DO PRIVATIZATION IPOS OUTPERFORM IN THE LONG-RUN?

Seung-Doo Choi
Dongeui University, Korea

Inmoo Lee
National University of Singapore

William Megginson
University of Oklahoma
Global Privatization Advisory Committee,
Italian Ministry of Economics and Finance

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Please address correspondence to:

William L. Megginson
Price College of Business
307 West Brooks, 205A Adams Hall
The University of Oklahoma
Noman, OK 73019-4005
Tel: (405) 325-2058; Fax: (405) 325-7688
e-mail: *wmegginson@ou.edu*
website: *http://faculty-staff.ou.edu/M/William.L.Megginson-1*

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Abstract

This paper investigates the long-run stock returns of privatization initial public offering (IPO) firms using a sample of 241 privatization IPOs from 42 countries during the period 1981-2003. We compare one-, three-, and five-year holding period returns of privatization IPOs to those of the domestic stock market indices and to those of size and size-and-book-to-market equity ratio (BM)-matched firms of respective countries. Consistent with previous studies, privatization IPOs have significantly outperformed their domestic stock markets in the long-run. However, they show less consistent abnormal long-term stock performance relative to their size- or size-and-BM-matched benchmark firms. These results confirm the problems inherent in estimating long-run abnormal returns and suggest that previous results on the long-run stock performance of privatization IPOs should be interpreted with caution. Additionally, the market values privatization IPOs without much systematic bias after the IPO, in contrast to private companies' IPOs. This is consistent with privatization IPOs having less information asymmetry than private IPOs.

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1. Introduction

Since the early 1980s, privatization of state-owned enterprises has become very popular in many countries and has dramatically promoted development of capital markets around the world. According to Megginson (2005), the cumulative value of proceeds raised by governments around the world probably passed $1.25 trillion in 2005, while the total market capitalization of privatized companies became 18 percent of the combined market capitalization of the firms in Business Week Global 1000 in 2004. These firms accounted for over 34 percent of total non-US market capitalization, and represented a much higher fraction of these markets' total trading volume. Even more dramatically, Chinese state-owned companies executed share issue privatizations worth over $35 billion during 2006 alone, including the $21.9 billion IPO of Industrial and Commercial Bank of China, the largest initial offering in history.

Reflecting the significance of these activities, numerous studies examine whether privatization improves the operating and financial performance of divested firms. Most studies, including those surveyed in Megginson and Netter (2001) and Djankov and Murrell (2002), document significant post-privatization increases in efficiency, profitability, and financial strength.[1] This contrasts sharply with Jain and Kini (1994), Mikkelson, Partch and Shah (1997), and others who document poor subsequent operating performance for private IPOs.

Compared to the extensive literature on performance changes for privatized firms, relatively few studies examine these firms' long-run stock performance. In contrast to private companies' initial public offerings (IPOs), these studies generally show that privatization IPOs outperform in the long-run. Boardman and Laurin (2000) document significantly positive 34.7 percent three-year market-adjusted buy-and-hold abnormal returns (BHARs) for 99 privatization IPOs between 1980 and 1995. Dewenter and Malatesta (2001) also find statistically significant positive 88.2 percent five-year market adjusted abnormal returns for a sample of 102 privatization IPOs. Using a larger sample, Megginson, Nash, Netter, and Schwartz (MNNS hereafter, 2000) also report significantly positive long-run abnormal returns for a sample of 158 privatization IPOs conducted in 33 countries compared domestic market indices, the *Financial Times* World index, the S&P 500 index, and portfolios of American firms in the same industry. The long-run positive abnormal stock returns of privatization IPOs has been interpreted as consistent with documented improvement of operating performance and managerial efficiency of privatized firms. However, it is premature to conclude that the long-term stock abnormal performance of privatization IPOs is indeed superior because of potential problems in measuring long-term stock performance.

Since Ritter (1991) documented significant long-run underperformance of US IPO firms, there have been many studies that examine long-term stock performance of companies after important

corporate events such as IPOs, seasoned equity offerings [Brav, Geczy, and Gompers (2000), Eckbo, Masulis, and Norli (2000), Jegadeesh (2000), Mitchell and Stafford (2000), Clarke, Dunbar, and Kahle (2001), Gibson, Safieddine, and Sonti (2004), and Hertzel and Li (2006)], private placements [Hertzel, Lemmon, Linck, and Rees (2002)] and equity carve-outs [Vijh (1999)]. However, no single long-term performance study methodology is supported by both theory and empirical evidence. In a study of long-run stock performance, it is very critical to use an appropriate benchmark since the results are quite different depending on benchmarks used.

This is in contrast to an event study that focuses on a short window where the results are, in most cases, robust to the use of different benchmarks. In an event study, benchmark returns are oftentimes calculated using the Capital Asset Pricing Model (CAPM). However, there are potential problems in using the CAPM for the calculation of benchmark returns in a long-run stock performance study since, as Fama and French (1992) show, the CAPM does not successfully explain the cross-sectional distribution of stock returns. Instead, size and book-to-market equity ratio (BM) seem to explain the distribution well. However, there is no generally accepted theoretical reason why size and BM should matter in determining expected returns. Therefore, much debate has focused on the usefulness of long-term stock performance studies and many follow-up papers frequently present different results using alternative methodologies. For example, since Ritter (1991) and Loughran and Ritter (1995) documented significant long-run underperformance of IPOs, there have been many follow-up papers that document insignificant abnormal performance of IPOs using different approaches [Schultz (2003), Gompers and Lerner (2003), and Eckbo and Norli (2005)].

Given the difficulties of finding an agreed upon long-term stock performance study methodology, several studies addressing potential problems of traditional methodologies used in the literature have received attention. For example, Lyon, Barber, and Tsai (1999) argue that the commonly used methods for computing long-run abnormal returns tend to yield mis-specified test statistics. Barber and Lyon (1997) recommend the use of BHAR based on a size-and-BM matched firm approach since it eliminates the biases in test statistics designed to detect long-run abnormal returns. However, Fama (1998) points out that BHARs tend to yield statistical artifacts because a distribution of long-horizon returns is positively skewed and has very fat tails. This leads to an inflated significance level for lower tailed tests and a loss of power for upper tailed tests. Mitchell and Stafford (2000) also indicate that the BHAR method ignores the problems arising from calendar time or industry clustering which inflate the statistical significance of economically trivial events. They strongly recommend the use of cumulative abnormal returns (CARs) and a calendar time regression approach used by Fama-French (1993). On the other hand, Loughran and Ritter (2000) show that the Fama-French approach is the uniformly least powerful test of market efficiency. In short, there is still great debate on the best way to examine long-run stock performance.

Therefore, it is important to check whether previously documented results on long-run performance of privatization IPOs are robust to the methodologies used. This will be critical in understanding the role of privatization in improving efficiency and/or profitability of firms and in contributing to the economic development of each country. In addition, the robustness check will also provide further information about whether the stock market values privatization firms without any systematic bias after IPOs. Importantly, privatization IPOs are the only significant group of firms that appear to display positive excess long-run returns, so examining these firms will provide a unique empirical counter-point to existing long-run return literature. Even though there are many disputes, one popular explanation for the underperformance of private IPOs is that investors are overoptimistic about the future of IPO firms and managers optimally time their IPOs to take advantage of over-optimism (Loughran and Ritter (1995)). However, given the fact that privatization IPO firms are typically larger with a longer history than private IPO firms, and that the timing of IPO is typically determined by government policies rather than by management, privatization IPOs are less likely to display long-run abnormal performance because of asymmetric information between issuers and investors, as is often posited as a rationale for the long-run underperformance observed for private IPOs. If long-run excess performance of privatization IPOs is robust to benchmarks used, it is likely that the stock market in general underestimates the efficiency gains achieved by privatization. To address these issues, we examine the long-term stock performance of 241 privatization IPOs from 42 countries, executed between 1981 and 2003, using several novel approaches in the privatization literature. In particular, we employ a size-and-BM matched control firm approach using both domestic firms and international firms, as well as the calendar-time regression approach based on the Fama-French three-factor model.

Previous studies of the long-run stock performance of privatization IPOs have mostly used market-adjusted abnormal returns because it is hard to have access to required data needed to use alternative benchmarks. In spite of the difficulties, there have been some attempts to improve benchmarks being used. For example, MNNS (2000) also calculate industry-adjusted abnormal returns using only American firms in the same industry. Even though these studies try to control for firm characteristics in selecting benchmarks, most do not use matched firms from domestic markets. Due to different legal and institutional environments and stages of capital market developments, the use of characteristic matched firms from domestic markets is likely to be more relevant in evaluating the efficiency gains from privatization. One except to this is Boubakri and Cosset (2000) who use size-and-BM-adjusted control firms from the domestic firms available in the Emerging Market Data Base (EMDB) in their analysis of 75 privatization IPOs in developing countries with available matching firms between 1982 and 1995.

