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Abstract

A unique dataset is analyzed in this study comprising of data obtained from the TSE transactions record database on trading activity for the 208 IPO firms. The investor's identity can trace investor's trading records. Thus, we can define new and old investors. Additionally, the identification of the type of investor (as either an individual or institutional investor) facilitates the examination of investor behavior for either type.

From the analysis in the chapter 2, we can see that there is an increase over time in the number of investors which IPOs are able to attract. An increase of 14.2 percent is found in the mean number of investors per firm, while 43.8 percent of firms are found to experience increases in the overall number of investors from the first year to the second year after their initial listing. On average, the mean rate of increase for new investors is larger than that for old investors, with 61.5 percent of IPO firms experiencing increases in the total number of new investors, as compared to the 39.4 percent of firms which experience increases in old investors.

The results reveal that the rate of increase in investors has a positive correlation with holding period excess returns (HPERs), which helps to explain why both firms and stock exchanges have such similar strong desires to see improvements in the overall number of investors. A significant increase in new investors is discernible in a 'hot' market, and in those firms with higher return volatility levels. Furthermore, all investors naturally prefer firms with higher returns.

The analysis of the changes in the investor base suggests that if investors do not hold the stock in first year, then the higher the HPERs, the greater the overall increase in the total number of investors; however, where investors had previously held the relevant stocks, we find that they will tend to sell their winning stocks.

Chapter 3 undertakes an examination of the Merton (1987) 'investor recognition hypothesis', in which he argues that an increase in the total number of investors with prior knowledge of a firm will ultimately lower the expected returns of investors by reducing the 'shadow cost' arising from the lack of knowledge on a particular security; the end result of this will invariably be an increase in the market value of the firm's shares. In contrast to the prior studies, we employ the total number of traders to represent the awareness of any given firm among investors.

We examine the reduction in the costs of equity capital associated with listing using the 'market model' to compute the abnormal returns, and find a decline in the average daily abnormal return in the second year. Similar patterns are discernible for firms in both the non-electronics and electronics industries. Finally, our test of the Merton (1987) investor recognition hypothesis is undertaken by regressing the firms'

average abnormal returns against the changes in the overall numbers of traders. The results confirm the association between investor recognition and the costs of capital.

Key Words: investor base, initial public offering (IPO), cost of capital

Chinese Abstract

本論文利用證券交易所提供的日內成交資料可以追蹤投資人的交易記錄，並研究 1995-2003 年 208 家初次發行上市公司(IPO)的新舊投資人基礎以及其變動對於資金成本的影響。研究結果發現，大部分 IPO 確實能增加投資人基礎，而且投資人偏好報酬率與報酬率波動較大的股票；另外，投資人基礎的變動可以解釋 Merton(1987) investor recognition hypothesis，即投資人基礎增加可以降低資金成本。

由第二章的分析可知大部分 IPO 的確能吸引更多的投資人交易，平均而言，第二年新增 14.2%的投資人交易，而且有 43.8%的公司增加投資人交易；另外，61.5%的公司吸引更多的新投資人，只有 39.4%的公司吸引更多的舊投資人。投資人增加的比率與持有期間超額報酬有關，這可以解釋為何上市公司以及交易所皆努力提升投資人基礎。另外，新投資人在市場較熱絡時增加較為顯著，而且較偏好報酬率波動較大的股票。

除了研究第二年投資人基礎增加的情形，本論文亦研究第一年的投資人在第二年的股票持有變化情形，如果投資人在第一年曾經持有該公司的股票，並於期末前賣掉，則第二年股票的持有期間超額報酬率愈高時，將吸引愈多的投資人繼續交易該股票；但是如果投資人在第一年期末持有該 IPO 股票，當股票的第二年持有期間超額報酬率愈高時，投資人會傾向賣掉手中持股。

第三章檢驗 Merton (1987) ‘investor recognition hypothesis’，即公司增加愈多投資人基礎將降低因為資訊不完全所產生之資金成本，並增加公司的價值。相對於之前針對投資人基礎增加會降低資金成本的研究，本論文以交易該公司股票的投資人代表知道該股票的投資人基礎，此代理變數較先前研究更能代表“awareness of the firm”。利用市場模型，發現公司在第二年平均減少超額報酬率，若將樣本分成電子與非電子產業，仍然得到類似的結果。最後，本論文發現投資人變動的確能解釋異常報酬的變動，即符合 Merton (1987) investor recognition hypothesis，此現象不論在產業分類或法人皆得到一致的結論。

關鍵詞：投資人基礎，初次上市公司，資金成本

Chapter 1 Introduction

A 'good' financial market, which is able to provide investors with an environment of greater investment choices and opportunities, should also be able to succeed in attracting greater numbers of investors to become involved within the market. A considerable body of research has emerged over recent decades addressing the various topics relating to stock market development, with the various indicators used as proxies for financial development in these studies including the number of listed and newly-listed domestic companies (Frost, Gordon and Hayes, 2006; La Porta, Lopez-de-silanes and Shleifer, 2006).

The extant literature is replete with studies which attempt to explain the factors motivating initial public offerings (IPOs). It is essentially argued within such studies that IPOs can raise the overall level of publicity for a firm, thereby potentially enhancing its reputation (Maksimovic and Pichler, 2001). Furthermore, those IPOs that are targeted for more comprehensive coverage by analysts (Bradley, Jordan and Ritter, 2008) and those with higher levels of disclosure (Diamond and Verrecchia, 1991; Kim and Verrecchia, 1991, 1994) will invariably also see an increase in the shareholder base of their firms (Mittoo, 1992; Fanto and Karmel, 1997), thereby raising the level of liquidity of their firms' stocks, while also minimizing the costs of capital (Lins, Strickland and Zenner, 2005).

When firms engage in IPOs, their stocks continue to be traded within the same trading environment and under the same trading mechanism; that is, there is no change in the overall market microstructure. Thus, in contrast to the prior studies on the effects of cross-listing, this dissertation sets out to document the investor base of 208 IPOs listed on the Taiwan Stock Exchange (TSE).

A unique dataset is analyzed in this study comprising of data obtained from the TSE transactions record database on trading activity for the 208 IPO firms. This database provides detailed information on the trading data of all investors for every trading day, including the investor's identity (with random code transform), the type of investor, stock number, date and time of trade, trade size, trade price and whether the trade was a buy or a sell. The investor's identity can trace investor's trading records. Thus, we can define new and old investors. Additionally, the identification of the type of investor (as either an individual or institutional investor) facilitates the examination of investor behavior for either type.

In order to effectively analyze the rate of change in the investor base, we need to determine which kind of IPO firms investors prefer, including the particular characteristics they look for, and also to evaluate the effects on the costs of capital based upon such investor recognition. For an exchange, the greater the number of firms choosing to go public which coincide with the preferences of investors, the more liquid

and efficient the market will subsequently become. Thus, an enhanced stock market will provide investors with better diversification opportunities, thereby lowering firms' costs of capital and increasing stock prices.

From the analysis undertaken in Chapter 2, we can see that there is an increase over time in the number of investors which IPOs are able to attract. An increase of 14.2 percent is found in the mean number of investors per firm, while 43.8 percent of firms are found to experience increases in the overall number of investors from the first year to the second year after their initial listing. On average, the mean rate of increase for new investors is larger than that for old investors, with 61.5 percent of IPO firms experiencing increases in the total number of new investors, as compared to the 39.4 percent of firms which experience increases in old investors.

The results reveal that the rate of increase in investors has a positive correlation with holding period excess returns (HPERs), which helps to explain why both firms and stock exchanges have such similar strong desires to see improvements in the overall number of investors. The multivariate results of the rate of change in the investor base on firm characteristics show that firms with high betas experience a reduction in investors, and this is particularly so for net buyers. A significant increase in new investors is discernible in a 'hot' market, and in those firms with higher return volatility levels. Furthermore, the coefficients of HPERs on the rate of change in the investor base are significantly positive at the 1 percent level; that is, all investors naturally prefer firms with higher returns.

From the analysis undertaken in this dissertation on the evolution of the investor base over time, it is clear that there is a tradeoff between the stability and liquidity of the investor base. Firms would obviously like to see investors continuing to regularly invest in their stocks; the only real exception to this would be the desire to see improvements in the groups of investors associated with the firm. However, it is also clear that if a firm's investor base is too stable, then there is likely to be less liquidity, such that the firm will ultimately be unable to attract any further investment.

The analysis of the changes in the investor base in this dissertation suggests that if investors do not hold the stock in first year, then the higher the HPERs, the greater the overall increase in the total number of investors; however, where investors had previously held the relevant stocks, we find that they will tend to sell their winning stocks.

Chapter 3 undertakes an examination of the Merton (1987) 'investor recognition hypothesis', in which he argues that an increase in the total number of investors with prior knowledge of a firm will ultimately lower the expected returns of investors by reducing the 'shadow cost' arising from the lack of knowledge on a particular security; the end result of this will invariably be an increase in the market value of the firm's

shares. In contrast to the prior studies, which tend to use the number of shareholders, the number of analysts' reports or the number of citations of a firm in the Wall Street Journal (WSJ) or Financial Times (FT), we employ the total number of traders to represent the awareness of any given firm among investors.[1]

When an investor does decide to trade in a given stock, it would naturally be expected that the investor would already have some prior knowledge of that particular firm. It is also suggested that investors will often have a tendency to concentrate their holdings in certain stocks to which they may have some professional affinity or geographical proximity, or in stocks which they may have previously held for some considerable period of time. Furthermore, according to 'familiarity' theory, although an investor may well decide to sell off his inventory of stocks, given that he does have some level of familiarity with a particular firm, there is also a high probability of the investor holding on to that stock.

We examine the reduction in the costs of equity capital associated with listing using the 'market model' to compute the abnormal returns, and find a decline in the average daily abnormal return in the second year. Similar patterns are discernible for firms in both the non-electronics and electronics industries. Finally, our test of the Merton (1987) investor recognition hypothesis is undertaken by regressing the firms' average abnormal returns against the changes in the overall numbers of traders. The results confirm the association between investor recognition and the costs of capital.

The remainder of this dissertation is organized as follows. In Chapter 2, we examine the rate of change in, the investor base, and go on to analyze the ways in which investors select their IPO stocks. Analysis of the impact of investors on the costs of capital of IPO stocks is subsequently undertaken in Chapter 3, followed in Chapter 4 by a summary of this dissertation, along with presentation of the conclusions drawn from the study.

[1] Kadlec and McConnell (1994), Foerster and Karolyi (1999), Tse and Devos (2004) and Baker, Nofsinger, and Weaver (2002) examine the effects of a reduction in the costs of capital using NYSE or LSE data, while Amihud, Mendelson and Uno (1999) use Japanese data for a similar analysis.

Chapter 2 How IPO Firms are Chosen by New and Old Investors

1. Introduction

A considerable body of research addressing topics relating to stock market development is already available within the extant literature.[2] In many of these studies, proxies for financial development are provided by a variety of indicators, including the number of newly-listed domestic companies, deflated either by the population of the country (Frost, Gordon and Hayes, 2006) or by GDP (La Porta, Lopez-de-silanes, and Shleifer, 2006), or the total number of listed domestic companies, again deflated by the population of the country (Frost et al., 2006; La Porta et al., 2006; Demirgüc-Kunt and Levine, 1995). These proxies indicate that a 'good' market can provide investors with greater investment choices, and thus attract more investment in the financial market.

In reality, it is obvious that many exchanges do their utmost to induce greater numbers of firms to list on their exchanges. For example, a working alliance was formed by the NYSE and Tokyo Stock Exchange, while in Asia, the Hong Kong Stock Exchange reorganized itself to attract prospective issuers from Mainland China, while also promoting its listing platform to Korean and Japanese companies (Hong Kong Exchange, 2006).[3] There is, however, little evidence to suggest that every firm engaging in an IPO is actually able to attract greater numbers of investors, or indeed, whether they can attract more new or old investors.

A unique dataset is analyzed in this study comprising of data obtained from the Taiwan Stock Exchange (TSE) transactions record database on trading activity. This database provides detailed information on the trading data of all investors for every trading day, including the investor's identity (with random code transform), the type of investor, stock number, date and time of trade, trade size, trade price and whether the trade was a buy or a sell. The investor's identity can trace investor's trading records. Thus, we can define new and old investors.

In this study of 208 IPO firms listed on the TSE, we find that there is an increase,

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[2] Beck, Demirgüc-Kunt, and Levine (2003) assess the determinants of financial development, while Frost et al. (2006) examine the associations between market development and measures of stock exchange disclosure, and La Porta et al. (2006) examine the effects of securities laws on stock market development. Other studies, such as Greenwood and Smith (1997), Levine and Zervos (1998) and Black (2001) examine the relationship between financial development and economic growth.

[3] Exchanges can improve liquidity and expand the number of listed firms in various ways. For instance, NYSE Euronext, the holding company created by the combination of NYSE Group and Euronext in April 2007, operates the world's largest and most liquid exchange group offering the most diverse array of financial products and services. The Singapore Exchange also signed a Memorandum of Understanding with the Financial Affairs Office in the Liaoning Province of the government of the People's Republic of China to strengthen its listing collaboration in June 2006 (Stock Exchange of Singapore, 2006).

over time, in the number of investors that IPOs are able to attract; the increase in the mean number of investors is found to be 14.2 percent per firm. Furthermore, 43.8 percent of the firms are found to experience an increase in the number of investors between the first and second 252-trading-day periods after listing (each period covering approximately one calendar year).

