

Determinants of the Pricing of Privatization IPOs in the UK and Australia

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ABSTRACT

We examine the initial and long run performance and the determinants of underpricing of privatization IPOs in Australia and the United Kingdom. We include additional traditional variables from the privately owned IPO literature not used in other privatization studies and introduce three new variables specific to privatization. Although the process, characteristics and objectives of the privatization programs are similar, the results indicate that Australian privatization are significantly underpriced less, whereas U.K. privatization are underpriced significantly more, than IPOs of privately owned companies. Over the long term, Australian privatization insignificantly outperforms the market and performs significantly better than IPOs of privately owned companies. U.K. privatization significantly under-perform in the first year of listing but significantly outperform over three and five years. The cross sectional analysis supports ex ante uncertainty, signalling models, and the government's objective of wider share ownership.

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I. INTRODUCTION

The past fifteen years have witnessed a global revolution in the roles of government and the private sector. This process of change is being driven by intense pressure on public sector revenues and increasing competition. Privatization, which is the full or partial transfer of government assets to the private sector, is a response to these changes and the need for resources to flow to their most economically and socially valuable use. The argument for privatization assumes that the management and the efficient use of resources would be superior under the control of the private sector rather than the public sector. Megginson and Netter (2001) suggest that the arguments for privatization are based on the premise that the harmful effects of state intervention have a greater impact under state ownership than under state regulation, not that the harmful effects can be eliminated through privatisation.

The speed of this trend is evidenced by the value of global privatizations which, in 1997 totalled an all-time record of \$US153.4 billion which represents an increase of 55% from 1996.¹ Australia has had one of the larger privatization programs among OECD countries, second by value to the U.K. and to New Zealand, relative to GDP. The privatization program in Australia has been similar to the U.K. in terms of the objectives, characteristics, method and order of the privatization program. Privatization proceeds in Australia are estimated at \$A61 billion stemming from privatization by State and Commonwealth governments in the three main sectors of financial services, electricity and gas, and transport and communication.² The transfer of ownership of government owned corporations (GOCs) can be facilitated by several methods, including an Initial Public Offering (IPO), private or trade sales or tender offers. In Australia, trade sales have raised approximately \$A34 billion and public floats have raised \$A27 billion.³ Former GOCs now listed on the stock exchange account for approximately 10% of the capitalisation of the Australian stock market and the number of individuals owning stock has increased from 10% of the population in 1991 to 20% in 1997.⁴

Considerable attention has been paid to the pricing of initial public offerings (IPOs) over the last two decades. There is global evidence of the underpricing of privately owned companies that undertake an IPO.⁵ In addition, the international evidence for GOC IPOs generally finds that IPOs of GOCs are underpriced.⁶ Details of the UK and Australian studies are provided in Table 1.

Few studies have explicitly compared the pricing of IPOs of privately owned companies and GOC IPOs. Vickers and Yarrow (1988), Jenkinson and Mayer (1988), Jacquillat (1987) and Perotti and Guney (1993) all suggest that underpricing is greater for GOC IPOs than for privately owned companies. However, this conclusion is generally derived from casual observation rather than empirical tests and formal inference. Dewenter and Malatesta (1997) empirically test the difference between the level of underpricing for GOC IPOs and IPOs of privately owned companies in several countries, including the U.K. Their results suggest that GOC IPOs are more underpriced than IPOs of privately owned companies in the U.K., but in Canada and Malaysia, GOC IPOs are less underpriced and in France, Hungary, Japan and Thailand there is not a significant difference. Similar results for the U.K. are found [Menyah and Paudyal (1996), Choi and Nam (1998) and Huang and Levich (1998)]. However, Ljungqvist, Jenkinson and Wilhelm (2003) examine the pricing of IPOs including GOC IPOs in 61 non US markets using regression methodology and a privatisation dummy and find that GOC IPOs are

significantly more underpriced than the IPOs of privately owned companies.

Choi and Nam (1998) and Huang and Levich (1998) compare the performance of Australian IPOs of privately owned companies and GOC IPOs. They find an insignificant difference. However, the privately owned company IPO sample does not match the time period over which the government owned IPOs are listed. This study compares the performance over similar time periods, that is, 1991 to 1996, and finds significant differences.

In terms of the long term performance of GOC IPOs, multinational studies by Megginson, Nash, Netter and Schwartz (2000), Boardman and Laurin (2000), Choi, Nam and Ryu (2000) and Dewenter and Malatests (2000) find significant positive market adjusted returns over holding periods of up to five years. U.K. specific studies find similar outperformance [Levis (1993), Menyah, Paudyal and Inyangete (1995) and Menyah and Paudyal (1996)]. In particular, Boardman and Laurin (2000) find that U.K. privatisations have higher long term returns than other markets. The long-term performance of GOC IPOs in Australia has not been examined.

The purpose of this paper is to examine the initial and long run performance of GOC IPOs in Australia and the United Kingdom, given that the process, characteristics and objectives of the privatization program in the U.K. and Australia are very similar. Furthermore, the paper provides a comparison with the performance of IPOs of privately owned companies. In addition, the cross sectional determinants of the initial returns of GOC IPOs is analysed using various explanatory theories of underpricing of IPOs of both privately owned and GOCs. This study includes additional traditional variables from the privately owned IPO literature not used in other privatization studies and introduces three new variables specific to privatizations. These include the level of minimum subscription, the value of incentives, and whether a political statement is made by the opposition regarding privatization policy.

Table 1

Prior studies examining the underpricing of UK and Australian government owned IPOs

Study	Country	Year	Number	Underpricing (Unadjusted)
Jenkinson and Mayer (1988)	UK	79-87	14	32.8%
Perotti and Guney (1993)	UK	77-91	41	27.5%
Menyah, Paudyal and Inyangete (1995)	UK	81-91	41	41.4%
Menyah and Paudyal (1996)	UK	81-91	40	40.4%
Dewenter and Maltesta (1997)	UK	81-91	38	18.0%
Choi and Nam (1998)	UK	81-96	39	36.3%
Huang and Levich (1998)	UK	89-96	42	17.7%
Jones, Megginson, Nash and Netter (1999)	UK	77-97	61	35.0%
Easton and Pinder (1996)	Aus	89-95	6	8.3%
Breda, Collis, Deed and Pseudos (1997)	Aus	89-95	6	17.2%
Choi and Nam (1998)	Aus	91-97	7	16.6%
Huang and Levich (1998)	Aus	89-96	8	10.9%
Jones, Megginson, Nash and Netter (1999)	Aus	77-97	9	9.0%

The remainder of this paper is organised as follows. Section II provides background information and the pricing structure of the privatization process in the U.K. and Australia. The theoretical determinants of underpricing are discussed in section III. The data, methodology used, and proxy measurement is described in Section IV. Empirical results are presented in Section V.