Using the *Datastream* file, this paper identifies size-and-BM matched firms from domestic markets, calculates abnormal returns relative to the returns of these matched firms, and conducts various

statistical analyses to check the statistical significance of the results. Both Chen and Zhang (1998) and Fama and French (1998) show that BM matters not only for U.S. stocks but also for stocks listed in other markets around the world. To select these matching firms, we first identify domestic firms the market capitalization and BM of which are in between 70 and 130 percents of those of the issuer. Among those, one company with the closest BM is selected and used as a matching firm. This method is analogous to the methods used in Barber and Lyon (1997). Out of 241 privatization IPOs, size-and-BM matched firms are identified for 143 privatization IPOs. In addition, to check the robustness of the results, we also select matching firms from international firms belonging to the *FTSE All World Index*. Finally, we also use a calendar-time regression approach based on the Fama-French three-factor model. Based on the findings in Griffin (2002), we use domestic factors in implementing the Fama-French three-factor model.

The results show that equally-weighted average market-adjusted abnormal returns are significantly positive, which is consistent with previous studies. The results from the Fama-French three-factor model also show that privatization IPO firms significantly outperform over one-, three- and five-year horizons in most countries However, size-and-BM-adjusted BHARs are not statistically significant over three or five years horizons when matching firm approaches are used. This indicates that compared to the domestic firms with similar size and BM, privatization IPOs do not consistently outperform in the long-run. This does not contradict the conclusions of previous studies that privatization improves efficiencies and profitability, but instead suggests that investors more appropriately capitalize these performance improvements in the value they assign to newly privatized firms' shares than they do for private IPOs.

The rest of this paper is organized as follows. Section 2 describes data and methodology. Section 3 provides empirical results and Section 4 concludes.

2. Data and methodology

We initially collect privatization IPO samples from three sources. The first two sources are the share issue privatization (SIP) appendix in Megginson (2005) and the privatization database maintained by the World Bank. The final data source is the July 1997 edition of the *Privatisation International* database, which provides a comprehensive listing of 618 initial equity offerings of former state-owned enterprises from February 1981 through June 1997. This datafile also provides information on offer size (in U.S. dollars), issue date, offering type (initial or unseasoned versus seasoned), fraction of capital sold, currency of issue, and exchange where the new issue will be traded. We then collect stock returns and financial statements data from *Datastream*. For an issue to be included in our final sample of privatization IPOs, it must have at least one year of post- issue return data available on *Datastream* and

the first price in *Datastream* must be available no later than three months after the issue date provided in the SIP appendix, the World Bank file, or *Privatisation International*.

Our final sample of privatization IPOs consists of 241 IPOs from 42 countries over the years 1981-2003. Table 1 reports the distribution of our sample across countries and the average proceeds for each country. The proceeds are expressed in terms of 2003 U.S. dollars using the U.S. consumer price index (CPI) and contemporaneous exchange rates. The proceeds raised by these IPOs total $434 billion, which is much larger than the aggregate amount of $164 billion (in 1997 dollars) in MNNS (2000), who use a sample of 158 privatization IPOs from 33 countries. The average (median) proceeds of our sample IPOs is $1.8 billion ($484 million) and this is much greater than the average size of typical U.S. private companies' IPOs. Ritter and Welch (2002) report that the aggregate gross proceeds raised by 6,249 IPOs of U.S. firms between 1980 and 2001 is $488 billion in 2001 dollars.

****** Insert Table 1 about here ******

The United Kingdom has the largest number of privatization IPOs in our sample. There are 27 U.K. privatization IPOs in our sample and these raise $64 billion in total. However, the largest total proceeds ($73 billion) were raised by Japan, even though there were only five privatization IPOs. Nippon Telegraph & Telephone raised $18.7 billion in its IPO in November 1986, which was history's largest IPO at the time.

Table 2 reports yearly distributions of our sample IPOs. It also reports distributions across five industries--financial, manufacturing, natural resources, services and utilities. The industry classification is based on the two-digit U.S. standard industry classification code. Initial returns and average proceeds are also reported in Table 2. The number of privatization IPOs increased sharply during the late 1980s, but then declined after 1995. The total number of IPOs dropped from 91 between 1990 and 1994 to 19 during 2000-2003, though the average size of the issues was much larger during the latter period. The number of privatization IPOs decreased even during the Internet Bubble period; there were only seven privatization IPOs in 1999.

****** Insert Table 2 about here ******

Utilities and financial firms are well represented in our privatization IPO sample. There are 45 financial companies and 84 utilities firms in the sample. This proportion of financial and utilities firms is much higher than in typical private IPO study samples, though Ljungqvist, Jenkinson and Wilhelm (2003) report that 56 percent (24 percent) of energy and utilities (banking and financial services) offerings in their sample of 2,143 IPOs from 65 countries outside the U.S. between January 1992 and July 1999 are in fact privatization IPOs.

Consistent with previous studies that document high initial returns for privatization IPOs (e.g., Jones, Megginson, Nash and Netter (1999) and Dewenter and Malatesta (1997)), the average initial return

is 23.0 percent. Privatization IPOs do not show any significant increases in initial returns during the internet bubble period; indeed, the average initial return of 11.2 percent in 1999 is lower than the average initial returns of most years during our sample period. This is in sharp contrast to private IPOs. The average initial return is 71.7 percent for 457 U.S. private IPOs in 1999 (Ritter and Welch (2002)).

The average market capitalization of our privatization IPOs is $7.8 billion, which is far greater than the average market capitalization of private IPO firms. For example, Corwin, Harris and Lipson (2004) show that the average market capitalization of 220 IPOs listed on the New York Stock Exchange (NYSE) from January 1995 to September 1998 is $689 million. Considering the fact that NYSE IPO firms are typically much larger than Nasdaq IPO firms, privatization IPO firms are significantly larger than typical private IPO firms. The average stake sold in privatization IPOs is 44 percent, which is similar to the 40 percent average stake sold in NYSE IPOs documented in Corwin, Harris and Lipson (2004).

The results in Table 2 indicate that privatization IPO firms are typically much bigger than private IPO firms and raise substantially larger amounts than private IPO firms. However, the initial returns are on average very high, which is not expected from asymmetric information based explanations of IPO underpricing. The common prediction of various asymmetric information based explanations is that as information asymmetry increases, initial returns are likely to increase as summarized in Ritter and Welch (2002). Since privatized firms are on average bigger, with a longer operating history, and are from more stable industries, we would expect there to be less information asymmetry in privatization IPOs. Choi and Nam (1998) and Jones, et. al (1999) indeed show that the initial returns of privatization IPOs are better explained by the theories provided by Perotti (1995) and Biais and Perotti (2002) that are specific to privatization IPOs, and asymmetry information based explanations do not work well. Perotti (1995) argues that privatization IPOs are underpriced to signal the government's determination to eliminate policy uncertainties regarding privatization plans and Biais and Perotti (2002) propose that underpricing is used in privatization IPOs to widely distribute shares among public investors. If high initial returns of privatization IPOs are not due to asymmetric information, but are instead due to deliberate government policies, there are no compelling reasons to expect long-term abnormal returns of privatization IPOs unless investors systematically under or overestimate the efficiency and/or profitability gains of privatized firms even when there is not much information asymmetry. The reexamination of long-run stock performance will give us some additional clues on this issue.

2.1. Long-run return methodology

We use numerous measures to estimate long-run abnormal stock returns of privatization IPOs. First, we use six different benchmarks: 1) domestic and international market indices; 2) control firms matched on firm size both in the domestic market and in the international market; and 3) control firms

matched on firm size-and-BM both in the domestic market and in the international market. Fama and French (1998) show that value premium exists in markets around the world, implying that controlling for BM is meaningful not only for U.S. stocks but also for stocks traded in other markets. Second, we use both BHARs and CARs to check the sensitivity of the results. Third, in calculating average abnormal returns, we use both equally- and value-weighted averages. Finally, we use the Fama-French three-factor model using domestic factors to test the long-run abnormal stock performance using a calendar-time regression approach.

Various national stock indices are collected from *Datastream*.[2] In particular, the return index of the *Datastream Total Market Index*, which is a value-weighted index, is used to calculate the market index returns. The return index defined in *Datastream* includes dividends and adjusts for stock splits and other relevant events. We compute long-run returns from the IPO's closing price after the first full day's trading to the end of one, three, and five-year holding periods. Thus we exclude the IPO initial return in computing the long-run return.

For the selection of control firms, we use the following procedures which are based on Barber and Lyon (1997) and Lee (1997). First, for each privatization IPO in our sample, we calculate the market capitalization by multiplying the price and the number of shares outstanding at the end of the first month available on *Datastream* after the IPO. Then, BM is calculated by dividing the book value of equity at the end of the fiscal year right before the IPO date by the market capitalization calculated above. In determining the book value of equity we use at least six months of lag, and collect the information required to calculate sizes and BMs from *Datastream*. Next, we calculate the market capitalization and BM of all firms in the domestic market, excluding those in our privatization IPO sample, that are available in *Datastream*. We calculate size and BM for these firms on the date when the corresponding IPO firm's market capitalization is calculated. Among those domestic firms with available size and BM, we identify all the firms the size and BM of which are between 70 and 130 percent of those of the corresponding IPO firms. Finally, we choose a company with the BM ratio closest to the IPO firm's BM as our size-and-BM matching firm. We use a similar approach to select size matching firms. We are able to identify one matching firm for 143 (193) IPOs from 39 (42) countries for size-and-BM (size) matching.[3] Since privatization IPO firms are typically the largest firms in each domestic market, it is sometimes difficult to find suitable matching firms within the domestic market. Therefore, we use the same method described above to find size and size-and-BM matching firms among the firms that belong to the *FTSE All World Index* to check the robustness of the results.