A new investor is defined in this study as one who has not engaged in any trading whatsoever in the three-year period prior to the IPO listing and then subsequently trades in the IPO stock.[4] We find that 61.5 percent of IPO firms tend to attract more new investors, while 39.4 percent tend to attract old investors; indeed, the mean rate of increase in new investors, at 12.6 percent, is much greater than that for old investors, at just 1.5 percent. The results also show that the rate of increase in investors has a positive relationship with 'holding period excess returns' (HPERs), which is why both stock exchanges and firms wish to see improvements in their overall numbers of investors. For the exchanges, if more firms choose to go public, then this will in turn make the markets more liquid and efficient; the resultant enhanced stock market will then provide investors with better diversification opportunities, which will thereby lower firms' capital costs and increase the price of their stocks.[5]

As noted by Subrahmanyam and Titman (1999), when greater numbers of agents begin to engage in stock market investment, this can create a 'snowball effect' further stimulating more firms to go public, and so the cycle continues. For listed firms, strong capital markets clearly help to reduce their overall costs of capital, thus enabling them to become more reliant upon external capital (Lins, Strickland and Zenner, 2005). Other studies, such as Merton (1987), Kadlec and McConnell (1994), Foerster and Karolyi (1999) and Tse and Devos (2004) find an increase in the number of shareholders after cross-listing, which they note is also associated with lower returns, thereby encouraging investment and helping to promote the rapid growth of firms (Frost et al., 2006).

It is important, for both the firms and the exchange, to have a good understanding of the evolution of, and the rate of change in, the investor base. This chapter therefore sets out to determine how certain firm-specific characteristics can attract greater numbers of investors, and whether such characteristics can explain the association, over time, with the evolution of the investor base. A similar view, proposed by Mayhew and Mihov (2004), is to identify the characteristics that make stocks more likely to be selected for options listing. If exchanges are aware of which types of IPOs can attract more investors,

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[4] Based on the 15 years study on investors' trading, we find an investor trades once every 59 days on average and the maximum trading interval is 364 days (about 1.5 trading years). Thus, this study that defines the new investor who never trades in the three-year prior to the IPO listing is reasonable.

[5] Boot, Thakor and Gopalan (2007) find that an increase in investor participation in the public equity market leads to an increase in the attractiveness of public ownership by elevating a firm's stock price, reducing its price volatility, and increasing the autonomy of its managers.

they can then encourage those types of firms to go public on their exchanges.

A variety of studies within the prior literature examine the reasons why firms move between exchanges, and the subsequent effects, including improved liquidity (Clyde, Schultz and Zaman, 1997; Barclay, Kandel and Marx, 1998), increased investor recognition (Cowan, Carter, Dark and Singh, 1992) and improved visibility (Kadlec and McConnell, 1994; Tse and Devos, 2004). Thus, if firms become aware of the specific firm characteristics that are associated with the evolution of the investor base, they can choose the appropriate exchange best suited to their proposed cross-listing.

The multivariate results of the rate of change in the investor base on firm characteristics show that those firms with low relative book-to-market ratios will experience an increase in their investor base, albeit somewhat weaker, while firms with high betas will experience a reduction in investors, particularly with regard to net buyers. Furthermore, there is a significant increase in new investors in a 'hot' market for those firms with higher return volatility. Finally, the coefficients of HPERs on the rate of change in the investor base are significantly positive at the 1 percent level, thereby indicating the obvious, that all investors prefer firms with high returns.

In addition to examining the increase in investors, this chapter also analyzes the evolution of the investor base in the first period over time. There is clearly a tradeoff between the stability and liquidity of the investor base. Firms would of course like to see investors continuing to invest in their stocks; however, if a firm's investor base is too stable, there will be less liquidity, which will ultimately result in the firm being unable to attract any further investment. An exception to this relates to improvements in the investor base. In an attempt to provide an understanding of the evolution of the investor base, we net every buy and sell undertaken by investors to define three types of investors: (i) net buyers, who hold positive positions; (ii) net sellers, who hold negative positions; and (iii) net zero investors, who buy stocks and then sell them off.

The results show that there is an association between greater numbers of investors holding stocks from a 'net sell' position and firms with relative low book-to-market ratios, low betas, high return volatility, high turnover and high HPERs. For those firms with growth stocks and low return volatility, there is a discernible increase in investors who were formerly 'net buy' or 'net zero' traders changing to the classification of 'net sell' traders. In short, if investors do not hold the stock in period 1, then the higher the HPERs, the greater the increase in investors.

There are at least three aspects of this setting that make it of interest to this study. Firstly, an exchange may understand which characteristics of IPOs can produce greater numbers of investors, new investors in particular. Secondly, a firm may fully understand its investor base and therefore decide to go public on its selected alternate exchange. Thirdly, this chapter complements the prior literature by explicitly considering the

investor base of IPOs; in short, we provide a direct link between stock-exchange policy and market development.

The remainder of this chapter is organized as follows. The next section provides details of the hypotheses proposed in this chapter. Section 3 presents a discussion of the data and research methodology, followed in Section 4 by the reporting of the main empirical results. The conclusions drawn in this chapter are presented in Section 5.

2. Hypotheses

The motivation for IPOs is proposed in numerous studies; for example, in their surveys of managers, Mittoo (1992) and Fanto and Karmel (1997) note that listing in the US lowers the costs of capital, provides access to foreign capital markets, increases the ability of managers to raise equity, increases their shareholder base, and adds liquidity, visibility, exposure and prestige to their stocks. In particular, it is suggested by Gervais, Kaniel and Mingelgrin (2001) that the increased visibility of a stock may well help to attract new investors.

Furthermore, from their survey of 336 chief financial officers (CFOs), Brau and Fawcett (2006) find that one of the primary motives for going public is the desire to enhance the reputation of the company. Other studies, such as Maksimovic and Pichler (2001), also provide support for this proposition; indeed, it is widely reported in many studies that positive excess returns are expected when firms move, for example, from the Nasdaq to the NYSE, essentially because of the stringent listing requirements of the NYSE, but also because of the subsequent reputation effect.[6]

Foreign firms seeking access to U.S. markets often cite changes in the underlying liquidity in the market for the shares and to changes in the shareholder base as two key factors in their decision to list abroad (Karolyi, 1998) but they are just as likely to influence U.S. firms that may simply seek to change trading location (i.e., from Nasdaq to the NYSE). In fact, existing research on domestic listings, such as Christie and Huang (1993), Kadlec and McConnell (1994) and Foerster and Karolyi (1999), links the effects of listing choices on share prices, liquidity, and changes in the shareholder base to theoretical models developed by Amihud and Mendelson (1986) and Merton (1987). Thus, the first hypothesis of this chapter is:

Hypothesis 1: *IPO firms will attract more investors.*

A healthy investment environment with more investment choices can attract greater numbers of investors to participate within the financial market. According to the

[6] See, for example, Sanger and McConnell (1986) and Kadlec and McConnell (1994).

'market timing hypothesis', given that CEOs consider stock prices to be a key factor in security issuance decisions (Graham and Harvey, 2001), firms will tend to time the market both when they list and when they issue equity (Baker and Wurgler, 2002; Derrien and Kecskés, 2007); that is, they will issue equity when it is overvalued by irrational investors who fail to revise their valuations to reflect the information conveyed to them by the equity issuance.

Lowry and Schwert (2002) find that both IPO volume and average initial returns are highly autocorrelated. Pástor and Veronesi (2005) also argue that IPOs tend to come in waves, preceded by high market returns and subsequently followed by low market returns. [7] Additionally, Benningaa, Helmantelc, and Sarig (2005) model the clustering in time of IPOs, the industry concentration of IPO waves, and the coincidence of IPO waves with relatively high market prices, and appear to be confirmed by Lowry and Schwert (2002). Lowry (2003) also suggests that IPO volume fluctuates substantially over time and finds the level of investor optimism can explain these fluctuations.[8] In this study, new investors are defined as those who have never traded during the three-year period prior to the IPO listing, and then subsequently trade in the IPO stocks. A 'hot' market has a greater effect on new investors than old investors because the former have less experience. Thus, our second hypothesis is:

Hypothesis 2: *Increases in new investors will be great when the market is 'hot'.*

3. Data and Methodology

3.1 Data

This study attempts to shed some light on the analysis of the investor base of IPOs, identifying those firms from the TSE website which were newly listed on the exchange between 1995 and 2003. The original sample covering the whole of the study period provides a total of 238 IPO firms; however, following the exclusion of 28 financial firms (including banks, savings and loans companies, insurance companies, financial holding companies, and securities companies) and an additional two firms with missing relevant data, we are left with a final sample of 208 IPO firms.

The data adopted for use in this chapter on the offer characteristics for each IPO are obtained from the Taiwan Economic Journal (TEJ) and verified using the Taiwan

[7] Baker and Wurgler (2000) suggest that firms successfully time the market, having IPOs near market peaks. Higher numbers of firms successfully go public prior to periods of lower market returns.

[8] Evidence has also been presented of a positive relationship between IPO volume and investor sentiment in the US market. Refer to Lee, Shleifer and Thaler (1991), Helwege and Liang (1996), Rajan and Servaes (1997), and more recently, Lowry (2000).

Securities Association website. We also analyze a unique dataset comprising of trading activity in the 208 IPOs using data from the TSE trading records database. The TSE database provides comprehensive information on trading by all investors for each trading day, including the investor's identity (with random code transform), the type of investor, the stock number, the date and time of the trade, the trade size, trade price and whether the trade was a 'buy' or a 'sell'. Identification of the type of investor (either as an individual or institutional investor) facilitates the examination of investor behavior.

In this chapter, we focus on investors' common stock sales and purchases, and supplement the information with stock prices, trading volume and financial statement data obtained from the TEJ. Table 2.1 provides the summary statistics on the IPO firms (Panel A) and their offer characteristics (Panel B). As can be seen from Panel A, the average size of the IPOs in the sample is quite large, with a market capitalization (based on the first-day closing price) of NT$16 billion, and total assets of NT$10 billion. The average firm also has a book-to-market ratio of 0.4.

Unlike other exchanges, there was a 7 percent upper/lower limit on daily price fluctuations in the Taiwan stock market for all IPOs prior to March 2005; 'honeymoon days' are therefore defined as the number of consecutive days when the closing price hit the daily price limit, a point at which there will usually be no more trading volume until the transaction price has fallen below the price limit.[9] The initial returns are equal to the percentage returns on the IPO from the offer price to the IPO's closing price on the next day of honeymoon days. The 208 IPOs in Table 2.1 have average initial returns of 19.7 percent; the lowest were –46.4 percent and the highest were 162 percent.

As later echoed by Pástor and Veronesi (2005), Ritter (1984) had earlier argued that there were waves of IPOs, a phenomenon referred to as the 'hot issues market'; that is, a situation in which IPO volume is high when shares are 'overvalued'.[10] Since firms tend to time the market, both when they list and when they issue equity (Baker and Wurgler, 2002; Derrien and Kecskés, 2007), there should be an increase in the total number of investors in a 'hot' market. By splitting the sample into quartiles based upon the initial returns in Panel A, the IPOs are categorized in Panel B of Table 2.1 as 'cold', 'cool', 'warm' and 'hot'.

'Hot' IPOs are those that open by more than 31.3 percent above the offer price, 'warm' IPOs open by a maximum of 31.3 percent above the offer price, 'cool' IPOs open by no more than 12.7 percent above the offer price, and 'cold' IPOs open below the offer price. Based upon this classification, the sub-samples comprise of between 51 and 53

[9] Between 1995 and 2003, honeymoon days for IPOs in the TSE ranged from a single day to 20 days.

[10] Consistent results are found in numerous studies, including Ritter (1991), Loughran, Ritter and Rydqvist (1994), Loughran and Ritter (1995), Rajan and Servaes (1997, 2003), Pagano, Panetta and Zingales (1998), Baker and Wurgler (2000), and Lowry (2003).

IPOs. The table lists the mean and median value for each variable, and a p-value from a test of the restriction that means are equal across cold, cool, warm and hot IPOs.

Table 2.1 Summary statistics for the 208 IPOs on the TSE

The table shows the summary statistics for a sample of 208 IPOs listed on the TSE between 1995 and 2003. Firm and offer characteristics are presented in Panel A, where 'market cap.' is defined as the outstanding post-IPO shares multiplied by the first-day closing stock price; 'book-to-market' ratio refers to the post-IPO book value of equity divided by market capitalization; 'total assets' are based on the most recent fiscal year ending prior to the IPOs; 'NT$' is the New Taiwan Dollar; M refers to millions; NT$B refers to New Taiwan Dollars in billions; and 'honeymoon days' indicates the number of consecutive days when the closing price hit the daily price limit, a point at which there will usually be no more trading volume until the transaction price has fallen below the price limit. The 'initial returns' is calculated as (closing price on the next day of honeymoon days - offering price) / offering price. The IPOs are then grouped in Panel B based upon their initial returns, where hot IPOs are those that open by more than 31.3% above the offer price, warm IPOs open by no more than 31.3% above the offer price, cool IPOs open by no more than 12.7%above the offer price, and cold IPOs open below the offer price. For each variable, the table lists the mean value, median value, and a p-value from a test of the restriction where means are equal across cold, cool, warm and hot IPOs.

