



THE AUSTRALIAN NATIONAL UNIVERSITY

Working Paper Series in Finance 02-04

**THE INTERRELATIONSHIP BETWEEN THE US AND
AUSTRALIAN IPO MARKETS**

Jing Shi

Australian National University

JEL Classification

G12; G14

Keywords

IPOs; stock market; linkage.

Last revision date:

December 2002

Contact author:

Jing Shi

School of Finance and Applied Statistics

The Australian National University

Canberra ACT 0200 AUSTRALIA

Telephone: 02 6125 4864 (International +61 2 6125 4864)

Facsimile: 02 6125 0087 (International +61 2 6125 0087)

Email: Jing.Shi@anu.edu.au

The working paper series is for manuscripts in draft form. Comments are welcome and should be sent to the contact author. Please do not quote without permission.

© Copyright 2002 Jing Shi

THE INTERRELATIONSHIP BETWEEN THE US AND AUSTRALIAN IPO MARKETS

Jing Shi

Abstract

Prior research on initial public offerings (IPOs) has concentrated on analysis of individual IPOs, or at least aggregated statistics thereof. This paper focuses on the aggregate market for IPOs and a cross-market study is undertaken in which the relationship between the Australian and US IPO markets is analyzed. The results reveal the relative dominance of the US market where the frequency of US IPOs leads the frequency of Australian IPOs. However, no linkage is observed in underpricing between the two markets.

Acknowledgements

I would like to acknowledge the helpful comments of an anonymous referee, John Powell, Adrian Pagan, Robert Faff, Robert Brooks, H.Y. Izan, Tom Fetherston, Richard Heaney, and seminar participants at the Doctorate Seminar of European Financial Management Meeting 1999, and the 1st Annual PhD Forum 1999 at the Australian National University. I am especially grateful to Tim Brailsford for his constructive comments and suggestions that greatly improved the paper. I also acknowledge the financial support of Accounting and Finance Association of Australia and New Zealand.

The Interrelationship between the US and Australian IPO Markets

1. Introduction

The role and importance of initial public offerings (IPOs) in financial markets has changed over time and IPO now represents a significant portion of market activity. In recent years, existing linkages between world equity markets have been improved and a significant market disturbance in one country can be more easily transmitted to other stock exchanges (e.g. Jeon and Furstenberg, 1990). This increasing interaction among national stock markets should, in turn, lead to an increasing correlation among IPO activity across markets.

This paper examines the interrelationship between the US and Australian IPO markets. While there exists considerable research in the area of IPOs, it mainly focuses on the US market and research on other international IPO market is still scanty. Moreover, there exists no in-depth analysis of the interdependence among national IPO markets. For instance, Loughran *et al.* (1994) document evidence of the short-run and long run performance of IPOs in fifteen countries but do not further examine the interrelationship between these markets. This may be due to the relatively short time period of their data. This paper fills this gap by exploring the financial linkage between the US and Australian IPO markets.

In an environment where international interaction is significant, knowledge of the relationship among international IPO markets is important for at least three reasons. First, individual investors are interested in the relationships between the national IPO markets for diversification purposes as such diversification may lead to total portfolio risk reduction while enhancing the performance opportunities. An

analysis of the interrelationship between the international IPO activities may shed additional light on the issue of international diversification. Second, owners and financial managers of private companies are also interested in worldwide IPO activity as it may influence investment decisions. Third, an understanding of financial linkages in international IPO activity can also be useful for policy coordination across governments and stock exchanges.

The purpose of this paper is to provide evidence of the interrelationship between the US and Australian IPO markets. Specifically, this paper addresses the following issues:

- a) Does the US IPO market activity influence Australian IPO market activity?
In turn, does Australian IPO market activity influence the US IPO market activity?
- b) Is there one market whose movements in IPO activity lead activity in another country?
- c) How rapidly are the movements of IPO activity in one country transmitted to another country, if at all?

In attempting to answer the above questions, two monthly measures of IPO activity are constructed for both the U.S. and Australia during the period January 1976 to December 2001. A volume measure, the number of IPOs per month (NOIPO), is consistent with previous work (e.g. Ibbotson *et al.*, 1994; Loughran *et al.*, 1994). An underpricing measure, value-weighted underpricing (VWUP), improved upon previous measures of underpricing by weighting each issue's contribution to monthly underpricing according to the relative size of the issue within the month. This avoids the problem whereby traditional arithmetic average measures of underpricing are subject to too much influence from small "penny" stocks (e.g. Ibbotson and Ritter,

1995). A vector autoregressive analysis (VAR) is then applied which allows for the possibility of a lead-lag interaction between the two markets. The results in this study suggest that the number of offerings in the Australian market follows the trend in the US IPO market. However, there appears to be no evidence of any association in IPO underpricing measures between the two markets.

