Privatization versus Private Sector

Initial Public Offerings in Poland

Wolfgang Aussenegg[*]

Vienna University of Technology

Department of Finance

Address: Favoritenstraße 9-11, A-1040 Vienna, Austria, Europe

E-Mail: waussen@pop.tuwien.ac.at

Phone: +43 1 58801 - 33082

Fax: +43 1 58801 - 33098

First draft: July 1999

This draft: May 2000

Abstract

This study compares the characteristics and the price behavior of case-by-case privatization initial public offerings and private sector initial public offerings in Poland over the first nine years after the reopening of the Warsaw Stock Exchange in April 1991. There is evidence that the Polish government is market-oriented, trying to build up reputation for its privatization policy over time by underpricing, selling a higher fraction at the initial offer and underpricing more when selling to domestic retail investors. In the long run privatization initial public offerings experience neither an under- nor an overperformance. High demand multiples at the initial offer result in a bad long-run performance, suggesting over-optimistic investors.

1. Introduction

In the past two decades a lot of state enterprises have been privatized in the world. This applies to developed economies like the UK, France or Germany as well as a lot of developing economies in Asia and South America. In Central and Eastern European transition economies the going public process of state enterprises started only at the beginning of the nineties. After the breakdown of communism a process of restructuring and transformation from originally planned to market-oriented economies was started.

An important ingredient in such a radical transformation is the privatization of state enterprises. While in western economies state enterprises are transferred into a well-functioning economic system, this is not the case in Central and Eastern European countries where a suitable legal and institutional framework is not available at the start of the transformation process.

This study examines the characteristics as well as the short- and long-run price behavior of Polish case-by-case privatization initial public offerings (PIPOs) compared to Polish private sector IPOs (IPOs). After a break of more than 50 years due to communism the share trading on the Warsaw Stock Exchange (WSE) resumed on April 16th, 1991 with the listing of five companies. Since then over 200 firms have gone public on the WSE and more than 50 of these are privatized state-owned enterprises. In contrast to other Central and Eastern European countries, like Russia, the Czech Republic or Slovakia, Poland decided to start the privatization program with case-by-case privatizations instead of a mass privatization program.[1]

The following questions are analyzed in this study: First, can the Polish government in the sense of Perotti (1995) and Biais and Perotti (1999) be classified as market-oriented and is a reduction in the political uncertainty about the future privatization policy observable in the course of time? Second, how do PIPOs and private sector IPOs differ

---

[1]   A mass privatization program was carried out in Poland only in a second phase of the privatization process. At the end of 1999 its size (market capitalization) reached only 1.5 percent of the size of all firms listed on the WSE.

with respect to underpricing? Is the underpricing of PIPOs higher than that of private sector IPOs? Third, how can the underpricing of PIPOs and private sector IPOs be explained? Are explanation hypotheses originally designed for developed markets also valid for Polish private sector IPOs and to what extent do they apply to PIPOs? Fourth, do Polish PIPOs experience a positive long-run performance and is the long-run performance of private sector IPOs negative as documented for many developed markets? Fifth, which factors influence the long-run performance of Polish PIPOs and private sector IPOs?

This study contributes to the existing literature in several ways: First, an Eastern European emerging market is examined completely from the resumption of the stock market. Other studies, like Jones et al. (1999), Megginson et al. (1999), Dewenter and Malatesta (1997) or Huang and Levich (1998) investigate several markets all over the world and consider developed and emerging markets jointly. The analysis of a single (Eastern European) emerging market can provide additional insights as the database is more homogeneous. Second, the investigation of a share privatization program right from the beginning allows e.g. testing to what extent a build-up of reputation for the government concerning the privatization program takes place over time. Third, in addition to PIPOs also private sector IPOs are examined and both groups are compared to each other. This allows identifying similarities and differences between privatization and private sector IPOs concerning their characteristics as well as their short- and long-run price performance.[2]

The following section reviews the empirical evidence of studies examining the price performance of PIPOs. The third section discusses the theory and testable hypotheses about the short- and long-run price behavior of PIPOs and private sector IPOs. Section four describes the database used and provides descriptive statistics for the IPO groups.

---

[2]   Until now there have only been a few comparisons of this kind in the literature. Examples are Menyah and Paudyal (1996), who examine privatization and private sector IPOs for the UK, Paudyal et al. (1998), who compare these groups for Malaysia, and Jelic and Briston (1999), who analyse the price behavior of Hungarian privatizations and private sector IPOs. The studies of Dewenter and Malatesta (1997) and Huang and Levich (1998) also compare privatization and private sector IPOs but they only analyze the underpricing.

In the fifth section the empirical evidence regarding the initial return is presented and possible reasons for the underpricing are examined. Section six deals with the aftermarket performance and section seven gives a summary of the findings.

2. Review of the empirical literature on the short- and long-run price behavior of privatization initial public offerings

Numerous studies focusing on privately-owned unseasoned new issues document two main phenomena: First, firms going public are underpriced and second, they tend to underperform benchmark firms in the long run.[3] Studies analysing the price behavior of privatized state-owned enterprises show that PIPOs are, on average, also underpriced. One of the first studies in this context was carried out by Jenkinson and Mayer (1988). They find that French PIPOs are underpriced by an average of 25.1% and PIPOs in the United Kingdom (UK) are underpriced by an average of 22.2%.[4] In addition, Perotti and Guney (1993) provide evidence that privatizations in Malaysia, Spain and Turkey are underpriced as well. Dewenter and Malatesta (1997) report for a total sample of 109 PIPOs of eight countries an (average) underpricing of 23.7%. For a subsample of 19 Polish PIPOs they document a mean market-adjusted initial return of 50.0%. In a recent paper Jones et al. (1999) examine a 59-country sample of PIPOs for which they document an average initial return of 34.1%.[5] Similar results are provided by Huang and Levich (1998). A significantly positive underpricing can also be observed for Hungarian PIPOs (see Jelic and Briston, 1999). The results of nine studies examining initial returns are summarized in table 1, Panel A.

---

[3]   See e.g. Loughran, Ritter, and Rydqvist (1994) for a survey reviewing the international empirical evidence. A non negative long-run performance is e.g. documented for Korea (Kim, Krinsky, and Lee (1995)), Singapore (Lee, Taylor, and Walter (1996)) or Switzerland (Kunz, and Aggarwal (1994)).

[4]   Qualitatively similar findings are documented e.g. by Vickers, and Yarrow (1988), Levis (1993) or Menyah and Paudyal (1996).

[5]   Their 59-country sample consists of 242 privatization initial public offerings (PIPOs), with 26 PIPOs in the Polish subsample.

The long-run performance of PIPOs has only been examined in recent years, at least on a large scale. For a 33-country sample of privatizations Megginson et al. (1999) find that regardless of the benchmark used the aftermarket performance of PIPOs is significantly positive. Menyal and Paudyal (1996) report similar results for a sample of 40 UK PIPOs. But not all studies document a significantly positive long-run performance for PIPOs. Paudyal et al. (1998) find for Malaysia a negative (but not significantly negative) aftermarket performance over the first three years. Using a 26-country sample of 120 PIPOs, Boubarki and Cosset (1999) report insignificant market-adjusted average returns for a three-year holding period of 37% to 46% (Median: -7% to 13%). Nine PIPOs in Chile experienced a significantly negative one-year aftermarket performance (see Aggarwal et al., 1993). Panel B of table 1 provides a summary for six studies measuring the long-run performance of PIPOs.[6]

Studies explicitly comparing the characteristics and the price behavior of PIPOs and private sector IPOs are scarce. Dewenter and Malatesta (1997) test for differences between the mean initial return in PIPOs and the mean initial return in private sector IPOs. For a 7-country sample (Canada, France, Hungary, Japan, Malaysia, Thailand, and the UK) they find no general tendency for privatizations to be underpriced more than private sector IPOs. Only in the UK do government officials underprice public share offers of state-owned firms significantly more than their private company counterparts. For Canada and Malaysia, however, the opposite is true. In contrast, Paudyal et al. (1998) report that the average initial return on Malaysian PIPOs is significantly higher than on private sector IPOs. Jelic and Briston (1999) compare Hungarian PIPOs and private sector IPOs and report average initial market adjusted returns of 44% and 40% respectively. Consistent with Dewenter and Malatesta (1997) they document no significant difference between the initial returns for Hungarian PIPOs and private sector IPOs.

---

[6]   Evidence for a significantly positive long-run performance of PIPOs is also provided by Choi et al. (2000) and Dewenter and Malatesta (2000).

Three studies explicitly comparing the long-run performance of PIPOs and private sector IPOs are shown in table 2. The three-year buy-and-hold abnormal return for UK PIPOs, for instance, is +61.0% for PIPOs and only +4.9% for private sector IPOs (see Menyal and Paudyal, 1996). For Hungarian issues Jelic and Briston (1999) report a positive 3-year aftermarket performance for PIPOs but a negative one for private sector IPOs. They show that PIPOs perform significantly better in the long run than IPOs. In contrast to these findings, Paudyal et al. (1998) document no abnormal long-run aftermarket performance difference between privatizations and private sector IPOs in Malaysia.[7]

*** Insert table 2 about here ***

3. Theories of short- and long-run price behavior and testable hypotheses

3.1 Underpricing

Many theories have been put forward to explain the underpricing of initial public offerings. In order to formulate hypotheses to explain the first-day return levels of Polish PIPOs and private sector IPOs, the most common and, in the case of Poland, testable explanations will be examined.