Panel A

	Mean	Min.	Q1	Q2	Q3	Max.
Offer Price (NT$)	53.4	10.5	29.0	40.0	61.0	375.0
Shares Offered (M)	25.8	2.6	9.2	13.7	20.0	1543.6
Market Cap. (NT$B)	16.0	0.6	2.4	4.1	9.0	969.6
Total Assets (NT$B)	10.0	0.4	1.9	3.1	5.6	466.0
Book-to-Market	0.4	0.1	0.3	0.4	0.5	1.7
Honeymoon Days	4.2	1.0	2.0	3.0	6.0	20.0
Initial Returns (IRs)	19.7%	-46.4%	0.0%	12.7%	31.3%	162.0%

Panel B

	Cold (N = 51) (IR<0)		Cool (N = 53) (0≦IR<12.7%)		Warm (N = 52) (12.7%≦IR<31.3%)		Hot (N = 52) (31.3%≦IR)		F-Test / P-value
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	
Offer Price (NT$)	47.4	35.0	43.2	38.3	54.7	37.0	68.5	47.5	0.014
Shares Offered (M)	43.9	12.1	17.3	13.3	24.0	15.2	18.4	13.9	0.567
Market Cap. (NT$B)	26.5	4.2	6.2	3.6	21.4	4.9	10.4	4.9	0.464
Total Assets (NT$B)	15.8	3.5	5.3	2.3	14.2	4.4	5.1	3.0	0.382
Book-to-Market	0.6	0.5	0.5	0.4	0.4	0.4	0.3	0.3	<0.0001
Honeymoon Days	2.6	2.0	2.0	2.0	3.7	3.5	8.5	8.0	<0.0001
Initial Returns (IRs)	-9.8%	-5.6%	5.3%	4.6%	19.5%	18.3%	63.4%	53.5%	<0.0001

The results show that for hot IPOs, the offer price, honeymoon days and initial returns are all higher, while the book-to-market ratio is lower, with the F-tests showing that these differences are significant at the 1 percent level.

3.2 Methodology

We follow a simple two-step procedure for the analysis of the investor base of

IPOs, first of all by using the data on the identity of investors to trace the same investor over time. If an investor trades in an IPO stock, he is regarded as an investor in that stock, regardless of whether he buys or sells. New investors are identified as those who did not engage in any trading during the three-year period prior to the IPO listing.

Investment horizons vary among different investors and investments. Benartzi and Thaler (1995) estimate that the investment horizon for an average investor is one year, while the turnover rate for NYSE securities is found to have been about two years during this period. The TSE data used in our analysis is available from 1992 onwards; we therefore collect trade data for the 208 firms in our sample of firms going public between 1995 and 2003, defining 252 trading days as one year; thus, 63, 126 and 504 days respectively represent periods of three months, six months and two years.

Secondly, we analyze the evolution of the investor base in the first period (about the first year), with particular focus on new investors. By tracing all trades by each investor, we can recreate an investor's portfolio at any specific time after listing. Although the portfolio constructed from the dataset clearly represents only part of the investors' total portfolios, the net flows do, nevertheless, reveal the positions that they take; that is, if an investor has positive net flows, he will have a 'net buy' position, if his net flows are negative (zero) he has a 'net sell' ('net zero') position. A net buy position indicates that the investor holds the stock, whereas a net sell position indicates that the investor held the security prior to its listing on the TSE. If an investor buys a stock and then sells it at any specific time (that is, he clears his position in the stock), he is then regarded as being a net zero investor.

The methodology proposed for the measurement of long-run return performance in the prior studies of Barber and Lyon (1997) and Kothari and Warner (1997) is also followed in this study, favoring HPERs over cumulative abnormal returns (CARs). In order to avoid abnormal returns with underpricing, we compute equally-weighted HPERs, the difference between the raw holding period return and the return on the TAIEX, starting from the next trading day of the honeymoon period of each new issue.

4. Empirical Results

4.1 The Relationship between the IPO Investor Base and Initial Returns

To investigate the evolution of the investor base, we measure the cumulative number of investors in a stock during the different periods, presenting the summary statistics in Panel A of Table 2.2, which shows that there is an increase, over time, in the number of investors which an IPO is able to attract.

Table 2.2 Investor base of IPOs and the relationship with initial returns

The table presents the summary statistics for the investor base of 208 IPOs listed on the TSE from 63-504 days after listing. New (Old) investors refers to changes in the investor base; investors are defined as New if they had never traded during the three-year period prior to the IPO launch, and then began trading in the IPO; otherwise they are defined as Old. Panel B reports the sample means for the two or four sub-groups of the 208 IPOs based on initial returns (IRs), defined as continued returns calculated by taking the difference between the offer price and the natural log of the closing price on the next day of honeymoon days. To test for equality across the groups, we use a t-test for the means in the binary group and an ANOVA F-test for the quartile group. * indicates significance at the 10% level; ** indicates significance at the 5% level; and *** indicates significance at the 1% level.

Panel A

	Days	Mean	Median	Min.	Max.	S.E.
Full Sample	63	13,175	9,091	573	110,532	14,081
	126	18,434	12,203	1,034	119,107	18,598
	252	35,130	22,689	1,176	187,760	34,599
	504	73,767	45,016	1,432	487,607	83,237
New Investors	63	1,756	872	27	21,404	2,651
	126	2,328	1,395	107	24,474	3,048
	252	4,695	2,696	210	33,339	5,476
	504	13,475	6,771	279	115,614	17,961
Old Investors	63	11,420	7,942	546	92,448	11,948
	126	16,105	10,798	850	99,279	16,106
	252	30,434	20,006	966	165,449	29,863
	504	60,292	37,401	1,153	416,135	67,531

Panel B

	Days	Initial Returns		Equality Tests	Initial Return Quartiles				Equality Tests
		<0	≥0		Cold	Cool	Warm	Hot	
Full Sample	63	8,629	14,652	***	8,629	8,951	17,411	17,704	***
	126	13,165	20,145	**	13,165	11,436	25,071	24,096	***
	252	30,812	36,532		30,812	19,482	45,427	45,015	***
	504	72,270	74,254		72,270	42,221	97,371	83,785	***
New Investors	63	888	2,037	***	888	1,360	2,041	2,724	***
	126	1,272	2,671	***	1,272	1,624	2,906	3,503	***
	252	3,294	5,151	**	3,294	2,621	5,887	6,993	***
	504	11,200	14,214		11,200	8,416	18,044	16,293	**
Old Investors	63	7,741	12,615	**	7,741	7,591	15,371	14,980	***
	126	11,892	17,474	**	11,892	9,811	22,165	20,593	***
	252	27,519	31,381		27,519	16,862	39,540	38,021	***
	504	61,070	60,040		61,070	33,805	79,327	67,492	***
No. of Obs.		51	157		51	53	52	52	

The mean number of investors rises from 13,175 per firm on the 63rd day after listing (about three months) to 73,767 per firm on the 504th day after listing (about two years), or about a 459 percent increase. However, there are extremely wide variations in the ability of various IPOs to attract investors to trade, as can be seen from the minimum

number of investors (1,432) as compared to the maximum number of investors (487,607). If the sample is divided into old and new investors, the proportion of participating new IPO traders is very low, with the majority of all traders being old investors.

However, despite being initially very low, the average number of new investors increases by a significant number, from the earlier 1,756 new investors on the 63rd day to 13,475 on the 504th day, an increase of 11,719 (667 percent) per firm. A similar rise is also discernible in the mean number of old investors, from 11,420 to 60,292, an increase of 48,872 investors per firm. The sample is separated into two sub-samples for the analysis of the evolution of the IPO investor base, categorized by negative and positive initial returns.

As noted in sub-section 3.1 (above), the four distinct groups of 'hot', 'warm', 'cool' and 'cold' IPOs are also identified according to these initial returns. As the results in Panel B of Table 2.2 show, the observations on the group with negative initial returns are the same as those for the 'cold' IPOs. In order to test for equality across the different classifications, t-tests are used for the means in the binary classification, and ANOVA F-tests are used to test the means in the quartile classification. As shown in the left-hand side of Panel B, the mean numbers of investors within the classification of negative (or cold) IPOs are lower than the mean numbers within the classification of positive initial returns, with the exception of the number of old investors on the 504th day, which is lower for those IPOs with positive initial returns; that is, firms with positive initial returns attract greater numbers of investors.

If the sample is separated into the four (hot-cold) groups, investors are generally found to have an attraction towards 'warm' and 'hot' IPOs, whereas 'cool' and 'cold' IPOs attract much smaller numbers of investors. Interestingly, when observing the behavior of new investors, we find that they have a preference for 'hot' IPOs in the first 252-day period; thereafter, there is increased interest in 'warm' IPOs in the second 252-day period. From the standpoint of both stock exchanges and firms, the preference would of course be for investors to hold stable, long-term investment positions. Thus, in order to avoid the biases associated with the initial returns of IPOs, the rest of the empirical results focus on the second period (from the 253rd to the 504th day).

4.2 The Rate of Change in the Investor Base and Returns

4.2.1 Summary statistics

In this section, the rate of change in the investor base is examined over the second year (defined here as +253 to +504 days) after the IPO launch. The measure of the rate of change in the investor base used in this study is:

$$change\ rate = \frac{investor_{j,t+1} - investor_{j,t}}{investor_{j,t}} \quad (1)$$

where $investor_{j,t}$ is the number of type j investors at time t (type j investors include all, new, old, net buy, net sell, net zero…, and so on).

The composition of the rate of change in the investor base is summarized in Table 2.3 in three different ways: (i) by all samples, new and old investors (Panel A); (ii) by the portfolio positions of investors (Panel B); and (iii) under the six classifications of 'net buy', 'net sell' and 'net zero' for new and old investors (Panel C). On average, the rate of increase for all investors is 14.2 percent per firm, with new investors accounting for the lion's share of 12.6 percent, whereas old investors increased by just 1.5 percent. The rate of change is highly skewed, with a positive mean and a median which is either close to zero or negative.

Table 2.3 Rate of change in the investor base, by new/old groups and net trade groups

This table reports the summary statistics for the rate of change in the investor base for 208 IPOs listed on the TSE from 252 to 504 days after listing. New (Old) investors refers to changes in the new (old) investor base; investors are defined as New if they had never traded during the three-year period prior to the IPO launch, and then began trading in the IPO; otherwise they are defined as Old. Panel A reports the mean rate of change for all samples. Panel B shows the results for three groups based upon the investors' portfolio positions, which is equal to buys minus sells for each investor; Net Buy (Net Sell) indicates that investors are holding positive (negative) portfolios after netting the buys by the sells. If an investor has a zero portfolio at any specific time, he has sold out his inventory and his position is Net Zero. Panel C shows the three situations of investor positions for both new and old investors. All figures refer to percentages.

		Mean	Median	Min.	Max.	Std.	% Positive
Panel A: New/Old Investors							
Full Sample		14.2	-14.3	-96.7	663.7	106.3	43.8
New Investors		12.6	4.1	-27.0	220.8	33.4	61.5
Old Investors		1.5	-17.3	-81.4	442.9	75.5	39.4
Panel B: Net Trade Groups							
Net Buy		43.2	32.7	-76.5	458.4	76.1	68.8
Net Sell		-24.1	-22.1	-86.6	21.0	19.4	6.7
Net Zero		-4.9	-12.0	-138.9	306.5	66.8	37.0
Panel C: Net Trades by New/Old Investors							
New	Net Buy	12.2	6.2	-11.9	148.2	19.0	83.2
	Net Sell	-4.8	-2.3	-27.8	9.0	6.7	20.2
	Net Zero	5.3	0.4	-15.2	83.4	16.1	52.9
Old	Net Buy	31.0	25.4	-71.7	310.2	60.1	64.9
	Net Sell	-19.3	-16.6	-61.7	13.9	15.2	5.3
	Net Zero	-10.2	-12.6	-134.3	229.8	53.3	34.1

Panel B shows the three groups by investment portfolios, with the final position of each investor being determined as total buys minus total sells. Net buy (sell) indicates that an investor holds a positive (negative) portfolio after netting buys by sells. If the investor

has no portfolios at a given time, he is regarded as having sold out his inventory; thus, his position is 'net zero'. The results reveal a mean increase of 43.2 percent in investors with net buy positions, but respective declines of –24.1 percent and –4.9 percent in investors with net sell and net zero positions. Thus, there is an increase of 43.2 percent in investors who hold the IPO stock in the second year; for firms, this means that more investors continue to invest in their stock, while for the exchange it means that most IPOs are succeeding in attracting greater numbers of investors to participate in the market.

The evidence presented so far reveals a tradeoff between reductions and increases in the rate of change in investors; we therefore further divide the new and old investors into three types of positions, net buy, net sell and net zero, to determine the sources of the changes in the investor base. The results, based upon this revised classification, show that the mean rate of change for old 'net buy' investors is 31 percent, which is larger than that for new investors, at 12.2 percent. The mean reduction in the rate of change in net sell investors is –24.1 percent, with new investors accounting for –4.8 percent and old investors accounting for –19.3 percent. This indicates that fewer numbers of investors who obtain their IPO shares from underwriters subsequently go on to sell their inventory in the second year.

The analysis of the net zero positions shows a mean increase of 5.3 percent per firm for new investors, while old investors have a mean reduction of –10.2 percent. Portfolios with net zero positions indicate that investors buy shares in an IPO firm and then sell them off in the second year; that is, they are not long-term investors and it may well be that they dispose of the stock simply as a result of gains or losses.