Table 3 reports some firm characteristics of our sample firms that belong to each subsample. Fortunately, our sample construction technique yields no substantial differences among the firms in each subsample. However, the privatization IPO firms with available size and size-and-BM matching firms

tend to be larger, and to raise more proceeds by selling a larger stake. They also tend to have lower initial returns than other privatization IPOs. BMs of IPO firms with available size matching firms are typically lower than other firms and indicate that privatization IPO firms tend to be more growth than value firms even though they are not extreme growth firms.

****** Insert Table 3 about here ******

To calculate BHAR, we first calculate monthly buy-and-hold returns (BHR) by compounding daily returns calculated using the total return index in *Datastream* over each time horizon. We exclude the initial return and measure BHAR from the day after IPOs. If a sample firm is delisted before the end of the time horizon of interest, the BHR of that particular firm over that time horizon is calculated over the period from the first to the last dates when return index data are available in *Datastream*. We then calculate BHRs of each matching firm over the same time horizon as the one used for the calculation of BHRs of the corresponding IPO. If a matching firm is delisted before the end of the time horizon used, we splice domestic market index returns into the calculation of BHR over the horizon starting from the day after the delisting date until the end of the time horizon.

After calculating BHRs of sample firms and matching firms, we calculate average BHRs for both sample firms and matching firms. We calculate the average BHRs using both equal-weighting and value-weighting methods to see how sensitive the results are to weighting methods. If large versus small privatization IPOs perform differently, two different weighting methods will lead to different results. Weights used in value-weighting are calculated based on the market capitalization that is converted into U.S. dollars at the contemporaneous exchange rate, then normalized to reflect year 2003 U.S. purchasing power. Finally, one-, three- and five-year BHARs are calculated by subtracting the corresponding average BHRs of matching firms from the relevant average BHRs of our sample firms.[4] For the significance test of BHARs, we use not only conventional t-statistics but also bootstrapped skewness-adjusted t-statistics as recommended in Lyon, Barber and Tsai (1999) as well as the simulation method used in Lee (1997). The simulation is conducted using 143 firms with available size-and-BM matching firms. For each privatization IPO firm, we first identify all the firms, size and BM of which are within the 70% - 130% range of size and BM of the original privatization IPO among those domestic firms that belong to the *Datastream Total Market Index*. These size-and-BM matched pseudo firms are included into the pseudo IPO pool. In each trial, we replace the privatization IPO firm with a randomly selected firm in this pseudo pool and calculate the average BHARs of this pseudo IPO portfolio. P-values are calculated based on the simulated distribution of 1,000 average BHARs of pseudo IPO samples.

For the calculation of CARs, we calculate daily abnormal returns by subtracting daily returns of matching firms (or market indices if matching firms are not available) from those of sample firms. We

then cumulate daily abnormal returns over the corresponding number of days to calculate CARs over different time horizons. We then calculate both equally-weighted and value-weighted average CARs.

For the Fama-French three-factor model, risk-free rates are collected from *Datastream* and the *Datastream Total Market Index* of each country is used as a proxy for the market portfolio for each country. Size (SMB) and BM (HML) factors are calculated based on the approach described in Fama and French (1993) using the domestic firms that belong to the *Datastream Total Market Index* of each country. Griffin (2002) shows that the Fama and French three-factor model based on country specific factors explains time-series variation in international stock returns much better than the three-factor model based on world factors. This is why we use domestic factors, rather than world factors in implementing the Fama-French three-factor model. Size and BM are calculated based on the market capitalization and the book equity value available at the end of June of each year. Monthly returns of each company are calculated from July of the same year to June of the next year and are used to find the values of SMB and HML as described in Fama and French (1993). Appendix 1 reports the list of interest rates used as risk free rates in the Fama-French three-factor model. Due to data limitations, this approach was used only for 34 countries.

3. Empirical results

Table 4 reports long-run BHRs of our sample firms and three different types of benchmarks. Panel A reports equally-weighted averages and Panel B reports value-weighted averages. For the case of equally-weighted BHARs based on size-and-BM matching firms, we also report p-values from the simulation method similar to the one used in Lee (1997). Over the first year, our privatization IPO firms earned on average 30 percent while the market earned 13 percent. This difference is significantly different from zero at the 0.01 significance level, implying that privatization IPO firms significantly outperform the domestic market during the first year after IPOs. Even when size or size-and-BM matching firms are used to calculate BHARs, the first year BHARs are significantly positive and are greater than 18 percent. This is true even when value-weighted averages are used as benchmarks. In this case, the first year average BHAR increases to over 31 percent.[5] This suggests that even though the average initial return is above 20 percent, the market on average underestimates the efficiency and/or profitability gains of privatizations right after IPOs, especially for larger privatization IPOs. Alternatively, the market might be concerned about government policy uncertainties after IPOs and hesitate to fully incorporate potential efficiency and/or profitability gains into stock prices for quite some time thereafter. Perotti (1995) and Jones, Megginson, Nash and Netter (1999) argue that the price at which a competitive capital market will be willing to pay for the privatized shares is affected by policy uncertainty. The market seems to pay a great deal of attention to how governments behave after IPOs and slowly incorporates prospective performance

improvements into stock prices as policy uncertainties disappear. However, for value-weighted averages of BHARs based on size and BM matching firms, the significance of first year BHARs disappears and the average drops to less than 5 percent. This indicates that the results are sensitive to the way we calculate averages even when the same benchmarks are used.

****** Insert Table 4 about here ******

When the horizon is extended to three years, we still observe significantly positive equally-weighted BHARs based on domestic market indices, which is consistent with previous studies. However, using size-matched benchmarks, the equally-weighted (value-weighted) average three-year BHAR drops (increases) from 28 (37) percent to 3 (40) percent, which is not significantly different from zero. When size-and-BM matched firms are used, both the equally-weighted and the value-weighted average three-year BHARs become insignificant (around 4 percent). These findings are similar to those of Brav, Geczy and Gompers (2000) and Eckbo, Masulis and Norli (2000) who report that private IPO firms have returns that are comparable to non-issuing size-and-BM-matched firms. Therefore, the use of domestic market indices as benchmarks seems to overestimate the long-term stock performance of privatization IPOs. Figure 1 shows how privatization IPOs perform relative to three benchmarks in three subsamples.

****** Insert Figure 1 about here ******

For a five-year horizon, when the market return is used as a benchmark, the equally-weighted average five-year BHAR is a significant 45 percent while the value-weighted average five-year BHAR is an insignificant 23 percent. In contrast, Dewenter and Malatesta (2001) report a significantly positive 88 percent five-year BHAR for their sample of 78 privatization IPOs, and Choi (2002) documents a significant 69 percent five-year BHAR for 134 privatization IPOs. Similarly, MNNS (2000) also report a statistically significantly positive equally-weighted average five-year BHAR of 91 percent. The primary reason for different results in our study compared to previous studies is likely to be our larger sample size. Our sample includes privatization IPOs between 1997 and 2003 and covers more IPOs during 1981-96, the same period used by MNNS (2000). The inclusion of more IPOs seems to reduce the average 5-year BHARs. In addition, our finding that the significance of the average five-year BHAR depends on the method of calculating the average returns is similar to the results presented in private IPO studies. Brav, Geczy, and Gompers (2000) and Mitchell and Stafford (2000) document that IPO firms significantly underperform broad market benchmarks on an equally weighted basis, while value weighting IPO stock returns reduces the abnormal negative performance by more than half. The value-weighted average BHARs continue to be insignificant when size or size-and-BM matched firms are used to calculate BHARs and traditional t-statistics and bootstrapped skewness-adjusted t-statistics are used for statistical tests.

However, when the simulation based p-values for three-year and five-year BHARs using size and BM matched firms are used for statistical tests, the results become significant. These conflicting results are likely to be due to a problem in the execution of this simulation. Out of 143 privatization IPOs, 56 IPOs do not have any other firm (except for the original matching firm) that can be used as a random firm with similar size and BM characteristics in the simulation. Therefore, the empirical distribution of abnormal returns generated from simulations will be very concentrated around the original abnormal return, implying that simulated p-values are less meaningful. Keeping this caveat in mind, it can be said that when more appropriate benchmarks are used, 5-year BHARs become insignificant even though they remain positive. Finally, the equally-weighted and value-weighted five-year BHARs become insignificant when size or size-and-BM matching firms are used as benchmarks.

In sum, the results in Table 4 show that privatization firms outperform their various domestic benchmarks over a one-year horizon after IPOs, but not generally over longer horizons. Given previous results that privatization IPO firms improve their operating performance over three years after IPOs, the market seems to be slow in correctly evaluating the efficiency and/or profitability improvements from privatization during the first year after IPOs but it seems to catch up by the end of the first year. In addition, there is no evidence of underperformance of privatization IPOs. This suggests that privatization IPOs are not offered to take advantage of investor over-optimism, in contrast to private IPOs. This is likely to be true since the timing is determined by government policies rather than by management. This is also supported by the fact that the number of privatization IPOs goes down during the internet bubble period when investor over-optimism is prevalent.

