson noted that the 'results are generally consistent with aftermarket

efficiency' and that 'after the first and second months there are very few departures from efficiency' (Ibbotson 1975, pp. 235 and 250). The Ibbotson study concluded that since positive initial returns had been confirmed and there was no evidence of market inefficiency, initial public offerings must be underpriced. However, there were no adequate explanations given to explain the underpricing.

Bear and Curley (1975) examined 140 issues from 1969 and found that the issues had declined in price by 25% in the first year. Their study was limited to one year and hence a finding of widespread market inefficiency is difficult to support. Block and Stanley (1980) found small negative returns over the first year. In contrast, Neuberger and La Chappelle (1983) found large increases in price for IPOs in their first six months of listing.

Ritter (1984) examined the aftermarket performance of natural resource IPOs and postulated that there was a 'speculative bubble' for these securities during the study period, where investors pushed the price of the shares over their intrinsic value for a short period. Speculative bubbles are discussed in more depth below in looking at the models of IPO underpricing. Ritter studied the returns from natural resource shares going public between 1977 and 1982. It was found that these natural resource IPOs underperformed an index of existing natural resource companies by 15%. This result may be explained in a similar way to Reilly (1977), however, the size of the underperformance does not rule out the existence of a 'speculative bubble'.

Chalk and Peavy (1987b) tracked the aftermarket performance of 649 IPOs between 1975 and 1982 for the first 190 days after listing. The mean return on day 1 was 21.65% and the entire aftermarket period had a cumulative return of 17.99% indicating that the abnormal return continued beyond the initial offering day, although there was a negative average return after excluding the day 1 return.

Ritter (1991) documented the long run performance of IPOs and found them to be overpriced. In the three years after going public, Ritter's sample of 1,526 companies underperformed a set of comparable companies matched by size and industry. The IPOs produced an average holding period gain of 34.47% over the three years compared to an average total return of 61.86% for the control sample of shares.

Ritter saw the long run performance of IPOs being important for: developing trading strategies to produce abnormal returns; seeking information on the existence of fads in share markets; and determining whether issuers take advantage of 'windows of opportunity' to issue securities. Ritter provided a number of potential explanations for the underperformance including bad luck, risk mismeasurement, fads and overoptimism.

Levis (1993) studied the long run performance of IPOs in the UK as a direct test of the robustness of Ritter's conclusions. Levis found that the UK evidence demonstrated that the long run underperformance of IPOs was not a uniquely US phenomenon and that poor after-market performance was a persistent feature of IPOs. In addition, Levis found that the poor performance extended beyond 36 months. It was noted that caution should be exercised in interpreting this finding because of the changes in the composition of the sample that occurred when researching over long test periods. Levis also found companies with the greatest initial underpricing to have the worst aftermarket performance. They were outperformed by those with more moderate initial returns.

Aggarwal, Leal and Hernandez (1993) found similar results to Levis for IPOs in Brazil, Chile and Mexico. This evidence showed that the patterns observed were not country-specific. They also found that the pattern of returns was not specific to a

particular issuing process since different issuing procedures were employed across the countries studied. In other countries, the pattern of IPO long run underperformance is also evident. Finn and Higham (1988) found long run underperformance in Australia, while Dawson (1987) found the same for the markets in Singapore and Hong Kong. In contrast, Dawson found superior long run performance for Malaysian IPOs.

The aftermarket performance studies leave us with the conclusion that there are doubts over the conventional belief that the initial high returns for IPOs are due to deliberate underpricing. Rather, the emerging opinion is that a certain level of first day return is intentional and any marked deviations from this are the result of the market overreacting.

A recent study by Jain and Kini (1994) sought to determine whether the aftermarket share price performance of IPOs was linked to a decline in operating performance indicators. They found that companies exhibit a substantial decline in operating performance after public listing. The decline in performance was indicated by falls in operating return on assets and operating cash flows deflated by assets, both before and after adjustment for industry factors. Further, the companies exhibited high growth in sales and capital expenditure compared to industry averages, so that the decline in performance could not be attributed to loss of market share or cutbacks in capital expenditure. It was also found that where entrepreneurs retain higher ownership levels, the companies generally perform better relative to the other IPOs.

Jain and Kini noted that poor post-issue performance is inconsistent with initial underpricing. The issues were initially priced in the market to yield high price-earnings ratios in anticipation of high growth in earnings. The authors noted:

It appears that IPO firms are priced with the expectation that profit margins will grow beyond their pre-IPO levels, while in reality they decline over time (Jain and Kini 1994, p. 725).

This result was consistent with the studies on the long run performance of IPOs reviewed above that show IPOs providing low returns in the long run.

Loughran and Ritter (1995) found that both IPOs and seasoned equity offerings (SEOs) underperformed in the market after issue. They found that the average annual return to investors was 5% for IPOs and 7% for SEOs over the five year post-issue period. This compared poorly with the average annual return that investors could have earned from non-issuing companies with similar market capitalisation (12% for IPOs and 15% for SEOs).

Loughran and Ritter considered a number of explanations for the poor performance of IPOs in the period following issue. The differences were not found to be related to size nor book-to-market ratio. The poor long run performance was also not related to long-term return reversals, nor related to differences in risk. Accordingly, Loughran and Ritter concluded that 'firms take advantage of transitory windows of opportunity by issuing equity when, on average, they are substantially overvalued' (Loughran and Ritter 1995, p. 46).

The literature clearly demonstrates that IPOs are initially underpriced and that they generally under-perform in the long run. In the next section, studies that consider the factors linked to initial underpricing are reviewed. This will be followed by discussion of the institutional and procedural influences on IPO underpricing and a review of the models proposed to explain IPO underpricing.

### 2.2.5 Cross-Sectional Variations

A number of the IPO studies have sought to determine the critical factors in IPO underpricing. They have typically used multiple regression techniques to determine the significant factors that are correlated with IPO underpricing.

Logue (1973) observed that the early IPO studies had not attempted to explain the amount of underpricing in terms of the attributes of the issue, market conditions or the qualities of the parties concerned. Logue provided a model of new issues handled by prestigious and non-prestigious underwriters.

While the previous studies had been concerned solely with reporting on cross-sectional averages, Logue attempted to also deal with the issue of cross-sectional variations in underpricing. Logue used nine macro and micro company specific variables. It was found that underpricing was related to the prestige of the underwriter, but the conclusion was that 'the explanation of performance and the factors that influence the behaviour of underwriters are not completely satisfactory' (Logue 1973, p. 102).

Neuberger and Hammond (1974) sought to evaluate the performance of the underwriters of unseasoned IPOs from 1965 to 1969 and to test whether there was a statistically significant difference between the portfolios of issues by various underwriters. They compared the average short-run portfolio appreciation for each underwriter using analysis of variance. It was found that the difference between underwriters was statistically significant from issue date to one week, and to one month after issue. They also found that once the market had eliminated the initial underpricing bias of the underwriters, there was no longer a statistically significant difference between the underwriters.

Neuberger and Hammond found support for Logue in that the more

prestigious underwriters underpriced by a lesser amount than the less prestigious underwriters. They also found that the prestigious underwriters tended to be involved with large issues, and that there was an inverse relationship between issue size and underpricing. This was evidence of a size effect in addition to the effect of the prestige of the underwriter. It was further found that the smaller underwriters tended only to be involved in periods of great IPO activity, when new issues tended to appreciate greatly.

Ibbotson (1975) found that the systematic risk of new issues was greater than the systematic risk of the market, and that the systematic risk of the new securities was not stable. Systematic risk tended to fall as investors became familiar with the shares trading in the market. It was concluded, however, that systematic risk did not explain the large underpricing of IPOs which would have still been a large magnitude even if the systematic risk factors were included.

Ibbotson and Jaffe (1975) found the existence of 'hot issue' markets and that the hot or cold markets were predictable. They found the existence of serial correlation in the first and second month indicating that the standard statistical assumptions of serial independence is invalid for the returns on new issues. Their results questioned the weak form efficiency of the market for IPOs.

Davis and Yeomans (1976) analysed new issues on the London Stock Exchange with the main purpose of examining the extent to which underpricing was influenced by size, method of issue and the effect of periods of differing market volatility. They found that in a stable or rising market, small companies (with net assets less than £250,000) recorded discounts averaging 24.9%. This was over three times the discount on large companies (with net assets over £1,000,000) of 8.04%. Statistically, the difference in means was only significant at the 10% level. In an

uncertain, rising market the difference in average discount between small and large companies was much less, 15.7% versus 6.4%, but the small sample size made any conclusions tentative. In periods of falling markets, it was unclear how company size influenced underpricing.

Ying et al. (1977) adjusted the IPO returns for risk and found that listing 'has value' for the companies concerned. They considered that listing conveyed information to the market and that this information was the real source of value. They found that the excess returns were concentrated around the various application and listing dates and considered that these events were seen by the market as favourable signals. They also found some evidence of market inefficiency, although they conceded that the results were a little ambiguous.

Reilly (1978) found strong support for the efficient market hypothesis in the IPO market. It was also found that the market adjusts almost immediately to underpricing. However, Reilly conceded that the choice of sample does affect the results (with samples including issues with incomplete data tending to be more skewed and dispersed). He also found that the index used to adjust for market movements had a large impact on the results. Over the study period, the NASDAQ-OTC index -- which they noted was commonly used in IPO studies -- moved down by 23%, while at the same time the Dow Jones moved down by only 4%.

Block and Stanley (1980) confirmed the earlier findings by Neuberger and Hammond (1974) of lower underpricing of issues by prestigious underwriters compared to less prestigious underwriters. The issues by the more prestigious underwriters were actually overpriced during the Block and Stanley study period. Neuberger and La Chappelle (1983) found similar results and concluded that there were different tiers of underwriters; the lower the tier of the underwriter the greater

the initial underpricing of an IPO.

Buckland, Herbert and Yeomans (1981) used their data in three ways. Firstly, the data was used to calculate the raw price discount as the difference between the issue price and the observed price in the opening market. This difference was then adjusted for market movements using industry specific indices. They also measured demand for the issue. This was calculated as the ratio of the number of applications for shares received by the issuing house to the number of shares offered for sale. Their final item of data was a measure of market volatility. The study found that discounts were very closely associated with excess demand in the new issue market. Those issues that were undersubscribed displayed overpricing. For oversubscribed issues, the higher the level of subscription, the higher the discount offered. For each class of subscription demand, there were no statistically significant differences in discount levels over the different periods of market volatility. There was, however, a measurable difference between subscription levels across periods of market volatility. In falling markets, the proportion of issues undersubscribed was much higher.

Ritter (1984a) followed the work of Ibbotson and Jaffe (1975), looking for the existence of 'hot issue' markets. It was found that between 1960 and 1982, there were 3 or 4 periods when IPO underpricing was extremely high for a prolonged period. These periods were followed by large and prolonged increases in the volume of IPOs.

Beatty and Ritter (1986) also studied the cross-sectional variations in underpricing. They found that underpricing related to an underpricing equilibrium for investment banks, and to ex-ante uncertainty to investors. Ex-ante uncertainty was seen as the expected price variation of the IPO, with the IPOs expected to have

greater price variability displaying greater underpricing. Rock (1986) saw underpricing as a risk premium to compensate investors for the risk associated with subscribing to the issue.

Jog and Riding (1987) undertook a cross-sectional analysis of Canadian IPOs. They collected information on: the shares authorised and shares issued; use(s) of the funds raised; industrial classification of the company; and underwriting fees. Initially, they carried out regression analysis to identify the variables that dominate the model. A forward selection regression technique was used because it was unlikely to include multiple measures of the same underlying factor. In the study several of the variables were not independent of each other. The technique used helped minimise multicollinearity. The authors then built a model including variables for trading activity (the number of days traded divided by the number of days listed for the first 200 days post-listing), industrial versus non-industrial grouping and whether the funds were used for investments or not. All variables were statistically significant at the 1% level as was the model. The model had an R-squared of 0.19 implying that 19% of underpricing could be attributed to these factors. The study found that the thinner the trading, the greater the underpricing. Industrials displayed highest degree of underpricing, and issues raised for pure investment purposes were underpriced to a greater extent than issues raised for other purposes.

Jog and Riding also found that measures of variance, market-related risk and the fraction of ownership retained by the original owners were not statistically significant. They concluded that company specific and issue specific factors have more information content than issue specific uncertainty, although they conceded that the measure they used for ex-ante uncertainty may have been inappropriate.

McConnell and Sanger (1987) found that the initial post-listing returns of new issues were negative; that is, after the initial underpricing had been removed. They also reported that there was no evidence in their data to support either the small company effect or the turn-of-the-year effect. They found that IPOs were not clustered around January and that underperformance occurs regardless of the market values of the companies concerned.

Chalk and Peavy (1987) included smaller company IPOs in their sample, since they had been excluded from many of the earlier studies. They found that underpricing was greater for low-priced securities than others. They offered four reasons for their results: transaction costs were relatively high for low-priced shares; shares priced at less than $1 displayed above average risk; a premium was payable for the lower liquidity involved; and there was a 'super' small company effect for IPOs.

Beatty (1989) found a negative relationship between the reputation of the auditor of an IPO and the initial underpricing. It was argued that the better the reputation of the auditor, the less the ex-ante uncertainty surrounding the issue. The lower the uncertainty, the higher the offer price and the lower the level of underpricing. It was concluded that the use of a 'nationally known' auditor reduced the level of IPO underpricing.

Koh, Lim and Chin (1992) examined the relationship between initial underpricing for IPOs on the Singapore Stock Exchange and the residual interest of the initial owners, the variance of the security post-listing and the value of the company. They found a positive relationship between the discounts and both the fractional holding of the issuer and with company value. They also found that the degree of underpricing was an increasing function of the variance of the shares

between listing date and the date when the first corporate results were published and the financial statements were available to shareholders. That is, the greater the variability of prices before the first accounting results after listing are available, the greater the level of underpricing.

How, Izan and Monroe (1995) proposed that the quality of information in an IPO is reflected in the reputation of the advisers employed by the issuing company. Three independent advisers were examined: the underwriter, the investigating accountant, and the expert. How, Izan and Monroe found strong evidence that the reputation of the underwriter had an effect on the level of underpricing. The reputation of the expert and the investigating accountant were negatively related to underpricing, but the relationship was not statistically significant. This research also found that the more information available about an issue, the lower the level of underpricing. The variables used as a proxy for the quantity of information were issue size and the age of the issuing company.

In summary, the cross sectional pattern of IPO returns has been examined in a number of studies. Positive initial returns have been found to be correlated with lower priced shares (Chalk and Peavy 1987b), smaller sized issues (Davis and Yeomans 1976, Beatty and Ritter 1986 and How 1995), less prestigious underwriters (Logue 1973 and How 1995), industrial shares and issues with low trading volumes (Jog and Riding 1987) and greater variance in initial ex-post returns (Ritter 1987). Rock (1986) and Taylor and Walter (1991) found that the largest initial returns occurred where higher levels of ex-ante uncertainty about the market value of the shares existed. Underpricing has also been shown to be significantly larger in some time periods than in others (Ritter 1984a).

A comprehensive study by Ibbotson, Sindelar and Ritter (1994) supported

these findings for the US. The results of the research on a monthly basis clearly found that there were cycles in both volume and extent of underpricing. It was also found that underpricing is more pronounced for smaller, younger companies. The offer price was also found to be an influencing factor in that the average initial return for a share with an offer price of less than $3.00 was 42.8%, while an average return of only 8.6% was found for shares with an offer price greater than $3.00. The annual sales of the company involved was also significant in that the average initial return for companies with no previous sales history was 42.9%. Companies with sales in the previous 12 months of $1 - $999,999 displayed 31.4% average initial return. Those with sales of $1 million to $5 million averaged 14.3%, while companies with sales of $5 million to $15 million averaged 10.7%, those with sales of $15 million to $25 million averaged 6.5%, and those with sales of over $25 million averaged 5.3%. The overall average initial return was 20.7%.

In summary, there is overwhelming evidence that initial public offerings are underpriced and give subscribers a high initial return. A number of factors appear to affect the size of the initial return including: the country concerned; the size of the company; issue size; issue price; ex-ante uncertainty; ex-post variability of returns; and the date of issue.

## 2.3    The Process of Initial Public Offerings

An understanding of the process of initial public offerings is crucial to understanding the models proposed to explain the underpricing phenomenon. It is also necessary to consider whether there are any procedural and institutional factors peculiar to specific countries that may explain differences in the IPO results.

Ibbotson, Sindelar and Ritter (1988) outlined the US process of making an

initial public offering and the institutional and regulatory factors involved. When a company decides to go public it is usually driven by the need to raise capital for expansion or to free up the owners' capital to enable them to diversify. A publicly traded share price also provides important outside information to management and investors about the performance of the company and its value.

The price set for the IPO depends upon the prevailing market conditions, the specific details of the company and the policies of the underwriters who underwrite the issue. Generally, the issuer wants to maximise proceeds from the issue, while minimising the dilution of their control over the company. The underwriter will need to balance their own needs for returns and to manage the risks that they face with the needs of the issuer and the perception of the market towards the issues that they underwrite.

The issuer will seek to employ the most prestigious underwriter possible to provide a favourable signal to the market. However, prestigious underwriters will typically avoid speculative issues. If the issue is overpriced or if the information provided to investors is incomplete and the returns of the company after the float disappoint investors, the reputation of the investment banker may suffer.

In the US there are two methods of undertaking an IPO: a 'best efforts' or a 'firm commitment' method. The 'best efforts' method involves the issuer and underwriter negotiating an offer price. The underwriter then uses its 'best efforts' to raise the desired capital at this price for a fee based upon a percentage of the capital raised. The offer is withdrawn from the market if it is unsuccessful and another offer at a lower price is unlikely to occur. Minimal risk is borne by the underwriter in this case because the issuer bears the risk of an unsuccessful issue.

The second method for an IPO is the 'firm commitment' approach. Ritter

(1987) outlined this approach, which involves the issue of a preliminary prospectus. The preliminary prospectus states a tentative offer price and the number of shares to be issued, and calls for indications of interest by potential investors. This prospectus is also reviewed by the SEC while the underwriter surveys the market. The final prospectus is then issued immediately prior to the offering and states the firm offer price and the size of the issue. This process enables the underwriter to revise the offer price in response to market expectations. Indeed, the process should lead to the minimisation of underpricing since the underwriter has an opportunity to test the pricing of the offer in the market. The underwriter is able to gauge market conditions and the likely response of the market to the company being floated.

Regardless of the approach taken, setting the offer price is crucial to the overall process and the success or failure of the float. Even in a 'firm commitment' offer, where the underwriter has the chance to survey the market, there will still be uncertainty surrounding the issue. This is because, regardless of the information that emerges during the offer period, the company has no market price history. The implications of mispricing are clear. If the issue is overpriced it is likely to be undersubscribed, and even if it is fully subscribed, the reputation of the underwriter may suffer and legal action by aggrieved investors may even result. If the issue is underpriced, the investors make windfall gains, but the issuer suffers from a shortfall in potential capital raised. This outcome would affect future dealings between the issuer and the investment bank concerned.

Ritter (1984b) studied whether there was a difference between use of a 'firm commitment' versus a 'best efforts' contract with underwriters. It was found that smaller companies make greater use of the 'best efforts approach'. Indeed as Ritter noted:

...small, more speculative firms tend to raise small amounts of money using best efforts offers, and larger, more established firms tend to raise large amounts of money using firm commitment contracts (Ritter 1984b, p. 280).

Ritter also observed that because the offer price was set much earlier in the process for 'best efforts' rather than 'firm commitment' offers, the latter contains a higher certification from the underwriter. The costs of each method bear out this observation, in that, the average costs were 21.22% for firm commitment offers and 31.87% for best efforts offers. Ritter also observed that 'the 'major bracket' underwriters almost always do firm commitment offers' (Ritter 1984b, p. 281).

The forgoing discussion of the process of IPOs has been for US offers only. It is important to consider whether the different offering mechanisms used around the world require a different theoretical treatment. Aggarwal, Leal and Hernandez (1993) studied IPO performance in Brazil, Chile and Mexico and found that the patterns observed are not country-specific nor of a particular issuing process, since different issuing procedures are employed across the countries studied.

The models of IPO underpricing that are reviewed in the next section, however, consider one explanation that is based upon information asymmetry in the market. Rock (1986) argued that there is likely to be information relevant to an issue beyond that which is held by the issuing company and its banker. This information may give rise to a 'winners' curse' in the marketing of an issue. The 'winners' curse' exists where uninformed investors receive disproportionately small allocations of underpriced rationed issues, and more of the less underpriced and not rationed issues. Benveniste and Spindt (1989) argued that an underwriter can use price and allocation discrimination to induce investors to reveal private information. Their analysis saw the underwriter as having a strong positive role in the marketing of the

issue.

Benveniste and Wilhelm (1990) considered the effect on IPO proceeds of alternative regulatory environments, in particular, restrictions on price discrimination and on the allocation of oversubscribed issues. They noted:

> The key to our analysis is the recognition that the underwriter potentially has two important degrees of freedom for extracting information from privately informed investors: discriminatory pricing and allocation, and the use of a two stage marketing mechanism (Benveniste and Wilhelm 1990, p. 195).

They demonstrated that restrictions on the ability of underwriters to price discriminate in the US reduced the expected proceeds from an IPO because of the increased cost imposition of using a two stage mechanism. The two stage mechanism involves the underwriter collecting nonbinding expressions of interest before formal marketing of the issue. This information is used to decide upon the final issue price.

Benveniste and Wilhelm focused on two restrictions imposed on the underwriters. The first was the widespread requirement that underwriters offer a security to all investors at a uniform price. In the US this effectively rules out price discrimination as a marketing tool. The second restriction related to the requirement to be 'evenhanded' in the allocation of oversubscribed issues. Although this is not usually a restriction in the US, it has been reported in the UK (Rock 1986) and Singapore (Koh and Walter 1989). In markets where such restrictions exist, the underwriter is unable to use preferential allocation treatment as a marketing tool.

Benveniste and Wilhelm concluded that the effect of the uniform price restrictions was to increase the cost of soliciting information from regular investors

which, when combined with 'evenhanded' allocation restrictions, made information gathering impossible for underwriters.

Levis (1990) outlined the issue procedures in the UK. The most favoured method for larger issues was the 'offer for sale at a fixed price' method, with tender offers and placements also available. Under this most common method, applications for the issues are at a fixed price and the issue is usually underwritten. The issuing house will charge a commission based on the size of the issue, which is divided between the sub-underwriting financial institutions, the broker who arranges the sub-underwriting and the issuing house itself.

Where issues are oversubscribed the issuing house can use discretion in deciding how to determine allotment amounts using either balloting and/or scaling down of applications. The method chosen will reflect the preferences of the company for its shareholder profile; that is, whether to favour the smaller or larger classes of applicants. However, the issuing house cannot discriminate in favour of specific investors, such as regular clients. Applications for shares must be accompanied by payment of the full amount. The applicant therefore incurs interest costs.

Finn and Higham (1988, p.336) outlined the institutional differences in Australia that existed prior to deregulation and set the market apart from the US market and hence from the empirical work in that country. The Australian approach involved the issuing of a prospectus that fixed the price for the offer. Underwriting took the form of a stand-by agreement in which the underwriter agreed to take up any shortfall at the offer price in return for a fee. At the time of the Finn and Higham study, the issuer had to be sponsored by a member of the Stock Exchange and the right to allocate the issue was transferred to the broker. In some cases the

sponsoring broker also acted as underwriter to the issue. During the period of the Finn and Higham study, the rules of the Stock Exchange gave the broker the allocation rights to all shares when also acting as underwriter and for 80% of the shares when a non-member underwriter was involved. Taylor and Walter (1991, p.2) noted that many of the institutional features for the Finn and Higham study were removed as a result of deregulation in that market.

In summary, the process of an IPO typically involves an underwriter and the issuer determining the issue price for an offer, with the underwriter guaranteeing the sale of all shares in the issue at that price. The underwriter is balancing the needs of their issuing clients with the need to manage their own risks, including risks to their reputation. In the next section, the models proposed to explain IPO underpricing are reviewed. It will be shown that the underwriter plays an important role in the models.

## 2.4    The Models

There are three anomalies associated with IPOs that require explanation since they appear contradictory to the theory of efficient capital markets. These are: (1) the initial underpricing of the share offers providing subscribers with high initial returns; (2) the existence of 'hot issue' markets where there appear to be cycles in both the volume of issues and the extent of underpricing; and, (3) the long run poor performance of IPO shares compared to market indices. Ibbotson, Sindelar and Ritter argued that:

> ...these anomalies are interrelated in the following sense: periodic
> overoptimism by investors creates 'windows of opportunity' during which
> many companies rush to market, which results in disappointing returns to

long-term investors when the issuers fail to live up to overly optimistic expectations. In contrast, companies that issue during low-volume periods typically experience neither high initial price run-ups nor subsequent long-run underperformance (Ibbotson, Sindelar and Ritter 1994, p. 66).

Initially the models developed to explain IPO underpricing were based on the belief that it was essentially a short term phenomenon, with excess returns being earned immediately after the issue and normal returns being earned thereafter. The implication of this view is that the security was initially mispriced by the issuing company and their advisers. A number of models have been proposed to explain short run IPO underpricing. In general, the models are not mutually exclusive.

The 'winners' curse' model proposed by Rock (1986) has received a large amount of support in the literature. Rock's model falls under the broader theory of information asymmetry; in this case, between different groups of investors. The other popular model was by Baron (1982) who also saw the source of underpricing lying in information asymmetry; but in this case, an information asymmetry between the issuing company and its investment banker.

Other models proposed in the literature include: risk-averse-underwriter; enhancing banker relations with investors; speculative bubbles; dynamic information acquisition; information cascades and legal liability insurance. Each of these is discussed below.

## 2.4.1 The Risk-Return Trade-off Model

Empirical studies on IPOs have clearly established that there are large initial average returns for subscribers to issues. However, in almost all studies, significant levels of negative returns have been reported. For example, in Jog and Riding (1987), the

average initial return on the issues was 9%. However, 40% of the issues displayed negative initial returns and the standard deviation was in the range of 40 to 50%. Indeed, in the first published study of IPO underpricing, Reilly and Hatfield (1969) reported negative initial returns for 41% of the sample. Many other studies have reported a degree of negative initial returns for IPOs and high standard deviations of day one returns.

When investors consider subscribing to an IPO there is a high degree of uncertainty involved. Although on average they will make high initial returns, the distribution of returns is such that the risk of investing in any one particular issue is high. Accordingly, the initial underpricing could be seen as a risk premium to compensate investors for the ex-ante uncertainty associated with any particular issue. The greater the ex-ante uncertainty; the greater the underpricing on average. The high level of the underpricing for IPOs (over 10% in one day) has led researchers to seek other explanations for the phenomenon.

### 2.4.2 The Asymmetric-Information Models

The asymmetric-information model is based upon different information being held by three groups -- the issuing company, the investment banker and the investment community. The theory forms the basis of the models developed by Rock (1986) and Baron (1982). Rock's model is concerned with information asymmetry between groups of informed and uniformed investors, while Baron's model is based on the different information held by the company and its advisers.

**Asymmetric Information between Issuer and Underwriter**

Baron (1982) modelled IPO underpricing based on the assumption that underwriters

have more information about investors' demand and market conditions for the securities than the issuers. An underwriter also uses its reputation to certify the quality of the issue and help generate demand for the issue. The issuers delegate pricing decisions to the underwriters because they are uncertain about the correct equilibrium price. The issuer compensates the underwriter for the superior information by allowing the security to be issued at a discounted price.

Gordon and Jin (1993) argued that underwriters actually play a dual role in securities markets by providing advice to both issuers of capital and to investors. In this case, they argued that the underwriters have reputation capital to protect, and hence they would try to avoid mispricing. Gordon and Jin considered that the underwriter faces a dilemma. If issues were overpriced, the underwriters would lose business from investors; while if the issues were underpriced, the issuers would take their business elsewhere. Gordon and Jin dismissed Baron's model, and saw underpricing as a balance between the needs of investors and issuers.

Muscarella and Vetsuypens (1989) found self-underwritten investment bank issues were underpriced by significantly more than those issues underwritten by third parties for the investment banker. This also raised doubts about the validity of Baron's model. The average underpricing was 12.9% for the fourteen issues that were underwritten by the investment banks themselves. For the IPOs where the investment bank did not serve as its own lead manager average underpricing was only 3%.

## The 'Winners' Curse'

The 'winners' curse' explanation of IPO underpricing is attributed to Rock (1986). The model is based on the existence of two groups of investors -- informed and

uninformed. It is also based on the fact that if demand for a share issue is unexpectedly strong, rationing will result. Informed investors only invest when they expect the price in the after-market to be higher than the issue price; that is, to be underpriced. If the informed investors subscribe to the issue then demand will be high and rationing of the shares will occur. Where the informed investors consider the shares to be not significantly underpriced or even overpriced, they will not subscribe to the issue. In contrast to the informed investors, the uninformed investors subscribe to every IPO indiscriminately. The uninformed investors face a 'winners' curse' since if there is no rationing these investors receive all the shares for which they have applied, but the shares may be overpriced or only slightly underpriced.

Under these conditions, all IPOs must be still be underpriced on average to keep the uninformed investors in the market by allowing them to earn a normal return with the underpriced issues offsetting the overpriced ones. Without this pricing, the uninformed investors would only be allocated shares in overpriced issues, which would lead them to avoid IPOs in the longer term.

Beatty and Ritter (1986) extended Rock's model to show that underpricing was a function of the uncertainty surrounding the real market price for IPO's. In addition, they proposed that underwriters must maintain an equilibrium amount of underpricing to ensure that uninformed investors continue to subscribe to the issues. The underwriters must also maintain confidence with the issuers, who wish to maximise the proceeds of the issue. Beatty and Ritter found that underwriters who consistently priced IPOs either too high or too low, lost market share to other underwriters.

Tinic (1988) used the results of the Institutional Investor Study Report by the

Securities and Exchange Commission (SEC) to reject the 'winners' curse' asymmetric-information model. Tinic concluded that the data revealed that there was no bias in rationing 'good' offers to institutional investors, provided that it is accepted that institutional investors represent a good proxy for informed investors.

Direct tests of the 'winners' curse' argument have been undertaken using data from the UK (Levis 1990) and Singapore (Koh and Walter 1989). Koh and Walter followed Rock's view that:

> The crucial test of the model involves observing the degree to which shares
> are rationed on the offer date. If the model is correct, weighting the returns
> by the probabilities of obtaining an allocation should leave the uninformed
> investor earning the riskless rate (Rock, 1986, p. 205).

Koh and Walter noted that such a test had not previously been performed because the data was not available. The Singapore market's institutional arrangements made it possible to undertake such a direct test. In Singapore, evidence on rationing is publicly available. The method of rationing involves a public ballot and is considered evenhanded; accordingly all applications of a particular size have an equal probability of being accepted.

Koh and Walter confirmed the major implications of Rock's model. The returns to uninformed investors on the first day of IPO listing were found not to be statistically significantly different to the risk free rate. Koh and Walter found that rationing explained IPO underpricing after taking into account the probability of successful application for investors. They also found a strong positive correlation between oversubscription levels and first day returns. The 'winners' curse' was also found to be present.

Koh and Walter also found that if the size of application was a reasonable

proxy for the distinction between uninformed and informed investors, then a number of additional conclusions were possible. Informed investors expanded their demand in response to greater expected underpricing. This was in line with rationality in the IPO market and contrary to the view that there are fads and fashions in the IPO market. They also found that their results held when the issues were categorised by underwriter and size.

Levis (1990) also directly tested Rock's model. In the UK, IPOs must be allocated on a pro-rata basis and data are available for over-subscription levels and actual allocation details. Using the UK data it was found that when the 'winners' curse' and interest rate costs are taken into account, the first day net IPO returns were much lower than the actual level of underpricing. Levis concluded: 'It is apparent that the average market-adjusted returns attained at the first day of the after-market on over-subscribed issues are probably just sufficient to cover the losses incurred in under-subscribed offerings and the interest rate costs involved when applying for new issues' (Levis 1990, p. 88).

Levis also found that it was not possible to overcome the 'winners' curse' and interest factors by developing strategies to select the most successful offerings based entirely on publicly available information. It was also acknowledged that there may be incentives to incur additional costs to be better informed about an issue. However, this would not guarantee excess profits, because information costs were fixed regardless of the size of application and oversubscription may dilute the actual allotment received.

The study by Carter and Manaster (1990) also provided support for the model of Rock (1986). They found support for the proposition that IPO underpricing compensates uninformed investors for the risk of trading against superior

information and extended the model to suggest that the greater the proportion of informed investors the greater the level of underpricing. They also argued that because investors have limited resources to devote to information acquisition, they will concentrate on the most risky propositions. Since underpricing disadvantages issuing companies, Carter and Manaster argued that lower risk companies will employ high prestige underwriters to signal the quality of their issue to the market. Carter and Manaster found a significant negative correlation between underwriter prestige and both underpricing and the variance in demand for issues. How (1995) provided evidence that the same relationship existed for Australian IPOs.

## Auditors Reputation

The information asymmetry model has lead to a growing body of research; research which considers the role of the auditor or investigating accountant in the IPO process. The role of the auditors is to attest to the 'truth and fairness' of the information included in the prospectus. Beatty (1989) observed that companies employ well-known national accounting firms to perform the registration audit. The reputation of the accountant under this scenario signals the quality of the IPO to the market. Beatty argued that it is directly related to the level of ex-ante uncertainty surrounding the issue, hence the higher the reputation of the auditor the lower the level of uncertainty and underpricing. Balvers, McDonald and Miller (1988) developed a theoretical model that explicitly incorporated the relation between underwriters and auditors. They confirmed that the reputations of both underwriter and auditor have a negative effect on underpricing. They further found that the two variables were related in that as either one increases, the importance of the other diminishes.

Menon and Williams (1991) studied the hypothesised preference of underwriters and issuers for reputable auditors. They found evidence that issuing companies change auditors from small accounting firms to large firms for reputation reasons. They also found that issuers that select large accounting firms tend to be those that employ the larger underwriters and make 'firm commitment' offers. They undertook a cross-sectional analysis of the fees charged by the underwriters and found that the better the reputation of the auditor, the lower the fee paid to the underwriter. That is, there was evidence that the underwriters fees are reduced where the accountant's reputation reduced the ex-ante uncertainty associated with the issue. The authors were somewhat surprised that there was no significant difference in the fees charged by the larger accounting firms compared to the smaller firms. That is, the large firms did not appear to be charging a premium for their reputation and its consequent effect on ex-ante uncertainty and underpricing.

### 2.4.3 Asymmetric Payoff to Underwriter Model

The asymmetric payoff to underwriter model is based on the proposition that underwriters undervalue IPOs to reduce their risks and costs of underwriting since it reduces the chances of an unsuccessful issue. This model is based upon the fact that in most markets, underwriters are constrained to offer new issues at a fixed price. Once the price is set, the underwriter cannot issue shares at a higher price if the issue price is considered too low -- even if demand is extremely strong. However, if the issue price is set too high, the issue will be undersubscribed and the underwriter will have to sell the shares in the aftermarket at a discounted price. The underwriter faces asymmetric payoffs.

Affleck-Graves and Miller (1989) argued that underwriters would maximise

their returns by underpricing IPOs because they were usually fixed price offers with fixed commission rates. The authors did not attempt to provide a complete model to fully explain IPO underpricing; rather, their model was an attempt to show that some level of underpricing was the result of the procedures and regulations involved. They found that even in the absence of other factors hypothesised to explain underpricing -- such as asymmetric information -- underwriter's income is expected to be maximised by underpricing. They concluded that 'underpricing is expected to be observed in any market in which underwriters seek to maximise their expected income' (Affleck-Graves 1989, p. 201).

Gordon and Jin (1993) extended the Affleck-Graves model. They demonstrated that the asymmetric payoff model, combined with risk, provided a 'satisfactory' explanation of IPO underpricing. Their simulation results showed that even if the underwriters are only to break even, IPOs must still be underpriced. They also found that the degree of underpricing increases with ex-ante uncertainty, demand elasticity and the commission rate. Their model implied that it was reasonable to observe underpricing in the range of 10 to 15%. They also found the underwriting business to be quite competitive.

Ibbotson (1975), Smith (1977), Marsh (1980), Bharat and Frost (1986) and Bae and Levy (1990) all used options pricing theory to model the asymmetric payoff model. These authors argued that the underwriting agreement is a put option[11] and that the underwriting fee should equal the value of this put option in a competitive equilibrium. However, the studies were more concerned with underwriting in general and did not focus specifically on IPOs and their underpricing.

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[11] A put option is the right to sell an asset (Bruce et al., p. 428)

Ritter (1986) questioned the asymmetric payoff model and argued that if it were true then one would expect only issues made on a 'firm commitment' basis to be underpriced. Issues made on a 'best efforts' basis would be priced fully since the underwriter does not carry the risk of issue failure. Tinic (1988) also questioned the model and observed that if the asymmetric payoff model was correct, underpricing would only be present for issues made on a 'firm commitment' basis. The evidence from Ritter (1984b) and Chalk and Peavy (1987) does not support this model. They found that IPOs issued on a 'best efforts' approach were underpriced by a greater amount than those issued on a 'firm commitment' basis.

Further, a recent study by Drake and Vetsuypens (1993) found that the litigation risk of accessing public capital markets did not appear to be related to whether the issue was initially underpriced or not.

In support of the asymmetric payoff model, Gordon and Jin (1993) argued that there were three problems with Ritter and Tinic's arguments. Firstly, issues made on a 'firm commitment' basis tended to be for larger and less risky companies and were underwritten by the more prestigious underwriters. The offers made on a 'best efforts' basis tended to be riskier. Hence it could be this risk factor that caused these issues to be underpriced and this neither confirmed nor denied the asymmetric payoff model. Secondly, they argued that the empirical results of Ritter and Chalk and Peavy were based on only successful 'best efforts' issues. A large number of 'best efforts' issues were withdrawn because they were unsuccessful. The samples of Ritter and Chalk and Peavy would have been biased towards underpriced IPOs, since the overpriced ones were withdrawn. This would overstate the true level of underpricing for best efforts issues. The third criticism was that since the underwriters served both investors and the issuing companies, if they did not try to

price correctly they will eventually lose business from the investors.

## 2.4.4 The Monopsony-Power of Underwriters Model

The monopsony-power model suggests that IPO underpricing results from the monopsony power of the underwriters in underwriting issues of smaller, speculative companies. According to the model, the larger investment banking firms refuse to underwrite small offerings from new companies and the IPO market is segmented. The smaller IPOs are underwritten by underwriters that can exercise greater bargaining power over the issuers. The underwriters intentionally underprice the smaller issues and offer them to their own large customers. The large customers are then willing to provide more business to the underwriters. The IPO is, therefore, used by the underwriters to generate goodwill from their clients.

West (1965) provided a case for the existence of monopsony power for underwriters of municipal bond issues. Such issues were found to be underpriced in that they quickly rose to significant premiums. Ritter (1986) argued that the major underwriters generally do not underwrite issues by small, start-up companies. Ritter argued that this was to maintain their reputation. Small issuers then use small, less prestigious underwriters, who may be able to exercise greater bargaining power over the issuers. If this is the case, then the smaller underwriters have monopsony power in the small issue segment of the market.

Chalk and Peavy (1987) also used the monopsony power argument and claimed that underwriters use underpricing to increase their own revenues by allocating IPOs to customers who pay high commissions or higher fees than market rates for the other investment banking services offered by the underwriters. In this case, the underwriters use underpricing to capture some of the benefits of the

underpricing for themselves. This can only be maintained in the longer term if the underwriters have monopsony power. However, Tinic (1988) found that there is virtually no relationship between the fees earned from institutional clients by underwriters and the allocation of underpriced IPOs to them.

Gordon and Jin (1993) outlined some other problems with the monopsony power model. They argued that it did not explain why reputable underwriters would refuse to underwrite some IPOs. They also questioned whether the segmentation of the IPO market into small and large issuers necessarily meant that underwriters of small issues would have monopsony power. They argued that competition in this market segment would occur because there were a sufficient number of underwriters prepared to underwrite smaller issues. In support of their argument, they observed that approximately 30% of IPOs underwritten by smaller, less prestigious underwriters since the 1940s were either fully priced or overpriced.

### 2.4.5  The Speculative-Bubble Model

The speculative-bubble model attributes the underpricing of IPOs to the speculative demand of investors who, unable to obtain sufficient allocations of an offer, bid up the price of the shares in the after-market to levels above their intrinsic worth. Such a phenomenon would be temporary and share prices should fall after the bubble has burst.

The model was first proposed by Miller (1977) who developed a model of 'speculative excesses' in financial markets, where badly informed or excessively optimistic investors can bid up the price of a security to an unreasonable level. Miller argued that the model also provided an explanation for the price behaviour of new issues, where the initial market prices are not set by the consensus of the typical

investor but by a small minority of investors who think highly enough of the issue to include it in their portfolios, generating demand for the issue in the early after-market. Miller further argued that the uncertainty about the performance of the new issue is increased because the companies involved do not typically have an earnings history publicly available. In addition, the market does not have full knowledge of the plans of the company and the ability of management to carry them out. This added uncertainty fuels speculation in the initial aftermarket, but is reduced over time as more information is made available to the market. Accordingly, Miller saw IPO underpricing as a short-term phenomenon.

Ritter (1984a) specifically tested the speculative bubble model and found that there was no evidence to support it from a sample of highly speculative, natural resource issues. Tinic (1988) argued that the model had failed to attract empirical support. The performance of the shares in the after-market was found to be indistinguishable from other, more seasoned shares. However, recent studies by Ritter (1991), Levis (1993) and Aggarwal, Leal and Hernandez (1993) provide evidence of underperformance of IPOs in the aftermarket, which was one implication of Miller's model.

## 2.4.6 Information Cascades and Signalling by Underpricing

Allen and Faulhaber (1989) and Welch (1989) considered IPO underpricing to be a means for issuers to provide information to investors. Allen and Faulhaber observed underpricing for high quality companies as signals of the potential for higher future dividends. They also observed that low quality companies did not offer the same trade-off, because they did not envisage higher cash flows and dividends in the future. Welch argued that initial underpricing was used by

companies to build a reputation with investors and to enable future seasoned offers to command higher prices. It was argued that there was not the same incentive for low quality companies because the seasoning of their shares may reveal negative information to investors. This would lead to a lower price for future issues.

In both of these cases, higher quality companies would underprice by a greater extent than low quality companies. However, the empirical evidence suggests the opposite is true. For example, Ibbotson, Sindelar and Ritter (1994) found IPOs for smaller, younger and riskier companies to be underpriced by a greater amount than for the larger, more established companies. Gordon and Jin (1993) also noted that there has not been a correlation found between a firm's IPO price and its subsequent seasoned issues prices. Hence, the initial underpricing cannot allow the company to command a higher price for its subsequent issues. Garfinkel (1993) found that underpricing does not affect the likelihood of the company making a subsequent seasoned equity issue. The research also found that IPO underpricing does not guarantee that a company is of high quality.

Keasey and McGuiness (1992) studied the role of signalling in the valuation of IPOs in the UK Unlisted Securities Market. They found that company value was significantly and positively related to a number of factors, including: the percentage of equity retained by the promoting entrepreneurs; the level of planned capital expenditure; the degree of underpricing; the quality of the investigating accountant; and the relative costs of the float.

Chemmanur (1993) presented an information-theoretics model in which issuers sell their shares in both the IPO and the secondary market and have inside information about the future prospects of the company. In these cases, outsiders may produce information about the company, but only at a cost. Chemmanur

demonstrated that underpricing resulted from insiders' desire to have information about the company produced and made available to investors to ensure a more precise valuation in the aftermarket. The model developed had a number of important implications. Firstly, the demand for an IPO was seen to be positively related to the extent of underpricing, consistent with Beatty and Ritter (1986). Second, the greater the cost of information production, the greater the underpricing. This was consistent with Muscarella and Vetsuypens (1987) and Ritter (1991) where an inverse relationship was found between underpricing and the amount of information about the company. In these studies, the age of the company was used as a proxy for the level of available information. The third implication was that it is best for the issuer to set the issue price as high as possible, since the benefits of information production will only flow to those companies intending to approach the market soon after the IPO. Those companies intending to make a seasoned issue soon after the IPO will have a lower equilibrium IPO price, after taking into account the cost of the information generated by the IPO. Chemmanur also found that the greater the probability that the company is of high value, the lower the extent of underpricing. Another consequence was that there may be time periods and industries where more highly valued companies undertake IPOs. This is consistent with the 'hot issue' and 'cold issue' markets reported by Ibbotson and Jaffe (1975), Ritter (1984) and Ibbotson, Sindelar and Ritter (1994). The final implication of Chemmanur's model was in line with Ritter (1991) in that the greater the gross proceeds of the issue the greater the degree of underpricing.

Welch (1992) outlined a model where investors pay attention to whether or not other investors are purchasing shares in an issue. An investor may decide not to purchase shares simply because no other investors are interested, even if the investor

has favourable information about the issue. Similarly, investors may invest in an issue because many others are doing so, even though they do not have favourable information. The remedy for the issuer is to underprice to induce potential investors to subscribe and hence set off a cascade in which other investors invest regardless of their own private information.

The implications of Welch's conclusions are worth considering. It was contended that the pricing decisions of issuers reflect informational cascades, where the later investors' behaviour is completely dependent upon the decisions of early investors. It was also contended that the model reduces the applicability of the 'winners' curse' when offerings are sold over a period of time. The model requires more empirical research but signals an important new direction in IPO research.

## 2.4.7  Reducing Legal Liability

Tinic (1988) developed a model for IPOs based on underpricing being a form of insurance. Tinic argued that, for unseasoned issues, there is little information about the quality of management. Further, there is little information about the changes that may take place in the future to improve the performance of the company. It was proposed that the issuers do not have a mechanism to communicate this information to the market, so underwriters provide the mechanism for communication and add credibility to the information supplied. The risk of overpricing may be linked to the legal liability of the issuer for the information provided, or at the least a higher risk premium on future share issues. The cost to the issuer of underpricing is the reduced proceeds from the issue.

The security laws in the US impose obligations on the professionals involved in an offering to exercise 'due diligence' to ensure that all information that may

affect a potential investor is examined and disclosed. The scope of these laws produce severe legal and financial consequences for underwriters. Further, by their nature, 'due diligence' investigations for IPOs are fraught with difficulties being based on the historical operating and financial information of privately owned companies undergoing transformation into public companies. This places significant legal exposure on the underwriters and advisers.