4.2.2 Univariate analysis

Table 2.4 shows the mean rate of change in the investor base ranked by initial returns (Panel A) and holding period excess returns (Panel B). The ranking for the different measures runs from 1 (low returns) to 4 (high returns). For all investors, Group 1 (4) exhibits the smallest (largest) initial returns, at –10.9 percent (47.6 percent), with a rate of increase of 29.8 percent (–15.7 percent) investors per firms, although these are not significant across groups. Both new and old investors experience a similar pattern, with old investors exhibiting a greater reduction of –19.2 percent, with mean initial returns of 47.6 percent.

Table 2.4 Relationships between the rate of change in the investor base, mean initial returns (IRs) and holding period excess returns (HPERs)

The table reports the rate of change in the investor base of the 208 IPOs listed on the TSE from 252 to 504 days after listing, according to the different types of investors and portfolios. In Panels A and B, each quintile is rank ordered by the mean initial returns (IRs) and holding period excess returns (HPERs, from +253 to +504 days), where the ranking order runs from 1 (low) to 4 (high). The mean rate of change in the investor base is listed in rows within each quintile. Investors are defined as New if they had never traded during the three-year period prior to the IPO launch, and then began trading in the IPO; otherwise they are defined as Old. There are three types of investors based upon the investors' portfolio position, which is equal to buys minus sells for each investor. Net Buy (Net Sell) indicates that investors are holding positive (negative) portfolios after netting the buys by the sells. If an investor has a zero portfolio at any specific time, he has sold out his inventory and his position is Net Zero. To test for equality across the groups, we use ANOVA F-tests for each quartile group. All figures refer to percentages. * indicates significance at the 10% level; ** indicates significance at the 5% level; and *** indicates significance at the 1% level.

Ranking Groups	IRs	HPERs	Full Sample	New Investors	Old Investors	Net Buy	Net Sell	Net Zero	New			Old		
									Net Buy	Net Sell	Net Zero	Net Buy	Net Sell	Net Zero
Panel A: Rate of Change in the Investor Base, by Initial Returns (IRs)														
1	-10.9	–	29.8	15.1	14.6	55.8	-16.6	-9.4	13.7	-3.9	5.3	42.1	-12.7	-14.7
2	5.1	–	19.5	14.7	4.8	56.8	-32.2	-5.1	15.6	-5.9	5.0	41.2	-26.3	-10.1
3	17.7	–	23.3	17.3	6.1	35.0	-24.1	12.4	11.6	-3.6	9.2	23.4	-20.5	3.2
4	47.6	–	-15.7	3.5	-19.2	25.1	-23.4	-17.5	7.8	-5.9	1.6	17.3	-17.4	-19.0
Equality Tests	***					*	***					*	***	
Panel B: Rate of Change in the Investor Base, by Holding Period Excess Returns (HPERs)														
1	–	-52.6	-27.5	0.0	-27.5	13.3	-26.6	-14.2	5.2	-7.2	2.0	8.1	-19.5	-16.2
2	–	-21.2	-6.8	6.9	-13.7	33.1	-21.9	-17.9	9.1	-3.9	1.7	23.9	-18.0	-19.6
3	–	4.1	-7.9	6.2	-14.1	27.9	-28.6	-7.2	8.4	-5.7	3.5	19.5	-22.9	-10.7
4	–	77.9	82.9	32.7	50.1	87.8	-20.2	15.2	23.4	-3.0	12.3	64.4	-17.2	2.9
Equality Tests		***	***	***	***	***	*	**	***	***	***	***		

When the sample is divided into the three types of investor base, according to their portfolio positions, a similar trend is also discernible in the net buy and net zero groups. The net sell group exhibits a negative rate of change in investors, which is consistent with the view that investors who obtain their IPO shares from underwriters will tend to 'flip' within a short period after listing. The correlation between initial returns and the rate of change in the investor base in the second year is not significant, although the net sell position exhibits significant differences across the four groups.

To analyze the relationship between the HPERs and the rate of change in the investor base, the mean HPERs are calculated from the 253rd to the 504th day (about one year) for every group based upon the rate of change in the investor base during the same period. The results show that higher positive HPERs are associated with a greater rate of increase in the investor base, while negative HPERs exhibit either a reduction or a smaller rate of increase in the investor base.

These results all differ significantly across the four groups, with the exception of investors with 'old net sell' or 'old net zero' positions. For example, from day 253 to day 504, there is an increase of 23.4 percent in new investors with a net buy position in Group 4, where the highest average HPERs are 47.6 percent, while similar results are revealed for the other measures. In short, the univariate results show that firms with higher HPERs will see greater increases in their total number of investors.

4.3 The Evolution of the Investor Base and Returns

The evolution of the investor base in the first period is shown in Table 2.5, using mean HPERs (Column 1) as the method of ranking from 1 (low HPERs) to 4 (high HPERs), and the remaining columns showing the evolution of the investor base by different measures. The evolution records the changes in investors' portfolios from the 252nd day to the 504th day after listing.

We begin by analyzing every investor's portfolio position at the end of the first period (day 252 after listing) under three types of position; (i) a net buy position, where investors continue to hold their positive position; (ii) a net sell position, where investors sell out the stocks which they held prior to the IPO listing; and (iii) a net zero position, where investors buy stocks and then finally sell them off. Having traced these investors positions at the end of the first period, we then measure their evolution from the end of period 1 to the end of period 2 (day 504 after listing).

Panel A analyzes new and old investors together, where a net buy is equal to a 'new net buy' plus an 'old net buy', and so on. The second column indicates those investors who were net buyers in period 1 retaining their position as net buyers in period 2. Group 2, with negative HPERs (–21.2 percent), have the highest stability, at 42.46 percent, while lower stability of 38.96 percent is experienced at the highest

HPERs (77.9 percent), although this is insignificant across groups. Additionally, the group with the highest HPERs is associated with the highest rate of change from net buy to net sell (0.53 percent), although this is insignificant across groups.

To observe the evolution of investors from net sell to net buy, when HPERs are high, at 77.9 percent, the ratio is also highest in Group 4, at 1.07 percent, with the difference being significant at the 1 percent level. A similar pattern is discernible in the change rate from net zero to net buy investors, with rates of change of 18.79 percent in the lowest group and 27.6 percent in the highest group, but with no significance. In short, the highest HPERs are associated with higher 'net buy' investors from net sell and net zero investors. Finally, HPERs are negative in the evolution from net zero to net zero investors (short-term traders) in both periods.

To study the effects of evolution on HPERs, we separate the sample into new and old investors. Although new investors have only a small effect on evolution, the difference is more significant than for old investors; for example, investors who change from a new net zero to a net buy position exhibit the smallest rate of change (1.64 percent) in the lowest HPERs, and the largest rate of change (3.11 percent) in the highest HPERs. That is, 'new net zero' investors will again buy IPOs with higher HPERs.

Table 2.5 The evolution of the investor base ranked by mean holding period excess returns

Each quintile is rank ordered (listed in rows) by the specific evolution of the investor base, according to their HPERs. The first column reports the mean 252-day HPERs (from +253 to +504 days), while the remaining columns report the evolution of the investor base. Period 1 refers to the portfolio position on day 252, while period 2 refers to the final position at day 504. Rankings are 1 (low) to 4 (high). Investors are defined as New if they had never traded during the three-year period prior to the IPO launch, and then began trading in the IPO; otherwise they are defined as Old. There are three types of investors based on the investors' portfolio position, which is equal to buys minus sells for each investor. Net Buy (Net Sell) indicates that investors are holding positive (negative) portfolios after netting the buys by the sells. If an investor has a zero portfolio at any specific time, he has sold out his inventory and his position is Net Zero. To test for equality across the groups, we use ANOVA F-tests for each quartile group. All figures refer to percentages.

Panel A: All Samples

Ranking Groups	HPERs	Period 1	Net Buy			Net Sell			Net Zero		
		Period 2	Net Buy	Net Sell	Net Zero	Net Buy	Net Sell	Net Zero	Net Buy	Net Sell	Net Zero
1	–52.6		37.76	0.41	2.44	0.47	28.56	0.036	18.79	0.10	11.44
2	–21.2		42.46	0.32	1.03	0.58	24.62	0.033	24.53	0.15	6.28
3	4.1		39.64	0.38	1.55	0.48	31.63	0.030	21.04	0.10	5.15
4	77.9		38.96	0.53	1.10	1.07	25.94	0.038	27.60	0.16	4.60
Equality Tests						***					**

Panel B: New Investor Base

Ranking Groups	HPERs	Period 1	New Net Buy			New Net Sell			New Net Zero		
		Period 2	Net Buy	Net Sell	Net Zero	Net Buy	Net Sell	Net Zero	Net Buy	Net Sell	Net Zero
1	–52.6		2.69	0.06	0.30	0.05	7.85	0.003	1.64	0.01	0.94
2	–21.2		3.57	0.05	0.18	0.05	4.85	0.004	2.41	0.02	0.64
3	4.1		3.90	0.07	0.25	0.06	6.76	0.002	2.27	0.01	0.40
4	77.9		3.18	0.08	0.15	0.09	5.02	0.003	3.11	0.02	0.35
Equality Tests						**	**		**	**	*

Panel C: Old Investor Base

Ranking Groups	HPERs	Period 1	Old Net Buy			Old Net Sell			Old Net Zero		
		Period 2	Net Buy	Net Sell	Net Zero	Net Buy	Net Sell	Net Zero	Net Buy	Net Sell	Net Zero
1	–52.6		35.07	0.35	2.13	0.42	20.71	0.033	17.14	0.09	10.51
2	–21.2		38.89	0.27	0.86	0.53	19.77	0.029	22.12	0.13	5.64
3	4.1		35.73	0.31	1.30	0.42	24.87	0.028	18.77	0.08	4.74
4	77.9		35.77	0.45	0.95	0.98	20.93	0.035	24.49	0.14	4.24
Equality Tests						***					**

4.4 The Relationship between the Investor Base and Firm Characteristics

This sub-section examines the ways in which the specific characteristics of firms can attract greater numbers of investors, and also attempts to explain the association with the evolution of the investor base. Firm characteristics include the firm's stock ratios of book-to-market (*rbm*) and market value (*rcap*) at day 252 after listing, normalized by the level of the market at that time; 'hot252' is a dummy variable which indicates whether the market price at day 252 is above the median of the market price during the 1995-2005 period. Relative return volatility (*ratiostd*), relative turnover rate (*rsturn*), 'Beta' and 'HPERs' are calculated using data from the second period (the daily data from the 253rd to the 504th day after the IPO listing).

4.4.1 The rate of change in the investor base on firm characteristics

The results of the regression on the rate of change in the investor base on the firm characteristics are presented in Table 2.6. As before, the rate of change in investors is computed as the increase in the number of investors in the second period over the total number of investors in the first period. The adjusted R^2 and robust t-statistics are adjusted by heteroskedasticity-consistent standard errors.

Overall, the results show that the relationship between beta risk and the rate of increase in investors is significantly negative, indicating that investors are not associated with a subsequent increase in investment when a firm has a higher beta. The effect is the same for both new and old investors. The impact of relative return volatility on the increase in investors is positive and significant, particularly for 'new net buyers'; that is, new investors prefer to hold IPO stocks with greater volatility.

Next, the relative book-to-market ratio is negatively related to the rate of change in investors, but not always significantly so, with most of the coefficients on market capitalization being neither significant nor consistently of the same sign, which means that investors do not prefer IPOs with specific characteristics and the effects trade off each other. The coefficient on 'hot252' is insignificantly negative and associated with the rate of increase in investors, particularly old investors. But the coefficient of new net buyer is significantly positive. Since the dummy represents whether or not day 252 coincides with a 'hot' market, the positive coefficient shows that when the market is hot, there is an increase in investors. This is consistent with the hypothesis proposed in this chapter, that a hot market will attract greater numbers of new investors.

It should be noted that interpretation of the results for the dummy variable needs to be undertaken with caution, because the actual result measures the rate of increase in investors throughout the whole of the second period, whereas the dummy variable indicates whether or not the market is hot on day 252. This could, therefore, have the

effect of increasing the total number of investors in the first period, leading to an apparently smaller, or negative, rate of change in investors in the second period.

HPERs have a very significantly positive impact on the rate of change in investors, which is consistent with the results previously reported in Table 2.5. In short, there will be a significant increase in investors when firms have high return volatility, high turnover rate and high HPERs. Although investors prefer growth stock, the effect is not significant. Furthermore, traders will tend to invest in stocks which are hot, and thus, HPERs have a positive correlation with the rate of change in investors.

4.4.2 The evolution of the investor base and firm characteristics

Table 2.7 measures the effects of the evolution of the investor base on firm characteristics. As before, the evolution of the investor base takes place in two stages; the first stage is the portfolio position at the end of period 1 (from the date of listing to +252 days) and the second stage is the final position at the end of period 2 (+253 days to +504 days). The regressions show only certain relevant evolution measures.

A net buy indicates a positive outcome from buys minus sells, which means that the investor is still holding the stock at the final position. A net sell indicates that the investor has a negative portfolio, which means that the investor bought the stock prior to the IPO listing. A net zero indicates that an investor buys the stock and then sells it off in the second period. The table reports the adjusted R^2 and robust t-statistics adjusted by heteroskedasticity-consistent standard errors.