In Table 5, we report equally-weighted average BHARs based on domestic market indices and size matched firms for 143 IPOs with available size-and-BM matching firms. This is to check whether the insignificant three-year BHAR based on size-and-BM matching firms is caused by the use of a different sample or by the use of a different matching technique. It turns out that when only the 143 IPOs with available size-and-BM matches are used to measure BHARs based on domestic market indices, equally-weighted BHARs are significantly positive for all three horizons. When BHARs are measured based on size-adjusted matching firms, only the average one-year BHAR is significant. This shows that the results shown in Table 4 are not due to different characteristics of sample firms in each benchmark group. Even when the same 143 IPOs are used, equally weighted average three- and five-year BHARs become insignificant if size or size-and-BM adjusted matching firms are used to calculate BHARs as shown in Table 4. This confirms the importance of benchmarks in a long-run stock performance study.

****** Insert Table 5 about here ******

To check the robustness of the results, we report CARs in Table 6. When domestic market indices are used as a benchmark, CARs are significantly positive for one-, three- and five-year horizons for both

equally-weighted and value-weighted averages. CARs increase when value-weighting is used even though the statistical significance decreases. For example, the equally-weighted average three-year CAR is 18 percent while the value-weighted average three-year CAR is 38 percent. The significant three- and five-year CARs for both equally-weighted and value-weighted methods contradicts the BHAR results reported above, again indicating that measures of long-run stock performance of privatization IPOs are not robust to the measurement methods used to calculate abnormal returns, even when the same benchmarks are used.

****** Insert Table 6 about here ******

When we use firm-characteristics-controlled benchmarks, the results again change. Equally-weighted, one-year CARs remain significantly positive. But for all other cases except for three-year CARs using size-matched benchmarks, CARs are not statistically significantly different from zero when size or size-and-BM matching firms are used as benchmarks. The results are very similar to the results based on BHARs and show that the choice of benchmark is very important.

Intriguingly, value-weighted average CARs are significantly greater than equally-weighted CARs, especially for the three-year horizon. For example, the equally-weighted average three-year CAR based on size matched firms is 9.25 percent while the corresponding value-weighted average CAR is 33.28 percent. Similar patterns exist for BHARs in Table 4. This indicates that large privatization IPOs do well relative to smaller privatization IPOs over the three-year horizon, and compared to other similarly sized domestic firms. Among privatized companies, telecommunications and utilities companies tend to be larger and they experience significant performance improvements after IPOs (Megginson, Nash and van Randenborgh (1994)).

Tables 7 and 8 report equally-weighted average BHARs and CARs, respectively, using international benchmarks. Since privatization IPO firms are usually much bigger than publicly traded firms, it is difficult to find truly matching firms in the domestic market. This is the main reason why we also consider characteristic-controlled matching firms in the international market. For the market control, we use both the *FTSE All World Index* and the *Datastream World Index* as benchmarks. In addition, we find size and size-and-BM matching firms from the international firms that belong to the *FTSE All World Index*.[6] To check the potentially different implications for domestic vs. international investors, we report results both for returns in local currencies and for U.S. dollar returns. The results in Table 7 are very similar to the results reported in Table 4 using the domestic benchmarks. For the three-year and five-year horizons, when size or size-and-BM matching firm approaches are used, privatization IPO firms do not seem to outperform their benchmarks. Here, at least for returns in local currency, we find that three- and five-year BHARs are not significant when size and BM benchmarks are used and simulation based p-values are used for statistical tests. This is different from the results in Table 4 and is more in line with the

results based on t-statistics and bootstrapped skewness-adjusted t-statistics. As discussed earlier, this is due to the fact that the simulation method here is less subject to the problem of finding suitable matching firms, since all IPOs have more than one possible random firm to choose from in the simulation when size and BM matched random firms are selected from the *FTSE All World Index* universe.

****** Insert Table 7 & 8 about here ******

Finally, we use a calendar- time regression approach based on the Fama-French three-factor model (Fama and French (1993)). As explained earlier, we form SMB and HML in the same way as described in Fama and French (1993) using the domestic firms that belong to the *Datastream Total Market Index* for each country in our sample. Due to data limitations, this approach is used only for 34 countries. In each month from November 1981 to July 2005, for each country, we form a portfolio which is composed of privatization IPO firms in each domestic market, that went public within the last one-, three- and five-year periods. Due to the limited number of privatization IPO firms for many countries, oftentimes the portfolio is composed of only one stock. Using this portfolio, we run the following regression (Equation 1) for each country.

$$R_{it} = \alpha_i + \beta_i (r_{mit} - r_{fit}) + \gamma_i SMB_{it} + \lambda_i HML_{it} + e_{it}, \qquad \text{Eq. 1}$$

where R_{it}, r_{mit}, r_{fit}, SMB_{it}, and HML_{it} are the portfolio return, the *Datastream Total Market Index* monthly return, the risk free rate, the size factor (Small minus Big) and the BM factor (High minus Low) of country i in month t, respectively.[7]

Table 9 reports the summary of 34 regressions. The results for each country are reported in Appendix 2. In contrast to the results reported so far, the calendar-time regression results show that for both equally-weighted and value-weighted cases, privatization IPOs significantly outperform after controlling for the market, size and BM factors for one-year, three-year and five-year horizons. In most cases, both mean and median intercepts are significantly positive, indicating abnormal performance of privatization IPO firms. Even though care should be taken in interpreting the results due to the limitation imposed by the data availability identifying factors and forming portfolios, the results show that we have to be careful in making any definitive conclusions regarding the long-term performance of privatization IPOs.

****** Insert Table 9 about here ******

Finally, we use regression analyses to examine what factors can explain long-term abnormal returns of privatization IPOs in multivariate settings. Given that long-term abnormal returns are highly skewed, the standard ordinary least square regression analyses might not be adequate, but they would at least provide us with some idea about relevant factors that might affect long-term abnormal performance. In addition, we compare the regression results of BHARs based on both local market indices and

domestic size-and-BM matched firms. This comparison can show how using the wrong benchmark can lead to differing conclusions regarding the relationship between long-term stock performance of privatization IPOs and some firm and country characteristics.

Due to additional data constraints, only 102 IPOs are used in the regression analyses for one-year BHARs instead of the 143 IPOs used in Table 4. The following explanatory variables are used to capture individual firms' characteristics: 1) percentage of shares sold at the IPO (PercentSold); 2) standard deviation of daily returns during the 20-day period after IPOs (StdDev); 3) book-to-market equity ratio (B/M); 4) market capitalization (Size); 5) return on assets (ROA); 6) beta (Beta); 7) dummy variable for utilities (UtilityD); and 8) dummy variable for financial companies (FinanceD). ROA and B/M are measured using the financial statement information at the fiscal year end of IPO years due to the lack of financial statement information prior to the IPOs for many sample firms. Size is measured by multiplying the number of shares outstanding by the IPO firm's stock price at the end of calendar month of the IPO. In addition, we use the following independent variables to control for country-specific characteristics: 1) dummy variables for legal origins indicating English, French and German origins (EnglishD, FrenchD and GermanD, respectively); 2) GNP per capita (GNP); 3) accounting standard scores (AcctSt); and 4) size of capital market defined as total market capitalization divided by GDP in 1997 (MarketSize). BM, Size, ROA and Beta are obtained from *Datastream International*, while law origins and accounting standards are obtained from La Porta, et al (1998).

On the left hand side of Table 10, the results based on the market-adjusted BHARs are reported. For one-year BHARs, the coefficients of PercentSold and UtilityD are significant at the 0.01 and 0.05 significance levels, respectively. All other variables are insignificant. The results indicate that as larger stakes are sold in the IPO, the first year stock performance is better, which seems to contradict Perotti's (1995) prediction that "committed" governments will sell only small stakes in IPOs—retaining a large share of the firm to bond the government's promise allow the divested firm to operate profitably and without political interference. In addition, utility firms perform better than others during the first year after IPOs. As we change our attention to five-year BHARs, we find somewhat different results regarding PercentSold. The coefficient of PercentSold becomes significantly negative at the 0.01 significance level. This result supports Perotti's (1995) prediction, showing that long term performance of privatization IPOs is higher when the government retains a larger share after the IPO. Another significant variable is BM, the coefficient of which is significantly negative at the 0.05 significance level for five-year BHARs, indicating that firms that are less likely to be overvalued (i.e., value firms) perform worse over the five-year period after IPOs. This is surprising, even after acknowledging that privatization IPOs are more mature and subject to less information asymmetry than private-sector IPOs. The coefficient of utilities firms remains significantly positive, although the significance level drops to the 0.10 level. In addition, all

three legal origin dummy variables are significantly positive, indicating that privatization IPOs in countries with the Scandinavian legal origin (the omitted legal family in the regression) tend to do poorly over the long-term, compared to IPOs in other countries.

****** Insert Table 10 about here ******

The results on the right hand side of Table 10 show the regression results for BHARs using domestic size-and-BM matching firms. For one-year BHARs, the coefficient of PercentSold is not significant. This clearly pinpoints the importance of using the right benchmark and the possibility of reaching misleading conclusions when incorrect benchmarks are used. A similar point can be made when we shift our focus to the role of BM. If size-and-BM-adjusted BHARs are used, the coefficients of BM are all positive for one-, three-, and five-year BHARs even though only the coefficient for three-year BHARs is significant at the 0.05 significance level. This again shows that the inferences from regression analyses can be quite different regarding the role of BM depending on how we calculate BHARs. For other variables, the results are similar to the ones using market-adjusted BHARs except that the coefficient of ROA becomes significant for one-year BHARs and the significance of GermanD disappears.