II. THE PRIVATIZATION OF GOCS IN THE U.K. AND AUSTRALIA

A. Background

The privatization program in the U.K. is the oldest endeavour of its kind in the world. In 1979 privatization became an important element of the British Government's economic strategy of involving the private sector in activities previously carried out by the public sector to reduce the size of the latter. Although some state owned industries had existed in the U.K. for many years, shortly after the Second World War ended, the British Government initiated a widespread program of nationalisation. Founded on the tenets of socialism, nationalisation's goals were to promote greater equality of income, increase the distribution of wealth, and create prosperity throughout the nation.

The privatization program that was initiated by the Thatcher Government was a direct strategy to deal with the poor performance of the nationalised companies and with the social, political, macroeconomic and managerial problems associated with these companies. Privatization was part of an overall plan for the Thatcher Government to create a truly free market economy in the U.K. The government chose to distribute shares widely through advertising and share allocation rules favouring small investors. Special arrangements were made to encourage employees to become stockholders such as free stock and bonus stock for all stock purchased, when a majority of the stock in the firm they worked for were sold by a public flotation on the stock exchange. In many cases, the government retained partial control via a golden share that conferred the right to veto certain transactions such as takeover by foreign companies. The UK Government has privatised 47 major businesses (mainly water and electricity companies) through a trade sale or an IPO between 1979 and 1995. The initial privatizations were companies that operated in competitive industries. Later privatizations included large monopoly utility companies where the sale of the government owned firm was accompanied by the creation of utility regulatory bodies to control prices.

Privatization in Australia was introduced in the late 1980s as part of a wider program of micro economic reform aimed at improving the efficiency of government business enterprises (GBEs) and strengthening the economy. Prior to this period, GBEs had been involved in essential community service obligations, the fulfilment of regulatory responsibilities, and commercial activities. However, during the late 1980s, the Labor Government initiated a GBE reform process in which the GBEs should focus their activities on performing community service obligations and regulatory functions, while GBEs performing commercial activities should be transferred to the private sector.

This policy was set against a background of rising public debt. The Government's desire to reign in the increasing level of public debt meant that the provision of capital to GBEs was becoming more difficult due to Government borrowing constraints. Alternative sources of capital were required, the private sector being the obvious choice. Thus, privatization in Australia was a response to the increasing level of public debt and

part of a policy of micro economic reform. The Labor Government raised over \$10 billion dollars through the sale of public assets to the private sector. The privatization process has continued under the current Liberal Government through the late 1990s and it has or intends to complete those asset sales announced by the Labour Government.

Privatization has not been the exclusive domain of the Federal Government as State Governments have also been active in privatising assets. Of the seven privatizations through IPOs between 1990 and 1996, four have been offered by the Federal Government. In addition over fifty other public assets have been privatised by Australia's states and territories. Tender offers (for electricity generation and distribution industries) and trade sales (for gas pipelines, roads and hospitals) have been the most common method for the transferral of ownership of assets from the public sector to the private sector.

Morgan (1990) notes that the central characteristics of the privatization process in Australia, that is, the type and order of the GOCs that have been sold, phased sales, professional marketing with the sale underwritten by respected institutions and measures to maximise institutional and individual investor participation, has closely followed the pattern of the U.K. program. Morgan argues that the objectives of privatization in the U.K. and Australia are similar and include improving the efficiency and quality of service by increasing competition; exposure to capital market disciplines, thereby providing a more transparent and effective monitor of management than in total government ownership; increased competition in both domestic and international markets; promoting share ownership as widely as possible among the population⁷; reducing the public sector borrowing requirement; easing of public sector debt pay determination; reducing government involvement in enterprise decision making; encouraging employee ownership of stock in their companies; and redistributing income and wealth. It is therefore not unexpected that the outcomes of the two programs are also similar.

B. Underwriting Arrangements and Pricing structure

In Australia and the U.K., it is conventional practice for an underwriter to be a company associated with a stock broking firm or an investment bank and for sub underwriters (generally for large offerings), to be institutional investors. Banks, companies and private citizens may also take sub underwriting positions. In contrast, in the United States, parties other than investment banks are unlikely to be in an underwriting or sub underwriting capacity.⁸ Generally, IPOs in Australia and the U.K. have been underwritten in advance of demand having been ascertained. Thus, a distinguishing feature of the Australian and U.K. market is that the offer or subscription price is fixed prior to the issue of a prospectus. There is usually a considerable time lag (approximately 45 days) between prospectus registration and listing of the firm. Thus, the issuer is locked into a subscription price well in advance of the listing of the firm and bears the risk of subsequent market movements.

In contrast, in the United States, the underwriting agreement is not executed until after demand has been determined through a process of book building where investors are requested to nominate demand at prices within a given price range. The price is generally set in the week before listing according to the overall demand indicated.

However, as Woo (2000) notes, since 1992 in Australia, there has been a trend

towards tiered equity offers which consist of a multi part offer to raise funds from two or more defined sectors such as institutions, the public, current private stockholders (entitlement) and employees. These joint arrangements usually have different conditions set for each sector and it has become widely accepted that the public offer is a fixed price, usually fixed quantity arrangement which closes before the institutional offer. The institutional offer is usually structured by way of a limited range tender. The other offer variations are set at the same price as the public and they essentially provide a preferential status to certain types of related parties to ensure that a proportion of the offer is reserved for existing private stockholders and employees. Only the first four privatizations have been underwritten by outside parties.

III. DETERMINANTS OF UNDERPRICING

Numerous theories have been proposed to explain IPO underpricing. However, the focus of these theories has generally been the underpricing of IPOs of privately owned companies. The following section examines the explanations proposed for the underpricing of both private and government owned IPOs that are tested in this study.

A. Determinants of Privately Owned IPO Underpricing

The existence of information asymmetry between the parties involved in the IPO is common to many of the explanations. The winner's curse model (Rock (1986)) suggests that there are two groups of investors differentiated by their knowledge of the intrinsic value of the stock being sold. The better informed group avoids overpriced IPOs. Thus investors with inferior information receive large allocations of overpriced offers relative to underpriced offers. Given the winners curse, uninformed investors will only submit purchase orders, if on average, IPOs are underpriced sufficiently to compensate them for the bias in the allocation of new issues. Thus a positive relationship between informed demand and the level of underpricing is hypothesised.

The inability to change the issue price and/or the quantity of shares in the Australian and U.K. fixed price offers represents an important difference between the Australian/U.K. and the prevailing U.S. environment. In Australian issues, underwriting agreements are usually signed five to six weeks prior to listing. In contrast, in the U.S., subscription prices are often not determined until (non binding) offers have been received from potential subscribers, usually one week before listing. In this way informed investor demand is revealed, thereby reducing the expected level of underpricing. Ritter (1987) observes that U.S. issuers face relatively low price uncertainty in setting the subscription price. Lee, Taylor and Walter (1996) note that the Australian issuing method can be expected to increase heterogeneity in information availability between classes of investors. Restrictions on pre selling should compound the importance of preferred clients for brokers and underwriters. Any 'informal' (and strictly illegal) pre selling of Australian IPOs would be confined to a select group, thereby reinforcing the distinction between informed and uninformed investors. Rock's (1986) model of underpricing relies on this type of heterogeneity, while the lack of widespread pre selling eliminates the explanation for underpricing offered by Benveniste and Spindt (1989), who model underpricing as a 'reward' for clients' revelation of information during the pre selling period.