Panel A indicates a stable investor base as a result of the tendency among this group to consistently hold on to the stock until the second period. As shown earlier, HPERs is insignificantly negative, (–0.0373), with ‘new net buy’ and ‘old net buy’ indicating the same effect on HPERs.

Firms with low relative book-to-market ratios are associated with a stable investor base. There is also a significant increase in new investors in a hot market and in those firms with higher return volatility, along with an increase in investors for firms with high betas, albeit not significant. As shown in Panel B (Panel C), there are changes among the other two types of investors, from net sell (net zero) to net buy, with both types of investors increasing their portfolio positions. Investors moving from a net sell or net zero position to a net buy position indicates that such investors had at some time sold their holdings, but subsequently bought them back.

Firms with low relative book-to-market ratios, high turnover and high HPERs are associated with greater numbers of investors holding on to the stock from a previous net sell position. A similar pattern is also discernible for investors moving from a net zero to a net buy position, but the effect of return volatility is significantly negative.

Table 2.6 Regression results on the rate of change in the investor base on firm characteristics

The table reports the results of the multiple regressions on the rate of change in the investor base on firm characteristics. New (Old) refers to changes in the new (old) investor base; investors are defined as New if they had never traded during the three-year period prior to the IPO launch, and then began trading in the IPO; otherwise they are defined as Old. There are three types of investors based on the investors' portfolio position, which is equal to buys minus sells for each investor. Net Buy (Net Sell) indicates that investors are holding positive (negative) portfolios after netting the buys by the sells. If an investor has a zero portfolio at any specific time, he has sold out his inventory and his position is Net Zero. *rbm* and *rcap* are the respective book-to-market and market capitalization to market at the 252nd day after listing; *ratiostd* and *rsturn* represent the standard deviation in the standardized return and the turnover rate, respectively; *hot252* is a dummy variable which is equal to 1 if the market price is above the 1995-2005 median value at the 252nd day after listing; *HPERs* refers to the holding period excess returns between the 253rd and 504th day (about one year) after listing. T-statistics (not shown in the table) use heteroskedasticity-consistent standard errors. * indicates significance at the 10% level; ** indicates significance at the 5% level; and *** indicates significance at the 1% level.

	Intercept	*rbm*	*Beta*	*ratiostd*	*rcap*	*rsturn*	*hot252*	*HPERs*	Adj.R^2 (%)
Full Sample	-1.215 ***	-0.048	-0.098	0.671 ***	9.321	0.115 **	-0.044	0.551 ***	38.3
New Investors	-0.298 ***	-0.017	-0.017	0.208 ***	4.497	0.016	0.062	0.165 ***	30.0
Old Investors	-0.917 ***	-0.031	-0.082	0.463 ***	4.824	0.099 ***	-0.106	0.386 ***	40.7
Net Buy	-0.061	-0.048	-0.192	0.240 **	-0.018	0.120 ***	0.063	0.401 ***	25.5
New Net Buy	-0.086 *	-0.013	-0.046	0.112 ***	2.142	0.012	0.058 **	0.088 ***	25.3
Old Net Buy	0.025	-0.034	-0.145	0.129	-2.160	0.108 ***	0.005	0.312 ***	24.3
Net Sell	-0.459 ***	-0.024 **	0.172 ***	0.028	2.618	0.021 **	0.022	0.015	31.0
New Net Sell	-0.096 ***	-0.009 *	0.020	0.012	0.814	0.005	0.020 **	0.015 *	15.1
Old Net Sell	-0.363 ***	-0.016 *	0.152 ***	0.016	1.804	0.017 **	0.003	0.000	31.7
Net Zero	-0.695 ***	0.024	-0.078	0.402 ***	6.721	-0.026	-0.129	0.135	15.1
New Net Zero	-0.117 ***	0.005	0.010	0.084 ***	1.540	-0.001	-0.015	0.062 ***	19.5
Old Net Zero	-0.578 ***	0.019	-0.088	0.318 ***	5.180	-0.026	-0.114	0.073	13.3

In summary, if investors do not hold on to the stock at the end of period 1, then the higher the holding period excess returns, the greater the increase in investors. From panels D and E, we can see that the sign of the coefficient on the relative book-to-market ratio is reversed, but insignificant. That is, in firms with growth stock, there is an increase in the number of investors who previously held net buy or net zero positions and subsequently changed to a net sell position.

5. Conclusions

A 'good market' can provide investors with greater investment choices, and thereby succeed in attracting more investors to become involved in the financial market. In reality, many exchanges will do their utmost to induce greater numbers of firms to list on their exchanges. From the examination in this chapter of 208 IPO firms listed on the Taiwan Stock Exchange between 1995 and 2003, we find that all firms improve their investor base, and almost a half of the firms experience an increase in the total number of investors from the first to the second 252-day period after the initial listing.

On average, the increase is greater for new investors than old investors. Of the 208 IPO firms examined, 61.5 percent saw increases in new investors, while only 39.4 percent saw increases in old investors. The results also show that the rate of increase in investors has a positive correlation with holding period excess returns (HPERs), which goes some way to explaining why both firms and stock exchanges generally share a desire to see improvements in the overall numbers of investors. In addition to studying the increase in the total number of investors, the evolution of the investor base is also analyzed in this chapter.

The results provide that investors have a tendency to sell off their winning stocks and hold on to their losers; that is, the high stability group of investors (those investors who remained as net buys in periods 1 and 2) is associated with lower HPERs. Conversely, the group with a high rate of change, from net buy to net sell investors, exhibits significantly higher HPERs. Finally, those who were previously net sell or net zero investors, and subsequently became net buy investors, have an association with significantly positive HPERs.

We can therefore conclude that investors, particularly new investors, have a preference for holding IPO stocks with higher return volatility, while a similar result is discernible for the relative book-to-market ratio. As expected, this suggests that stock exchanges should aim to encourage the listing of those firms with better performance, higher return volatility and growth.

Table 2.7 Regression results of the evolution of the investor base on firm characteristics

The table reports the results of the multiple regressions on the evolution of the investor base on firm characteristics. Period 1 (2) refers to the portfolio position for investors in the first (second) period. New (Old) refers to changes in the new (old) investor base; investors are defined as New if they had never traded during the three-year period prior to the IPO launch, and then began trading in the IPO; otherwise they are defined as Old. There are three types of investors based on the investors' portfolio position, which is equal to buys minus sells for each investor. Net Buy (Net Sell) indicates that investors are holding positive (negative) portfolios after netting the buys by the sells. If an investor has a zero portfolio at any specific time, he has sold out his inventory and his position is Net Zero. *rbm* and *rcap* are the respective book-to-market and market capitalization to market at the 252nd day after listing; *ratiostd* and *rsturn* represent the standard deviation in the standardized return and the turnover rate, respectively; *hot252* is a dummy variable which is equal to 1 if the market price is above the 1995-2005 median value at the 252nd day after listing; *HPERs* refers to the holding period excess returns between the 253rd and 504th day (about one year) after listing. T-statistics (not shown in the table) use heteroskedasticity-consistent standard errors. * indicates significance at the 10% level; ** indicates significance at the 5% level; and *** indicates significance at the 1% level.

Panel	Period 1 Position	Period 2 Position	*Intercept*	*rbm*	*Beta*	*ratiostd*	*rcap*	*rsturn*	*hot252*	*HPERs*	Adj.R^2 (%)
A	Net Buy	Net Buy	0.2415 ***	-0.0357 ***	0.1150 **	0.0643 *	-1.6822	-0.0150	0.0289	-0.0373	13.7
	New Net Buy	Net Buy	0.0083	-0.0030 *	0.0186 ***	0.0039	0.2225	-0.0019	0.0252 ***	-0.0032	26.5
	Old Net Buy	Net Buy	0.2332 ***	-0.0327 ***	0.0964 **	0.0604 *	-1.9046	-0.0132	0.0036	-0.0341	13.1
B	Net Sell	Net Buy	0.0011	-0.0010	0.0030	0.0008	0.1051	0.0009 *	0.0026 **	0.0023 **	16.4
	New Net Sell	Net Buy	0.0004	-0.0001 **	0.0004	0.0000	0.0079	0.0000	0.0003 **	0.0002 *	12.1
	Old Net Sell	Net Buy	0.0007	-0.0009	0.0027	0.0008	0.0973	0.0009 *	0.0023 *	0.0021 **	16.5
C	Net Zero	Net Buy	0.2938 ***	-0.0244 *	0.0642	-0.0847 **	-2.7429	0.0405 ***	0.0174	0.0611 **	17.5
	New Net Zero	Net Buy	0.0129 *	-0.0037 **	0.0059	-0.0015	0.1755	0.0035 **	0.0193 ***	0.0065 **	23.8
	Old Net Zero	Net Buy	0.2809 ***	-0.0208 *	0.0583	-0.0833 ***	-2.9184	0.0370 ***	-0.0019	0.0547 **	16.9
D	Net Buy	Net Sell	0.0020	0.0004	-0.0036 **	0.0023 **	0.0791	0.0002	-0.0005	0.0016 **	9.1
	New Net Buy	Net Sell	0.0006 **	0.0000	-0.0006 **	0.0003	0.0021	0.0000	0.0000	0.0002 *	6.1
	Old Net Buy	Net Sell	0.0014	0.0004	-0.0030 **	0.0020 **	0.0770	0.0002	-0.0006	0.0014 *	9.2
E	Net Zero	Net Sell	0.0010 **	0.0001	-0.0005	0.0002	0.0416 *	0.0001	-0.0001	0.0004 *	5.5
	New Net Zero	Net Sell	0.0002 **	0.0000	0.0000	0.0000	-0.0009	0.0000	0.0000	0.0001 **	2.6
	Old Net Zero	Net Sell	0.0008 *	0.0001	-0.0006	0.0002	0.0425 **	0.0001	-0.0001	0.0004 *	6.0

Chapter 3 The Impact of Investors on the Cost of Capital in Initial Public Offerings

1. Introduction

There are a number of studies within the extant literature in which attempts are made to explain the factors motivating initial public offerings (IPOs).[11] It is essentially argued in such studies that the attraction of IPOs is their ability to effectively establish the market price or value of a firm (Zingales, 1995; Mello and Parsons, 2000) while also allowing entrepreneurs to use share prices to infer the valuation of their firms by investors.[12]

Thus, IPOs can raise the overall level of publicity for a firm, thereby potentially enhancing its reputation (Maksimovic and Pichler, 2001). Furthermore, when an IPO has a higher level of disclosure (Diamond and Verrecchia, 1991; Kim and Verrecchia, 1991, 1994) or is targeted for more comprehensive coverage by analysts (Bradley, Jordan and Ritter, 2008), this can also increase the shareholder base of a firm (Mittoo, 1992; Fanto and Karmel, 1997), thereby raising the level of liquidity in a firm's stocks, while also minimizing the costs of capital (Lins, Strickland and Zenner, 2005).[13]

Based upon a model of capital market equilibrium with incomplete information, an investor recognition hypothesis was formally developed by Merton in 1987; the model, which is essentially an extension of the Shape-Lintner 'capital asset pricing model' (CAPM), relaxes the assumption of equality of information for investors. The suggestion is, therefore, that such investors will invest only in those securities with regard to which they have some prior knowledge. This ultimately results in the imperfect diversification of risk, which leads to a higher risk premium being required of investors.

According to the Merton model, all other things being equal, an increase in the total number of investors who are aware of a firm – which Merton refers to as the 'degree of investor recognition' – will ultimately lower the expected returns of investors by reducing the 'shadow cost' arising from the lack of knowledge on a particular security, and will thereby increase the market value of the firm's shares. The end result is that managers may choose to go public to reduce this shadow cost.

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[11] Examples include the analyses by Mittoo (1992) and Fanto and Karmel (1997) on managers and by Brau and Fawcett (2006) on chief financial officers.

[12] Leland and Pyle (1977), Benveniste and Spindt (1989), Dow and Gorton (1997), Subrahmanyam and Titman (1999), Habib and Ljungqvist (2001), Maug (2001) and Benninga, Helmantelc and Sarig (2005) all suggest that given their greater diversification, outside investors are willing to pay higher prices for the risky cash flows of firms than the entrepreneurs' own valuations of such cash flows.

[13] Amihud and Mendelson (1988), Holmström and Tirole (1993) and Bolton and Von Thadden (1998) suggest that IPOs lead to the greater liquidity of a firm's shares, which also increases the firm's value.

Consistent with Merton (1987), several of the prior studies use the reducing cost of capital for international cross-listing as an important example, identifying an increase in the number of shareholders after cross-listing which they also associate with lower returns.[14] Using visibility as a proxy for the number of investors with awareness of a particular stock, Baker, Nofsinger and Weaver (2002) note that the increase in the stock price at the time of the announcement of a firm's cross-listing on the NYSE or LSE is negatively correlated to the shadow cost of incomplete information. From their study of the Asian markets, Amihud, Mendelson and Uno (1999) also note that for reduced minimum trading units in the Japanese equity market, lower returns are associated with an increase in the total number of shareholders.

This chapter examines the Merton (1987) 'investor recognition hypothesis' using the total number of traders as a proxy for the overall number of investors with awareness of a particular IPO. This measure may be an appropriate alternative proxy for investor recognition, essentially because the use of the number of shareholders in a company at the fiscal year-end cannot avoid temporal measurement bias;[15] clearly, the size of the investor base is a static measure, whereas the number of traders is a flow variable which can reflect the investor base whichever investors exist within a firm.