4. Summary and conclusions

Many studies document that the operating performance of privatized companies significantly improves after IPOs (Boubakri and Cosset (1998), Megginson and Netter (2001), Djankov and Murrell (2002)). Consistent with these findings, earlier studies document significantly positive long-run abnormal stock returns and conclude that long-run stock performance evidence is consistent with efficiency and/or profitability gains from privatization (e.g., Dewenter and Maletesta (2001)). However, long-term stock performance studies are subject to difficult methodological problems related to the choice of benchmarks and the method of calculating abnormal returns. In addition, statistical tests are not easy to conduct due to a highly skewed distribution of long-term stock returns and clustered sample observations. This study tests the robustness of previous results on long-term stock performance of privatization IPOs to better understand the effectiveness of privatizations and the efficiency of capital markets in predicting (and valuing) these performance improvements.

To compare the performance of privatization IPOs with multiple benchmarks, we use size and size-and-BM matched firms from both domestic and international markets for the calculation of abnormal returns. To our knowledge, this is the first attempt to do this in the privatization literature. We also calculate both BHARs and CARs to check the sensitivity of the results to the way we calculate abnormal returns. In addition, we compare equally-weighted average returns with value-weighted average returns to see whether large privatization IPOs perform differently compared to smaller privatization IPOs. Finally,

we use the Fama-French three-factor model to examine long-term performance using a calendar-time regression approach. Again, this is the first attempt to try this methodology in the privatization literature.

Our analyses show that long-run stock performance results are very sensitive to benchmarks, abnormal return calculation methods and weighting methods. We observe statistically significant abnormal performance when domestic market indices are used as benchmarks. However, the significance level significantly drops when alternative benchmarks, especially size-and-BM-adjusted benchmarks, are used. In addition, we find that statistical significances of BHARs and CARs are quite different, especially for longer horizons. Moreover, the long-term stock performance of different size groups seems to be quite different since value-weighted averages tend to be much greater than equally-weighted average returns. On the other hand, when the Fama-French three-factor model is used, the privatization IPO firms once more seem to significantly outperform. Finally, the relationship between long-term stock performance of privatization IPOs and some firm and country characteristics is very sensitive to the specific benchmarks used to calculate BHARs. In sum, the results in the paper show that previously documented long-term outperformance of privatization IPOs is a less than fully robust result, though we do verify that privatization IPOs do not under-perform market indices or comparable private firms over time.

It is possible that we do not find significant long-term stock returns for privatization IPOs because there is less information asymmetry for privatization IPOs compared to private IPOs. As predicted by Perotti (1995), there is additional risk related to policy uncertainty in privatization IPOs, which seems to cause significantly positive abnormal stock returns during the first year after privatization IPOs. However, once policy uncertainties are resolved, the market seems to be more accurately valuing privatization IPOs due to the fact that privatization IPO firms are bigger than typical IPOs, with longer operating histories, and are in mature industries with less uncertainty. In short, the findings in this paper suggest that it is important to examine the link between long-term stock performance and operating performance as a next step. This is crucial to better understanding the consequences of privatization. This will be an interesting question to answer in future research.

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Table 1. Sample Description

Privatization IPOs during 1981 and May 2003 are from the July 1997 edition of the Privatization International, Megginson (2005) and the World Bank's privatization database. All those without available returns for one-year after the IPO at the *Datastream* are excluded. In addition those IPOs the prices of which are first available three or more months after the IPO are also excluded. Proceeds converted into million 2003 U.S. dollars based on the U.S. consumer price index and exchange rates on the issuing date.

Country	Number of Offerings	Average Proceeds	Median Proceeds	Country	Number of Offerings	Average Proceeds	Median Proceeds
Argentina	7	1,197	724	Korea, R.	6	1,899	609
Australia	8	2,604	1,114	Malaysia	12	529	122
Austria	11	334	216	Morocco	5	90	65
Brazil	2	605	605	Netherlands	2	3,367	3,367
Canada	9	689	437	New Zealand	4	813	750
China	7	1,865	723	Norway	3	294	401
Czech	1	187	187	Pakistan	1	1,460	1,460
Denmark	1	4,238	4,238	Philippines	3	295	151
Egypt	5	34	29	Poland	5	429	192
Finland	4	638	570	Portugal	11	1,091	443
France	14	4,186	3,488	Singapore	10	472	181
Germany	9	3,937	881	South Africa	2	1,342	1,342
Greece	5	365	392	Spain	7	982	1,046
Hungary	5	438	213	Sweden	5	2,772	1,243
India	4	475	257	Switzerland	1	7,055	7,055
Indonesia	4	1,152	1,042	Taiwan	6	1,266	127
Ireland	1	223	223	Thailand	7	190	187
Israel	5	202	124	Turkey	1	23	23
Italy	12	3,831	1,579	U.K.	27	2,385	2,025
Japan	5	14,586	11,313	U.S.	1	2,851	2,851
Kenya	2	38	38	Venezuela	1	1,343	1,343
Full sample					241	1,802	484

Table 2. Industry classification and issue characteristics of privatization IPOs, by Cohort Year, 1981-2003

Privatization IPOs during 1981 and May 2003 are from the July 1997 edition of the Privatization International, Jones, Megginson, Nash and Netter (1999) and the World Bank's privatization database. All those without available returns for one-year after the IPO at the *Datastream* are excluded. In addition those IPOs the prices of which are first available three or more months after the IPO are also excluded. Samples are classified as FIN (financial), MAN (manufacturing), NAT (natural resources), SER (services), and UTI (utilities) based on two-digit U.S. standard industry classification code. Average initial return is measured from the offer price to the closing price of the first trading day available at the *Datastream*. Stake sold are the percentage of shares sold at the IPO. Proceeds are converted into 2003 U.S. dollars based on the U.S. consumer price index and exchange rates on the issuing date. Market value is the market capitalization of the IPO firm at the end of the first available month at the *Datastream* after the IPO. Market values are also converted into 2003 US dollars using US CPI. Averages in this table are equally-weighted averages.

Year	Number of privatization IPOs by industry						Average Initial return (%)	Average Stake Sold (%)	Average Proceeds ($million)	Average Market Value ($millions)
	FIN	MAN	NAT	SER	UTI	Sum				
1981	-	1	-	-	1	2	15.7	50.3	820	1,865
1983	-	-	-	1	-	1	23.2	51.5	118	268
1984	-	-	1	-	1	2	20.6	75.1	5.129	12,498
1985	-	-	-	3	-	3	6.5	22.0	471	1,437
1986	-	2	1	-		3	15.4	71.1	1,424	1,427
1987	2	2	2	2	3	11	34.5	70.0	2,037	2,152
1988	1	3	-	2	3	8	33.1	49.5	1,853	1,345,
1989	3	3	1	-	8	15	27.3	60.0	1,351	4,666
1990	1	2	2	2	7	14	34.4	64.6	988	1,823
1991	2	4	2	-	4	12	16.4	42.0	1,455	2,907
1992	3	2	1	6	6	18	25.0	47.1	626	3,168
1993	8	5	2	-	4	19	21.4	37.9	1,576	6,889
1994	7	10	3	2	6	28	40.3	36.2	1,261	4,507
1995	7	9	6	1	6	29	9.0	33.4	1,065	3,857
1996	4	6	1	2	8	21	27.8	43.8	1,740	4,432
1997	2	4	2	2	7	17	12.8	46.1	2,148	7,765
1998	2	1	2	-	6	11	17.3	31.0	3,840	15,786
1999	1	2	-	1	3	7	11.2	35.5	4,946	12,280
2000	-	1	1	-	8	10	10.7	25.1	3,296	20,282
2001	1	-	2		2	5	0.5	28.9	1,417	4,853
2002	1	-	-	1	1	3	5.8	28.7	1,168	5,484
2003	-	-	-	-	1	1	8.0	25.0	500	2,874
1981-1989	6	11	5	9	15	46	27.6	58.3	2,193	14,641
1990-1994	21	23	10	10	27	91	29.5	44.1	1,185	4,116
1995-1999	16	22	11	6	30	85	15.4	38.1	2,140	7,018
2000-2003	2	1	3	1	12	19	8.0	26.5	2,318	12,969
1981-2003	45	57	29	26	84	241	23.0	43.9	1,802	7,761

Table 3. Comparisons of firm characteristics of total, size matched and size-and-book-to-market (BM) matched samples

Privatization IPOs during 1981 and May 2003 are collected from the July 1997 edition of the Privatization International, Jones, Megginson, Nash and Netter (1999) and the World Bank's privatization database. All those without available returns for one-year after the IPO at the *Datastream* are excluded. In addition those IPOs the prices of which are first available three or more months after the IPO are also excluded. Initial return is measured based on the offer price and the closing price of the first trading day available at the *Datastream*. Sample IPOs are compared with the domestic firms with similar size or size and book-to-market equity ratio (BM). Due to the data availability, only 193 (143) sample firms are matched with one matching firm the size (size and BM) of which is between 70 and 130 percent of that of the IPO firm. Stake sold is the percentage of total number of shares outstanding sold at the IPO. Market capitalization is calculated on the last date of calendar month of IPO dates. Proceeds and market capitalization are converted into million 2003 U.S. dollars based on the U.S. consumer price index and exchange rates on the issuing date. Book-to-market equity ratio is calculated by dividing the book value of equity by the market value of equity at the fiscal year end of an IPO year. Mean BM is reported on top and median BM is reported in parenthesis.