The organisation of the paper is as follows. In Section 2, prior evidence on stock market linkages is reviewed. The development of hypotheses is discussed in Section 3. Section 4 reports data sources. Construction of IPO activity measures for both markets is also presented with descriptive analysis. While Section 5 describes research methods used in this study, the empirical results are discussed in Section 6. The paper is concluded in Section 7.

2. Literature Review

There has been considerable growth in the flow of international investment across markets in recent years. For instance, investment flows across equity markets increased from US\$2.86 billion in 1990 to US\$15.51 billion in 1998.¹ This is in part due to the change in global political and economic dynamics which occurred during the 1980s. In addition, the relaxation of controls on capital movements, globalisation and improvements in technology have also stimulated international fund flows (Arshanapalli and Doukas, 1993). The growth in international flow of capital, in turn, has motivated interaction between stock markets. In other words, existing linkages between world equity markets have been improved and a significant market disturbance in one country can be more easily transmitted to other stock exchanges (Jeon and Furstenberg, 1990).

¹ Source: Table 7.6: Global Financial Flow, *World Development Indicator 2000*, World Bank.

Eun and Shim (1989) recognise that the US market is the most influential in the world. Innovations in the US market are rapidly transmitted to other markets whereas no other single market can significantly explain US market movements. Janakiramanan and Lamba (1998) examine the financial linkages in stock market indices between Pacific-Basin and the US stock markets during 1988-1996. Their results indicate that in general, the US stock market affects all Australasian stock markets. Since the US market is the most influential market in the world, this implies that, *prima facie*, aggregate US IPO activity should also influence IPO activity in other markets.

Previous research has indirectly documented the interrelationship between international IPO markets. Loughran *et al.* (1994) study fifteen international IPO markets and find evidence of a positive correlation between IPO volume and the level of the stock market in 14 out of 15 countries. More recently, by applying a regime-switching model, Brailsford *et al.* (2000) document the existence of hot periods in the U.S. using the U.S. IPO data over the period 1976-1998. They identify a number of hot periods in a variety of IPO activity measures that capture difference aspects of new issue volume and underpricing. Using Australian IPO data over the period 1976-1997, Brailsford *et al.* (2001) also confirm the existence of hot issue periods in both IPO underpricing and volume in Australia. An interesting finding in both above studies is that the IPO activities in both countries are strongly related to local stock market conditions. This implies a potential linkage in aggregate IPO activities between Australia and the U.S., given the relationship between Australia and the US national stock market returns.

3. Development of Hypotheses

Eun and Shim (1989) and Janakiramanan and Lamba (1998) provide empirical evidence of US stock market influences over the Australian stock market. Since IPO represents a significant portion of market activity, it is reasonable to expect that there may also be a potential linkage in aggregate IPO activity between Australia and the USA such that US IPO activity leads Australian IPO activity.

In this paper, the level of IPO activity is examined through two broad activity measures being IPO volume and underpricing. I first discuss the relationship in IPO underpricing between the two markets. Since changes in the stock price reflect a change in investor expectations about future business conditions, a higher stock market return reflects an upward revision in investor expectations (Choe *et al.*, 1993). In the IPO process, the offer price for an IPO is normally set based on the expected business conditions at the date of price setting. Hence, higher underpricing is subsequently expected if there is an upward revision in expected future business conditions. As a result, there should be a positive relation between stock market returns and IPO underpricing, as argued previously. Indeed, empirical evidence have confirmed this relationship (Brailsford *et al.*, 2000; Rees, 1997; Loughran *et al.*, 1994).

Combining the discussions above, an improvement in the US stock market condition can have two consequences. First, it will lead to higher underpricing in the local IPO market due to the evidence of a positive relation between stock market conditions and IPO underpricing. Second, an improvement in the US stock market will transmit to the Australian stock market, which leads to a subsequent improvement in the Australian stock market condition. The improvement in the Australian stock market should, in turn, also result in higher IPO underpricing in the Australian IPO

market. Therefore, it is reasonable to expect that underpricing in the USA leads IPO underpricing in Australia.

A critical issue needs to be considered in analysing the financial linkage in IPO underpricing between Australia and the USA. There is evidence that the degree of IPO underpricing may be affected by many factors. In addition to economic and stock market conditions, the degree of IPO underpricing may also be related to company specific factors, such as the size of issue (e.g. Michaely and Shaw, 1994), price of issue (e.g. Chalk and Peavy 1987), industry classification of issue (e.g. Ritter, 1984), underwriters (e.g. Carter *et al.*, 1998), age and size of the firm (e.g. James and Wier, 1990), and ownership structure of the firm (e.g. Downes and Heinkel, 1992). Since companies going public in two different markets are unlikely to be identical in every respect, the degree of aggregate IPO underpricing may therefore differ between the two markets. As a result, it is expected that the linkage in IPO underpricing between the two countries will be presented but weaker than first expected.