In addition, Lee, Taylor and Walter (1996) note that the form of underwriting agreement used for Australian IPOs also contributes to an expectation that IPO underpricing and the winner's curse are related in Australian offers. Ritter (1987) argues that relatively risky IPOs use best efforts underwriting to reduce expected underpricing through a reduction in the winner's curse faced by uninformed investors. However, Australian underwriting involves a standby arrangement, where in the event that the issue is not fully subscribed within a certain period, the underwriter agrees to take up any shortfall in subscription at an agreed price. Thus, the risk associated with the issue (that is, under-subscription) is borne by the underwriter compared to a best efforts contract where if the minimum number of shares is not sold at the offer price within a specified period of time (usually 90 days), the offer is withdrawn. Thus, the standby arrangement increases the probability that uninformed investors face a winners' curse.

Beatty and Ritter (1986) suggest that the magnitude of the difference between the degree of underpricing, is directly related to the ex-ante uncertainty about the value of the issue, due to increases in ex-ante uncertainty intensifying the winner's curse problem. Thus, a positive relationship between the ex-ante uncertainty about the value of an issue and underpricing is hypothesised.

Allen and Faulhaber (1989), Welch (1989) and Grinblatt and Hwang (1989) develop signalling models where issuers possess better information than investors about the value of the offer. High value companies may choose to underprice to signal to investors that they are high quality companies. This enables a high value firm to charge higher prices in subsequent offerings or to enjoy higher value for the equity that they retain. Thus, a positive relationship should exist between both the degree of underpricing and the issuer's fractional holdings and the firm's value and the degree of underpricing.

Barry and Brown (1984) suggest that the level of underpricing for an IPO is related to the quality and quantity of information available about the offering firm. Those companies with relatively little information available will be considered to be more risky than those companies which have more information available. Hence, companies with less information will underprice their securities at the IPO to compensate investors for investing in relatively riskier stocks. Thus, a negative relationship between the level of underpricing and the quantity of information about the firm is hypothesised.

The certification hypothesis reflects the belief that when a firm sells shares for the first time its true value is imperfectly known by investors and that the quality of the auditor, investment banker and underwriter chosen by the firm's owners provides information to the market about that value. Titman and Trueman (1986) hold that the information provided by a higher quality auditor allows investors to make a more precise estimate of the firm's value. As a result, an entrepreneur with more favourable private information about his firm's value will select a higher quality auditor than an entrepreneur with less favourable private information. Beatty (1989) argues that IPO firm owners will choose the auditing firm with reputation capital so that the marginal cost of a higher quality auditor equals the marginal benefit of less underpricing. Booth and Smith (1986) suggest that the underwriter is employed to 'certify' that the issue price is consistent with inside information regarding the future earnings prospects of the firm. In addition, Carter and Manaster (1990) develop a model where more prestigious underwriters are associated with IPOs with a lower dispersion of possible firm values and less underpricing. Thus, a negative relationship between the level of underpricing and the quality of information about the firm is hypothesised.

B. Determinants of Government Owned IPO Underpricing

Explanations for underpricing which are unique to GOC IPOs are dominated by political motives.⁹ These theories suggest that governments deliberately underprice GOC IPOs to achieve political objectives such as wider stock ownership, support for the privatization program and increased probability of re-election.

Perotti (1995) presents a signalling model where GOC IPOs are associated with uncertainty regarding the direction of future government policies that may affect firm value. Perotti argues that the sale price reflects the potential for any changes in policy, therefore the government has an interest announcing a policy of constraint. In the absence of a reliable signal, only sustaining the same policy over time can eliminate the risk perceived by investors. Perotti contends that the structure of the sale may be used to reassure investors. Thus a partial sale (and underpricing) is a signal of the government's commitment. Gradual sales with immediate transfer of control imply that the government is willing to bear residual risk, a signal that it does not intend to redistribute value through a future policy change. Thus, a government with no intention of changing to a policy which will adversely affect the firm's value, is more willing to retain a non controlling stake in the firm for a period of time, since it knows that it will sell its stake at a higher price in the future. Conversely, a government which expects to change its current policy prefers a rapid sale, since it expects a lower market value for the firm in the future.

In addition, Perotti and Guney (1993) argue that underpricing signals commitment because an uncommitted government cannot expect higher proceeds from a subsequent sale, and is therefore not willing to underprice the initial sale. Dewenter and Malatesta (1997) argue that underpricing only occurs when the optimal retained share is high. In contrast to Perotti (1995), Vickers and Yarrow (1988) suggest that underpricing will be greater for GOC IPOs where the government sells a large allotment of equity at one time, and therefore retains a smaller share, assuming the offer size is relatively large compared to other IPOs. Thus, a positive relationship between the level of underpricing and the level of retained ownership by the government is hypothesised.

Furthermore, similar to Mauer and Senbet (1992), Perotti and Guney (1993) argue that underpricing is greatest when the privatised firm is entirely new to the market and there are no companies in the same industry listed. As there are no comparable companies listed, information which can be used to price the privatised firm is limited. Consequently, the pricing decision becomes more difficult and as a result the level of underpricing is greater. However, Vickers and Yarrow do not elaborate on the precise cause of underpricing, whether it is due to a risk premium to compensate investors, a conservative price setting decision due to lack of information or an alternative reason. A negative relationship between the level of underpricing and the order of the IPO in the government's privatization program is hypothesised.

Alternatively, issuing companies may intentionally underprice their shares in order to generate excess demand and attract a large number of small shareholders. The disperse ownership will increase both the liquidity of the market for the stock and make a future takeover more difficult. Booth and Chua (1995) argue that investors will be willing to price stock using a lower discount rate if they expect a liquid market for their shares. Thus, the post issue price is dependent upon the dispersion of stock ownership. Brennan and Franks (1995) argue that companies may underprice in order to have a diffuse ownership base. In the U.K., an important objective of the Thatcher

Government's privatization program was the promotion of wider share ownership, and especially share ownership by employees of companies, as part of the desire to extend "property-owning democracy". Vickers and Yarrow (1988) believe that underpricing is used as an incentive to encourage small investors to participate in an IPO of a government owned company. Furthermore, Jenkinson and Mayer (1988) attribute the relationship between underpricing and the objective of wider stock ownership as a consequence of Rock's (1986) model. As investors possess diverse information regarding the companies to be privatised, which are of uncertain value, the government must underprice the issue to encourage widespread participation in the offer and hence achieve the objective of wider share ownership. Thus, a positive relationship is hypothesised between the government's desire for wider share ownership and the degree of underpricing.