Accordingly, Tinic proposed that underpricing of IPOs serves as a form of insurance for both the issuers and the underwriters against potential legal losses and the consequent damage to their reputation. Tinic tested several of the implications of the implicit-insurance model. Firstly, Tinic tested the effect of the US Securities Act 1933, which widened the potential liabilities of the issuers and underwriters and increased the need for some form of insurance. Tinic then tested whether less experienced underwriters offer greater underpricing because they have a greater need for insurance and whether small and more risky companies offer greater underpricing because they are more likely to face legal liabilities. Tinic also tested whether underwriters avoid small, highly speculative IPOs where the risk of damage to their reputation is too high and the 'due diligence' investigations are too expensive or too difficult; and, whether the market share of the less reputable underwriters increases in periods when there are a large number of speculative issues.

Tinic's results supported the implicit-insurance model and showed that the extent of underpricing increased after the introduction of legislation defining the legal liability of issuers and underwriters. Further, the more prestigious underwriters were able to price more fully than the fringe underwriters; a difference that did not exist prior to the changes to the law. Indeed, it was found that the prestigious group started to avoid highly speculative issues following the tightening of the law.

## 2.4.8 Dynamic Information Acquisition

Beneviste and Spindt (1989) developed a model based on underwriters use of underpricing to induce regular investors to reveal information that can be used in the valuation process. The model is only valid for offers on a 'firm commitment' basis in the United States where a preliminary prospectus may be issued to test the market prior to issuance of the main prospectus. As noted, Beneviste and Spindt explain the existence of underpricing as an inducement to reveal information. Further, in order to elicit truthful information, the investment banker must underprice issues where favourable information is revealed to a greater extent than those for which unfavourable information is revealed. Investors would not reveal favourable information in the future if the underwriters continually used the information to remove all underpricing. According to the model, there will only be a partial adjustment of the offer price from the preliminary to the final prospectus to leave 'some money on the table' for investors. Underpricing will be greater for issues that are revised upwards in price than for issues whose offer price is revised downwards.

## 2.5 IPO Underpricing and Privatisation

There are relatively few studies devoted to the pricing of privatisation issues in capital markets. Jenkinson and Mayer (1988) examined the extent of underpricing for 11 French and 20 UK privatisation issues between 1979 and 1987. They found the average discount on the first day's closing market price relative to the offer price to be 25.05% for French tender offers, 32.79% for 14 UK fixed price offers and 2.5% for 6 UK tender offers. They found the average discount for all UK privatisation issues to be 22.2%.

These figures can be compared to studies of all IPOs over similar time periods. Husson and Jacquillat (1990) found the average underpricing in 131 French IPOs from 1983 to 1986 to be only 4.0%, while Levis (1993) found underpricing of 712 IPOs from 1980 to 1988 in the UK to average 14.3%. Although the time periods involved differ slightly, it could be generally concluded that privatisation issues display greater underpricing than the market average.

Menyah, Paudyal and Inyangete (1990) investigated the UK privatisation issues as IPOs and compared the underpricing involved with private sector initial public offerings. Their results indicate that privatisation issues provided excess returns above private IPOs on average by 31%. They concluded that none of the existing models were consistent with their result. Their result implied a wealth transfer to those subscribing to privatised shares and was in conflict with the government's fiscal aim to maximise sale proceeds.

Menyah, Paudyal and Inyangete rejected Tinic's implicit insurance model as being largely irrelevant in the UK where there have been very few cases of civil action on the basis of information contained in prospectuses. However, this may miss an important variation of the implicit insurance model. Tinic based the model on the US securities legislation and the liability that it places on issuers and their advisers, with underpricing being a means to reduce the probability of litigation. In the context of privatisation, the issuers are the government owners of public enterprises. Privatisation, to be successful, must have political support from the masses. Overpricing would impose significant political costs on the government and would threaten the future of the privatisation program. It could be hypothesised that underpricing of privatised issues is insurance for the government to ensure that investors do not lose. It also ensures that a wide share ownership pattern is achieved

since this may provide political support for the government if investors' experience is favourable.

After rejecting Tinic's model, Menyah, Paudyal and Inyangete focused exclusively on the information asymmetry model. They argued that the existence of informed and uninformed investors in privatisations is doubtful because of the efforts made to produce information on the privatisation issues to the public. Any residual information asymmetry is likely to be smaller than for private IPOs. Further, since informed investors have lower information costs in this context, the degree of underpricing should be smaller relative to private issues. They concluded that privatisation issues should produce no more underpricing than the 'equilibrium' level enforced in the market. On the contrary, they found that underpricing in privatisation issues significantly exceeded private issues.

Lee, Taylor and Walter (1991) sought to apply the lessons from the IPO literature to the privatisation of state owned enterprises in the UK. They used data provided by Vickers and Yarrow (1988) and proposed that variation in oversubscription rates reflected variation in the level of demand by informed investors. Further, given that the objective of privatisation was to promote a wide ownership pattern across the community, they proposed that the uninformed/informed dichotomy proposed by Rock (1986) should be more evident.

Lee, Taylor and Walter found a high degree of correlation between the level of underpricing and the extent of oversubscription for shares issued on a fixed price basis. In a regression of oversubscription rates and underpricing, a weak positive relationship was found. It was noted that explanatory power of the proxy used for aggregate demand was weak due to the underpricing of privatisations being greater than for IPOs generally. The authors suggested that this may reflect the

government's intention to attract small shareholders in spite of the economic cost. Interestingly, in the three cases of privatisation by tender offer, there was no evidence of underpricing and two of the offers were undersubscribed. Under the tender procedures, bidders pay the clearing price or marginal bid, not their own bid price. Informed investors would have no advantage in the process, and accordingly, would have no special interest in the float. This provides some minor additional support for the Rock 'winners' curse' argument.

Perotti and Guney (1993) undertook a large scale review of privatisation programs in 13 countries where a public offering of shares was undertaken. They documented extensive underpricing, which in most cases was greater than in IPOs of private companies. They also found that underpricing was largest for companies like utilities, with large taxable rents and which are exposed to changes in government policies after the privatisation. They argued that this is consistent with a signalling argument because of the policy risk involved and argued that it was inconsistent with the information asymmetry explanation over asset values, since the privatised companies were large and better known than the smaller private IPOs.

The authors compared two interpretations of the use of gradual sales by governments instead of selling the whole company initially. These are the 'market capacity view' and the 'confidence building hypothesis'. As the names imply, the first is based upon the belief that the market cannot absorb the whole sale of a large public enterprise which might swamp the market and depress the market price. The second model sees the need for the government to build confidence about its privatisation plans among investors.

Perotti and Guney support the confidence building hypothesis, which can be seen as consistent with the information signalling model of Allen and Faulhaber

(1989). Their argument was based upon the existence of substantial policy risk for investors in privatisation issues. They argued that to ensure investor support for the issue, the government must hold a stake in the company for some time even though managerial control is transferred immediately. The government, therefore, bears some of the policy risk of the issue. Over time the credibility of the privatisation program is developed and the government can accelerate the plan. Similarly, early sales may be underpriced to encourage the market to absorb larger sales.

## 2.6     Summary

This chapter has provided a detailed review of the literature on initial public offerings (IPOs). It has outlined the extensive evidence on the initial underpricing of IPOs and reviewed the models put forward to explain the phenomenon and the empirical testing of those models. The aim of this review was to identify the key variables involved in the initial underpricing of assets subject to privatisation by means of a public share offer.

Chapter Three continues the review of the literature with an overview of the literature on privatisation, its definition, the processes involved, and the main issues in the debate.

# Chapter 3.   Privatisation -- An Overview

## 3.1    Introduction to Privatisation

This chapter provides an overview of privatisation.  It is not an exhaustive study of all of the literature on privatisation because this would be beyond the scope of this thesis.   The review of the privatisation literature begins with definitions of privatisation, an historical overview and an introduction to the privatisation process. The objectives of privatisation and a discussion of the political and economic impact of the process are then considered.  The chapter continues with a discussion of the debate over privatisation and, in particular, a review of the arguments for and against privatisation.  The main advantage of privatisation is claimed to be efficiency gains, evidenced by lower costs.  The chapter concludes with a review of the performance of privatisation.

## 3.1.1   Definition of Privatisation

From the literature it appears that there is some confusion over the definition of privatisation.  Some authors use the term 'privatisation' to refer to the contracting out of services, while others use it to mean the sale of public sector assets.  Some authors use the terms 'privatisation' and 'deregulation' interchangeably, while others see them as being quite distinct processes and use the term 'privatisation' only where assets sales take place.

Hensher observed that privatisation had become 'a generic term for almost any activity that involves the transfer of ownership or service-provision rights from the public sector to the private sector' (Hensher 1986, p.147).  Similarly, Abelson defined privatisation as 'the transfer of activities and assets from the public sector to the private sector' (Abelson 1987, p.1).  Abelson noted that often privatisation was

defined narrowly as the sale of public assets or even more narrowly as the sale of public trading enterprises.

Ng and Wagner (1987) provided a wider definition of privatisation. Their definition included: the transfer of ownership of assets; the transfer of production; financial privatisation (the introduction of fees for public sector goods and services previously provided free); and finally, deregulation of markets to allow competition with public sector monopolies.

Blankart (1987) provided a succinct definition that captures these elements. Blankart distinguished between the privatisation of the supply of goods and services and the privatisation of capital. An example of the privatisation of supply of goods and services is the leasing of government owned assets to private operators, with the private suppliers taking responsibility for production while ownership of the assets remains with the government. Another example might be where an industry that was previously dominated by a government owned monopoly is deregulated. This would allow for competition in the provision of the goods and services provided by the public sector. In both of these examples, the government maintains its level of ownership, but relinquishes its control over the supply of goods and services. The privatisation of production occurs but not a transfer of ownership.

Parker (1993) proposed that privatisation involves two distinct processes: (i) deregulation in the product market accompanied by improved management performance and, (ii) privatisation of ownership in the capital market. Parker also considered that the efficiency benefits of privatisation could be realised at the preparatory or commercialisation stage that usually precedes privatisation. This stage may involve deregulation in the product market. Parker noted:

> ...the central hypothesis is that as organisations move away from political control and Exchequer financing towards more independent management their economic and financial performance improve. This should show up particularly when an organisation is privatized, but should also be evident when organisations remain in the public sector and achieve an 'arm's length' relationship with the government (Parker 1993, p. 33).

Yarrow (1986) included both asset sales and competition policy in a working definition of privatisation. He argued that any evaluation of privatisation had to consider both the relevant market structures and the regulatory and competition policies that were to be adopted at the same time as the asset sales.

> I take as my working definition of privatization the transfer from the public to the private sector of entitlements to residual profits from operating an enterprise, coupled with any accompanying changes in regulatory policy (Yarrow 1986, p. 325).

In summary, privatisation can be defined in a number of ways. This thesis is concerned with privatisation where ownership is transferred from the government to shareholders through an IPO. This may or may not also involve deregulation of the product market as part of broader industry structure changes. Such changes are only relevant to this thesis if they affect the value of the privatised company and the regulatory framework under which it operates. These factors may also have a direct impact on the pricing of the shares in the privatised company.

### 3.1.2 Historical Background

Megginson, Nash and Van Randenborgh (1994) observed that the government of Adenauer in the Federal Republic of Germany (FRG) launched the first post-war 'denationalisation' program. This was despite the common belief that the Thatcher

Government in the UK was the first to undertake a privatisation program. A majority of the shares in Volkswagon were sold in a public share offer. This offer was designed to encourage small investors to subscribe to the issue. Four years later, a similar float of VEBA was undertaken. However, the poor capital market performance of the company led the government to act to protect small investors. Megginson, Nash and Van Randenborgh reported that the two privatisations led to an increase in the number of shareholders in Germany. The total number of shareholders increased from 500,000 to almost 3 million. The poor experience of the VEBA issue lowered public enthusiasm for further privatisation issues.

Grimstone (1990) argued that an understanding of the historical background of the privatisation program in Britain was necessary to understand the program and the processes involved in implementing it. He observed that the state owned industry sector was established in the 1950's because of a range of political, economic and philosophical reasons. At that time, political motivations were behind moves to bring the major industrial elements of the economy under state ownership. The economic motivation was to enable rationalisation and reconstruction of the industries. Philosophically, it was felt that state ownership would instil a sense of public good into workers and management, enhancing productivity and efficiency and thereby moderating wage demands. Grimstone reported that the general feeling was that this process of nationalisation did not work. The state owned enterprises showed low returns on capital, low levels of customer satisfaction, and a poor record of pricing, productivity and human resource costs.

Against this background, the Conservative Government of the UK began a program of privatisation undertaking seven major sales during the 1979 - 1983 term. Grimstone (1990) noted that the 1983 General Election saw the Conservatives

include in their Manifesto detailed commitments on privatisation, when they outlined their intention to sell major publicly owned enterprises and to accelerate the pace and breadth of their program. The Manifesto stated:

> We shall transfer more state-owned businesses to independent ownership. Our aim is that British Telecom -- where we will sell 51% -- Rolls Royce, British Airways, and substantial parts of British Steel, of British Shipbuilders and of British Leyland, and as many as possible of Britain's airports, shall become private sector companies. We also aim to introduce substantial private capital into the National Bus Company. As before, we will offer shares to those who work in them. We shall also transfer to the private sector the remaining state-owned oil business -- the British Gas Corporation's offshore oil interests. In the next Parliament, we shall seek other means of increasing competition in, and attracting private capital into, the gas and electricity industries (Grimstone 1990, p. 5).

Grimstone noted that the political debate surrounding this program centred narrowly on whether privatisation involved 'selling the family silver.'

Following the example set by the UK, privatisation programs were implemented in almost all economies in the world. Programs have been implemented in both the developed and less-developed world and in democratic and non-democratic political systems. El-Naggar (1989), Adhikari and Kirkpatrick (1990), Alexander (1990), Perotti and Guney (1993), and Wright (1994), described major programs that have been implemented globally, and reported details of the programs that have been developed in Eastern and Western Europe, Africa, the Middle East, North and South America, the Pacific and Asia.

## 3.2 Objectives of Privatisation

Megginson, Nash and Van Randenborgh (1994) reported that the objectives of the UK Thatcher Government's privatisation program were similar to those of the Adenauer Government, even though the programs were two decades apart. Indeed, the objectives outlined by Megginson, Nash and Van Randenborgh were common to most countries undertaking a privatisation program. As Megginson, Nash and Van Randenborgh observed:

> All (privatisation programs) are ultimately based on disappointment with the actual performance of SOEs (state owned enterprises), and all perceive that the lure of financial incentives and the discipline of the capital markets will spur greater efficiency (Megginson, Nash & Van Randenborgh 1994, p. 407).

This quotation outlines the prime objective of privatisation: to improve performance through changing ownership. Under these conditions the drivers of improved performance are the financial incentives available to management and shareholders, and the discipline of the capital market.

Beesley and Littlechild (1983) outlined an overriding objective for privatisation. This was to maximise the present value of aggregate net benefits to UK consumers, as measured by falls in real prices of currently available goods and services. They recognised that there would also be an impact on the level of output, the quality and variety of goods and services available, and the rate of innovation. They also argued that there would be changes in the distribution of benefits and that the impact would be felt by employees, suppliers, exporters and taxpayers. Although they accepted that all these stakeholders would need to be considered, they saw the main objective of privatisation as benefiting current consumers.

Yarrow (1986) observed that the objectives of the UK privatisation program had not been explicitly stated. He considered that the following principal aims summarised the UK experience:

a) improving efficiency by increasing competition and allowing firms to borrow from the capital market;

b) reducing the public sector borrowing requirement;

c) easing problems of public sector pay determination;

d) reducing government involvement in enterprise decision making;

e) widening ownership of economic assets;

f) encouraging employee ownership of shares in their companies; and

g) redistributing income and wealth.

The first of these objectives reflects the aim of promoting economic efficiency and to help the economy compete in global markets. The pressure of global competition has become a prime driving force for privatisation for all countries, as reported in El-Naggar (1989), Adhikari and Kirkpatrick (1990), Alexander (1990), Perotti and Guney (1993), and Wright (1994). These authors clearly centred the debate on the economic gains created by the privatisation process. The potential for efficiency gains is predicated on the assumption that the public sector is inefficient and that the capital market provides greater discipline on management behaviour and encourages efficiency improvement.

Milanovic saw the motivation for privatisation as being threefold:

(a) to provide extra sources of revenue to the treasury, (b) to improve efficiency of the firms by handing them over to the private sector, and (c) ideological preference for the private sector (Milanovic 1989, pp. 109 & 110).

Milanovic did not consider that privatisation will necessarily lead to less state interference in the economy. 'It is quite conceivable that privatization may be accompanied by more extensive regulations or increased protection from competition' (Milanovic 1989, p. 110). He concluded that the impact of privatisation on the level of state intervention must be assessed on a case by case basis.

Bös (1991) covered many of these issues in discussing the economic arguments for privatisation. Bös saw the main arguments for privatisation being based on efficiency, distributional and fiscal reasons. He proposed two main efficiency arguments: technical and allocative efficiency. Bös observed that one of the most common arguments was that the technical efficiency of the firm is improved as a result of privatisation. This is largely a result of improved management behaviour. Three factors were seen as responsible for such improvement. Firstly, privatisation reduces government intervention in the operations of the business. Management decisions are then able to be made entirely from the point of view of the company. They can ignore other political and social factors that may have been important under government ownership. Secondly, the stock market places discipline on the management of the company. Management may respond with improved processes and projects designed to enhance capital market value. Finally, privatisation may be accompanied by deregulation in the product and labour markets of the firm.

Bös also argued that allocative efficiency arguments were centred on the issue of the natural monopoly nature of some public enterprises. A natural monopoly is where it is cheaper to produce goods and services as a sole producer because of the existence of economies of scale or scope. Where there are barriers to

entry, the producer can sustain its position and maximise its profits. If the monopoly is unregulated it may exploit the situation. Hence, to avoid such exploitation it must be either in government ownership and control or heavily regulated. Bös argued that the privatisation of these firms requires the establishment of a regulatory framework. Bös observed that this typically involves a price cap regulation, such as the 'RPI minus X' formula.

Yarrow (1986) reported that there have also been attempts at altering industry structure and deregulating the areas of industries that are not natural monopolies to allow for competition. Some elements of telecommunications and electricity generation have been deregulated, while the natural monopoly elements of the networks have remained regulated monopolies. This has allowed for competition in parts of industries that were previously dominated by a single supplier.

Bös raised another element of the privatisation efficiency argument concerning the quality of services provided. It is often argued that privatisation and deregulation lead to a deterioration in the quality of goods and services provided. This is likely where privatisation leads to the removal of social obligations imposed on the pre-privatisation enterprise. The issue becomes one of equity versus efficiency. For example, the government may require public enterprises to supply rural telephone services and off-peak transportation services, effectively subsidising services for lower socio-economic groups. Privatised firms are likely to cut these services because they are uneconomic; hence, the level of service to some consumers may fall. Bös observed that the government often imposes these obligations on privatised firms. This restricts the ability of management to improve the economic performance of the privatised firm. Bös concluded that any fall in quality following privatisation is usually a response to market signals that the prior level of quality was

not warranted, and, as a result, economic efficiency is improved. In any case, many privatised utilities are regulated with performance monitored in terms of both price and quality.

Distributional arguments over privatisation typically centre on who wins and who loses as a result of privatisation. Yarrow (1986) found that distributional arguments had become a prominent influence on privatisation policy decisions. Yarrow outlined three elements of the distribution question:

> The first is the change in both the level and structure of output prices that may occur following privatisation. The second is the price at which the shares in an enterprise that is being sold are offered to the market. Discounts on the market clearing price represent a transfer of wealth to the new owners from the wider public, and more particularly, from taxpayers. Third, privatization may also redistribute income towards those associated with the provision of services that can be regarded as inputs into the process of selling assets: for example, the financial institutions responsible for underwriting and placing or advertising agencies running the campaign (Yarrow 1986, p. 358).

The efficiency gains and higher profits made as a result of privatisation might increase the value of the firm, so that everybody wins. The key issue in the distributional argument is, therefore, the method of valuing the assets to be privatised. If under-valued, capital flows to private investors from the government; if over-valued, the reverse is true. Similarly, if privatised assets are systematically undervalued the underwriting risk is almost non-existent and the returns to those financial institutions are virtually risk-free. Further, if privatisation is successful in improving economic performance, the value of the assets is expected to be higher in

private hands. In this case, the distributional issue of who should profit from these gains arises.

The fiscal motive for privatisation is quite clear-cut. Privatisation serves to raise large amounts of capital for the government upon sale. It also increases the number of tax paying firms in the economy. In return, the costs to the government are in the form of lost dividends from the public enterprises and the loss of control over public enterprises for economic and social policy purposes.

Yarrow (1986) argued that selling public sector assets is the same as selling fixed interest debt securities. Both were seen as involving the mortgage of future income to improve current cash flow. Yarrow also observed that while privatisation is seen as a reduction in the Public Sector Borrowing Requirement (PSBR), the distinction is contentious since it does not result in a change in the net worth of the public sector. However, Yarrow also outlined how privatisation may signal that future government monetary and fiscal policy will be tight. The privatisation program may be a sign that future government borrowing levels will be low.

Yarrow concluded that the fiscal impact of privatisation is more about changes in the operation of public enterprises than changes in ownership. Privatisation may induce an improvement in the internal efficiency of the enterprise, and, hence, the enterprise is worth more in private hands. Both economic efficiency and public finances are improved as a result of privatisation. The economic efficiency objectives will be in conflict where the improved profit performance after privatisation results from greater exploitation of market power. Sales proceeds may be maximised by selling an enterprise with its market power intact, but the cost is likely to be in terms of economic efficiency.

This issue was also canvassed by Brittan (1984), who claimed that the impact of privatisation on the PSBR was purely cosmetic. Brittan argued:

> Much less hangs on the definitions than people suppose. Privatisation should be assessed on the basis of its likely effect on economic performance, or the wider functioning of society, not on the basis of its cosmetic effects on the Government's accounts (Brittan 1984, p. 114).

In summary, although privatisation programs may involve a range of expressed and implied political, economic and social objectives, the main explicit objective is improvement in the efficiency of public enterprises. This is considered possible through a change in ownership from public to private hands and through monitoring of management behaviour via capital market disciplines. In discussing the various objectives of privatisation the issue of the pricing of the assets involved has been paramount. Pricing plays a key role in the distributional outcomes of privatisation. This issue is discussed further in Section 3.4. The next section outlines the process of privatisation and the main issues flowing from it.


## 3.3 The Process of Privatisation

Figure 3.1 outlines the process of privatisation employed in the UK, as reported by the United Nations (1993). The process outlined has many common features with programs introduced around the world. There are four stages in the process.

The first stage in the privatisation process involves identification of privatisation candidates. This involves a feasibility study and preparation of background papers for the government. The decision to proceed with privatisation is followed by the selection of advisers to assist in the following procedures: preparing the business for sale, preparing legislation to change the status of the State Owned

## Figure 3.1
## The Process of Privatisation in the United Kingdom

**STAGE 2**

**PUBLIC CORPORATION**
Government owned by statute;
Loan financed;
Public sector management;
Often monopoly businesses.

**CONSIDER BALANCE SHEET**
Adjust balance sheet, if necessary.

Power to create and sell a company.

**FEASIBILITY STUDY**
Undertaken by civil service, merchant bank or management consultant.

**WELL RUN COMPANY WITH A REASONABLE BALANCE SHEET**
A Companies Act company; debt/equity ratio sound; commercially orientated management; reduced monopoly power.

**BACKGROUND AND OPTIONS**
Report to Ministers on possibility, options and prerequisites of any sale.

**STAGE 3**

**MINISTERIAL DECISION**
Decision in principle to proceed, choice of sale option to be pursued.

**SELECT ADVISERS FOR SALE**
Merchant bank, brokers solicitors, etc chosen for sale.

**GOOD RESULTS**

**STAGE 1**

**SELECT ADVISERS**
Merchant bank advisers for advice leading up to sale.

**CHOOSE MARKET** | **PRODUCE PROSPECTUS** | **BUILD IMAGE**

Decisions taken on how many shares to sell and how to fit sale in with other issues.

Advertising starts.

**PREPARE BUSINESS**
Strengthen management; introduce private sector attitudes and methods.

**PREPARE LEGISLATION**
Power to unwind the SOE and create a company.

**CONSIDER REGULATION**
Powers included to regulate any monopoly business.

**IMPROVED RESULTS**

**PASS LEGISLATION INCLUDING ANY REGULATORY MEASURES**

**FINAL DECISIONS**

**SELL (100%)**

**STAGE 4**

**TRANSFER OF OWNERSHIP FROM PUBLIC TO PRIVATE SECTOR COMPLETED**

Enterprise (SOE) to a company, and the consideration of any regulatory framework to be put in place for the privatised firm. If Stage One in the privatisation process is successful, legislation will have been passed to enable the enterprise to be converted into a company and to introduce an appropriate regulatory framework. In addition, at this stage the effect of changes to management and management practices should be reflected in improved operating results for the company and increasing potential value upon sale.

In Stage Two of the privatisation process, the original public corporation has been transformed from operating under its own legislation to operating as a company under the rules of company law of the country. In addition, its capital structure has been transformed from a dependence on loan finance to one with a commercially sound mix of debt and equity. Finally, any monopoly power may have been reduced via a regulatory framework or through the introduction of competition into its markets.

At Stage Three of the process, the government is in a position to select advisers to assist in the sale of the company. The advisers include underwriters, brokers, solicitors and other consultants who assist in choosing the method of sale and preparing the prospectus (if a public float). The advisers may also help build a positive public profile for the company. On the basis of this advice and feedback from the potential buyers of the company, the government will decide whether or not to proceed with the sale of the company. Stage Four of the privatisation process results in the successful transferral of ownership of the company from public to private hands.

The process outlined in Figure 3.1 was based upon the UK experience. The issue of whether all of these steps are necessary for a successful privatisation program

has been subject to debate. Megginson, Nash and Van Randenborgh (1994) expressly tested whether the managerial changes envisaged in Stage 1 were necessary. They proposed that because the French privatisations were undertaken without the 'preparatory phases' in the process, their post-privatisation performance would be different to privatisations where all steps were completed. They found no support for this proposition, indicating French privatisations were qualitatively identical to their whole sample and that the gains flowing from privatisation are realised through the change to private ownership and not in the 'preparatory phase.'

The choice of method for the sale is also subject to conjecture. Megginson, Nash and Van Randenborgh (1994) reported that the majority of privatisation sales have been through selling the enterprise directly to another company in a trade sale. In spite of the popularity of trade sales among governments, Megginson, Nash and Van Randenborgh also saw a role for public share issues in the sale process. They reported:

> First, the most economically significant SOEs can usually only be privatised through public share issues, and companies so privatized account for easily the largest fraction of all the assets and employees transferred to the private sector (between 1961 and 1990). Second, companies sold publicly are by far the most visible and politically sensitive of all privatisations, and it is the public's perception of their post-divestment performance that will determine whether the entire privatization program was a success or failure (Megginson, Nash & Van Randenborgh 1994, p. 417).

In the UK, most privatisations have involved the sale of 100% of the shares in the SOE, offered in an initial public offering. In addition, small investors were encouraged to subscribe to the issue to help achieve the wide ownership pattern

proposed as an objective of privatisation. The UK approach was in contrast to the approach advocated by Jenkinson and Mayer (1988), who drew three important conclusions from their study:

(i)    Privatisations are not appropriate vehicles for extending share ownership;

(ii)   Mispricings are best avoided by establishing traded security prices. This can be achieved by disposal of assets in stages. The first sale should be small and confined to institutions.

(iii)  Where tenders can be arranged they will reduce mispricings (Jenkinson and Mayer 1988, p. 489).

These conclusions also provided support for Beesley and Littlechild (1983) who argued that some mechanism for testing market price was necessary for privatisations using public share issues. They saw a role for the development of a futures market, where limited quantities of shares could be traded in advance of the main float. This would provide valuable information to supplement the professional advice received.

Baldwin and Bhattacharyya (1991) analysed the sale of Conrail (Consolidated Rail Corporation) in the US. Significantly, it was the only major privatisation through public share offer in the US and was the largest share issue in US history at that time. They found three problems in the chosen method of sale. First, the government had conflicting objectives, maximising proceeds while preserving the ability of the company to function as a going concern. Second, bidders in the process placed different values on the issue and did not compete effectively. Third, Conrail management had an information advantage over the seller and outside bidders. They also discussed different methods of sale that could overcome these problems; however, they could not find a single 'best method'.

Baldwin and Bhattacharyya (1991, p. 90) observed that the method of sale can have a profound impact on the outcome of the sale. They provided a series of steps in choosing a method of sale:

a) the seller must decide to sell as a going concern or liquidate;

b) identification of potential buyers who fall into four main categories: competitors, managers, third party buyers and dispersed buyers brought in via a public float;

c) the seller must determine a final pool of acceptable buyers, taking into account the objectives of the sale and any contingent claims that may survive the sale;

d) the seller must select a particular method; and

e) choose an appropriate disclosure policy (eg. sealed versus open bidding).

Grimstone (1988) provided a hierarchy of desirability for the method of sale, with public offerings having the most appeal and overseas sales the least appeal. Moore (1992) argued that fixed price sales were more vulnerable to both major outside events and fluctuations in the market in the lead up period to the float than tender issues. However, fixed price methods were of more appeal to the smaller investors targeted in the UK privatisation program. Moore outlined a mixed system in the UK, where small investors are offered a fixed price, while large institutions submit tenders.

Forsyth (1988, p.4) suggested the following criteria for the choice of privatisation method:

● the enterprise should be owned by those who can obtain the best performance;

- transaction costs should be low; and

- the resulting distribution of wealth in the community should be acceptable.

In summary, the main elements of the privatisation process are displayed in Figure 3.1. There are some areas in the process that are subject to debate, including the need for a preparatory phase and the choice of sale method. The question of pricing the issue is also a controversial one. This issue is considered in depth in the next section.

## 3.4    Pricing of Privatised Assets

*The single most critical step in implementing a privatization process is actually selling the industry in question ... Price and demand are the two pivots around which all sales revolve ... If your offering is oversubscribed, they will say that it was priced too low; if it is undersubscribed they will say it was priced too high* (Moore 1992, p. 122).

Moore summed up the basic problem in pricing a privatisation share issue. This was having to price something that has never existed in the commercial world, and involved having to uncover and value the effects of removing inefficient management and political interference. In the early stages of the UK program, Moore reported a heavy reliance on bankers and brokers who the government doubted were giving the best possible service. Moore also outlined how the introduction of competitive bidding by banks and brokers for privatisation issues reduced the cost of financial services substantially.

Beesley and Littlechild (1983) argued that the sales price for privatised assets should simply be the price investors are prepared to pay after considering the main

terms of the sale. These include:

- the aims and scope of the business;

- the structure of the industry and the conditions of new entry;

- the regulatory environment;

- any non-commercial obligations (e.g. employment, maintenance of community service obligations) and their funding (e.g. direct subsidy from government);

- the timing of the privatisation and of any changes to the industry and regulatory structures; and,

- future levels of government shareholdings and power.

Beesley and Littlechild argued that potential investors translated this package into a market price and successful flotation required an accurate forecast of this price. They also argued that there was no point in making gifts to 'stags' or imposing losses on underwriters, so the method of sale should aim to minimise over- or under-subscription.

Copeland, Koller and Murrin (1990) outlined how a private company considering a public float will usually employ a merchant bank or broking house to advise on the issue price and best issue method for the shares. The organisation's past pattern of earnings forms the basis of an accounting approach used in determining the issue price for an initial public offering. An expected price per share may be estimated using past earnings to estimate future earnings. A price-earnings multiple may then be estimated with reference to other similar companies in the market and a share price range can be estimated. The adviser then chooses a price within this range. The choice of price will determine the extent of discount offered to subscribers of the issue.

Lawriwsky and Kiefel (1993) outlined a valuation model for privatisation share issues. In this model, value is based upon future free cash flow which is discounted back to a present value using a cost of capital figure that reflects the business and financial risk of the enterprise. The main elements of value in the model are cash flow, growth in cash flow and risk.

A number of issues related to this model were raised by Lawriwsky and Kiefel, including: the capital structure of the company; the connection between politics and market pricing; the stage of the business cycle; and political costs of the sale.

The chosen capital structure for an enterprise being privatised directly affects the value of the proceeds from privatisation. High debt levels add to the financial risk of the enterprise and leads to a greater discount rate being applied to free cash flow in determining value. Management may prefer the enterprise to be floated with minimal debt to reduce financial risk and to enhance flexibility for financing future capital expenditure requirements. The issue of optimal capital structure for any enterprise is largely unresolved in the literature. The issue involves a balance between the costs of financial distress as debt increases and the benefits of the tax deductibility of interest payments.[1] However, an enterprise operating under government guarantee can tolerate higher levels of debt than the privatised firm which faces the potential effects of financial distress. Financial risk must increase following privatisation as a result of the loss of government guarantee.

There are also political factors that have an impact on the value and pricing of

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[1] This is not to deny the effect of agency costs and management signalling on capital structure. Jensen and Meckling (1976) used agency costs to argue that company value is not independent of capital structure and that this may be used to explain optimal capital structure. Further, management may use changes in capital structure to establish unambiguous signals about the company's future to the market. Ross (1977) was the first to propose that changes in capital structure may alter the market's perception of the company's value. A detailed review of this literature is outside the scope of this thesis.

the privatised enterprise. If the opposition parties are vocal in their opposition to the process and threaten renationalisation, this will reduce the value of the enterprise since it increases the risks that investors face. Likewise, the regulation of the firm in the future will affect the profitability, cash flow and value of the enterprise. The attitude of the main opposition political parties towards particular privatisations and details of the future regulatory environment have been included in the prospectuses of the UK privatisation floats. This has allowed investors to assess the level of risk involved. Even if these details are not included in the prospectus, informed investors may incur information search costs to find out the relevant details. These investors can then include these risk factors in determining the price they will be willing to pay for shares in the privatised entity.

The timing of the float may also be crucially important, affecting the price received for the assets and the future returns from ownership of the privatised assets. Lawriwsky and Kiefel (1993) reported that British Steel and Air New Zealand were sold at the top of their industry cycles. This maximised the price received by the government but resulted in underperformance in the aftermarket. In the previous chapter, the literature on initial public offerings was reviewed. One of the findings from that research supports the existence of the 'hot issue' markets and cycles of IPO activity as implied by Lawriwsky and Kiefel.

The final group of pricing factors outlined by Lawriwsky and Kiefel relate to the potential for value to be added to the enterprise once it is in private ownership and the role of the underwriters. The authors noted that all initial public offerings have risk attached to them because they are new and unseasoned securities. Privatisation issues face higher risks because of the uncertainty flowing from the transition to a private sector culture, regulatory factors, and the lack of accounting data to assess

prior performance. These factors increase the uncertainty facing all parties: the government and its advisers in setting a price for the issue; and the potential investors, in deciding whether to invest in the issue at that price.

Bollard and Mayes (1993) considered the difficulties experienced by the government in New Zealand due to its lack of experience in privatisation. The government found pricing the assets to be difficult and decided that sale by treaty (tender followed by negotiation) was the best method. This method enabled testing the market price of the assets prior to sale. In New Zealand there were no full market floats, in contrast to the UK experience. The New Zealand government argued that this maximised their proceeds since higher premiums were received for total control of a company. The government also argued that value was maximised by selling assets to those with expertise to ensure more efficient use of the assets involved. New Zealand did not use privatisation as a mechanism to promote wide share ownership. The fiscal and efficiency objectives were considered to be more important.

Notwithstanding the sale by treaty process employed in NZ, there were still cases where asset prices appeared too low. Bollard and Mayes reported that in one controversial case the Rural Bank reported very large profits after only one year of operation. This was politically embarrassing to the government.

Filatotchev, Buck and Wright (1993) also acknowledged the existence of valuation problems in privatisations. They noted that the problems were not necessarily resolved as the government developed greater experience of the privatisation process over time. They identified an interrelated set of factors, which included presentational, institutional, economic and accounting issues. They also noted that in the ex-communist countries of Eastern and Central Europe there were

other problems such as the absence of asset markets and unsophisticated accounting conventions. They concluded that these factors added to the uncertainty faced by governments, their advisers and potential investors.

The literature on privatisation share issues provides evidence on the existence of discounts or underpricing. Buckland found that privatisation sales were more heavily discounted than is normal for similar private sector sales. He also offered some explanation of the determinants of the discount but failed to provide evidence supporting them:

> This 'cost' is certainly partly explicable in terms of the inducement necessary to encourage new shareholders, to generate goodwill amongst them, to market large quantities of equity quickly and to promote an active aftermarket in the share (Buckland 1987, p. 245).

Buckland clearly saw the discounts as the price paid by the government to meet the non-fiscal objectives of the privatisation program. Kay and Thompson (1986) argued that:

> ...the financial gain or loss from a sale depends on whether the price paid is more or less than the present value of prospective shareholders earnings from the asset. Thus the critical question is whether the assets concerned have been sold at a discount or a premium to the market's assessment of their value (Kay and Thompson 1986, p. 28).

Kay and Thompson calculated the discounts involved[2]. The discounts ranged from 98% for Associated British Ports and 91% for British Telecom, to 8% for Jaguar and 6% for British Petroleum. The authors concluded that the degree of discount was

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[2] As measured by the change in price from the issue price to the closing price after one week's dealings, after allowance for market-wide share price movements.

high compared to private sector floats. Further evidence of the underpricing of privatisation IPOs was reviewed in the previous chapter.

Grout (1987) outlined reasons why the price received through privatisation could be greater than the present value of the future profit flows to the government from the unprivatised enterprise. Firstly, the privatised company may follow a different pricing policy, and the company will be more valuable in private hands. Grout saw this as not taking into account the welfare loss to society of the higher prices, which he argued were likely to be greater than the increased share price. Secondly, Grout argued that the higher share price reflected the efficiency gains that would flow after the change of ownership. This would be a real gain to society. Grout could not see why either of these reasons meant that the government should underprice the issue of privatised shares. He noted:

> ...there is no reason for the offer price to differ from the opening market price. However, one final reason why the government may not receive the discounted value of future profits is the desire of the government to widen the share base (Grout 1987, p. 68).

Grout went on to consider the fact that privatisation IPOs are similar to private IPOs with high degrees of uncertainty surrounding the issues. He also noted that if the government had an objective to promote 'peoples' capitalism' then it would underprice by a greater amount than for private IPOs. Grout saw other factors considered to add to the uncertainty about the offer price flowing from the IPO literature, including the need to increase the discount for larger floats to take into account the greater risks involved. Grout also noted:

> ...privatisations face the problem that the companies are household names, and, for reasons that are rather unclear, this traditionally creates an additional uncertainty about the correct price to pitch (Grout 1987, p. 69).

The previous chapter reviewed the literature demonstrating the underpricing of initial public offerings (IPOs). Privatisation issues display even greater underpricing than private IPOs, as found in Jenkinson and Mayer (1988) and Menyah, Paudyal and Inyangete (1990). The IPO literature review also considered the factors involved in this phenomenon. We should note the political impact of underpricing. Underpricing provides a gain to the successful applicants for shares in the newly privatised company. If the government wishes to encourage a wide share ownership pattern, the prospect of discounts is an important incentive for members of the public to subscribe to the issue. Discounts will provide political support for the government. Conversely, overpricing may cause the subscribers to an issue to feel resentful of the government. This will also lower demand for the shares in the future, thereby undermining the whole privatisation program.

From the opposing viewpoint, the underpricing of privatised assets may appear to be 'selling the family jewels' cheaply (Moore 1992, p. 119). Moore argued that if a wide share ownership pattern did not emerge then the government is effectively transferring wealth from the public purse to private hands. It was also noted that the public's reaction to privatisation may become more sensitive if the buyers are foreign or from a particular ethnic or political group in society.

Viravan (1991) argued that the realistic pricing of privatised assets was a critical factor in the privatisation process. He urged that 'privatization must have as its primary objective a firm intention to widen equity ownership and decentralise wealth in the nation' (Viravan 1991, p.15). An allied factor must be the degree of transparency of the process. It must not appear that any individuals or groups are being favoured in this process.

In summary, the pricing of privatisation share issues involves a high degree of uncertainty for the government, its advisers and the potential investors in the issue. It appears that privatisation issues have been priced to provide successful subscribers to the issues with short term gains. Some authors see this as the price the government pays to achieve its mixed objectives in the process. Others argue that political factors play an important part in the outcome. The next section explores the political economy elements of privatisation programs in more depth.

## 3.5    The Political Economy of Privatisation

Political considerations may be crucial determinants of the privatisation policies of a government, and the under-valuation of assets may be a deliberate ploy to gain political support for a government and its policies. Clarke (1993) provided evidence that privatisation was an unpopular policy with the majority of voters and concluded that underpricing may be a method of shoring up support at the margin. The political strength and will of the government may also have an effect on the privatisation process. Governments with strong majorities and leaders with a strong political will are less likely to underprice assets to maintain support.

Bös (1991) noted that the political side of the privatisation debate also involves the international distribution of power. Bös observed that foreign investors may buy control over industries vital to the development of the domestic economy through the privatisation process. In many cases, public enterprises were developed in the first place for economic development reasons. These included to correct for market failure, to counter large scale multinational involvement in the economy and to develop strategic industries to foster growth. Ownership of such industries by foreign investors may result in a loss of control and power over industries crucial to

a country's economic development. Bös also observed, however, that in some cases the government retained 'golden shares' to prevent hostile takeovers and changes in control. Thus, they effectively prevented any investor obtaining control.

Employees may be resistant to privatisation because of fears of job losses and deterioration in working conditions. Both of these factors may lead to union opposition to the process. Lawriwsky and Kiefel (1993) reported that in the UK job cuts occurred in some areas, but in others the new operating environment led to the creation of more jobs. They also noted the use of employee share ownership schemes that attempted to establish strong bonds between the workers and the newly privatised company.

Viravan (1991) identified a number of factors critical to effective privatisation. These were: strong political will and unambiguous objectives; realistic pricing of the privatised assets; managerial improvement and freedom from bureaucratic control; and a sufficiently strong and sophisticated capital market. Each of these items has a political dimension. The pricing issue was discussed in the previous section while the issue of management performance is one that has been subjected to empirical analysis, the results of which are reviewed in the next section. The remainder of this section considers the other issues: political will, wide pattern of share ownership and the role of the capital market. Before considering these issues the role of the political system in the privatisation process is considered.

### 3.5.1 The Role of the Political System

Privatisation has not been without its critics, nor has it necessarily been a popular policy. One would expect that since privatisation has become a global phenomenon, the policies are being implemented with substantial support of the population.

Somewhat puzzling, however, are the results of public opinion polls taken in the UK to determine attitudes towards privatisation. Clarke reported the results of several opinion polls:

> Gallop and NOP surveys suggested that 57% opposed privatization of British Gas; 56% were opposed to privatization of BT; and 72% expressed opposition to the privatization of water and electricity (Clarke 1993, p. 226).

Clarke concluded that privatisation was not directly concerned with economic efficiency nor democracy. He argued that it is a 'contradictory policy' that resulted in unstable industrial structures where the populations become exposed to potential monopolistic exploitation. Clarke argued that with the creation of private monopolies in essential industries, they become less socially responsible -- putting profit ahead of the quality of service. He also argued that they may even become less efficient, because as privately owned monopolies they may become less accountable. Clarke concluded that competition and regulation policy for privatised monopolies is crucial to the maintenance of equity following privatisation.

Walters (1989) summarised the political implications of privatisation across a number of countries, which were in contrast to Clarke's conclusions. Walters argued that the policy was a key factor in the re-elections of the Thatcher Government in the UK and the Lange Government in New Zealand, and has even been popular in the authoritarian regime in Chile. Even more modest programs such as in Spain and Turkey have met with political support. Accordingly, privatisation may have political as well as economic objectives, and may even result in unintended political consequences.

Hinton (1990) blamed privatisation for the Chinese uprising in Tiananmen Square. He argued that the reforms towards privatisation of the supply of goods and services and the privatisation of capital with its re-introduction of private property rights fuelled calls for democratic reforms. The demand for reform came from two sources: from workers, and from the new owners of property. In rural areas, the privatisation of land and farm production led to unemployment and the migration of workers to the cities to seek employment. In the cities, the privatisation of factories created a new group of capitalists who were able to exploit the oversupply of workers. Hinton saw these conditions creating the climate for the demands for democratic reform that led to the government's severe response in Tiananmen Square.

Sir Jeremy Morse questioned the role of the political system in privatisation in a question to Amnuay Viravan following his International Monetary Fund, Per Jacobsson Foundation lecture in Bangkok. Viravan was Chairman of the Bangkok Bank and a former Thai Minister of Finance. Morse posed the question in two ways: 'Is privatization essential for democracy? and Is democracy essential for privatization?' (Viravan 1991, p.19). Viravan argued that privatisation was essential in socialist countries facing democratic reform. He argued that an effective market economy could not be developed without private enterprise or private initiative.

Beesley and Littlechild (1983) outlined two of the political arguments in favour of privatisation. They noted:

> Respectable arguments support ... (that privatisation is desirable in itself) ...
> for example, that political freedom depends on private property, or that
> government intervention should be minimized, because the larger the
> government sector, the larger the threat to liberty (Beesley and Littlechild
> 1983, p. 2).

However, privatisation may also provide another mechanism for governments to further their own political objectives. For example, Ng and Wagner (1989) cite a number of instances where privatisation has been used by the Malaysian government to grant favours to their supporters.

Yarrow (1986) raised the issue that privatisation had the objective of reducing union power within the UK economy, but he concluded that there can be no presumption that the privatisation process will necessarily reduce union power. Indeed, in most cases, union power is a function of the negotiating stance of management. Yarrow argued that there may be instances where the government will have greater resources to be able to withstand union pressure. It is really a matter of the government's desire. In cases where it wishes to demonstrate toughness, it may use its resources to fight union power. However, in other cases, it may allow a generous settlement in one area to flow across the public sector.

## 3.5.2 Political Will

Milne defined political will as 'the determination of leaders, given their governments' capabilities, to promote stated political objectives' (Milne 1991, p.329). Milne argued that the success of the privatisation program in Britain was due to the political strength of the Thatcher Government. This was largely a direct result of the personality of Margaret Thatcher and her own personal will. Thatcher was able to implement privatisation and many of her policies largely as a result of her own political determination. She used this power in a number of ways. She attacked the power of the unions during the miners strike. She also implemented unpopular right wing policies and began a program to sell the major public enterprises of the government. These policies were implemented without major

electoral backlash. Milne concluded that it is doubtful that any other British politician could have implemented these policies and retained power.

Lawriwsky and Kiefel (1993) also saw a place for political will in a privatisation program. They identified political will flowing from the government's mandate, the security of its position of power, or the strength and will of the political leader. The authors also noted the potentially conflicting goals pursued in the privatisation process. These included the trade-off between maximising price and enhancing competition, and the effects of price regulation on the welfare of consumers as opposed to investors. They noted that discounts on shares may be a mechanism for furthering the objective of a wide pattern of share ownership.