Ibbotson *et al.* (1988) demonstrate significant positive correlation between the annual US IPO initial returns and subsequent annual IPO volume. Brailsford *et al.* (2000) and Brailsford *et al.* (2001) also document a lead-lag relationship between monthly IPO underpricing and volume measures in both the USA and Australia, whereby IPO underpricing leads volume by up to six months. More recently, Lowry and Schwert (2002) conclude that the signal contained in current level of underpricing leads to decisions to issue. Since the level of IPO underpricing in the USA is expected to lead the level of IPO underpricing in Australia, there should be a linkage in IPO volume between the two markets, whereby US IPO volume leads Australian IPO volume.

4. Data

This study examines the interrelationship in the aggregate IPO market activity between Australia and the USA over the period January 1976 and December 2001. The US IPO data is initially collected from the Securities Data Corporation (SDC) and the Australian IPO data is collected from various sources, such as SDC, the Australian Financial Review, Annual Reports of the Stock Exchange of Melbourne, the Companies Department Weekly Schedules published by the Australian Stock Exchange, and the Corporate Adviser IPO database. The IPO sample for both Australia and the USA excludes issues that involve debt, hybrid securities and derivatives.² Similarly, closed-end mutual funds, investment and real estate trusts are excluded due to their unique institutional setting.³ As a result, a final sample consists of 1,070 Australian IPOs and 7,619 US IPOs.

In the literature, the level of IPO activity has been generally examined through two broad measures being volume and underpricing of IPOs. Consistent with these traditional measures, two measures of IPO activity are developed which capture both volume and underpricing aspects of the market.

NOIPO is measured as the number of offerings per month. It is the simplest measure and is consistent with previous literature.

VWUP is a measure of underpricing weighted by the relative size of the offer in each month. Hence, large underpricing observed in small companies in a particular month will not significantly affect this measure. Measures of underpricing have been criticized as they can be subject to too much influence by 'penny' stocks (Ibbotson and

² These issues are basically unit offerings. Unit offerings are removed from the sample due to differences in underpricing between unit and stock IPOs as well as complexities involved in valuing unit offerings (Schultz, 1993; Jain, 1994).

³ Closed-end mutual funds and REITs tend to be overpriced rather than underpriced (Peavy, 1990; Wang *et al.*, 1992). This paper follows Ibbotson *et al.* (1994) in excluding closed-end mutual funds and REITs from the sample.

Ritter, 1995; Ritter, 1998). Indeed, the hot market of 1980 has been ascribed to small natural resource issues (Ritter, 1984). However our measure avoids this criticism by accounting for differences in firm/issue size within the month.⁴ VWUP is calculated as follows:

$$VWUP_t = \frac{\sum_{i=1}^N (\text{proceeds})_{i,t} \times (\text{IPO Underpricing})_{i,t}}{\sum_{i=1}^N (\text{proceeds})_{i,t}} \quad (1)$$

where

$$(\text{IPO underpricing})_{i,t} = \frac{(\text{closing price on first day trading})_{i,t} - (\text{offer price})_{i,t}}{(\text{offer price})_{i,t}} ;$$

i = company 1, 2, ..., N where N is the number of IPOs in month t.

The variables used in the analysis are described below:

USNOIPO = NOIPO for the US IPO sample;

AUSNOIPO = NOIPO for the Australian IPO sample;

USVWUP= VWUP for the US IPO sample;

AUSVWUP= VWUP for the Australian IPO sample.

Summary statistics on the IPO activity measures in Australia and the USA are reported in Table 1. While the AUSNOIPO ranges from a low of zero (e.g. no issues) to a monthly high of 32 IPOs, its mean and standard deviations is 3.43 IPOs and 4.34 IPOs respectively. The USNOIPO has a higher mean value of 24.42 IPOs but also a higher standard deviation of 19.66 IPOs. While the average VWUP per month in the USA is 12.1%, the average VWUP per month in Australia is 22.1%. Of note, the

⁴ A monthly index of equal weighted underpricing is also constructed. This index is highly correlated with the value weighted underpricing index for both Australian and US IPO data (e.g. a correlation of 0.895 is observed using US IPOs).

standard deviation and range for the underpricing measure are greater in Australia than in the USA, which suggests that the IPO underpricing is more volatile in the Australian market. Test statistics from the augmented Dickey-Fuller test for stationarity are presented and these results suggest that the four series are all stationary.

[INSERT TABLE 1 HERE]

By checking the autocorrelation tests for all the series, it appears that statistically significant correlation is observed in the IPO volume series in both markets. The first-order autocorrelation for USNOIPO is 0.797. These results are consistent with prior research which has demonstrated persistence in these series. For instance, Ibbotson *et al.* (1994) observe a first-order autocorrelation of 0.88 for the monthly number of new issues in the USA.