In many government owned offers, a portion of the stock is reserved for purchase by employees of the privatised firm. Dewenter and Malatesta (1997) postulate that where the shares are greatly underpriced, allocation preferences are used to enlist employee political support. This suggests that initial returns in GOC IPOs where a stock tranche is reserved for employees, should exceed initial returns in GOC IPOs where there is no such reserved tranche. Thus, a positive relationship is hypothesised between employee participation and the degree of underpricing.

Vickers and Yarrow (1988) suggest that GOC IPOs are underpriced to a greater extent if the government's opposition stated it would re-nationalise the asset and only compensate investors with the original offer price. If stock was taken back at the original offer price, then existing stockholders would sustain a capital loss or gain equal to the difference between that price and the previously prevailing market price. Thus, in GOC IPOs where the government's opposition party intends to re-nationalise the privatised firm, underpricing will be greater. By underpricing, the government ensures investors enjoy large capital gains which will be lost should the opposition be elected to power, therefore generating political support. Similarly, Perotti and Guney (1993) and Ibbotson, Sindelar and Ritter (1994) suggest that allocating underpriced shares to smaller investors, creates a large constituency whose interests lie with a successful privatization program, and thus, are more likely to re-elect the government.

IV. DATA AND EMPIRICAL METHODS

The privatization of government assets is examined in Australia and the U.K. The data comprises 40 GOC IPOs, 33 U.K. IPOs over 1981 to 1991 and 7 Australian IPOs over the period 1991 to 1996. There were 38 government owned IPOs in the U.K. over the sample period, five of which were excluded from the sample due to the inability to obtain prospectuses. A total of 7 Australian GOC IPOs listed during the sample period and thus the number of observations used in this study represents the population. Company specific information is obtained from prospectus documents. Stock and market index prices are sourced from the ASX/Statex database and the Financial Times.

Returns are calculated on an unadjusted, market adjusted, and price relative basis. The unadjusted return is calculated as the closing price on the first day of listing less the offer price, as a percentage of the offer price. The market adjusted excess return on the first day of listing is calculated as:

$$MA U_{it} = \frac{(P_i - S_i)}{S_i} - \frac{(M_i - M_{i-1})}{M_{i-1}} \quad (1)$$

where P_i = the closing stock price of security I on the first day of listing; S_i = the offer price of security I; M_i = the closing price of the market index on the first day of listing; M_{i-1} = the closing price of the market index on the day the offer price is set.

The price relative is calculated as:

$$PR U_{it} = \ln(P_i / S_i) - \ln(M_i / M_{i-1}) \quad (2)$$

The market indices used are the All Ordinaries Index for Australia and the Industrial Ordinary Index or the FTSE100 for the U.K.

Long term performance is measured as the buy and hold return¹⁰ over one, three and five years. The one year aftermarket period is defined as the 12 trading months following the date of listing but excluded the initial trading day. The three year aftermarket return is measured over the 36 months following listing and the five year return over the 60 months following listing, both excluding the initial trading day.

The holding period return for a single firm I is defined as:

$$R_i = \prod_{t=1}^n (1 + r_{it}) \quad (3)$$

where r_{it} is the raw return on firm I in event month t. The holding period return is calculated as both an equally weighted and value weighted return. The performance of GOC IPOs is compared to the accumulated market index.

Multivariate regression is used to examine the relationship between underpricing and the explanatory variables drawn from both the privately owned and government owned IPO literature. The explanatory variables are measured as follows. The gross proceeds and standard deviation of returns in the after market are proxies for ex ante uncertainty. The gross proceeds of the issue are calculated as product of the offer price and the total number of shares offered in millions of dollars. The standard deviation of returns is calculated over twenty trading days subsequent to the firm listing. The first day return is excluded from the calculation to avoid the tautological relationship as discussed by Finn and Higham (1988).

The age of firm is a proxy for the quantity of information available about the firm. Age can be measured by the number of years between incorporation and the date of listing.¹¹ However, this measure does not provide an accurate measure of the age of the companies in the sample for this study. Often, companies which are to be privatised are not incorporated until after the government decides privatization is to proceed. A superior measure for the age of privatised companies is the number of years of existence of the firm.¹² To normalise the distribution of the variable, the natural logarithm of age plus one is calculated, consistent with Beatty and Ritter (1986).

Underwriter and auditor reputation are proxies for the quality of information available about the firm. Underwriter reputation is proxied by the frequency of underwriting engagements conducted by the lead underwriter to the issue.¹³ The frequency is calculated as the number of times an underwriter appeared on a tombstone announcement, either in the role as lead underwriter or as a secondary underwriter. If a

privatization had two or more lead underwriters, the highest frequency is used. A second proxy is calculated which weights the frequency measure depending on whether the underwriter was the lead underwriter in the tombstone announcement or a secondary underwriter. However, using this measure did not result in significantly different results. The reputation of the auditor is measured by a dichotomous variable, taking the value of one if the auditor is a Big Eight/Six auditing companies, or the value of zero otherwise.

The delay in listing may capture the extent to which uninformed investors face a winner's curse from the presence or absence of informed investor demand. It is calculated as the number of calendar days between the date of the prospectus and the date of listing for each firm, consistent with How, Izan and Monroe (1995) and Lee, Taylor and Walter (1996).

The level of retained ownership is a signalling proxy and is measured as the proportion of the equity retained by the government. The size of the firm may signal firm quality or reduce information uncertainty and is measured by the total assets of the firm, in millions of dollars at the end of the twelve month period closest to the IPO date.

The variables specific to privatizations are employee participation, foreign participation, minimum subscription level, the value of incentives to investors, opposing political parties' stance towards the privatization, and the order of the privatization in the privatization program. Employee participation is measured as the fraction of firm equity reserved for employees. Following Dewenter and Malatesta (1997), foreign participation is measured as the maximum fraction made available to foreign investors. The minimum subscription value is calculated as the product of the offer price and the minimum number of shares that can be subscribed for.

The value of incentives is calculated as the maximum value of incentives an individual investor can receive from the firm as outlined in the prospectus. Incentives received are in the form of vouchers redeemable for the product or service offered by the firm or bonus shares. The number of vouchers or bonus shares received by individual investors is proportional to the number of shares purchased in the offer. The value of vouchers is calculated as the product of the maximum number of vouchers which can be received and the value of each voucher as stated in the prospectus. The value of bonus shares is calculated as the product of the maximum number of bonus shares which can be received and the offer price. For companies where a choice between vouchers and bonus shares was offered, the greater value of the two was used. A dummy variable is employed to measure opposing political parties' stance towards the privatization. The variable takes a value of one if the prospectus for the privatised firm contains a statement of opposing political parties' intentions to renationalise the firm at the offer price. If the prospectus contains no statement or if the statement indicates that opposing political parties will not renationalise the firm, the dummy variable takes a value of zero. Finally, the order is measured by a variable indicating the order of the offer within the country's privatization program.