Baker et al. (2002) use the number of analysts' reports and number of citations of a firm in the Wall Street Journal (WSJ) or the Financial Times (FT) to represent awareness among investors of any given firm, under the assumption that information which is important to investors is obtained from such analyst reports or business newspapers.[16] However, while such sources may well provide important information for investors, it is nevertheless clear that the number of times a firm is reported may not entirely equate to the number of investors with awareness of that firm. If an investor does not follow any particular firm, then any amount of analyst report coverage or news coverage on the firm is unlikely to lead to that investor taking up a position in the firm's stocks.

The intuition behind the alternative measure proposed in this chapter is quite straightforward. The number of traders represents the number of investors who actually trade in a stock, irrespective of whether or not they are current shareholders in that particular firm; thus, when an investor does decide to trade in the stock, we would naturally expect to find that the investor already has some prior knowledge of that

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[14] Kadlec and McConnell (1994), Forster and Karolyi (1999) and Tse and Devos (2004).

[15] The TEJ database provides a dataset of shareholders for all firms for each sample year. However, as noted in the TEJ documentation, some firms do not include the number of shareholder in the central depository; thus, it may be that changes in the investor base are not due to changes in shareholders.

[16] The SRI International (1987) survey results suggest that analyst reports provide the necessary information on firms with regard to buy-side investors, while Marcus and Wallace (1991) and Walther (1997) also note that investors use such analyst reports as their primary source of information on firms. Bailey, Chung and Kang (1999) use the number of times a firm is cited in newspapers as a proxy for the information driving the demand for its shares.

particular firm. It is suggested that investors will often have a tendency to concentrate their holdings in certain stocks to which they have some professional affinity or geographical proximity, or in stocks which they may have held for some considerable period of time (Massa and Simonov, 2006). Furthermore, according to 'familiarity' theory, although an investor may sell out his inventory of stocks, given that he is familiar with a particular firm, there is also a high probability of the investor holding on to that stock.

Firms going public on the stock market for the first time do so by arranging an IPO, usually with the support of an investment bank. Such firms are often younger and less well known than many existing firms, although some firms going public may well have been established for many years. In his 1987 model, Merton postulates that an increase in the relative size of the firm's investor base will reduce its cost of capital, noting that the magnitude of the effect will be greatest for lesser-known firms and for those firms with greater firm-specific variances (Merton, 1987: 500). It should, therefore, be of some considerable interest to undertake a study of the impact of firms engaging in IPOs on the Merton (1987) investor recognition hypothesis.

In contrast to the stocks of firms which engage in cross-listing, the stocks of firms engaging in IPOs continue to be traded within the same environment and under the same trading mechanism; that is, there is no change in the overall market microstructure. The Taiwan stock market provides an appropriate trading environment for an examination of the Merton (1987) proposition, that an increase in the firms' investor base will reduce its cost of capital. Using a unique transaction dataset, we can accurately categorize investors into the two specific groups of individual and institutional investors to facilitate our examination of the different effects of investor recognition. We know, for example, that between 1995 and 2003, individual investors in Taiwan accounted for about 77 to 90 percent of all trading volume.

Since no transaction data is available on a firm prior to its IPO launch, we divide the post-IPO period into two sub-periods, referred to in this chapter as the first and second periods (or period 1 and period 2) to measure the effects of the costs of capital on investor recognition. The first period comprises of all trading days from the first day of the IPO listing to the 252nd trading day after the listing, while the second period comprises of all trading days from the 253rd day after the IPO listing until the 504th day after the listing.

The results of the examination of the Merton proposition show that the full sample of firms is associated with a rise of 3,508 in the total number of traders (an average increase of 9.98 percent), although this is not significant; this insignificant increase is also diminished by positive increases in firms in the electronics industry and by negative decreases in firms in the non-electronics industries, both of which are significant at the 5 percent level. For both the full sample and the industry sub-samples,

a significant decline is discernible in the number of institutional traders; thus, the results of this study show that not all firms provide support for an association between IPOs and increased investor base. Indeed, it is only in the electronics industry that there is any significant increase in the awareness of any particular firm among investors.

We also examine the reduction in the costs of equity capital associated with listing using the 'market model' to compute abnormal returns, and find that the average daily abnormal return in the first (second) period is 0.045 percent (0.015 percent). Similar to this pattern, the average abnormal return for the first (second) period is 0.027 percent (–0.01 percent) for firms in the non-electronics industries and 0.061 percent (0.026 percent) for firms in the electronics industry. Finally, we test the Merton (1987) investor recognition hypothesis by regressing the firms' average abnormal returns against changes in the overall numbers of traders. The results confirm the association between investor recognition and the costs of capital.

The remainder of this chapter is organized as follows. The next section provides details of the hypotheses proposed in this chapter. Section 3 presents a discussion of the data and research methodology, followed in Section 4 by the reporting of the main empirical results, as well as tests for increased trading and the costs of capital for IPO firms. The conclusions drawn in this chapter are presented in Section 5.

2. The Merton (1987) Investor Recognition Hypothesis

The Merton (1987) investor recognition hypothesis postulates that investors are not endowed with equal information; hence they will invest only in securities with regard to which they have some prior knowledge. Under this assumption, Merton shows that expected returns are dependent upon factors other than simply market risk. For an individual security, this introduces the shadow cost of incomplete information for a security i, which is given as:

$$\lambda_i = \frac{\delta \sigma_i^2 x_i (1 - q_i)}{q_i}, \tag{2}$$

where δ is the coefficient of aggregate risk aversion; σ_i^2 is the firm-specific component of the stock's return variance; x_i is the market value of the firm relative to the market value of traded securities; and q_i is the proportion of all investors with prior knowledge of security i.

Merton demonstrates that the relationship between the actual expected excess returns for the stock, $E(R_i)$, and the expected excess returns for the case of complete information (where q_i is equal to 1), $E(R_i^*)$, is:

$$E(R_i) - E(R_i^*) = \lambda_i \frac{E(R_i^*)}{R_0}, \tag{3}$$

where R_0 is the return on the risk-less security.

In reality, it is impossible for all market participants to be aware of a firm ($q_i < 1$); thus, firm-specific risk is priced. Based upon the above equation, we would expect to see a general decline in returns, with the magnitude of the effect being greater for lesser-known firms (with small q_i) and for firms with large firm-specific variances. One of the primary motivating factors for IPO firms to go public is the desire to expand their firm's investor base. Furthermore, such firms engaging in IPOs are generally smaller than firms which already exist within the market. We would therefore expect to see the effect of the reduction in the shadow cost for IPOs being associated with an increase in the number of traders.

Following Kadlec and McConnell (1994), Foerster and Karolyi (1999) and Baker et al. (2002), we can construct an empirical proxy for the change in the shadow cost of incomplete information, as follows:

$$\Delta\lambda_i = \sigma_{ei}^2 SIZE_i \left(\frac{1}{Traders^{P2}} - \frac{1}{Traders^{P1}}\right), \tag{4}$$

where σ_{ei}^2 is the residual variance from the market model regression given by Equation (1); $SIZE_i$ is the relative market capitalization of the firm relative to level of TAIEX at the time; and $Traders^{P1}$ and $Traders^{P2}$ are the first- and second-period proxies for the number of investors with awareness of the firm.

Several of the prior studies have used the total number of shareholders or visibility as the proxy for such awareness by investors.[17] However, in this study on IPO firms, real traders should of course already have some awareness of the firms in which they are investing, regardless of whether they are net buyers, net sellers or net zero. Welch (1992) notes that potential investors focus not only on their personal information relating to a new issue, but also on whether other investors are purchasing the issue, since it is clear that traders in any particular stock should have some prior knowledge of the firm. Thus, the use of the number of traders as the proxy may well represent a more precise measure for the knowledge of the firm possessed by investors than the use of visibility.

[17] Kadlec and McConnell (1994) and Foerster and Karolyi (1999) use the number of shareholders as a proxy for the number of investors with awareness of the firm, while Baker et al. (2002) employ two measures of visibility which can represent the extent of investors' knowledge about the firms; these are: (i) the number of analysts estimating the firm's annual earnings; and (ii) the number of citations a firm receives in an article title or leading paragraph appearing in the Wall Street Journal (WSJ) or the Financial Times (FT).

According to the Merton (1987) hypothesis, the abnormal returns experienced by firms during the first and second periods may be due to changes in the investor base, adjusted by the stock's residual variance and relative size. Using our unique database on trading records, we can compute the total number of traders during the first period, as well as the increment in traders during the second period. Therefore, following Kadlec and McConnell (1994), Foerster and Karolyi (1999), and Baker et al. (2002), we perform the following cross-sectional regressions:

$$\alpha_i = \gamma_0 + r_1 \Delta\lambda_i + e_{it} \tag{5}$$

where α_i refers to the first- or second-period daily abnormal returns from Equation (1). The variable $\Delta\lambda_i$ is the change in the shadow cost of incomplete information; assuming that it is negative for firms with an increase in traders, we would expect to see γ_i being significant and negative in the cross-sectional regressions. Other factors such as relative market capitalization and relative book-to-market ratio are also controlled for in the regressions.

3. Data and Methodology

The initial sample of IPOs in the TSE comprises of data on 238 firms covering the period from 1995 to 2003. The sample and listing dates are obtained directly from the Taiwan Economic Journal (TEJ) and verified by annual Taiwan Stock Exchange Corporation (TSEC) statistical data. A total of 28 financial firms were excluded from the sample (comprising of banks, savings and loans companies, insurance companies, financial holding companies and securities companies) along with two other firms on which there was incomplete data; the final sample for analysis in this study therefore comprised of 208 IPOs. Table 3.1 provides the distribution and listing year of the full sample, as well as two sub-samples organized by industry group.

The top three years, in terms of numbers of IPOs, were 1995, 1996 and 2002, which accounted for almost half of the full sample. The smallest number of IPOs occurred in 2000 with just 12 firms going public in that year. As can be seen from the last two columns of Table 3.1, there was a high concentration of IPOs in the non-electronics industries in the 1995-1999 period, while the largest number of IPO firms is found in 2002, when there were a total of 118 firms going public in the electronics industry and a further 90 IPO firms in the non-electronics industries.

A unique dataset is analyzed in this study comprising of data obtained from the TSE transactions record database on trading activity for the 208 IPO firms. This database provides detailed information on the trading data of all investors for every trading day, including the investor's identity (with random code transform), the type of investor,

stock number, date and time of trade, trade size, trade price and whether the trade was a buy or a sell. The identification of the type of investor (as either an individual or institutional investor) facilitates the examination of investor behavior for either type. In this chapter, we focus on investors' trading behavior, supplementing the information with stock prices and financial statement data obtained from the TEJ.

Table 3.1 Sample of IPOs on the Taiwan Stock Exchange, 1995-2003

The table presents the details on the sample of IPOs organized by the year of listing and by industry group. Financial firms include banks, savings and loans companies, insurance companies, financial holding companies and securities companies. The electronics industry is based upon the industrial categorization of the TEJ. The percentages refer to the proportion of the full sample for each sub-sample in each specific year.

Year	No. of IPOs	Financial Firms	Full Sample		Non-Electronics		Electronics	
			No.	%	No.	%	No.	%
1995	39	1	38	18.3	24	11.5	14	6.7
1996	36	4	32	15.4	19	9.1	13	6.3
1997	21	3	18	8.7	12	5.8	6	2.9
1998	23	3	20	9.6	10	4.8	10	4.8
1999	19	1	18	8.7	11	5.3	7	3.4
2000	15	3	12	5.8	2	1.0	10	4.8
2001	21	4	17	8.2	5	2.4	12	5.8
2002	41	8	33	15.9	2	1.0	31	14.9
2003	21	1	20	9.6	5	2.4	15	7.2
Totals	236	28	208	100.0	90	43.3	118	56.7

Our measure of investor recognition is the number of traders during the period; based upon the identification of each investor, we can trace their trading records and determine how many investors traded in any given period. Since there are of course no trading records on a firm prior to its IPO, we compare the effects of the changes in the cost of capital based on the two post-IPO periods. The first period runs from the date of the IPO listing to the 252nd trading day after listing, while the second period runs from the 253rd day to the 504th day after the date of the listing; the length of each of these periods (252 days) is based upon the total number of trading days in a full year.[18] The change in traders is measured as the second-period traders minus the first-period traders.

[18] Prior to 1998, there were a total of six full trading days in each week in Taiwan; however, changes were subsequently made to national working conditions which also resulted in changes to the total number of trading days on the TSE. From 1998 to 2001, six-day trading continued only in alternate weeks, such that there were five trading days in weeks 1 and 3, and six trading days in weeks 2 and 4; thereafter, from 2001 onwards, the total number was reduced to five trading days per week. Therefore, since our sample period runs from 1995 to 2003, we define a trading month as 21 days, and a trading year as 252 days.

4. Empirical Results

4.1 Unconditional Tests

The results of the univariate test on changes in the number of traders are presented in Table 3.2, where the number of traders is reported for the two 252-day periods immediately after the IPO launch. Panel A of Table 3.2 presents the results for the full sample, while panels B and C present the respective results for the non-electronics and electronics industries. The electronics industry in Taiwan has traditionally accounted for more than 50 percent of all trading value on the Taiwan Stock Exchange (TSE) and the 'over the counter' (OTC) market since 1998. Furthermore, many studies suggest that industry effects have a substantial effect on IPO volume.[19] This suggests that a thorough analysis of IPO related topic must consider dynamics at the industry level.