Although there is evidence of significant autocorrelations in the USVWUP, this result is not present in the Australian underpricing measure. Autocorrelations in AUSVWUP are all statistically insignificant and exhibit mixed signs. This supports that argument that the behavior of aggregate IPO underpricing measure in Australia differs.

Figures 1 and 2 present graphs of the IPO volume and underpricing measures across the markets over the period 1976 to 2001, respectively. In Figure 1 NOIPO in Australia appears to exhibit some correlation with NOIPO in the USA, especially in the periods around 1985-1988, 1993-1995 and 1999-2001. However, the relationship in VWUP between Australia and the USA appears to be weaker as shown in Figure 2.

[INSERT FIGURES 1 AND 2 HERE]

5. Research Method

The method used to examine the interrelationship in the level of aggregate IPO market activity between the two countries involves the use of a Vector Autoregression (VAR) model. Loughran *et al.* (1994) and Rees (1997) provide evidence that stock market condition has explanatory power in explaining the measures of IPO underpricing and volume. The implication is that the VAR analysis needs to incorporate the role of stock market variable as control variable to avoid model mis-specification. Hence, relative changes in the monthly stock market indices for both Australia and the USA are incorporated in the VAR analysis. While the Australian stock market index used is the All Ordinaries Price Index, the US stock market index used is the S&P 500 index.⁵

The form of the VAR becomes:

$$y_{1,t} = a_1 + \sum_{i=1}^m b_{1,i} y_{1,t-i} + \sum_{i=1}^m d_{1,i} y_{2,t-i} + \sum_{i=1}^m f_{1,i} USSP_{t-i} + \sum_{i=1}^m j_{1,i} AUSSP_{t-i} + m_{1,t} \quad (2)$$

$$y_{2,t} = a_2 + \sum_{i=1}^m b_{2,i} y_{1,t-i} + \sum_{i=1}^m d_{2,i} y_{2,t-i} + \sum_{i=1}^m f_{2,i} USSP_{t-i} + \sum_{i=1}^m j_{2,i} AUSSP_{t-i} + m_{2,t} \quad (3)$$

where

$y_{1,t}$ denotes the measure of IPO activity in the USA at month t ;

$y_{2,t}$ denotes the measure of IPO activity in Australia at month t ;

m is the number of lags;

$USSP_t$ is the relative changes in the S&P 500 index at month t ;

$AUSSP_t$ is the relative changes in the Australian All Ordinaries price index at month t ;

⁵ Data were obtained from Datastream International. Instead of the relative change in both US and Australian stock market monthly indices, the monthly change in the Morgan Stanley Capital International Index was also used. The results from this alternative index show that the conclusions remain unchanged.

$\mathbf{m}_{1,t}$ and $\mathbf{m}_{2,t}$ are the error terms.

Several critical issues are relevant in the VAR analysis. First, we need to decide how many lags should be included in the model. Given degrees of freedom considerations, as well as the regulatory and institutional features in an IPO market where issuers cannot respond instantaneously to market conditions (due to a three- to six-month lag during which time various activities are undertaken to fulfil the legal requirement and promotion of issues), a lag length of six months for the VAR analysis is chosen.⁶

Second, there is evidence of heteroscedasticity in the series. Therefore, a Generalised Autoregressive Conditional Heteroscedasticity (GARCH) model is used to model the series with heteroscedastic errors. A GARCH (1,1) process was initially fitted to the data. However, the initial estimates indicated an explosive process in the unconditional variance with the GARCH parameters summing to a number slightly greater than one. Therefore, restrictions are imposed through an integrated GARCH process (IGARCH) when appropriate.

As a result, the final form of VAR analysis is:

$$y_{1,t} = a_1 + \sum_{i=1}^6 \mathbf{b}_{1,i} y_{1,t-i} + \sum_{i=1}^6 \mathbf{d}_{1,i} y_{2,t-i} + \sum_{i=1}^6 \mathbf{f}_{1,i} USSP_{t-i} + \sum_{i=1}^6 \mathbf{j}_{1,i} AUSSP_{t-i} + \mathbf{m}_{1,t} \quad (4)$$

$$y_{2,t} = a_2 + \sum_{i=1}^6 \mathbf{b}_{2,i} y_{1,t-i} + \sum_{i=1}^6 \mathbf{d}_{2,i} y_{2,t-i} + \sum_{i=1}^6 \mathbf{f}_{2,i} USSP_{t-i} + \sum_{i=1}^6 \mathbf{j}_{2,i} AUSSP_{t-i} + \mathbf{m}_{2,t} \quad (5)$$

$$\mathbf{m}_{1,t}, \text{ and } \mathbf{m}_{2,t} \sim N(0, h_t^2) \quad (6)$$

$$h_t^2 = v + f_1 \mathbf{m}_{t-1}^2 + f_2 h_{t-1}^2. \quad (7)$$

⁶ The choice of lag length of six months is somewhat arbitrary. However, this lag length is logical and consistent with the results of Ibbotson *et al.* (1994), Brailsford *et al.* (2000) and Brailsford *et al.* (2001).