Characteristics	Total	Size Matching	Size and BM Matching
Sample	241	193	143
Mean first-day Return	23.0%	19.9%	18.7%
Mean stake sold	44.9%	45.4%	46.8%
Mean proceeds (in millions of 2003 US dollar)	1,802	1,920	1,905
Mean market capitalization (in millions of 2003 US dollar)	7,761	8,212	8,197
Mean and median book-to-market equity ratio	0.73 (0.598)	0.674 (0.547)	0.747 (0.694)

Table 4. Buy and hold abnormal returns (BHAR) of privatization IPOs over one, three and five year periods against three matching criteria

Returns of sample IPOs are compared with domestic market index returns and returns of domestic firms with similar size or size and book-to-market equity ratio (BM). Due to the data availability, only 193 (143) sample firms are matched with one matching firm the size (size and BM) of which is between 70 and 130 percent of that of the IPO firm. For each IPO firm, annual buy-and-hold return (BHR) is calculated using the total return index available at *Datastream*. If an IPO firm is delisted before the end of time horizon, the return calculation will stop on the date of delisting. Using the same time horizon used for the calculation of sample firm's BHR, the BHR of the matching firm are calculated. If a matching firm is delisted before the end of time horizon, market index returns are spliced until the end of the horizon. Buy-and-hold abnormal returns (BHARs) are calculated by subtracting the average BHRs of matching firms from the average BHRs of IPO firms. In Panel A, equally-weighted averages are reported and in Panel B, value-weighted averages are reported. For value-weighting, weights are based on the market capitalization of IPO firms at the end of IPO month converted into 2003 US dollars using US CPI and exchange rates. N represents the number of IPOs. For BHAR column, average BHARs are reported on top, t-statistics are reported in parenthesis, and bootstrapped skewness-adjusted t-statistics as in Lyon, Barber and Tsai (1999) are reported in square brackets. *, **, and *** indicate significant results at the 0.10, 0.05 and 0.01 significance levels, respectively. For BHAR column of Size-BM in Panel A, p-values from a simulation as in Lee (1997) are reported at the bottom in curly brackets.

Benchmark	Market				Size				Size-BM			
	N	BHR		BHAR	N	BHR		BHAR	N	BHR		BHAR
		IPO	Matching			IPO	Matching			IPO	Matching	
Panel A: Equally-weighted												
One-year	241	29.64%	13.00%	16.64% (4.84^{***}) [6.40^{***}]	193	29.32%	16.47%	12.85% (2.96^{***}) [3.35^{***}]	143	31.86%	12.13%	18.73% (3.94^{***}) [4.69^{*}] {0.000}
Three-year	239	72.78%	44.31%	28.47% (4.08^{***}) [6.62^{***}]	190	72.35%	69.14%	3.21% (0.25) [-0.26]	142	82.50%	78.06%	4.44% (0.27) [0.01] {0.023}
Five-year	224	119.47%	74.15%	45.32% (3.62^{***}) [5.41^{***}]	175	122.19%	125.95%	-3.76% (-0.17) [0.47]	131	140.32%	124.38%	15.95% (0.56) [0.01] {0.010}
Panel B: Value-weighted												
One-year	238	42.82%	11.23%	31.58% (2.38^{***})	193	47.20%	9.94%	32.37% (2.19^{**})	143	53.96%	49.01%	4.87% (0.21)
Three-year	237	84.10%	46.95%	37.15% (1.27)	190	86.16%	46.03%	40.13% (0.76)	142	95.99%	91.62%	4.37% (0.06)
Five-year	221	87.80%	65.19%	22.61% (0.58)	175	79.36%	82.24%	-2.88% (-0.05)	131	96.15%	94.44%	1.71% (0.02)

Table 5. Market and size-adjusted equally-weighted average buy and hold abnormal returns (BHAR) of 143 privatization IPOs with available size-and-book-to-market equity ratio (BM) matched firms.

Returns of sample IPOs are compared with domestic market index returns and returns of domestic firms with similar size or size and book-to-market equity ratio (BM). Due to the data availability, only 143 sample firms are matched with one matching firm the size and BM of which are between 70 and 130 percent of those of the IPO firm. For each IPO firm, annual buy-and-hold return (BHR) is calculated using the total return index available at *Datastream*. If an IPO firm is delisted before the end of time horizon, the return calculation will stop on the date of delisting. Using the same time horizon used for the calculation of sample firm's BHR, the BHR of the matching firm are calculated. If a matching firm is delisted before the end of time horizon, market index returns are spliced until the end of the horizon. Buy-and-hold abnormal returns (BHARs) are calculated by subtracting the average BHRs of matching firms from the average BHRs of IPO firms. Average BHARs are reported on top, t-statistics are reported in parenthesis, and bootstrapped skewness-adjusted t-statistics as in Lyon, Barber and Tsai (1999) are reported in square brackets. *, **, and *** indicate significant results at the 0.10, 0.05 and 0.01 significance levels, respectively.

Benchmark	One-Year BHAR	Three-Year BHAR	Five-Year BHAR
Market Index	23.57%	41.44%	60.43%
	(4.87^{***})	(4.54^{***})	(4.05^{***})
	[6.38^{***}]	[5.46^{***}]	[4.60^{***}]
Size	17.12%	11.97%	11.36%
	(3.50^{****})	(0.77)	(0.42)
	[3.69^{***}]	[0.70]	[0.30]

Table 6. Cumulative abnormal returns (CAR) of Privatization IPOs over one-, three- and five-year periods against three different matching criteria

Returns of sample IPOs are compared with domestic market index returns and returns of domestic firms with similar size or size and book-to-market equity ratio (BM). Due to the data availability, only 193 (143) sample firms are matched with one matching firm the size (size and BM) of which is between 70 and 130 percent of that of the IPO firm. For each IPO firm, monthly buy-and-hold return (BHR) is calculated using the total return index available at *Datastream*. Similarly monthly BHRs of matching firms are calculated over the same time horizon. Then, monthly abnormal returns are calculated by subtracting the average of monthly BHRs of matching firms. If an IPO firm is delisted before the end of time horizon, the return calculation will stop on the date of delisting. Using the same time horizon used for the calculation of sample firm's monthly BHR, the monthly BHR of the matching firm is calculated. If a matching firm is delisted before the end of time horizon, market index returns are spliced until the end of the horizon. For each IPO, we calculate daily abnormal returns by subtracting daily returns of matching firms (or market indices) from those of sample firms and then cumulate those daily abnormal returns over relevant number of days to calculate cumulative abnormal returns (CARs) over one-, three- and five-year horizons. Average CARs are calculated using both equally-weighting and value-weighting methods. For value-weighting, weights are based on the market capitalization of IPO firms converted into 2003 US dollars using US CPI and exchange rates. N represents the number of IPOs. For CAR column, average CARs are reported on top and t-statistics are reported in parenthesis. *, **, and *** indicate significant results at the 0.10, 0.05 and 0.01 significance levels, respectively.

Benchmark	Market-matched		Size-matched		Size-BM matched	
	N	CAR	N	CAR	N	CAR
Panel A. Equally-weighted						
One-year	241	13.73% (5.54^{***})	193	10.63% (3.10^{***})	143	14.66% (3.93^{***})
Three-year	239	18.48% (5.06^{***})	190	9.25% (1.53^{*})	142	7.64% (1.11)
Five-year	224	29.04% (5.11^{***})	175	6.18 (0.85)	131	5.41% (0.68)
Panel B. Value-weighted						
One-year	238	31.94% (3.34^{***})	193	35.37% (2.63^{***})	143	4.88% (0.28)
Three-year	237	38.31% (2.51^{***})	190	33.28% (1.31^{*})	142	4.46% (0.14)
Five-year	221	30.41% (1.74^{**})	175	7.17% (0.32)	131	1.72% (0.07)

Table 7. Buy and hold abnormal returns (BHAR) of privatization IPOs using international benchmarks

Returns of sample IPOs are compared with two international market index returns and returns of international firms in the *FTSE All World Index* with similar size or size and book-to-market equity ratio (BM). *Datastream* provides the information on the composition of the *FTSE All World Index* during our sample period, which is used to find matching firms. However, it provides the *FTSE All World Index* return only from 1994. Therefore, FTSE All World column reports the results only for those privatization IPOs from 1994.Panel A reports the average returns in local currencies and Panel B reports the average returns in US dollars. Due to the data availability, only 210 (187) sample firms are matched with one matching firm the size (size and BM) of which is between 70 and 130 percent of that of the IPO firm. For each IPO firm, annual buy-and-hold return (BHR) is calculated using the total return index available in *Datastream*. If an IPO firm is delisted before the end of time horizon, the return calculation will stop on the date of delisting. Using the same time horizon used for the calculation of sample firm's BHR, the BHR of the matching firm is calculated. If a matching firm is delisted before the end of time horizon, *Datastream World Index* returns are spliced until the end of the horizon. Buy-and-hold abnormal returns (BHARs) are calculated by subtracting the average BHRs of matching firms from the average BHRs of IPO firms. N represents the number of IPOs, IPO represents BHRs of IPO firms and Mat represents BHRs of benchmarks. For BHAR column, average BHARs are reported on top, t-statistics are reported in parenthesis, and bootstrapped skewness-adjusted t-statistics (Lyon, Barber and Tsai, 1999) are reported in square brackets at the bottom. *, **, and *** indicate significant results at the 0.10, 0.05 and 0.01 significance levels, respectively. At the bottom of BHAR column for Size-BM, p-values from the simulation are reported in curly brackets.