Ng and Wagner (1989) noted that in less developed countries, the ruling political party is often in a position of substantial power, without an effective opposition. In this political environment, the government may have the political power to undertake a privatisation program regardless of the views of the population at large. However, privatisation is often part of programs aimed at developing a market economy. The government may require the cooperation, support and the capital of the population at large, and hence, must not endanger the popular view of the government's legitimacy. If the government introduces its programs without due consideration of popular opinion, it runs the risk of fuelling political unrest, and hence, may jeopardise development of a market economy.

In Malaysia, one of the first privatisation projects was the North-South highway. The contract was awarded to a company closely associated with the ruling political party. Ng and Wagner (1989) reported that this contract led to a political backlash against the Malaysian government. The successful tenderer, United Engineers Malaysia, was insolvent at the time and had tendered a price much higher

than many others. An opposition member of parliament, Lim Kit Siang, alleged a conflict of interest since the government had substantial interests in the company. He applied for a Supreme Court injunction to prevent the contract from being signed. Both Mr Lim and his counsel were detained under the Malaysian Internal Security Act. Ng and Wagner also cited instances of political favour being granted in the Malaysian privatisation process.

### 3.5.3 'Peoples' capitalism'

In a democratic society, the need to maintain the electorate's support is an important constraint in a privatisation program. Milne observed that:

> ...the most effective political will achieve its ends, not just by the exercise of
> a crudely asserted regulative capability, but is reinforced by sentiments
> among the citizens that the government is legitimate (Milne 1991, p.330).

The UK government aimed to achieve this for its privatisation program through promoting a wide pattern of share ownership. The notion of popular capitalism was intended to increase the distribution of share ownership in the country, and included employee share acquisition schemes intended to placate the opposition of the unions. This may have been an important determinant of the deep discount offered on most privatisation share issues in the UK. It has been noted that: 'The discounts provided an added incentive to investors, especially those who had never invested in shares before' (Moore 1992, p. 122).

Grout (1987) discussed the role of a wider share ownership program in economic performance. He observed that the UK government had committed itself to the policy aimed at reversing the decline in direct share ownership that had occurred throughout the 1960s and 1970s. During this period, the number of adults

directly owning shares had fallen from 7% in 1958 to 4.5% in 1979 (Grout 1987, p. 59). Grout also provided evidence that the situation had been reversed and that the estimated figure for 1987 was 19.5% of adults. Interestingly, 59% of respondents to Grout's survey held shares in only one company, while only 18% held shares in more than four. While the percentage of the population holding shares had increased, the greater majority of the shareholders did not have diversified portfolios. Also of interest was Grout's finding that only 30% of investors held more than £3,000 worth of shares. Despite the policy of wider share ownership, the main investors in shares remained large institutions who had increased the relative value of their holdings compared to small investors. Overall, the wider share ownership program appeared to have been successful in getting more investors to buy shares, but it had not arrested the swing towards major institutional investment as the main source of capital market investment.

Buckland (1987) also provided strong evidence that privatisation had little impact on shareholding in the UK: 'Whereas institutions owned 1.2 times the value of equities in personal sector hands during 1970, the figure had risen to 1.8 times by 1985' (Buckland 1987, p. 255).

Yarrow (1986) provided evidence that the objective of 'peoples' capitalism', had failed, since small investors tend to sell out early to realise their initial gains:

> Within one month of flotation, the number of shareholders in Amersham
> had fallen from 62,000 to 10,000; within one year of flotation the number
> had fallen from 150,000 to 26,000 in Cable and Wireless (first tranche) and
> from 158,000 to 27,000 in British Aerospace (Yarrow 1986, p. 357).

Bös (1991) argued that this phenomenon was not repeated for later issues because the government introduced measures to discourage investors from selling their shares

to realise their profit from the privatisation issues. Such measures included loyalty bonuses for holding shares for longer time periods and vouchers to provide shareholders with discounts on the goods and services of the firm. In addition, Bös argued that while early issues reached only sophisticated, speculative investors, later issues attracted much broader support.

Moore (1992) outlined the use of vouchers and bonuses to encourage small investors to hold their shares over a longer period of time. A small investors' bonus provided an additional 10% of the original number of shares to small investors who held their shares for more than three years. Vouchers were also introduced with the British Telecom float that entitled investors to choose telephone discounts instead of additional shares. The bonus share offer was the most popular option and Moore observed that it became a feature of most UK privatisations. Both measures were designed to attract small investors and encourage them to retain their investment. Both measures were also opposed by the companies involved. It should be noted that these schemes added to the real value of the discount offered in the privatisation.

While Grout (1987) saw few advantages in a wider share ownership objective in a privatisation program, he noted that the discounts offered on privatisation IPOs was a direct inducement to encourage a wider share ownership pattern. The average discount on shares in privatised companies in the UK had been 21.1% (Vickers and Yarrow 1988, p. 174). Milanovic observed:

> The combination of cut-price privatizations to the public at large, employees, or users of particular services, contributed to a dramatic rise in the number of individual shareholders. Between 1979 and 1987 the total number of shareholders in Great Britain expanded roughly fourfold: from a little over 2 million to 9 million. The latter figure represents 21% of the

adult population, only 6 points below the level in the United States (a paramount shareholders' country) (Milanovic 1989, p.112).

Brittan (1984) proposed the ultimate method of encouraging 'peoples' capitalism' -- giving the shares away. He argued that if the shares are given away then the problem of any conflict between efficiency and fiscal objectives is solved. The objective of raising revenue from the privatisation would be abolished. He also argued that this solution would solve any distributional problems because the shares would be issued equally to all citizens. It would enable citizens to have the benefits of wealth ownership, which would not be available had the enterprise been sold and the proceeds used to finance tax cuts.

Bös (1991) also raised the issue of 'peoples' capitalism'. Bös argued that because the person in the street could buy shares in major industries, replacing the government as the sole shareholder, a wide spread of any distributional effects of privatisation was possible. He also noted that it builds a barrier to potential renationalisation by a future government, which would prove politically unpopular where low income earners and employees hold shares. A discount on the share issue price provides the incentive for small investors to subscribe to the privatisation and issue procedures may be put in place to favour such investors.

Milanovic (1989) outlined a special kind of privatisation involving the sale of shares to employees in an employee buyout. As the workers sell shares to the public the organisation is likely to evolve towards a typical publicly owned company. It was argued that these modes of privatisation also have appeal in that they further government aims to widen the pattern of share ownership in the economy. They also protect the privatisation from renationalisation since the greater the distribution of share ownership the greater the resistance to a potential renationalisation.

Grout (1987) provided details of the extent of employee share ownership following eight of the UK privatisations. In the majority of cases over 90% of employees took up their entitlement for shares. The only exceptions were National Freight (36%) and British Aerospace (74%). Grout noted that the employee shareholding schemes created diversification problems for the employees. It encouraged bundling rather than diversifying risks and that this was exacerbated where profit sharing arrangements were in place. This meant a high correlation between income and wealth was created.

Brittan outlined the main case for employee share ownership as being: 'the increased personal motivation from having a stake in the fate of the enterprise in which one works' (Brittan 1984, p. 124). It was also noted that workers who are shareholders lose their objections to high profits, as the distinction between pay and profits becomes only one of accounting convenience. Brittan also saw the lack of diversification as one of the main problems of employee share schemes.

Brittan considered the other main problem to be one of equity. Not all citizens have access to the employee share deals in privatisation. In addition, the benefits may flow unequally across industries. Workers in capital intensive industries stand to gain more than those in labour intensive industries.

### 3.5.4 Capital Market Considerations

The degree of development of the capital market will have an important bearing on the success of a privatisation program. This is especially so where privatisation involves floating shares to the public. Privatisation may provide a mechanism for the mobilisation of national savings. If the domestic capital market is underdeveloped and national savings are low privatisation may result in a low level

of sales to the few domestic investors. In these cases, privatisation must involve a large overseas involvement. The political consequences of this may be quite damaging to the government. For example, Pangestu and Habir (1989) reported opposition to privatisation in Indonesia based on the need for public enterprise to counter the private sector dominance of Chinese Indonesian businesses and foreign investment. They also observed a problem emanating from the small pool of potential domestic buyers and the political sensitivity of sales of public enterprises to large Chinese companies and foreign investors.

Milanovic (1989) also identified a related problem with privatisation and its link with competition and the degree of development of the capital market. Where the market is 'thin' large scale privatisation will lead to the firms being bought up by the few powerful industrialists, which decreases rather than increases competition. He also observed that if the government sells a monopoly before breaking it up, it will maximise the proceeds but will not increase competition in the industry. This was the case for British Telecom, British Gas, and Nippon Telephone and Telegraph. Milanovic also noted that a government is more likely to allow free entry into the markets after privatisation. The government is more likely to defend its own monopoly rather than a privately owned one. The threat of deregulation post-privatisation adds to the risk faced by investors in the company.

The motives for privatisation and the processes employed are likely to differ between developed and developing nations. There are a number of possible reasons for this. The different forms of privatisation may rely heavily on the stage of development of the country and its capital market. Indeed even in the UK, with its highly developed capital market, Buckland (1987) reported concern over the ability

of the market to absorb the major share floats that were a feature of the Thatcher program.

Moore (1992) also noted the doubts about the ability of the markets to absorb privatisation issues. He outlined the problems of the British Telecom float in 1984, which was the largest public float the world had seen at that time. Moore reported that the financial community provided the stiffest opposition on the grounds that they felt the market could not cope with such a large issue, and they were not keen to see large numbers of small investors involved. Moore argued that one of the greatest successes of the program was the growth in the number of investors in the market, which enabled such large floats to be successful and in fact oversubscribed.

In summary, a range of political issues surround privatisation. Unlike a private firm undertaking an initial public offering, the privatisation IPO is both a capital market and a political process. Privatisation has an impact on the political system itself, promoting private property rights and democratic processes. The political will of the government is also directly relevant to the process. Governments with political power can undertake privatisation programs in spite of any adverse public opinion. In addition, privatisation IPO underpricing may be used to encourage 'peoples' capitalism', that may strengthen the government's political position, even though there are doubts about the success of the policy in capital market terms.

The next section considers impact on the product market of privatisation, and in particular, the effect of uncertainty about industry structure on the valuation of the privatised company.

## 3.6    Competition, Regulation and Industry Structure

### 3.6.1    Industry Structure

Lawriwsky and Kiefel (1993) observed that the government can influence the product market outcome through its industry policy settings. They also noted that the government will look to establish the optimal industry structure for a newly privatised enterprise. This may involve the creation of a competitive market framework by dividing a monopoly into efficient and economically viable forms. They also argued that in cases where a 'natural' monopoly exists a regulatory structure must be established that best approximates a competitive environment.

Lawriwsky and Kiefel argued that the determination of the optimal industry structure will take into account any economies of scale and scope. They referred to the need to consider the feasibility and desirability of vertical separation of the industry, as well as the horizontal competitive structure. They also saw the need to determine how new competitors could enter an industry because entry may be obstructed if large capital costs are involved. In these cases, the government may use policies such as restricting the number of new licences issued to promote entry. In this way, potential entrants would be encouraged by the knowledge that the number of new entrants after them would be limited, thus enabling them to recoup their investments.

Beesley and Littlechild (1983) argued that competition was the most effective mechanism for maximising the benefits to consumers and for limiting any monopoly power. They identified the main factors as rivalry and freedom to enter a market. They argued that although this falls short of the 'perfect market' from the economics literature, it may be more realistic for privatised industries. They argued that the

relevant comparison was between the level of competition prior to privatisation and that which could be created post-privatisation.

Vickers and Yarrow (1988b) saw the natural monopoly transmission networks as a common problem in privatising the large public utilities. They argued for regulation designed to promote competition and to restrain the large privatised companies from predatory behaviour against any new, smaller competitors. The industry structure chosen for the privatised company was seen as vital in the deliberations over regulatory measures. They argued: 'Whereas vertical separation would have reduced incentives to distort competition, vertical integration requires effective regulation of conduct' (Vickers and Yarrow 1988b, p. 471).

Moore (1992) also recognised that the best way to keep prices down and quality high in an industry was through competition. He argued that one of the principal roles of government in privatisation was to ensure that the market was kept open and that the competition was real. However, Moore conceded that monopolies provide special problems. In the absence of competition steps needed to be taken to devise substitutes for competitive pressures. Moore outlined the use of licences and the development of regulatory bodies as the main substitutes for competition in the UK. Brittan (1984) argued that the full benefits of privatisation will only be realised where it is accompanied by greater competition, and that if regulation has to be used to control monopolies, it is a highly inadequate mechanism. The next subsection considers the regulatory mechanisms that may be used as a substitute for competition for privatised monopolies.

### 3.6.2   The Regulation of Privatised Companies

In the UK, a system of 'RPI minus X' price regulation has been employed. In this

system, price rises for a privatised company are limited to the rate of inflation less a factor (X) set by the regulator to encourage efficiency. Littlechild (1983) outlined the method employed in the UK. Prices are capped with reference to the consumer or retail price index minus a negotiated 'X' factor. Brittan (1984) observed that the inventors of the scheme did not see it as a permanent solution for control. He argued, in line with Beesley and Littlechild (1983), that: 'Repeated bargaining rounds over the size of X, in the light of past profit performance, would eventually cause the scheme to degenerate into ordinary cost-plus' (Brittan 1983, p. 117).

Beesley and Littlechild (1989) considered that the 'RPI minus X' method was superior to the rate of return regulation in the US. In the US, monopoly public utility prices are set to yield a legally determined rate of return on capital. Beesley and Littlechild (1983) argued that the US rate of return regulation led to cost-plus inefficiency, disincentives for efficiency improvements, overcapitalisation and a high cost of enforcement. Beesley and Littlechild argued that the best method of regulation was to introduce competition, although they considered that in some cases monopoly power would remain, including scope for predatory pricing to fight off any competition.

Beesley and Littlechild (1989) pointed out that the factor (X) is set in the first instance as part of the privatisation strategy, since it will affect valuation and net receipts to government. After this stage, an independent regulator determines the factor. There is a risk that if the regulator looks to set the factor with reference to past returns, then the problems associated with over-capitalisation may emerge. There is also the possibility of windfall losses to investors. This takes on particular importance given the fact that there are many small investors in a privatisation issue. As noted above, employees and small shareholders are often encouraged to invest in a

privatisation issue and these investors typically do not hold well-diversified portfolios. Accordingly, the small investors are likely to lose and feel aggrieved by the privatisation and regulatory process if losses result.

Vickers and Yarrow (1988b) summarised the advantages of the 'RPI minus X' form of regulation compared to the rate of return regulation used in the US. They argued that the regulatory burden was not so severe since it is limited to checking if price increases are in line with the formula. They also argued that the incentives for productive efficiency seemed good because the benefits from innovation and cost control were retained by the firm. They saw the key factor involved in the choice of the X factor as the potential rate of improvement in cost efficiency, after taking into account demand growth and technological change. They argued that the initial X factor should reflect the scope to remove the inefficiencies that existed under public ownership. Overall, they concluded that the mechanisms provided good incentives for cost control. Vickers and Yarrow also found that the ability of the 'RPI minus X' regulatory framework to provide incentives for efficient pricing was limited by the degree of competition in the industry.

An alternative regulatory mechanism is regulation by 'yardstick' as proposed by Yarrow (1989). Under this scheme, independent operators will have prices set by reference to the average level for the country, enabling more efficient producers to make larger profits. The scheme also introduces the threat of takeover as less efficient management is removed in favour of those best able to improve performance. This was the method proposed by Yarrow for the private providers of electricity and water in Britain. However, these companies were privatised using the 'RPI minus X' approach.

Lawriwsky and Kiefel (1993) outlined another approach to regulation employing the methods currently used in Australia through the Trade Practices Commission and the Prices Surveillance Authority. The approach is described as 'light handed' regulation that seeks to monitor market outcomes rather than use 'heavy handed' approaches that suffer the problems of deciding factors like the cost of capital, price caps, and entry conditions.

In summary, the industry structure and related policies chosen by the government for privatised companies have a direct impact on their value. In particular, where a company is operating as a monopoly the literature clearly advises the introduction of competition to enable the benefits of privatisation to be realised. Where it is not feasible to introduce competition, regulatory frameworks must be introduced to substitute for the disciplines of competition.

In both cases, government policies directly affect the value of the privatised firm. Clearly, the sale of an unrestrained monopoly would maximise the government's proceeds, but it would fail to achieve the other objectives of privatisation, in particular, efficiency. In addition, investors in these cases would also face the risk that future governments might change the industry policy. Where a regulatory framework is introduced, the value of the firm is reduced by restrictions on pricing and the risks of potential changes in the regulatory framework over time. The government's industry structure and regulatory policies add to the ex-ante uncertainty faced by investors. From the IPO literature, high levels of ex-ante uncertainty require deep discounts to attract investors.

## 3.7    The Debate over Privatisation

In this final section of the privatisation literature overview, the debate over privatisation is considered. It was reported earlier that economic efficiency is seen by many as the overriding objective of privatisation. Efficiency considerations dominate the debate over privatisation.

### 3.7.1    The Case for Privatisation

> *In every great monarchy in Europe the sale of crown lands would produce a very large sum, which, if applied to the payment of the public debts, would deliver from mortgage a much greater revenue than any which those lands have ever afforded to the crown. . . When crown lands had become private property, they would, in the course of a few years, become well improved and well cultivated* (Adam Smith 1776).

The drive towards privatisation has been fuelled by the expected efficiency benefits foreseen by Adam Smith two centuries ago. Ng and Wagner (1989) saw the main benefits as: the reduction of government deficits through the sales proceeds and ongoing taxation revenues; the reduction of overstaffing; reduced government debt levels; and the elimination of sub-optimal use of resources. Allied benefits might flow from a reduction in undue influence from the government and through reduction in corruption levels.

For a less developed country, privatisation is seen as facilitating development of the capital market. It also acts 'as a key to streamlining inefficient state

enterprises, reducing pressure on the national budget, and laying the foundation for a vibrant private sector' (Asiamoney 1994, p.45).

Clarke and Pitelis (1993) reviewed the literature on the case for private ownership and market location. They concluded that it is based upon three well-known theories:

> First, the neo-classical property rights school, which suggests that communal ownership (the lack of private property rights) will lead to dissipation. Second, Hayek's view of 'dispersed knowledge'. According to this, knowledge is widely dispersed in every society and efficient acquisition and utilisation of such knowledge can only be achieved through price signals provided by markets. Third, Alchian and Demsetz's 'residual claimant' theory which suggests, much in line with the property rights school, that private capitalist ownership of firms is predicated upon the need for a residual claimant of income. In the absence of this income members of a coalition, for example a firm, would tend to free-ride, thus leading to inefficient utilisation of resources (Clarke and Pitelis 1993, p. 2).

Rowthorn and Chang (1993) rejected each of these theories as not providing a general case for private ownership. They noted:

> Despite their merits, these theories do not provide much support for the proposition that private ownership is intrinsically more efficient than public ownership. Why, then, are we so often told that the performance of public enterprises will be improved by privatization? In our opinion, the answer to this question lies not primarily in conventional economics, but rather in the sphere of politics and political economy -- that is, in the factors which influence government decision-making and determine how the state apparatus will behave in practice, (Rowthorn and Chang 1993, p. 59).

Moore (1992) reported the reasons for privatisation from the perspective of the UK government. John Moore was a minister in the Thatcher Government for ten years, including four years where he was responsible for the initial stages of the privatisation program. He argued that privatisation was:

> ...a practical process by which a state-owned industry can join the free market with visible, often dramatic gains for the industry, its employees, its customers, and for its citizens who set it free by purchasing its shares. More important, privatization has become an educational process by which the people can grasp the fundamental beliefs and values of free enterprise (Moore 1992, p. 116).

Moore saw the main benefits of privatisation as being improved company performance, broadened share ownership and the refocus of government away from ownership to regulator.

Moore argued that the opponents of privatisation lost the debate because implementation of the policy was successful and facts overtook the debate. However, Moore did not offer any empirical tests showing whether privatisation was successful.

Walters (1989) argued that the key feature of privatisation is the reassignment of property rights from the state to the individual. Powers that were once the domain of the state are devolved to private sector interests. Walters also saw two distinct issues in the privatisation process, the transfer of property rights and the payment for them. He argued that the transfer of property rights was the main issue. The payment issue was only relevant to the extent that it affects wealth and income distribution. Walters saw changes in property rights transforming the organisation and creating new incentives. Walters explained further that the issue of

payment was secondary to the fundamentals of privatisation, but had a central role in considering equity issues and in regard to the development of capital markets.

Walters' main premise was that privatisation was a good policy if it results in a marked improvement in the efficiency of the organisation. He saw this as being the central issue in economic debate over privatisation, and he ignored the political, social and administrative reasons for privatisation. Walters only considered these issues in passing. His main focus was the economic efficiency argument.

Walters also considered the other economic arguments for privatisation based on it being a means of reducing government borrowing requirements, helping to control aggregate demand and inflation. He made several points in this regard. Firstly, a reduction in the government's borrowing requirement will only occur where the asset is sold at a net positive price. In many privatisations around the world assets are either given away or actually cost the government to dispose of them. Secondly, even if the sale does raise considerable cash and reduces borrowing requirements, without substantial efficiency gains there will be little impact on demand and inflation. If priced correctly the government receives a capital sum that only reflects its loss of future earnings from the enterprise. The absorption of the new equity from the privatisation into the capital market exactly offsets the reduced government borrowing requirement. Accordingly, Walters observed that unless there were efficiency gains, privatisation merely results in a transfer, with no net effects on wealth, inflation, or real output. He further asserted that privatisation was not a substitute for either reducing public expenditure, increasing tax revenue, nor reducing the monetary expansion of the central bank, but must be part of overall government economic strategy.

It can be concluded that the main economic argument for privatisation was on the grounds of efficiency. According to Walters this can take the following forms:

- an increase in output from existing inputs;

- a reduction in inputs required to produce existing outputs; or

- an improvement in the quality of output, or some combination of all three.

The next section reviews the empirical studies of public enterprise performance and privatisation, with a view to determining whether the efficiency objective of privatisation has been achieved. It is relevant to this research because the potential for improving the performance of a privatised enterprise is a component of value. As noted above, the extent of efficiency improvements possible is an input into the government valuation process which creates a degree of uncertainty. The potential for operating improvements must also add to the uncertainty facing potential investors in the privatised company. Much of the research related to efficiency has been aimed at determining whether the public or private sector is more efficient, relatively little has been published on the pre- and post-privatisation performance of companies.

### 3.7.2 The Comparative Performance of Public and Private Enterprises

Moore (1992) argued that the failure of public enterprise was due to a number of factors: the conflict between commercial and political objectives; political interference in pricing; restrictions on access to capital markets; the lack of incentives to management; and, the fact that survival is not dependent on success.

In a similar vein, Rowthorn and Chang (1992) argued that the question of public sector efficiency cannot be separated from politics and the attitude of the state

towards factors like industry structure and fiscal issues. They argued that where government enterprise can insulate itself from political pressures it can operate efficiently. If this is the case, privatisation will not lead to greater efficiency. Their argument was based on the belief that the inefficiency of public enterprise is due to political interference in management.

The evidence on the relative efficiencies of public versus private enterprise follows three main forms:

- before and after privatisation (or nationalisation) time series studies;

- cross-sectional comparisons of private and public corporations in the same business; and

- studies of management and techniques.

Walters reported that the time series studies generally found the interesting result of efficiency gains in the periods immediately prior to privatisation. It could be concluded that all is needed is the threat of sale to obtain the efficiency gains of privatisation. Walters also reported that management studies of privatisation were rare, which is unfortunate because management is often one of the key factors that changes in a privatisation. This may not always mean a change in managers but a change in the incentives to management. This may also be associated with a dramatic change in the structure and form of management responsibilities.

The question of whether or not privatisation leads to efficiency gains can be answered empirically. However, whether or not any gains are the result of purely political factors or result from the inherent superiority of private ownership is not easy to determine.

A number of the studies have found evidence in favour of privatisation enhancing economic efficiency (Bailey 1986, Bishop and Kay 1989 and Prkye 1982), while others have found the opposite (Kay and Thompson 1986 and Wortzel and Wortzel 1989). Boardman and Vining (1989) provided a review of the literature on the relative efficiency of state owned enterprises and private companies.

Molyneux and Thompson (1987, p. 48) observed that no comprehensive review of the performance of the UK nationalised industries had been undertaken since the 1978 White Paper introduced new measures that emphasised profitability, return on capital, and cost efficiency. They found that the reforms had resulted in improved performance in public enterprises, although they found scope for further improvement. Significantly, they found the greatest reforms in areas where competition had been introduced, and they concluded that competition policy needed greater emphasis.

Caves and Christensen (1980) provided a classification that put the issues of competition and privatisation into perspective. They saw four types of company, distinguishing public and private ownership, and competitive and non-competitive industries. They noted that there was little disagreement that private, competitive firms were the most efficient and that public, non-competitive companies the least efficient. However, they observed that ranking the other types of company was difficult, given that competitive forces may have a greater effect on efficiency than ownership. Their study found that public ownership was not inherently less efficient than private ownership, but that the absence of competition was the cause of most inefficiency.

Boardman and Vining (1989) considered the property rights theory that public enterprises should perform less efficiently and less profitably than private enterprises.

They observed that, except for studies in Indonesia and Tanzania, no study had explicitly considered the effect of ownership on performance, while controlling relevant factors. They compared the performance of the top 500 non-US industrial firms, which included 58 state owned enterprises and 23 mixed enterprises (where both private investors and the government hold shares). They found that after controlling for a wide variety of factors, mixed enterprises and state owned enterprises performed worse than similar private companies. They also found that partial privatisations may result in worse profitability than either complete privatisation or continued state ownership. They also found that there were performance differences between public and private companies in competitive environments.

Eckel and Vermaelen studied the effect of partial government ownership on the value of shares. They observed that government influence may:

> ...benefit consumers through lower prices, higher quality, or increased availability of the product; workers who are employed directly or in some related business may benefit through higher wage rates or availability of jobs; taxpayers could benefit through the collection of economic rent or because of the reduction of an externality; and debtors of the firm may benefit because the risk of default by a failing firm may be reduced (Eckel and Vermaelen 1986, p. 399).

They argued that these factors lower profitability and that this reduction is capitalised into lower share prices. They did, however, outline some offsetting factors that may improve the profitability of the mixed enterprise as a result of the government retaining some shareholding. These included access to government policy making, reduced risk of failure and any subsidies that may be granted.

Bishop and Kay (1989) found no real evidence of major efficiency gains as a result of privatisation from an early post-privatisation survey of UK companies. However, later research by one of the authors found conflicting results. Bishop and Thompson concluded:

First, it is clear that economic performance improved during the decade across the public sector. If you accept that the central goal of the reforms was to increase the efficiency of the public sector, then the reforms must be judged a success.

Second, improvements in performance were more substantial in companies operating in competitive markets or where the introduction of greater competition -- through deregulation or tendering -- was feasible. Performance improvement, although positive, was less impressive in the natural monopolies. Ownership change, too, cannot be easily linked to changes in performance. Indeed, the many reforms to companies whilst still under public ownership, by replicating the conditions and pressures observed in the private sector, inevitably reduced the scope for a clear connection between privatization and performance (Bishop and Thompson 1993, p. 26).

Bishop and Thompson (1993) also found that employment was the major casualty of privatisation with the burden falling on older workers who in general did not work again. However, in terms of overall equity, they found privatization to be essentially neutral. Licence conditions had forced the privatised companies to subsidise unprofitable services such as rural telephones and bus routes.

Bishop and Thompson (1993) indicated that substantial regulatory challenges lay ahead for the privatised utilities. They also noted that quality appears not to have been compromised in the pursuit of economic efficiency. However, they saw the need for regulators to monitor the situation. The 'RPI minus X' formula approach to price

regulation was considered to have been successful to date, but because it is a 'second best' solution, the true potential performance improvement remained obscured. They considered that the real level of potential improvement would only be seen if a competitive market was created.

Parker (1993) sought to test whether performance had changed for a number of public sector bodies following a change in organisational status. The status change may have involved commercialisation, privatisation or any change designed to improve the performance of the organisation. Parker also sought to identify the cause of any performance changes. Parker's results confirmed that a move from public ownership towards private ownership[3] resulted in improved performance. Performance was measured in terms of employment levels, productivity and financial ratios. The reasons for the improvements were found to be associated with major changes in organisational structure, objectives, management, labour relations, communication and reporting systems, and the nature and location of the business. Parker expressed some reservations about the findings since there seemed to be many subtle forces involved. He also argued that privatisation must be accompanied by changes in the internal environment of the organisation if efficiency gains are to be realised.

Lawriwsky and Kiefel (1993) outlined a number of components of performance. They began with the performance of the transaction itself, followed by analysis of performance of the privatised entity. Their first measurement of performance was the actual privatisation transaction. For privatisation accomplished through a public float, the capital market provided measures of success in terms of the

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[3] The changes included commercialisation which can be seen as introducing private structures to the organisation.

initial listing and aftermarket performance. Oversubscription rates indicated the success of the float in attracting investors, while the performance of the shares in the aftermarket indicated the success of the issue in the secondary market. The evidence from the UK shows that most privatisation issues have been underpriced with high levels of demand reflected in large oversubscription rates.

Other dimensions of performance include prices, costs, quality, employment levels and environmental impact. Lawriwsky and Kiefel reported that evidence from the UK has been encouraging. Real telecommunication prices have fallen by 27% since 1984, and real gas prices by 20% since 1986. The authors argued that the price reductions were not at the expense of quality. British Telecom reported a lower time to repair faults and British Airways has scored highly in customer satisfaction surveys.

A recent major study by Megginson, Nash and Van Randenborgh (1994) addressed the financial and operating performance of newly privatised firms. The authors felt that the motives for privatisation had not been properly justified by rigorous academic study and debate. They noted:

> What we find most surprising about the privatization programs of the 1980s
> ... is not their size or scope but the fact that they were adopted largely on
> faith. The academic literature available at the time these decisions were made
> offered precious little guidance as to the best method of divesting state-owned
> assets and only limited theoretical analysis of the predictable costs and
> benefits of privatization (Megginson, Nash & Van Randenborgh 1994, p.
> 404).

The authors also noted that the previous studies were contradictory in their findings. A number of the studies in favour of privatisation enhancing economic efficiency (Bailey 1986, Bishop and Kay 1989 and Prkye 1982) as well as those finding the

opposite (Kay and Thompson 1986 and Wortzel and Wortzel 1989) were deficient. They were based upon a small sample of companies, in a single country and were not statistically significant. Megginson, Nash and Van Randenborgh aimed to overcome the problems of the previous studies by: 'obtaining truly comparable pre- and post-privatization data for a large, multinational, multi-industry sample of companies' (Megginson, Nash & Van Randenborgh 1994, p. 406).

Megginson, Nash and Van Randenborgh studied the pre- and post-privatization performance of 61 companies from 18 countries and 32 industries that experienced full or part privatisation by public share issue between 1961 and 1990. Their results showed strong improvements in performance for the companies including increased real sales, profitability, increased capital investment spending and improved operating efficiency. Contrary to the arguments of the opponents of privatisation, employment levels actually increased. Financially the companies reduced their debt levels and increased their dividend payouts.

These strong performance improvements held for both full and partial divestments. The results also held for cases where the companies operated in competitive versus non-competitive (regulated and or protected) industries. Improved performance was also evident regardless of whether the government sold control of the company or undertook a revenue raising approach. Where a revenue raising approach is followed the main aim is to raise cash but maintain control. Finally, the results were the same for companies from both the developed or developing world. Interestingly, performance improved more where over half of the board of directors changed as a result of the privatisation.

Megginson, Nash and Van Randenborgh did not document the reasons for the improved performance, only that the companies performed better. They suggested that:

> ...privatization itself -- the involvement of private investors in a firm's ownership structure -- critically impacts a firm's financial and operating performance. We feel that the most likely explanation for these changes is that (even partial) private ownership allows the internalization of these benefits of performance improvements, and publicly listed shares allow these benefits to be capitalized into the price of the firm's stock (Megginson, Nash & Van Randenborgh 1994, p. 406).

Overall, despite problems in its implementation, privatisation has lead to performance improvements for the organisations concerned. A comprehensive study by Megginson, Nash and Van Randenborgh has not provided explanations of the reasons for improved performance. The next section continues this overview of the privatisation literature and reviews the management factors that give rise to opportunities for efficiency improvements. The discussion looks to these features for the sources of increased value which may lie in these efficiency improvements. The extent to which these gains can be realised, and the risk that the gains may not be achieved, may be among the determinants of the market value of the privatised public enterprises.

### 3.7.3 Managerial Improvement

*The paradox of privatisation is that the view that it contributes to economic efficiency is derived from the belief that private sector managers are subject to incentives and disciplines different from, and*

*more demanding than, those which apply to their public sector counterparts* (Kay and Thompson 1986, p. 18).

Kay and Thompson argued that if this were the case then public sector managers would attempt to stop privatisation from occurring in their organisations. They observed that the opposite has occurred as major concessions were granted to management to win their support. They considered that this may have undermined the potential for efficiency gains.

Kay and Thompson further observed that the managers of the privatised company are usually the very same people who were managers of the old public enterprise. They concluded that efficiency gains do not lie in the character or abilities of the management of an enterprise, but in the constraints and opportunities that they face. They outlined a number of factors that distinguish public enterprises from private firms. These were: the risk of bankruptcy, the threat of takeover, the competitiveness of their product market, and any incentives to allocative and productive efficiency.

Kay and Thompson argued that it was competitive, privately owned firms that have the incentives to ensure both allocative and productive efficiency. Privatisation was seen as promoting productive efficiency, while competition promotes allocative efficiency. They noted:

> The incentive to productive efficiency comes from the requirement on private firms to achieve profits -- to stay in business in competitive markets, to avert the threat of takeover from the 'market for corporate control'. If, however, there is little competition in the product market, if the risk of bankruptcy is slight, and if the risk of takeover is also minimal, the pressures of the market affect a private sector manager no more than his private sector counterpart (Kay and Thompson 1986, p. 22).

Goodman and Loveman (1991) argued that the key issue was how private sector managers behave and what mechanisms monitor their actions. They argued that it was these factors, and not simple ownership, that accounted for differences in the performance of public versus private sector managers. They cited leveraged buyout companies as extreme examples of changes in ownership structure that impact on management behaviour. These cases can be directly translated to the privatisation experience. They observed three key criteria that account for improved performance: managerial incentives that tie pay to performance; decentralisation that replaces supervision with incentives and ownership; and debt obligations that prevent managers from using cash flow to cross-subsidise divisions (Goodman and Loveman 1991, p. 36). These arguments are the same as those used for the UK privatisation program: 'In state-owned industries there is no incentive to serve the customer -- no reward for doing it well, and no punishment for doing it badly' (Moore 1992, p. 118).

Beesley and Littlechild (1983) also observed that the benefits of privatisation flow mainly from improved management of the company. The companies that are successful are those that produce goods and services in the quantity and variety demanded by consumers. These companies make profits and grow, while the unsuccessful companies get smaller and eventually go out of business. The capital market provides discipline in this process since the acquisition of capital for growth depends upon a record of success. Beesley and Littlechild argued that privatisation substitutes market discipline for public influence.

Lawriwsky and Kiefel (1993) highlighted an agency problem between public sector management and the government. Agency problems arise out of situations where there are agency relationships. Whittred and Zimmer define an agency relationship as 'a contract under which one or more persons (principals) engage

another (the agent) to perform some service on their behalf which involves the delegation of decision-making authority' (Whittred and Zimmer 1988, p.11,12)  The principal -- agent framework for a company sees the shareholders as principals and the management of the company as their agents.  Jensen and Meckling (1976) defined agency costs as comprising monitoring expenditures by principals (such as the cost of employing auditors); bonding expenditures by the agent (such as the cost of preparing periodic financial statements); and a residual loss.  The principal is able to limit the agent operating against their best interests by providing appropriate incentives and by monitoring the agent's behaviour.  Watts (1977) hypothesised that financial statements were a mechanism for reducing agency costs.

Yarrow (1986) observed that the immediate effect of privatisation was to substitute shareholder for government monitoring and control of management. Yarrow outlined two problems flowing from the new agency situation.  Firstly, monitoring activities of one owner confers benefits on others and encourages a 'free rider' problem.  Secondly, asymmetric information arises since managers know more about the firm than the owners.  Yarrow observed that the first of the problems can be overcome through 'the market for corporate control'.  Where the performance of management is poor, the share price will fall and the company becomes a takeover candidate and, if successfully acquired, a new management team may be introduced. However, Yarrow also found strong grounds to believe that the market for corporate control had major imperfections.

Yarrow then outlined the case for public ownership based on the ability of the government to correct for failure in the markets for goods, factors and corporate control.  However, it was also found that because voters do not have detailed knowledge of the performance of public enterprises, they cannot vote separately on

the issue. The performance of public enterprises has only a minor effect on the electoral position of the government; hence, the political incentives to monitor performance are reduced.

Caves (1990) developed a normative model that showed that privatisation was only optimal when it was assumed that the private sector enterprises maximised productive efficiency. In addition, Caves argued that evaluation of privatisation needed some basis for understanding the choices public sector managers were making that give rise to the potential improvements of privatisation. Caves employed an agency costs framework in outlining the political support hypothesis of public sector performance. Caves used this hypothesis to explain the inefficiency of public enterprises. Under this hypothesis, the general population is the owners or the principals of the public enterprise, but they do not monitor the performance of the enterprise in the same manner as shareholders in private enterprise. This is due to the basic nature of the collective ownership and the 'free rider' problem. Monitoring costs would not be incurred collectively, but by individuals, allowing for the majority to reap the benefits of monitoring without incurring the costs. Accordingly, the people delegate monitoring to government ministries whose objective is to maximise political support. The objectives of the ministries are not directly linked to the financial performance or operating efficiency of the organisation. One would expect to find cross-subsidies in favour of groups able to provide votes and political power to the government in this environment. The public enterprise becomes a vehicle for furthering the political aims of the government at the expense of efficiency.

Beesley and Littlechild (1983) also recognised that the flow of benefits in a privatisation are not all one way. Privatisation is intended to change the motivations of management towards profit-making. However, there is a greater risk of

exploitation where the privately owned business operates in a monopoly. Also, a privatised company is likely to eliminate unprofitable services that may disadvantage some consumers. Finally, gains from privatisation may be at the expense of employees especially when they are achieved by eliminating inefficient production and restrictive labour practices.

Viravan (1991) identified managerial improvement and the removal of bureaucratic control as critical factors in privatisation. Public enterprises provide a mechanism for the implementation of government policies, including: the subsidy of investment in regional areas; the development of employment and employment policies such as affirmative action for minority groups; and the development of strategic industries and infrastructure. They are also a source of revenue through levies and taxes on public sector output. Once privatised, the government no longer has the same degree of influence over the bodies and hence influence on the development and structure of the economy. This is one of the key arguments in favour of privatisation, with the loss of government interference leading to more efficient outcomes. However, the government may not be prepared for the implications of this loss of control in all cases.

Pangestu and Habir (1989) reported that in Indonesia there has been considerable opposition to privatisation because it dilutes the role of the state in controlling the economy. They see such opposition as rooted in an economic nationalist ideology that views the state as having an important role in achieving a range of various objectives. These include: 'stabilizing prices, providing employment, setting modernization examples as 'agents of development', promoting regional development and controlling strategic areas' (Pangestu and Habir 1989, p. 234).

Brittan (1984) observed that state owned enterprises were involved in loss-making services, either because of discrepancies between private and social costs (for example, road versus rail in the absence of full cost road pricing), or for distributional reasons (such as the provision of services to disadvantaged groups).

Brittan also noted that there are a number of artificial restraints to competition that should be removed if privatisation is to provide maximum benefits. Even where a monopoly is unavoidable, competition can still be brought in through private contractors bidding to provide a single service at the lowest price. Brittan noted further: 'Competition is often politically unpopular, but it stands a greater chance if directed against a privately owned company than a nationalised enterprise whose losses are borne by the state' (Brittan 1984, p. 120)

### 3.7.4    Problems of Privatisation

In this section some of the proposed problems of privatisation are briefly reviewed. The main purpose of this section is to provide balance in the review of the debate over privatisation. Ng and Wagner (1989) outlined a number of the problems of privatisation. These included: nationalistic sentiments, management resistance, employee resistance, legal problems, absorptive capacity of the capital markets, distributional effects, and efficiency effects being dampened by regulation. These problems are briefly discussed below.

**Nationalistic sentiments**

As discussed above, there may be opposition to privatisation where there are substantial foreign interests in the process. This is especially so in countries with less developed capital markets or with capital markets that lack sufficient depth to cope with large scale sales of public sector assets. In such instances, the success of

the privatisation program will be dependant upon the involvement of foreign capital. Accordingly foreign influence in the economy is increased. Ng and Wagner (1989) reported that these sentiments had a major part to play in the Aquino Government's decision to postpone plans to privatise the Philippines National Oil Corporation.

Moore (1992) argued that ownership was not the only remedy the government had to protect the national interest following privatisation. He outlined the use of a 'special share' held by the government. The special share gave the government limited control over specified areas of the companies' activities, including, for example, a time-protection factor to protect the company from takeover and limits on the level of direct foreign ownership.

## Management resistance

The managers of public enterprises may resist privatisation if they see it as threatening their job security, salary and other benefits, or if they see it as reducing their influence and decision making power. The government may need to offer incentives or even exert pressure on public sector managers to obtain their support and cooperation in the privatisation program. In contrast to this line of thinking, there is the argument that public sector managers may support privatisation because they see themselves as gaining from the higher salaries and benefits paid to private sector managers.

It may also be argued that for privatisation to succeed there must be an ample supply of management resources in the economy. If good managers are scarce, one would expect that the salary packages of the best managers would increase if demand for their services rises as a result of privatisation. Accordingly, good public sector managers would favour privatisation.

## Employee resistance

Organised labour unions typically oppose privatisation. They see it as a threat to employment levels, wages and working conditions of their members. They may also see privatisation as an instrument to be used by the government to tame the power of the trade unions. These fears are perhaps not without foundation, since a key proposed benefit of privatisation is in terms of increased efficiency which implies reduced costs, lower staff levels and improved work practices. The extent of union opposition to privatisation will also depend upon the political power of the unions in the country concerned and the terms and conditions of the privatisation process itself. Ng and Wagner (1989) reported that in Malaysia there was a policy of no layoffs for a certain period after privatisation. There was also a requirement that employees of privatised companies should retain the benefits they received as government employees.

Employee share offers may be used to make the privatisation process more attractive to employees. It has been argued that:

> ...a visible change comes over workers when they become part owners of
> their companies through employee share-ownership plans ...In fact, (the
> National Freight Consortium's) new owners grew so concerned about
> profitability that during wage negotiations they actually pressed their union
> to lower its wage demands (Moore 1992, p. 119).

## Legal problems

In most countries there are legal obstacles to be overcome before privatisation can proceed. In some cases the process may only require direction from the government; while in other cases it may require an act of parliament and consequent delays in the drafting of legislation.

**Absorptive capacity of the capital markets**

The capital market must play a critical role in the privatisation process. The greater the depth and breadth of the capital market the easier it will be to sell shares in privatised enterprises. Paradoxically, for developing nations, the privatisation process may provide a mechanism for the development of the capital market, providing a mechanism through which to channel national savings and to attract foreign investment.

A related issue is the information provided by the capital market. It is difficult to value shares that are not traded in the capital market. The existence of a well-developed capital market provides a vast source of information on the value of similar shares. If privatisation is undertaken in stages, once a parcel of shares is being traded, this facilitates the determination of the issue price for the next issue.

The capital market also provides an aftermarket for newly privatised shares. This provides liquidity for the investors in the issue and a mechanism for measuring the performance of the privatised shares after the issue. For developing countries with smaller capital markets liquidity may be low.

**Distributional effects**

Ng and Wagner (1989) highlighted two repercussions on the distribution of income and wealth which occur as a result of privatisation. These are: firstly, the transfer of ownership and control of assets from public to private ownership; and secondly, the fact that the mode of privatisation and valuation can result in substantial distributional effects.

The first issue relates to privatisation as a policy that reverses socialism. Ownership is transferred from the collective to the individual. This is a substantial political issue, and a sensitive issue where privatised enterprises are sold at a

discount. The discount may mean that wealth is transferred from collective ownership to the individual.

The second issue also has a significant and related impact politically. The method of deciding who will buy the privatised assets and at what price, may determine who wins and who loses as a result of privatisation. Privatisation may provide the government with a mechanism for favouring particular ethnic or political groups. The transparency of the process is crucial in this regard. The more transparent the process, the less likelihood of the government favouring vested interest groups. Transparency may also reduce the potential opposition to the overall privatisation program. It is often argued that the discount on privatised shares is an incentive to attract a wide ownership pattern. However, as noted above (and by Ng and Wagner 1989), there is evidence that the smaller investors sell almost immediately to realise their capital gain.

## Efficiency effects being dampened by regulations

The case for privatisation is largely based on the potential efficiency gains and the consequent effect on economic development. If the privatised firm must face heavy regulation then such gains may not be realised.

Ng and Wagner (1989) outlined two conditions necessary in order for privatisation to improve efficiency. Complete control must be transferred to the private sector and the new private owner must be held fully accountable for the consequences of all management decisions. This is an important issue since it recognises the diminished control that the government will have over large sectors of the economy. This may be important in particular industries where the main role has been the provision of infrastructure to promote economic development.

The second issue is that of market structure. The replacement of a public owned monopoly with a privately owned one is unlikely to generate the efficiency gains envisaged. However, deregulation of the market prior to sale will not maximise the proceeds to the government from the sale.

## 3.8 Summary

This chapter has provided an overview of the literature on privatisation. It began with consideration of the definition of privatisation and discussion of its historical background. It was found that usually the change in ownership in privatisation is accompanied by changes in industry structure, competition policy and deregulation. The process of privatisation was then outlined. This enabled identification of a number of stages. The pricing of assets in privatisation was found to be a crucial issue in achieving the objectives of privatisation, in particular, meeting fiscal needs and encouraging small investors. These matters led to a review of the political issues involved and consideration of industry structure and the regulatory mechanisms proposed. The chapter concluded with a review of the debate over privatisation, which largely centred on the efficiency gains expected from the privatisation process. Overall it is clear that the pricing of privatised assets plays a crucial role in achieving the objectives of a privatisation program.

Chapters Two and Three provide the base to develop a model of valuation suited to the privatisation process. In the next chapter, professional approaches to valuation are reviewed. A model of privatisation pricing is then developed that incorporates these approaches, as well as elements from the IPO and privatisation literature. From the model of pricing, a series of testable hypotheses will be developed.