where

h_t^2 is the conditional variance and is a function of:

- the mean, ν ;
- innovations from the previous month, measured as the lag of the squared residual from the VAR equation, \mathbf{m}_{t-1}^2 ;
- last month's forecasted variance, h_{t-1}^2 .

$$f_1 + f_2 = 1.$$

6. Empirical Results

6.1. IPO Volume

The results of VAR analysis on IPO volume are reported in Table 2. The VAR models enable a test of the predictability of lagged USNOIPO on AUSNOIPO and vice versa. For USNOIPO, the table shows that the lagged coefficients of USNOIPO up to 4 months are positive and significant, except the third lag. This finding is consistent with the autocorrelation results reported in Table 1, and suggests that lags up to four months exhibit significant predictive ability over the current level of USNOIPO. The first four lagged coefficients of USNOIPO add up to a value of 0.921 which indicates that a substantial variation in the number of US IPOs is explained by its first four lags.

[INSERT TABLE 2 HERE]

As noted, lagged coefficients of AUSNOIPO exhibit relatively little influence on USNOIPO, though the first lagged coefficient of AUSNOIPO is negatively significant which is somewhat spurious. Of note, three out of six lagged coefficients of USSP are positive and significant, which implies that an improvement in stock

market conditions precedes increases in the number of IPOs in the USA. This result further confirms the incorporation of stock market variable in the VAR process as control variables. The influence of prior Australian market conditions on the USNOIPO is not evident as indicated by the insignificant lagged coefficients of AUSSP.

For AUSNOIPO, its third and sixth lagged coefficients are statistically significant in explaining the current level of AUSNOIPO. This feature of persistence in Australia is consistent with the US results. Compared to the autocorrelation observed for AUSNOIPO earlier in Table 1, the persistence is somewhat weaker in Australia after controlling for the stock market condition.

Of note, the second, fourth and sixth lagged coefficients of USNOIPO also exhibit statistical explanatory power in explaining the current level of AUSNOIPO. The implication is that an upward trend in the frequency of US IPOs transmits to the Australian market in around six months. This result confirms that while there is evidence of a direct relationship between previous and current frequency of IPOs in Australia, the number of offerings in the Australian market also follows the trend in the US IPO market.

In Summary, the current levels of IPO volume in both Australia and the USA are explained by their own lags and prior stock market conditions. While USNOIPO has an important effect and leads AUSNOIPO by up to six months, the lagged Australian IPO volume measure exhibits little influence on US IPO volume measure. Therefore, the empirical findings support the hypothesis that there is a uni-directional linkage in IPO volume between Australian and the US full samples, whereby US IPO volume leads Australian IPO volume.

6.2. IPO Underpricing

For USVWUP, the results presented in Table 3 indicate that there is a significant positive relationship between current USVWUP and its lags up to five months. Comparing the magnitude of lagged coefficients, it appears that a large variation in current USVWUP is explained by its own first two lags. Although the fifth lag of AUSVWUP is significant, however, this lagged coefficient is only 0.028 which suggests low economic importance. Three out of six lags of USSP exhibit significantly positive coefficients, while none of the lagged coefficients of AUSSP is significant. That is, the influence of stock market conditions on the level of IPO underpricing is presented in the USA and the Australian stock market conditions cannot predict the current level of underpricing in the USA.

[INSERT TABLE 3 HERE]

For AUSVWUP, neither lagged coefficients of USVWUP nor lagged coefficients of AUSVWUP is significant. This suggests that the level of underpricing in the previous six months in both markets exhibit no explanatory power over the current level of underpricing in Australia. Of note, all lagged coefficients of AUSSP exhibit positive signs with significance of the fourth and sixth lags. This finding indicates that the degree of underpricing in Australia has an association with prior local stock market conditions, consistent with the US evidence. Interestingly, the sixth lagged coefficient of USSP is also statistically significant indicating that the current level of underpricing in Australia follows the movements in the US stock market up to six months. However, given the low R-square obtained for the model on AUSVWUP (only 5.7%) and the VAR results observed, it implies that monthly underpricing in Australia generally appears to be unpredictable, given the model.