In Rock's model (1986) underpricing is a necessary equilibrium condition in a world of informational asymmetry between groups of informed and uninformed investors. Informed investors are able to distinguish between underpriced ('good') and overpriced ('bad') new issues and therefore avoid overpriced IPOs. 'Good' issues are subscribed for by informed as well as uninformed investors while 'bad' issues are subscribed for by

---

[7]   An extensive survey of empirical studies on privatizations are provided by Megginson and Netter (2000).

uninformed investors only. It can therefore be expected that there is a positive relation-ship between the demand for an issue and the underpricing level.[8]

Another consequence of informational asymmetry is that the level of underpricing re-quired to attract investors increases with the ex-ante uncertainty about the value of the firm (see e.g. Beatty and Ritter (1986)). The greater the ex-ante uncertainty, the more costly it is to value a new issue and the higher is the expected reward investors demand. In order to test this proposition it is necessary to use a proxy for the unobservable ex-ante uncertainty. In the empirical literature it is common to measure the ex-ante uncer-tainty by the standard deviation of daily returns in the first trading months.[9]

The asymmetric information theories also imply that the uncertainty about the value of small, not established firms is higher than for offers of larger, well-known firms. This implies e.g. that offers of small, not established firms should be underpriced more than offers of large, well-known firms. As PIPOs tend to be larger than private sector IPOs this hypothesis suggests that initial returns in PIPOs should be lower than initial returns in private sector IPOs.

In another group of models underpricing is used as a signal that the firm is of a high-value type (see e.g. Allen and Faulhaber (1989), Grinblatt and Hwang (1989), and Welch, (1989)). These models assume that issuers possess better information about the true value of the offer than investors. In the signaling approach by Welch (1989), for example, high-quality firms deliberately choose an offer price below the intrinsic value to signal their quality to investors. This underpricing is motivated by the possibility of achieving higher offer prices in subsequent seasoned issues. High-quality firms will therefore underprice their issue and only offer a small part of their share capital at the initial issue. This implies a negative relationship between the level of underpricing and the fraction of the share capital sold at the initial offer.

---

[8]   Paudyal et al. (1998) e.g. document for Malaysian PIPOs as well as private sector IPOs a signifi-cantly positive association between the demand multiple and the underpricing. Similar results for UK are presented by Menyah and Paudyal (1996).

[9]   See for example Ritter (1984) or Paudyal et al. (1998).

A government committed to privatization has the objective that public offers of its state enterprises should be a success. One requirement for success is that the market price on the first trading days does not fall below the issue price. To keep the probability of an unsuccsessfull issue low, a higher market volatility will encourage the issuing government to set a lower offering price, which results in a higher underpricing. It is therefore expected that the market volatility prior to the issue is in a positive relationship with the underpricing. Following Menyah and Paudyal (1996) and Paudyal et al. (1998), the market volatility is measured in the present study using the standard deviation of daily stock market index returns over three months prior to the subscription period.

Perotti (1995) explicitly models privatizations within a signaling framework. Similar to Allen and Faulhaber (1989), Grinblatt and Hwang (1989) or Welch (1989), Perotti (1995) presumes that there is informational asymmetry between the issuer – in the case of privatizations the issuing government – and the investors. An important feature of Perotti's (1995) model is that the issuer (the government) can influence a firm's value after the initial offer.

In his model Perotti (1995) distinguishes between two types of governments: market-oriented (committed) and populist governments. A market-oriented government wants to privatize state-owned enterprises seriously and irreversibly. This does not apply to populist governments. Privatization can only restrain but not eliminate public interference, e.g. to transfer value from shareholders to other groups by policy changes through e.g. regulation or taxation. A government committed to privatization will not use such instruments to transfer value, but less committed or populist governments will. Whether a government is market-oriented or populist can only be realized by the market if there are concrete signals. Only announcing to be market-oriented is not enough.

What signals can a government send to be recognized as market-oriented? In Perotti's (1995) model a government has two parameters to signal: the fraction of the share capital it sells at the initial offer and the issue price. A selling government may signal its committment by retaining a stake in the firm for some time, thus showing willingness to

bear some financial costs of policy changes. At the beginning of the privatization process the political uncertainty can be expected to be highest. At this point the portion a government retains from its state-owned enterprises should therefore be highest. On the other hand, if the political uncertainty is very high, a committed government might be forced to sell a higher fraction at the initial offer, otherwise the market might get the impression that the government possibly does not want to give up control rights over the state enterprise. If a government sells a large fraction in an environment of high political uncertainty, it transfers risk to investors. To convince the market to absorb a large portion and to signal commitment a government will have to underprice. A testable implication of Perotti's (1995) model is therefore that the relationship between the fraction sold at the initial offer and the underpricing level is positive for a market-oriented government.

For a market-oriented government it can be expected that the political uncertainty drops after the beginning of the privatization program due to the buildup of reputation over time. This has the testable implication that for a committed government the fraction of PIPOs sold at the initial offer should be highest at the beginning of the privatization program and drop thereafter. The same should be valid for the underpricing of PIPOs. By contrast, a populist government is not willing to accept a (high) underpricing and the corresponding lower gross proceeds. A populist government would therefore also try to sell a not too small fraction, but at a maximum issue price (and therefore minimum underpricing).

Biais and Perotti (1999) show that a market-oriented government can generate support for its privatization program by allocating more shares to median-class voters. Since a reversal of the privatization program decreases the value of the already privatized firms, median-class voters will support the privatization efforts of the government, which results in a support of the government in elections (re-election hypothesis). In order to make median-class voters buy enough shares so that their political preferences are similar to those of the government, underpricing is necessary. A government can achieve this aim by allocating a large portion to domestic retail investors (median-class voters) when selling a large fraction of a state enterprise. If this hypothesis applies, the

underpricing should be higher for issues that meet two requirements: a) a relatively large fraction is sold at the initial offer and b) a relatively large portion is allocated to domestic retail investors.

The testable hypotheses to explain the underpricing of Polish PIPOs and private sector IPOs can be summarized as follows:

Hypothesis 1:   *Demand Multiple:* A higher demand multiple at the initial offer is associated with a higher underpricing.

Hypothesis 2:   *Ex-ante uncertainty I:* The relationship between the level of underpricing and the ex-ante uncertainty measured by the standard deviation of the daily returns over the first two aftermarket months is positive.

Hypothesis 3:   *Ex-ante uncertainty II:* The underpricing level of PIPOs is lower than for private sector IPOs.

Hypothesis 4:   *Signaling*: The relationship between the level of underpricing and the fraction of the share capital sold at the initial offer is negative. A higher fraction sold is associated with a lower underpricing.

Hypothesis 5:   *Market Volatility*: The relationship between the level of underpricing and the standard deviation of daily returns of the Warsaw Stock Exchange (WIG) Index over three months prior to the subscription period is expected to be positive.

Hypothesis 6:   *Political Uncertainty I*: The relationship between the level of underpricing and the fraction of the share capital sold at the initial offer is positive for PIPOs.[10]

---

[10]   Note that this hypothesis contradicts hypothesis 4. A high uncertainty about the true value should lead to a negative relationship between the level of underpricing and the fraction sold (hypothesis

Hypothesis 7:   *Political Uncertainty II*: If a large fraction of the share capital is sold at the beginning of the privatization process (when the political uncertainty is expected to be highest) to signal the willingness to give up control rights, a committed government has to underprice more. For such a government the underpricing is therefore expected to be highest at the beginning of the process and to drop (in line with the fraction sold) in the course of time due to the buildup of reputation.

Hypothesis 8:   *Re-Election*: Issues experience a higher underpricing if the government sells a large fraction of the share capital at the initial offer (i.e. a fraction above the median fraction sold) and if the government at the same time allocates a large portion of the share capital to domestic retail investors (i.e. a portion above the median portion allocated).

3.2 Long-Run Performance

The empirical evidence of the long-run performance of firms going public indicates that PIPOs and private sector IPOs do not perform similarly. Private sector IPOs mostly experience a negative abnormal performance over the first three to five years of aftermarket trading,[11] whereas PIPOs mostly experience a long-run aftermarket performance equal or better than that of benchmark firms.[12]

---

4). On the other hand, a higher political uncertainty might require selling a larger fraction to transfer control rights credibly, which in turn forces a committed government to underprice more, which results in a positive relationship between the level of underpricing and the fraction sold (hypothesis 6).

[11] See e.g. Ritter (1991) and Loughran and Ritter (1995) for US IPOs, Levis (1993) for UK IPOs or Keloharju (1993) for Finnish IPOs.

[12] Panel A of table 1 provides evidence given in several empirical studies measuring the long-run performance of PIPOs.

A mostly non-negative long-run abnormal performance for PIPOs coincides with the objectives of a market-oriented government. As privatization programs in most cases last several years, a committed government will be interested in building up reputation for its privatization program over time. This is the only way to generate support in the population, which is necessary to successfully continue the program. For Poland the following hypothesis is tested in this context:

Hypothesis 9: For PIPOs the long-run aftermarket performance from the first trading day till the third anniversary is non-negative.

As there is (at least some) evidence that PIPOs tend to outperform private sector IPOs in the long-run (see e.g. the empirical evidence in Menyah and Paudyal (1996) for the UK and Jelic and Briston (1999) for Hungary) it is also tested whether the long-run abnormal performance of Polish PIPOs significantly exceeds that of Polish private sector IPOs:

Hypothesis 10: The long-run abnormal performance of PIPOs from the first trading day till the third anniversary is significantly better than the 3-year abnormal performance of private sector IPOs.

Boycko, Shleifer and Vishny (1996) show in their model that the fraction a government sells at the initial offer is an important factor for the restructuring efforts of state enterprises. The higher the fraction sold, the lower is the possibility that politicians interfere directly. Boycko, Shleifer and Vishny (1996) conclude that the relationship between efficient restructuring activities and the fraction of the state enterprise sold at the initial offer should be positive. Provided that a lower state holding leads to a more efficient restructuring, the long-run abnormal performance should be positive. In this context the following hypothesis is tested:

Hypothesis 11: *Political Influence:* The higher the fraction of the share capital sold at the initial offer, the lower is the direct political influence. This implies

a better restructuring and therefore a better long-run abnormal performance.