# Chapter 4. A Theoretical Framework for the Valuation of Shares in Privatised Companies

## 4.1 Introduction

This chapter begins with discussion of the determinants of value. This discussion reviews the professional valuation approaches: the accounting based approach and the discounted cash flow approach. The discounted cash flow approach is then considered in more depth to identify the main determinants of value. Copeland, Koller and Murrin (1990) identified the key determinants of value for a company at the broadest level as being the value of assets in place and the value of growth opportunities. Clarke, Wilson, Daines and Nadauld (1988) outlined three main determinants of value creation for organisations: profitability, growth and risk. These factors are influenced by management strategy, the competitive position of the organisation and industry structure. Together, these elements provide the basis for developing a model of valuation suited to the unique case of privatisation.

After discussion of the basics of valuation the chapter considers the lessons from the IPO literature that may influence the value of privatisation issues. It is also necessary to take into account political influences, such as the government's political objectives for the privatisation program. These influences are also discussed in this chapter.

A general theoretical model of privatisation valuation is developed which incorporates elements from both the IPO and the privatisation literature. The chapter concludes with hypothesised determinants of the initial underpricing of shares in privatised companies. Testable hypotheses flowing from the general theory and the literature are also developed.

## 4.2 Professional Approaches to Valuation

Copeland, Koller and Murrin (1990) provided a manual for valuation of companies based on the McKinsey and Company corporate finance practices and the experiences of their consultants. They outlined two methods of valuation: the accounting approach and the discounted cash flow approach.

The accounting approach to valuing companies is based upon the accounting earnings of the business. The value of a company is calculated as its earnings multiplied by a multiple, typically a price-earnings (P/E) ratio. A simplistic application of this approach would see only current or next year's earnings used as the basis of valuation. The more complex form of the model discounts future earnings at a subjectively determined rate.

In the discounted cash flow (DCF) method of valuation, the value of a business, in general terms, is the expected future cash flow discounted back to a present value using a risk adjusted discount rate.

Copeland, Koller and Murrin criticised the accounting approach because it does not consider the investment required to generate earnings, nor the timing of those earnings. They also argued that the method ignores the difference in the capital employed by firms by focusing on the P/E ratio as a function of earnings growth. In contrast, the DCF method factors in the value of the capital employed by a business by including capital expenditures and other cash flows required to generate earnings. The DCF approach is based upon the methods widely used by businesses to evaluate real investment opportunities. An investment is considered to add value if, in equilibrium, it is expected to generate returns over the level of expected returns on investments of similar risk level.

Notwithstanding the criticisms of Copeland, Koller and Murrin, the accounting approach has enjoyed enormous popularity amongst practitioners. Indeed, practitioners have criticised the DCF approach. Abbott (1990) noted that 'the sparkling reputation' of DCF analysis was threatened when it was used by a Wall Street advisory firm in the creation of a takeover defence for the US furniture and footwear company Interco. 'The strategy worked, but Interco has had difficulty meeting interest payments on the additional debt raised. Its ability to generate the necessary cash flow was calculated by the DCF analysis' (Abbott 1990, p. 42).

Abbott observed that the advocates of the accounting approach argued that in DCF analysis assumptions on growth and inflation are being tested, not absolute figures or projections. In contrast, it was argued that the accounting method, using P/E multiples, is based upon a straight marketplace perception of a company. The value of a company is determined by devising a multiple and applying that to the latest profit figure. In this way the P/E ratio is used as an indicator of the future earnings of the company. The accounting method requires determination of the appropriate multiple, which must be estimated on the basis of past trends and an analysis of comparable companies (in terms of turnover and profit) in the same industry.

Copeland, Koller and Murrin accepted that the accounting method provides a good proxy for DCF when forecasts of earnings reflect cash flow. Their main concerns only emerge when earnings and cash flows diverge. Copeland, Koller and Murrin recognised that an even more complex form of the accounting model could be employed, but in most cases the DCF approach is simpler and explicitly considers the key valuation parameters. In addition, their criticism of accounting based valuation models is supported by the empirical work considering the impact of

accounting earnings figures on share prices. A review of these studies is outside the scope of this thesis.[1]

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**Figure 4.1:**
# A Framework for Pricing in Privatisation
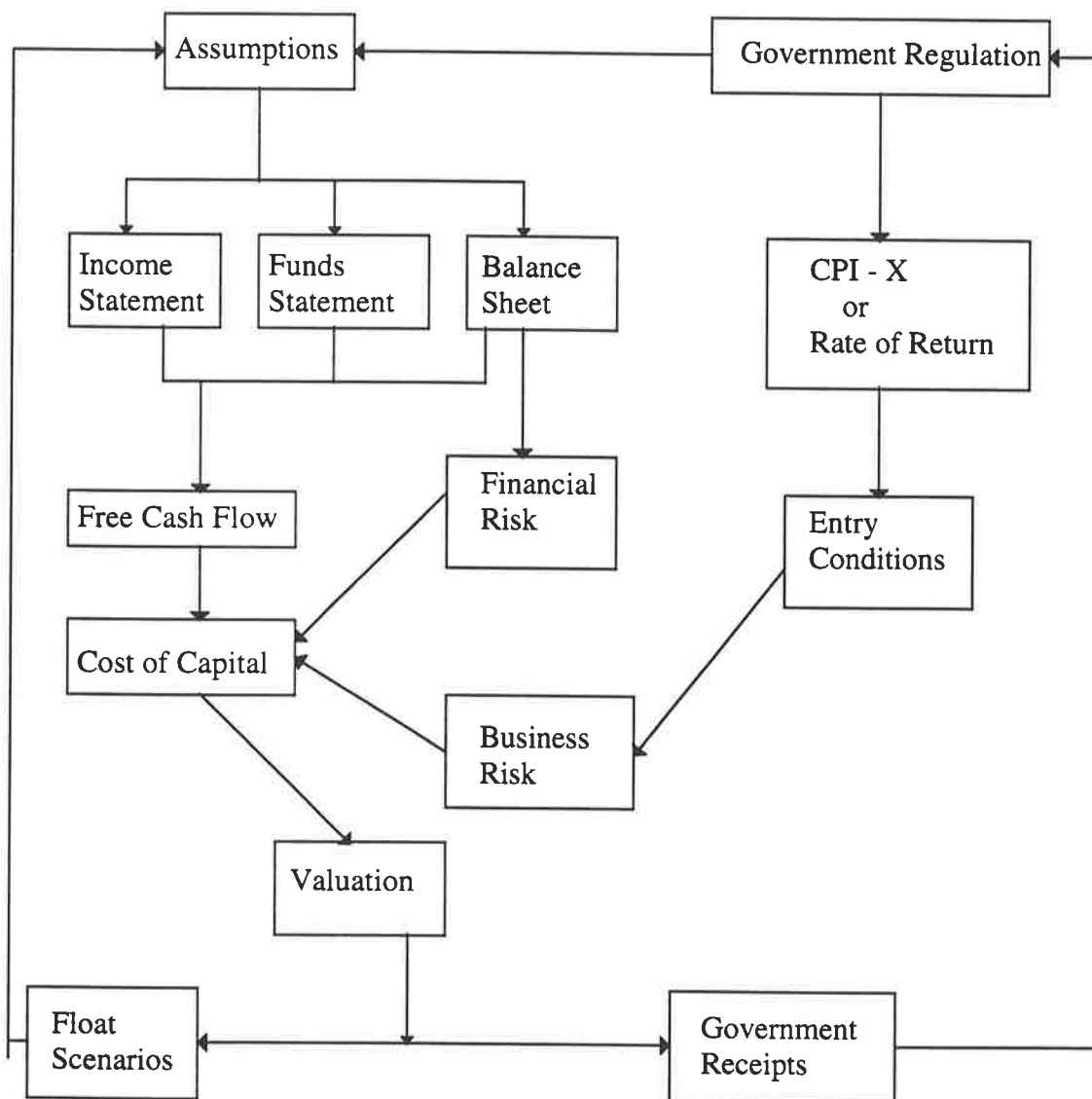


Source: Lawriwsky and Kiefel 1993, p. 43.

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[1] A review of these studies may be found in Watts (1988).

The United Nations (1993) recognised the difficulty of using accounting information in valuation for privatisation. Two main problems were outlined: relevance and reliability. It was argued that the accounting information gathered in the past for public sector management purposes may be irrelevant to the private entity operating in a different environment. In addition, the reliability of the information may also be questionable because accounting assumptions, methods and systems change over time. In valuing British Telecom:

> ...the problems of valuation were acute. The company had no history as a commercial organisation; there were no comparable companies in the United Kingdom, and only distant relations in the United States; and the company did not even have very reliable financial accounts. This made the job of those responsible for the flotation and for advising on the issue price very difficult (Hawkings 1987, p.2).

From a modern finance view of the world it could be concluded that the DCF approach is superior to the accounting approach based on use of P/E ratios. As previously mentioned, Lawriwsky and Kiefel (1993) provided a model for privatisation pricing. The model was based on the DCF approach and their pricing module is reproduced in Figure 4.1. The model shows valuation as a process of determining the future free cash flow of the company facing privatisation. Cash flow is then discounted to a present value using the cost of capital. Free cash flow has been defined as the:

> ...total after-tax cash flow generated by the company that is available to all providers of the company's capital, both creditors and shareholders. A company's free cash flow is calculated by subtracting the amount the company invests in new capital from the gross cash flow available from

operations (operating earnings plus noncash charges) (Copeland, Koller & Murrin 1990, p. 109).

The future free cash flow is estimated in Lawriwsky and Kiefel's model using financial statements forecast on the basis of a number of macroeconomic and microeconomic assumptions about the company and its industry.

Once free cash flow has been determined a discount rate is applied to the forecast to arrive at a value for the company. The discount rate reflects the cost of capital to the firm. The cost of capital for a company 'depends primarily on the use of funds, not the source' (Ross, Westerfield and Jordan 1993, p. 488). For practical purposes, however, the cost of capital is usually estimated based on the capital structure of a company and the cost of each source of capital. These are influenced by its business and financial risks. Business risk reflects the nature of the business of the company and the susceptibility of the free cash flow to fluctuations in the business cycle. Financial risk reflects the risks flowing from the capital structure. Copeland, Koller and Murrin argued that the estimate of the cost of capital must:

- comprise a weighted average of the costs of all sources of capital -- debt, equity and so on -- since the free cash flow represents cash available to all providers of capital;

- be computed after corporate taxes, since free cash flow is stated after taxes;

- use nominal rates of return built up from real rates and expected inflation, because the expected free cash flow is expressed in nominal terms;

- adjust for the systematic risk borne by each provider of capital, since each expects a return that compensates for the risk taken;

- employ market rates for each financing element, because market values reflect the true economic claim of each type of financing outstanding, whereas book values usually do not; and

- be subject to change across the cash flow forecast period, because of the expected changes in inflation, systematic risk, or capital structure (Copeland, Koller & Murrin 1990, p. 171-2).

Lawriwsky and Kiefel argued that in a privatisation there are other factors that affect the cost of capital. Business risk in a privatisation is also affected by the decisions of the government regarding the future industry structure and regulatory environment that the company will face. Prior to privatisation, the government decides upon the regulatory framework to be employed, the industry structure that the company will operate in and any conditions or restrictions imposed upon the operations and management of the company.

Financial risk will be influenced by the level of debt and any restrictions on the capital structure of the newly floated company and the level of residual equity of the government. These are also based on decisions by the government prior to the privatisation.

In summary, a DCF approach to valuation sees the key elements as free cash flow and the cost of capital. These provide the main sources of uncertainty to the valuer in a privatisation issue. As noted, government decisions prior to the issue will determine a number of factors that affect the valuation. However, some residual uncertainty remains. Free cash flow stems from the current and future profitability and cash flow from the assets that the company currently has in place and the potential for growth. Uncertainty flows from current and future management strategy, competitive position and industry structure, all of which may change due to

government policy shifts or changes in the business environment. The cost of capital largely reflects the risks associated with the company, because the other main determinants of the cost of capital, capital structure and market-wide costs of capital, are exogenous to the deliberations in the valuation process. The capital structure is usually decided earlier in the privatisation process. Hence, there is residual uncertainty for the valuer flowing from estimating the impact of the elements of risk.

Clarke et al. (1988) outlined three main determinants of value creation for organisations: profitability, growth and risk. Together, these elements provide a framework for discussing the main factors creating uncertainty to the valuer in developing a model of valuation suited to the unique case of privatisation.

## 4.3    Profitability

The recent profitability of a public enterprise is a prime determinant of its market value because it is an indicator of future free cash flow of the company from its assets in place. It is affected by government policies with respect to the commercialisation of the enterprise prior to privatisation, its current strategies and the current structure of its industry.

The analysis of the literature in Chapter Three showed that the arguments are mixed about the efficiency of public enterprises compared to private companies. The debate is centred on the agency problems between the government and public sector management. On balance, the view is that public enterprises are less efficient and the privatisation process will lead to lower overall agency costs and substantial efficiency gains as government monitoring of management behaviour is replaced with the disciplines of the capital market.

The recent work by Megginson, Nash and Van Randenborgh (1994) indicated substantial efficiency gains resulting from privatisation. This provides a major motive for privatisation, which, in an economic sense, would look to increased value as a result of the efficiency gains resulting from privatisation. Privatisation driven efficiency gains from the current assets in place add value, since they increase free cash flow. The extent of the improvements possible depends upon the scope for management reforms and the extent to which reforms are instigated prior to privatisation. Efficiency gains also flow from the increased growth options created by privatisation as the new management environment enables the identification and implementation of new investment opportunities.

Opponents of privatisation have argued that public sector reform and commercialisation of public enterprises will lead to the same efficiency gains as that expected of privatisation. However, privatisation supporters have rebutted this. They argued that political interference and the imposition of other socio-economic objectives on the public enterprise limit the ability to undertake reform. Further, performance measurement is left to the vagaries of accounting reports and rates of return rather than real market price performance. This enables public enterprise managers to manipulate accounting reports rather than undertake reform of operations. After privatisation, the capital market imposes an added discipline on management. Only real expected improvements in cash flow will be reflected in higher share prices.

The profitability of a privatisation candidate is affected by the decisions of the government in preparing the organisation for sale. A process of commercialisation may occur in the first instance with the objective of instilling private sector management practices and disciplines on the organisation prior to

privatisation. This involves more than a simple change in legal structure, and includes both cost reduction and revenue enhancement initiatives. The benefits to the government from commercialisation include increased dividends and a higher overall value for the enterprise as efficiency improvements are reflected in higher levels of free cash flow.

The extent of commercialisation prior to privatisation may directly affect the management changes that the new owners can undertake to improve profitability and the price that they would be prepared to pay. That is, where limited commercialisation has occurred, there is potential for the new owners to add value to the organisation by managing its assets in a more efficient manner. This may provide a source of information asymmetry between investors, since informed investors may have information about the potential of the assets of the organisation and the extent of commercialisation already undertaken. Uninformed investors may not have access to such information. This issue is discussed further in the section below dealing with IPOs. Caves observed that:

> Given the implication of organisational slack within SOEs (state owned enterprises), the prospect of privatisation implies that large rents may be available for those who can squeeze out the slack, and factors such as pre-privatization gains are consistent with this. Privatization substitutes the market for corporate control for the central government as the monitoring principal (Caves 1990, pp. 165-6).

The position of the public enterprise within its industry also affects its value. The government, through regulation, has the power to bestow monopoly rights on the public enterprise. Similarly, deregulation may remove such monopoly power.

For example, the value of a monopoly telecommunications supplier may be reduced where competition is introduced forcing it to compete on price and service levels.

Porter (1979) provided perhaps the most widely used model of the forces governing competition within an industry. Porter's forces may be summarised as:

1. Rivalry among current competitors. This might involve price or quality competition, which reduces revenues or increases costs, thus reducing profits.

2. Rivalry with substitute products. The availability of substitute products effectively limits prices and profits in any industry.

3. Bargaining power of buyers and sellers. Large scale buyers have the potential to drive down prices while significant suppliers may increase costs or reduce quality of required inputs.

4. Entry of new firms. New competitors reduce the sales of existing firms, and tend to drive down prices and/or increase costs.

The first of these forces, rivalry among competitors, will have a significant impact on the profitability and value of the company. The key factors driving competition in an industry are detailed below with discussion of the likely effect of these forces in the valuation of privatised enterprises.

Competition increases as the number of firms in the industry rises and as these firms become more equal in size and capability. Many public enterprises are in positions of monopoly or are market leaders in their industry. As competition is increased the value of the firms may fall. Paradoxically, the increase in competition is often the result of deregulation by the government that has the effect of reducing the value of their own investment in the public enterprise. It may, however, help achieve the aim of the government to develop more efficient market structures.

Rivalry is typically stronger where demand within the industry is growing more slowly than otherwise is the case. In rapidly expanding markets all competitors may be able to increase sales and profits, whereas in mature markets, total sales are either falling or growing at a slow rate. Accordingly, for one firm to grow more rapidly it must be at the expense of others. Strategy in mature markets must be directed at competing for market share by taking customers away from competitors, which in turn, may reduce profitability. The value of a public enterprise will be greatest where it operates in an industry with high growth prospects.

Competition will be greatest in industries where fixed costs are high, the product is perishable, or where price cutting behaviour is triggered. Where the cost structure of an industry provides high fixed costs and hence low variable costs, firms are encouraged to operate at the highest possible capacity. This may even be at the expense of profitability, since marginal cost based pricing may be used to stimulate demand through special rebates, price cutting and large discounts for special orders. Similar competitive pressures may occur in industries with the following features: perishable products; long lead times in new plant construction; economies of scale resulting in large increases in capacity; and where demand is volatile and at times there is excess capacity in the industry. Many public enterprises are in high fixed cost industries, for example, telecommunications, electricity and water utilities. These industries would be characterised by high levels of price competition and hence reduced profitability, if they were not either directly controlled and regulated by the government and/or operating as a natural monopoly. Where the organisation operates as a monopoly, prices are likely to be higher than in a competitive market. This lies at the heart of the main reasons given for the deregulation and privatisation occurring around the world.

Competition also increases when the products of an industry become less differentiated from the point of view of the buyers. Where products are seen to be standard within the industry firms must compete on price and service. This competition will erode profitability. Once again, many public enterprises are in industries where products are more or less standard, but they have been protected by regulation or via a natural monopoly. When faced with competition firms compete on price and quality in an attempt to either 'buy' customers or to differentiate themselves on the basis of quality.

The operation of competitive forces in an industry reduces industry profits and free cash flows, which lead to falls in rates of return and value. Government privatisation strategy needs to consider the industry structure to maximise value for sale, subject to any other political and economic objectives. It also needs to consider its general economic policies and aims for the future of the industry concerned.

The potential for new entrants to an industry is linked to: economies of scale, experience, product differentiation, capital requirements, cost advantages independent of size, access to distribution channels, and government policy, (Clarke et al. 1988, pp. 19-20). Many privatisation candidates are in a monopoly position within their industry with substantial barriers to entry. Typically this is manifest as extremely high entry costs and heavy government regulation. Government deregulation removes one barrier to entry, while technological change in some industries has reduced the costs of entry. For example, government deregulation of telecommunications allows for increased competition; while technological change has meant that new entrants can compete in new areas, such as mobile telephones, without the huge investment in infrastructure needed to operate a complete telephone

network. Deregulation across the value chain may reduce the profitability of the privatisation candidate and hence its value.

In summary, government owned companies that operate in competitive markets could be privatised without substantial changes to industry structure and realise a fair, market-derived value. In contrast, the value of the companies in monopoly positions is maximised if the industry structure is preserved. The political and economic objectives of the government provide a constraint in both cases. Vickers and Yarrow (1988b) noted that privatisation in the UK was accompanied by deregulation of some of the industries involved. They noted that even though a number of barriers to entry had been removed, liberalisation had not been carried out to the maximum extent possible.

The main factors affecting the future profitability of a privatisation candidate are its assets in place and its growth potential from new investment opportunities. The profitability flowing from the assets in place is directly affected by the extent of commercialisation undertaken prior to privatisation, the current and future industry structure and government policy on the enterprise and its industry. These factors also influence the growth prospects of the firm, since industry structure and government policy have an impact on the value of new investment opportunities.

## 4.4 Growth

Growth is a major determinant of value under both the accounting approach and the DCF approach. The potential for growth of an organisation is linked to the industry in which it operates. The telecommunications industry is traditionally dominated by public sector enterprises and is one that is seen by many as experiencing rapid growth. The potential growth of water and sewerage provision is linked to the stage

of development of the country, as is transportation and the provision of other infrastructure. As noted above, there is usually enough demand for all firms in high growth industries and competition is lessened as a result. In these cases, value is not diminished by competition to the same extent as for low growth industries. Therefore, firms in high growth industries are valued more highly.

Growth is also determined by management strategy and vision. Western management has been criticised for its focus on the profitability dimension of value at the expense of strategies for growth (Hayes and Abernethy 1981). Short run profit improvements may be at the expense of longer term competitive position. It could also be argued that public sector management is even more short term focussed and the agency problem is even more severe because of the changed nature of public sector management and the influence of political pressures in a democracy. In recent years there has been a drive to 'managerialism' in the public sector, with the introduction of performance based contracts for Chief Executive Officers, often written in terms of return on assets. This makes the new public sector CEO more concerned with short term profit to ensure that performance agreement targets are achieved. One would expect the recent direction of public enterprise strategy to be short term focussed in this environment. This, however, may reduce the value of the firm since it may reduce its growth prospects. Accordingly, we would expect the public enterprise being privatised to have a lower P/E ratio than other similar firms, where the lower P/E reflects, in part, lower expected growth prospects.

Industry structure and the extent of regulation will also affect growth. The extent of competition within the industry and the key forces that drive that competition directly affect the growth potential of the firm and hence its value, as

discussed in the previous section with reference to current profitability. These factors will have a similar impact on future profitability and hence, growth.

Technological change alters the competitive structure of industries (Porter and Millar 1985) and the potential for growth both for the industry as a whole and for individual firms within the industry. While change may alter the overall growth potential of an industry, it also makes it possible for some firms to find better ways to compete within the industry. The ability of the firm to exploit these opportunities is directly linked to the calibre of management and their ability to implement strategies that enable the firm to capitalise on the opportunities. It is also linked to the vision of management and its ability to see the structure of their markets in the future and the role of technology.

Government deregulation has a similar effect in that it may open up markets for competition, which may, in turn, lead to significant growth opportunities. In some industries, regulations have held back the rate of growth. From a public enterprise point of view, regulations may have allowed the enterprise to grow at its own pace and to not consider market demand fully. Upon deregulation, the door is opened for others to compete and satisfy the previously ignored needs of the market, generating significant growth within the industry. The implications of deregulation also have a risk dimension, to be considered further below.

In summary, the main factors affecting the growth potential of a privatisation candidate are management strategies prior to privatisation, including the extent of commercialisation, the current and future industry structure and the impact of current and future government policy on the enterprise and its industry.

## 4.5 Risk

Traditional finance theory sees risk as an important determinant of value in that it has an impact on the discount to be applied to future free cash flows in arriving at the value of a company in a valuation model. As noted previously, such risk is related to the risk of the business of the company (business risk) and its financial structure (financial risk).

Business risk is the risk inherent in the nature of the business of the company. It is directly related to the risks in the markets for the output of the company and includes the elasticity of demand for its output; the vulnerability of operating profit to swings in the business cycle; the influence of the industry structure on competitive position and profitability; the effect of technological change; and the risks involved in the actual production process itself. It is related to the responsiveness of earnings before interest and tax (EBIT) to a change in sales (Gitman et al. 1985, p.413).

Financial risk is related to the capital structure of the company. In an accounting sense, it is reflected in the response of earnings per share (EPS) and return on equity (ROE) to changes in EBIT. Leverage can amplify the business risks to the shareholders, providing a total risk exposure for the company that is greater than the risks if the business was all-equity financed (Gitman et al. 1985, p.413).

The level of business and financial risk for a company is priced in capital markets and is reflected in the company's share price. In privatisation, these elements must be estimated to arrive at the offer price for the share issue. Investors will also consider these factors in deciding whether to subscribe to the issue or not. Given that there may be limited information available for the privatisation candidate, an additional risk is present in the form of uncertainty over the true business and

financial risks involved. This additional risk is brought about because the company has usually not provided accounting and other information to the market in a form similar to public companies.

Modern portfolio theory flowing from the work of Markowitz (1959), divides total risk into diversifiable (or non-market, company specific) risk and undiversifiable (or market related) risk. Under the Sharpe-Lintner Capital Asset Pricing Model, only market related risk is priced in capital markets since it is only this risk that the well-diversified investor faces. The well-diversified investor diversifies away the company specific risk by combining securities into portfolios. In valuing an asset, a risk adjusted discount rate is used to discount future cash flows to their present value. The risk adjusted discount rate only incorporates systematic or undiversifiable risk.

In a privatisation, the government's aim of 'peoples' capitalism' is achieved by maximising the spread of share ownership across the community. Accordingly, the investors in a privatisation issue will include investors whose only share investment arises from that issue. One might question the applicability of the Capital Asset Pricing Model and the use of risk adjusted discount rates in this context, since the small investors are clearly not holding well-diversified portfolios. It may be necessary to consider a different notion of risk in these cases. A total risk model, including both diversifiable and undiversifiable risk, may be more appropriate. If a total risk concept is applicable the returns required to compensate for the risk of the investment will be much higher.

From a political perspective, if the government has an objective of 'peoples' capitalism' and encourages a wide share ownership, the view of risk of the government must be more in line with the total risk view of the small investor than

the large, well-diversified investor. The political implications clearly support this, since small investors have a franchise to vote, while large investors are typically corporations or large mutual funds, who do not vote. Losses by small investors will be politically damaging to the government.

Also, at least one more determinant of risk is present in privatisations, namely policy risk. This is the risk that government changes in policy may undermine the competitive position of the new company. The business risk of a privatised company may also be affected by future government policy regarding industry structure. After selling a public enterprise monopoly the government may deregulate, which would alter the business risks that the company faces, and hence its value. This policy risk is present at the time of privatisation and will be considered by both the underwriters of the issue and potential investors. The extent of policy risk present will depend upon a number of factors including the extent of deregulation prior to sale, any regulatory mechanism to be put in place, for example the 'RPI minus X' price regulation, and the scope for future deregulation.

Gole (1985) outlined the main problems associated with valuing unlisted shares. Three of these problems are relevant to this discussion:

- restrictive provisions regarding the transfer of shares;

- powers of control; and

- minority or majority holdings and voting power.

These restrictions add to the uncertainty surrounding the valuation of the privatisation candidate.

In summary, the main factors affecting the risk of a privatisation candidate are the levels of its financial and business risks. In addition, there are political risks involved which flow from the political objectives of the government in a

privatisation, including a goal of encouraging a wide pattern of share ownership for the company, and the risks flowing from the regulatory framework put in place.

The main problems in privatisation valuation stem from the fact that the shares in the company have no capital market history, hence estimates of profitability, growth and risk are made more difficult. Further, additional risks flow from the political implications of the privatisation program.

## 4.6    Initial Public Offerings

The fact that many privatisations are also IPOs raises two questions for the development of a general theoretical framework of privatisation valuation. Firstly, the body of evidence on IPOs must be considered for its relevance to privatisation; secondly, the issue of whether there is anything unique about privatisation must be addressed.

From the previous review of the literature on IPO underpricing, it is apparent that the main theories argue for the existence of information asymmetry between the company, the underwriters and the investors. In Rock (1986), information asymmetry occurs where some investors are better informed than other investors, the company and the underwriter. Another view is that of Baron (1982) where the asymmetry occurs because the underwriter is better informed than the company and sells this information to the company. Bös (1991) considered the applicability of the basic theories of Rock (1986) and Baron (1982) to privatisation issues and rejected them both.

Rock's theory was based upon there being two groups of investors: informed and uninformed. Informed investors know the actual market value of the shares to be issued. The uninformed investors only know the range of market values and the

probability of their occurrence. Accordingly the informed investors know whether the issue is a good or bad offer, subscribing to buy all of the good ones and avoiding the bad ones. The uninformed investors will be crowded out of the best issues and will succeed only in the less desirable issues that may even be overpriced -- the so-called 'winners' curse'. If uninformed investors are only successful in the less desirable issues and consistently make losses, they will soon stop subscribing to the issues. Accordingly, there must still be some underpricing in all issues to retain general support for IPOs from uninformed investors. The demand for the most underpriced issues will be from both informed and uninformed investors and rationing will be necessary. The demand for the less underpriced issues will only be from the uninformed investors and little or no rationing will be required.

As discussed, Koh and Walter (1989) used the unique data available in Singapore to undertake a direct test of Rock's model of unseasoned new issues of equity using a simulation to forecast the likely returns to different investment strategies in an IPO. They found that the first day return to a successful informed subscriber to an IPO was equal to the risk free rate of interest after allowing for the probability of being successful and the opportunity cost of the funds deposited on application. This directly confirmed the argument of Rock (1986), who proposed that the extent of underpricing will be dependent upon the probability of successful subscription by informed investors. Rock also argued that the underpricing anomaly would disappear when rationing was included into the analysis. Koh and Walter also found that the 'winners' curse' was strongly evident and that there was a significant positive correlation between oversubscription levels and first-day returns. Levis (1990) found similar results in the UK.

Bös (1991, p. 28) rejected Rock's theory as being applicable to privatisation issues. Bös argued that the theory required the government, the underwriter and most investors to be badly informed, while some institutional investors have some superior and perhaps inside information. Bös argued that in a privatisation small investors do not have as much information as the government and the underwriter, even if the prospectus provides all information available to the government and the underwriter. This is because small, uninformed investors do not possess the skills necessary to interpret the information provided. Strangely, this argument by Bös seems to support the informed/uniformed dichotomy of Rock. Bös also noted that the privatised company is usually protected from hostile takeover by government precautions such as a 'golden share'. Bös argued that this means that there is less scope for inside information and, hence, less potential to become informed investors than for private sector issues. Further, it was argued that the government has political objectives and fears that its reputation, and that of the privatisation program, will be damaged by setting a price that is too high, causing the small investor to suffer a loss. This conforms with the need to consider total risk to undiversified investors in a privatisation case where a broad public float is planned.

In contrast to Bös, it could be argued that even where there is free access to information, informed investors may view the elements of value differently. They may even place a different price on the issue than either the government or the underwriters. Bös also ignored the role of the financial press and the fact that privatisation issues may receive more publicity than private sector issues. Such publicity may better inform the public about the issue's prospects, without requiring them to incur information costs. Consideration of these factors requires better understanding of the factors that give rise to uncertainty about the true value to

investors. The key issue is whether there is potential for information asymmetry between informed and uninformed investors in privatisation issues. Regardless of the level of government disclosure in the prospectus there will still be uncertainty about the true market value of the company. The extent to which informed investors can use superior analysis and their access to non-public information in order to become better informed is one for conjecture.

Bös (1991) also rejected the underpricing theory of Baron (1982). Baron noted that the company employs an underwriter to set an offer price and distribute the shares. The profit of the underwriter will be maximised where the costs of distribution are minimised and compensation received is maximised. Compensation is determined by the offer price, the proceeds from the issue, and the underwriters own report on capital market conditions. Accordingly, a principal-agent problem emerges. The issuing company aims to maximise proceeds but does not have the necessary information about the market and must compensate an underwriter to provide the information. Under Baron's model, the offer price is a decreasing function of the uncertainty about the market's demand for the shares.

Bös considered that the information asymmetry argument of Baron had some merit for privatisation cases. It was also argued that Baron's argument -- that risk shifting was not a major factor in underpricing -- was also relevant to privatisation, since the government is better able to bear risk than the underwriters. Bös argued that the needs of the government are for market advice and distribution mechanisms, not risk shifting. This, however, ignores other dimensions of risk involved in privatisation, notably political risk. The use of an underwriter may shift the responsibility for valuation from the government to the underwriter. Hence, the blame for significant under or over valuation may also shift to the underwriter.

Overall, however, Bös rejected Baron's account because of the view that the government underprices for political reasons. Bös also argued that a theory of privatisation underpricing must include elements of the political background and that the role of political objectives in privatisation cannot be ignored. The political objectives of privatisation and their impact on valuation are discussed in the next section.

## 4.7    Government Objectives

From the previous review of the privatisation literature, three dominant political and economic objectives of privatisation emerged: 'peoples' capitalism', the need to realise efficiency gains, and the need to satisfy fiscal needs.

Bös (1991) outlined the relationship between 'peoples' capitalism' and underpricing. 'Peoples' capitalism' was a stated objective in the UK privatisation process. This process could be seen as one where ownership is shifted from the indirect, collective form to direct legal ownership through shareholdings. 'Peoples' capitalism' may be used to gain long run support and protection for a privatisation program by providing an impediment to renationalisation by future governments. A wide share ownership pattern means that a renationalisation strategy would be politically unpalatable if not impossible, since it may mean the nationalisation of assets held by a large cross section of the electorate. This factor is strengthened by encouraging both a wide initial share ownership pattern and a high retention rate in the long run.

There are two problems in a policy of 'peoples' capitalism'. The first is the problem of encouraging people who are not accustomed to buying securities to become shareholders. This may be achieved through underpricing the initial public

issue and the establishment of a reputation that privatisation issues are good investments. This is the basis of the 'reputation building hypothesis' as the explanation of underpricing of privatisation issues. However, underpricing of initial issues is not unique to privatisation issues. There is a significant body of literature documenting the underpricing of IPOs of all shares. This literature was reviewed in Chapter Two.

The second problem relates to the longer term retention of shares by the successful subscribers to a privatisation issue. The government may provide incentives to encourage retention of shares, including bonuses that are unique to privatisation issues. For example, discounts for goods and services can be provided to shareholders and extra dividends or bonus shares can be issued to long term shareholders. The aim of these schemes is to encourage investors to hold their shares rather than realise the initial gains made possible by any underpricing of the issue. If the initial wide share ownership is maintained, the government can maintain some defence against the future renationalisation by opposition forces.

The government may also have the objective of improving the operational efficiency of the industry concerned and may see the privatisation process as a part of this strategy. In order to increase the country's overall profitability, microeconomic reform of key infrastructure provision may be an allied objective. Improving the profitability of a privatised company might also provide a bonus to the government in the form of increased dividends if it retains some shares in the company. It may also enable the future sale of further stakes in the enterprise at higher prices.

A potentially conflicting objective for the government is the need to control the economic behaviour of monopolies. Since many public enterprises are utilities in

a monopoly position (or at least have a dominant role in the industry) the government may need to regulate the newly privatised companies. The degree of deregulation of an industry prior to privatisation will have an impact on the value of the company being privatised, as will any post-privatisation regulatory framework.

A fiscal need driven reason for privatisation would see the government seek to maximise its sale proceeds. Hence, by implication, it would not see the other objectives as of great importance. The government's proceeds are maximised by obtaining the highest price possible for the entity. In these cases, the government is likely to sell public enterprises as monopolies and structure the sale to maximise proceeds. The form of sale is also an issue, since trade sales and tender offers display lower levels of underpricing than public floats (Vickers and Yarrow 1988). The lower discounts in these cases are partly explained by the absence of 'peoples' capitalism' as a major objective in the sale.

Early in the privatisation debate, Heald (1984, p.2) argued that the enthusiasts for privatisation were different to previous critics of public enterprise. Supporters of privatisation considered public enterprise to be a flawed instrument of public policy that could not be corrected with the changes in control systems previously recommended to improve public enterprise performance. Further, market forces were seen as conceptually superior to the state in the provision of goods and services because of political distortions (or state failure). Given this line of argument, privatisation is the only option. A government with these philosophies may undertake a privatisation program irrespective of any initial political opposition because of their belief that the economic gains to be made from the process will offset any political costs. A government with a high degree of political will, in the

form of a significant mandate or a strong leader or with no opposition, is more likely to follow this approach than a government lacking such will.

In summary, the theory of value for a company identifies the main factors as being: profitability, growth and risk. In the case of privatisation, there are also political risks present. These add to the ex-ante uncertainty faced by all parties in the privatisation. Gole (1985) argued that the issue of control is also relevant, since for unlisted companies there is added uncertainty about who will retain control of the entity post-listing. The IPO literature also provides some explanations for privatisation IPO underpricing. The work of Rock (1986) and Koh and Walter (1989) explained underpricing in terms of informed and uninformed investors and the level of demand for an issue. Baron (1982) explained underpricing in terms of the ex-ante uncertainty facing the underwriter. Bös (1991) considered the government to use underpricing as an instrument to build a good reputation for privatisation issues, with privatisation and deregulation part of an overall policy program by government.

The next section outlines a general model of valuation for privatisation IPOs. It is followed by the development of hypotheses to test the theories put forward to explain IPO underpricing and any relationships unique to privatisation issues.

**Figure 4.2: A General Model of Privatisation Valuation**
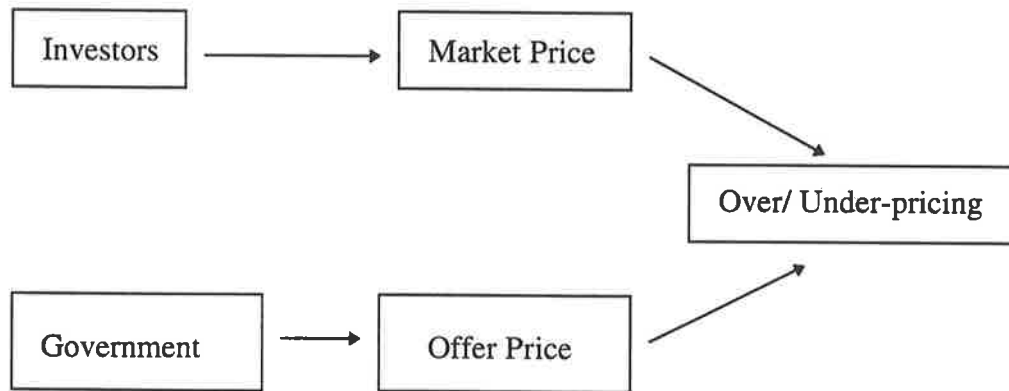
# Figure 4.3: Issues in Privatisation Valuation -- The Government Side

COMMERCIALISATION                                      PRIVATISATION
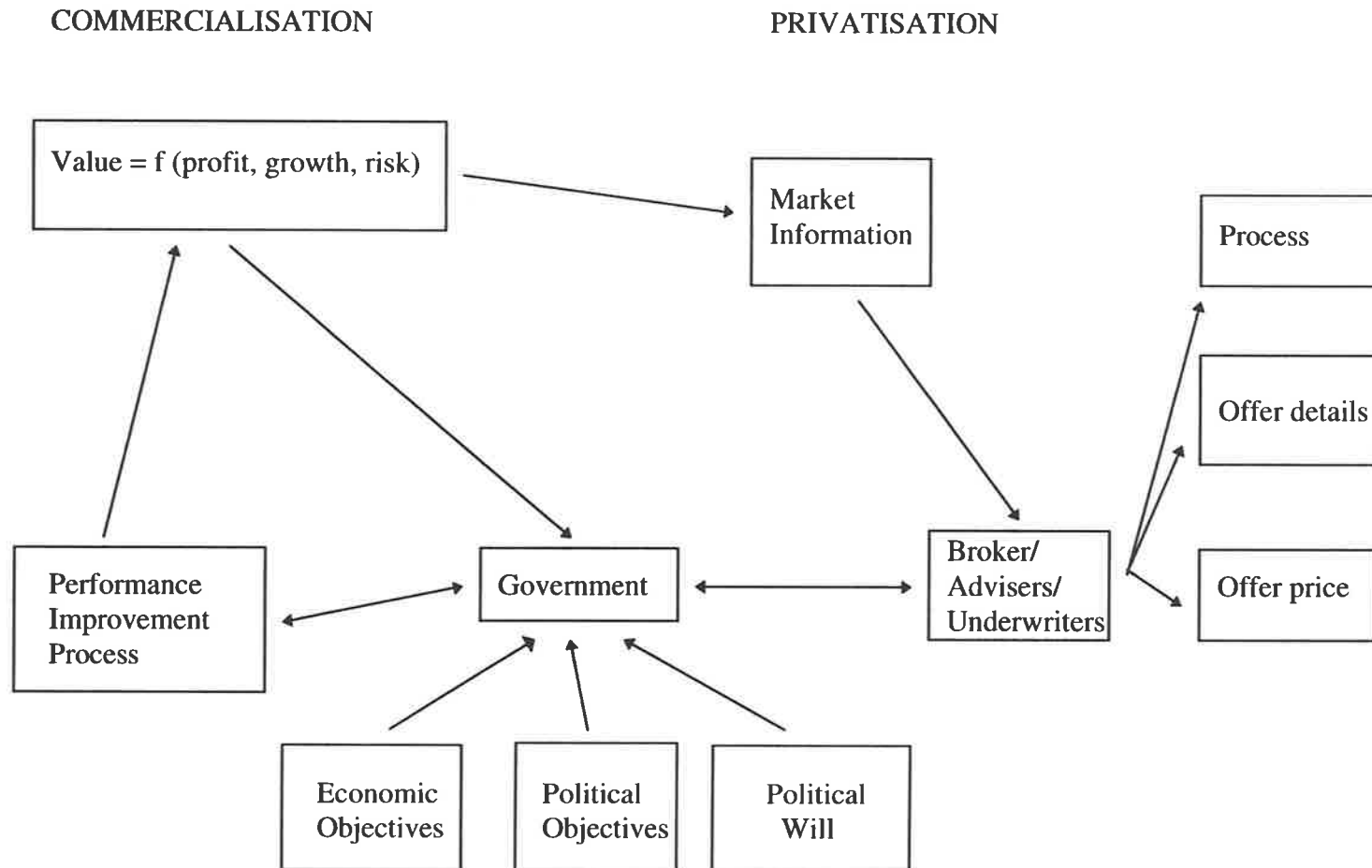
# Figure 4.4: Issues in Privatisation Valuation -- The Investors Side
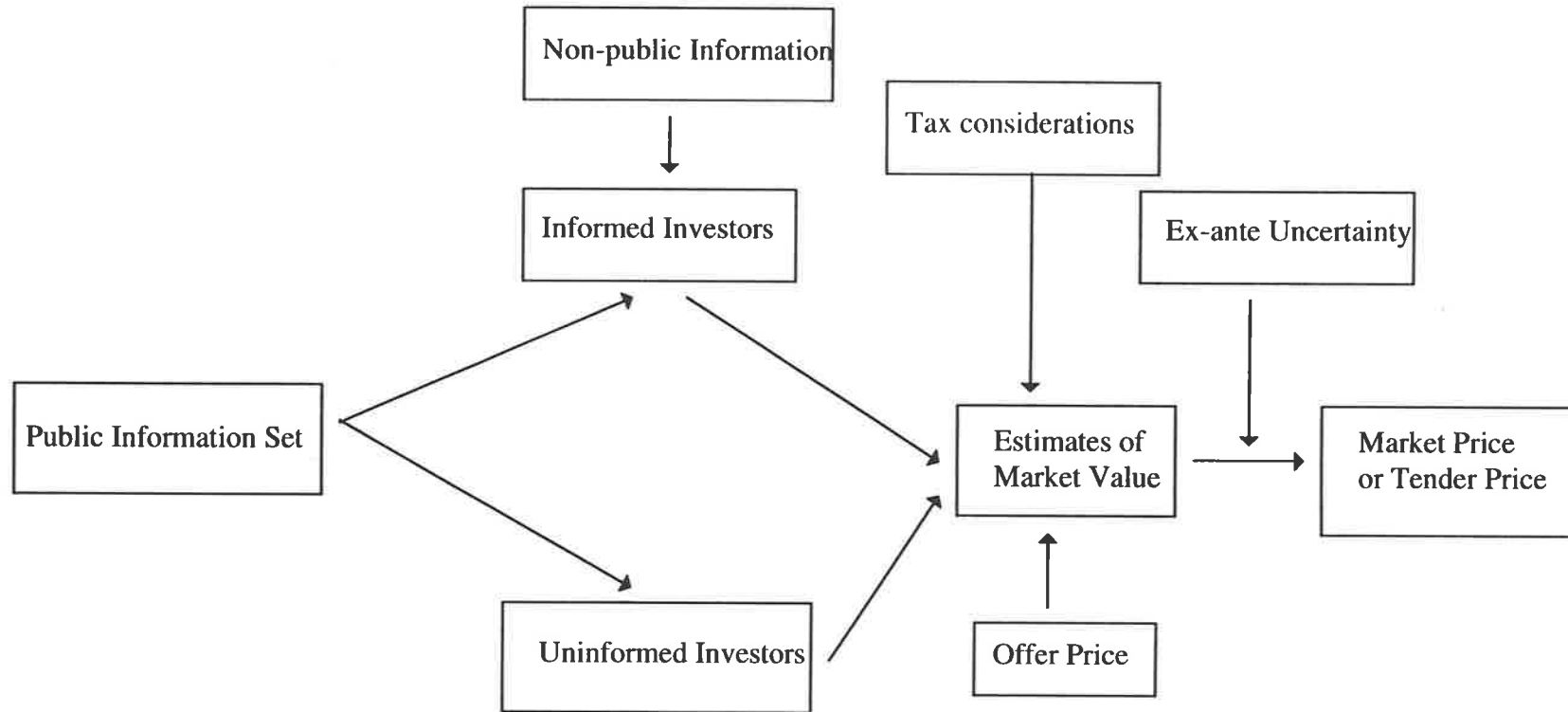
## 4.8 Development of a General Model of Privatisation Valuation

There are two sides to the privatisation valuation question. The government is concerned about setting the offer price at a level that achieves its many, often competing, objectives. The other side is that of the investors, who determine whether to subscribe to the issue by comparing their assessment of value with the offer price, and who set the market price of the issue post-listing. There are three general instances where investors must value the organisation prior to privatisation. Firstly, it must be valued for a trade sale which may be via a tender offer or negotiation. Secondly, it must be valued when faced with uncertainty about whether the offer price is acceptable or not for a public float at a fixed subscription price. Thirdly, it must be valued for a tender issue of shares where the price to include in the tender offer must be determined.

Figure 4.2 outlines the overall valuation model, while Figures 4.3 and 4.4 detail the position of the government and the position of investors respectively. Figure 4.2 illustrates the general model in which investors set the initial aftermarket price for the public enterprise being privatised. This may or may not agree with the offer price that the government is seeking. The extent to which the market price is over or under the offer price is the extent of over or under pricing, or mispricing. For trade sales, mispricing cannot usually be detected because there is not an observable market price. Any mispricing involved will be openly reported only in cases where there is an element of public share subscription.

### 4.8.1 Issues in Privatisation Valuation -- the Government Side

Figure 4.3 outlines a model of the commercialisation and privatisation process from the government's perspective. The process begins with the government resolving to

either improve the performance of the public enterprise before sale, or to sell the enterprise immediately.