As Beatty and Ritter (1986) argue that heteroscedasity may be present in a linear regression model of underpricing, heteroscedasity is tested for and corrected using White's (1980) heteroscedastic consistent covariance matrix. In addition, multicollinearity is tested for and corrected using a ridge regression.

V. RESULTS

Initially, an examination of the level of short and long term performance of GOC IPOs, is undertaken and compared to the performance of IPOs of privately owned companies. The level of initial returns for GOC IPOs are reported in Table 2. Consistent with previous research, the level of underpricing for GOC IPOs is significantly different from zero. The mean level of unadjusted underpricing for the complete sample is 17.90%. For the U.K. and Australian GOC IPOs, the mean level of adjusted underpricing is 19.37% and 11.43% respectively.¹⁴ The results are comparable to those reported for Australia by Easton and Pinter (1996) and Choi and Nam (1998)¹⁵ and for the U.K by Jenkinson and Mayer (1988), Menyah, Paudyal and Inyangete (1990) and (1995), Levis (1993), Perotti and Guney (1993), Huang and Levich (1998) and Choi and Nam (1998).¹⁶ In addition, the mean initial return for U.K. GOC IPOs is significantly higher than the mean initial return for Australian GOC IPOs.¹⁷

Table 2
Underpricing of UK and Australian government owned IPOs 1981-1996

The sample consists of 33 UK government owned IPOs between 1981 and 1991 and 7 Australian government owned IPOs between 1991 and 1996. Unadjusted returns are calculated as the difference between the closing price on the first day of listing and the offer price, as a percentage of the offer price. The market adjusted return is the unadjusted return less the return on the market index between the day that the offer price is set and the day of listing. The unadjusted price relative is the log (closing price on the first day of listing / offer price). The market adjusted price relative is the unadjusted return less the log (return on the market index between the day that the offer price is set and the day of listing). The market index for the Australian issues is the All Ordinaries Index. The market index for the UK issues is the Industrial Ordinary Index or the FTSE100.

Underpricing Measure		Mean	Std Dev	t-stat.	Min.	25%	Media n	75%	Max.
Unadjusted	U.K.	19.37	7.09	7.23 ^a	1.82	17.12	19.63	21.17	35.26
	Aust	11.43	10.12	2.99 ^b	-2.22	5.06	7.50	12.09	25.85
	All	17.98	8.14	5.84 ^a	-2.22	14.78	19.30	21.17	35.26
Adjusted	U.K.	15.88	7.28	5.77 ^a	5.50	10.02	15.17	18.50	34.45
	Aust	11.18	11.88	2.50 ^b	-5.58	1.08	8.53	23.05	27.15
	All	15.06	7.89	5.05 ^a	-5.58	8.89	15.17	18.56	34.45
Unadjusted Price Relative	U.K.	16.27	4.60	9.36 ^a	6.11	13.11	16.72	18.48	26.39
	Aust	10.47	9.06	3.06 ^b	-2.25	4.87	7.23	17.92	23.00
	All	15.25	5.85	6.90 ^a	-2.25	13.33	17.65	19.45	26.39
Adjusted Price-Relative	U.K.	14.05	6.21	5.99 ^a	5.10	8.70	13.80	16.70	25.41
	Aust	10.33	11.01	2.48 ^b	-5.55	1.01	8.46	20.26	25.90
	All	13.39	6.71	5.28 ^a	-5.55	1.01	13.50	16.73	25.90

^a Significant at the 1% level. ^b Significant at the 5% level.

The level of underpricing of GOC IPOs is compared to IPOs of privately owned companies in Table 3.

Table 3

Differences in the level of underpricing between Australian and UK IPOs of government owned companies and IPOs of privately owned companies.

The table reports the average difference between initial returns of IPOs of government owned companies and IPOs of privately owned companies for the UK and Australia separately. Market adjusted initial returns are used for comparison with Levis (1993), Lee, Taylor and Walter (1996) and Woo (2000). Unadjusted price relatives are used for comparison with Loughran, Ritter and Rydqvist (1994). The student t statistic represents a test of the null hypothesis that the true difference of the means is zero. The test statistic is distributed as student t with degrees of freedom equal to the sample size minus one.

Country	Period	IPOs of privately owned companies			IPOs of government owned companies		Difference (%)	Student t	
		No of IPOs	Mean (%)	Std Dev	Mean (%)	Std Dev			
U.K.	Lev	1980-88	184	11.50	4.39	15.88	7.28	4.38	(2.91) ^b
	LRT	1959-90	2133	12.00	Na	16.27	4.60	4.27	(5.31) ^a
Aus	LTW	1976-89	266	16.4	Na	11.43	10.12	4.97	(0.49)
	Woo	1983-90	811	45.04	165.38	11.43	10.12	33.61	(4.11) ^a
	Woo	1991-96	336	18.90	26.54	11.43	10.12	7.47	(1.83) ^c

^a Significant at the 1% level. ^b Significant at the 5% level. ^c Significant at the 10% level
 Lev is Levis (1993); LRT is Loughran, Ritter and Rydqvist (1994); LTW is Lee, Taylor and Walter (1996); Woo is Woo (2000).

The U.K. GOC IPOs are significantly more underpriced compared to estimates of underpricing of IPOs of privately owned companies reported in Levis (1993) and Loughran, Ritter and Rydqvist (1994).¹⁷ The results are similar to those found in Dewenter and Malatesta (1997) and Boardman and Laurin (2000). The Australian GOC IPOs are compared to IPOs of privately owned companies examined in Lee, Taylor and Walter (1996) and Woo (2000). A significant difference is not found between the underpricing of GOC IPOs and the IPOs of privately owned companies reported in Lee, Taylor and Walter (1996) similar to Choi and Nam (1998) and Huang and Levich (1998) who also use the Lee, Taylor and Walter (1996) sample.

However the 1976 to 1989 sample period studied in Lee, Taylor and Walter (1996) does not overlap the period in which GOC IPOs are offered and the sample does not cover all IPOs listed during that period (only 226 companies). The underpricing of Australian GOC IPOs is compared to a more complete sample of IPOs of privately owned companies in Woo (2000), consisting of 811 industrial IPOs of privately owned companies over 1983 to 1990 and 336 industrial IPOs of privately owned companies over 1991 to 1996, which directly corresponds to the period in which the GOC IPOs were listed. In contrast to the U.K and other markets (Ljungqvist, Jenkinson and Wilhelm (2003)), Australian GOC IPOs have significantly lower underpricing compared to IPOs of privately owned companies. Further, a regression to control for offer size between

IPOs GOCs and IPOs of privately owned companies is run. Initial returns for GOC IPOs are adjusted by subtracting the average privately owned IPO return for each country. Offer size is similarly adjusted. The results confirm that U.K. GOC IPOs are significantly more underpriced than IPOs of privately owned companies and Australian GOC IPOs are significantly less underpriced than IPOs of privately owned companies. This result is surprising given the similarities in the privatization process and objectives in the U.K and Australia.