Benchmarks	Market								Size				Size-BM			
	FTSE All World				Datastream World											
	N	IPO	Mat	BHAR	N	IPO	Mat	BHAR	N	IPO	Mat	BHAR	N	IPO	Mat	BHAR
Panel A. Return in Local Currency																
One-year	133	29.00%	12.53%	16.47% (2.91***) [3.62***]	233	28.75%	10.39%	18.36% (4.76***) [5.97]	210	28.42%	16.69%	11.73% (1.94*) [1.89]	186	29.96%	15.42%	14.54% (2.66***) [3.18***] {0.002}
Three-year	132	60.71%	45.35%	15.36% (1.36) [1.58**]	232	71.32%	38.19%	33.13% (3.87***) [4.86***]	211	62.21%	47.27%	14.94% (1.08) [1.06]	185	82.82%	85.79%	-2.97% (-0.03) [-0.13] {0.302}
Five-year	119	80.40%	70.34%	10.06% (0.588) [0.73]	219	115.1%	65.31%	49.71% (3.86***) [4.92***]	196	91.96%	113.88%	-21.92% (-0.63) [-0.87]	172	133.21%	139.49%	-6.28% (-0.27) [-0.32] {0.872}
Panel B. US Dollar Return																
One-year	133	26.56%	10.43%	15.59% (2.67***) [3.33***]	233	27.72%	10.38%	17.34% (4.32***) [5.41***]	210	28.37%	15.37%	13.00% (2.17**) [2.18**]	186	28.48%	14.37%	14.12% (2.43***) [3.04****] {0.038}
Three-year	132	40.08%	41.33%	0.77% (0.09) [0.11]	232	57.44%	38.15%	19.29% (2.60***) [2.97***]	211	62.92%	56.90%	6.02% (0.50) [0.49]	185	65.34%	73.56%	-8.23% (-0.48) [0.67] {0.590}
Five-year	119	42.33%	58.34%	-15.21% (-1.36) [-1.26]	219	86.91%	65.29%	21.62% (2.11**) [2.31**]	196	91.28%	103.67%	-12.39% (-0.75) [-0.78]	172	99.76%	106.47%	-6.71% (-0.71) [-0.40] {0.956}

Table 8. Cumulative Abnormal Returns (CAR) of privatization IPOs using international benchmarks

Returns of sample IPOs are compared with two international market index returns and returns of international firms in the *FTSE All World Index* with similar size or size and book-to-market equity ratio (BM). *Datastream* provides the information on the composition of the *FTSE All World Index* during our sample period, which is used to find matching firms. However, it provides the *FTSE All World Index* return only from 1994. Therefore, FTSE All World column reports the results only for those privatization IPOs from 1994. Panel A reports the average returns in local currencies and Panel B reports the average returns in US dollars. Due to the data availability, only 210 (187) sample firms are matched with one matching firm the size (size and BM) of which is between 70 and 130 percent of that of the IPO firm. For each IPO, we calculate daily abnormal returns by subtracting daily returns of matching firms (or market indices) from those of sample firms and then cumulate those daily abnormal returns over relevant number of days to calculate cumulative abnormal returns (CARs) over one-, three- and five-year horizons. Average CARs are calculated using both equally-weighting and value-weighting methods. For value-weighting, weights are based on the market capitalization of IPO firms converted into 2003 US dollars using US CPI and exchange rates. N represents the number of IPOs. For CAR column, average CARs are reported on top and t-statistics are reported in parenthesis. *, **, and *** indicate significant results at the 0.01, 0.05 and 0.01 significance levels, respectively.

Benchmark	Market				Size		Size & BM	
	FTSE All World		Datastream World					
	N	CAR	N	CAR	N	CAR	N	CAR
Panel A. Return in Local Currency								
One-year	133	11.25% (3.03^{***})	233	14.30% (4.87^{***})	210	10.36% (2.29^{**})	186	109.33% (2.66^{***})
Three-year	132	10.53% (1.81^{*})	232	23.26% (3.87^{***})	209	10.34% (1.46)	186	2.70% (0.40)
Five-year	119	17.76% (2.50^{**})	219	32.37% (4.96^{***})	196	-3.65% (-0.42)	173	-6.60% (-0.76)
Panel B. US Dollar Return								
One-year	133	10.26% (2.65^{***})	233	13.72% (4.82^{***})	210	10.96% (2.35^{**})	186	9.55% (2.66^{***})
Three-year	132	3.56% (0.61)	232	14.72% (3.38^{***})	209	6.48% (0.94)	186	1.02% (0.40)
Five-year	119	5.43% (0.79)	219	19.58% (3.67^{***})	196	-14.01% (-1.69^{*})	173	-11.59% (-1.42)

Table 9. Summary of the results from the Fama-French three-factor regressions of 34 countries

The following show the summaries of the results of the Fama-French Three-factor model for 34 countries used to test the long-term performance of privatized IPO firms. For each country, SMB and HML monthly factors are calculated in a similar way described in Fama and French (1993) using the domestic firms that belong to the *Datastream Total Market Index* of each country. In each month during November 1981 and July 2005, for each country, a portfolio is formed by including the privatized IPO firms that went public within the past one-, three- and five-year periods. The portfolio monthly return is calculated by using both equal-weights and value-weights.

	Equally-weighted				**Value-weighted**			
	Intercept	(r_m-r_f)	SMB	HML	Intercept	(r_m-r_f)	SMB	HML
Panel A: One-year								
Mean	0.073	0.669	0.070	-0.053	0.073	0.669	0.046	-0.027
Standard Deviation	0.057	0.545	0.676	0.603	0.056	0.547	0.668	0.601
Median t-statistics	(2.52)	(2.62)	(0.11)	-(0.20)	(2.51)	(2.62)	(0.16)	-(0.19)
Min	-0.018	-0.963	-1.454	-1.509	-0.018	-0.974	-1.454	-1.514
1st Quartile	0.031	0.413	-0.349	-0.311	0.034	0.335	-0.367	-0.287
Median	0.059	0.706	0.042	-0.065	0.063	0.697	0.056	-0.049
3rd Quartile	0.093	0.912	0.312	0.101	0.095	0.912	0.304	0.170
Max	0.214	1.679	1.809	1.885	0.214	1.679	1.809	1.885
Panel B: Three-year								
Mean	0.059	0.596	0.021	-0.043	0.061	0.608	-0.009	-0.051
Standard Deviation	0.044	0.401	0.323	0.324	0.044	0.422	0.362	0.332
Median t-statistics	(4.05)	(4.20)	(0.04)	-(0.01)	(4.12)	(4.49)	-(0.09)	(0.11)
Min	0.014	-0.690	-0.614	-1.207	0.014	-0.769	-0.711	-1.333
1st Quartile	0.032	0.459	-0.185	-0.172	0.032	0.400	-0.235	-0.180
Median	0.044	0.633	-0.001	0.001	0.048	0.609	-0.020	0.022
3rd Quartile	0.071	0.838	0.169	0.159	0.072	0.910	0.155	0.116
Max	0.213	1.284	0.868	0.576	0.213	1.284	0.868	0.442
Panel C: Five-year								
Mean	0.054	0.573	0.005	0.012	0.056	0.576	-0.061	-0.037
Standard Deviation	0.031	0.333	0.283	0.268	0.032	0.348	0.324	0.331
Median t-statistics	(4.70)	(5.56)	-(0.28)	(0.39)	(4.58)	(5.51)	-(0.85)	(0.29)
Min	0.015	-0.626	-0.475	-0.707	0.015	-0.660	-0.752	-1.300
1st Quartile	0.032	0.413	-0.186	-0.168	0.033	0.404	-0.249	-0.163
Median	0.044	0.677	-0.021	0.048	0.045	0.612	-0.079	0.031
3rd Quartile	0.070	0.806	0.152	0.196	0.069	0.849	0.109	0.147
Max	0.128	1.076	0.868	0.570	0.147	1.076	0.868	0.498

Table 10. Regression analyses of Buy-and-hold abnormal returns (BHARs) of privatization IPOs

The table reports the regression of one-, three- and five-year buy-and-hold abnormal returns (BHARs) of privatization IPO firms. BHARs are calculated by subtracting buy-and-hold returns (BHRs) of local market indices or domestic matching firms with similar size and book-to-market equity ratio (BM) from BHRs of IPO firms. Dependent variables are stake sold at the IPO (PercentSold), standard deviation of returns during 20-day trading days after IPOs (StdDev), book-to-market equity ratio (B/M), market capitalization (Size), return on assets (ROA), beta (Beta), dummy variables for utilities and financial industries (UtilityD and FinanceD, respectively), dummy variables for legal origins indicating English, French and German (EnglishD, FrenchD and GermanD, respectively), GNP per capital (GNP), accounting standard score (AcctSt), and size of capital market defined as total market capitalization divided by GDP in 1997 (MarketSize). B/M, Size, ROA and Beta are obtained from Datastream International and information on law origin and accounting standard is from La Porta et al (1998). T-statistics are calculated using White (1980)'s heteroskedasticity-adjusted standard errors and reported in parentheses. N indicates the number of observations. *, **, and *** indicate that results are significant at the 0.10, 0.05 and 0.01 significance levels, respectively.