In the first instance, the government may undertake commercialisation of the public enterprise with the intention of improving performance and, hence, increasing its potential value by increasing the levels of free cash flow. Commercialisation is intended to improve the determinants of value: future free cash flow, growth and risk. The techniques involved attempt to ensure that a profit making objective becomes the dominant objective of the enterprise. Commercialisation may be a continuous process with changes being initiated a number of times.

When the government decides to privatise the public enterprise, it will seek to optimise its position, satisfying a number of often conflicting objectives. These are its political and economic objectives, which are moderated by the political will or strength of position of the government, and the underlying value of the enterprise.

The political objectives of the government may be driven by ideological motives to see a smaller public sector. There may also be the need to obtain popular support for re-election in democratic states. 'Peoples' capitalism', if successfully implemented, may shore up support for the government. For developing countries, there is also the need to maintain the support of the major aid granting bodies, which encourage and even demand privatisation as part of economic restructuring. Politically, countries relying on such aid must implement a privatisation program. Other political motives for privatisation may include the need to serve a particular interest group or to attack another, for example, to reduce the power of the union in a strategically sensitive industry.

The need to include political objectives on the privatisation agenda is moderated by the political will of the government. Political will may be bestowed

on a government by the size of its mandate to govern in a democracy, the position that it holds by virtue of its dominant role in politics in the country and/or by the strength and resolve of the leader. For example, a dictatorship or government ruling without significant opposition has the necessary political will to implement a privatisation program even without the explicit support of the general populous. Similarly, a political leader with a high degree of individual political strength and will, may be able to implement a program in spite of spirited opposition.

Where a high degree of political will is present, the political objective of a wide share ownership pattern may be a less significant factor in setting the price for the privatisation. We would also expect that employee share ownership plans and employment maintenance deals with unions to be almost absent, since these are more likely to be used to elicit support by governments lacking political strength and will.

Economic objectives will also have an impact on the pricing and overall approach in a privatisation. The objective of meeting fiscal needs is best accomplished by maximising the sale price and choosing the sale method that achieves this. This may involve a direct trade sale to the highest bidder which, by ignoring 'peoples' capitalism' and the other political objectives, enables the government to avoid underpricing. Similarly, the government may choose to sell the entity in a trade sale to parties considered to have the expertise to improve performance. Reform in such cases may mean reduced proceeds to the government, especially when the sale occurs after major deregulation and the dismantling of the public enterprise's monopoly position. The sale, however, may achieve the objective of improving performance in the provision of basic infrastructure and inputs into the economy.

Value will also be affected by market factors about which the government may not have complete information or expertise. The government is in a position similar to that described by Baron (1982), needing to employ brokers, underwriters and advisers to assist in valuing and selling the public enterprise. The type of market information will include advice on valuation within the capital market, the likely demand for the assets to be sold or equity to be issued, market conditions and the appropriate form of sale (public float at a fixed price, tender issue, trade sale, etc.). The advisers, underwriters and brokers to the issue also have an interest in maximising their returns from the issue. These returns may be in the form of fees for service or freedom in allocating shares to favoured clients.

The price set for sale will be one that recognises the compromises between conflicting objectives and reflects prevailing market factors in acknowledging value. Once the offer price is set the investors are able to consider the factors surrounding the float and decide whether or not to invest.

### 4.8.2  Issues in Privatisation Valuation -- the Investors' Side

The potential investors in a privatised company face the problem of considering the market value of the entity without prior market information. While the government and its advisers may attempt to provide to investors all the information available, there may still be some residual ex-ante uncertainty brought about because the enterprise has never faced valuation in the market place. The determinants of value -- free cash flow, risk and growth -- are all sources of uncertainty about the market value of the enterprise. Further, there are factors in privatisation valuation that are unique to that process, a major one being policy risk. As previously defined, policy risk is the risk that the government will move to change the industry structure faced

by the newly privatised enterprise or change the basis of regulation, such as a change in the X factor in 'RPI minus X' price regulation.

Rock's (1986) model of underpricing is based upon the existence of a group of informed investors who have superior information to other investors, the government and its advisers. Bös (1991) argued that there is little scope for such information asymmetry in a privatisation since the government will ensure that all available information is given to potential investors. However, there may still be remaining sources of information asymmetry. Policy risk flows from future government policies regarding industry structure. It also flows from the policies of the opposition parties towards industry structure, the privatisation itself, and its likely response should it be elected in the future. These elements may be sources of non-public information. For example, the opposition policy towards a privatisation is included in the prospectus for privatisations in the UK; however, this is not always the case globally. The prospectus for the Tabcorp float in Australia failed to report the opposition's policy in the prospectus and, as a consequence, suffered from a high degree of speculation about the policy risk involved, a factor seen by some observers as reducing the value of the enterprise to investors.

Other sources of information asymmetry flow from the fact that investors are relatively inexperienced in privatisation issues. In most countries, there have been only a few privatisations compared to the many private share issues. Accordingly, there are very few investors that have expertise in valuing privatisations. Large investors, however, may be able to draw on global expertise. Hence, their superior ability to process the available information gives them an advantage and is a potential source of information asymmetry.

The plans of the likely future directors may also be a source of non-public information that would only be available to a small group of investors. However, the freedom of the new directors to implement major new projects may be limited by the terms of the privatisation. The government may hold a 'golden share' giving it right of veto over certain developments, including takeover by overseas interests. These restrictions directly affect those large, and usually informed investors, who may be seeking to control the newly privatised company. The restrictions reduce the price they are prepared to pay since any premium for control is removed.

Both informed and uninformed investors will decide whether to invest in the privatisation depending on comparison of their assessment of value with the offer price. The decision to invest flows from this comparison, with the decision being moderated by the effect of the ex-ante uncertainty surrounding the issue. According to Rock (1986), the uninformed investors will invest regardless of the information available, while the informed investors will only invest where they see a good chance of large initial gains. Accordingly, the issues that are significantly underpriced will be oversubscribed and rationing will result.

In summary, the general model of privatisation underpricing outlined in this section draws upon the research findings on IPOs and on the basic process of a privatisation IPO. That is, the model sees underpricing as a result of processes in two interrelated decision centres -- the investors and the government. Although the relationships proposed are too complex to test in this research, a number of hypotheses can be developed from the general theory. These hypotheses are developed in the next section.

## 4.9 Hypothesised Relationships for the Underpricing of Initial Public Offerings of Privatised Shares

In this section a number of testable hypotheses flowing from the general model of valuation for privatisation are developed. The hypotheses relate to the initial public offering of shares in privatised companies offered through a public share float at a fixed subscription price. The model, therefore, relates only to those privatisations where the capital market effects are clearly observable. In the cases of privatisation by trade sale the extent of underpricing, if any, is not readily available because the share market value post sale is not identifiable.

There are two sides to the underpricing question outlined from the general theory developed in the previous section. These are the investors' side and the government's side. In addition, the literature review on IPOs has clearly identified ex-ante uncertainty as a key issue in underpricing. Ex-ante uncertainty affects the perceptions of value of the enterprise being privatised for both the investors and the government. Accordingly, a key objective in this research is to consider the explanatory power of ex-ante uncertainty in privatisation IPO underpricing.

Ex-ante uncertainty is central to the theories of IPO underpricing in general. The main causes of the uncertainty are the difficulties in forecasting the quality of management, earnings and growth options implicit in the company's existing assets and future investment opportunities. The difficulties arise because of the differential information available to the potential investors, the issuer and their advisers. As discussed, the existence of asymmetric information provides the main theoretical explanations of IPO underpricing: Baron (1982) distinguished between issuer and adviser, while Rock (1986) distinguished between informed and uninformed investors. Muscarella and Vetsuypens (1989) tested Baron's model and did not find

support for it. Koh and Walter (1989) and Levis (1990) undertook direct tests of Rock's model and strongly supported it.

In many of the specific hypotheses developed below, the variables being tested are also sources of ex-ante uncertainty to investors and the issuing government. Tests of these hypotheses are joint tests of the role of the specific factor in underpricing and the overall relevance of ex-ante uncertainty in explaining underpricing. If ex-ante uncertainty is found to be a significant factor, it will bring into question the arguments of Bös (1991) and Perotti and Guney (1993) that see privatisation IPO underpricing as largely a political process using the discounts to build confidence in the privatisation program and to promote the objective of 'peoples' capitalism'.

Menyah, Paudyal and Inyangete (1990), Bös (1991) and Perotti and Guney (1993) rejected the existing theories of IPO underpricing as being applicable to privatisation IPOs. They also questioned the relevance of information asymmetry. Their argument was that information asymmetry was not relevant since privatised companies are usually well known and the government typically goes to great lengths to provide as much information to investors as possible. The general conclusion was that privatisation IPOs should be no more underpriced than private IPOs, and possibly less underpriced. In fact, Menyah, Paudyal and Inyangete (1990) found that privatisation IPOs were significantly more underpriced. Bös concluded that more research was required before sound conclusions could be drawn. Menyah, Paudyal and Inyangete (1990) also found that the main measures used as proxies for ex-ante uncertainty did not explain the differences between private sector and privatisation IPOs.

Lee, Taylor and Walter (1991) provided a contrary argument and proposed that an objective of 'peoples' capitalism' would magnify the informed/uninformed investor dichotomy of Rock (1986). Jenkinson and Mayer (1988) also supported these conclusions and found that ex-ante uncertainty had a role in underpricing, since secondary issues were less underpriced than IPOs. Bös (1991) recognised that an objective of 'peoples' capitalism' would attract investors with poor access to information and limited ability to interpret what was available. Overall, it could be expected that in privatisation issues, Rock's informed/uninformed investor dichotomy should be strong.

The following specific hypotheses relate to both the investors' and the government's side of the privatisation IPO valuation problem. Hypotheses are developed linked to the main determinants of value for the company: profitability, risk and growth. In addition, hypotheses are developed to test the theories proposed in the literature to explain privatisation IPO underpricing, in particular, the 'winners' curse' and the reputation building hypothesis. The factors affecting the offer price set by the government and its advisers may also provide sources of ex-ante uncertainty to investors. A range of hypotheses are also developed relating to the strength of ex-ante uncertainty in privatisation IPOs. These hypotheses also propose ex-ante uncertainty factors that are unique to privatisation issues, which may explain, in part, why these issues are underpriced to a greater extent than private IPOs.

### 4.9.1 Valuation Variables and their Hypothesised Effect on Underpricing

The discussion of the professional approaches to valuation in section 4.2 outlined a number of variables. Study of these variables enables understanding of the valuation dynamics in privatisation share issues. The variables are also sources of ex-ante

uncertainty since estimates of their future values are used in valuation. The first three hypotheses outlined below consider the relationships involved in privatisation valuation, in particular, the role of growth and the extent to which the purchase price reflects tangible versus intangible assets.

The growth options implicit in a valuation may be important in explaining the ex-ante uncertainty associated with an IPO. A variable for growth options may be used as a direct measure of the estimated value of intangibles inferred in the offer price for privatisation issues. Accordingly, the variable captures a number of important determinants of value from the perception of the advisers to the float, including goodwill, management plans, current industry structure, the regulatory framework, and the potential for the new management to create value through their own management plans.

Taylor and Walter (1991) proposed a growth option variable as their preferred proxy for ex-ante uncertainty. They found a statistically significant positive correlation between growth options and underpricing. How, Izan and Monroe (1995) also used a measure of growth options as a proxy for ex-ante uncertainty, but found no statistically significant effect.

The growth implied in a share issue indicates the extent to which the subscription price represents the purchase of growth options as opposed to unencumbered assets in place. Growth options may be calculated as :

$$1 \quad - \quad \frac{\text{net tangible assets per share}}{\text{subscription price per share}}$$

where cash is excluded from tangible assets to reflect uncertainty about the 'value' of its application. The higher the growth option inferred by the offer, the greater the ex-ante uncertainty and hence the higher the underpricing involved.

Privatisation issues are different to the typical IPO. They typically involve companies with high public profiles that operate in low growth industries, often as public utilities or nationalised industries. The companies can only achieve profit growth in these industries through increasing prices or cost reduction made possible by efficiency gains. Accordingly, another view of the growth options variable emerges. It could be seen as a signalling device to the market. If the government believes that future growth in profit will be difficult it would price the issue with little or no growth option. The demand for these issues would be lower and the first aftermarket price would be lower than it would otherwise be. The government would need to underprice these issues by a greater amount to maintain demand. In these cases, underpricing is greatest for low growth companies.

**Hypothesis 1**: The abnormal excess return of a privatisation share issue is negatively related to the size of the growth options implied in the issue.

A related issue is the nature of the assets concerned. A large proportion of the privatisation issues have been for utilities with high future capital expenditure needs and highly specialised assets. These assets would have little value in a liquidation or where the company has to downsize if it loses market share, because the assets have a high value in use. The value of the assets is only maintained where they can be used to generate real profits. The value of the assets to an investor in these cases is not necessarily the book value reported in the privatisation prospectus. The real value may be substantially less, reflecting the specialised nature of the assets and the fact that large investments may be required to maintain the operating capability necessary to realise the value of the assets through use. Accordingly, in privatisation issues the government may need to set a price that offers significant underpricing as an inducement to investors. Once again, for privatisation issues the

growth option variable would be negatively related to underpricing. The greater the level of net asset backing of the issue the higher the level of underpricing. The significance of the level of capital expenditure needed for the privatised company is covered in a later section.

It is generally felt that the greater the level of asset backing, the higher the value of the shares and the lower the risk involved to the investor. That is, where a company has a high level of tangible assets in place, the ex-ante uncertainty to the investor is reduced. Accordingly, a negative correlation between net tangible assets and underpricing would be expected. In the case of privatisation issues, however, the nature of the assets involved may mean that this relationship does not hold. It is hypothesised in this thesis that the opposite relationship in fact exists. The value of the assets being purchased is dependent upon their value in use which may be less than the book value.

> **Hypothesis 2**: The abnormal excess return of a privatisation share issue is positively related to net asset backing of the company.

As previously discussed, the P/E ratio is used in an accounting approach to valuation. A high P/E ratio translates into high value. The P/E ratio is positively related to the expected growth in earnings, and negatively related to risk. The riskier the company is considered, the lower the price-earnings ratio. In an IPO, the higher the level of risk to investors, the greater the expected level of underpricing required to provide an incentive for investors to subscribe to the issue. Accordingly, it is expected that the lower the P/E of a privatisation issue, the higher the risk of the issue and hence the higher the level of underpricing.

**Hypothesis 3**: The abnormal excess return of a privatisation share issue is negatively related to the P/E ratio implied in the issue.

This hypothesis requires careful interpretation since valuation is linked to estimates of future earnings, not past earnings, and more specifically, future free cash flow. Past earnings are not directly relevant to valuation; they are only useful to the extent that they provide indications of future cash flow. In the case of privatisation, however, the earnings forecasts used are prepared by prestigious accounting firms, using commercial accounting principles. It could be concluded that while there are real doubts about use of the P/E ratio in general, it is appropriate to use the ratio as an indicator of value and risk in privatisation IPOs.

### 4.9.2 The Hypothesised Effect of Information Asymmetry between Investors on Underpricing

The level of oversubscription of an issue may be used as a proxy for the level of excess demand. Rock (1986) argued that where there is a high level of informed demand we would expect the initial returns also to be high. Similarly where potential gains are low, demand is low. This is because informed investors stay away from an issue, in line with the 'winners' curse'. Koh and Walter (1989) found that the 'winners' curse' was strongly evident in Singapore and that there was a significant positive correlation between oversubscription levels and first-day returns.

An alternative explanation of this relationship is that underpricing may be associated with a 'speculative bubble' (Tinic 1988). The existence of a 'speculative bubble' might be reflected in the level of aggregate demand for the issue, as measured by the level of oversubscription. This variable should be positively related to the extent of underpricing, where actual underpricing in this context is a proxy for the level of expected underpricing. If a 'speculative bubble' does exist then in an

efficient market initial underpricing would be followed by underperformance in the after market.

Bös (1991) outlined the relationship between what is termed 'peoples' capitalism' and underpricing. 'Peoples' capitalism' may be used to gain long run support and protection for a privatisation program by providing an impediment to renationalisation by future governments. A wide share ownership pattern means that a renationalisation strategy would be politically unpalatable, if not impossible, since it may mean the nationalisation of assets held by a large cross section of the electorate. This factor is strengthened by encouraging both a wide initial share ownership pattern and a high retention rate in the long run. Underpricing and a reputation that privatisation issues are generally underpriced should encourage high subscription levels from investors. When coupled with allotment procedures designed to ensure a broad ownership pattern, the 'peoples' capitalism' objective of the government is served. Lee, Taylor and Walter (1991) argued that an objective of 'peoples' capitalism' would magnify the informed/uninformed investor dichotomy of Rock (1986).

> **Hypothesis 4**: The abnormal excess return of a privatisation share
> issue is positively related to the level of excess
> demand.

As discussed in the literature review, Koh and Walter (1989) found support for Rock (1986) in that the first day return to a successful uninformed subscriber to an IPO is equal to the risk free rate of interest. This was after allowing for the probability of being successful and the opportunity cost of interest forgone. Flowing from this finding, it would be expected that the higher the level of interest rates, the greater the level of expected underpricing. The greater level of underpricing would

be necessary to provide the expected return necessary for investors to maintain their demand for an issue.

> **Hypothesis 5**: The abnormal excess return of a privatisation share issue is positively related to the interest rate at the time of subscription.

### 4.9.3 The Hypothesised Effect of Ex-Ante Uncertainty on Underpricing

As discussed above, information asymmetry arguments rely on ex-ante uncertainty about the 'true' value of the shares in a public issue, that is the market value once the shares begin trading. In the previous section, hypotheses related to the 'winners' curse' theory of Rock (1986) were developed. Beatty and Ritter (1986) argued that, in line with Rock, the degree of underpricing should be directly linked to the ex-ante uncertainty surrounding an issue. They argued that 'as ex-ante uncertainty increases, the winners' curse problem intensifies' and that 'a representative (uninformed) investor will demand that more money be 'left on the table', in an expected value sense, via underpricing.'

In addition, ex-ante uncertainty plays an important role in the IPO underpricing model of Baron (1982). Baron observed that the underwriter's profit from an issue will be maximised where the costs of distribution are minimised and compensation received is maximised. Compensation is determined by the offer price, the proceeds from the issue, and the underwriter's own report on capital market conditions. Accordingly, a principal-agent problem emerges. The issuing company, as the principal, aims to maximise its proceeds but does not have the necessary information about the market, and must compensate an agent, the underwriter, to provide the information. Under Baron's model, the greater the uncertainty about the market demand for the shares, the lower the offer price. This

would, therefore, lead to greater underpricing as the offer price is reduced to boost demand for the issue by providing greater expected returns to investors. Accordingly, ex-ante uncertainty and underpricing should be positively correlated.

Clarkson (1994) studied a number of proxies for the ex-ante uncertainty surrounding an IPO issue. Clarkson noted that in most empirical studies of IPO underpricing, proxies for ex-ante uncertainty were used. He sought to test the efficacy of a range of proxies as well as 'the primary prediction that underpricing should be increasing in ex-ante uncertainty'. Clarkson found support for a positive relationship between underpricing and ex-ante uncertainty. It was found that the most highly significant proxies were the age of the company and the number of risk factors listed in the prospectus. The gross proceeds of the issue and the company's sales level were also statistically significant.

Overall, high ex-ante uncertainty surrounding an issue is expected to be associated with a high level of underpricing. This leads to the development of a number of hypotheses relating to proxies for ex-ante uncertainty in privatisation IPOs.

**Hypothesis 6**: The abnormal excess return of a privatisation share issue is negatively related to the size of the issue, as measured by the gross proceeds.

For privatisation issues there are other dimensions of ex-ante uncertainty facing the investor, for example, the issue of policy risk. We would expect that the higher the policy risk, the greater the initial underpricing. This would compensate investors for the added exposure brought about by the risk that after privatisation government policy may change. The government may deregulate the industry structure that the company faces or change the regulatory framework. Although, the measurement of policy risk is difficult, the extent of deregulation prior to

privatisation could be an indicator of the scope for further change. Where significant deregulation has occurred prior to privatisation policy risk is likely to be lower than where there is greater potential for future deregulation and changes in the industry structure.

> **Hypothesis 7**: The abnormal excess return of a privatisation share issue is positively related to the level of policy risk involved.

Where a privatisation candidate operates in a highly competitive industry with a minimum of regulatory control, there are low risks associated with government policy changes. For companies that operate in a monopoly position, there is an added risk associated with buying shares in the privatised company. The risk is that government policy might change resulting in lower future cash flows, hence, lower value. Typically, utilities operate as monopoly suppliers of electricity, telecommunications, sewerage and water services. Shares in a privatised utility might face policy risk in the form of deregulation. The additional policy risk facing utilities would see them underpriced in an IPO to offer greater expected initial returns to compensate investors for the additional ex-ante uncertainty involved.

Linked to this line of thinking are the results of the research on the relative performance of public versus private enterprises. In particular, Caves and Christensen (1980) provided a classification that put the issue of competition and privatisation into perspective. As discussed previously, they saw four types of companies, distinguishing public and private ownership, and competitive and non-competitive industries. They argued that the performance of public enterprises operating in competitive industries was better than other public enterprises and indistinguishable from privately owned companies in non-competitive industries. Following this line of reasoning, the ex-ante uncertainty of privatisation IPOs, where

the company has been operating in a competitive industry, is likely to be lower than for those in non-competitive industries. This uncertainty flows from the risk of regulatory changes to the industry and from the fact that the potential for large efficiency gains in competitive industries is lower, hence, less uncertain.

**Hypothesis 8**: The abnormal excess return of a privatisation share issue by utilities is greater than for issues by non-utility companies.

Hypothesis 8 flows from a number of observations. The impact of growth potential and policy risk on an industry and its structure should vary across different industries. Accordingly, it is expected that underpricing will be significantly different across industries because of the different ex-ante uncertainty involved. Also, by implication, there will be significant differences in the valuation factors across industries. In particular, utilities usually do not operate in a competitive environment since they have usually been developed under the assumption of a natural monopoly. The deregulation policies that often accompany privatisation add to the ex-ante uncertainty faced by investors in utility IPOs. In addition, privatised utilities usually face regulation in some form. In the UK new regulatory agencies were established for the privatised utilities. The future operation of these agencies, and their attitude to revisions of the pricing formula and other regulations affecting the utilities, increase the ex-ante uncertainty surrounding the IPO. Accordingly, higher underpricing is expected where there is greater regulation because of the greater ex-ante uncertainty involved.

In a number of privatisations, the government concerned has imposed restrictions on the behaviour of management in the newly privatised company. Two common restrictions in UK privatisations were restrictions on 'winding up' newly privatised companies and restrictions on the disposal of assets. The effect of such

restrictions is to reduce the value of the company to its new owners because it creates uncertainty about the extent of management changes that can be introduced. The restrictions effectively increase ex-ante uncertainty surrounding the issue by restricting the range of alternatives for the future management direction of the company. A restriction on 'winding up' a company forces management to continue to operate even though operations are unprofitable. In these cases, the government would have to offer high discounts in the share offer to attract investors to the issue.

**Hypothesis 9:** The abnormal excess return of a privatisation share issue is higher where there are restrictions on the 'winding up' of the privatised company than in the absence of such restrictions.

A related hypothesis can be developed where management is constrained in selling the assets of the privatised company. Effectively this rules out asset stripping behaviour by investors, but also may restrict the ability of management to rationalise the asset holding of the business. The business faces the risk of being overcapitalised and unable to dispose of the assets involved. Similarly, if the market value of certain assets increases to levels over their 'value in use' to the company, the restrictions imposed prevent management from capitalising on the situation. In all cases, these restrictions require greater initial underpricing to compensate for the greater uncertainty involved and generate demand for the issue.

**Hypothesis 10:** The abnormal excess return of a privatisation share issue is higher where there are restrictions on the disposal of the assets of the privatised company than in the absence of such restrictions.

### 4.9.4 A Hypothesised Relationship Between Underpricing and Government Reputation Building

Perotti and Guney (1993) outlined a confidence building hypothesis, where privatisation underpricing is used by government to build confidence about its privatisation plans among investors. They concluded that the early sales in a privatisation program will be underpriced to a greater extent than later sales. The reason for this is to build credibility in the privatisation program overall.

> **Hypothesis 11**: The abnormal excess return of a privatisation share issue is greater for sales early in a privatisation program compared to sales later in the program.

Jenkinson and Mayer (1988) argued that the proceeds from a privatisation are greater when there is already an established market for the securities involved. This can be achieved by initially floating a small parcel of shares to enable a market to be established and following this with sale of the remainder of the equity. Where the government sells a large initial parcel of shares the underpricing discount is likely to be greater. This is because the government does not use a small, initial float to build confidence in the issue and communicate information to the market. In these cases, there are higher levels of ex-ante uncertainty from the perspective of the government, its advisers and the investors.

A related proposition was put forward by Perotti and Guney (1993). They argued that the government seeks to reduce the policy risk faced by investors and ensure investor support by maintaining a level of ownership in the company post-privatisation. Where the government retains some equity in the company, policy risk is lower and underpricing will be lower. Conversely, investors face all of the policy risk where all of a company is sold; hence, underpricing is expected to be higher.

Finally, where the government sells the whole of an entity, it is also sells the control of that entity. In the market for corporate control, a value is placed on such control. Accordingly, where the government sells a high percentage in a privatisation, the market is likely to bid up the market price for shares; hence, underpricing will be high. The value of any premium for corporate control is also a source of ex-ante uncertainty surrounding the issue. Accordingly, the greater the level of equity sold the higher the degree of underpricing.

**Hypothesis 12**:  The abnormal excess return of a privatisation share issue is positively related to the percentage of total shares in the company sold.

### 4.9.5 A Hypothesised Relationship Between Underpricing and the Value of Corporate Control

Closely connected to Hypothesis 12 is the fact that where the government sells all of a company it also sells corporate control. Investors may pay a premium when they are able to purchase a controlling interest in the company. There is a greater chance that investors can obtain control of the company when a greater proportion of equity is sold. However, the actual value of any premium for control is uncertain and will not be determined until the shares are traded in a competitive market for corporate control. The added uncertainty brought about by the premium for corporate control is likely to be positively related to underpricing in accordance with Hypothesis 12.

In addition, Bös (1991) noted that the privatised company is often protected from hostile takeover by government precautions such as a 'golden share'. The 'golden share' may restrict the behaviour of management in that it may enable the government to veto strategies proposed by them. This would reduce the value of the company to investors since it adds to the uncertainty surrounding the future performance of the company. Higher levels of underpricing would be expected since

the value of the company to investors is lower than it would have been had the 'golden share' not been in place. In such cases, the issuer underprices to compensate for the additional ex-ante uncertainty involved.

> **Hypothesis 13**: The abnormal excess return of a privatisation share issue is higher where the government holds a 'golden share' in the privatised company sold than where it does not hold a 'golden share'.

The government also might place restrictions on the number of shares that an individual investor can purchase in the privatised company to prevent anyone from taking control of the company. These restrictions will remove the possibility of an investor controlling the company, hence, they will reduce the value of the company to the investor.

There may also be greater agency costs involved where these restrictions exist. This is because management of the organisation will not face the pressures from the 'market for corporate control'. One of the main reasons for privatisation identified in the previous literature review was to open management to the full discipline of capital markets. Yarrow (1986) observed that the immediate effect of privatisation was to substitute shareholder for government monitoring and control of management. Yarrow observed how the market for corporate control operates. If the performance of management is poor, the share price will fall and the company becomes a takeover candidate. In this way, a new management team may be introduced. Where control is limited by restrictions on the level of individual shareholding there is greater ex-ante uncertainty surrounding the issue. This is because the market for corporate control cannot operate efficiently. In these cases, the issuing government underprices to compensate for the additional ex-ante uncertainty involved.

**Hypothesis 14**: The abnormal excess return of a privatisation share issue is higher where the government places a limit on the shareholding levels of investors than in the absence of a limit.

### 4.9.6 A Hypothesised Relationship Between Underpricing and the Country of Issue

A government in a weak political position may use underpricing as a means of eliciting political support. The political will of a government is also likely to influence whether underpricing of privatisation IPOs will be necessary to maintain support for a government's programs. Alternatively, underpricing and the share allocation mechanism may be an instrument of social policy for governments. For example, it may be used as a means of discrimination in favour of a particular race or group in society. In these cases, underpricing of privatisation IPOs provides a mechanism to redistribute wealth in line with a government's policies.

A related issue is the condition of a country's capital market. The ability of the market to absorb large share issues was questioned by the advisers to the government in the UK privatisation program. In addition, the capacity of the capital market to absorb large privatisation share issues will differ across countries. In general terms, less developed countries have poorly developed capital markets. In these countries, the government might actually use privatisation to help in the development of the share market.

Overall, we would expect to find differences in the extent of underpricing in different countries. In particular, developing countries may use underpricing for other objectives, such as the redistribution of wealth and to develop the capital market. Overall, it is expected that underpricing will be higher in less developed countries than in developed countries.

**Hypothesis 15**:  Underpricing is higher in less developed countries than in developed countries.

### 4.9.7 A Hypothesised Relationship Between Underpricing and 'Hot Issue' Markets'

Ritter (1984a) observed that there appeared to be 'hot issue' markets for IPOs. That is, there are certain time periods when the number of issues and the degree of underpricing are different to the average levels. These results were confirmed by Ibbotson, Sindelar and Ritter (1994) in a study of IPOs in the US. Accordingly, underpricing of privatisation IPOs is expected to vary over time periods. How, Izan and Monroe (1994) divided their sample into three time periods: pre-1985, 1985 to October 1987 and post-October 1987. They found that underpricing was greater in the first two periods when boom market conditions prevailed than in the last period where the more bearish post-crash conditions prevailed.

**Hypothesis 16**:  Underpricing is greater in a boom state of the market than in a 'bear' state.

### 4.9.8 A Model of Underpricing of Initial Public Offerings of Privatised Shares Specific to Utilities

The British government's privatisation program in 1989 and 1990 provides the opportunity to study valuation of privatised companies within an industry context. The general theory of valuation in privatisation has hypothesised a number of economic, social and political factors. The study of the privatisation in 1989 of the British water companies and the 1990 sale of the regional electricity companies provides an opportunity to gain further insights into privatisation. These cases are, in effect, a controlled situation where a number of the hypothesised variables are common. In particular, these companies were sold on the same day, at the same price, to be paid under the same terms, in the same industry and hence faced the

same political costs, the same capital market, the same interest rates and the same economic and capital market conditions. Any variance in underpricing must have been due to other factors besides those recognised in the general model discussed above. Study of these companies provides an opportunity to consider the valuation process at a micro level.

ANZ McCaughan (1994) concluded that the underpricing of the British electricity companies was due to errors in the estimation of the X factor to be applied in the 'RPI minus X' regulatory regime used. If X is underestimated it will lead to higher prices for the companies and higher returns for the shareholders at the expense of consumers. They also argued that the relative initial X factors were not consistent because they failed to adequately take into account the following factors: 'the appropriate benchmark reference, measuring the scope for productivity gains relevant to each company, and accordingly establishing an appropriate target or discipline for management' (ANZ McCaughan, p.viii).

The ANZ McCaughan study also summarised its view of the key dynamics in valuation for the electricity companies as being:

- yield - operating cash flow margin per Gwh, which is influenced by utility size, business mix (residential, commercial and industrial), productivity, growth rate of units of electricity distributed, and tariff levels and their relationship with X factor.

- cash flow and P/E multiples: influenced by the relative earnings-per-share (EPS) growth rate, business risk, financial risk, and regulatory risk. In addition, capital expenditure requirements will influence the financial risk and share rating, which is dependent, in

part, on the life and quality of existing infrastructure (ANZ McCaughan 1994, p. vii).

Kerstein and Kim (1995) studied whether capital expenditures provided information about a company's value that is not captured by current earnings. They argued that managers use private information about future demand and costs that motivates their investment decisions. When changes in capital expenditure levels are communicated to the market they convey good or bad news and have an impact on value. Kerstein and Kim tested this using US data and found that capital expenditure changes were strongly and positively associated with excess returns on shares.

In the case of the UK electricity and water utilities, the level of future capital expenditure needs were reported in the prospectuses. The existence of a high level of needs adds to the ex-ante uncertainty faced by investors. The higher the level of ex-ante uncertainty, the greater the level of underpricing.

**Hypothesis 17**: The underpricing of shares in privatised companies is positively related to the future capital expenditure needs of the company.

For companies privatised within an 'RPI minus X' regulatory framework, the value of the X factor will impact on company value. The mechanism restricts price increases to inflation less this factor, therefore the higher the factor the lower the price rises possible. This increases the uncertainty about the future profitability levels of the privatised company. It is expected that the greater the restriction on pricing, the lower the value of the company in the market. Accordingly, it is expected that the X in the formula will be positively correlated with underpricing, as the issuer leaves more reward 'on the table' for investors to compensate them for these restrictions and the uncertainty created.

**Hypothesis 18:** The abnormal excess return of a privatisation share issue is positively related to the X factor in an 'RPI minus X' regulatory framework.

## 4.10 Summary

In this chapter a general theory of privatisation valuation has been developed. This has led to the development of a number of testable hypotheses about the factors influencing privatisation IPO underpricing. The main factor identified was the ex-ante uncertainty facing investors, the issuing government and their advisers. The next chapter considers the issues involved in the research design to test these hypotheses.

# Chapter 5    Research Design and Methodology

## 5.1    Introduction

The previous chapter led to the development of a general model of valuation in privatisation cases that includes economic, political, management and capital market factors. From the general model, a series of hypotheses has been developed that may be subjected to statistical testing. The purpose of this chapter is to discuss the major conceptual and methodological issues in this research.

## 5.2    Research Design

Sekaran (1992, pp. 92-112) outlined the issues in research design as being: the purpose of the study, type of investigation, extent of researcher interference, study setting, time horizon, unit of analysis, sampling design, data collection methods, measurement, and data analysis. This outline is used in this section to discuss the issues relevant to the research design for this thesis.

### The purpose of the study

Sekaran outlined how studies can be either exploratory in nature, descriptive, and/or conducted to test hypotheses. Exploratory studies are undertaken where there is not much known about a problem, or where little prior research has been undertaken. They are important in developing an understanding of the problem at hand and in the development of theories.

A descriptive study is undertaken to ascertain and describe the characteristics of the variables surrounding a situation. These studies present data in meaningful forms and help to:

(1) understand the characteristics of a group in a situation of interest,

(2) aid in thinking systematically about aspects of a given situation,

(3) offer ideas for further probing and research, and/or

(4) help make certain simple decisions (Sekaran 1992, p. 97).

Studies involving hypothesis testing try to explain the nature of the relationships involved in a situation, or to establish the differences among groups. In hypothesis testing the research goes beyond description of the variables involved and seeks an understanding of the relationships among the variables.

Our level of understanding of the key constructs involved in privatisation is developing and we cannot be sure of the key variables and relationships between them. Accordingly, previous studies of privatisation IPOs have tended to be either descriptive or exploratory in nature. The only empirical studies published in journals to date have been Jenkinson and Mayer (1988), Menyah, Paudyal and Inyangete (1990) and Perotti and Guney (1993). The first and last of these studies were largely descriptive, while the study by Menyah, Paudyal and Inyangete was largely exploratory and involved only limited hypothesis testing.

Hypothesis testing provides an opportunity to enhance understanding of the relationships involved in privatisation IPOs. This thesis uses some variables from the IPO literature and some variables that are unique to privatisation share issues. This enables testing of hypotheses that have not been considered in previous research. In the previous chapter, the relationships between the variables and IPO underpricing were built into a series of hypotheses to be tested. Overall, the thesis involves a higher level of methodological rigour than evident in the previous studies of privatisation IPOs.

## Type of investigation: Causal versus non-causal

Sekaran distinguished between causal studies and correlational studies. Causal studies are designed to establish cause and effect relationships in situations, whereas correlational studies attempt to determine the factors associated with certain phenomenon. In this research a correlational study approach is used since the research aims to further knowledge of the factors that are associated with underpricing of IPOs and in particular, privatisation IPOs. These relationships were built into the series of hypotheses developed in the previous chapter.

## Extent of researcher interference

Correlational studies are usually undertaken with a minimum of researcher interference (Sekaran 1992, p. 102). There is a minimum of researcher interference in capital market based studies such as this one, since the data comes largely from secondary sources.

## Unit of analysis

The unit of analysis in this thesis is the individual company that was privatised through an initial public offering and floated on the stock exchange of the country concerned. The nature of this thesis also allows for cross-sectional analysis of these companies across countries, industries and time.

## Time horizon

This thesis is a cross-sectional study, where the data was gathered for each company once. In the final chapter of the thesis, directions for future research are discussed. The possibility of a future study using longitudinal data for the companies involved is

discussed. The main body of IPO literature includes both cross-sectional and longitudinal studies. The studies attempting to explain the short term factors associated with initial underpricing have been cross-sectional. This thesis follows the same methods as these studies. The longitudinal studies have been concerned with whether the performance of IPOs is significantly different to similar shares over time. There is scope for a future longitudinal study of the privatised companies to consider their pricing behaviour in the after-market.

In summary, this thesis involves hypothesis testing using cross-sectional data. The thesis is a correlational study. The approach taken here is justified and considered appropriate for privatisation IPOs, which have not been researched in this manner before. While there is an extensive body of knowledge on IPOs generally, there are few published works on the valuation issues in privatisation cases. The research on IPOs tends to be quantitative, using statistically based, causal and correlational models. In contrast, the research on privatisation is still very much descriptive and qualitatively based. This reflects the fact that for privatisation IPOs our level of understanding of the key constructs is developing and we are uncertain about the key variables and relationships between them. The following sections discuss data collection methods, issues of measurement of the variables involved, and the data analysis techniques involved.

## 5.3    Data

The main sample in this thesis includes data on 114 initial public offerings of shares in privatised companies from six countries: France, Spain, Turkey, Malaysia, the United Kingdom and Singapore. These countries were chosen because they provide an interesting mix of developing and developed countries from Europe and South East

Asia. They also represent countries which have differing degrees of political power in the hands of the government. The UK government undertook perhaps the largest and highest profile privatisation program in the world. France provided examples of privatisation where the companies involved were sold without preliminary preparation. Singapore and Malaysia provided cases from South East Asia where privatisation was aimed, in part, at developing the capital markets, and where the government retained effective control over the privatised companies. The stages of development of Singapore and Malaysia also provide an interesting contrast. Singapore has developed rapidly and is to be included in the OECD in 1996, while Malaysia is a developing country. Finally, Spain and Turkey are included because they provide an opportunity to include a Latin country and a developing country from the northern hemisphere. Overall, the six countries chosen provide a sample that is rich in its mix of different economic conditions, culture, political climate and stage of development.

The data collection procedures differed for each of the countries involved. The main data collection effort was for the Malaysia, Singapore and the UK issues. The data collection for these countries was undertaken over approximately four months and involved visits to London and Singapore, as well as a manual search of the micro film records held in the Barr Smith Library of The University of Adelaide.

The data for Malaysia, United Kingdom and Singapore was obtained from a range of sources. The main sources of data were the issue prospectuses, company records and stock exchange reports. In general, these records were obtained from the Stock Exchange of Singapore (SES) and the Library of the National University of Singapore (NUS) for the Singaporean and Malaysian issues, and from the FT EXTEL records held at the London Business School (LBS) library and Disclosure Limited for

the United Kingdom issues. Opening price details were initially obtained from The Financial Times and The Straits Times and were checked against the records held at the SES for Singapore and Malaysia and FT EXTEL for the United Kingdom. The process involved is outlined in more depth below.

For the UK data, the initial list of privatised companies was obtained from Buckland (1987) and the United Nations (1993). Prospectus details for all of the companies were available from the micro fiche records held at the London Business School (LBS). The LBS library subscribes to the FT EXTEL Data series which includes micro fiche copies of prospectuses, annual reports and company announcements for all companies listed on the London Stock Exchange. A manual search of the prospectuses was undertaken for the companies involved to extract the relevant details for each issue. This included issue price, issue size, accounting data, the percentage of the company being sold and a range of qualitative features of the issues. Details for the privatised electricity and water companies were incomplete at the LBS library. Hard copies of these prospectuses were purchased from Disclosure Limited and shipped back to Australia for analysis. The data for closing share price on the first day of trading, the application multiple and the interest rate over the period of the issue were initially obtained by a manual search of the micro film copies of The Financial Times in the Barr Smith Library of The University of Adelaide. The data obtained from the manual search of the micro film was checked against the computer records of FT EXTEL where they were available.

The initial list of privatised companies in Malaysia and Singapore was compiled by searching through the annual reports of the Kuala Lumpur Stock Exchange (KLSE) and the Stock Exchange of Singapore (SES). These reports were held in the libraries of the SES and the National University of Singapore (NUS). The

list was checked with the cases discussed in Ng Chee Yuen (1989) and Puthucheary (1990). A manual search of the company files at the SES library was then undertaken for the companies involved to extract details for each issue including issue price, issue size, accounting data and the percentage of the company being sold. The data for closing share price on the first day of trading, the application multiple and the interest rate over the period of the issue were obtained by a manual search of the micro film copies of The Straits Times in the Barr Smith Library.

The data for France, Spain and Turkey was obtained from Perotti and Guney (1993). For all countries, data for interest rates and exchange rates were obtained from The Economist. The process here involved manually searching through the back issues of The Economist held at The University of Adelaide to find the relevant data.

## 5.4    Description of Proxies for the Determinants of Underpricing and Ex-ante Uncertainty

This section discusses the variables measured to test the hypotheses of privatisation IPO underpricing. In most cases, the variables have been used in previous studies of IPOs. In addition, a number of variables are measured that have not been used in previous research. These are largely qualitative, dichotomous variables that measure certain attributes of privatisation issues.

The variable used to measure underpricing in this thesis is DISC. It is defined as the discount on the share issue, measured as the raw day 1 return -- the difference between the offer price and the day 1 closing bid price. The issue of whether this return should be adjusted for market movements and risk needs to be addressed. In the study of IPO underpricing by Ibbotson, Sindelar, and Ritter (1994) the reported initial returns were calculated over the first month of trading after adjustment for

market returns for the period 1960- 76. For the period 1977-92, however, first day returns were used without adjustment. It was noted that the conclusions regarding underpricing were 'fairly insensitive to the length of the initial return interval, and whether (and how) market risk adjustments are made,' (Ibbotson, Sindelar & Ritter 1994, p. 67).

Miller and Reilly (1987) and Barry and Jennings (1993) provided evidence to support Ibbotson, Sindelar and Ritter. Accordingly, this thesis uses the first day raw return as the measure of IPO underpricing.

Table 5.1 summarises and describes the variables used for the hypothesis testing and shows the predicted relationship of the explanatory variables with the degree of underpricing, as implied by the hypotheses. The table shows the variables under the main categories used to develop the hypotheses: valuation, information asymmetry to investors, ex-ante uncertainty, reputation building, value of corporate control, country of issue, hot issue markets, and utility specific factors. The measurement of each of the variables is discussed below.

**Valuation Variables**

The discussion of professional approaches to valuation has led to the development of a number of hypotheses about the role of growth options, earnings and net asset backing in valuing privatisation IPOs. Data for the following variables has been collected:

GROWTH: This represents growth options, measured as one minus the ratio of net asset backing per share to the offer price. It indicates the extent to which the offer price represents the growth option vis-à-vis assets in place. Taylor and Walter (1990) found this variable to be significant in explaining underpricing. How (1995) found that a growth option was positively correlated with underpricing, but not significant.

**Table 5.1**

**Explanatory Variables and their Predicted Relationship with the Degree of Underpricing**

| Explanatory Variable | Represented by: | Measured by: | Predicted sign: |
|---|---|---|---|
| **Valuation Variables** | | | |
| Growth Options | GROWTH | a measure of growth options, measured as one minus the ratio of net asset backing per share to the offer price. | - |
| Issue Price | ISSPRIC | the offer price for the privatisation IPOs. | - |
| Asset Backing | NTAPER | the net tangible assets per share for the privatisation IPOs obtained from the prospectus. | + |
| Price Earnings | PE | the price earnings ratio of the issue based on the most recent reported earnings and the offer price. | - |
| **Information Asymmetry** | | | |
| Demand for Issue | APPMULT | the application multiple, measured as the proportion of the number of shares applied for by investors to the number of share on issue. | + |
| Interest Rate | INTEREST | the prime interest rate of the country concerned over the period that the share offer was open. | + |
| **Ex-ante Uncertainty** | | | |
| Industry | IND | classification of the privatisation IPOs by industry group: Financial Services, Manufacturing, Oil & Gas, Transport and Utilities. | |
| Policy Risk | POLRISK | a dichotomous variable (0,1) indicating the existence of policy risk. | + |
| Issue Size | PROCEEDS | the proceeds of the issue, converted to US dollars at the exchange rate on the day of listing. | - |
| Restrictions on Management | NOWIND | a dichotomous (0,1) variable indicating restrictions on the winding up of the newly privatised company. | + |
| | RESTRASS | a dichotomous (0,1) variable indicating restrictions on the disposal of the assets of the newly privatised company. | + |

| Table 5.1 continued | | | |
|---|---|---|---|
| **Explanatory Variable** | **Represented by:** | **Measured by:** | **Predicted sign:** |

**Reputation Building**

| Date of Listing | DATE | the date of initial listing of the shares. | - |
| Extent of Sale | PERSOLD | the percentage of the company's equity sold in the issue. | + |

**Value of Corporate Control**

| Limits on Control | CONTLIM | a dichotomous (0,1) variable indicating restrictions on the size of shareholdings of a single investor. | + |
| | SPECSHAR | a dichotomous (0,1) variable indicating whether the government holds a special or 'golden' share in the newly privatised company. | + |
| **Country of Issue** | COUNTRY | a dichotomous variable (0,1) indicating whether the company operates in an OECD or Non-OECD country. | - |
| | COUNTRY2 | classification of the privatisation IPOs by actual country. | |
| **Hot Issue Markets** | MKT1 | a dichotomous variable (0,1) indicating the state of the market, MKT1 = 1 for the pre-1985 boom period, 0 otherwise. | - |
| | MKT2 | a dichotomous variable (0,1) indicating the state of the market, MKT2 = 1 for the 1985 to October 1987 boom period, 0 otherwise. | + |
| | MARSTATE | classification by state of the market: pre-1985, 1985 to October 1987 boom period and the post-October 1987 period. | |

**Utility Specific Factors**

| Capital Expenditure Needs | CAPEX | the estimated capital expenditure requirements for the privatised company over the next ten years, estimated from the disclosures made in the prospectus. | - |
| Price Regulation | XFACTOR | the factor to be used in the RPI-X regulatory framework for the privatised utilities. | + |

NTAPER: This represents the net tangible assets per share for the privatisation IPOs, obtained from the prospectus.