It is often cited that over-optimistic investors are one of the main reasons for a negative long-run performance (see e.g. Aggarwal and Rivoli (1990), Ritter (1991) or Loughran and Ritter (1995)). Firms planning to go public make use of this over-optimism and time their IPO correspondingly. If investors lose their over-optimism in the course of time, this leads to a bad long-run performance (investors' sentiment hypothesis). The level of investors' optimism cannot be observed directly. As a proxy the demand multiple is used in this study.[13] The two testable hypothesis can be summarized as follows:

Hypothesis 12:   *Investors' sentiment:* Firms with a high demand multiple experience a bad long-run performance. As the cut-off point between high and low demand multiples the median is used.

4. Data and sample characteristics

In Poland shares are traded on the Warsaw Stock Exchange (WSE), which was founded in 1817. During the Second World War and the following decades of communism the WSE was closed. The WSE resumed trading on April 16th, 1991 with the listing of five firms. From April 1991 till the end of 1999 altogether 215 firms went public with a listing on the WSE. 107 firms started trading in the main market of the WSE, 78 in the parallel market and 30 in the free market. At the end of 1999 206 firms were listed on the WSE: 119 in the main market, 61 in the parallel market and 26 in the free market. The differences to the number of going publics can be explained by changes from one market segment to another and nine delistings.[14] The parallel market started on April 22nd, 1993 and the free market on February 20th, 1997.

---

[13]   Ljungqvist (1996) provides further variables that can be used as proxies for investors sentiment.

[14]   To avoid a delisting bias all delisted firms are included in this study.

This study uses the two biggest market segments: the main market and the parallel market. They comprise the biggest and most liquid firms trading on the WSE. Disclosure requirements are the same for all companies, regardless of their quotation market. All companies are quoted in the single-price auction system. In addition, shares of the most liquid companies from the main and the parallel markets are traded in the continuous trading system. The main market and the parallel market differ with respect to the listing requirements. A company which would like to begin trading in the main market has to fulfill higher minimum size and liquidity criteria than a company applying for listing on the parallel market.[15]

The investigation period starts with the reopening of the WSE on April 16th, 1991 and ends on December 31st, 1999. Of the 185 firms going public in the main market and the parallel market only those are used which a) made a public offer before trading on the WSE and b) for which all necessary information was available (especially issue price, issue volume, demand multiple, contract type (fixed price or tender), dividend payment or seasoned equity offering information). Therefore the final sample comprises 159 firms, 99 from the main market and 60 from the parallel market. For investigation purposes the sample of 159 firms is divided into two parts: A sample of 52 PIPOs and a sample of 107 private sector IPOs.[16] In the sample of PIPOs all those firms are included which are classified as *Public Offering by State Treasury* in the WSE Fact Book 2000. These are firms controlled by the Polish state and for most of them 100% of the shares were held by the state prior to going public.

---

[15] Examples of listing requirements (PLN numbers valid in the years 1998 and 1999) are the minimum value of shares to be admitted for trading (PLN 40 mil. for the main market versus PLN 14 mil. for the parallel market), the minimum book value of the company (PLN 40 mil. versus PLN 14 mil.), the minimum number of shareholders who hold shares to be admitted for trading (500 versus 300) and the period for which the company is required to disclose audited financial reports to the public (three financial years for the main market versus two financial years for the parallel market).

[16] Of the 52 PIPOs 50 went public in the main market and 2 in the parallel market. Of the 107 private sector IPOs 49 went public in the main market and 58 in the parallel market.

To build up the database three main sources were used: First, the *Historical Database of the Warsaw Stock Exchange,* which provides information on daily stock prices, dividend payments, number of outstanding shares and the first trading day on the WSE; second, several editions of the *WSE Fact Book* which were used to get information about issue prices, first trading day, original ownership structure of listed companies, dividend payments, stock splits, mergers and delistings; and third, *REUTERS Business Briefing Archives*[17] for information on subscription period, issue price, ownership structure, demand multiple, rationing data, gross proceeds, seasoned equity offerings, stock splits and other company-related information. All information received from these three main sources was checked and completed using information available of the Polish stock market in *Reuters 3000 Equities History* as well as in *Datastream.*

Table 3 presents summary statistics for the sample of all 159 issues (All), the 52 PIPOs and the sample of 107 private sector IPOs (IPOs). About 84.5% of the total gross proceeds of 18,843 million PLN comes from the 52 PIPOs (15,932 Million PLN). The mean (median) gross proceeds for the PIPO firms are more than 11 (3) times higher than for the private sector IPOs (306.4 versus 27.2 million PLN and 43.5 versus 14.4 million PLN). The mean as well as the median gross proceeds are significantly different from each other (see table 3, Panel B). This has two reasons: First, PIPO firms are larger than private sector IPOs, and second, the fraction sold at the initial offer is nearly twice as high for the PIPO firms as for private sector IPOs (63.2% versus 32.1%). The two samples significantly differ from each other in this respect. The mean percentage of capital offered in the 59-country sample of PIPOs in Jones et al. (1999) is 43.9%. Therefore, the Polish government sold about 19 percentage points (or 45%) more than the average fraction sold on a global basis.[18] In Malaysia, for instance, the government sold only 25% (see Paudyal et al. (1998)) and for Hungary the corresponding number is 41.7% (see Jelic and Briston (1999)).

---

[17]   REUTERS Business Briefing Archives is a comprehensive business database, with access to national and international news wires, news papers, trade journals, research reports and news pictures.

[18]   For Non-UK PIPOs Jones et al. (1999) document an average fraction sold at the initial offer of only 37.9%. Similar results can be found in Huang and Levich (1998).

The model of Perotti (1995) predicts that if there is higher political uncertainty about the future privatization policy, a market-oriented government will sell a higher fraction at the initial offer and will underprice more to signal its commitment. This implies that for a market-oriented Polish government the initial return should be higher than the global average (median) of 34.1% (12.4%) provided in Jones et al. (1999). As section five shows this applies to the 52 PIPO sample used in this study.

*** Insert table 3 about here ***

PIPOs and private sector IPOs not only differ with respect to the gross proceeds and the fraction sold at the initial offer but also significantly depending on whether secondary or primary shares are sold. 94.4% of the gross proceeds for PIPO firms consist of secondary shares and for two thirds of PIPOs only secondary shares were sold. In contrast, only primary shares were sold at the initial offer in 84.1% of private sector IPOs. This observation is consistent with the evidence provided by Megginson, Nash, and Van Randenborgh (1994) and Jones et al. (1999), which says that PIPOs in most cases tend to be pure secondary offerings with none of the sale proceeds flowing to the firm. On the other hand, private sector IPOs tend to be mostly primary, capital-raising events. As the evidence for Poland shows, this seems to be a general feature of private sector IPOs.

The empirical evidence for Poland reveals that only 57.7% of all PIPOs in the sample have a fixed issue price. This compares to the global evidence in Jones et al. (1999) of 79.9% fixed-price offers for their 59-country sample. This indicates that the Polish government did not excessively need fixed-price offers to generate enough demand for its issues. The average demand measured by the demand multiple is only a little higher for PIPOs than for the private sector IPOs (2.63 versus 1.96).[19] But both mean and median demand multiples of the two samples are not significantly different from each other.

---

[19]   Much higher demand multiples are reported for Malaysia, with mean demand multiples of 21.2 for PIPOs and 23.4 for private sector IPOs (see Paudyal et al. (1998)).

In Poland trade unions have historically been very powerful. In the process of privatization it can therefore be expected that the government will particularly try to offer shares to the employees of the state enterprises. On average (median) 19.0% (18.7%) of the shares sold during the initial offer were sold to employees. This value is more than twice as high as the international evidence in Jones et al. (1999). For their 59-country sample they report an average (median) portion sold to employees of 8.5% (7.0%).[20] This underlines the strong and important position of trade unions in Poland and the political necessity to integrate Polish employees in the privatization program to a higher degree than in most other countries.

5. Initial return

5.1 Methodology and summary statistics

The starting point for investigating the initial returns is the calculation of initial raw returns and initial market-adjusted returns. The initial raw return for IPO i corresponds to its buy-and-hold return (BHR) from the issue price to the closing price on the first trading day and is defined as

$$BHR_i = \frac{P_{i,1} - P_{i,0}}{P_{i,0}}, \tag{1}$$

where $P_{i,0}$ represents the issue price and $P_{i,1}$ the closing price on the first trading day of IPO i. The time index t=0 refers to the first day of the subscription period. The market-adjusted return (=underpricing) for each issue is defined as the difference between its initial raw return (the BHR_i) and the corresponding return on the market index:

$$UP_i = BHR_i - BHR_{WIG,i}, \tag{2}$$

---

[20]   For an international sample of 190 PIPOs Huang and Levich (1998) document an average portion sold to employees of 9.5%.

where UP_i is the underpricing of IPO_i and $BHR_{WIG,i}$ is the buy-and-hold return of the Warsaw Stock Exchange Index (WIG).[21] Analogous to (1) the BHR for the WIG-Index is defined as

$$\text{BHR}_{WIG,i} = \frac{WIG_{i,1} - WIG_{i,0}}{WIG_{i,0}}. \qquad (3)$$

$WIG_{i,0}$ represents the WIG-Index on the first day of the subscription period of IPO i and $WIG_{i,1}$ is the WIG-Index at the end of the first trading day of IPO i.

Panel A of table 4 presents summary statistics of the raw and market-adjusted initial returns for all three samples. With the trading strategy of investing a similar amount of money in each of the 159 Polish IPOs at the issue price and selling each IPO on its first trading day an investor would have earned an average initial raw return of +38.5%. Applied to the individual subsamples this trading strategy would have yielded average initial raw returns of +65.6% and +25.3% for the PIPOs and the private sector IPOs respectively. The market-adjusted average initial returns are also all positive: 60.4% for PIPOs, 19.8% for private sector IPOs and 33.1% for the sample of all 159 issues. All mean and median returns reported in Panel A of table 4 are greater than zero at the 1% significance level. In addition, about a quarter of all Polish IPOs are overpriced (negative initial market-adjusted return). These results document that, similar to the findings reported in earlier research for other markets, Polish PIPOs as well as Polish private sector IPOs are significantly underpriced.