In summary, IPO underpricing in the USA appears to be mainly explained by its own lags and movements in local stock market. In contrast, neither lagged underpricing in the USA or lagged underpricing in Australia exhibit any predictive ability over the current level of underpricing in Australia. While we posit that there is a linkage in monthly IPO underpricing between the Australian and the US samples, the empirical results indicate this linkage does not exist. An implication from these results is that monthly underpricing in Australia generally appears to be unpredictable and is more likely to be affected by issuer-specific features.

7. Summary

This study has investigated the linkage between the US and Australian IPO markets. By incorporating stock market conditions from both countries, the IPO activity measures for both markets are examined through a VAR model.

Strong autocorrelation is observed on all US IPO activity measures (both IPO volume and underpricing). In addition, all US IPO activity measures appear to be influenced by prior US stock market conditions.

The results on the monthly number of new issues suggest that an upward trend in the frequency of US IPOs transmits to the Australian market in around six months. This result confirms the leading effect of US IPO volume on Australian IPO volume. However, the lead-lag relationship is not evident in another measures, IPO underpricing.

Although there is evidence of persistence in the monthly number of offerings in Australia, this feature is not evident in another Australian IPO measure, AUSVWUP. While the number of IPOs in Australia appears to follow the general trend in the US market, and there appears evidence of a relationship between Australian IPO underpricing and previous local stock market conditions, neither

lagged underpricing in the USA or Australia exhibit any explanatory power over the current level of underpricing in Australia. The result suggests that IPO underpricing in Australia is largely unpredictable and is more likely to be affected by issuer-specific features.

References

- Arshanapalli, B. & Doukas, J. (1993), 'International Stock Market Linkages: Evidence from the Pre- and Post-October 1987 Period', *Journal of Banking and Finance*, vol. 17, pp. 193-208.
- Brailsford, T.J., Heaney, R.A., & Shi, J. (2001), 'The Cyclical Behaviour of the IPO Market in Australia', *Accounting Research Journal*, vol. 14, pp. 17-34.
- Brailsford, T.J., Heaney, R.A., Powell, J.G., & Shi, J. (2000), 'Hot and Cold IPO Markets', *Multinational Finance Journal*, vol. 4, pp. 35-68.
- Carter, R.B., Dark, F.H. & Singh, A.K. (1998), 'Underwriter Reputation, Initial Returns and the Long-Run Performance of IPO Stocks', *Journal of Finance*, vol. 53, pp. 285-311.
- Chalk, A.J. & Peavy, J.W. (1987), 'Initial Public Offerings: Daily Returns, Offering Types and the Price Effect', *Financial Analysts Journal*, vol. 43, pp. 65-69.
- Choe, H., Masulis, R.W. & Nanda, V. (1993), 'Common Stock Offerings Across the Business Cycle: Theory and Evidence', *Journal of Empirical Finance*, vol. 3, pp. 3-31.
- Downes, D.H. & Heinkel, R. (1982), 'Signalling and the Valuation of Unseasoned New Issues', *Journal of Finance*, vol. 37, pp. 1-10.
- Eun, C.S. & Shim, S. (1989), 'International Transmission of Stock Market Movements', *Journal of Financial and Quantitative Analysis*, vol. 24, pp. 241-256.
- Ibbotson, R.G. & Ritter, J.R. (1995), 'Initial Public Offerings', *Handbooks in Operations Research and Management Science*, ed. Jarrow, R.A., Maksimovic, V., and W.T., Ziemba, North-Holland, pp. 993-1016.

- Ibbotson, R.G., Sindelar, J.L. & Ritter, J.R. (1988), 'Initial Public Offerings', *Journal of Applied Corporate Finance*, vol. 1, pp. 37-45.
- Ibbotson, R.G., Sindelar, J.L. & Ritter, J.R. (1994), 'The Market's Problems with the Pricing of Initial Public Offerings', *Journal of Applied Corporate Finance*, vol. 7, pp. 66-74.
- Jain, B. A. (1994), 'The underpricing of 'unit' initial public offerings', *Quarterly Review of Economics and Finance*, vol. 4, pp. 309-325.
- James, C. & Wier, P. (1990), 'Borrowing Relationships, Intermediation and the Cost of Issuing Public Securities', *Journal of Financial Economics*, vol. 28, pp. 149-172.
- Janakiramanan, S. & Lamba, A.S. (1998), 'An Empirical Examination of Linkages between Pacific-Basin Stock Markets', *Journal of International Financial Markets, Institutions and Money*, vol. 8, pp. 155-173.
- Jeon, B.N. & Furstenberg, G.M. (1990), 'Growing International Co-movement in Stock Price Indexes', *Quarterly Review of Economics and Business*, vol. 30, pp. 15-30.
- Loughran, T., Ritter, J.R. & Rydqvist, K. (1994), 'Initial Public Offerings: International Insights', *Pacific-Basin Finance Journal*, vol. 2, pp. 165-199.
- Lowry, M. and Schwert, G.W. (2002), 'IPO Market Cycles: Bubbles or Sequential Learning?', *Journal of Finance*, vol. 57, pp. 1171-200.
- Michaely, R. & Shaw, W.H. (1994), 'The Pricing of Initial Public Offerings: Tests of Adverse-Selection and Signalling Theories', *Review of Financial Studies*, vol. 7, pp. 279-319.
- Peavy, J. W. (1990), 'Returns on initial public offerings of closed-end funds', *Review of Financial Studies*, vol. 3, pp. 695-709.