PE: This represents the price earnings ratio of the issue based on the most recent reported earnings and the offer price.

## Information Asymmetry to Investors

Rock (1986) saw IPO underpricing as linked to information asymmetry to investors where there are uninformed and informed groups of investors. Where issues are substantially underpriced the informed investors subscribe to the issue and demand is high. The variables related to this theory are: measures of demand, and interest rates. In this thesis these are measured as:

APPMULT: This represents the application multiple, measured as the proportion of the number of shares applied for by investors to the number of shares on issue. Buckland, Herbert and Yeomans (1981) found underpricing to be positively correlated with demand for the issue as measured by the application multiple. The application multiple was a proxy for the existence of informed and uninformed investors. A number of other studies have used the application multiple in this way, including the IPO privatisation studies of Menyah, Paudyal and Inyangete (1990) and Lee, Taylor and Walter (1991), and the direct tests of Rock (1986) in Koh and Walter (1989) and Levis (1990).

INTEREST: This represents the prime interest rate of the country concerned over the period that the share offer was open. Koh and Walter (1989) and Levis (1990) included interest in direct tests of Rock (1986), and found interest to be positively correlated with underpricing.

**Ex-ante Uncertainty**

The two models of information asymmetry developed by Rock (1986) and Baron (1982) require high ex-ante uncertainty surrounding an issue to provide opportunities for informed investors (Rock) or the professional advisers (Baron) to seek costly information. Accordingly, ex-ante uncertainty is central to the main theories of IPO underpricing.

Beatty and Ritter (1986) argued that underpricing was dependent upon the ex-ante uncertainty faced by investors; the higher the level of ex-ante uncertainty the higher the extent of underpricing. Support for this relationship has been found in Ritter (1984), Beatty and Ritter (1986), Taylor and Walter (1991), Clarkson (1994) and How, Izan and Monroe (1995). Clarkson (1994) tested for a hierarchy of proxies for ex-ante uncertainty. The proxies used in this thesis are described below.

IND: This represents the classification of the privatisation IPOs by industry group: Financial Services, Manufacturing, Oil & Gas, Transport and Utilities. Jog and Riding (1987) found significant differences in underpricing between industrial and non-industrial firms.

ISSPRIC: This represents the offer price for the privatisation IPOs. Chalk and Peavy (1987) found the lower the issue price the higher the underpricing. This was considered to be due to transaction costs, the higher risk of low priced shares, a premium for the lower liquidity of smaller company shares and a 'small firm effect' for IPOs. Ibbotson, Sindelar and Ritter (1994) supported these results.

POLRISK: This represents a dichotomous variable (0,1) indicating the existence of policy risk for the issuing company. Policy risk is deemed to exist where the firm is operating in a non-competitive environment or is subject to supervision by a regulatory body. Clarkson (1994) argued that the number of risk factors present in

the prospectus of an IPO were positively related to the degree of underpricing. In this thesis, policy risk, as measured by POLRISK, and country risk are included. Clarkson (1994) found the number of risk factors to be the best measure of ex-ante uncertainty.

PROCEEDS: This represents the proceeds of the issue, converted to U.S. dollars at the exchange rate on the day of listing. Many authors have used the size of an issue as a proxy for ex-ante uncertainty. Beatty and Ritter (1986) and How (1995) also found a negative relationship between size and underpricing. Clarkson (1994) also found issue size to be an effective proxy for ex-ante uncertainty.

Analysis of the prospectuses for the UK privatisation IPOs also enabled the measurement of two additional qualitative variables related to restrictions on management after privatisation.

NOWIND: This represents a dichotomous (0,1) variable indicating whether the government has placed restrictions on the 'winding up' of the newly privatised company.

RESTRASS: This represents a dichotomous (0,1) variable indicating whether the government has placed restrictions on the disposal of the assets of the newly privatised company.


**Reputation Building**

Perotti and Guney (1993) argued that governments underprice privatisations in order to build a reputation for future issues. The following variables enabled testing of this view.

DATE: This represents the date of initial listing of the shares.

PERSOLD: This represents the percentage of the company's equity sold in the issue, and is relevant to the reputation building hypothesis, since governments might sell a

small proportion of the shares initially and then sell a seasoned issue at a later date to maximise the proceeds from the overall sale. This view was proposed by Jenkinson and Mayer (1988).

## Value of Corporate Control

Koh, Lim and Chin (1992) found a relationship between the residual holding of the owners and underpricing. This provided evidence of a premium for corporate control. Although the percentage sold is the best measure for residual control of the issuer, in privatisations the government may include restrictions within the terms of the offer that limit control. The following qualitative variables sought to measure these effects.

CONTLIM: This represents a dichotomous (0,1) variable indicating whether the government has placed restrictions on the shareholdings to prevent a single investor taking control over the newly privatised company.

SPECSHAR: This represents a dichotomous (0,1) variable indicating whether the government holds a special or 'golden' share in the newly privatised company.

## Country of Issue

The sample chosen provided an opportunity to study privatisation across a number of different countries, with different economic and political forces affecting the process of privatisation. The following variables were included to enable cross-sectional analysis of the factors involved.

COUNTRY: This represents a dichotomous variable (0,1) indicating whether the company is classified as a developed or developing economy.

COUNTRY2: This represents the classification of the privatisation IPOs by country: France, Malaysia, Singapore, Spain, Turkey and the United Kingdom.

## Hot Issue Markets

Davis and Yeomans (1976) found underpricing in rising markets to be significantly higher than at other times. Ibbotson and Jaffe (1975), Ritter (1984a) and Ibbotson, Sindelar and Ritter (1994) find evidence of 'hot issue' markets for IPOs in general. These results infer that some periods are better than others for floating previously unlisted companies. Government privatisation programs are also likely to be timed to capitalise on the 'hot issue' markets. The following variables enabled tests of cross-sectional differences between time periods.

MKT1, MKT2: This represents a dichotomous variable (0,1) indicating the state of the market, MKT1 = 1 if the IPO was issued during the pre-1985 boom period, 0 otherwise; and MKT2 = 1 if the IPO was issued during the 1985 to October 1987 boom period, 0 otherwise.

MARSTATE: This represents the classification by state of the market: pre-1985, the 1985 to October 1987 boom period, and the post-October 1987 period. These are the same time periods as used by How, Izan and Monroe (1995).

## Factors Specific to Utilities

As explained previously, the water and electricity authorities in the UK provide a controlled environment in which to study IPO underpricing. A number of empirical studies of IPO underpricing have looked to details of the share issue for sources of ex-ante uncertainty. These studies have considered the reputation effects of the professional advisers, capital market conditions, interest rates, risk factors and the issue price. For the privatisation of the water and electricity authorities many of these sources of ex-ante uncertainty were common to all the issues. Accordingly, if any difference in underpricing is observed, there must be factors affecting the issue not

reflected in the existing research. The following variables were measured for the UK water and electricity authorities.

CAPEX: This represents the estimated capital expenditure requirements for the privatised company over the next ten years, estimated from the disclosures made in the prospectus. Jog and Riding (1987) found significant differences in underpricing where the funds raised through an IPO were for investment purposes rather than for other purposes. They also concluded that firm specific and issue specific factors had greater explanatory power than measures of ex-ante uncertainty. Kerstein and Kim (1995) studied the information content of the capital expenditure decisions by management. They found that capital expenditure changes were strongly and positively associated with excess returns.

XFACTOR: This represents the factor to be used in the 'RPI minus X' price formula used in the regulatory framework for the privatised utilities. ANZ McCaughan (1994) observed that the X factors set for the UK electricity boards were based on the expected capital expenditures necessary to maintain the distribution networks, as well as an adjustment for unique operating conditions faced in the different regions.

## 5.5    Analytical Techniques

Two sets of empirical techniques are to be employed to test the association between the variables described above and the degree of underpricing of privatisation IPOs. These techniques are multivariate analysis and regression analysis.

The first empirical technique, a set of multivariate analyses (including analysis of variance) gives insights into the effects of both qualitative and quantitative factors. This approach has been employed in many IPO empirical studies, more recently in Jog and Riding (1987), Clarkson (1994) and How, Izan and Monroe (1995). In the first

instance in this thesis, a Pearson correlation matrix is to be prepared for the continuous variables to determine the extent, direction and significance of any correlation between the variables. The analysis also involves use of a set of qualitative and nominal measures that are used to classify underpricing into a series of categories. These measures will be used in addition to the main continuous variables.

For both sets of variables, a range of tests are to be performed to assess variations between classifications including $t$-tests, the standard $F$ ratio and the Bonferroni test. The $t$-tests test for the equality of means between two particular categories. The standard $F$-ratio compares variations between categories to variations within categories. The Bonferroni test involves ranking means for the range of categories in the analysis of variance and then comparing means, pairwise, so that those that differ significantly can be identified.

The dichotomous variables fall into a natural partition and differences in means are tested using the $t$-test. The continuous variables will be partitioned at the median value and a $t$-test employed to test for differences in the means of the high and low partitions. For both sets of variables the $F$-ratio is to be calculated to test for significant differences in the variance between the partitions for each variable.

A number of additional categories are also specified to undertake further analysis by country, by industry and over time. The $F$-ratio is then to be used to test for differences between the groups and the Bonferroni test will be used to identify which groups are significantly different.

The SPSS for Windows package is to be used to undertake this analysis. The package enables the calculation of basic descriptive statistics such as mean, standard deviation and skewness for each of the continuous variables. The package will also be used to calculate a Pearson correlation matrix for all continuous variables and to

calculate significance levels in one or two tailed tests. Since this thesis involves testing hypotheses about the direction of relationships between underpricing and a range of explanatory variables, one tailed $t$-tests are appropriate. SPSS for Windows also enables analysis of variance between groups of variables and calculates the $t$-statistic for tests of significant difference in the means between groups and the $F$-statistic to test for significant differences in the variance between groups. The independent sample $t$-test option is to be used when the sample is partitioned into two groups, while one way analysis of variance is to be used for the tests involving more than two categories. SPSS for Windows also enables the use of the Bonferroni test in the one way ANOVA option.

The second empirical technique to be used in this thesis, cross-sectional multiple regression, employs a set of cross-sectional continuous variables (application multiple, proceeds, interest, date, percentage sold, etc.) and dichotomous (0-1 dummy) variables as measures of qualitative factors (political risk, country, residual control, etc.) Regression has been a common technique for researching cross-sectional relationships in IPO underpricing. The studies that used multiple regression include those by: Logue (1973), Neuberger and Hammond (1974), Ibbotson (1975), Ibbotson and Jaffe (1975), Davis and Yeomans (1976), Ying et al. (1977), Reilly (1978), Block and Stanley (1980), Buckland, Herbert and Yeomans (1981), Ritter (1984a), Beatty and Ritter (1986), Rock (1986), Jog and Riding (1987), McConnell and Sanger (1987), Chalk and Peavy (1987), Beatty (1989), Koh, Lim and Chin (1992), Clarkson (1994) and How (1995).

Regression techniques are to be used in this thesis in two ways: to fit theoretical models based upon the hypothesised variables and to fit models using stepwise regression. The SPSS for Windows package will be used to undertake the

multiple linear regression analysis. This package allows for regression analysis by directly entering models or by a stepwise approach. The package also provides tests of the significance of the regression coefficients using $t$-tests; a test of the significance of the overall regression using the regression $F$-statistic; and a test of the overall goodness of fit of the regression using the adjusted R-squared coefficient. SPSS for Windows also enables tests for the violation of the main regression assumptions. This includes tests for the independence of the residuals using the Durbin-Watson statistic; tests of linearity by plotting the residuals in a scatter plot against the predicted values; and tests of normality by plotting the frequency distribution of residuals.

The regression models are then to be used to test the hypotheses developed about the association between underpricing and the range of explanatory variables. A 'forward selection stepwise' regression approach is to be used to fit a 'best' model using the hypothesised variables from both the international and the United Kingdom samples. Two reasons prompt this choice. Firstly, stepwise regression permits identification of the variables that dominate the model; hence, in this case it enables identification of the most important determinants of privatisation IPO underpricing. Secondly, since a number of the variables are not independent of each other (for example, PERSOLD and RESCONT), forward selection helps overcome any significant problems of multicollinearity. Forward selection stepwise regression is unlikely to include more than one measure of the same underlying factor, hence minimising the potential effects of multicollinearity. In any case, tests for multicollinearity are to be undertaken using the variance inflation factor. This is also calculated by the SPSS for Windows package.

The hypotheses developed will be subjected to a range of tests using the methods described above. The range of tests provide convergent validity for the

results. Convergent validity has been defined as being 'established where the scores obtained by different instruments measuring the same construct are highly correlated' (Sekaran 1992, p. 173).

## 5.6    Summary

In this chapter, research design issues and methodology to be used in this thesis have been discussed. The data collected relates to a range of variables developed to test the hypotheses formulated in Chapter Four. The variables reflect both quantitative and qualitative information about privatisation IPOs. A range of statistical techniques will be used to provide convergent validity to the results. These techniques include analysis of variance and multiple regression, which were the dominant techniques used in previous empirical studies of IPO underpricing. The next chapter reports the results of the analysis and the tests of the hypotheses.

# Chapter 6. Analysis of Results

## 6.1 Introduction

This chapter presents the results of the research on the determinants of underpricing of privatisation IPOs. In the first section of the analysis, an international perspective is taken. As previously reported, sample data for 114 privatisation IPOs is drawn from six countries: France, Malaysia, Spain, Singapore, Turkey and the United Kingdom. The second section of the analysis focuses purely on UK privatisations. The analytical procedures employed to analyse the data and test the hypotheses are analysis of variance, comparison of means and multiple regression. The results of these tests are reported in the third section of this chapter.

## 6.2 Results from the International Sample

Table 6.1 contains a descriptive profile of the data and the variables measured from the sample of 114 privatisation IPOs from 6 countries. Appendix 1 contains a full list of the companies in the sample. The sample size differs between variables because not all data was available for all issues.

The sample includes companies from a variety of industries, with the main industry group being utilities, followed by manufacturing, services, and transport. Panel A of Table 6.1 provides a full breakdown of industry categories. Panel B of Table 6.1 shows that the sample was drawn from six countries: UK (36%), Turkey (21.1%), Singapore (15.8%), Malaysia (11.4%), France (9.6%), and Spain (6.1%). The majority of the issues were made after the 1987 stock market crash, with 1990, 1987 and 1991 being the years with the highest volume of issues. Panel C of Table 6.1 provides a full breakdown of the year of issue.

## Table 6.1:
## Descriptive Statistics for a Sample of 114 Privatisation
## IPOs in the period 1977 - 1993.

### Panel A: Industry Category

|  | Number of firms | % |
|---|---|---|
| Financial Services | 9 | 7.9 |
| Manufacturing | 26 | 22.8 |
| Oil & Gas | 8 | 7.0 |
| Services | 16 | 14.0 |
| Transport | 13 | 11.4 |
| Utilities | 34 | 29.8 |
| Unknown | 8 | 7.0 |
| Total | 114 | 100.0 |

### Panel B: Country

|  | Number of firms | % |
|---|---|---|
| France | 11 | 9.6 |
| Malaysia | 13 | 11.4 |
| Spain | 7 | 6.1 |
| Singapore | 18 | 15.8 |
| Turkey | 24 | 21.1 |
| United Kingdom | 41 | 36.0 |
| Total | 114 | 100.0 |

### Panel C: Year of Issue

|  | Number of firms | % |
|---|---|---|
| 1977 | 1 | 0.9 |
| 1981 | 2 | 1.8 |
| 1982 | 2 | 1.8 |
| 1983 | 1 | 0.9 |
| 1984 | 4 | 3.5 |
| 1985 | 2 | 1.8 |
| 1986 | 6 | 5.2 |
| 1987 | 22 | 19.3 |
| 1988 | 7 | 6.1 |
| 1989 | 13 | 11.4 |
| 1990 | 28 | 24.5 |
| 1991 | 21 | 18.4 |
| 1992 | 4 | 3.5 |
| 1993 | 1 | 0.9 |
| Total | 114 | 100.0 |

## Table 6.1 continued:
## Descriptive Statistics for a Sample of 114 Privatisation
## IPOs in the period 1977 - 1993.

### Panel D: Continuous Measures

| Variable | Mean | Std Dev | Minimum | Maximum | Valid N |
|----------|------|---------|---------|---------|---------|
| DISC | .3978 | .5283 | -.2370 | 3.7750 | 112 |
| APPMULT | 24.06 | 40.58 | .30 | 188.00 | 113 |
| INTEREST | .11 | .04 | .05 | .17 | 90 |
| PERSOLD | .6143 | .3467 | 0 | 1.00 | 97 |
| PROCEEDS | 669.55 | 1143.14 | .83 | 8034.70 | 112 |

### Panel E: Dichotomous Variables

| Variable | Proportion of 1's |
|----------|-------------------|
| COUNTRY | 0.675 |
| MKT1 | 0.088 |
| MKT2 | 0.248 |
| POLRISK | 0.298 |

APPMULT: the application multiple, measured as the proportion of the number of shares applied for by investors to the number of share on issue.

COUNTRY: a dichotomous variable (0,1) indicating whether the company operates in a developed or developing economy.

DATE: the date of initial listing of the shares.

DISC: the discount on the share issue, measured as the raw day 1 return--the difference between the offer price and the day 1 closing bid price.

INTEREST: the prime interest rate of the country concerned over the period that the share offer was open.

MKT1, MKT2: a dichotomous variable (0,1) indicating the state of the market, MKT1 = 1 if the IPO was issued during the pre-1985 boom period, 0 otherwise; and MKT2 = 1 if the IPO was issued during the 1985 to October 1987 boom period, 0 otherwise.

PERSOLD: the percentage of the company's equity sold in the issue.

POLRISK: a dichotomous variable (0,1) indicating the existence of policy risk for the issuing company. Policy risk was deemed to exist where the firm was operating in a non-competitive environment or was subject to supervision by a regulatory body.

PROCEEDS: the proceeds of the issue, converted to US dollars at the exchange rate on the day of listing.

The explanatory variables are defined as:

APPMULT: the application multiple, measured as the proportion of the number of shares applied for by investors to the number of shares on issue.

COUNTRY: a dichotomous variable (0,1) indicating whether the company operates in a developed or developing economy.

DATE: the date of initial listing of the shares.

INTEREST: the prime interest rate of the country concerned over the period that the share offer was open.

MKT1, MKT2: a dichotomous variable (0,1) indicating the state of the market, MKT1 = 1 if the IPO was issued during the pre-1985 boom period, 0 otherwise; and MKT2 = 1 if the IPO was issued during the 1985 to October 1987 boom period, 0 otherwise.

PERSOLD: the percentage of the company's equity sold in the issue.

POLRISK: a dichotomous variable (0,1) indicating the existence of policy risk for the issuing company. Policy risk was deemed to exist where the firm was operating in a non-competitive environment or was subject to supervision by a regulatory body.

PROCEEDS: the proceeds of the issue, converted to US dollars at the exchange rate on the day of listing.

The underpricing of privatisation IPOs is measured by the variable DISC. DISC is calculated as the initial gross return to an investor who acquires a share at the offering price and sells it at the closing bid price on the first day of public trading (Clarkson 1994 and Ibbotson 1975). As can be seen in Table 6.1, the average underpricing (DISC) on the 114 privatisation IPOs across 6 countries is 39.78%, with a median value of 30% and a standard deviation of 52.83%. The minimum discount is in fact negative, while the maximum is close to four hundred percent and the distribution of initial returns is positively skewed. Interestingly, a negative initial return is recorded for only 7.9% (9 companies) of the sample. This is in contrast to the evidence for IPOs in general that show significant levels of negative returns. The distribution of

returns for privatisation IPOs is in line with IPOs in general with a positive mean and a positively skewed distribution[1].

The mean application multiple for the issues is 24.06 times[2] and the median value is 8 times, demonstrating that there was a high demand for the issues. The distribution of application multiples (APPMULT) is positively skewed, with few issues being undersubscribed. The distribution of the proceeds from the issue (PROCEEDS) is also positively skewed around the mean of US$669.55M, with a median of US$206.434M. The average interest over the issue periods is 11%; while, the average privatisation IPO is for 61.43% of the company's equity.

As reported in Panel E of Table 6.1, the majority of companies in the sample are from developed countries (67.5%). Most of the issues were made after the stock market crash of 1987, with only 8.8% of the issues made prior to 1985 and 24.8% made during the period from 1985 to October 1987. Policy risk is deemed to exist where the company was operating in a non-competitive environment or where it was subject to supervision by a regulatory body. Policy risk was present in 29.8% of issues.

A simple Pearson correlation matrix for the underpricing (DISC) and selected proxies is presented in Table 6.2. For the purpose of this analysis, APPMULT and PROCEEDS are transformed using logarithms to LOGAPPMU and LOGPROC, because of the skewed nature of their distributions (see Hair et al. 1992, p. 52). The transformation does not alter the direction or the significance of the correlations with underpricing.

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[1] For the IPOs in general, see Ibbotson, Sindelar & Ritter (1994).
[2] That is, in the average issue, investors applied for 24.06 times the number of shares on offer.

**Table 6.2:**

## Pearson Correlation Matrix for Initial Return and Selected Proxies for the Determinants of Underpricing for a Sample of 114 Privatisation IPOs from the Period 1977 - 1993.

| | Predicted Sign[1] | DISC | APPMULT | LOGAPPMU | DATE | INTEREST | PERSOLD | PROCEEDS | LOGPROC |
|---|---|---|---|---|---|---|---|---|---|
| DISC | | 1.0000 | | | | | | | |
| APPMULT | + | .2733** (.006) | 1.0000 | | | | | | |
| LOGAPPMU | + | .3100** (.002) | .8200** (.000) | 1.0000 | | | | | |
| DATE | − | -.0838 (.189) | .0486 (.331) | .0235 (.417) | 1.0000 | | | | |
| INTEREST | + | -.0954 (.187) | -.4437** (.000) | -.3943** (.000) | .0124 (.454) | 1.0000 | | | |
| PERSOLD | + | .0927 (.183) | -.1552 (.103) | .0282 (.410) | -.0192 (.426) | .4328** (.000) | 1.0000 | | |
| PROCEEDS | − | -.1235# (.098) | -.2669** (.008) | -.2557* (.011) | -.1364# (.076) | .2007* (.030) | .3051** (.001) | 1.0000 | |
| LOGPROC | − | -.1348# (.079) | -.5270** (.000) | -.5013** (.000) | -.1933* (.021) | .5466** (.000) | .4657** (.000) | .6757** (.000) | 1.0000 |

Actual significance level shown in parentheses.

\#      Significant at the 10% level.

\*      Significant at the 5% level.

\*\*      Significant at the 1% level.

[1] Denotes the expected direction of the correlation coefficient between DISC and the other variables.

**Table 6.3:**

## Average Initial Return and Standard Deviation of Initial Return for a Sample of 114 Privatisation IPOs from the Period 1977 to 1993 Partitioned on the Basis of Selected Proxies for the Determinants of Underpricing.[a]

| Explanatory Variable | Predicted Sign $\rho$ | Level of Proxy | | | | Mean Diff (High – Low) | $F$-Value[b] | Test Statistics | | |
| | | Low | | High | | | | F Prob | $t$-value[c] $\rho$ | $t$ Prob |
| | | Mean | StdDev | Mean | StdDev | | | | | |
| APPMULT | + | .4157 | .5049 | .5877 | .6207 | .1721 | .030 | .432 | -1.37# | .0825 |
| COUNTRY | - | .4414 | .8019 | .3765 | .3265 | -.0649 | 15.294** | .0000 | .61 | .271 |
| DATE | - | .5049 | .675 | .2888 | .285 | -.2161 | 7.179** | .0080 | 2.21* | .015 |
| INTEREST | + | .5658 | .7360 | .4179 | .2846 | -.1479 | 12.778 | .0005 | 1.26 | .1065 |
| MKT1 | - | .4139 | .5448 | .2316 | .2728 | -.1823 | 1.1314 | .1270 | 1.04 | .150 |
| MKT2 | + | .3171 | .3368 | .6425 | .8497 | .3255 | 19.568** | .0000 | -2.92** | .002 |
| PERSOLD | + | .2963 | .5295 | .4966 | .5632 | .2003 | .106 | .3725 | -1.80* | .0375 |
| POLRISK | + | .6583 | .6208 | .4352 | .2062 | .0769 | 6.820 | .0050 | -.70 | .242 |
| PROCEEDS | - | .4455 | .7103 | .3302 | .2313 | -.1152 | 16.886** | .0000 | 1.15 | .1255 |

a   The sample of 114 privatisation IPOs was partitioned sub-samples of low and high determinants of underpricing on the basis of each of the selected proxies. For the 'continuous' measures (PROCEEDS, PERSOLD, APPMULT and INTEREST), the sample was split in half at the median value. For the other proxies (COUNTRY, POLRISK, MKT1 and MKT2), the sample was split on the basis of the value assumed by the dichotomous variable. Underpricing was expected to decrease with COUNTRY, MKT1 and PROCEEDS, and to increase with APPMULT, INTEREST, MKT2, PERSOLD and POLRISK.

b   $F$-test values for differences in the variance of the initial returns between low and high determinants of underpricing. The sub-samples were formed on the basis of selected proxies.

c   $t$-test values for differences in average initial return between low and high determinants of underpricing. The sub-samples formed on the basis of selected proxies.

\#   Significant at the 10% level          *   Significant at the 5% level.          **   Significant at the 1% level.

## Table 6.4:
## Average Initial Return and Standard Deviation of Initial Return for a Sample of 114 Privatisation IPOs from the Period 1977 to 1993 Partitioned on the Basis of Country, Industry and State of the Market.

### Panel A: Analysis by Country

COUNTRY2        $F$ Statistic    12.6643**    $F$ Prob ( $\rho$ )    .0000

**    Significant difference between groups at the 1% level.

| | | Mean | Std Dev | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Bonferroni Test Results | | | | | |
| 1 | France | .1866 | .0971 | | | | | | |
| 2 | United Kingdom | .3515 | .1778 | | | | | | |
| 3 | Malaysia | 1.1606 | 1.0217 | # | # | | # | | # |
| 4 | Singapore | .4317 | .4754 | | | | | | |
| 5 | Spain | .6871 | .5588 | | | | | | # |
| 6 | Turkey | .0519 | .1066 | | | | | | |

\# Significantly different at the 5% level

### Panel B: Analysis by Industry

IND          $F$ Statistic    2.5327*    $F$ Prob ( $\rho$ )    .0162

*    Significant difference between groups at the 5% level.

| | | Mean | Std Dev |
|---|---|---|---|
| 1 | Financial Services | .2013 | .1703 |
| 2 | Manufacturing | .2366 | .2637 |
| 3 | Oil & Gas | .1382 | .3636 |
| 4 | Services | .6649 | 1.0632 |
| 5 | Transport | .6204 | .6990 |
| 6 | Utilities | .4352 | .2062 |

Bonferroni Test Results: No two groups significantly different at the 5% level.

### Panel C: Analysis by State of the Market

MARSTATE       $F$ Statistic    4.3794**    $F$ Prob ( $\rho$ )    .0072

**    Significant difference between groups at the 1% level.

| | | Mean | Std Dev | 1 | 2 | 3 |
|---|---|---|---|---|---|---|
| | | | | Bonferroni Test Results | | |
| 1 | Pre-1985 | .2316 | .2728 | | | |
| 2 | 1985-October 1987 | .6426 | .8497 | | # | |
| 3 | Post-October 1987 | .3285 | .3444 | | | |

\# Significantly different at the 5% level

Underpricing is found to be significantly positively correlated with demand, where demand is measured by the application multiple. Underpricing is also significantly negatively correlated with the size of the issue as measured by proceeds. Overall, even though not all the reported correlations are significant, the direction of the correlation between underpricing and the explanatory variables is as hypothesised in all cases except for the interest rate variable.

Table 6.2 also suggests that there was some overlap among the variables. The application multiple is found to be significantly negatively correlated with the interest rate and the proceeds or size of the issue. In addition, the size of the issue is also significantly positively correlated with the interest rate and the percentage of equity sold, and significantly negatively correlated with the date.

Table 6.3 presents the underpricing statistics for sub-samples formed on the basis of high and low values for the variables selected as proxies for the determinants of underpricing. For each of the 'continuous' measures (APPMULT, DATE, INTEREST, PERSOLD and PROCEEDS) the sample is split in half at the median value. For the dichotomous variables (COUNTRY, MKT1, MKT2, and POLRISK) the sample is split on the basis of the value assumed by each variable. Underpricing is expected to decrease with COUNTRY, MKT1 and PROCEEDS and to increase with APPMULT, INTEREST, MKT2, PERSOLD and POLRISK. The direction of the difference in mean underpricing is as hypothesised for all variables except interest. The difference in means for the partitions is significant for the application multiple, the date, the period January 1985 to October 1987 compared to the other periods, and for the percentage of equity sold. In addition, there are significant differences in the variances between the partitions for the country concerned, the date, the period 1985 to October 1987 compared to the other periods, and for the proceeds from the issues.

Table 6.4 reports further analysis of differences in means for partitions of the sample. The variables reported are: COUNTRY2, which identifies the actual country involved; IND, which identifies the industry involved; and, MARSTATE, which classifies privatisation IPOs accordingly to time periods. Bonferroni tests are used to test for significant differences in the means between the groups. The Bonferroni test may be used to test for differences in means between samples that are of uneven size.

Mean underpricing is found to be significantly higher in Malaysia than in all other countries except Spain. Underpricing in Spain and Turkey is also significantly different, with underpricing in Turkey being lower. The analysis by industry reports significant difference between groups, however, the Bonferroni test is unable to detect the actual groups involved. Underpricing in the 1985 to October 1987 boom period is found to be significantly higher than for issues made after this period.

Table 6.5 reports the results of multiple regressions undertaken on the variables hypothesised to be determinants of underpricing for privatisation IPOs. Four models are reported. Models 1 and 2 respectively are regressions based on the two highest correlated variables, LOGAPPMU and LOGPROC. As noted earlier, these variables are the logs of the raw variables APPMULT and PROCEEDS, the transformation being necessary to correct for the skewed nature of their distributions (see Hair et al. 1992, p. 52). The first two models provide limited explanatory power, with R squared values of 8.48% and 17.06% respectively. For these models, the Durbin-Watson test was used to test for autocorrelation. The results indicate that the null hypothesis of no autocorrelation could be rejected for model 1, however, not rejected for model 2. The variance inflation factors (VIF) for the two variables in model 2 indicate that multicollinearity is not a problem. Tests for multicollinearity

indicate that the variance inflation factor (VIF) for all variables is well below the cutoff threshold of 10 outlined by Hair et al. (1992, p. 48).

**Table 6.5 :**
**Fitted Models of Multivariate Relations Between Underpricing and Selected Proxies for the Determinants of Underpricing for a Sample of 114 Privatisation IPOs between 1977 and 1993.[a]**

| Independent Variable | Predicted Sign | Models 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| intercept | | .2279* | .9425** | .3831 | .0651 |
| | | (2.020) | (3.535) | (1.196) | (.235) |
| LOGAPPMU | + | .2924** | .1216 | .3198** | .3705** |
| | | (2.917) | (1.058) | (2.484) | (3.278) |
| LOGPROC | - | | -.2378* | -.2114* | |
| | | | (-3.001) | (-2.101) | |
| COUNTRY | - | | | -1.0583** | -1.2611** |
| | | | | (-5.383) | (-6.992) |
| INTEREST | + | | | 7.5009** | .5826** |
| | | | | (2.417) | (3.809) |
| MKT1 | - | | | .1734 | |
| | | | | (.935) | |
| MKT2 | + | | | .7236** | 4591** |
| | | | | (3.931) | (3.075) |
| PERSOLD | + | | | -.1304 | |
| | | | | (-.582) | |
| POLRISK | + | | | .4620* | |
| | | | | (2.312) | |
| Adjusted R$^2$ | | .0848 | .1706 | .5682 | .5303 |
| Regression $F$ | | 8.5081** | 9.1254** | 11.0585** | 7.3674** |

a   Adjusted $t$-values are shown in parentheses. Underpricing was expected to decrease with COUNTRY, MKT1, LOGPROC and INTEREST, and to increase with LOGAPPMU, MKT2, PERSOLD and POLRISK.

#  Significant at the 10% level.    *  Significant at the 5% level.  **  Significant at the 1% level.

The third regression model includes all of the hypothesised variables and results, with an R squared value of 55.04%.  The variance inflation factors (VIF) reveal that multicollinearity is not a problem in this model, since for all variables the

VIFs are well below the cutoff threshold of 10 outlined by Hair et al. (1992, p. 48). Further, the Durbin-Watson test indicates that a null hypothesis of no autocorrelation could not be rejected at the 1% level. Overall, this model provides a strong basis for testing the hypotheses about the direction of any correlation between underpricing of privatisation IPOs and the explanatory variables.

The final model employs a forward selection stepwise regression procedure. As discussed in Chapter Four, this is the same as the method used in Jog and Riding (1987), and is justified because it is unlikely to include multiple measures of the same underlying factor. Thus, the potential effect of multicollinearity is minimised. The following model of underpricing results from the application of these techniques:

$$DISC =$$

.0651+.3505(LOGAPPMU)-.2611(COUNTRY)+8.5826(INTEREST)+.4591(MKT2)
(.235)   (3.278)          (-6.992)        (3.809)         (3.075)

This model is found to be statistically significant at the 1% level with all independent variables also significant at that level. The intercept is not statistically significant. Tests for multicollinearity find the variance inflation factor (VIF) for all variables to be well below the cutoff threshold of 10 outlined by Hair et al. (1992, p. 48). The Durbin-Watson statistic was calculated to test for autocorrelation, and the result indicates that the null hypothesis of no autocorrelation could be rejected at the 1% level. However, a visual plot of the residuals was then undertaken to check for departures from the regression model assumptions. The conclusion drawn is that the residuals approximate a normal distribution, hence, there is no evidence to suggest non-linearity and heteroscedasticity (see Hair et al. 1992, p. 40).

## Table 6.6 :
## Descriptive Statistics for a Sample of 41 UK Privatisation IPOs in the period 1977-1991.

### Panel A: Industry Category

| | Number of firms | Percent |
|---|---|---|
| Financial Services | 1 | 2.4 |
| Manufacturing | 5 | 12.2 |
| Oil & Gas | 4 | 9.8 |
| Transport | 3 | 7.3 |
| Utilities | 28 | 68.3 |
| Total | 41 | 100.0 |

### Panel B: Year of Issue

| | Number of firms | Percent |
|---|---|---|
| 1977 | 1 | 2.4 |
| 1981 | 2 | 4.9 |
| 1982 | 2 | 4.9 |
| 1983 | 1 | 2.4 |
| 1984 | 3 | 7.3 |
| 1985 | 0 | 0 |
| 1986 | 2 | 4.9 |
| 1987 | 3 | 7.3 |
| 1988 | 1 | 2.4 |
| 1989 | 10 | 24.4 |
| 1990 | 12 | 29.4 |
| 1991 | 4 | 9.8 |
| Total | 41 | 100.0 |

### Panel C: Dichotomous Variables

| Variable | Proportion of 1's |
|---|---|
| CONTLIM | 0.902 |
| MKT1 | 0.220 |
| MKT2 | 0.122 |
| NOWIND | 0.171 |
| POLRISK | 0.683 |
| RESTRASS | 0.098 |
| SPECSHAR | 0.854 |

CONTLIM: a dichotomous (0,1) variable indicating whether the government has placed restriction on the shareholdings to prevent a single investor taking control over the newly privatised company.

MKT1, MKT2 : a dichotomous variable (0,1) indicating the state of the market, MKT1 = 1 if the IPO was issued during the pre-1985 boom period, 0 otherwise; and MKT2 = 1 if the IPO was issued during the 1985 to October 1987 boom period, 0 otherwise.

NOWIND: a dichotomous (0,1) variable indicating whether the government has placed restrictions on the winding up of the newly privatised company.

POLRISK: a dichotomous variable (0,1) indicating the existence of policy risk for the issuing company. Policy risk was deemed to exist where the firm was operating in a non-competitive environment or was subject to supervision by a regulatory body.

RESTRASS: a dichotomous (0,1) variable indicating whether the government has placed restrictions on the disposal of the assets of the newly privatised company.

SPECSHAR: a dichotomous (0,1) variable indicating whether the government holds a special or 'golden' share in the newly privatised company.

## Table 6.6 continued:
## Descriptive Statistics for a Sample of 41 UK Privatisation IPOs in the period 1977-1991.

### Panel D: Continuous Measures

| Variable | Mean | Std Dev | Minimum | Maximum | Valid N |
|----------|------|---------|---------|---------|---------|
| DISC | .3515 | .1778 | -.09 | .66 | 41 |
| APPMULT | 8.31 | 7.69 | .30 | 35.00 | 41 |
| CAPEX | 1694.14 | 1180.98 | 570.00 | 4280.00 | 21 |
| GROWTH | -.269 | .719 | -2.7979 | .634 | 32 |
| INTEREST | .14 | .02 | .10 | .17 | 41 |
| ISSPRIC | 209.20 | 48.94 | 100.00 | 300.00 | 41 |
| NTAPER | 282.56 | 182.92 | 64.00 | 955.00 | 32 |
| PE | 7.50 | 2.69 | 3.40 | 15.30 | 32 |
| PERSOLD | .8997 | .2139 | .17 | 1.00 | 41 |
| PROCEEDS | 1344.71 | 1483.15 | 33.44 | 8034.70 | 41 |
| XFACTOR | 2.85 | 2.40 | -.50 | 7.00 | 24 |

DISC: the discount on the share issue, measured as the raw day 1 return--the difference between the offer price and the day 1 closing bid price.

APPMULT: the application multiple, measured as the proportion of the number of shares applied for by investors to the number of share on issue.

CAPEX: the estimated capital expenditure requirements for the privatised company over the next ten years, estimated from the disclosures made in the prospectus.

GROWTH: a measure of growth options, measured as one minus the ratio of net asset backing per share to the offer price and representing the extent to which the offer price represents the growth option vis-a-vis assets in place.

INTEREST: the prime interest rate of the country concerned over the period that the share offer was open.

ISSPRIC: the offer price for the privatisation IPOs.

NTAPER: the net tangible assets per share for the privatisation IPOs, obtained from the prospectus.

PE: the price earnings ratio of the issue based on the most recent reported earnings and the offer price.

PERSOLD: the percentage of the company's equity sold in the issue.

PROCEEDS: the proceeds of the issue, converted to US dollars at the exchange rate on the day of listing.

XFACTOR: the factor to be used in the RPI-X price formula used in regulatory framework for the privatised utilities.

## 6.3 Results for the United Kingdom Sample

Table 6.6 contains a descriptive profile of the variables measured from the sample of

41 privatisation IPOs from the United Kingdom. The sample size differs between

variables due to the data being unavailable for some observations. The sample

includes companies from a variety of industries, with the main industry group being

utilities. Panel A of Table 6.6 provides a full breakdown of industry categories. As reported above, the majority of the issues occur after the 1987 stock market crash, with 1990 and 1989 being the highest volume years. Panel B of Table 6.6 provides a breakdown by year of issue.

A number of additional continuous and dichotomous variable have been collected for the UK sample in addition to those collected for the international sample. The additional continuous explanatory variables are:

CAPEX: the estimated capital expenditure requirements for the privatised company over the next ten years.

GROWTH: a measure of growth options, measured as one minus the ratio of net asset backing per share to the offer price.

ISSPRIC: the offer price for the privatisation IPOs.

NTAPER: the net tangible assets per share for the privatisation IPOs.

PE: the price earnings ratio of the issue, based on the most recent reported earnings and the offer price.

XFACTOR: the factor to be used in the 'RPI minus X' price formula used in the UK regulatory framework for the privatised utilities.

Analysis of the prospectuses for the UK privatisation IPOs also enabled measurement of the following additional qualitative variables:

CONTLIM: a dichotomous (0,1) variable indicating whether the government has placed restrictions on shareholding levels to prevent a single investor taking control over the newly privatised company.

NOWIND: a dichotomous (0,1) variable indicating whether the government has placed restrictions on the 'winding up' of the newly privatised company.

RESTRASS: a dichotomous (0,1) variable indicating whether the government has placed restrictions on the disposal of the assets of the newly privatised company.

SPECSHAR: a dichotomous (0,1) variable indicating whether the government holds a special or 'golden' share in the newly privatised company.

As reported in Table 6.6, Panel C, the majority of companies in the sample have a limit on shareholding to prevent any one investor taking control (90.2%). Most of the issues occur after the stock market crash of 1987, with 22.0% of the issues occurring prior to 1985 and only 12.2% during the boom period from 1985 to October 1987. Government restrictions on the 'winding up' of the newly privatised company (NOWIND) are only present in 17.1% of issues. Policy risk was deemed to exist where the company has been operating in a non-competitive environment or where it was subject to supervision by a regulatory body. Policy risk is present for 68.3% of issues -- a much greater incidence than for the whole international sample. Government restrictions on the disposal of the assets of the newly privatised company is present in only 9.8% of cases, while in 85.4% of cases the government holds a special or 'golden' share in the newly privatised company.

Underpricing (DISC) is calculated as the initial gross return to an investor who acquires a share at the offering price and sells it at the closing bid price on the first day of public trading. As can be seen in Table 6.6, the average underpricing (DISC) on the 41 UK privatisation IPOs is 35.15%, with a median value of 37% and a standard deviation of 17.8%. The minimum discount is in fact negative, while the maximum was 66% and the distribution of initial returns is positively skewed, but not to the same extent as the international sample. Interestingly, a negative initial return is reported for only one company. Once again, this is in contrast to evidence for IPOs in

general that shows significant levels of negative returns. The distribution of returns for the UK privatisation IPOs is less severe than for the international privatisation IPOs and with IPOs in general.[3] In the UK, there is a lower standard deviation and the distribution is less positively skewed.

The mean application multiple for the issues is 8.31 times oversubscribed and the median value is 5.6 times. This demonstrates that while there was a high demand for the issues, the demand levels were not as high as for the international sample. The distribution of application multiples (APPMULT) is also positively skewed, with only two issues being undersubscribed. The proceeds from the issue (PROCEEDS) are also positively skewed around the mean of US$1,344.71M, with a median of US$969.798M. The average size of the UK issues is far in excess of the average from the international sample, and the average percentage of equity sold (90%) is also high for the UK sample.

The new variables introduced into the analysis for the UK issues provide some interesting results. The future capital expenditure needs (CAPEX) for the issues are extremely high. Indeed, the average capital expenditure requirement is higher than the average proceeds from the sale. This data was only available for the electricity and water privatisations with the overall average mean level of CAPEX being $1,694.14M.

The measure of growth options (GROWTH) has a negative mean indicating that, on average, the issues sold at a price less than their net asset backing. However, the distribution is negatively skewed, with a high standard deviation. This unusual finding is further demonstrated by comparing the components of the growth option -- the mean issue price (ISSPRIC) of $2.09 and the mean net asset backing per share

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[3] For the IPOs in general, see Ibbotson, Sindelar & Ritter (1994).

(NTAPER) of $2.82. The average sale price for the UK privatisations is below the average net asset backing, inferring negative growth expectations from existing assets. The average price earnings ratio for the UK sample is 7.5, with a maximum of 15.3 and a minimum of 3.4. The average X factor used in the 'RPI minus X' price regulation formula is 2.85, with a minimum figure of -.5 and a maximum of 7.

Simple Pearson correlation matrices for the underpricing (DISC) and selected proxies are presented in Tables 6.7 and 6.8. For the purpose of this analysis, APPMULT, CAPEX, NTAPER, PE and PROCEEDS are transformed using logarithms to LOGAPPMU, LOGCAPEX, LOGNTA, LOGPE and LOGPROC, because of their positively skewed nature. The square root of GROWTH transforms that variable to SQRTGROW to correct for the negatively skewed distribution of that variable (see Hair et al. 1992, p. 52). The transformations do not alter the direction or the significance of the correlations with underpricing, except for APPMULT (which becomes more significant) and PROCEEDS (which becomes less significant) following transformation. Tables 6.7 and 6.8 also suggest that there is some overlap among the variables. The results reported in these tables allow for the testing of some basic hypotheses about the direction and significance of the new variables in their effect on underpricing in the UK.

As Table 6.7 reports, underpricing is found to be significantly positively correlated with demand (as measured by the application multiple), interest rates, net tangible asset backing, and the percentage of equity sold. Underpricing is significantly negatively correlated with capital expenditure needs, the date, the issue price, the price earnings ratio, and the size of the issue as measured by proceeds. The direction of the correlation between underpricing and the explanatory variables is as hypothesised for all variables, except for the interest rate, date, and issue price

variables. Furthermore, these results are statistically significant for all variables except the X factor. In Table 6.8 the correlation coefficients for the transformed variables are reported which confirm these results.

Tables 6.7 and 6.8 suggest that there is some overlap among the variables. The application multiple is found to be significantly negatively correlated with capital expenditure needs, the issue price, the proceeds or size of the issue, and the X factor. In addition, the size of the issue is also significantly positively correlated with capital expenditure needs and the price earnings ratio; and, significantly negatively correlated with interest rates, the issue price, and net tangible asset backing. The X factor was significantly positively correlated with capital expenditure needs, interest rates, net tangible asset backing and significantly negatively correlated with the date, the price earnings ratio and the size of the issue.

Table 6.9 presents the underpricing statistics for sub-samples formed on the basis of high and low values for the variables selected as proxies for the determinants of underpricing. For each of the 'continuous' measures shown in panel A (APPMULT, CAPEX, DATE, GROWTH, INTEREST, ISSPRIC, NTAPER, PE, PERSOLD, PROCEEDS and XFACTOR) the sample is split in half at the median value. For the dichotomous variables shown in Panel B (COUNTRY, MKT1, MKT2, NOWIND, POLRISK, RESTRASS and SPECSHAR) the sample is split on the basis of the value assumed by each variable. DATE is split at the water authorities privatisations in 1989. Underpricing is expected to decrease with CAPEX, DATE, GROWTH, ISSPRIC, MKT1, PE and PROCEEDS; and to increase with APPMULT, CONTLIM, INTEREST, MKT2, NTAPER, NOWIND, PERSOLD, POLRISK, RESTRASS, SPECSHAR and XFACTOR.