*** Insert table 4 about here ***

For a 59-country sample of 303 PIPOs Jones et al. (1999) present an average (median) initial raw return of 34.1% (12.4%). The average initial raw return for Polish PIPOs is therefore nearly twice as high. Only two studies examining individual countries report a higher underpricing for PIPOs compared to Poland: Paudyal et al. (1998) for Malaysia (103.5%) and Su and Fleisher (1999) for China (948.6%). A lower underpricing is

---

[21] The WIG is a value-weighted share price index comprising all firms listed on the main market of the Warsaw Stock Exchange.

documented e.g. for Chile (7.6%, see Aggarwal et al. (1993)), for Hungary (44%, see Jelic and Briston (1999)), for the UK (38.7%, see Menyah and Paudyal, 1998) and France (25.1%, Jenkinson and Mayer (1988)). Further details of these studies are reported in table 1. The observation that the Polish government sold a higher fraction at the initial offer than the average reported for Jones' 59-country sample is consistent with the predictions in Perotti (1995). A market-oriented government selling a higher fraction at the initial offer has to underprice more to signal its commitment.

The mean raw and market-adjusted initial returns of PIPOs are about 40 percentage points above those of private sector IPOs (see table 4, Panel B). But both test statistics of 1.463 and 1.639 are statistically insignificant. The differences in the median values are only +4.1% and +6.9%. The main reason for the large mean underpricing of PIPOs is one issue: Bank Slaski. After an issue price of 50 PLN the market price on the first trading day rose to 675 PLN. The resulting initial raw return of +1,250% caused a lot of criticism for the privatization policy and also political consequences.[22] Without Bank Slaski the average (median) market-adjusted initial return of the remaining 50 PIPOs drops to +38.86% (+19.74%), resulting in a decreased and statistically insignificant average (median) difference between PIPOs and private sector IPOs of 19.04% (6.83%). Altogether this indicates that the Polish government does not significantly underprice initial offers more than private company issuers do. Hypothesis 3, which implies that the underpricing level of PIPOs is higher than for private sector IPOs therefore has to be rejected.

According to hypothesis 7, a committed government has to underprice more to signal the willingness to give up control rights if a large fraction of the share capital is sold at

---

[22]   The unusually high initial return of Bank Slaski led to the resignation of the deputy finance minister Stefan Kawalec, who was in charge of privatizing the Polish banking sector. He was accused of having underestimated the value of the stock resulting in a high loss of money for the state budget. Besides the probable undervaluation, there was also a second reason for the extremely high market prices on the first trading day: a delay in opening accounts and confirming the purchase of the bank's shares. As a result, two thirds of all new shareholders (about 800,000 Polish citizens bought Bank Slaski shares, only three shares were allocated per person) could not sell their shares on the first trading day, which led to a shortage of supply.

the beginning of the privatization program (when the political uncertainty is expected to be highest). Assuming that the political uncertainty was high at the start of the program in Poland, the fraction sold and the underpricing should have been highest at the beginning of the program and should have decreased over time due to the build up of reputation. To analyze these hypotheses the investigation period is divided into four subperiods: 1991 till 1992 (subperiod one), 1993 till 1994 (subperiod two), 1995 till 1996 (subperiod three) and finally 1997 till 1999 (subperiod four).

Table 5 reports the empirical results. First, as expected, the fraction of capital sold at the initial offer is highest for PIPOs at the beginning of the program and decreases in the course of time (see Panel A of table 5). The average (median) fraction sold is 86.1% (90.0%) in the first subperiod, 63.6% (68.3%) in the second subperiod, 54.6% (60.1%) in the third subperiod and 48.0% (44.2%) in the last subperiod. Second, the underpricing level of PIPOs is not highest in the first but in the second subperiod and decreases thereafter (see Panel B of table 5). The average (median) underpricing for PIPOs is 11.8% (13.1%) in the first subperiod, 191.0% (71.4%) in the second subperiod, 46.8% (29.2%) in the third subperiod and 15.8% (19.7%) in the last subperiod.

*** Insert table 5 about here ***

The main reason for the high underpricing level in the second subperiod (1993-1994) is again Bank Slaski with a huge underpricing of 1166.75%. Without Bank Slaski the average (median) underpricing level of PIPOs drops to 102.24% (20.56%). But still the average underpricing decreases after the second subperiod. There are six PIPOs underpriced by more than 100% in the second subperiod (1993-94) and two PIPOs underpriced by more than 100% in the third subperiod (1995-96). In the first and fourth subperiod no issue is underpriced by more than 100%.

The low underpricing and the high fraction sold in the first subperiod would suggest a populist (or at least a less committed) government. But another interpretation is that the first subperiod was used as a test phase by the Polish government. This view is supported by the fact that state-owned enterprises sold in the first subperiod are very small

compared to PIPOs in the remaining periods. The average market values of PIPOs (measured using the first market price) in the last three subperiods are 14 to 182 times higher than in the first subperiod.

The underpricing level for private sector IPOs and the fraction sold at the initial offer do not behave in the same way as for PIPOs. Throughout the period considered the fraction sold is nearly constant at around 30% and the underpricing level decreases but from a lower level than for PIPOs. All in all, the evidence in table 5 provides no clear support for the view of a committed government in the sense of Perotti (1995). Only if the first subperiod is excluded, do the fraction sold at the initial offer and the underpricing behave as predicted in hypothesis 7.

5.2 Multivariate cross-sectional analysis

In this section, the determinants of underpricing in Polish PIPOs and Polish private sector IPOs are studied in a multivariate cross-sectional analysis, testing hypotheses specified in section three. The following regression models are used:

Model I: $UP_i = \alpha_o + \alpha_1 \cdot MV_i + \alpha_2 \cdot DM_i + \alpha_3 \cdot Risk_i + \alpha_4 \cdot LFR_i + \varepsilon_i$ (4.1)

Model II: $UP_i = \alpha_o + \alpha_1 \cdot MV_i + \alpha_2 \cdot DM_i + \alpha_3 \cdot Risk_i + \alpha_4 \cdot Frac_i + \varepsilon_i$ (4.2)

where UP_i is the underpricing (market-adjusted initial return) of issue i, MV_i is the market volatility measured using the standard deviation of daily returns of the Warsaw stock exchange (WIG) index during the last three months before the subscription period of issue i (*hypothesis 5: market volatility*), DM_i is the demand multiple of issue *i (hypothesis 1: demand multiple)*, $Risk_i$ is the two month aftermarket daily return standard deviation of issue i (*hypothesis 2: ex-ante uncertainty I*), LFR_i ist a dummy variable: coded 1 if a large fraction of the share capital is sold at the initial offer (i.e. a fraction above the median) and if in addition domestic retail investors receive a large portion of the issue (i.e. a portion above the median) and 0 otherwise) (*hypothesis 8: re-election*)

and Frac$_i$ is the fraction of the share capital sold at the initial offer (*hypothesis 4: signaling and hypothesis 6: political uncertainty I*).

The variables LFR and Frac are highly correlated and cannot be used in the same model. To test all hypotheses specified above it is therefore necessary to use two models. Table 6 presents the regression results.[23] First, the variable market volatility (MV) is significantly positively related to the underpricing level of Polish PIPOs. In line with hypothesis 5 this result is consistent with a committed government trying to make its issues a success in order build up reputation for further issues of state enterprises. If the market conditions are riskier (higher volatility), it reduces the issue price to ensure the success of the issue. This finding for Polish PIPOs is consistent with the results for UK PIPOs reported in Menyah and Paudyal (1996) and for Malaysian PIPOs reported in Paudyal et al. (1998). In contrast to PIPOs there is no significant relationship between the underpricing level and the market volatility observable for private sector IPOs.[24]

*** Insert table 6 about here ***

Second, the demand multiple (DM) is significantly positively related to the underpricing level. The positive relationship suggests that demand pressure pushes the market price on the first day upwards and results in a higher market-adjusted initial return. This finding is consistent with the results of Menyah and Paudyal (1996) for UK PIPOs and Paudyal et al. (1998) for Malaysian PIPOs. They both document a significantly positive relationship between the underpricing of PIPOs as well as private sector IPOs and the demand multiple.

How can this result be interpreted? A positive relationship between the initial market-adjusted return and the demand multiple indicates that 'good' issues are subscribed for by more investors, including informed investors. This would support Rock's (1986) winner's curse model. If small (domestic) retail investors belong to the group of uninformed investors and institutional investors to the group of informed investors then the

---

[23]   Bank Slaski is viewed as an outlier and is therefore not included in the regression analysis.

[24]   Paudyal et al. (1998) document a similar result for their sample of Malaysian private sector IPOs.

demand of small investors should be independent of whether an issue is over- or under-priced. But this is not the case in Poland. The demand multiple of small retail investors for underpriced issues (positive market-adjusted initial return) is 3.08 and 0.88 for over-priced issues (negative market-adjusted initial return). For institutional investors the corresponding demand multiples are 2.71 and 0.87 respectively.[25] This indicates that both groups of investors are able to differentiate between 'good' and 'bad' issues. This observation is not in line with the winner's curse model.