- Rees, W.P. (1997), 'The Arrival Rate of Initial Public Offerings in the UK', *European Financial Management*, vol. 3, pp. 45-62.
- Ritter, J.R. (1984), 'The 'Hot Issue' Market of 1980', *Journal of Business*, vol. 57, pp. 215-240.
- Ritter, J.R. (1998). Initial Public Offerings, in *Warren Gorham and Lamont Handbook of Modern Finance*, ed. Dennis Logue and James Seward, Boston and New York, USA.
- Schultz, P. (1993), 'Unit initial public offerings: A form of staged financing', *Journal of Financial Economics*, vol. 34, pp. 199-229.
- Wang, K.; Chan, S. H. and Gau, G. W. (1992), 'Initial public offerings of equity securities: Anomalous evidence using REITs', *Journal of Financial Economics*, vol. 31, pp. 381-410.

Table 1
Summary Statistics of the IPO Activity in Australia and the USA

	USA		AUSTRALIA	
	USNOIPO	USVWUP	AUSNOIPO	AUSVWUP
Mean	24.420	0.121	3.429	0.221
Standard Deviation	19.663	0.180	4.344	0.501
Maximum	90.000	1.339	32.000	5.416
Minimum	0.000	-0.156	0.000	-0.820
Augmented Dickey-Fuller Test Statistics	-3.443*	-3.185*	-3.738*	-7.445*
<i>Autocorrelation</i>				
Lag 1	0.797*	0.544*	0.634*	-0.065
Lag 2	0.707*	0.527*	0.534*	0.006
Lag 3	0.664*	0.469*	0.559*	0.064
Lag 4	0.636*	0.469*	0.492*	0.002
Lag 5	0.577*	0.483*	0.432*	0.000
Lag 6	0.511*	0.387*	0.443*	0.034

*denotes significance at 5% level.

Table 2
VAR Results of NOIPO between US and Australian IPO Samples

	USNOIPO		AUSNOIPO	
	Coef.	Std. error	Coef.	Std. error
Intercept	0.666	0.763	-0.066	0.151
USNOIPO Lag_1	0.578*	0.060	-0.011	0.007
USNOIPO Lag_2	0.085	0.078	0.025*	0.008
USNOIPO Lag_3	0.136*	0.067	-0.016	0.009
USNOIPO Lag_4	0.122*	0.056	0.018*	0.009
USNOIPO Lag_5	0.065	0.067	-0.002	0.010
USNOIPO Lag_6	-0.042	0.058	0.020*	0.010
AUSNOIPO Lag_1	-0.698*	0.205	0.091	0.054
AUSNOIPO Lag_2	0.264	0.187	0.021	0.054
AUSNOIPO Lag_3	-0.368	0.236	0.168*	0.060
AUSNOIPO Lag_4	0.112	0.217	0.072	0.062
AUSNOIPO Lag_5	0.224	0.178	0.077	0.050
AUSNOIPO Lag_6	0.107	0.161	0.173*	0.052
USSP Lag_1	33.076*	10.296	0.488	2.399
USSP Lag_2	-2.494	10.694	3.618	2.636
USSP Lag_3	17.405	10.058	-4.278	2.952
USSP Lag_4	29.321*	12.158	-3.321	2.263
USSP Lag_5	32.050*	11.424	0.854	2.682
USSP Lag_6	11.084	13.183	-0.664	2.535
AUSSP Lag_1	5.175	8.822	2.035	2.030
AUSSP Lag_2	17.425	11.218	2.135	2.087
AUSSP Lag_3	2.553	10.874	5.603*	2.223
AUSSP Lag_4	-2.766	10.084	4.748*	1.760
AUSSP Lag_5	-13.955	10.060	2.933	1.973
AUSSP Lag_6	-0.291	9.244	0.069	1.884
<i>Variance Equation</i>				
Constant	1.773	1.066	0.083	0.045
ARCH(1)	0.283*	0.055	0.304*	0.055
GARCH(1)	0.718*	0.055	0.697*	0.055
R-square	0.710		0.455	

*denotes significance at 5% level.