## Table 6.7:
## Pearson Correlation Matrix for Initial Return and Selected Proxies for the Determinants of Underpricing for a Sample of 41 UK Privatisation IPOs from the Period 1977-1991.

| | Predicted Sign[1] | DISC | APPMU. | CAPEX | DATE | INT. | ISSPRIC | NTAPER | PE | PERSLD. | PROCS. | XFACT. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DISC | | 1.0000 | | | | | | | | | | |
| APPMULT | + | .2247# (.079) | 1.0000 | | | | | | | | | |
| CAPEX | - | -.6735** (.000) | -.7049** (.000) | 1.0000 | | | | | | | | |
| DATE | - | .6187** (.000) | -.1118 (.243) | -.6290** (.001) | 1.0000 | | | | | | | |
| INTEREST | + | .5808** (.000) | -.1409 (.190) | .6290** (.001) | .5496** (.000) | 1.0000 | | | | | | |
| ISSPRIC | - | .4718** (.001) | -.3275* (.018) | . | .4182** (.003) | .4018** (.005) | 1.0000 | | | | | |
| NTAPER | + | .4011* (.011) | -.2563 (.078) | .1480 (.261) | .0945 (.304) | .6681** (.000) | .4156* (.009) | 1.0000 | | | | |
| PE | - | -.4015* (.001) | .1125 (.270) | -.3873* (.041) | -.0362 (.422) | -.7196** (.000) | -.0181 (.461) | -.6839** (.000) | 1.0000 | | | |
| PERSOLD | + | .3759** (.008) | .0263 (.435) | . | .6914** (.000) | .3635** (.010) | .2062# (.098) | .2754# (.064) | -.0240 (.448) | 1.0000 | | |
| PROCEEDS | - | -.3408* (.015) | -.2443# (.062) | .7175** (.000) | .0246 (.439) | -.3408* (.015) | -.4644** (.001) | -.4122* (.010) | .2678# (.069) | -.0050 (.488) | 1.0000 | |
| XFACTOR | + | .1473 (.246) | -.4737* (.010) | .4342* (.025) | -.9209** (.000) | .7742** (.000) | . | .8296** (.000) | -.8865** (.000) | . | -.4153* (.022) | 1.0000 |

'.' is printed if a coefficient cannot be computed. Actual significance level is shown in parentheses.

\#     Significant at the 10% level.     *     Significant at the 5% level.     **     Significant at the 1% level.

[1] Denotes the expected direction of the correlation coefficient between DISC and the other variables.

## Table 6.8:
## Pearson Correlation Matrix for Initial Return and Selected Proxies for the Determinants of Underpricing Transformed to Correct for Skewness for a Sample of 41 UK Privatisation IPOs from the Period 1977-1991.

| | Predicted Sign[1] | DISC | LOGAPPMU | LOGCAPEX | LOGNTA | LOGPE | LOGPROC | SQRTGROW |
|---|---|---|---|---|---|---|---|---|
| DISC | | 1.0000 | | | | | | |
| LOGAPPMU | + | .4634** (.001) | 1.0000 | | | | | |
| LOGCAPEX | - | -.7015** (.000) | -.7942** (.000) | 1.0000 | | | | |
| LOGNTA | + | .4661** (.004) | -.3197* (.037) | .2897 (.101) | 1.0000 | | | |
| LOGPE | - | -.3277* (.034) | .3556* (.023) | -.3603# (.054) | -.7671** (.000) | 1.0000 | | |
| LOGPROC | - | -.1701 (.144) | -.2982* (.029) | .6538** (.001) | -.6849** (.000) | .4422** (.006) | 1.0000 | |
| SQRTGROW | - | -.0972 (.298) | -.5952** (.000) | .3245# (.076) | .4992** (.002) | -.5282** (.001) | -.2056 (.130) | 1.0000 |

' . ' is printed if a coefficient cannot be computed. Actual significance level is shown in parentheses.

\#      Significant at the 10% level.

\*      Significant at the 5% level.

\**      Significant at the 1% level.

[1] Denotes the expected direction of the correlation coefficient between DISC and the other variables.

**Table 6.9:**

**Average Initial Return and Standard Deviation of Initial Return for a Sample of 41 UK Privatisation IPOs from the Period 1977 to 1991 Partitioned on the Basis of Selected Proxies for the Determinants of Underpricing.[a]**

**Panel A: Continuous Variables**

| Explanatory Variable | Predicted Sign | Level of Proxy | | | | Mean Diff. (High - Low) | $F$-Value[b] | Test Statistics | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Low | | High | | | | $F$ Prob $\rho$ | $t$-value[c] | $t$ Prob $\rho$ | |
| | | Mean | StdDev | Mean | StdDev | | | | | | |
| APPMULT | + | .2842 | .178 | .4157 | .155 | .1316 | .933 | .340 | -2.52** | .008 | |
| CAPEX | - | .5246 | .080 | .4206 | .070 | -.1040 | .093 | .764 | 3.12** | .003 | |
| DATE | - | .1738 | .139 | .4469 | .116 | .2731 | .956 | .334 | -6.64** | .000 | |
| GROWTH | - | .4007 | .156 | .4130 | .141 | .0123 | .012 | .913 | -.23 | .409 | |
| INTEREST | + | .2119 | .146 | .4504 | .125 | .2385 | 1.194 | .281 | -5.62** | .000 | |
| ISSPRIC | - | .2081 | .157 | .4343 | .132 | .2261 | 2.012 | .164 | -4.94** | .000 | |
| NTAPER | + | .3433 | .162 | .4697 | .099 | .1264 | 3.407 | .075 | -2.67** | .006 | |
| PE | - | .4501 | .1535 | .3628 | .131 | -.0873 | .203 | .655 | 1.74* | .046 | |
| PERSOLD | + | .2430 | .195 | .3837 | .170 | .1407 | .013 | .911 | -1.69* | .045 | |
| PROCEEDS | - | .3750 | .217 | .3292 | .132 | -.0458 | 5.767* | .021 | .82 | .209 | |
| XFACTOR | + | .4317 | .126 | .4746 | .113 | .0429 | .011 | .919 | -.88 | .194 | |

\*       Significant at the 5% level.
\*\*     Significant at the 1% level.

**Table 6.9 continued:**

# Average Initial Return and Standard Deviation of Initial Return for a Sample of 41 UK Privatisation IPOs from the Period 1977 to 1991 Partitioned on the Basis of Selected Proxies for the Determinants of Underpricing.[a]

### Panel B: Dichotomous Variables

| Explanatory Variable | Predicted Sign | Level of Proxy | | | | Mean Diff. (High - Low) | $F$-Value[b] | Test Statistics | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Low | | High | | | | $F$ Prob $\rho$ | | $t$-value[c] | $t$ Prob $\rho$ |
| | | Mean | StdDev | Mean | StdDev | | | | | | |
| CONTLIM | + | .0915 | .162 | .3796 | .157 | .2881 | .082 | .776 | | -3.48** | .000 |
| MKT1 | - | .4065 | .147 | .1562 | .141 | -.2502 | .000 | .996 | | 4.56** | .000 |
| MKT2 | + | .3630 | .182 | .2690 | .123 | -.0940 | .696 | .409 | | 1.11 | .137 |
| NOWIND | + | .3980 | .142 | .1260 | .166 | -.2720 | .398 | .532 | | 4.48** | .000 |
| POLRISK | + | .1764 | .147 | .4329 | .125 | .2565 | 1.104 | .300 | | -5.78** | .000 |
| RESTRASS | + | .3644 | .179 | .2325 | .130 | -.1319 | .318 | .576 | | 1.43# | .085 |
| SPECSHAR | + | .1918 | .171 | .3789 | .166 | .1871 | .000 | .984 | | -2.54** | .008 |

a   The sample of 41 UK privatisation IPOs was partitioned into low and high determinants of underpricing sub-samples on the basis of each of the selected proxies. For the 'continuous' measures (APPMULT, CAPEX, GROWTH, INTEREST, ISSPRIC, NTAPER, PE, PERSOLD, PROCEEDS, and XFACTOR), the sample was split in half at the median value. DATE was split at the Water privatisations in 1989. For the other proxies (CONTLIM, MKT1, MKT2, NOWIND, POLRISK, RESTRASS and SPECSHAR), the sample was split on the basis of the value assumed by the dichotomous variable. Underpricing was expected to decrease with CAPEX, DATE, GROWTH, ISSPRIC, MKT1, PE and PROCEEDS; and to increase with APPMULT, CONTLIM, INTEREST, MKT2, NTAPER, NOWIND, PERSOLD, POLRISK, RESTRASS, SPECSHAR and XFACTOR.

b   $F$-test values for differences in the variance of the initial returns between sub-samples formed on the basis of low and high determinants of underpricing.

c   $t$-test values for differences in average initial return between sub-samples formed on the basis of low and high determinants of underpricing.

\#        Significant at the 10% level.
\*        Significant at the 5% level.
\*\*       Significant at the 1% level.

In Table 6.9 it is reported that there is no significant difference in the variances between the partitions for any of the variables, except PROCEEDS. There are, however, some interesting differences in the means between the partitions. These are discussed in depth in the next section where the results of testing the hypotheses are summarised. The direction of the difference in mean underpricing is as hypothesised for all variables except date and the percentage of equity sold. The difference in means for the partitions is significant for all variables except growth options, proceeds and the X factor.

Table 6.9, Panel B shows the results of comparing the means of the dichotomous variables. There is a significant difference in the means for CONTLIM, MKT1, NOWIND, POLRISK and SPECSHAR. The direction of the difference in underpricing is as hypothesised for all variables except the 1985 to October 1987 period compared to the other periods, and the existence of restrictions on winding up the company and disposal of its assets. There are no significant differences in the variance for any of the partitioned dichotomous variables.

Table 6.10 reports further analysis of differences in means for partitions of the sample. Panel A reports the means and standard deviations of initial underpricing by the industry group variable IND. Underpricing of utilities is significantly higher than for manufacturing companies and oil and gas producers. Analysis by state of the market shows the pre-1985 period to be significantly less underpriced than the post-October 1987 period. Underpricing is the highest for the most recent UK privatisation IPOs.

## Table 6.10:
## Average Initial Return and Standard Deviation of Initial Return for a Sample of 41 UK Privatisation IPOs from the Period 1977 to 1991 Partitioned on the Basis of Industry and State of the Market.

### Panel A: Analysis by Industry

IND $\quad\quad$ $F$ Statistic $\quad$ 10.9224** $\quad$ $F$ Prob ($\rho$) $\quad$ .000

\* $\quad$ Significant at the 1% level.

|   |                    | N  | Mean  | Std Dev |
|---|--------------------|----|-------|---------|
| 1 | Financial Services | 1  | .3550 |         |
| 2 | Manufacturing      | 5  | .1884 | .1434   |
| 3 | Oil & Gas          | 4  | .0565 | .1348   |
| 4 | Services           |    |       |         |
| 5 | Transport          | 3  | .2567 | .0833   |
| 6 | Utilities          | 28 | .4329 | .1248   |

Bonferroni Test Results: Group 6 was significantly different to groups 2 and 3 at the 5% level.

### Panel B: Analysis by State of the Market

MARSTATE $\quad\quad$ $F$ Statistic $\quad$ 14.7076** $\quad$ $F$ Prob ($\rho$) $\quad$ .0000

\*\* $\quad$ Significant at the 1% level.

|   |                   | N  | Mean  | Std Dev |
|---|-------------------|----|-------|---------|
| 1 | Pre-1985          | 9  | .1562 | .1408   |
| 2 | 1985-October 1987 | 5  | .2690 | .1230   |
| 3 | Post-October 1987 | 27 | .4319 | .1378   |

Bonferroni Test Results: Group 3 was significantly different to group 1 at the 5% level.

**Table 6.11:**

**Fitted Models of Multivariate Relations Between Underpricing and Selected Proxies for the Determinants of Underpricing for a Sample of 41 UK Privatisation IPOs between 1977 and 1991.[a]**

| Independent Variable | Predicted Sign | Model | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 |
| intercept | | .2040** | .2506 | 1.4650 | 1.2403** | .6794** | -.0245 |
| | | (3.956) | (1.213) | (.971) | (6.976) | (8.315) | (-.049) |
| LOGAPPMU | + | .1956 | .1921** | .0803 | | .2885** | .1915** |
| | | (3.266) | (3.010) | (.660) | | (6.201) | (3.886) |
| LOGPROC | - | | -.0147 | .0045 | | | -.1513* |
| | | | (-.233) | (.012) | | | (-1.881) |
| LOGCAPEX | - | | | -.1775 | -.2417** | | |
| | | | | (-.584) | (-4.291) | | |
| LOGPE | - | | | -.4830 | | -.5356** | |
| | | | | (-.941) | | (-5.015) | |
| SQRTGROW | - | | | -.0058 | | | |
| | | | | (-.048) | | | |
| LOGNTA | + | | | -.0250 | | | |
| | | | | (-.059) | | | |
| XFACTOR | + | | | -.0154 | | | |
| | | | | (-.610) | | | |
| INTEREST | + | | | | | | 5.0949** |
| | | | | | | | (2.617) |
| Adjusted $R^2$ | | .1945 | .1746 | .2975 | .4654 | .6551 | .6573 |
| Regression $F$ | | 10.6677** | 5.2316** | 2.2010 | 18.4114** | 22.8459** | 15.7053** |

a  Adjusted $t$-values are shown in parentheses. Underpricing was expected to decrease with CAPEX, INTEREST, LOGPE and LOGPROC, and to increase with SQRTGROW, LOGNTA, LOGAPPMU and XFACTOR.

*  Significant at the 5% level.     **  Significant at the 1% level.

Table 6.11 reports the results of multiple regressions undertaken on the variables hypothesised to be determinants of underpricing for privatisation IPOs. Six models are reported. Models 1 and 2 respectively report regressions based on the two highest correlated variables, LOGAPPMU and LOGPROC, from the earlier international sample. As noted earlier, these variables are the logs of the raw variables APPMULT and PROCEEDS, the transformation being necessary to correct for the skewed nature of their distributions (see Hair et al. 1992, p. 52). The first two models provide limited explanatory power, with R squared values of 19.45% and 17.46% respectively. Tests for autocorrelation for these model using the Durbin-Watson test indicate that for both models the null hypothesis of no autocorrelation can be rejected at the 1% level. In model 2, the variance inflation factors (VIF) indicate that multicollinearity is not a problem, with the factors for both variables being well below the cutoff threshold of 10 outlined by Hair et al. (1992, p. 48).

The third regression model includes all of the hypothesised variables, except INTEREST, and results in an R squared value of 29.75%. However, with this model the variance inflation factors (VIF) for the variables indicate that multicollinearity is present, and the regression $F$ statistic indicates that the overall regression is not significant. This model is, therefore, of limited use.

The fourth model employs a forward selection stepwise regression procedure. The method is the same as Jog and Riding (1987). As discussed in Chapter Four, it is justified because it is unlikely to include multiple measures of the same underlying factor, thereby minimising the potential effect of multicollinearity. The dominance of the CAPEX variable sees it as the only independent variable in the model, which had an R squared of 46.54%. The Durbin-Watson test for autocorrelation indicates that the null hypothesis of no autocorrelation can be rejected at the 1% level. The value of

this model is restricted because the variable for capital expenditure needs (CAPEX) was available for only 21 of the 41 issues. Accordingly, it is removed from the regression in model 5.

The fifth model also employs a forward selection stepwise regression procedure, however the variable CAPEX is excluded. The following model of underpricing resulted from the application of these techniques:

$$DISC = \quad .6794 \quad + .2885 \ (LOGAPPMU) \quad - .5356 \ (LOGPE)$$
$$\quad\quad\quad (8.315) \quad\quad\quad (6.201) \quad\quad\quad\quad\quad (-5.015)$$

The R squared of the model is 65.51%. The model is statistically significant at the 1% level with all independent variables and the intercept also significant at that level. The test for multicollinearity using the variance inflation factor (VIF) indicates that it is well below the cutoff threshold of 10 for all variables, as outlined by Hair et al. (1992, p. 48). Thus, multicollinearity is not considered to be a problem. The Durbin-Watson statistic indicates that the null hypothesis of no autocorrelation can be rejected at the 1% level.

The final model also employs a forward selection stepwise regression procedure, except, in this case, INTEREST is added to the analysis. The following model of underpricing results from the application of these techniques:

$$DISC =$$

$$-.0245 \quad + .1915 \ (LOGAPPMU) \quad - .1513 \ (LOGPROC) \quad + 5.0949 \ (INTEREST)$$
$$(-.049) \quad\quad (3.886) \quad\quad\quad\quad\quad (-1.881) \quad\quad\quad\quad\quad (2.617)$$

The R squared of the model is 65.73%. This model is found to be statistically significant at the 1% level, with all independent variables and the intercept also significant at this level. Tests for multicollinearity find the variance inflation factor (VIF) for all variables to be well below the cutoff threshold of 10 outlined by Hair et

al. (1992, p. 48). The Durbin-Watson statistic test indicates that the null hypothesis of no autocorrelation could be rejected at the 5% level.

## 6.4    Tests of Hypotheses

In this section the tests of the hypotheses developed in Chapter Four are described. Table 6.12 at the end of this section summarises the hypothesised relationships between underpricing and the explanatory variables. In all cases, a range of tests are used to provide convergent validity of the results. Multiple regression is the main technique used for testing the hypotheses. The other techniques employed are the Pearson correlation matrix, partitioning of the sample and testing for differences in mean and variance using $t$ and $F$ tests; and, the Bonferroni test for differences between groups of different size.

### 6.4.1    Valuation Variables and their Hypothesised Effect on Underpricing

The first three hypotheses relate to variables used in the valuation of shares in companies: expected growth rates; price-earnings ratios and net tangible assets per share.

> **Hypothesis 1**: The abnormal excess return of a privatisation share issue is negatively related to the size of the growth options implied in the issue.

The UK sub-sample includes data that enables the calculation of growth options for a number of issues, as discussed in Chapter Five. In Table 6.8 underpricing is shown to be negatively correlated with the level of growth options, but the relationship is not significant. In addition, the results of partitioning the sample at the median reported in Table 6.8 are inconclusive, with the means of the high and low partitions being

almost identical. The regression analysis reported in Table 6.11 also shows underpricing to be negatively correlated with the level of growth options, but again, the relationship is not significant. Overall, the hypothesis can not be supported. However, further analysis is warranted because the privatisations of the UK water authorities distort the analysis.

In a series of further tests, the water authorities were excluded from the analysis. In these cases, the issue price was generally much lower than the level of assets in place, providing a negative measure for growth options. In addition, the companies required significant capital investment by the new owners in the post-privatisation period. In most cases, the estimated capital investment reported in the prospectuses over the ten year post-privatisation period was substantially higher than the initial market capitalisation. The total proceeds from the sale of the water authorities was $8.3 billion, however, they collectively reported future capital investment needs of $24.5 billion over the ten years after being floated. This represented the sale of companies with significant investment needs. Accordingly, the average sale price of the companies was less than their average tangible asset backing. The purchase price reflected the negative growth option associated with the investment backlog.

After removing the water companies from the analysis, a highly significant negative correlation is found between underpricing and growth options. This provides support for the hypothesis that there is a negative relationship between underpricing and the size of the growth options implied in the issue. In privatisation IPOs the government underprices the low growth companies by more than those with high growth potential. In these cases, the high underpricing provides an incentive to investors to buy those shares that are less likely to provide growth.

**Hypothesis 2**: The abnormal excess return of a privatisation share issue is positively related to net asset backing of the company.

The results of the analysis presented in Tables 6.7 and 6.8 support Hypothesis 2. Specifically, the level of net tangible assets per share is positively correlated with underpricing. The higher the level of net tangible assets of the companies, the higher the level of underpricing, with the positive correlation being significant at the 5% level. The transformed variable for net tangible assets (LOGNTA) is also positively correlated and highly significant at the 1% level. These results are confirmed in the tests of the partitioned sample reported in Table 6.9. The mean level of underpricing for issues with high net tangible assets per share is significantly different to those with low net tangible assets. The direction of the difference is positive, providing further support for the hypothesis. These results, however, are not confirmed by the results of the regression analysis, as reported in Table 6.11. There is no significant relationship found. Overall, the tests provide some support for the hypothesis that net asset backing and underpricing are positively correlated, although the result is not strong.

**Hypothesis 3**: The abnormal excess return of a privatisation share issue is negatively related to the P/E ratio implied in the issue.

The correlation coefficients reported in Tables 6.8 and 6.9 indicate a significant negative correlation between underpricing and the P/E ratio. The negative correlation between the price earnings ratio and underpricing is significant at the 5% level. The transformed variable for PE (LOGPE) is also negatively correlated and significant at the 5% level. In Table 6.9 it is also reported that issues with higher P/E ratios are underpriced by less than those with lower P/Es, and the difference is significant at the

5% level. This result is confirmed in the results of the regression analysis reported in Table 6.11, which shows P/E ratios to be negatively correlated with underpricing and highly significant at the 1% level. Overall it can be concluded that, for the UK sub-sample, issues with higher P/E ratios are underpriced by less than those with lower P/Es. This provides strong support for the hypothesis that P/E ratios and underpricing are negatively correlated.

### 6.4.2 The Hypothesised Effect of Information Asymmetry between Investors on Underpricing

The next two hypotheses relate to the direct tests of the theory of information asymmetry between investors, as developed by Rock (1986). Rock argued that where there is a high level of informed demand we would also expect the initial returns to be high; similarly where potential gains are low, demand is low as informed investors stay away from the issue. The uninformed investors receive the largest allotment from the issues where there is low underpricing, in line with the 'winners' curse'. Koh and Walter (1989) found support for the 'winners' curse' and that there is a significant positive correlation between oversubscription levels and first-day returns.

> **Hypothesis 4**: The abnormal excess return of a privatisation share issue is positively related to the level of excess demand.

The variables APPMULT and LOGAPPMU measure the demand for the issue in terms of the application rate. It is hypothesised that demand for an issue is positively correlated with underpricing, since demand reflects the participation of informed investors in the issue. This hypothesis is supported by the results of the analysis. The correlation coefficients reported for the whole sample in Table 6.2 for APPMULT and

LOGAPPMU are both positive and significant. That is, underpricing and the application multiple are correlated and the correlation is highly significant at the 1% level.

As reported in Table 6.3, there is a difference in mean underpricing between high and low levels of application multiples, when the sample is partitioned at the median level of the application multiple. This difference is only significant at the 10% level. The regression results reported in Table 6.5 also indicate a strong positive correlation between underpricing and application multiple. The regression analysis finds the positive relationship between underpricing highly significant at the 1% level.

Overall, it can be concluded that there is strong support for a positive relationship between underpricing and demand. This is strong evidence of the existence of information asymmetry between investors, as proposed by Rock (1986).

For the UK sub-sample, the application multiple is also found to be positively correlated with the level of underpricing. This is evidenced by the correlation coefficient for LOGAPPMU reported in Table 6.8. The relationship is highly significant at the 1% level. In Table 6.9, it is reported that there is also a highly significant difference in mean underpricing between high and low levels of application multiples when the sample was partitioned at the median for the UK sub-sample. The issues that experience higher demand (as measured by the application multiple) also display higher underpricing. This provides further support for the existence of informed and uninformed investors in the market and given the significance of the correlation for both the whole sample and the UK sub-sample, it can be concluded that underpricing of privatisation IPOs is positively correlated with demand.

These results are confirmed by the results of the regression analysis reported in Tables 6.5 and 6.11. The application multiple is positively correlated with

underpricing and it is significant at the 1% level. In addition, in a stepwise regression of underpricing with the explanatory variables, the application multiple is chosen as a variable with a high degree of explanatory power for both the whole sample and the UK sub-sample. Overall, there is strong support for Hypothesis 4 and the result is corroborated by the range of tests used.

**Hypothesis 5**: The abnormal excess return of a privatisation share issue is positively related to the interest rate at the time of subscription.

The correlation coefficient between underpricing and interest rates reported in Table 6.2 is not significant. In Table 6.3, partitioning the whole sample on the basis of interest rates also fails to find a significant result. The evidence reported in these tables fails to support the hypothesis for the international sample. However, in line with the hypothesis, the results of the regression analysis reported in Table 6.5 indicate a highly significant positive correlation between underpricing and interest rates.

For the UK sample, in Table 6.7 it is reported that interest rates are positively correlated with the discounts and the correlation is highly significant. There is evidence to suggest that the relationship found in Koh and Walter (1989) may hold for UK privatisation IPOs. This conclusion is confirmed by the results of the regression analysis reported in Tables 6.5 and 6.11. Interest rates are positively correlated with underpricing, highly significant at the 1% level. In addition, in a stepwise regression of underpricing with the explanatory variables, interest is chosen as a variable with a high degree of explanatory power for both the main sample and the UK sub-sample. Overall, there is strong support for Hypothesis 5 and the result is corroborated using a range of tests. The results provide strong support for

Hypotheses 4 and 5 indicating that the 'winners' curse' argument of Rock (1986) may be applicable in the case of privatisation issues.

### 6.4.3  The Hypothesised Effect of Ex-Ante Uncertainty on Underpricing

It is generally proposed that IPOs with higher ex-ante uncertainty are more difficult to value for both the issuer and investors. The following five hypotheses relate to ex-ante uncertainty of privatisation IPOs. The hypotheses relate to factors from the main body of IPO literature, such as issue size, and factors specific to privatisations, such as the existence of restrictions on the management of the company after privatisation.

> **Hypothesis 6**: The abnormal excess return of a privatisation share issue is negatively related to the size of the issue, as measured by the gross proceeds.

Ex-ante uncertainty among investors is considered to be positively linked to underpricing. A common proxy for this uncertainty is the size of the issue. The basis for this is that the larger the issue, the greater the amount of information that would be available to investors; hence, the lower level of uncertainty and underpricing. Accordingly, one would expect issue size to be negatively correlated with underpricing. The variable PROCEEDS measures the issue size for the privatisation IPOs. As reported in Table 6.2, both the proceeds from the issue and the transformed variable, the log of proceeds, are negatively correlated with underpricing. However, the correlations are significant only at the 10% level.

As reported in Tables 6.7 and 6.8 for the UK sub-sample, proceeds are negatively correlated with underpricing, significant at the 5% level. The correlation with the transformed variable, LOGPROC, is not significant.

When both the whole sample and the UK sub-sample are partitioned at the median value of PROCEEDS there is a significant difference in the variance of the partitions. The difference in the variance is highly significant at the 1% level for the whole sample and significant at the 5% level for the UK sub-sample. This is reported in Tables 6.3 and 6.9. Clarkson (1994) reported that variables with highly significant $F$-test values were able to discriminate between high and low ex-ante uncertainty firms. In the case of the privatisation IPOs, it can be concluded that this variable provides a discriminator between high and low ex-ante uncertainty issues. Large privatisation IPOs have low levels of ex-ante uncertainty.

These results are confirmed by the results of the regression analysis reported in Tables 6.5 and 6.11. Issue size is positively correlated with underpricing and it is significant at the 5% level. The result is stronger for the UK sub-sample. For the UK sub-sample, in a stepwise regression of underpricing with the explanatory variables, the proceeds of the issue is chosen as a variable with a high degree of explanatory power. Overall, there is strong support for Hypothesis 6, and the result is corroborated by the range of tests used. These is also strong support for proceeds serving as a discriminator between high and low ex-ante uncertainty issues in terms of the variance of underpricing.

**Hypothesis 7**: The abnormal excess return of a privatisation share issue is positively related to the level of policy risk involved.

For the whole sample, there is no significant difference in the means between the high and low partition for POLRISK as reported in Table 6.3. This result fails to provide support for the hypothesis that underpricing and policy risk are positively related. However, the results of the regression analysis reported in Table 6.5 indicate a

positive relationship between policy risk and underpricing. This is as hypothesised and the result is significant at the 10% level.

For the UK sub-sample a similar result is found. There is no significant difference between the means of the issues with policy risk compared to those without such risk. There is, however, a significant difference in the variance of the partitions, as reported in Table 6.9. As noted, Clarkson (1994) reported that variables with highly significant $F$-test values are able to discriminate between high and low ex-ante uncertainty firms. In the case of the privatisation IPOs, it can be concluded that this variable provides a discriminator between high and low ex-ante uncertainty issues in the UK. Issues faced with policy risk have a greater variance in initial underpricing even though there is no significant difference in the mean level of underpricing.

Overall, there is minor evidence to suggest that underpricing is higher when there is a higher level of policy risk. Consideration of the other hypotheses allows this hypothesis to be explored further.

**Hypothesis 8**: The abnormal excess return of a privatisation share issue for utilities is greater than for issues by non-utility companies.

In Panel B of Table 6.4 the means and standard deviations of initial underpricing by the industry group variable (IND) for the whole sample are reported. The $F$ statistic indicates that there is a significant difference between the groups. The Bonferroni test, however, does not identify differences at the 5% significance level. Therefore, the identity of the actual groups that were significantly different cannot be determined.

The UK data enabled further analysis of the industry factors involved. Panel A of Table 6.10 contains evidence that there is a significant difference in underpricing of utilities as opposed to the manufacturing and oil and gas industry categories.

Underpricing is not significantly different in the other industry categories. These results provide support for Hypothesis 8. This is not surprising given that utilities generally operate in less competitive markets than manufacturers and to a lesser extent, oil and gas companies.

**Hypothesis 9**: The abnormal excess return of a privatisation share issue is higher where there are restrictions on the 'winding up' of the privatised company than in the absence of such restrictions.

**Hypothesis 10**: The abnormal excess return of a privatisation share issue is higher where there are restrictions on the disposal of the assets of the privatised company than in the absence of such restrictions.

In Table 6.9, Panel B the results of partitioning the sample on the basis of a number of dichotomous variables are reported. Two of these variables relate to Hypotheses 11 and 12. NOWIND indicates where there were restrictions on the winding up of the new company, while RESTRASS indicates restrictions on the disposal of assets following privatisation. There are significant differences in the means of the partitions for both of these variables. For NOWIND the difference is highly significant at the 1% level, while the difference is only significant at the 10% level for RESTRASS.

In the case of restrictions on winding up the company, the direction of the difference in underpricing is the opposite to that hypothesised. Where there are such restrictions, underpricing is in fact lower. There is no support for a positive relationship between underpricing and restrictions on winding up the company, hence, there is no support for Hypothesis 9.

Where there are restrictions on the disposal of assets, there is evidence to support the existence of a positive relationship between the existence of the

restrictions and underpricing for the UK issues. This provides some support for Hypothesis 10, albeit rather weak.

### 6.4.4 A Hypothesised Relationship Between Underpricing and Government Reputation Building

**Hypothesis 11**: The abnormal excess return of a privatisation share issue is greater for sales early in a privatisation program compared to sales later in the program.

A reputation or confidence building hypothesis states that the discounts on privatisation IPOs fall over time as governments use discounts in early issues to build confidence among investors to boost demand for future issues. Accordingly, it is expected that the variable for date of issue (DATE) is negatively correlated with underpricing (DISC). The correlation coefficient shown in Table 6.2 between the date variable and underpricing indicates no significant correlation for the international sample.

The reputation building hypothesis would also suggest a significant difference between the means of the partitions from the sample, when the sample is partitioned at the median date. Table 6.3 shows that there is some support for the hypothesis, with mean underpricing found to be higher for the earlier privatisations, significant at the 5% level. In addition, the difference in the variance between the early and later partitions is highly significant, indicating that the date may be a good discriminator between high and low ex-ante uncertainty firms. The strength of this conclusion must be questioned, however, because the hypothesis is really related to the policy of the government of a single country rather than at an international level. A test of reputation building for a specific country is considered more appropriate.

The UK sub-sample provides a better opportunity to test the reputation building hypothesis. For the UK sub-sample, date is positively correlated with underpricing, and the relationship is highly significant at the 1% level. That is, underpricing of privatisation IPOs in the UK increased over time, not decreased as hypothesised.

The partitioning of the UK sub-sample at the median date supports this finding. Evidence of a relationship that is opposite to the hypothesis is reported in Table 6.9. Mean underpricing is found to be lower for the earlier privatisations and the result is highly significant at the 1% level. This is contrary to the hypothesis that underpricing and date are negatively related. An offsetting factor is that the later privatisations were utilities while the earlier ones were previously nationalised industries, including manufacturers, oil and gas producers and transport companies. Overall, there is no support for the reputation building hypothesis in the UK. There is some evidence that underpricing fell over time for the international sample, however, the relevance of the result to the hypothesis is questionable.

**Hypothesis 12**: The abnormal excess return of a privatisation share issue is positively related to the percentage of total shares in the company sold.

In Table 6.2, PERSOLD is positively correlated with DISC, however, the relationship is not significant. The results of the regression analysis reported in Table 6.5 also fail to find a significant relationship between percentage sold and underpricing. However, in Table 6.3, the results of partitioning the sample on the basis of the median value of PERSOLD are reported. In this test, a significant difference between the means of the partitions is found. Where the government sells a higher percentage of the firm, underpricing is greater, and the result is significant at the 5% level. This result

provides evidence in support of the hypothesis that there is a premium for control of newly privatised firms and indicates that ex-ante uncertainty is higher where higher levels of the company's equity are sold.

For the UK sub-sample these results are also supported. PERSOLD and DISC are positively correlated and the correlation is significant at the 1% level. A positive correlation is also found between PERSOLD and DISC as reported in Table 6.7, with the result highly significant at the 1% level. The results of partitioning the sample on the basis of the median value of PERSOLD are reported in Table 6.9. These results show a positive difference between the means of the partitions, the difference being significant at the 5% level. Overall, the results provide evidence to support the hypothesis that where the government sells a higher percentage of the firm, underpricing is greater than where a lower proportion of the company is sold.

### 6.4.5 A Hypothesised Relationship Between Underpricing and the Value of Corporate Control

The variables CONTLIM and SPECSHAR are dummy variables indicating where the government maintains control through special regulations like a 'golden share' (SPECSHAR) or restrictions on individual shareholding (CONTLIM). The existence of these restrictions adds to the ex-ante uncertainty faced by investors and was hypothesised to be positively correlated with underpricing.

> **Hypothesis 13**: The abnormal excess return of a privatisation share issue is higher where the government holds a 'golden share' in the privatised company sold than where it does not hold a 'golden share'.

> **Hypothesis 14**: The abnormal excess return of a privatisation share issue is higher where the government places a limit on the shareholding levels of investors than in the absence of a limit.

In Table 6.9, Panel B the results of partitioning the sample on the basis of a number of dichotomous variables are reported. Two of these variables relate to Hypotheses 15 and 16. SPECSHAR indicates where the government holds a special or 'golden' share in the privatised firm, while CONTLIM indicates restrictions on individual shareholdings following privatisation to prevent anyone securing a controlling interest. There were differences in the means of the partitions for both of these variables, highly significant at the 1% level. It can be concluded that these variables provide discriminators between high and low ex-ante uncertainty issues for the UK issues. High ex-ante uncertainty issues are underpriced to a greater extent than low ex-ante uncertainty issues. Overall, the results provide strong evidence to support Hypotheses 13 and 14.

### 6.4.6 A Hypothesised Relationship Between Underpricing and the Country of Issue

**Hypothesis 15**: Underpricing is higher in less developed countries than in developed countries.

The dichotomous variable COUNTRY distinguishes between less developed and developed economies. While a significant difference is found in the variance, there is not a significant difference in the means between the two groupings of countries. Further tests for differences between countries are reported in Table 6.4.

It can be seen from Table 6.4 that the mean underpricing and its standard deviation are much higher for Malaysia, and to a lesser extent, Spain, than for the other countries. The $F$ statistic indicating a difference in the means within the sub-samples is highly significant. The Bonferroni test, undertaken to test for significant differences in the means between countries, indicates that mean underpricing is

significantly different in Malaysia compared to France, the UK, Singapore and Turkey. Underpricing in Spain is significantly different to that in Turkey.

These results are confirmed in the regression analysis reported in Table 6.5. Underpricing is significantly correlated with whether the country of issue is from a developed or developing country and the relationship is significant at the 1% level. Developed countries display significantly lower underpricing than developing countries. In a stepwise regression of underpricing with the explanatory variables, the country grouping is chosen as a variable with a high degree of explanatory power. Overall, the results provide strong support for Hypothesis 15 and the result is corroborated by the range of tests used.

### 6.4.7 A Hypothesised Relationship Between Underpricing and 'Hot Issue Markets'

**Hypothesis 16**: Underpricing is greater in a boom state of the market than in a 'bear' state.

MKT1 and MKT2 are dummy variables for privatisation IPOs prior to the 1985 to October 1987 boom period and for issues during that period. Partitioning on the basis of MKT1 does not provide evidence of a significant difference between the mean and variance in the different time periods. However, the MKT2 partitioning finds that the mean underpricing and variance is significantly higher in the 1985 to October 1987 boom period. This provides evidence of a 'hot' issue market, as initially reported by Ritter (1984a).

The time periods involved are analysed further, with the results reported in Table 6.4. These results indicate that underpricing in the 1985 to October 1987 period is significantly different to the post-1987 period. The variable MARSTATE segments the sample into the following time periods: pre-1985, 1985 to October 1987

and post-October 1987. The $F$ statistic indicates that there is a difference between the means of the sub-samples, and the difference is significant at the 1% level. Further, the Bonferroni test indicates that mean underpricing in the 1985 to October 1987 boom period is significantly different to that of the post-October 1987 period. This provides further support for the existence of 'hot issue' markets.

This result is confirmed by the results of the regression analysis reported in Table 6.5. Underpricing is found to be higher during the 1985 to 1987 boom period, significant at the 1% level. In addition, in a stepwise regression of underpricing with the explanatory variables, the variable for the time period (MKT2) is chosen as a variable with a high degree of explanatory power.

Overall, the results provide strong support for Hypothesis 16 for the international sample and the result is corroborated by the range of tests used.

For the UK sub-sample a different result is found. Partitioning on the basis of MKT1 provides evidence of a significant difference between the mean and variance in the different time periods. That is, underpricing is higher on average for the pre-1985 period. However, the MKT2 partitioning finds that the mean underpricing is not significantly different in the 1985 to October 1987 period for the UK sample.

The time periods involved are analysed further, and the results are reported in Table 6.10. As discussed, the variable MARSTATE segments the sample into the following time periods: pre-1985, 1985 to October 1987 and post-October 1987. The $F$ statistic indicates that there is a difference between the means of the sub-samples, which is significant at the 1% level. Further, the Bonferroni test indicates that mean underpricing in the pre-1985 period is significantly different to that of the post-October 1987 period. This provides further evidence to support the existence of 'hot issue' markets. Although it does not coincide with the 1985 to 1987 boom period,

the sample size for this period in the UK is very small. These results also provide further reasons to question the reputation building hypothesis since mean underpricing in the earliest period is in fact lower than in later periods, although the difference is not significant between the first and second periods. As noted, a small sample size for the second period may influence the results here. The UK evidence provides further support for Hypothesis 16, if it is accepted that the pre-1985 market conditions were less 'bearish' than in the post-October 1987 period.

### 6.4.8 A Specific Model of Underpricing of Initial Public Offerings of Privatised Shares for Utilities

**Hypothesis 17**: The underpricing of shares in privatised companies is positively related to the future capital expenditure needs of the company.

The level of future capital expenditure required for a company is likely to reduce its value to investors. This is because high future needs reduce the free cash flow to the firm, hence, also reduce its value. It is reported in Tables 6.7 and 6.8 that the level of capital expenditure required over the next ten years is negatively correlated with underpricing and this is highly significant.

The level of future capital expenditure is likely to be negatively related to underpricing, so it is expected that issues with high needs will be more underpriced than issues with low needs. In Table 6.9 this is found to be the case with the mean underpricing for the lowest half of the sample being significantly greater than for the half of the sample with high capital expenditure needs.

The results of the regression analysis reported in Table 6.11 provide strong support for the role of capital expenditure needs in underpricing. Underpricing is significantly negatively correlated with capital expenditure needs and the relationship

is significant at the 1% level. In addition, in a stepwise regression of underpricing with the explanatory variables, the variable representing capital expenditure needs is chosen as the main variable, with a high degree of explanatory power. The regression using only the CAPEX variable reports an adjusted $R^2$ of 46.54%. Overall, there is strong support for Hypothesis 17 and the result is corroborated by the range of tests used. A limitation of this result is the small sample size brought about because of the limited availability of data on capital expenditure needs.

**Hypothesis 18**:   The abnormal excess return of a privatisation share issue is positively related to the X factor in an 'RPI minus X' regulatory framework.

An 'RPI minus X' pricing formula is used to regulate the prices of newly privatised utilities. It is expected the greater the restriction on pricing, the lower the value of the company in the market. Accordingly, it is expected that the X in the formula (XFACTOR) is positively correlated with underpricing, as the issuer leaves more reward 'on the table' for investors to compensate them for these restrictions. Table 6.7 reports that XFACTOR and DISC are positively correlated for the UK sample, however, not at a significant level. The results of the regression analysis reported in Table 11 also do not support the hypothesis. The results reported in Table 11 fail to find a significant relationship between X factor and underpricing. Overall, there is no evidence to support Hypothesis 18.

At this stage, we can conclude that while there is no evidence that the X factor is directly related to underpricing, it may be an intervening variable in the privatisation process. The X factor is positively correlated with interest rates and negatively correlated with the price earnings multiple, with both relationships significant at the 1% level. The X factor variable is also negatively correlated with issue size and

significant at the 5% level. The X factor is positively correlated with capital expenditure needs significant at the 5% level.

### 6.4.9 Summary of Hypothesis Testing

Table 6.12 provides a summary of the results of the hypothesis testing in terms of the explanatory variables involved, the hypothesised direction of the relationship with underpricing, and the results of the hypothesis testing. In this table, the reported 'actual direction' is that confirmed by the range of tests discussed above.

### 6.5 Summary

This chapter has presented the results of the analysis of an international sample of 114 privatisation IPOs from six countries. It has also presented the results of analysis of a sub-sample of 41 UK privatisation IPOs for which additional data was available. The results of the tests of the hypotheses are summarised in Table 6.12. In the next chapter these results are discussed with reference to the literature on IPOs and privatisation.

### Table 6.12
### Explanatory Variables and their Predicted Relationship with the Degree of Underpricing

| Explanatory Variable | Represented by: | Measured by: | Predicted Sign | Test Result |
|---|---|---|---|---|
| **Valuation Variables** | | | | |
| Growth Options | GROWTH | a measure of growth options, measured as one minus the ratio of net asset backing per share to the offer price. | - | - |
| Issue Price | ISSPRIC | the offer price for the privatisation IPOs. | - | N/S |
| Asset Backing | NTAPER | the net tangible assets per share for the privatisation IPOs, obtained from the prospectus. | + | + |
| Price Earnings | PE | the price earnings ratio of the issue based on the most recent reported earnings and the offer price. | - | - |
| **Information Asymmetry** | | | | |
| Demand for Issue | APPMULT | the application multiple, measured as the proportion of the number of shares applied for by investors to the number of share on issue. | + | + |
| Interest Rate | INTEREST | the prime interest rate of the country concerned over the period that the share offer was open. | + | + (UK only) |
| **Ex-ante Uncertainty** | | | | |
| Policy Risk | POLRISK | a dichotomous variable (0,1) indicating the existence of policy risk. | + | + |
| Issue Size | PROCEEDS | the proceeds of the issue, converted to US dollars at the exchange rate on the day of listing. | - | - * |
| Restrictions on Management | NOWIND | a dichotomous (0,1) variable indicating restrictions on the winding up of the newly privatised company. | + | - |
| | RESTRASS | a dichotomous (0,1) variable indicating restrictions on the disposal of the assets of the newly privatised company. | + | + |
| **Reputation Building** | | | | |
| Date of Listing | DATE | the date of initial listing of the shares. | - | -* |

### Table 6.12 continued
### Explanatory Variables and their Predicted Relationship with the Degree of Underpricing

| Explanatory Variable | Represented by: | Measured by: | Predicted Sign | Test Result |
|---|---|---|---|---|
| Extent of Sale | PERSOLD | the percentage of the companies equity sold in the issue. | + | + |
| **Value of Corporate Control** | | | | |
| Limits on Control | CONTLIM | a dichotomous (0,1) variable indicating restrictions on the size of shareholdings of a single investor. | + | + |
| | SPECSHAR | a dichotomous (0,1) variable indicating whether the government holds a special or 'golden' share in the newly privatised company. | + | + |
| **Country of Issue** | COUNTRY | a dichotomous variable (0,1) indicating whether the company operates in a developed or developing country. | - | - * |
| **Hot Issue Markets** | MKT1 | a dichotomous variable (0,1) indicating the state of the market, MKT1 = 1 for the pre-1985 boom, period, 0 otherwise. | - | N/S |
| | MKT2 | a dichotomous variable (0,1) indicating the state of the market, MKT2 = 1 for the 1985 to October 1987 boom period, 0 otherwise. | + | +* |
| **Factors Specific to Utilities** | | | | |
| Capital Expenditure Needs | CAPEX | the estimated capital expenditure requirements for the privatised company over the next ten years, estimated from the disclosures made in the prospectus. | - | - |
| Price Regulation | XFACTOR | the factor to be used in the RPI minus X regulatory framework for the privatised utilities. | + | N/S |

* For these variables a significant difference was found in the variance of the groups displaying these attributes, an indicator that these attributes were valid discriminators of high ex-ante uncertainty issues.

# Chapter 7. Discussion

## 7.1 Introduction

The main aim of this chapter is to provide a summary of the results of this thesis. The next section of this chapter discusses the results of the analysis from the previous chapter in the context of the privatisation and the IPO literature. The third section addresses the main research questions raised at the beginning of this thesis. The concluding section considers the limitations of the research and the scope for further research in the area.

## 7.2 Discussion of the Tests of the Hypotheses

In this section the hypotheses developed in Chapter Four and the results of the tests described in Chapter Six are discussed. The aim of this section is to discuss the interpretation of the results of Chapter Six with reference to the IPO and the privatisation literature. It will be argued that the main forces involved in the underpricing of IPOs in general are applicable to privatisation IPOs. In addition, it will be argued that ex-ante uncertainty is a factor explaining the underpricing of privatisation IPOs and that the 'winners' curse' model of Rock (1986) is applicable to privatisation IPOs. It will also be argued that there is little evidence to support a reputation building motive for the underpricing of privatisation IPOs. Finally, it will be argued that capital expenditure needs and the regulatory framework explain a high proportion of the underpricing of the UK electricity and water companies.

## 7.2.1 Valuation Variables and their Hypothesised Effect on Underpricing

The first three hypotheses were related to variables used in the valuation of shares in companies.

**Hypothesis 1**: The abnormal excess return of a privatisation share issue is negatively related to the size of the growth options implied in the issue.

As previously discussed, Taylor and Walter (1991) and How (1994) proposed growth options as a proxy for the ex-ante uncertainty associated with an IPO issue; hence, measures of growth options should be positively correlated with underpricing. In this thesis, an alternative hypothesis was proposed due to the nature of the privatisation issues. It was proposed that a negative relationship between growth and underpricing exists, because the growth option is a signal to the market of the government's expectations. Since most privatisations involved companies in low growth industries, underpricing is used to maintain demand for the issue. In these cases, the lower the growth, the higher the degree of underpricing. For the complete UK sample, the analysis failed to provide support for the hypothesis. However, in a series of further tests, the water authorities were removed from the analysis and a highly significant negative correlation was found between underpricing and growth options. This provided support for the hypothesis.