Table 3.2 Univariate tests for changes in the number of traders

The table reports the changes in the total number of traders for period 1 (the first 252 days) and period 2 (the second 252 days) after the launch of the IPOs. The differences between the mean measures for the two periods are tested using paired t-test statistics for the full sample (Panel A), and for sub-groups according to the type of industry (Panels B and C). * indicates significance at the 10% level; ** indicates significance at the 5% level; and *** indicates significance at the 1% level.

Sample	Total No.	Mean	Median	Min.	Max.	S.D.	% Positive
Panel A: Full sample							
Period 1	208	35,130	22,689	1,176	187,760	34,599	43.8
Period 2	208	38,638	18,253	256	364,883	55,641	
Difference (2 – 1)	208	3,508	–2,455	–105,970	244,453	40,714	
t-value		1.24					
Panel B: Non-electronics							
Period 1	90	22,094	14,145	1,176	136,016	23,994	16.8
Period 2	90	16,249	10,490	256	93,872	16,858	
Difference (2 – 1)	90	–5,845	–4,087	–105,970	51,996	22,366	
t-value		–2.48**					
Panel C: Electronics							
Period 1	118	45,072	32,730	5,234	187,760	38,074	26.9
Period 2	118	55,713	35,050	899	364,883	67,687	
Difference (2 – 1)	118	10,642	–657	–80,082	244,453	49,331	
t-value		2.34**					

[19] See Ritter (1984), Pagano et al. (1998), and Rajan and Servaes (1997)

The results for the full sample show an increase in the mean number of traders from 35,130 to 38,638, an increase which is a statistically insignificant (*t*-value = 1.24), with the last column showing that 43.8 percent of the firms saw an increase in the total number of traders. The overall changes in the number of traders range from a reduction of 105,970 to an increase of 244,453, indicating wide variations in the changes in both periods, which may explain the insignificant differences between the first and second periods.

For firms in the non-electronics industries (Panel B), there is a reduction in the mean number of traders in each firm, from 22,094 to 16,249. This reduction, which amounts to 5,845 traders in each firm (representing a 26 percent reduction), is significant at the 5 percent level. Furthermore, the maximum increase is found to be only 51,996 traders, whereas the reduction in traders for one firm was found to be as high as 105,970; only 16.8 percent of the firms in the non-electronics industries saw any increase in the total number of traders.

Panel C reports the results of the changes in the number of traders for firms in the electronics industry. The reported t-statistic for the mean difference is 2.34, which indicates that the change in the number of traders is significantly greater for period 2 than for period 1 at the 5 percent significance level; that is, second-period traders are associated with a mean increase of 10,642 (24 percent) traders per firm. Although there was one firm in the electronics industry which experienced an increase of 244,453 traders, there was another firm which saw a reduction of 80,082 investors.

Trading by institutional investors in the Taiwan stock market is always a major indicator, and indeed, there was a rise in the trading volume accounted for by such institutional investors relative to the market increase, from 8.06 percent in 1995 to 30.63 percent in 2007. Since changes in the numbers of institutional shareholders have been used in numerous studies as a proxy for investor recognition or the visibility of the firm,[20] it is clear that changes in the number of institutional investors is another important proxy for investor awareness of a particular stock.

Table 3.3 reports the univariate tests of changes in institution investors. In contrast to all traders, there is a reduction in the mean number of institutional traders, from 218 in period 1 to 171 in period 2, representing an average change of 47 institutional traders per firm (an approximate reduction of 22 percent).

The mean difference in the number of institutional traders is smaller than the median difference, with its distribution demonstrating a skew to the right. The greatest reduction in traders is 739, while the greatest increase is 814; furthermore, there is an increase in institutional traders in about 24 percent of all firms. Similar to the results for the full sample, IPO firms in the non-electronics industries appear to experience a greater reduction in institutional traders; indeed, the results for IPO firms in the non-electronics

[20] See, for example, Kadlec andMcConnell (1994), Christie and Huang (1994) and Baker et al. (1999).

industry are much stronger than those for IPO firms in the electronics industry.

Table 3.3 Univariate tests for changes in the number of institutional traders

The table reports the changes in the total number of institutional traders for period 1 (the first 252 days) and period 2 (the second 252 days) after the launch of the IPOs. The differences between the mean measures for the two periods are tested using paired t-test statistics for the full sample (Panel A), and for sub-groups according to the type of industry (Panels B and C). * indicates significance at the 10% level; ** indicates significance at the 5% level; and *** indicates significance at the 1% level.

Sample	Total No.	Mean	Median	Min.	Max.	S.D.	% Positive
Panel A: Full sample							
Period 1	208	218	149	16	1,410	202	24.0
Period 2	208	171	91	1	1,515	225	
Difference (2 – 1)	208	–47	–43	–739	814	153	
t-value		–4.40***					
Panel B: Non-electronics							
Period 1	90	129	101	16	841	114	8.2
Period 2	90	79	54	1	436	81	
Difference (2 – 1)	90	–50	–41	–405	166	83	
t-value		–5.63***					
Panel C: Electronics							
Period 1	118	286	236	24	1,410	226	15.9
Period 2	118	241	153	10	1,515	270	
Difference (2 – 1)	118	–45	–54	–739	814	190	
t-value		–2.55***					

As the last column in Table 3.3 shows, the percentage increase in institutional investors for firms in the electronics industry, at 15.9 percent, was almost twice the size of that for firms in the non-electronics industry (8.2 percent). Furthermore, both the greatest increases and decreases in the number of institutional traders are found among IPO firms in the electronics industry, thereby indicating that the electronics industry in Taiwan is regarded as an important sector of the economy.

4.2 Risk-adjusted Returns

Studies within the prior literature on the reduction in firm's costs of capital have tended to focus on international or cross-listing, with two types of methodology being adopted for the study of stock price impacts surrounding such listings. In the earlier studies examining patterns in expected returns around such listing,[21] 'event study' methodology has tended to be adopted, within which the expected returns are derived

[21] Alexander, Eun and Janakiramanan (1988), Howe and Kelm (1987), Foerster and Karolyi (1993) and Lau, Diltz and Apilado (1994).

from the Sharpe-Lintner CAPM.[22] Since the event-period abnormal returns use conventional event study methods, some of the later studies have adopted the use of contemporaneous measures of pre- and post-listing returns after adjusting for market covariance risks.

Within the more recent literature, notably Foerster and Karolyi (1999) and Baker et al. (2002), a two-factor 'international asset pricing model' (IAPM) is employed, incorporating both domestic and world market risk. For the examination in this study of the valuation effect of IPOs on the TSE, we follow the Foerster and Karolyi (1999) and Baker et al. (2002) model, excluding the world market index and pooling the cross-section and time series returns to estimate a single-factor market model:

$$R_{it} = \alpha^{P1} + \beta^{P1} R_{mt} + \alpha^{P2} D_{it}^{P2} + \beta^{P2} R_{mt} D_{it}^{P2} + \varepsilon_{it} \qquad (1)$$

where R_{it} are the excess returns on stock i for day t; D_{it}^{P2} is a dummy variable which is equal to 1 if the observations are from the second period (+253 to +504 days) and is equal to 0 if the observations are from the first period (+0 to +252 days); R_{mt} are the TAIEX daily returns in excess of the time deposit rate offered by the Bank of Taiwan; and β are the coefficients on the market excess returns R_{mt}. The intercept, α^{P1}, is the average abnormal return for the firm in the first period, and α_i^{P2} is the incremental average change in the return for the firm in the second-period. For example, an α_i^{P1} estimate of 0.045 percent and an α_i^{P2} estimate of –0.029 percent should be interpreted as a 0.045 percent average abnormal return in the first period and a 0.016 percent (0.045 – 0.029) average abnormal return in the second period.

The results of the market model regression for the 208 IPO firms are presented in Table 3.4, along with the results for a sub-sample of 90 firms in the non-electronics industries and 118 firms in the electronics industry. We can see that the full sample of firms experience positive abnormal returns in period 1, where the estimate is 0.045 percent per day (about 16 percent annualized) and is significant at the 1 percent level. For the sub-sample of firms in the non-electronics industries, α_i^{P1} reduces to 0.027 percent in period 1 and is insignificant, whereas firms in the electronics industry experience higher abnormal returns. This is hardly surprising, given that the electronics industry has a greater weight of trading volume, and that the first period also includes the IPO 'honeymoon period'.

The abnormal returns for the full sample during the second period, at 0.016 (0.045 – 0.029) percent, are insignificant, with similar patterns being discernible for firms in the non-electronics and electronics industries; α_i^{P2} is negative, but again, insignificant. The reduction in abnormal returns during the second period (about the

[22] Foerster and Karolyi (1999) cite several reasons for a limiting approach.

second year), albeit with no level of significance, is similar with previous studies that IPO is underpriced in the short run and underperformance in the long run.[23] But the abnormal returns in the second period are only smaller than those in the first period, and they are still positive.

Table 3.4 Market model regressions for IPO firms

The table reports the regression estimates of firms' daily excess returns based upon Equation 1 using a constant from the single-factor market model and the excess returns on the TAIEX.

$$R_{it} = \alpha_i^{P1} + \beta_i^{P1} R_{mt} + \alpha_i^{P2} D_{it}^{P2} + \beta_i^{P2} R_{mt} D_{it}^{P2} + \varepsilon_{it}$$

The dummy variables D_{it}^{P1} and D_{it}^{P2} indicate the period 1 (the first 252 days) and the period 2 (the second 252 days) after IPOs. The reported robust t-value is computed using Newey and West (1987) standard errors correcting for heteroskedasticity and serial correlation. *, **, or *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Period 1		Change from Period 1 to Period 2	
	$\hat{\alpha}_i^{P1}$	$\hat{\beta}_i^{P1}$	$\hat{\alpha}_i^{P2}$	$\hat{\beta}_i^{P2}$
Full sample	0.00045	0.78469	-0.00029	0.05305
	(3.041) ***	(69.722) ***	(-1.511)	(3.178) ***
Non-electronic	0.00027	0.55665	-0.00028	-0.00815
	(1.530)	(38.400) ***	(-1.087)	(-0.398)
Electronic	0.00061	0.93200	-0.00035	0.13065
	(2.838) ***	(69.972) ***	(-1.284)	(6.917) ***

As for the market excess return in period 1, we find that the average beta for the full sample is 0.784 and significantly different from zero. In period 2, the average beta rises to 0.837, and is significant at the 1 percent level. It is suggested in some of the prior studies, such as Eckbo and Norli (2004) and Benninga et al. (2005), that the risks associated with recently floated 'young' firms are smaller than the risks associated with 'older' firms; here, the increased risks relate only to the variant, over time, of a comparison with the firm itself.

The sample for this study is disaggregated by industry in order to examine whether the apparent shift in risk exposure is sensitive to different industries. During the second period after the launch of the IPO, the risk for firms in the electronics industry increases to 1.06, at a significance level of 1 percent. The positive beta in the second period is indicative of a shift in risk to the market portfolio. In contrast, firms in the non-electronics industries exhibit a statistically significant reduction to beta of 0.54.

[23] Ritter (1991) was the first to present evidence that high first-day returns are followed by abnormally low returns in the long run, with numerous other studies being consistent with this finding and providing explanations for such a phenomenon (Ibbotson, Sindelar and Ritter, 1994; Loughran and Ritter, 1995; Spiess and Affleck-Graves, 1995; Nelson, 1999; and Baker and Wurgler, 2000).

From our computation of the measures of the abnormal returns for a cross-section of firms in periods 1 and 2 following their IPO launch, we find that the declining pattern in the price run-up for the two periods remains robust after accounting for statistically significant changes in risks.

4.3 Univariate Cross-sectional Tests

In this sub-section, we go on to recompute the daily abnormal excess returns and betas for each of our sample firms based upon the 208 univariate time-series regressions,

$$R_{it} = \alpha_i^{P1} + \beta_i^{P1} R_{mt} + \alpha_i^{P2} D_{it}^{P2} + \beta_i^{P2} R_{mt} D_{it}^{P2} + \varepsilon_{it} \qquad (2)$$

Following the separate estimation of the time-series regressions for each of the firms, the coefficients are then cross-sectionally averaged. The mean coefficients and associated *t*-values are reported in Table 3.5, where the average daily abnormal excess returns are found to be 0.054 percent in the first period, and 0.019 (0.054 – 0.035) percent in the second period. The proportion of firms with positive abnormal returns is 56.7 percent in period 1, as compared to 50 percent in period 2. There is an increase in abnormal returns in about 42.3 percent of all firms.

In period 1, the average abnormal returns increase consistently, although the differences range from 0.038 percent per day for firms in the non-electronics industries to 0.067 percent per day for firms in the electronics industry. In contrast to the increase observed in period 1, there is a decline of –0.042 percent in the average abnormal returns in period 2 for firms in the non-electronics industries, which is somewhat greater than the decline of –0.03 percent for firms in the electronics industry.

The weaker second-period abnormal return results for firms in the electronics industry suggest that these firms experience a smaller reduction in the costs of capital than firms in the non-electronics industries. This is a result which stands in stark contrast to the results presented in Table 3.4, where firms in the electronics industry were found to have a much greater reduction in the costs of capital than firms in the non-electronics industries.