The long term performance of GOC IPOs is examined in Table 4.

Table 4

The long term performance of Australian and UK government owned IPOs

The performance of a government owned IPO is measured as an equally weighted buy and hold return over one, three and five years after listing. The one year period is defined as the 12 trading months following listing but excludes the initial day of trading. The three year aftermarket return is measured as the 36 months following listing and the five year return as the 60 months following listing, both excluding the initial day of trading. The IPO return is compared to the return on the All Ordinaries Index for Australian IPOs and the All Industries Index or FTSE 100 for UK IPOs.

		No	One year returns		Three year returns		Five year returns	
			IPO	Index	IPO	Index	IPO	Index
Australia	Mean	7	8.29	2.39	74.88	26.56	110.00	48.10
	Std Dev		22.16	5.99	101.83	5.31	145.74	9.52
UK	Mean	33	-5.41	2.34	88.00	32.36	141.41	56.66
	Std Dev		13.84	9.75	55.35	17.73	87.29	37.49

Australian GOC IPOs outperform the accumulated market index (All Ordinaries) by 5.90%, 48.32% and 61.90% on an equally weighted basis¹⁸ over one, three and five years. However, the returns are not significant due to the small sample size. The results are similar to the Malaysian market where Paudyal, Saadouni and Briston (1998) find insignificant underperformance of 7%. In comparison, Australian privately owned industrial IPOs have significant underperformance of -18.77% and -51.58% over one and three years.¹⁹ There is a significant difference between the underperformance of IPOs of privately owned companies and the over-performance of GOC IPOs over one and three years post listing.²⁰

In the U.K., prior research by Levis (1993), Menyah, Paudyal and Inyangete (1995) and Menyah and Paudyal (1996) finds that GOC IPOs outperform the market index. In particular, Boardman and Laurin (2000) find that U.K. privatisations have higher long term returns than other markets. In a direct test, Menyah and Paudyal (1996) find a significant difference in the long term performance of U.K. GOC IPOs compared to privately owned IPOs.

For the sample of 33 U.K. GOC IPOs in this study, there is significant underperformance of -7.75% on an equally weighted basis in the first year of listing. However, there is significant over-performance of 55.74% and 84.76% on an equally weighted basis, over three and five years compared to the market index (All Industrial

Index and FTSE100).²¹

Tables 5A and B report the descriptive statistics for the continuous explanatory variables for the sample and independently for U.K. and Australian GOC IPOs. All values are reported in constant Australian dollars at the year 1991.

Table 5A and B show that the average age, standard deviation of returns, average maximum foreign ownership, average minimum subscription amount and average length of time between prospectus registration and listing variables for the Australian GOC IPOs is significantly greater than the equivalent average for U.K. GOC IPOs. The average underwriter frequency and average amount of equity reserved for employees are significantly greater for the U.K. GOC IPOs compared to the Australian GOC IPOs. There is no significant difference in means between the two countries for gross proceeds, total assets, and the proportion of equity retained by the government.

Table 5A

Descriptive statistics for characteristics of the total sample of UK and Australian government owned IPOs

Issue size is the gross proceeds of the offer measured as the number of stock issues multiplied by the offer price. Standard deviation is the standard deviation of returns in the 20 days post listing. Age is the number of years of existence of the firm. Underwriter measures underwriter reputation and is the frequency of underwriting engagements in the sample. Retained ownership is the proportion of equity retained by the government. Delay is the number of days between the date of the prospectus and the date of listing. Foreign ownership is the maximum fraction available to foreign investors in the IPO. Employee ownership is the fraction of the IPO reserved for employees. Minimum subscription value is the product of the offer price and the minimum number of stock that can be subscribed for. Incentives are the value of incentives to investors and are calculated as the maximum value an individual investor can receive from the firm as outlined in the prospectus. Firm size is measured as total assets at the end of the twelve month period closest to the listing date. All dollar values are reported as inflation adjusted 1991 Australian dollars.

Variable	Average	Std Dev	Min.	25%	Median	75%	Max.
Issue size (\$Am)	1 718	2 128	127	670	1 177	1 798	11 983
Standard deviation	5.09	4.38	0.23	1.74	4.20	6.30	23.05
Age (yrs)	31.75	24.39	15	16	19	39	100
Underwriter (freq.)	3.98	1.88	0	2	4	6	6
Retained Ownership (%)	0.08	0.19	0	0	0	0	0.70
Delay in listing (days)	24.73	13.2	12.0	19.75	20	20	69
Foreign Ownership (%)	0.22	0.15	0.08	0.19	0.20	0.20	1.00
Employee Ownership (%)	0.10	0.49	0	0.05	0.10	0.15	0.15
Minimum Subscription (\$)	745.68	625.54	133.62	495.38	551.09	551.85	2400
Incentives (\$)	897.78	577.53	0	774.33	826.63	1486.1	1671.24
Firm Size (\$Am)	7 573	12 265	112	2 235	3 566	8 417	67 030

Table 5B

Comparative characteristics of UK and Australian government owned IPOs.

This table presents the characteristics of UK and Australian government owned IPOs separately and compares their characteristics. The student's t statistic represents a test of the null hypothesis that the true difference of the means is zero. The test statistic is distributed as student's t with degrees of freedom equal to the sample size minus one. Issue size is the gross proceeds of the offer measured as the number of stock issues multiplied by the offer price. Standard deviation is the standard deviation of returns in the 20 days post listing. Age is the number of years of existence of the firm. Underwriter measures underwriter reputation and is the frequency of underwriting engagements in the sample. Retained ownership is the proportion of equity retained by the government. Delay is the number of days between the date of the prospectus and the date of listing. Foreign ownership is the maximum fraction available to foreign investors in the IPO. Employee ownership is the fraction of the IPO reserved for employees. Minimum subscription value is the product of the offer price and the minimum number of stock that can be subscribed for. Incentives are the value of incentives to investors and are calculated as the maximum value an individual investor can receive from the firm as outlined in the prospectus. Firm size is measured as total assets at the end of the twelve-month period closest to the listing date.

Variable	U.K.			Australia		
	N	Mean	Std Dev	N	Mean	Std Dev
Issue size (\$m)	33	1 911	2 290	7	804	537
Standard deviation	33	4.58	4.38	7	7.61	3.75 ^a
Age (yrs)	33	23.36	15.27	7	71.29	20.31 ^a
Underwriter (freq.)	33	4.58	0.96	7	1	1 ^a
Retained Ownership	33	0.05	0.15	7	0.17	0.3
Delay in listing (days)	33	19.36	3.131	7	50	13.29 ^a
Foreign Ownership	33	0.19	0.05	7	0.61	0.39 ^a
Employee Ownership	33	0.11	0.04	7	0.03	0.02 ^a
Minimum	33	475.52	109.92	7	2 019.29	430.33 ^a
Incentives (\$)	33	1 039.74	468.17	7	228.57	604.74
Firm size (\$m)	33	6 508	8 095	7	12 596	24 343

^a Significant at the 1% level.