Third, the underpricing level of Polish PIPOs and private sector IPOs is unrelated to the variable Risk, which has a negative instead of an expected positive sign. For PIPOs this result is consistent with the findings for Malaysian PIPOs (see Paudyal et al. (1998)). But for private sector IPOs the ex-ante uncertainty has a significant explanatory power in many markets.[26]

Fourth, the results in table 6 reveal that the underpricing for PIPOs is especially large if a large fraction is sold at the initial offer and if, in addition, domestic retail investors are allocated a large portion at the initial offer. This result suggests that if the Polish government wants to increase the number of shareholders and therefore also the acceptance of its privatization program among the citizens, it sells a higher fraction and uses an underpricing strategy. This empirical evidence is in accordance with the model of Biais and Perotti (1999) and hypothesis 8 can be accepted. By contrast, the variable LFR has no explanatory power for private sector IPOs.

The final variable is the fraction of the share capital sold at the initial offer. Hypothesis 4 predicts a negative relationship between the fraction sold and the underpricing level. But for PIPOs as well as private sector IPOs the relationship is not significantly negative but positive, in the case of private sector IPOs even significantly positive. As the relationship for PIPOs is not significant, hypothesis 6 has to be rejected too.

---

[25]   Information on the demand multiple for small retail investors and institutional investors is available for a subsample of 135 firms.

[26]   See e.g. Ritter (1984) for US IPOs, Finn and Higham (1988) for Australian IPOs and Paudyal et al. (1998) for Malaysian private sector IPOs.

Other studies relating the fraction of the share capital sold to the underpricing level of PIPOs were made by Jones et al. (1999) for an international sample of 93 PIPOs, Menyah and Paudyal (1996) for the UK and Paudyal et al. (1998) for Malaysian PIPOs. They report different findings. Paudyal et al. (1998) and Jones et al. (1999) document that a higher fraction sold is (significantly) related to higher underpricing levels. By contrast, Menyah and Paudyal (1996) find a significantly negative relationship for UK PIPOs.

To sum up, three out of five variables have a significant and positive impact on the underpricing of Polish PIPOs: the market volatility prior to the issue, the demand multiple and a dummy variable for the re-election hypothesis of Biais and Perotti (1999). The signaling hypothesis (hypothesis 4) has to be rejected and the positive relationship between the underpricing level and the fraction sold is not significant. On the other hand, only the demand multiple and the fraction sold have significantly positive explanatory power for the underpricing of private sector IPOs.

6. Aftermarket Performance

The objective of this section is to examine the aftermarket performance of firms going public on the WSE. Besides the short-run aftermarket performance, which permits conclusions about the price adjustment process, the long-run aftermarket performance within three years of the first trading day is analyzed. Four hypothesis, specified in Section 3, are explicitly tested: hypothesis 9 (no negative long-run performance for PIPOs), hypothesis 10 (PIPOs experience a better long-run performance than private sector IPOs), hypothesis 11 (a lower direct political influence is associated with a better long run performance) and hypothesis 12 (investors sentiment: a high demand multiple at the issue leads to a bad long-run performance).

6.1 Methodology

To measure the performance of IPOs in the aftermarket buy-and-hold returns are calculated in a first step for each issue. In contrast to cumulative returns, which are sometimes used to measure long-horizon security, price performance buy-and-hold returns have the advantage that they are based on a realistic ex-ante trading strategy. The buy-and-hold return for issue i ($BHR_{i,T}$) is defined as

$$BHR_{i,T} = \left[\prod_{t=2}^{T} \left(1 + R_{i,t}\right) \right] - 1 ,\tag{5}$$

where $R_{i,t}$ is the return of IPO i in period t and t = 2 indicates the second trading day in the aftermarket.[27] BHRs are calculated for the following time periods: T = 1 week, 2 weeks, 1 month, 2 months, 1 year, 2 years and 3 years.

To be able to compare the aftermarket performance within the first three years after the first trading day for different time periods (e.g. one year and three years) only issues are used with a first trading day earlier than March 10th, 1997. This leads to a reduction in the sample sizes to 83 firms for the sample of all issues, 38 firms for the sample of PIPOs and 45 firms for the sample of private sector IPOs.

To measure the abnormal performance of IPOs in the aftermarket it is first necessary to specify appropriate benchmarks. This task is of particular importance because it can affect the aftermarket performance measured. One possibility is to use a matching firm adjustment procedure, in which for each IPO firm a non-IPO firm of approximately similar size and the same industry is chosen.[28] Another possibility, which is used for markets in which the number of potential benchmark firms is low, is to use one or more

---

[27]   The starting point for measuring the aftermarket performance is therefore the closing price on the first trading day.

[28]   See e.g. Ritter (1991) or Loughran and Ritter (1995).

24

indices, e.g. a market index, as benchmark.[29] Because of the low number of firms listed in the first years after the resumption of the WSE a matching procedure (e.g. matching by size and industry) is not possible in Poland.

The aftermarket performance is therefore measured against the WIG-Index as a benchmark. For comparison purposes and as a robustness check an equally weighted stock market index is used as an additional benchmark.[30] In a similar way to (5) the BHR of the WIG-Index for IPO i ($BHR_{i,WIG,T}$) is calculated as

$$BHR_{WIG,i,T} = \left[\prod_{t=2}^{T} \left(1 + R_{WIG,i,t} \right) \right] - 1 \, . \tag{6}$$

$R_{i,WIG,t}$ is the return of the WIG-Index in period t, where t = 2 indicates the second trading day in the aftermarket. Therefore, buy-and-hold returns over identical intervals are calculated for each issue and the benchmark. To measure the market-adjusted performance buy-and-hold abnormal returns (BHARs) and wealth relatives (WRs) are used. In accordance with Ritter (1991) the WR of IPO i (WR_i) is defined as

$$WR_i = \frac{1 + BHR_i}{1 + BHR_{WIG,i}} \tag{7}$$

and BHARs are defined as

$$BHAR_{i,T} = BHR_{i,T} - BHR_{WIG,i,T} \, . \tag{8}$$

---

[29]   See e.g. Keloharju (1993) for the Finnish IPO market, Kunz and Aggarwal (1994) for the Swiss IPO market, Paudayal et al. (1998) for Malaysian and Jelic and Briston (1999) for Hungarian PIPOs and private sector IPOs.

[30]   It is common in the literature to use value-weighted as well as equally weighted stock market indices as benchmarks (see e.g. Loughran and Ritter (1995) or Brav and Gompers (1997)). The WIG Index is a value-weighted index. Small PIPOs or private sector IPOs are therefore primarily compared with big firms. This is not the case when an equally weighted index used.

Another important point in measuring the long-run abnormal performance of security prices is the usage of appropriate test statistics. As the simulation results of Kothari and Warner (1997), Barber and Lyon (1997) and Lyon, Barber, and Tsai (1999) show, conventional tests of long-run abnormal security returns are often misspecified. They find that conventional parametric test statistics often indicate a long-run abnormal performance when none is present. They especially mention three main reasons for potential misspecifications: (a) survival-related biases, which occur if failing firms are excluded, (b) rebalancing biases, which arise if cumulative return procedures are used and (c) biases because long-run abnormal performance measures are typically skewed.

To minimize these sources of misspecification, this study includes all firms delisted on the WSE during the investigation period and uses buy-and-hold returns to calculate the long-run performance. In addition, to account for the skewness bias, a skewness-adjusted t-statistic with bootstrapped p-values (as suggested by Lyon, Barber and Tsai (1999)) and a non parametric Wilcoxon-Signed-Rank-Test are used to test the null hypothesis of no abnormal long-run performance.[31]

6.2 Results

Table 7 presents the short-run aftermarket performance for the three samples.[32] First, it can be seen that in line with the evidence of many other markets the short-run aftermarket performance is not significantly different from zero. For the sample of all issues, for instance, the average BHAR over the first two months is -3.16%. A slightly negative short-run aftermarket performance can also be observed for PIPOs and private sector IPOs. All BHARs are not significantly different from zero. This result leads to the con-

---

[31] As a result of their simulation analyses concerning the long-run security price performance, Kothari, and Warner (1997) recommend using nonparametric and bootstrap tests to reduce misspecification.

[32] The results of using the equally-weighted market index are not shown for the short-run aftermarket performance. They are similar to those reported for the WIG index.

clusion that for Polish PIPOs as well as private sector IPOs there is full price adjustment on the first trading day.[33]

*** Insert table 7 about here ***

The long-run aftermarket performance for the first three years reveals some differences between the samples. First, for the sample of all issues the average (median) BHAR is +11.46% (-61.09%) and the wealth relative is 1.037 (see Panel A of table 8). The negative median-BHAR is significantly different from zero at the 1%-level. More than 66% of all issues experience a negative long-run performance (55 out of 83). The 3-year abnormal performance of PIPOs is a bit better: The mean-BHAR is positive (+39.47%), but the median-BHAR is negative (-41.70%). Both values are not significantly different from zero at conventional significance levels. Hypothesis 9 can therefore be accepted. According to the model of Perotti (1995) it could be expected that a market-oriented government trying to build up reputation over time is not interested in a significantly negative long-run performance of PIPOs. The non-negative long-run performance of Polish PIPOs can be viewed as further evidence that the Polish government is market-oriented.

*** Insert table 8 about here ***

These observations for Polish PIPOs are in contrast to the international evidence found by Megginson et al. (1999). When using national indices as benchmarks, they document for a 33-country sample of 117 PIPOs a significantly positive aftermarket performance for the first three years of aftermarket trading. The average (median) BHAR for their sample is +31.9% (+7.3%). Jelic and Briston (1999) also report a significantly positive abnormal performance (mean-BHAR = +92.3%) for a sample of 16 Hungarian PIPOs till the third anniversary of public trading. But the evidence for Polish PIPOs is in line with a non-significant 3-year abnormal performance documented in Paudyal et al.

---

[33]   Similar results are documented for Hungary (see Jelic and Briston (1999) and Malaysia (see Paudyal et al. (1998)).

(1998) for Malaysian PIPOs and in Boubakri and Cosset (1999) for a 26-country sample of 120 PIPOs.