It can be concluded that the extent to which the purchase price represents growth options is an important factor in the valuation of a privatisation issue. Where the issue is for a low growth company, the evidence suggests that the government underprices by a greater extent to maintain demand for the issue. Although this result contradicts the findings in the IPO literature, especially the findings of Taylor and Walter (1991), the result is entirely consistent with the theories on privatisation and can be explained due to the nature of privatisation IPOs compared to IPOs in general.

From a political perspective, deliberate underpricing of low growth shares avoids the potentially damaging consequences of overpricing the issue and undersubscription which may harm the reputation of the privatisation program in general. The result may also be explained in terms of the 'peoples' capitalism' objective of privatisation for a wide pattern of share ownership across the community. Given the fact that the companies involved were well known but considered to be low growth, small investors were encouraged to subscribe with the prospect of high discounts and a reputation in the market that privatisation issues are underpriced. This is in contrast to IPOs in general. For the typical private IPO, the company has high growth prospects but it is relatively unknown in the market. In the case of the private IPO, high growth means high uncertainty which is compensated for with high discounts.

The other interesting finding flowing from the tests of this hypothesis concerns the water authorities. Clearly, the companies were sold for less than the book value of the assets. The high discounts offered by the government could be seen as an inducement for investors to buy into companies whose future profitability was dependent on huge injections of capital to finance future expenditure on assets.

> **Hypothesis 2**: The abnormal excess return of a privatisation share
> issue is positively related to net asset backing of
> the company.

The second hypothesis led to a more direct test of the previous hypothesis. As discussed in Chapter Four, it is generally felt that the higher the level of asset backing, the higher the value of the shares and the lower the risk involved to the investor. Where a company has a high level of tangible assets in place, the ex-ante

uncertainty to the investor is reduced and underpricing would be lower. An alternative hypothesis was developed in this thesis, namely underpricing and net asset backing were seen to be positively related. Cowan and Popoff (1989, p. 185) noted that the security provided by net asset backing is dependent on the realisable value of the assets, not the book value. Where there are significant levels of specialised assets the value of the company to an investor may be less, especially if there are risks that the 'value-in-use'[1] may not be fully realisable. In privatisation IPOs, the assets are typically highly specialised and there is uncertainty about the government's policy concerning the future industry structure.

The empirical tests found some support for the hypothesis that net asset backing and underpricing are positively correlated. This result may be explained given the nature of the privatised companies involved and the uncertainty surrounding the difference between book value and the 'value-in-use' of the assets. The majority of the companies privatised were either public utilities or manufacturers. The book value of the companies in these cases may have reflected assets valued at their historical cost less depreciation. The assets may even have been revalued to replacement cost as part of the privatisation process. Neither of these values are necessarily the 'value-in-use' to the new owners nor are they likely to be the liquidation value should assets need to be sold after privatisation.

There is also a complication flowing from the fact that the government may introduce an industry deregulation policy in tandem with the privatisation program. This creates further uncertainty about the true value of the assets to the new owners.

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[1] 'Value-in-use' refers to the value that an owner derives from an asset through using it to earn cash inflows.

Overall, the tests of Hypotheses 1 and 2 lead to similar conclusions. Companies privatised with high levels of asset backing are likely to be more heavily underpriced than those with low asset backing. This is explained by the information signal to investors by governments where the issue is priced with low growth options. It is also explained by the specialised nature of the assets which gives rise to uncertainty about the real 'value-in-use' to the new owners. Both factors are also affected by uncertainty surrounding the industry structure of the newly privatised company.

**Hypothesis 3**: The abnormal excess return of a privatisation share issue is negatively related to the P/E ratio implied in the issue.

As previously discussed, the price earnings ratio (P/E) is used in an accounting approach to valuation. As a proxy in this research, it served as an indicator of both the growth and risk factors employed by the government and its advisers in determining the value of the privatisation candidate. The higher the risk of the shares, the lower the P/E multiple. As such, the P/E should be negatively correlated with underpricing. For the UK sub-sample, it was concluded that issues with higher P/E ratios were underpriced by less than those with lower P/Es, which provided support for the hypothesis that P/E and underpricing are negatively correlated.

Extreme care must be taken in the use of P/E ratios in the analysis. This is because the P/E ratio represents two opposing factors, growth and risk. As discussed above, growth was considered in the first hypothesis and the relationship for the whole sample was not statistically significant. In regard to risk, the higher the risk of the shares, the lower the P/E. The results here were entirely consistent

with the normal valuation principles, as outlined by Copeland, Koller and Murrin (1990) in respect to the role of risk in valuation.

Overall, there are some interesting results from the tests of the first three hypotheses. In particular, the hypotheses question whether the standard determinants of value used in professional approaches to valuation are relevant to privatisation issues. For the typical privatisation, the growth option (as measured using the accounting data for the issue) is negatively related to the degree of underpricing, except where there are large future capital investment needs for the privatised company. The growth levels implied in the issue price can be seen as a signal to the market. Finally, the position with respect to risk is in line with the traditional theory of valuation.

### 7.2.2 The Hypothesised Effect of Information Asymmetry between Investors on Underpricing

The next two hypotheses were related to the 'winners' curse' model developed by Rock (1986). As discussed previously, Rock argued that where there is a high level of informed demand we would expect the initial returns also to be high. Similarly where potential gains are low, demand is low as informed investors stay away from the issue. The uninformed investors receive the largest allotment from the issues where there is low underpricing, in line with the 'winners' curse'. Koh and Walter (1989) found that the 'winners' curse' was strongly evident and that there was a significant positive correlation between oversubscription levels and first-day returns. They also found that the return to uninformed investors was the risk free rate after taking into account the interest costs of subscription. Interest rates and underpricing levels should be positively correlated.

**Hypothesis 4**: The abnormal excess return of a privatisation share issue is positively related to the level of excess demand.

In this thesis it was found that there is strong support for the existence of a positive relationship between underpricing and demand, which is evidence of information asymmetry between investors as proposed by Rock. For both the whole international sample and the UK sub-sample, the application multiple was found to be significantly positively correlated with the level of underpricing. This provided support for the existence of informed and uninformed investors in the market and given the significance of the correlation for both the whole sample and the UK sub-sample, it can be concluded that underpricing of privatisation IPOs is positively correlated with demand.

These results provide strong evidence in support of information asymmetry for privatisation IPOs in line with Rock (1986). The results also support the conclusions of Jenkinson and Mayer (1988) and Lee, Taylor and Walter (1991) but are in contrast to the propositions of Bös (1991) and Perotti and Guney (1993). The latter authors preferred a confidence building theory of privatisation and saw a wider role for other political and industry-specific factors.

**Hypothesis 5**: The abnormal excess return of a privatisation share issue is positively related to the interest rate at the time of subscription.

Koh and Walter (1989) found that investors are likely to receive only the risk free rate of return after the discount received from an IPO is discounted for interest rates, the delay between application and the issue of shares and the probability of success in the issue. For privatisation IPOs, the results provided evidence that interest rates are positively correlated with underpricing.

Overall, the results provided strong evidence to support the argument that the 'winners' curse' argument of Rock (1986) may be applicable to privatisation IPOs.

### 7.2.3 The Hypothesised Effect of Ex-Ante Uncertainty on Underpricing

As noted, it is generally proposed that IPOs with higher ex-ante uncertainty are more difficult to value for both the issuer and investors. The next five hypotheses included a range of proxies for ex-ante uncertainty.

**Hypothesis 6**: The abnormal excess return of a privatisation share issue is negatively related to the size of the issue, as measured by the gross proceeds.

The results of this thesis provided strong evidence to support Hypothesis 6. There also was strong support for the size of the issue serving as a discriminator between high and low ex-ante uncertainty privatisation IPOs. These results are consistent with the results of IPO studies generally. Davis and Yeomans (1976), Beatty and Ritter (1986) and How, Izan and Monroe (1995) provided evidence of the negative relationship between underpricing and the size of the issue for samples of private company IPOs from the UK, the US and Australia.

**Hypothesis 7**: The abnormal excess return of a privatisation share issue is positively related to the level of policy risk involved.

The results provided evidence to suggest that underpricing was higher when there was a higher level of policy risk. These results provided empirical support for the proposition of Perotti and Guney (1993) that policy risk and investors' reluctance to bear risk were major determinants of underpricing. Perotti and Guney (1993, p. 97) noted that, while the government may not have more information about the

value of the assets than the market, it does have better information about its own policies. The number of risk factors present in an IPO was found to be an indicator of the level of ex-ante uncertainty (Clarkson 1995). The result that underpricing and policy risk are correlated is consistent with the conclusion of Clarkson that the presence of a greater number of risk factors translates into greater underpricing.

**Hypothesis 8**: The abnormal excess return of a privatisation share issue for utilities is greater than for issues by non-utility companies.

The analysis of the whole international sample found that there were differences in the level of underpricing between industries. Utilities were underpriced by more than manufacturers and companies from the oil and gas industry. The difference in underpricing was not statistically different for the other industry categories. This provided empirical support for the general proposition of Perotti and Guney (1993), who proposed that underpricing by utilities was greater than for other industries. The results of this thesis are not consistent with the findings of Jog and Ridings (1987) who found underpricing for industrials to be higher than for the other industry groups. The difference can be explained, however, because Jog and Riding did not differentiate between utilities and the other non-industrial companies in their sample.

The higher level of underpricing for utility issues is also consistent with the previous hypothesis on the effect of policy risk. This is because utilities are more likely to have been operating in non-competitive industries in the past and may face significant changes to the industry structure as part of the privatisation process. This adds to the uncertainty faced by investors in the privatised utilities. Consistent with Clarkson (1994), this uncertainty is another risk factor that should

give rise to greater underpricing. The result is also consistent with the arguments of Caves and Christensen (1980) about the relative performance of public versus private sector enterprises. Caves and Christensen saw the poorest performers as public enterprises operating in non-competitive industries. In the privatisation of these enterprises there is additional uncertainty flowing from changes in the industry structure to promote competition, and from the potential for improved performance once the company is in private hands.

**Hypothesis 9**:  The abnormal excess return of a privatisation share issue is higher where there are restrictions on the 'winding up' of the privatised company than in the absence of such restrictions.

**Hypothesis 10**:  The abnormal excess return of a privatisation share issue is higher where there are restrictions on the disposal of the assets of the privatised company than in the absence of such restrictions.

Hypotheses 9 and 10 related to restrictions on management behaviour in the post-privatisation period. Broadly speaking, any restrictions may hamper attempts by management to obtain the efficiency gains expected from privatisation. The hypotheses related to where there were restrictions on the winding up of the new company and restrictions on the disposal of assets following privatisation. The results found that there were significant differences in underpricing when these restrictions were in place. There was evidence to support the existence of a positive relationship between restrictions on the disposal of the assets of a privatised company and underpricing for the UK issues. However, for restrictions on 'winding up' the opposite was found.

For large investors, the restriction on 'winding up' the company effectively prevents takeover and rationalisation of the industry or even an asset stripping

policy. Hence, the existence of the restriction was expected to be associated with higher levels of underpricing. However, the direction of the difference in underpricing was found to be the opposite to that hypothesised. Where there have been such restrictions, underpricing has been lower, not higher. A possible explanation of this may lie in the fact that restrictions on winding up may be accompanied by some explicit or implied guarantee that the company will not go into liquidation. If this is the case, then the risk to investors is lower and underpricing would be low.

Further analysis of the data also throws some light on this result. The UK government only placed the restriction on 'winding up' on certain companies. The restriction only applied to some of the companies sold early in the UK privatisation program. The government may have used the restriction to avoid the political embarrassment of the liquidation of a newly privatised company or to reduce the uncertainty surrounding the early issues in the privatisation program. It is also interesting to note that two of the issues with the restriction were undersubscribed, evidence that informed investors avoided the issue.

### 7.2.4  A Hypothesised Relationship Between Underpricing and Government Reputation Building

> **Hypothesis 11**:  The abnormal excess return of a privatisation share issue is greater for sales early in a privatisation program compared to sales later in the program.

Bös (1991) and Perotti and Guney (1993) proposed a reputation or confidence building hypothesis that the discounts on privatisation IPOs will fall over time as governments use discounts in early issues to build confidence among investors to boost demand for future issues.

The results for the whole international sample found that the difference in the variance between the early and later partitions was highly significant, indicating that the date may be a good discriminator between high and low ex-ante uncertainty firms. However, this does not provide unambiguous support for the confidence building hypothesis, which would require the earlier issues to be underpriced to a greater extent than later issues. The results merely indicate that there was greater variance in underpricing for the earlier issues, and that the earlier issues had higher levels of ex-ante uncertainty.

The results of this thesis do not provide support for the existence of a deliberate strategy of underpricing early privatisation IPOs to build confidence in the programs as envisaged by Bös (1991) and Perotti and Guney (1993). However, as discussed, the strength of this conclusion must be questioned, because the hypothesis is really related to the policy of the government of a single country rather than being observable at an international level. The hypothesis should be tested for a specific country.

In the UK, a privatisation program has been under way for almost twenty years, and it has included some of the biggest share issues in the world. There can be no doubt that the government had the opportunity to rely on its reputation for the later issues. For the UK data, the date of issue was positively correlated with underpricing and the relationship was statistically significant. That is, underpricing of privatisation IPOs in the U.K. increased over time, not decreased as hypothesised. This is the opposite of that proposed by Bös (1991) and Perotti and Guney (1993). The main reason for this finding was that the electricity and water authorities were underpriced by a greater amount than the earlier issues. However, overall, there is no empirical support for the reputation building hypothesis. On

the basis of the tests in this thesis, reputation building does not appear to have been a feature of the UK privatisation program. However, these results are clouded somewhat because the most recent privatisations were utilities with higher levels of policy risk than the earlier privatisations of nationalised industries.

**Hypothesis 12**: The abnormal excess return of a privatisation share issue is positively related to the percentage of total shares in the company sold.

As discussed, where the government sells the whole of an entity, it is also sells the control of that entity. In this thesis, it was found that where the government sold a higher percentage of the company, underpricing was significantly greater. This result provided evidence in support of the hypothesis of a premium for control of newly privatised firms. It also indicated that ex-ante uncertainty is high where higher levels of the company's equity are sold. Overall, the results supported the hypothesis that where the government sells a higher percentage of the company, underpricing is greater. This is in line with the findings from the studies of IPOs in general where is was found that where the original owners retain equity in the company the level of ex-ante uncertainty faced by investors is lower.

This result is in contrast to the recommendations of Jenkinson and Mayer (1988), who argued that governments should initially float small parcels of securities with high discounts to enable seasoning of the shares to reduce underpricing in future issues. The results of this thesis reveal that the actual behaviour of governments was to sell large initial parcels of shares at high discounts.

The results of this thesis are also consistent with a 'peoples' capitalism' objective in privatisation programs. That is, governments float large quantities of

equity at large discounts to encourage a wide pattern of share ownership across society. Moore (1992) outlined 'peoples' capitalism' as one of the main objectives of the UK privatisation program. Bös (1991) outlined the theoretical origins of the policy as lying in the desire to ensure a wide spread of the distributional effects of privatisation.

### 7.2.5 A Hypothesised Relationship Between Underpricing and the Value of Corporate Control

The existence of restrictions where the government maintains control through special regulations, like a 'golden share' or restrictions on individual shareholding, also adds to the ex-ante uncertainty faced by investors.

> **Hypothesis 13**: The abnormal excess return of a privatisation share issue is higher where the government holds a 'golden share' in the privatised company sold than where it does not hold a 'golden share'.

> **Hypothesis 14**: The abnormal excess return of a privatisation share issue is higher where the government places a limit on the shareholding levels of investors than in the absence of a limit.

The results of the tests in this thesis failed to provide a clear result that underpricing was significantly different in the presence of these factors. However, where these restrictions were present the variance of the level of underpricing was significantly higher. It can be concluded that where these restrictions exist there is a higher level of ex-ante uncertainty surrounding the issue.

### 7.2.6 A Hypothesised Relationship Between Underpricing and the Country of Issue

> **Hypothesis 15**: Underpricing is higher in less developed countries than in developed countries.

It was found that mean underpricing and its standard deviation are much higher for Malaysia and to a lesser extent, Spain, than for the other countries studied. Further empirical tests found a number of statistically significant differences in the levels of underpricing between countries. Underpricing was higher in Malaysia than in France, the U.K., Singapore and Turkey; and, underpricing in Spain was higher than in Turkey.

The regression analysis confirmed these results and found that underpricing was significantly correlated with whether the country of issue was a developed or developing country. Developed countries displayed significantly lower underpricing than developing countries. The results of this thesis add to the work of Perotti and Guney (1993), who compared the privatisation programs of 10 countries but did not attempt to test for differences between countries.

### 7.2.7 A Hypothesised Relationship Between Underpricing and 'Hot Issue' Markets'

**Hypothesis 16**: Underpricing is greater in a boom state of the market than in a 'bear' state.

The empirical results found that underpricing and its variance was significantly higher in the January 1985 to October 1987 boom period, compared to the time periods either side of it. This provided evidence of a 'hot issue' market, as initially reported by Ritter (1984a). The time periods involved were analysed further and provided additional evidence to support the existence of 'hot issue' markets. This result also raises doubts over the reputation building hypothesis, since mean underpricing in the earliest period was in fact lower than in later periods, although the difference was not significant.

For the UK sub-sample, a different result was found. It was found that the mean underpricing and variance was not significantly higher in the 1985 to October 1987 period. The UK data indicated that underpricing in the pre-1985 period was significantly different to that of the post-October 1987 period. This is consistent with Hypothesis 16 since market conditions in the period immediately prior to 1985 were stronger than in the post-October 1987 'bear' market. However, the direction of the difference was the opposite to that expected. Mean underpricing in the pre-1985 period was in fact lower than in later periods. These UK results also provided further reasons to question the reputation building hypothesis.

### 7.2.8 A Specific Model of Underpricing of Initial Public Offerings of Privatised Shares for Utilities

**Hypothesis 17**: The underpricing of shares in privatised companies is positively related to the future capital expenditure needs of the company.

As discussed, the level of future capital expenditure is likely to be negatively related to underpricing, so it is expected that issues with high needs will be more underpriced than issues with low needs. The results of this thesis provided strong support for the hypothesised effect of future capital expenditure needs on underpricing. Underpricing was significantly negatively correlated with capital expenditure needs. The limitation of this result is the small sample size, brought about because of the limited availability of data on capital expenditure needs. The result is consistent with the emerging literature on the incremental information content of capital expenditure decisions. Kerstein and Kim (1995) found that capital expenditure changes were strongly and positively associated with excess returns for securities. They concluded that capital expenditure provides

information in addition to risk, growth and current earnings. The results of this thesis are consistent with Kerstein and Kim and may provide a new direction for IPO research in general.

**Hypothesis 18**: The abnormal excess return of a privatisation share issue is positively related to the X factor in an 'RPI minus X' regulatory framework.

ANZ McCaughan (1994, p. 100) argued that underpricing was 'loosely related' to the X factor in the 'RPI minus X' regulatory framework. This thesis did not find direct empirical support for their proposition. However, the results did indicate that the X factor had a mediating effect on the other variables in the valuation process. The empirical tests led to the conclusion that the X factor was positively correlated with interest rates and capital expenditure needs, and negatively correlated with the price earnings multiple and issue size.

The results of this thesis are not surprising and have identified some of the variables likely to be used to determine the X factor. Interest rates reflect the cost of capital to the company and the prevailing inflation rate, both of which are likely to be positively related to decisions about the future price rises possible under the regulatory framework. Likewise, where the company faces high levels of future capital expenditure needs, regulators may set the X factor at a high initial level to ensure that the economics of the new capital expenditure projects appear sound and to compensate the company for the risks involved in the new projects.

As discussed previously, the P/E ratio is an indicator of both risk and growth potential, and these factors influence a company's value in opposite ways. The results of this thesis find that the X factor is negatively related to the P/E ratio, which is consistent with the expected effect of both growth and risk on the setting

of the X factor. The higher the level of expected growth, the lower the X factor. That is, for high growth companies, a low X factor is set forcing management to seek improved future profitability from growth and not price rises. Likewise, the higher the level of risk, the higher the X factor, which allows for higher future price rises to compensate for the additional risks involved.

## 7.3 Discussion of the Results of this Research

In discussing the general results of this research the main research questions raised in Chapter One are addressed.

1. To what extent do the main variables used in valuation (risk, profitability and growth) affect the uncertainty surrounding the pricing of privatisation IPOs?

The results of this research are quite clear. Underpricing was significantly positively correlated with net tangible assets per share and significantly negatively correlated with the P/E ratio. However, there was no significant correlation found between growth options and underpricing. The latter finding is quite surprising since the measure of growth options is calculated using issue price and net asset backing. How, Izan and Monroe (1995) also found growth options not significant in explaining underpricing. In contrast, the other indicator of growth, the P/E ratio, was found to be statistically significant. However, P/E ratios also reflect the level of risk involved.

For the UK electricity and water authorities only, the nature of the issues was such that little variance in pricing was expected between the companies. The electricity authorities were all sold on the same day, and at the same price, as were the water authorities. These sales provided a unique opportunity to study IPOs. The controlled situation involved meant that many of the factors giving rise to ex-

ante uncertainty for IPOs were constant and attention could be focussed on other sources of uncertainty. These were found to be capital expenditure needs, growth and the value of the firm's assets.

These results make intuitive sense, since in the case of the water authorities, and, to a lesser extent, the electricity authorities, there were significant investment needs outlined in the prospectuses. This expenditure was necessary for the new owners to achieve the future standards of service required of them, and hence, to allow them to realise the value of the assets purchased in the privatisation. The potential growth of these companies was also an important factor giving rise to ex-ante uncertainty. Growth potential from existing assets appeared limited. The growth from new assets and from new business opportunities was uncertain and dependent upon the government's regulation of the industries involved and the potential to expand outside the companies' traditional markets.

2. To what extent do the theories of private sector IPOs explain privatisation IPO underpricing?

*Information Asymmetry*

Perhaps the strongest results in this thesis are those related to the work of Rock (1986). The existence of the 'winners' curse' and the informed/uninformed investor dichotomy has been linked back to the level of demand for an IPO, usually measured by the application multiple. In this thesis, the application multiple was found to be significantly positively correlated with underpricing; that is, the higher the demand the greater the underpricing. This is entirely consistent with Rock and in contrast to the views of Bös (1991) and Perotti and Guney (1993).

As discussed, Koh and Walter (1989) directly tested Rock's theory using data from the Singapore Stock Exchange. The results in this thesis are entirely consistent with Koh and Walter. Koh and Walter found that the return to investors was only the risk-free rate, after taking into account the time delay between application and listing of the shares, the probability of success and the interest rate or opportunity cost of capital. From the results of this thesis, both the application multiple[2] and the interest rate were significantly correlated with underpricing. The correlation was also in the right direction, with both interest rates and the application multiple found to be positively correlated. Intuitively, if interest rates are high the opportunity cost of applying is also high. Also, if the application multiple is high, the chances of successful application are lower. Together, these factors would require informed investors to invest only where the payoffs are high; that is, through high underpricing.

The results of the UK sub-sample provided even greater support for information asymmetry arguments. These results confirmed the significance of demand and interest costs in explaining underpricing. Regression analysis using these variables provided high explanatory power with adjusted R squared measures around 65 percent. This is far in excess of the results of studies of IPOs in general. The high degree of explanatory power of the regression is not surprising, however, because of the reduced sources of variance brought about by the unique environment provided by privatisation issues. For the UK sub-sample, the sources of variance from factors common to IPOs in general were further reduced since the companies involved had long operating histories and in most cases were household

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[2]  Application multiple can be seen as being directly linked to the probability of successful application for shares.

names. In addition, the UK government only used high prestige underwriters, investigating accountants and advisers. In can be safely concluded that the results of this thesis provide further support for the information asymmetry argument of Rock.

*Ex-ante Uncertainty*

Many of the main theories of IPO underpricing stem from the existence of ex-ante uncertainty faced by investors, the issuer and the underwriter. Clarkson (1994) provided a study of the proxies proposed for ex-ante uncertainty. In this thesis, the proxies for ex-ante uncertainty also were significantly correlated with underpricing. In this thesis, issue size, as measured by the level of gross proceeds was found to be significantly negatively correlated with underpricing. That is, the bigger the issue, the lower the uncertainty faced by investors and the lower the underpricing.

Other proxies for ex-ante uncertainty in this thesis included a range of qualitative, dichotomous variables collected mainly for the UK sub-sample. Apart from a broad variable measuring the presence of policy risk, there was no significant difference in mean underpricing based on these variables. Policy risk is the risk that the government may change the regulatory framework or basic operating conditions of the company after privatisation. As discussed, Clarkson (1994) found the number of risk factors present in a privatisation to be significantly correlated with underpricing and the strongest proxy for ex-ante uncertainty in his study. In this thesis, policy risk is found to be significantly positively correlated with underpricing. That is, the higher the risk, the greater the uncertainty and the greater the underpricing. This tendency is entirely consistent with the findings of Clarkson (1994).

While there was not a significant difference in the means for a number of the other dichotomous variables for the UK sub-sample (when partitioned on the basis of the attribute being measured), there was a significant difference in the variance of the partitions for many of them. While failure to find a difference in mean may have been due to the small sample size, the size of the difference in variance was sufficient to overcome this problem. As discussed previously, Clarkson (1994) reported that variables with highly significant $F$-test values were able to discriminate between high and low ex-ante uncertainty firms. In the case of the privatisation IPOs, it can be concluded that these variables provide discriminators between high and low ex-ante uncertainty issues. These results make sense, since these factors increase the uncertainty surrounding an issue and, although the mean of the partitions is not significantly different, there is higher risk attached to particular issues than others. That is, these factors indicate the issues where the variance of initial returns is high, and therefore, the risk of low or negative returns is great. The significant factors are: restrictions on individual shareholding to prevent takeover; restrictions on management behaviour regarding the winding up of the company; and, the existence of a special or 'golden' share held by the government.

Another element of risk is that of country risk. Country risk may exist because of the vulnerability of an economy to rapid political and economic change. This thesis has found that underpricing in developing countries is greater than in developed countries. If the developed countries can be seen as more stable, politically and economically, it can be concluded that the additional underpricing is related, in part, to the additional political and economic risk of these countries.

Overall, issue size and risk factors were found to be indicators of ex-ante uncertainty for privatisation IPOs in the same manner as for private sector IPOs. Also, a number of factors exist that enable one to discriminate between high and low ex-ante uncertainty issues.

3.  To what extent is underpricing explained by government policy?

While it has already been recognised that government industry and regulatory policies may add to the risks of the privatisation IPO, there are other elements of policy that are relevant. Perotti and Guney (1993) proposed two theories of privatisation: the market capacity view and the confidence building hypothesis.

The first of these theories argued that governments float privatisations in small initial issues to allow the issue market to absorb the issue. Moore (1992) reported that as a Minister responsible for a number of UK privatisations this was not the case. Indeed, the British Telecom float was the biggest in the world at that time and it was floated against the wishes of the government advisers of the time. The advisers argued that the market could not absorb such a large issue. The market capacity theory was not directly tested in this thesis, although there seem to be no grounds to support it, given the comments of Moore. In addition, analysis of the data on UK privatisations reveals that the government responsible for the first major privatisation program was not overly concerned about capital market capacity, and in most cases, sold the whole of a company in one large issue, thereby setting records for the size of the floats.

The confidence building hypothesis was seen by Perotti and Guney as being consistent with the information signalling theory of Allen and Faulhaber (1989). Basically, underpricing is used in early issues to generate support among investors

for the government's program. There is limited support for this hypothesis in the international sample, although, it is difficult to draw conclusions on a global scale about policies that relate to individual countries. Interestingly, the idea of discounts being higher in early issues compared to later issues is soundly rejected for the UK sub-sample. It can be safely concluded that there is no evidence of the confidence building hypothesis in the UK. In fact, analysis of three periods of privatisations in the UK found that mean underpricing was significantly greater in the most recent period, since October 1987, compared to the first period, prior to 1985. Although other factors are involved, the evidence fails to find support for the confidence building hypothesis.

Bös (1991), in a similar vein to the confidence building hypothesis, argued that underpricing was used as a means of obtaining political support for the government and its privatisation policies. He also introduced the theory of 'peoples capitalism'. This thesis did not directly test these propositions; however, the results of this thesis do allow for some related observations. If underpricing is a means of obtaining political support, it is likely to be used more by governments with low political will or those faced with narrow majorities. The results of this research show that underpricing in Malaysia and Singapore was higher than in the UK and France, with Malaysia being significantly different to all countries except Spain. The political systems in Europe are more democratic than those of Singapore and Malaysia where a change of government is unlikely to occur. If Bös were correct, we would have expected underpricing to be lower in the less democratic countries, which is not supported by the results of this research.

4. To what extent does the market for corporate control affect pricing of privatisation issues?

There were three tests of the impact on underpricing of the market for corporate control. The percentage of the shares sold provided a measure of whether the government sold the majority of its holding in the privatised company. This variable was found to be positively correlated with the degree of underpricing. That is, the greater the level of equity in the company sold, the higher the extent of underpricing. This can be interpreted as consistent with a premium being paid in the initial aftermarket by investors seeking to increase their holding in the company to obtain control.

However, there were also some restrictions on corporate control built into privatisation issues. In the UK, there have been restrictions on individual shareholding and cases where the government retained a special or 'golden share'. As reported above, these conditions do not lead to a significant difference in the mean level of underpricing, however, there were significant differences in the variances of the sample of firms that faced these conditions. Accordingly, these factors have been interpreted as indicators of the extra ex-ante uncertainty of these firms. In the context of the market for corporate control, the existence of restrictions on individual shareholding and of special shares, increases the uncertainty of success in securing corporate control.

5. Are there some periods when 'hot issue' markets exist for privatisation share issues?

This research has found support for the existence of hot issue markets for privatisation IPOs in much the same way as for IPOs in general. In the international sample, underpricing was greater during the January 1985 to October 1987 period than in the other periods. The same result was not found for the UK privatisations, however, the sample size was small for the 1985 to October 1987

period. This, in itself, is contrary to the 'hot issue' market finding. One may expect the government to come to the market during a period of high issue activity. However, it could also be argued that the government would avoid the 'hot issue' market and avoid the potential criticisms of privatisation issues crowding out private IPOs. In addition, given the magnitude of the UK floats, they may have been better suited to periods of low activity in capital markets. That is, the government may choose to undertake large privatisation floats in periods when there is little competition for investors and media attention. Accordingly, governments would avoid 'hot issue' markets.

6. Are there any underlying industry factors that explain differences in the extent of underpricing for different companies?

The results of the individual industry analysis for the international sample did not identify the actual industries where IPO underpricing differed, merely that there were differences. However, the analysis by industry for the UK sub-sample clearly showed that underpricing was greater for privatisations of the utilities than for the manufacturing and oil and gas privatisations. The latter firms already operated in competitive markets hence the risk of changes in industry structure was not as great as for the utilities, where government policy regarding competition is subject to change. The increased risk of investing in utilities is a factor contributing to the high underpricing of these issues.

7. Is privatisation IPO underpricing related to the country of issue?

As reported, in the analysis by specific country, underpricing in Malaysia was significantly greater than in all of the other countries except Spain. The situation in Malaysia requires some brief consideration. The Malaysian political system is

designed to ensure positive discrimination in favour of the indigenous population. Accordingly, privatisation has been used as a vehicle for creating wealth for the bumiputera majority using high levels of initial underpricing and discriminatory allocation procedures to re-allocate wealth (Puthucheary 1990).

## 7.4    Limitations of this Research and Future Research Directions

This thesis has not directly tested the relationship between 'peoples' capitalism' and underpricing. Further research might test whether the abnormal excess return of a privatisation share issue is positively related to the pattern of share ownership after allotment of shares. Privatisation may be used as a mechanism to promote wider share ownership throughout the community. This has political advantages in that it enables the government to state this as an aim in privatisation. Underpricing will enhance support for the government and its policies by providing a gain to initial shareholders. Similarly, if shareholders lose as a result of subscribing to an overpriced privatisation IPO the government's future privatisation plans might become politically unacceptable. Accordingly, a positive relationship between the actual number of successful shareholders and the extent of underpricing is expected. Future research could examine the allotment procedures for the privatisation issues to test for these relationships.

This thesis has not directly tested whether there is a significant difference between the level of underpricing in private versus public sector IPOs. There is some evidence that privatisation IPOs are higher on average and the distribution of returns has a lower incidence of negative observations than IPOs in general. Future research could test whether there is a significant difference between privatisation IPOs and IPOs in general. If privatisation IPOs differ substantially,

then the results of some of the studies of IPOs in general may be questioned. In particular, the direct tests of Rock (1986) undertaken by Koh and Walter (1989) and Levis (1990) include privatisation IPOs in their sample, which may have distorted their results.

One reason for privatisation IPOs having higher levels of underpricing is because the Government can recoup some of the return in capital gains tax when the shares are sold. Further research could test whether the abnormal excess return of a privatisation share issue is positively related to the rate of capital gains tax. If there is a high capital gains tax levied, the after tax returns to investors are much lower than the raw returns used in this thesis. While this is true for private IPOs as well, the unique feature in privatisation is that the government is usually both seller and tax collector. Accordingly, the government can recoup some of its initial underpricing loss in the form of tax receipts and would be able to make its offer more attractive to investors than private issuers. Therefore, where there is a capital gains tax levied, and the government selling the company receives the tax proceeds (state governments in a federal system may not receive the capital gains tax from sales of shares in their own privatised enterprises), the initial underpricing may be greater.

How (1995) considered the time lag between application for shares in a IPO and listing. It was proposed that the abnormal excess return of a privatisation share issue is negatively related to the time lag between application and listing. The time lag between issuing the prospectus and listing is a proxy for the level of informed demand in a number of studies in the IPO literature. As noted above, an alternative explanation of IPO underpricing -- the insurance premium hypothesis of Tinic (1988) -- would see this delay variable as being positively related to

underpricing, since the issuer is effectively buying a put option through underpricing. An alternative way of viewing this, with the same implications, is that the greater the time lag, the greater the chance that investors can obtain and analyse information. This would reduce the uncertainty associated with the issue; hence, it reduces the required return of investors and increases the price they are prepared to pay.

Further research could also test whether underpricing is lower in a tender issue than in a fixed subscription price offer. The tender process enables the government to elicit the market price from the tenderers prior to issue. This reduces uncertainty on the government's behalf and hence enables them to reduce the extent of underpricing.

This thesis has been confined to the underpricing of privatisation IPOs on the day of listing on the stock exchange. It has not addressed the long run performance of the privatised shares. The study by Megginson, Nash and Van Randenborgh (1994) considered the post-privatisation accounting performance of the privatised companies. There is scope for further research on the long run capital market performance of privatisation IPOs.

The literature on IPOs, and privatisation IPOs in particular, has not raised the issue of the use of the proceeds from the issue. However, in many privatisation IPOs the proceeds of the issue are paid to the government and not to the privatised company. That is, the process is an offer for sale by the government as the shareholder not by the company. For an IPOs by a private company, the proceeds of the issue may be used to assist in the financing of new investment projects, to pay off debt, to finance dividend payment to shareholders or to cover liquidity problems expected to arise from operating losses. In some cases, the IPO may be a

selling down of the shareholding by the owners in the same manner as a privatisation issue with the proceeds flowing directly to the owners and not to the company. In all IPOs, however, the use to which the proceeds of the issue will be put is disclosed in the prospectus. This information is therefore available for all parties and can be used by the company and its underwriters in deciding upon the price for the issue.

Nonetheless, it is suggested that future research could investigate whether there is a difference in underpricing for IPOs in general related to the various disclosed uses for the proceeds of the issue.

# Chapter 8. Conclusion

This thesis presents a review of the capital market implications of privatisation. It provides depth of analysis and enables testing of the capital market theories of privatisation IPOs. This has not been undertaken to date in a comprehensive manner. The thesis builds on the work of Jenkinson and Mayer (1988) and Menyah, Paudyal and Inyangete (1990). The thesis directly tests the theories flowing from their analysis. It also empirically tests the propositions developed in the theoretical treatment of privatisation by Bös (1991). Importantly, the thesis considers privatisation within the context of the substantial body of initial public offerings literature. This thesis also undertakes tests of the relevance of the theories from the IPO literature for privatisation IPOs. These theories were largely rejected by Bös (1991).

The use of only privatisation IPO issues in this research provides an opportunity to gain insights into IPOs that cannot be obtained from the study of IPOs in general. The sample of privatisation IPOs provides a controlled environment for studying IPOs. A significant amount of literature has been written explaining IPO underpricing in terms of the reputation effects of investigating accountants, auditors and underwriters. For IPOs in general there are a range of these professionals involved, and reputation variables have been found to be significantly negatively correlated with underpricing. The main reason proposed is that firms employ high prestige professionals to reduce the ex-ante uncertainty faced by investors, which, in turn, reduces the level of underpricing necessary to generate sufficient demand for the issue. In these cases, the advisers use their reputations to reduce uncertainty over unseasoned issues and, in a sense, replace

the accounting and other financial history that is available for seasoned issues.[1] In privatisation IPOs, the companies are usually well known by the public and have a readily available accounting history. In addition, governments employ only high prestige professionals. As such, in privatisation IPOs, the range of sources of ex-ante uncertainty is reduced. This, in part, explains the high R squared measures found in the regression analysis in Chapter Six, since the sources of variability are greatly reduced in the privatisation environment.

Overall, the results of this thesis add to the body of knowledge in both the privatisation and the IPO literature. The thesis also provides an important link between the literature on IPOs and on privatisation. The results of the thesis provide a basis for explaining the underpricing of privatisation IPOs, building on the findings of Menyah, Paudyal and Inyangete (1990) and using factors unique to privatisation issues. The results also contribute to the understanding of the valuation process in general.

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[1] See, for example, Logue (1973), Neuberger and Hammond (1974) for underwriters, Beatty (1989) for auditors, and How (1995) for all professional advisers.

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## Appendix 1:
## List of Privatised Companies, the Date Sold and the Level of Underpricing on Sale

| Country & Reference number | | Date Sold | Underpricing |
|---|---|---|---|
| France | | | |
| f1 | Elf Aquitaine | 1-Sep-86 | 30.50% |
| f2 | St Gobain | 1-Nov-86 | 19.90% |
| f3 | Paribas | 1-Jan-87 | 24.20% |
| f4 | Sogenal | 1-Mar-87 | 36.00% |
| f5 | Banque de Traveaux Publiques | 1-Apr-87 | 23.10% |
| f6 | Banque Industrielle et Mobiliere Privee | 1-Apr-87 | 21.40% |
| f7 | Credit Commercial de France | 1-Apr-87 | 16.80% |
| f8 | Havas | 1-May-87 | 8.00% |
| f9 | Compagnie General d'Electicitie | 1-May-87 | 11.40% |
| f10 | Societe Generale | 1-Jul-87 | 6.10% |
| f11 | Television Francaise 1 | 1-Jul-87 | 7.90% |
| | | | |
| Spain | | | |
| s1 | Amper | 1-May-86 | 161.60% |
| s2 | Gesa | 1-Nov-86 | 33.30% |
| s3 | Acesa | 1-May-87 | 110.70% |
| s4 | Gasmadrid | 1-Dec-87 | 100.00% |
| s5 | Ence | 1-Apr-88 | 14.00% |
| s6 | Endesa | 1-Jun-88 | 41.40% |
| s7 | Repsol | 1-May-89 | 20.00% |
| | | | |
| Turkey | | | |
| t1 | Teletas | 1-Mar-88 | 27.92% |
| t2 | Eregli | 1-Apr-90 | 4.19% |
| t3 | Cukurova | 1-Apr-90 | 10.50% |
| t4 | Kepez | 1-Apr-90 | 5.93% |
| t5 | Arcelik | 1-May-90 | 7.66% |
| t6 | Bolu | 1-May-90 | 9.10% |
| t7 | Celik H. | 1-May-90 | 15.90% |
| t8 | Petkim | 1-Jul-90 | -1.96% |
| t9 | Konya C. | 1-Oct-90 | 0.00% |
| t10 | Mardin C. | 1-Nov-90 | 1.60% |
| t11 | Unye C. | 1-Dec-90 | 0.00% |
| t12 | Thy Airlines | 1-Feb-91 | -8.33% |
| t13 | Adana A | 1-Feb-91 | 11.11% |
| t14 | Adana B | 1-Feb-91 | 10.00% |
| t15 | Migros | 1-Feb-91 | 10.00% |
| t16 | Kalkinma | 1-Mar-91 | 0.00% |
| t17 | Afyon C. | 1-Mar-91 | 30.00% |
| t18 | Ditas | 1-May-91 | -10.00% |
| t19 | Nigde C. | 1-May-91 | -12.12% |
| t20 | Petrol Ofisi | 1-May-91 | 0.00% |

| t21 | Tupras | 1-May-91 | -10.10% |
|-----|--------|----------|---------|
| t22 | Gima | 1-Jun-91 | 0.00% |
| t23 | Tofas (Auto) | 1-Jul-91 | 13.15% |
| t24 | Tofas (Auto Dist) | 1-Jul-91 | 10.00% |

Malaysia

| m1 | Cement Ind of Malaysia | 26-Jun-84 | 91.00% |
|----|------------------------|-----------|--------|
| m2 | Malaysian Intl. Shipping | 23-Feb-87 | 108.30% |
| m3 | Sport Toto Malaysia | 29-Jul-87 | 377.50% |
| m4 | Tradewinds | 23-Mar-88 | 66.30% |
| m5 | Sistem Tel. | 25-Apr-88 | 202.50% |
| m6 | Cement Manuf. Svces | 2-Feb-89 | 66.90% |
| m7 | Malaysian Airlines Systems | 16-Dec-85 | 250.00% |
| m8 | Ederan Auto National | 26-Jul-90 | 89.50% |
| m9 | Pernas Intl Hotels | 25-Sep-90 | 78.40% |
| m10 | Syarikat Telecom | 7-Nov-90 | 22.00% |
| m11 | Kedah Cement | 29-Jan-92 | 30.00% |
| m12 | Perusahaan Otomobil | 26-Mar-92 | 32.00% |
| m13 | Tenaga Nasional | 28-May-92 | 94.40% |

Singapore

| si1 | Singapore Airlines | 18-Dec-85 | -6.00% |
|-----|--------------------|-----------|--------|
| si2 | Resources Development Corp | 9-Jan-87 | 26.95% |
| si3 | Singapore National Printers | 18-Feb-87 | 160.00% |
| si4 | Sembawang Maritime | 18-Jun-87 | 82.20% |
| si5 | Jurong Shipyard | 18-Sep-87 | 88.00% |
| si6 | Singamarine Industries | 8-Oct-87 | 66.90% |
| si7 | DBS Land | 29-Oct-87 | -23.70% |
| si8 | RMCA Reinsurance | 26-Sep-88 | 1.10% |
| si9 | Steamers Maritime Holdings | 7-Apr-89 | 30.80% |
| si10 | Singapore Aerospace | 8-Aug-90 | 9.30% |
| si11 | Singapore Shipbuidling | 28-Aug-90 | 7.00% |
| si12 | Singapore Petroleum | 25-Oct-90 | 24.00% |
| si13 | SAL Industrial Leasing | 2-Aug-91 | 53.00% |
| si14 | Singapore Electronic & Eng | 23-Aug-91 | 52.00% |
| si15 | Singapore Automotive Eng | 30-Sep-91 | 57.50% |
| si16 | Singapore Computer Systems | 15-Nov-91 | |
| si17 | Keppel Integrated Engineering | 20-Aug-92 | -2.20% |
| si18 | Singapore Telecom | 1-Nov-93 | 107.00% |

UK

| u1 | British Petroleum | 1-Jun-77 | 22.60% |
|----|-------------------|----------|--------|
| u2 | British Aerospace | 1-Feb-81 | 14.00% |
| u3 | Cable and Wireless | 1-Nov-81 | 17.00% |
| u4 | Amersham | 1-Aug-82 | 32.00% |
| u5 | Assoc. British Ports | 1-Feb-83 | 23.00% |
| u6 | Jaguar | 1-Aug-84 | 8.00% |
| u7 | BT | 1-Dec-84 | 33.00% |
| u8 | Enterprise Oil | 1-Jul-84 | 0.00% |
| u9 | BritOil | 1-Nov-82 | -9.00% |

| u10 | Trustee Savings Bank | 1-Oct-86 | 35.50% |
|-----|---------------------|----------|--------|
| u11 | British Gas | 1-Dec-86 | 9.00% |
| u12 | British Airways | 1-Feb-87 | 35.00% |
| u13 | Rolls Royce | 1-May-87 | 36.00% |
| u14 | BAA | 1-Jul-87 | 19.00% |
| u15 | British Steel | 1-Dec-88 | 4.20% |
| u16 | Anglian W. | 1-Dec-89 | 48.50% |
| u17 | N.W.W. | 1-Dec-89 | 35.00% |
| u18 | Northu. W. | 1-Dec-89 | 57.00% |
| u19 | Severn Trent | 1-Dec-89 | 31.00% |
| u20 | S.W. W. | 1-Dec-89 | 47.00% |
| u21 | Southern Water | 1-Dec-89 | 41.00% |
| u22 | Thames W. | 1-Dec-89 | 36.00% |
| u23 | Welch W. | 1-Dec-89 | 41.00% |
| u24 | Wessex W. | 1-Dec-89 | 54.00% |
| u25 | Yorkshire W. | 1-Dec-89 | 49.00% |
| u26 | East Mid. E. | 1-Dec-90 | 50.50% |
| u27 | Eastern E. | 1-Dec-90 | 48.00% |
| u28 | London E. | 1-Dec-90 | 42.00% |
| u29 | Manweb | 1-Dec-90 | 66.00% |
| u30 | Midlands E. | 1-Dec-90 | 44.00% |
| u31 | Norweb | 1-Dec-90 | 52.00% |
| u32 | Northern E. | 1-Dec-90 | 42.50% |
| u33 | Seaboard | 1-Dec-90 | 42.00% |
| u34 | S. Wales E. | 1-Dec-90 | 64.00% |
| u35 | S. West E. | 1-Dec-90 | 50.00% |
| u36 | Southern E. | 1-Dec-90 | 50.00% |
| u37 | Yorkshire E. | 1-Dec-90 | 59.50% |
| u38 | National Power | 1-Mar-91 | 37.50% |
| u39 | PowerGen | 1-Mar-91 | 37.00% |
| u40 | Scott Hydro | 1-Jun-91 | 22.00% |
| u41 | Scottish Power | 1-Jun-91 | 15.50% |