	Market-adjusted BHAR			Size-BM-adjusted BHAR		
	One-year	Three-year	Five-year	One-year	Three-year	Five-year
Constant	-0.762 (-1.23)	-1.575 (-0.78)	-2.437 (-1.13	-0.941 (-1.32)	-4.761 (-1.20)	-6.825 (-1.03)
PercentSold	0.027 (3.23***)	-0.014 (-0.78)	-0.050 (-3.48***)	0.009 (1.34)	-0.012 (-0.48)	-0.118 (-3.60***)
StdDev	0.031 (1.43)	0.045 (1.39)	0.043 (0.73)	0.029 (1.10)	0.039 (0.66)	-0.023 (-0.27)
BM	0.000 (0.26)	0.000 (0.03)	-0.006 (-2.62**)	0.001 (1.52)	0.007 (2.24**)	0.007 (1.31)
Size	0.032 (0.81)	-0.067 (-0.70)	-0.162 (-1.22)	0.037 (0.75)	0.359 (1.30)	0.281 (0.63)
ROA	0.663 (1.49)	0.825 (0.89)	0.857 (0.50)	0.820 (2.20**)	2.787 (1.17)	2.770 (0.71)
Beta	0.152 (0.84)	-0.367 (-1.36)	-0.425 (-0.89)	0.017 (0.10)	-1.021 (-1.61)	-0.868 (-0.71)
UtilityD	0.317 (2.55**)	0.501 (1.81*)	0.628 (1.95*)	0.381 (2.70***)	0.261 (0.45)	0.802 (1.34)
FinanceD	0.113 (1.05)	-0.030 (-0.10)	0.168 (0.45)	0.137 (0.95)	0.867 (1.26)	1.437 (1.16)
EnglishD	0.318 (1.30)	1.305 (4.62***)	2.242 (4.45***)	0.286 (1.19)	1.808 (2.49**)	2.697 (2.01**)
FrenchD	0.183 (0.63)	1.049 (2.58)	1.484 (2.69***)	0.251 (0.97)	0.980 (1.54)	1.410 (1.69*)
GermanD	0.126 (0.34)	0.995 (2.44**)	1.445 (2.78***)	0.122 (0.45)	0.823 (1.23)	0.841 (0.90)
GNP	-0.016 (-0.22)	-0.038 (-0.18)	0.074 (0.40)	-0.031 (-0.42)	-0.067 (-0.21)	0.103 (0.23)
AcctSt	0.003 (0.37)	0.024 (1.51)	0.026 (1.56)	0.008 (1.22)	0.021 (0.83)	0.030 (0.93)
MarketSize	0.016 (0.75)	0.004 (0.08)	-0.038 (-0.82)	0.026 (1.35)	0.039 (0.65)	-0.019 (-0.20)
R-squared	0.2135	0.2146	0.2770	0.2478	0.1854	0.1351
Adj. R-sq	0.0869	0.0868	0.1489	0.1268	0.0528	-0.0162
F-statistic	1.6868*	1.6787*	2.1622**	2.0472**	1.3980	0.8928
N	102	101	94	102	101	94

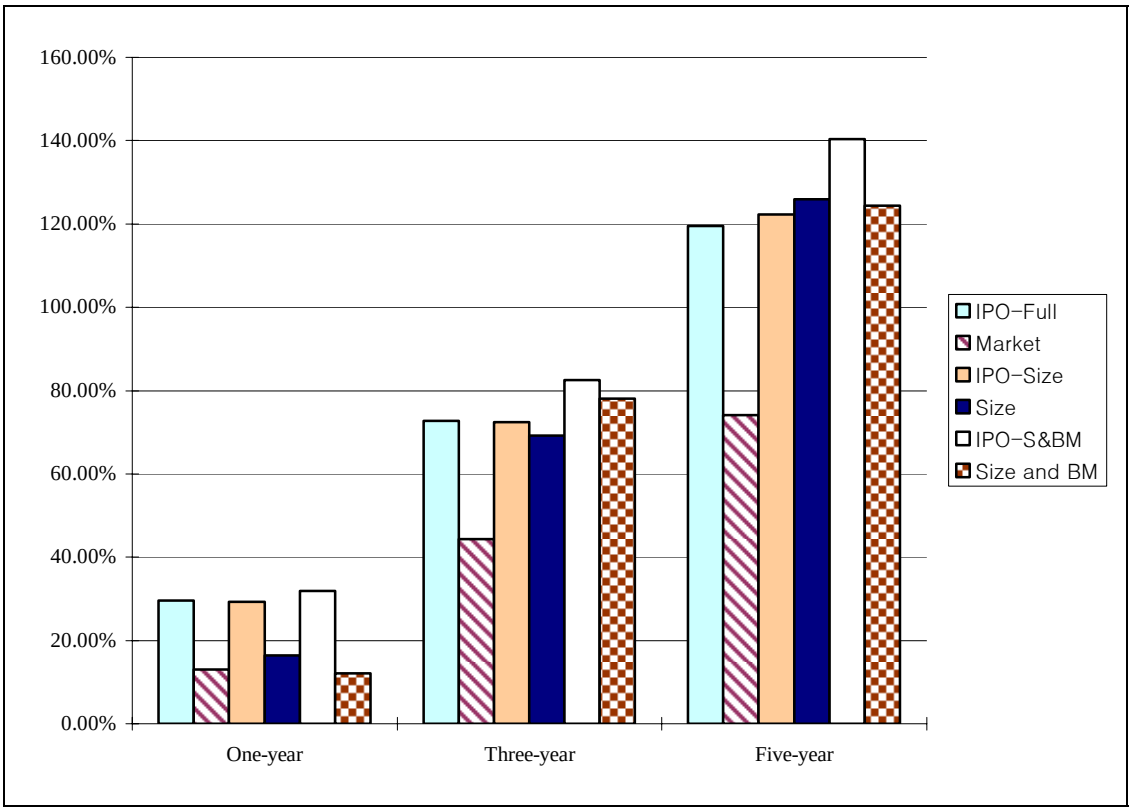

Figure 1. Equally-weighted average buy-and-hold return (BHR) of privatization IPOs and their benchmarks

Returns of sample IPOs are compared with domestic market index returns and returns of domestic firms with similar size or size and book-to-market equity ratio (BM). Due to the data availability, only 193 (143) sample firms are matched with one matching firm the size (size and BM) of which is between 70 percent and 130 of that of the IPO firm. For each IPO firm, annual buy-and-hold return (BHR) is calculated using the total return index available at *Datastream*. Buy-and-hold abnormal returns (BHARs) are calculated by subtracting the average BHRs of matching firms from the average BHRs of IPO firms. IPO-Full, IPO-Size and IPO-S&BM represent equally-weighted averageBHRs of IPO firms in total sample (241), size-matched sample (193) and size-and-book-to-market equity ratio-matched sample (143), respectively. Market, Size and Size and BM represent equally-weighted BHRs of domestic market indices, size matched firms and size-and-BM matched firms.

Endnotes

[1] See, for example, Galal, Jones, Tandon, and Vogelsang (1994), Megginson, Nash, and van Randenborgh (1994), Boubakri and Cosset (1998), La Porta and López-de-Silanes (1999), D'Souza and Megginson (1999), Dewenter and Malatesta (2001). performance improvements for newly privatized firms in both developing and developed countries, though Chan, Wang, and Wei (2004) document negative long-term stock performance following Chinese IPOs, most of which are privatizations.

[2] In measuring markets' performance using various market indices, we do not purge privatization IPOs from the indices, the weights of which are typically large in value-weighted indices due to huge market capitalization to make our results comparable to most previous studies. This, however, can bias the results against finding abnormal returns when market indices are used as benchmarks. Given that privatization IPOs are typically very large in their domestic markets and tend to perform well, the exclusion of privatization IPOs from the market indices tend to increase abnormal returns as shown in Boubakri and Cosset (2000).

[3] Since privatization IPO firms are typically very large, we are not able to find size matched firms in domestic markets for 48 privatization IPOs. This problem bedevils all privatization empirical studies that try to match divested firms with comparable domestic (or even international) companies. *Datastream* does not provide financial statement information for some countries such as Morocco and Israel and started to provide book value of equity information for China and Eastern European countries only from 1995. Due to this restriction, we could not find book values of equity for 50 privatization IPOs. Finally, we could not find size-and-BM matched firms for remaining samples since some countries have very thin markets.

[4] Here, we do not exclude privatization IPOs that subsequently sell additional equity as a gradual sales scheme. To examine whether those with gradual sales schemes have different performance, we included a dummy for gradual sales in regression analyses and found that the coefficient were not significant in unreported results, indicating that the performance of privatization IPOs with gradual sales schemes are similar to the performance of other privatization IPOs.

[5] In Table 4, the numbers of sample IPOs are different for Panels A and B in the "Market" column because we could not find market capitalization, which is necessary for the calculation of weights, for three sample observations in Panel B.

[6] *Datastream* provides information about the composition of the *FTSE All World Index* during the whole sample period of our paper. However, it provides the *FTSE All World Index* return only from 1994. Therefore, the FTSE All World columns in Table 7 and 8 report the results only for those privatization IPOs from 1994.

[7] Appendices detailing the interest rates and national regression estimates of Fama-French factor loadings we use to estimate Equation 1 are available upon request.