PIPOs yield a highly significant mean unadjusted 3-year return of +435.1%. This is nearly four times higher than the average BHR Boubakri and Cosset (1999) document for their international sample of 120 PIPOs. The annual average return (geometric mean) for Polish PIPOs corresponds to 74.9%.

Second, private sector IPOs experience an insignificant average performance over the first three years: The mean-BHAR is -12.2% (see Panel A of table 8). But the mean is associated with a significantly negative median-BHAR of -70.8%. For 32 out of 45 private sector IPOs the 3-year BHAR is negative. Polish private sector IPOs therefore tend to underperform in the long-run but the evidence is not unambiguous. On the other hand, a clearly negative and significant 3-year abnormal performance is documented by Jelic and Briston (1999) for a sample of 12 Hungarian private sector IPOs. The mean-BHAR for their sample is -127.6%.

The main conclusions do not change when the equally weighted (EW) stock market index is used as a benchmark. The samples of all issues and private sector IPOs experience a normal mean but a significantly negative median 3-year performance. Although the mean-BHAR for PIPOs drops to –27% when using the EW-index, both mean and median-BHARs are not significantly different from zero.

Hypothesis 10 says that Polish PIPOs experience a better long-run (abnormal) performance than their private sector counterparts. Panel C of table 8 reveals that hypothesis 10 has to be rejected. The 3-year abnormal performance difference (difference in the BHARs) is slightly positive when using the WIG-index and slightly negative when using the EW-index as a benchmark. But both values are not significantly different from zero. This evidence for Poland is in line with the findings for Malaysia (see Paudyal et al. (1998)) but contradicts the evidence for Hungary. Jelic and Briston (1999) report a significantly negative performance difference between PIPOs and private sector IPOs.

To test whether the fraction of the share capital sold at the initial offer has an influence on the long-run performance the samples of PIPOs and private sector IPOs are each divided into two groups: a group with a large fraction sold (i.e. above the median) and a group with a low fraction sold (i.e. below the median). Panel A of table 9 summarizes the results. State enterprises of which the government sells a large fraction at the initial offer experience a positive abnormal 3-year performance of +86.9% whereas for enterprises of which only a small fraction is sold the average BHAR is –8% (WIG-index as benchmark). The difference is huge but not significant and the median difference is only 2%. If the EW-index is used as a benchmark, the mean and median-BHAR differences are not significant either. Because of the evidence provided hypothesis 11 therefore has to be rejected. The fraction sold at the initial offer has no influence on the long-run performance of private sector IPOs either. This evidence is consistent with the findings by Paudyal et al. (1998) for private sector IPOs in Malaysia.

Aggarwal and Rivoli (1990), Ritter (1991) or Loughran and Ritter (1995) mention that one reason for the negative long-run performance of (private sector) IPOs is over-optimism among investors at the time of the initial issue. Hypothesis 12 (investors sentiment) implies in this context that a higher demand multiple (a demand multiple above the median) is positively related to a lower long-run performance (and vice versa). To test this hypothesis again two portfolios are constructed for PIPOs and IPOs respectively on the basis of their demand multiple at the initial issue: (a) low demand multiple and (b) high demand multiple. If there is no initial over-optimism, the performance of these portfolios should not significantly differ from each other.

The results in Panel B of table 9 show that this is not the case for Polish PIPOs. In accordance with hypothesis 12 the portfolio of PIPOs with a high demand multiple underperforms the portfolio of those with a low demand multiple. The 3-year BHAR for the high demand multiple portfolio is -75.4% whereas the one for the low demand multiple portfolio is +132.5%. The difference of 207.9% is significant at the 5%-level. This performance pattern does not disappear if the EW-index is used as a benchmark. In contrast to PIPOs the demand multiple has no influence on the long-run performance of Polish private sector IPOs.

How can this result be interpreted? One reason for this observation might be that for some issues the marketing efforts of the government might have been too big, generating a too high demand for shares. The resulting over-optimism leads to first market prices above the 'true' equilibrium level. As investors correct their misvaluation over time, the long run performance will be below average.

7. Summary

This study examines the characteristics and the short- and long-run price behavior of two groups of firms going public in Poland: Case-by-case privatization initial public offerings (PIPOs) and private sector IPOs. Unlike other Central and Eastern European countries (e.g. Russia, the Czech Republic or Slovakia) Poland did not start its privatization process with a mass privatization program. Instead the Polish government privatized many firms through public offerings on a case-by-case basis.

On average Polish PIPOs as well as private sector IPOs are significantly underpriced. With a mean of 60% the underpricing of PIPOs is about 40 percentage points above the underpricing of private sector IPOs. This huge difference is not statistically significant and can partly be explained by one particular privatization. In comparison to the international evidence provided in Jones et al. (1999), the Polish government sold a higher fraction of the share capital at the initial offer and underpriced more than the average government in the world did. This observation is consistent with a committed government according to Perotti (1995).

A multivariate cross-sectional analysis reveals that the underpricing of Polish PIPOs can best be explained by the market volatility prior to the issue and the demand multiple. In addition and in accordance with Biais and Perotti (1999) the underpricing is significantly higher for issues where the government sells a higher fraction of the share capital at the initial offer and allocates a larger portion to domestic retail investors. By contrast,

only the demand multiple and the fraction sold at the initial offer have significant explanatory power for the underpricing of private sector IPOs.

The long-run performance provides interesting results: First, Polish PIPOs neither under- nor overperform benchmarks over the first three years of aftermarket trading. This is in contrast to Megginson et al. (1999), who document for a 36-country sample of PIPOs a significantly positive long-run performance, but is in line with the observations of Boubakri and Cosset (1999) for a 26-country sample of PIPOs and of Paudyal et al. (1998) for Malaysian PIPOs. The non-negative long-run performance of Polish PIPOs is consistent with a market-oriented government trying to build up reputation for its privatization program in the course of time.

Second, the long-run abnormal performance of Polish PIPOs and private sector IPOs is not significantly different from each other. Third, PIPOs experiencing a high demand multiple at the initial issue underperform a low demand multiple portfolio of PIPOs significantly. This suggests that high demand multiples are associated with over-optimistic investors pushing market prices upwards on the first trading day, which results in a below-average long-run performance as investors correct their misvaluation.

References

Aggarwal, R., R. Leal, and L. Hernandez, 1993, The aftermarket performance in initial public offerings in Latin America, <u>Financial Management</u>, Spring 1993, pp. 42-53.

Aggarwal, R., and P. Rivoli, 1990, Fads in the initial public offering market?, <u>Financial Management</u>, Winter 1990, pp. 45-57.

Allen, F., and G.R. Faulhaber, 1989, Signaling by underpricing in the IPO market, <u>Journal of Financial Economics</u>, Vol. 23, pp. 303-323.

Barber, B. M., and J.D. Lyon, 1997, Detecting long-run abnormal stock returns: The empirical power and specification of test statistics. <u>Journal of Financial Economics</u>, Vol. 43, pp. 341-372.

Beatty, R.P., und J.R. Ritter 1986, Investment banking, reputation, and the underpricing of initial public offerings, <u>Journal of Financial Economics</u>, Vol. 15, pp. 213-232.

Biais, B., and E.C. Perotti, 1999, Machiavellian privatization, Working Paper, Universite des Sciences Sociales de Toulouse, University of Amsterdam and CEPR, June 1999.

Boubakri, N., and J.-C. Cosset, 1999, The aftermarket performance of privatization offerings in developing countries, Working Paper, University of Montreal, Ecole des HEC.

Boycko, M., A. Shleifer, and R.W. Vishny, 1996, A theory of privatisation, <u>Economic Journal</u>, Vol. 106, March 1996, pp. 309-319.

Brav, A., and P.A. Gompers, 1997, Myth or reality? The long-run underperformance of initial public offerings: Evidence from venture and nonventure capital-backed companies, <u>Journal of Finance</u>, Vol. 52, No. 5, pp. 1791-1821.

Choi, S.-D., S.-N. Nam, and G.-Y. Ryu, 2000, Do privatization IPOs outperform the market? International evidence, Working Paper, Korea University.

Dewenter, K.L., and P.H. Malatesta, 1997, Public offerings of state-owned and privately-owned enterprisies: An international comparison. <u>Journal of Finance</u> Vol. 52, No. 4, pp. 1659-1679.

Dewenter, K.L., and P.H. Malatesta, 2000, State-owned and privately-owned firms: An empirical analysis of profitability, leverage, and labour intensity, forthcoming: <u>American Economic Review</u>.

Finn, F.J., and R. Higham, 1988, The Performance of unseasoned new equity issues-cum-stock exchange listings in Australia, <u>Journal of Banking and Finance</u>, Vol. 12, 1988, pp. 333 - 351.

Grinblatt, M., and C.Y. Hwang, 1989, Signaling and the pricing of new issues, <u>Journal of Finance</u> 44 (June), No. 2, pp. 393-420.

Huang, Q., and R.M. Levich, 1998, Underpricing of new equity offerings by privatized firms: An international test, Working Paper, Hofstra University and New York University, November 1998.

Jelic, R., and R. Briston, 1999, Hungarian privatisation strategy and financial performance of privatized companies, <u>Journal of Business Finance & Accounting</u>, Vol. 26, No. 9 & 10, pp. 1319-1357.

Jenkinson, T., and C. Mayer, 1988, The privatization process in France and the UK, <u>European Economic Review</u>, Vol. 32 (March), pp. 482-490.

Jones, S.L., W.L. Megginson, R.C. Nash, and J.M. Netter, 1999, Share issue privatizations as financial means to political and economic ends, Journal of Financial Economics, Vol. 53, No. 2, pp. 217-253.

Keloharju, M., 1993, Winner's curse, legal liability, and the long-run price performance of initial public offerings in Finland, Journal of Financial Economics, Vol. 34, pp. 251-277.

Kim, J., I. Krinsky, and J. Lee, 1995, The aftermarket performance of initial public offerings in Korea, Pacific-Basin Finance Journal, Vol. 3, pp. 429-448.