Table 3
VAR Results of VWUP between US and Australian IPO Samples

	USVWUP		AUSVWUP	
	Coef.	Std. error	Coef.	Std. error
Intercept	0.008	0.009	0.168*	0.042
USVWUP Lag_1	0.333*	0.088	-0.063	0.209
USVWUP Lag_2	0.488*	0.051	0.232	0.245
USVWUP Lag_3	-0.128*	0.054	0.194	0.213
USVWUP Lag_4	-0.215*	0.048	0.005	0.232
USVWUP Lag_5	0.188*	0.046	-0.042	0.181
USVWUP Lag_6	-0.029	0.051	-0.085	0.177
AUSVWUP Lag_1	-0.005	0.013	0.101	0.074
AUSVWUP Lag_2	-0.009	0.011	0.066	0.055
AUSVWUP Lag_3	-0.001	0.009	0.004	0.074
AUSVWUP Lag_4	0.015	0.012	0.008	0.056
AUSVWUP Lag_5	0.028*	0.007	0.025	0.060
AUSVWUP Lag_6	0.005	0.008	0.069	0.047
USSP Lag_1	0.392*	0.115	-0.193	0.684
USSP Lag_2	-0.016	0.103	0.428	0.756
USSP Lag_3	0.402*	0.120	0.668	0.682
USSP Lag_4	0.164	0.133	-0.939	0.693
USSP Lag_5	-0.168	0.126	-0.743	0.736
USSP Lag_6	-0.498*	0.104	-2.028*	0.614
AUSSP Lag_1	-0.039	0.086	-0.063	0.527
AUSSP Lag_2	0.071	0.091	0.330	0.630
AUSSP Lag_3	-0.098	0.088	0.416	0.594
AUSSP Lag_4	-0.123	0.091	1.817*	0.533
AUSSP Lag_5	0.041	0.095	0.827	0.678
AUSSP Lag_6	0.128	0.089	1.886*	0.413
<i>Variance Equation</i>				
constant	0.002*	0.000	0.105*	0.016
ARCH(1)	0.776*	0.060	1.000*	0.000
GARCH(1)	0.224*	0.060	0.000*	0.000
R-square	0.278		0.057	

*denotes significance at 5% level.

Figure 1
NOIPO between Australia and the USA

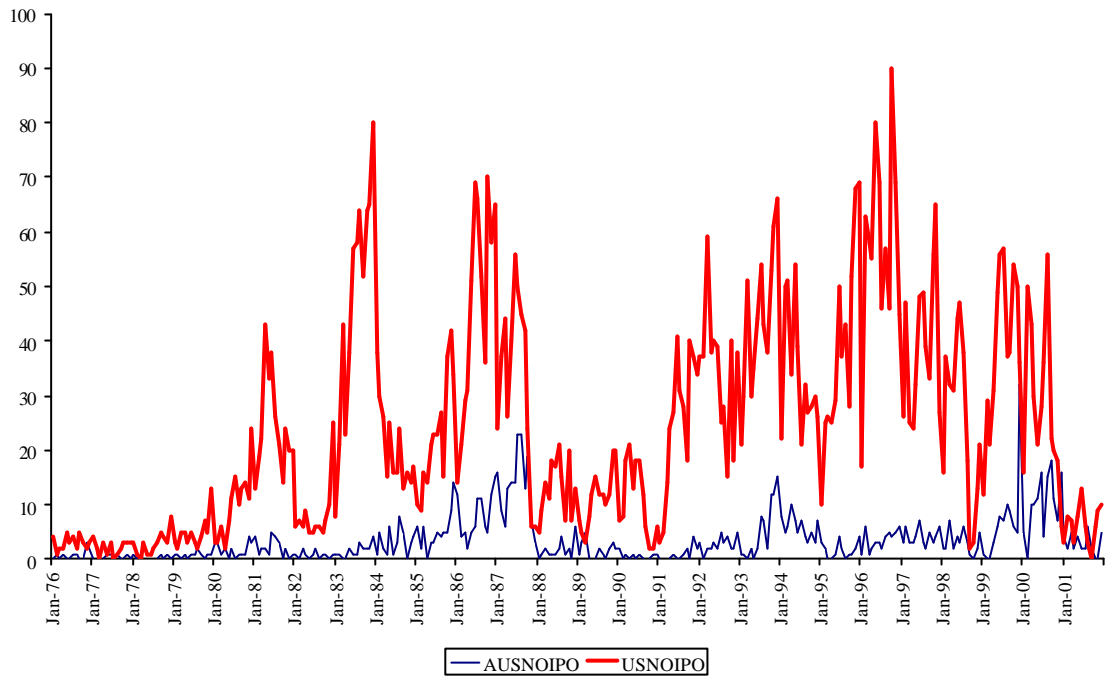


Figure 2
VWUP between Australia and the USA