Furthermore, the characteristics of GOC IPOs are compared to IPOs of privately owned companies. The gross proceeds of U.K. GOC IPOs are significantly greater than the gross proceeds of IPOs of privately owned companies reported in Levis (1993).²² In addition, Table 6 shows that the gross proceeds, the standard deviation of aftermarket returns, and age of Australian GOC IPOs are significantly greater than IPOs of privately owned companies reported in Lee, Taylor and Walter (1996).

Multivariate regression results are reported in Table 7. The dependent variable is market adjusted price relative underpricing. The regression models are adjusted for the presence of heteroscedasticity using White's (1980) heteroscedastic consistent variance-covariance matrix. In addition multicollinearity is present and a ridge regression is used. The results obtained from the ridge regression are consistent with the results presented in Table 7. The first model in Table 7 is the complete model, which considers the effects of the variables jointly. The second model excludes the statement dummy variable as the univariate regression results suggest that this is not a suitable proxy for the political support hypothesis.

Table 6
Descriptive statistics of the characteristics of Australian government owned IPOs compared to privately owned IPOs

The characteristics of Australian government owned IPOs are compared to the characteristics of privately owned IPOs as reported in Lee, Taylor and Walter (1996). The Students t statistic represents a test of the null hypothesis that the true difference of the means is zero. The test statistic is distributed as Student's t with degrees of freedom equal to the sample size minus one. Issue size is the gross proceeds of the offer measured as the number of stock issues multiplied by the offer price. Standard deviation is the standard deviation of returns in the 20 days post listing. Age is the number of years of existence of the firm. Underwriter measures underwriter reputation and is the frequency of underwriting engagements in the sample. Retained ownership is the proportion of equity retained by the government. Delay is the number of days between the date of the prospectus and the date of listing. Firm size is measured as total assets at the end of the twelve month period closest to the listing date.

Variable	IPOs of privately owned			IPOs of government		
	N	Mean	Std Dev	N	Mean	Std Dev
Issue size (\$m)	266	9.05	13.24	7	804.40	537.10
Standard deviation	266	15.11	11.40	7	7.61	3.75
Age (yrs)	266	4.49	3.91	7	71.29	20.31
Retained Ownership (%)	266	54.60	22.30	7	17.00	30.00
Delay in listing (days)	266	52.81	25.52	7	50.00	13.29
Firm size (\$m)	266	40.44	193.45	7	12595.79	24343.0

^a Significant at the 1% level.

The results provide strong support for the hypothesised relationship between ex ante uncertainty and the level of underpricing. The coefficient of issue size is positive and significant at the 5% level and the coefficient of the standard deviation of returns is positive and significant at the 1% level. These results suggest that issues surrounded by a greater level of ex ante uncertainty will be underpriced to a greater extent than issues surrounded by less ex ante uncertainty. This result is consistent with results obtained by Beatty and Ritter (1986) and How, Izan and Monroe (1995) and support Rock's (1986) winner's curse model.

The delay in listing -a proxy for informed demand- is predicted to be negatively related to underpricing. The coefficient of the delay in listing is positive and significant (at the 10% level). The results from the multivariate regressions do not support the information hypothesis. Dewenter and Malatesta (1997) obtain similar results.²³ This result is not necessarily inconsistent with Rock's (1986) model. Rather, delay in listing may not be a suitable proxy for informed demand. For GOC IPOs, political considerations²⁴ may prevent offers with a greater level of informed demand from closing early, hence the delay in listing may not accurately reflect the level of informed demand.

Table 7
Multivariate regression of government owned IPO initial returns

Market adjusted one day initial returns are regressed on the explanatory variables. Coefficients are estimated using ordinary least squares regression. The regression is adjusted for heteroscedasticity using White's (1980) heteroscedastic consistent variance covariance matrix. The t statistics based on the ordinary least squares standard errors are given in parentheses below the estimated coefficients. Model 1 considers the effects of all the variables jointly. Model 2 excludes the statement dummy variable.

Independent Variable	Model 1	Model 2
Intercept	16.73 (0.66)	16.63 (0.64)
Issue Size	1.19x10 ⁹ (2.10) ^b	1.12x10 ⁹ (2.53) ^b
Standard deviation	0.54 (4.83) ^a	0.54 (4.92) ^a
Age	5.73 (2.57) ^b	5.78 (4.18) ^a
Underwriter	1.36 (3.15) ^a	1.35 (4.23) ^a
Auditor reputation	-0.88 (-1.05)	-0.880 (-1.05)
Retained ownership	6.86 (1.76) ^c	6.74 (1.83) ^c
Delay in listing	0.24 (1.76) ^c	0.24 (2.230) ^b
Foreign ownership	11.87 (2.40) ^b	11.96 (3.13) ^a
Employee ownership	-0.003 (-1.82) ^c	-0.003 (-4.17) ^a
Minimum subscription	-6.01 (-2.28) ^b	-6.04 (-2.75) ^a
Value of incentives	1.24 (2.96) ^a	1.24 (3.02) ^a
Statement	-0.17 (-0.04)	
Firm Size	-0.71 (-0.71)	-0.71 (-0.76)
Order	0.22 (2.97) ^a	0.22 (3.01) ^a
Adjusted R²	0.83	0.83
F-stat.	8.46 ^a	9.94 ^a
N	40	40

^a indicates significance at the 1% level. ^b indicates significance at the 5% level. ^c indicates significance at the 10% level.

The results provide mixed support for the differential information hypothesis. The quality of information is proxied by the reputation of the auditor and the underwriter to the issue. The coefficient of the auditor reputation variable is negative but insignificant. The coefficient of the underwriter reputation variable is significantly positive (at the 1% level). However, the differential information hypothesis predicts a negative relationship between this variable and the degree of underpricing. Alternatively, underwriter reputation may also serve jointly as a proxy for the relative bargaining power of the underwriter and support the investment banker's monopsony power hypothesis. This hypothesis predicts that issues underwritten by an investment bank with greater relative bargaining power will be underpriced to a greater extent.

The coefficient of the age of the firm is significantly positive (at the 1% level). The differential quality of information hypothesis predicts a negative relationship between the age of the firm and the level of underpricing, as older companies have more information available about them, greater opaqueness and thus ease of valuation. The inconsistency between the results and the theory may be due to efficacy of the proxy for information quality. It is likely that quantity of information increases at a decreasing rate with respect to age. As all the companies in the sample are relatively old, age may not effectively differentiate between the quantities of information available about each of the companies. Banz (1981) suggests that size measured as total assets, is an alternative proxy for quantity of information. The coefficient of total assets is negative, as predicted by the information quantity hypothesis, although it is insignificant. Thus, the results do not support the differential quantity of information hypothesis.