Kothari, S.P., and Warner, J.B., 1997, Measuring long-horizon security price performance, Journal of Financial Economics, Vol 43, pp. 301-339.

Kunz, R.M. and R. Aggarwal, 1994, Why initial public offerings are underpriced: Evidence from Switzerland, Journal of Banking and Finance, Vol. 18, pp. 705-723.

Lee, P.J., S.L. Taylor, and T.S. Walter, 1996, Expected and realised returns for Singaporean IPOs: Initial and long-run analysis, Pacific-Basin Finance Journal, Vol. 4, pp. 153-180.

Levis, M., 1993, The long-run performance of initial public offerings: The UK experience 1980 – 1988, Financial Management, Vol. 22, pp. 22-41.

Ljungqvist, A.P., 1996, Can firms outwit the market? Timing ability and the long-run performance of IPOs, in: Levis, M. (Hrsg.), Empirical issues in raising equity capital, Elsevier, Amsterdam 1996, 215-244.

Loughran, T., and J.R. Ritter, 1995, The new issues puzzle, Journal of Finance, Vol. 50 (March), No. 1, pp. 23-51.

Loughran, T., J.R. Ritter, and K. Rydqvist, 1994, Initial public offerings: International insights, <u>Pacific-Basin Finance Journal</u>, Vol. 2, pp. 165-199.

Lyon, J.D., B.M. Barber, and C.-L. Tsai, 1999, Improved methods for tests of long-run abnormal stock returns, <u>Journal of Finance</u>, Vol. 54 (February), No. 1, , pp. 165-201.

Megginson, W. L., R.C. Nash, and M. Van Randenborgh, 1994, The financial and operating performance of newly privatized firms: An international empirical analysis, <u>Journal of Finance</u>, Vol. 49 (June), No. 2, pp. 403-452.

Megginson, W.L., R.C. Nash, J.M. Netter, and A.L. Schwartz, 1999, The long-run return to investors in share issue privatizations, Working Paper, University of Oklahoma, Wake Forest University, University of Georgia and University of Miami, July 1999, fortcoming: <u>Financial Management</u>.

Megginson, W.L., and J.M. Netter, 2000, From state to market: A survey of empirical studies on privatization, Working Paper, University of Oklahoma and University of Georgia, March 2000.

Menyah, K., and K.N. Paudyal, 1996, Share issue privatisations: The UK experience, in: Levis, M. (Editor), Empirical Issues in Raising Equity Capital, Elsevier, Amsterdam, pp. 17-48.

Paudyal, K.N., B. Saadouni and R.J. Briston (1998), Privatisation initial public offerings in Malaysia: Initial premuim and long-term performance, <u>Pacific-Basin Finance Journal</u>, Vol. 6, pp. 427-451.

Perotti, E.C., 1995, Credible privatization, <u>American Economic Review</u>, Vol. 85 (September), No. 4, pp. 847-859.

Perotti, E.C., and S.E. Guney, 1993, The structure of privatization plans, <u>Financial Management</u>, Vol. 22 (Spring), pp. 84-98.

Ritter, J. R., 1984, The "hot issue" market of 1980, <u>Journal of Business</u>, Vol. 57, No. 2, pp. 215-240.

Ritter, J. R., 1991, The long-run performance of initial public offerings, <u>Journal of Finance</u>, Vol. 46 (March), No. 1, pp. 3-27.

Rock, K., 1986, Why new issues are underpriced, <u>Journal of Financial Economics</u>, Vol. 15, pp. 187-212.

Su, D., and B.M. Fleisher, 1999, An empirical investigation of underpricing in Chinese IPOs, <u>Pacific-Basin Finance Journal</u>, Vol. 7, pp. 173-202.

Vickers, J.S., and G. Yarrow, 1988, Privatization: An Economic Analysis, MIT Press, Cambridge.

Welch, I., 1989, Seasoned offerings, imitation costs, and the underpricing of initial public offerings, <u>Journal of Finance</u>, Vol. 44 (June), No. 2, pp. 421-449.

Table 1: Summary of Studies on the Short- and Long-Run Performance of Privatization IPOs (PIPOs)

Panel A: Initial return

Study	Market	Sample Size	Time Period	Underpricing (%)	Sig [a]
Aggarwal et al. (1993)	Chile	9	1982-90	7.6	No
Jelic and Briston (1999)	Hungary	25	1990-98	44.0	Yes
Jenkinson and Mayer (1988)	France	n.a.	n.a.	25.1	n.a.
Menyah and Paudyal (1996)	UK	40	1981-91	38.7	Yes
Paudyal et al. (1998)	Malaysia	18	1984-95	103.5	Yes
Su and Fleisher (1999)	China	308	1987-95	948.6	Yes
Dewenter and Malatesta (1997)	8 countries	109	n.a.	23.7	Yes
Huang and Levich (1998)	39 countries	221	1979-96	32.2	n.a.
Jones et al. (1999)	59 countries	242	1977-97	34.1	n.a.

[a]   Significantly different from zero at the 5-percent level.
n.a. Not available.

Panel B: Abnormal aftermarket performance: first trading day till the third anniversary (exclusive of initial return).

Study	Market	Sample Size	Time Period	Average Abnormal Performance (%) [b]	Sig [a]
Aggarwal et al. (1993)	Chile	9	1982-90	-29.9 [c]	Yes
Jelic and Briston (1999)	Hungary	16	1990-98	92.3	Yes
Menyah and Paudyal (1996)	UK	40	1981-91	61.0	Yes
Paudyal et al. (1998)	Malaysia	18	1984-95	-7.5	No
Boubakri and Cosset (1999)	26 countries	120	1982-95	37.0 to 46.0	No
Megginson et al. (2000)	33 countries	117	1981-97	31.9 [d]	Yes

[a]   Significantly different from zero at the 5-percent level.
[b]   Mean buy-and-hold abnormal return.
[c]   Abnormal long-run performance for the first year.
[d]   If national stock market indices are used as benchmarks.

Table 2: PIPOs versus Private Sector IPOs in the Long-Run.

Summary of studies explicitly comparing the long-run performance of privatization IPOs (PIPOs) and private sector IPOs (IPOs). The table reports the market-adjusted aftermarket performance form the first trading day till the third anniversary (exclusive of initial return).

Study	Market	Time Period	PIPOs AP (%)	PIPOs Sample Size	IPOs AP (%)	IPOs Sample Size	Difference in AP (%)	Sig [a]
Jelic and Briston (99)	Hungary	1990-98	92.3	16	-127.6	12	219.9	Yes
Menyah and Paudyal (96)	UK	1981-91	61.0	40	4.9	75	56.1	n.a.
Paudyal et al. (98)	Malaysia	1984-95	-7.5	18	12.9	77	-20.4	No

[a]   Significantly different from zero at the 5-percent level.
n.a. Not available.
AP   Average abnormal performance (Buy-and-hold abnormal return).

Table 3: Sample Characteristics
Summary statistics (period: April 1991 – December 1999) for the samples: all issues (All), privatization IPOs (PIPOs) and private sector IPOs (IPOs) as well as mean and median differences between PIPOs and private sector IPOs (PIPOs minus IPOs) for several characteristics. In Panel B it is tested whether a) the differences in the mean and b) the differences in the median values are significantly different from zero. For the means a t-test and for the medians a Wilcoxon-Signed-Rank-Test is used. Test statistics in parentheses.

Panel A: Summary statistics

	All	PIPOs	IPOs
Number of firms	159	52	107
Gross proceeds:			
Total (million PLN)	18,843.4	15,931.7	2,911.8
Primary shares (million PLN)	3,514.1	890.9	2,623.2
Secondary shares (million PLN)	15,329.3	15,040.8	288.6
Primary shares (%)	18.65	5.59	90.09
Secondary shares (%)	81.35	94.41	9.91
Mean (million PLN)	118.5	306.4	27.2
Median (million PLN)	18.2	43.5	14.4
Percent of capital sold in offer	42.28	63.25	32.08
Portion of issues:			
only secondary shares (%)	28.9	67.3	10.3
only primary shares (%)	57.9	3.8	84.1
fixed-price offers (%)	67.3	57.7	72.0
tender offers (%)	32.7	42.3	28.0
Mean demand multiple	2.18	2.63	1.96
Mean fraction sold to employees at initial offer (%)	9.72	19.02	5.20

Panel B: Mean and median differences between PIPOs and private sector IPOs

	Mean	Median
Gross proceeds (million PLN)	277.17 [a]	29.10 [a]
	(2.998)	(4.575)
Percent of capital sold in offer	31.17 [a]	36.08 [a]
	(6.823)	(5.972)
Portion of issues: only secondary shares (%)	57.10 [a]	100.00 [a]
	(7.920)	(5.825)
Portion of issues: only primary shares (%)	-80.30 [a]	-100.00 [a]
	(-18.012)	(-8.198)
Demand multiple	0.67	-0.03
	(1.320)	(1.250)
Fraction sold to employees at the initial offer (%)	13.82 [a]	18.68 [a]
	(4.920)	(5.584)

[a]   Significant at the 1% level.

Table 4: Initial Returns

Mean and median values of initial raw returns (initial RR) and initial market-adjusted returns (initial MAR) for the samples: all issues (All), privatization IPOs (PIPOs) and private sector IPOs (IPOs) as well as mean and median differences of initial returns between PIPOs and private sector IPOs. The initial raw and market-adjusted returns are measured by Eqs. (1) and (2) respectively. In Panel A it is tested whether the means and medians of initial returns are significantly different from zero. For the means a skewness-adjusted test statistic with p-values using a bootstrapping procedure is employed (see Lyon, Barber and Tsai (1999)). For the medians a Wilcoxon-Signed-Rank-Test is used. In Panel B it is tested whether the difference in the mean and the differences in the median initial returns between PIPOs and private sector IPOs are significantly different from zero. For the means a t-test and for the medians a Wilcoxon-Signed-Rank-Test is used. Test statistics in parentheses.