The results relating to the cross-sectional mean betas are also presented in Table 3.5, which shows that there is a significant increase in betas for the full sample of firms. On average, second-period betas are 0.08 higher than first-period betas, with more than 58.7 percent of the firms experiencing an increase. Similar to the results for the full sample, firms in the electronics industry appear to experience a greater increase in beta, of 0.14, with only 31 percent of the firms experiencing a decline.

The second-period beta of 1.03 (0.89 + 0.14) is very close to the market risk and is strongly significant at the 1 percent level. In contrast to the full sample and the

firms in the electronics industry, firms in the non-electronics industries experience the same increase in betas, but with a weaker effect, with only 45 percent experiencing an increase in second-period betas.

Table 3.5 Mean abnormal returns and betas, by industry groups

The table reports the abnormal returns computed using regression model estimates of excess returns from period 1 (0 to +252 days) and period 2 (+253 to +504 days) for a market model using the TAIEX excess returns; these are also used for the separate computation of abnormal returns for each firm.

$$R_{it} = \alpha_i^{P1} + \beta_i^{P1} R_{mt} + \alpha_i^{P2} D_{it}^{P2} + \beta_i^{P2} R_{mt} D_{it}^{P2} + \varepsilon_{it}$$

* indicates significance at the 10% level; ** indicates significance at the 5% level; and *** indicates significance at the 1% level.

	Period 1		Change from Period 1 to Period 2	
	α_i^{PRE}	β_i^{PRE}	α_i^{POST}	β_i^{POST}
Full sample				
Mean	0.00054	0.74083	-0.00035	0.08787
	(3.470) ***	(34.495) ***	(-1.843) *	(4.155) ***
Percentage Positive	56.7% **	100.0% ***	42.3% **	58.7% ***
Non-electronic				
Mean	0.00038	0.53879	-0.00042	0.01894
	(1.809) *	(23.052) ***	(-1.543)	(0.653)
Percentage Positive	60.0% **	100.0% ***	44.4%	45.6%
Electronic				
Mean	0.00067	0.89494	-0.00030	0.14045
	(2.971) ***	(35.038) ***	(-1.127)	(4.811) ***
Percentage Positive	54.2%	100.0% ***	40.7% **	68.6% ***

4.4 Testing the Merton (1987) Investor Recognition Hypothesis

The cross-sectional regressions of the abnormal returns for the second period are presented in Table 3.6, with Panel A reporting the results for all investors and Panel B reporting the results for institutional investors. Each of the regressions reports the coefficient estimates and the adjusted R^2, with the coefficient estimates being denoted as statistically significant based upon the robust t-statistics from Newey and West (1987) standard errors.

The regressions show that there is significant correlation in period 2 between the abnormal returns for the full sample and the market value of the firm. The abnormal returns have a negative correlation with the Merton (1987) market incompleteness factor in both periods; the coefficient on $\Delta\lambda$ is –1.9954 and of the expected sign for period 2 with statistical significance at the 1 percent level.

These results provide support for the Merton hypothesis and are consistent with the earlier studies on the reduction of the costs of capital achieved by cross-listing abroad. Using book-to-market (B/M) ratios as a proxy for investor sentiment, Rajan and Servaes (2003) find a negative correlation with long-run returns. Consistent with their finding, the coefficient on B/M in this study is found to be significantly negative in the second period.

A similar pattern is discernible for firms in the non-electronics industries; that is, the negative coefficient for the change in shadow cost is consistent with the Merton (1987) investor recognition hypothesis. Similar to the results for firms in the non-electronics industries, the effect of investor recognition for firms in the electronics industry is in the same direction, although stronger in the second period.

Panel B of Table 3.6 presents the results of the abnormal return regressions on the shadow cost of incomplete information with firm-specific variables, including relative market size and relative book-to-market ratio. The regression shows that, in the second period, the coefficient on $\Delta\lambda$ is again negative but with increased significance for the full sample and both sub-samples at the 1 percent level. Consistent with Kadlec and McConnell (1994) and Tse and Devos (2004), the number of institutional investors is an appropriate proxy for investor recognition or visibility.

4.4 Robust Check: By Excluding the SEO events

Since there are of course no trading records on a firm prior to its IPO, we compare the effects of the changes in the cost of capital based on the two post-IPO periods. The first period runs from the date of the IPO listing to the 252nd trading day after listing, while the second period runs from the 253rd day to the 504th day after the date of the listing. By avoiding the important events to cause the increase in investor base, we exclude 47 IPOs who have SEO events during the second period.

Base on the table 3.7, the results still support the hypothesis of investor recognition, that is, there is the negative relation between the shadow cost of incomplete information and abnormal returns. Although the coefficient on $\Delta\lambda$ and adjusted R-square are smaller than table 3.6, the reduced observations still have the same results. Thus, we can say the Merton (1987) investor recognition is one of factor that can explain abnormal returns for IPOs during the second period.

Table 3.6 Abnormal return regressions on the shadow cost of incomplete information with firm-specific variables

The table reports the abnormal returns for the IPO firms for period 1 (0 to +252 days) and period 2 (+253 to +504 days) using a market model regression on firm-specific variables such as relative market capitalization, and book-to-market ratio. The investor recognition measure, $\Delta\lambda$, is computed from Equation 4:

$$\Delta\lambda_i = \sigma_{ei}^2 SIZE_i \left(\frac{1}{Traders^{P2}} - \frac{1}{Traders^{P1}}\right)$$

where σ_{ei}^2 is the residual variance from the market model regression, $SIZE_i$ is the relative market capitalization of the firm, $Trader^{P1}$ and $Trader^{P2}$ are the period 1 and period 2 traders. *, **, or *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Panel A: All traders					Panel B: Institutional Traders				
	Constant	$SIZE(10^{-7})$	$\Delta\lambda$	B/M	$Adj.R^2$	Constant	$SIZE(10^{-7})$	$\Delta\lambda$	B/M	$Adj.R^2$
Full sample										
Period 2	0.0003	0.0978	-1.9954	-0.0002	11.8%	0.0005	0.1025	-0.0177	-0.0001	18.1%
	(1.88) *	(4.13) ***	(-6.13) ***	(-2.18) **		(3.00) ***	(3.33) ***	(-4.99) ***	(-1.43)	
Non-electronic										
Period 2	0.0004	0.0295	-1.8017	-0.0002	9.7%	0.0006	0.0044	-0.0126	-0.0001	13.6%
	(1.71) *	(1.59)	(-4.26) ***	(-2.30) **		(2.36) **	(0.35)	(-3.50) ***	(-2.01) **	
Electronic										
Period 2	0.0004	0.1329	-2.4444	-0.0004	11.9%	0.0004	0.2373	-0.0372	-0.0002	30.9%
	(0.98)	(3.47) ***	(-4.08) ***	(-0.95)		(1.23)	(4.36) ***	(-4.14) ***	(-0.45)	

Table 3.7 Robust check: by excluding the SEO events

The table reports the robust check for the table 3.6 by excluding the 47 SEO events. The results report the abnormal returns for the IPO firms for period 2 (+253 to +504 days) using a market model regression on firm-specific variables such as relative market capitalization, and book-to-market ratio. The investor recognition measure, $\Delta\lambda$, is computed from Equation 4:

$$\Delta\lambda_i = \sigma_{ei}^2 SIZE_i \left(\frac{1}{Traders^{P2}} - \frac{1}{Traders^{P1}}\right)$$

where σ_{ei}^2 is the residual variance from the market model regression, $SIZE_i$ is the relative market capitalization of the firm, $Trader^{P1}$ and $Trader^{P2}$ are the period 1 and period 2 traders. *, **, or *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Panel A: All traders					Panel B: Institutional Traders				
	Constant	$SIZE(10^{-7})$	$\Delta\lambda$	B/M	$Adj.R^2$	Constant	$SIZE(10^{-7})$	$\Delta\lambda$	B/M	$Adj.R^2$
Full sample										
Period 2	0.0002	0.0994	-1.8500	-0.0001	10.1%	0.0003	0.1006	-0.0161	-0.0001	16.6%
	(0.83)	(4.50) ***	(-5.80) ***	-(1.63)		(1.72) *	(3.50) ***	(-4.66) ***	-(0.92)	
Non-electronic										
Period 2	0.0004	0.0375	-1.9215	-0.0001	8.6%	0.0006	0.0071	-0.0126	-0.0001	13.1%
	(1.22)	(2.75) ***	(-3.37) ***	-(2.04)		(1.64)	(0.59)	(-2.95) ***	-(1.70) *	
Electronic										
Period 2	0.0002	0.1342	-2.2723	-0.0003	9.9%	0.0002	0.2274	-0.0342	-0.0001	28.3%
	(0.44)	(3.48) ***	(-3.77) ***	-(0.75)		(0.43)	(4.23) ***	(-3.94) ***	-(0.14)	

5. Conclusions

One of the primary factors motivating initial public offerings (IPOs) is the desire to increase a firm's shareholder base, and thereby minimize its cost of capital. Merton (1987) suggests that investors cannot possibly have complete awareness of all firms; hence they will invest only in those securities with regard to which they have some prior knowledge. This results in imperfect diversification of risk, which leads to a higher risk premium being required of investors.

Thus, all other things being equal, we find that an overall increase in the total number of investors with some awareness of a firm will have the effect of lowering the expected returns for investors by reducing the 'shadow cost' arising from the lack of knowledge on a particular security. Since this will ultimately lead to an increase in the market value of the firm's shares, managers may naturally choose to go public to reduce this shadow cost.

Since it is quite obvious that no transaction data is available on a firm prior to its IPO launch, in this study, we define two post-IPO periods to measure the effects of the costs of capital on investor recognition; these two periods equate approximately to the first and second year after the IPO launch date. From an examination of the reduction in the cost of equity capital associated with the IPO launch, we find that the average daily abnormal return is 0.045 percent in the first period and 0.015 percent in the second period. A similar pattern is also found for the change in the average abnormal returns for firms in the non-electronics and electronics industries, with both of these sub-samples being in the same direction.

This chapter examines the Merton (1987) investor recognition hypothesis using the total number of traders as a proxy for the number of investors with prior awareness of a particular IPO firm. The number of traders represents the number of investors who actually trade in a stock, irrespective of whether or not they are current shareholders in that particular firm; thus, when an investor does decide to trade in the stock, it would naturally be expected that the investor already has some prior knowledge of that particular firm. According to familiarity theory, although an investor may sell off his inventory of stocks, given that he is familiar with a particular firm, there is also a high probability of the investor holding on to that stock.

The results for the full sample reveal an association with an increase in the average number of traders, albeit with no level of significance. This insignificant increase is also diminished by positive increases in firms in the electronics industry and by significantly negative reductions in firms in the non-electronics industries. Thus, the results show that not every firm provides support for that IPOs are associated with

heightened investor base. Indeed, in this study, we find that only the electronics industry has any clear association with a significant increase in the awareness of particular firms by investors.

Finally, we test the Merton (1987) investor recognition hypothesis in this chapter by regressing the average firm abnormal returns against changes in the total number of traders. Although we find that not all IPO firm experience an increase in investor base, the results do provide support for the hypothesis of an association between investor recognition and the costs of capital.

Chapter 4 Summary and Conclusions

This dissertation examines 208 IPO firms listed on the Taiwan Stock Exchange (TSE) between 1995 and 2003, and finds that all firms improve their investor base, with almost half of the firms experiencing increases in the total number of investors from the first year to the second year after listing. On average, the increase in new investors is greater than the increase in old investors; of the 208 IPO firms examined in this study, 61.5 percent experienced an increase in new investors, as compared to the 39.4 percent of these firms which experienced increases in old investors. Furthermore, the results also reveal that the rate of increase in the total number of investors has a positive correlation with holding period excess returns (HPERs).

The analysis undertaken in this dissertation on the evolution of the investor base reveals that investors do indeed tend to sell their winning stocks; that is, significantly higher HPERs are exhibited by the group with a high rate of change from net buy to net sell investors. Those who were net sell or net zero investors in the first period, and subsequently became net buy investors in the second period, are associated with significantly positive HPERs. It is clear that investors, particularly new investors, have a preference for holding IPO stocks with higher return volatility levels, and indeed, a similar result is discernible for the relative book-to-market ratio, which, as we would expect, strongly suggests that exchanges should aim to encourage the listing of firms with good performance, and higher return volatility and turnover rate. From the examination undertaken in this dissertation of the reduction in the costs of equity capital associated with an IPO launch, we find that the average daily abnormal return is higher in the first period than in the second period. A similar pattern is also found in the change in the average abnormal returns for firms in the non-electronics and electronics industries, with both of these sub-samples being in the same direction.

This dissertation also examines the Merton (1987) investor recognition hypothesis using the total number of traders as a proxy for the number of investors with prior awareness of a particular IPO firm. Although we find that not all IPO firms experience an increase in investor base, the results do provide support for the Merton hypothesis of an association between investor recognition and the costs of capital.

There are at least three aspects of this study that make it of interest. Firstly, an exchange may understand which characteristics of IPOs can produce greater numbers of investors, new investors in particular. Secondly, a firm may fully understand its investor base and therefore decide to go public on its selected alternate exchange. Thirdly, this study complements the prior literature by explicitly considering the investor base of IPOs; in short, we provide a direct link between stock-exchange policy and market development.

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