There is a significantly positive relationship (at the 10% level) between the government's retained ownership and underpricing. The result is similar to Jones, Megginson, Nash and Netter (1999) and supports the signalling models of Allen and Faulhaber (1989), Grinblatt and Hwang (1989), Welch (1989) where retained ownership and underpricing are both signals of firm quality. In addition, Perotti's (1995) model is supported where retained ownership and underpricing signal the government's commitment to the privatization.

Furthermore, the results provide support for the wider stock ownership hypothesis. The proxies for the wider stock ownership objective are the minimum subscription amount where a smaller minimum subscription amount permits a wider segment of the population to participate in the offer and the value of monetary incentives offered to investors where to encourage more people to participate in the offer the value of monetary incentives offered is higher. The coefficient of the minimum subscription amount is negative and significant (at the 1% level) whereas the coefficient of the value of incentives is positive and significant (at the 1% level). Both these variables influence the level of underpricing in the predicted direction. Thus, these results support Jenkinson and Mayer's (1988) and Vickers and Yarrow's (1988) hypothesis that underpricing is greater for GOC IPOs when a government objective is wider stock ownership.

However, the employee ownership hypothesis and political support hypothesis are not supported by the results. The coefficient of employee ownership is significantly negative (at the 10% level). A possible explanation is that alternative methods may be used to generate employee support for the privatization such as interest free loans. This result is inconsistent with Dewenter and Malatesta (1997). In addition, the coefficient of the policy statement variable is negative and insignificant suggesting that the opposition's policy stance does not influence the Government's pricing decision.

The results also reject the hypothesis that underpricing will be greater for GOC IPOs in which foreign participation is kept to a minimum. The coefficient of foreign ownership is significantly positive (at the 5% level). This result does not support the general proposition that political factors influence government owned IPO pricing. However, as univariate regression results found a negative relationship between foreign ownership and underpricing a definite conclusion cannot be reached.

The coefficient of order is significantly positive (at the 1% level) consistent with Dewenter and Malatesta (1997). This outcome tends to reject the hypothesis that initial returns are higher for the first GOC IPOs within a country than for subsequent offers. The positive relationship may be due to the speculative actions of investors. If early GOC IPOs are successful, there will be increased participation in subsequent GOC IPOs which could lead to speculative activity in the aftermarket which drives up the price.

Finally, model 2 excludes the political statement dummy as univariate results suggest that it is not a suitable proxy for the political support hypothesis. The results are stronger as the significance of age, delay, foreign ownership, employee participation and minimum subscription increase. Results obtained using alternative definitions of underpricing are not significantly different to those reported in Table 7.

V. CONCLUSION

This paper presents evidence of the underpricing of government owned IPOs in Australia and the U.K. The results indicate that GOC IPOs in Australia and the U.K. are significantly underpriced. The average unadjusted underpricing for the entire sample is 17.9%, 11.43% for Australia and 19.37% for the U.K. Australian GOC IPOs are underpriced significantly less than U.K. GOC IPOs. In addition, Australian GOC IPOs have lower underpricing than IPOs of privately owned companies whereas U.K. GOC IPOs have higher underpricing than IPOs of privately owned companies. This result is surprising given the similarities in the privatization process and objectives in the U.K and Australia.

Over the long term, Australian GOC IPOs insignificantly outperform the market over a one, three and five year period compared to U.K. GOC IPOs which significantly underperform in the first year of listing but significantly outperform over three and five years compared to the market index. Furthermore, Australian GOC IPOs experience significantly different long-term performance compared to IPOs of privately owned companies that underperform the market over one and three years.

Although, previous research has identified the phenomenon of government owned IPO underpricing, there have been few empirical studies that examine the determinants of this underpricing. Determinants of underpricing are classified into two categories, those applicable to all IPOs and those unique to government owned IPOs. The results suggest that factors from both categories influence the level of underpricing.

The evidence provides strong support for the hypothesis that issues surrounded by a greater level of ex ante uncertainty will be more underpriced than issues surrounded by less uncertainty. The results also support signalling based explanations of underpricing and the wider stock ownership hypothesis. The results do not support the differential quantity/quality information hypothesis, the certification hypothesis, and Rock's (1986) winner's curse explanation. However, the inadequacy of the proxy for informed demand may explain the results of the test of the winners curse model. Future research may

consider the use of alternative proxies that better reflect the level of informed demand for government owned IPOs. In addition, other hypotheses for the underpricing of GOC IPOs, namely employee ownership, political support and Vicker and Yarrow (1988)'s order of listing hypothesis are not supported.

ENDNOTES

1. OECD Financial Market Trends 1998: no 70.
2. Reserve Bank of Australia Bulletin (1997).
3. The exceptions are one management buyout and one merger.
4. Reserve Bank of Australia Bulletin (1997) and Australian Stock Exchange Share Ownership Survey (1997).
5. See Loughran, Ritter and Rydqvist (1994).
6. Megginson and Netter (2001) include a survey of the international evidence.
7. Preference is given for equity participation to individual Australians as part of public floats.
8. Curtis (1993).
9. Perotti and Guney (1993), Perotti (1995) and Brennan and Franks (1995).
10. Cumulative abnormal returns results are not used in this study. Kothari and Warner (1997) and Barber and Lyon (1997) argue that cumulated returns are biased upward and the bias is an increasing function of the proportionate bid-ask spread of the sample companies.
11. Ritter (1984), Clarkson (1994) and Lyneham (1996).
12. As in Carter and Manaster (1990).
13. How, Izan and Monroe (1995).
14. On a value weighted basis the mean return for U.K. GOC IPOs is 18.1% compared to 10.98% for Australian GOC IPOs.
15. The unadjusted return is 8.27% and 16.6%.
16. The unadjusted return is 45.5% for GOC IPOs between 1979 and 1987, 45.1% for 13 GOC IPOs between 1981 and 1987, 41.36% for 40 GOC IPOs between 1981 and 1991, 37.3% for 12 GOC IPOs between 1980 and 1988, 27.4% including the value of vouchers in the calculation of the return, 17.7% for 42 GOC IPOs between 1979 and 1996 and 36.3% for 39 GOC IPOs between 1981 and 1996.
17. Significant at the 5% level.
18. Market adjusted returns and price relative returns respectively.
19. The performance on a value weighted basis is 3.75%, 20.59% and 37.69% over one, three and five years.
20. Lee, Taylor and Walter (1996).
21. The t statistics are 2.97 and 2.60 respectively which are significant at the 1% level.
22. The performance on a value weighted basis is -5.13%, 34.26% and 69.36% over one, three and five years.
23. The t stat is 5.37 which is significant at the 1% level.
24. A positive insignificant relationship is found.
25. For example, the desire for wider share ownership may induce the government to keep the offer open so small investors do not miss out.

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