Panel A: Initial raw and market-adjusted returns

	Initial raw returns			Initial market-adjusted returns		
	All	PIPOs	IPOs	All	PIPOs	IPOs
Mean	38.46 [a]	65.60 [a]	25.27 [a]	33.10 [a]	60.43 [a]	19.82 [a]
	(7.265)	(3.813)	(6.661)	(6.873)	(4.058)	(5.259)
Median	16.47 [a]	16.61 [a]	12.50 [a]	16.05 [a]	19.78 [a]	12.91 [a]
	(6.387)	(4.235)	(4.875)	(6.495)	(5.200)	(4.258)
Minimum	-51.06	-44.12	-51.06	-82.23	-38.83	-82.23
Maximum	1250.00	1250.00	257.14	1,166.75	1,166.75	270.18
Number of firms:						
Positive	107	39	68	117	45	72
Negative	41	11	30	42	7	35
Zero	11	2	9	0	0	0
Total	159	52	107	159	52	107

Panel B: Difference between PIPOs and private sector IPOs (PIPOs minus IPOs)

	With Bank Slaski		Without Bank Slaski	
Number of PIPOs	52		51	
Number of IPOs	107		107	
	Mean	Median	Mean	Median
Initial RR	40.33	4.11	17.10	4.05
	(1.463)	(0.687)	(1.131)	(0.496)
Initial MAR	40.61	6.88	19.04	6.83
	(1.639)	(1.820)	(1.535)	(1.746)

[a] Significant at the 1% level.
[b] Significant at the 5% level.

Table 5: Fraction Sold at the Initial Offer and Underpricing in the Course of Time

Mean and median initial market-adjusted returns (underpricing), fraction the share capital sold at the initial offer and price-earnings ratios at the issue (using the issue price) for all issues (All), privatization IPOs (PIPOs) and private sector IPOs (IPOs) in successive non overlapping sub-periods.

Panel A: Fraction sold at the initial offer (%)

Period	No[a]	All Mean	Median	No	PIPOs Mean	Median	No	IPOs Mean	Median
91-92	14	86.11	90.00	14	86.11	90.00	-	-	-
93-94	26	47.61	34.85	12	63.58	68.26	14	33.92	30.53
95-96	38	39.89	32.82	11	54.58	60.07	27	33.90	27.78
97-99	81	34.11	30.21	15	48.01	44.16	66	30.95	29.83

Panel B: Underpricing (%)

Period	No[a]	All Mean	Median	No	PIPOs Mean	Median	No	IPOs Mean	Median
91-92	14	11.85	13.14	14	11.85	13.14	-	-	-
93-94 [b]	26	106.65	21.37	12	190.95	71.39	14	34.40	20.25
95-96	38	29.59	20.78	11	46.76	29.24	27	22.60	12.91
97-99	81	15.63	14.99	15	15.79	19.74	66	15.60	6.62

[a] Number of firms.
[b] Underpricing results without the outlier Bank Slaski (underpricing = 1166.75%):
     All-mean = 64.51%, All-median = 20.56%; PIPOs-mean = 102.24%, PIPOs-median = 20.56%.

Table 6: Multivariate Cross-Sectional Regression Analysis

Regression results of model I and II for all issues (All), privatization IPOs (PIPOs) and private sector IPOs (IPOs):

$$\text{Model I:} \quad UP_i = \alpha_o + \alpha_1 \cdot MV_i + \alpha_2 \cdot DM_i + \alpha_3 \cdot Risk_i + \alpha_4 \cdot LFR_i + \varepsilon_i$$

$$\text{Model II:} \quad UP_i = \alpha_o + \alpha_1 \cdot MVa_i + \alpha_2 \cdot DM_i + \alpha_3 \cdot Risk_i + \alpha_4 \cdot Frac_i + \varepsilon_i$$

where UP_i = underpricing (market-adjusted initial return) of issue i; MV_i = market volatility measured using the standard deviation of daily returns of the Warsaw stock exchange (WIG) index during the last three months before the subscription period of issue i; DM_i = demand multiple of issue i; $Risk_i$ = two-month aftermarket return standard deviation of issue i; LFR_i = dummy variable: coded 1 if a large fraction of the share capital is sold at the initial offer (i.e. a fraction above the median) and if, in addition, domestic retail investors receive a large portion of the issue (i.e. a portion above the median) and 0 otherwise; $Frac_i$ = fraction of the share capital sold at the initial offer. Test statistics in parentheses. The tolerance measures the degree of collinearity.

Explanatory variables		Model I			Model II		
		All	PIPOs	IPOs	All	PIPOs	IPOs
Intercept		-0.234	-0.675	0.108	-0.312	-0.907 [b]	-0.023
		(-1.447)	(-1.828)	(0.653)	(-1.880)	(-2.332)	(-0.127)
Market Volatility (MV)		1.112 [a]	2.224 [a]	0.309	1.077 [a]	2.230 [a]	0.338
		(3.445)	(3.406)	(0.863)	(3.356)	(3.389)	(0.956)
Demand Multiple (DM)		0.083 [a]	0.096 [a]	0.064 [a]	0.079 [a]	0.085 [a]	0.065 [a]
		(4.910)	(3.106)	(3.251)	(4.628)	(2.723)	(3.305)
Issue Volatility (Risk)		-0.376	-0.370	-0.453	-0.437	-0.341	-0.403
		(-1.221)	(-0.519)	(-1.411)	(-1.419)	(-0.473)	(-1.264)
LFR		0.209 [a]	0.438 [b]	0.134			
		(2.938)	(2.034)	(1.372)			
Fraction of the share capital sold (Frac)					0.516 [a]	0.646	0.446 [b]
					(3.256)	(1.841)	(2.028)
Adjusted R^2		20.4%	29.1%	11.0%	21.4%	28.1%	12.9%
F-value		11.086 [a]	6.140 [a]	4.269 [a]	12.690 [a]	5.877 [a]	4.908 [a]
Durbin-Watson-Statistic		2.002	2.160	2.199	2.044	2.083	2.242
Number of firms[c]		158	51	107	158	51	107
Tolerance	MV	0.915	0.983	0.824	0.914	0.982	0.831
	DM	0.925	0.947	0.878	0.918	0.935	0.879
	Risk	0.868	0.819	0.815	0.861	0.811	0.808
	LFR	0.997	0.860	0.985			
	Frac				0.996	0.866	0.991

[a] Significant at the 1% level.
[b] Significant at the 5% level.
[c] The outlier Bank Slaski (UP = 1166.75%) has been excluded from the sample all issues (All) and the sample privatizations (PIPOs).

Table 7: Short-Run Aftermarket Performance

Buy-and-hold abnormal returns (BHARs) and wealth relatives (WR) during the first two months of aftermarket trading for all issues (All), privatization IPOs (PIPOs) and private sector IPOs (IPOs). BHARs are defined as the difference between the buy-and-hold return (BHR) of the issue and the BHR of the benchmark over the same period. The (value weighted) Warsaw Stock Exchange (WIG) Index (Panel A) is used as benchmark. BHRs are measured by Eqs. (5) and (6) respectively. It is tested whether the BHRs and the BHARs are significantly different from zero. For the means a skewness-adjusted test statistic with p-values using a bootstrapping procedure is employed (see Lyon, Barber and Tsai (1999)). For the medians a Wilcoxon-Signed-Rank-Test is used. Test statistics in parentheses.

Sample	Period	BHRs (%) Issues	BHRs (%) Benchmark	WR	BHAR (%)	No of Cases	BHAR positive	BHAR negative
All	1 week	1.724 (0.889)	1.470 (1.855)	1.003	0.254 (0.177)	83	40	43
	2 weeks	2.816 (1.166)	3.018 [a] (2.595)	0.998	-0.203 (-0.090)	83	34	49
	1 months	-0.053 (-0.006)	3.489 (2.066)	0.966	-3.542 (-1.390)	83	28	55
	2 months	1.610 (0.503)	4.767 [b] (2.120)	0.970	-3.157 (-1.278)	83	36	47
PIPOs	1 week	3.188 (1.252)	2.229 (1.754)	1.009	0.959 (0.580)	38	18	20
	2 weeks	4.801 (1.370)	4.202 [b] (2.009)	1.006	0.598 (0.261)	38	15	23
	1 months	0.613 (0.167)	3.793 (1.351)	0.969	-3.181 (-1.009)	38	14	24
	2 months	4.679 (1.021)	5.259 (1.384)	0.994	-0.580 (-0.186)	38	18	20
IPOs	1 week	0.487 (0.178)	0.830 (0.853)	0.997	-0.342 (-0.126)	45	22	23
	2 weeks	1.140 (0.356)	2.019 (1.625)	0.991	-0.879 (-0.286)	45	19	26
	1 months	-0.615 (-0.126)	3.232 (1.589)	0.963	-3.847 (-0.974)	45	14	31
	2 months	-0.982 (-0.218)	4.351 (1.655)	0.949	-5.333 (-1.392)	45	18	27

[a] Significant at the 1% level.

[b] Significant at the 5% level.

Table 8: Long-Run Aftermarket Performance

Buy-and-hold abnormal returns (BHARs) and wealth relatives (WR) during the first three years of aftermarket trading for all issues (All), privatization IPOs (PIPOs) and private sector IPOs (IPOs). BHARs are defined as the difference between the buy-and-hold return (BHR) of the issue and the BHR of the benchmark over the same period. Two benchmarks are used: the (value weighted) Warsaw Stock Exchange (WIG) Index (Panel A) and an equally weighted (EW) stock market index (Panel B). BHRs are measured by Eqs. (5) and (6) respectively. It is tested whether the BHRs and the BHARs are significantly different from zero. For the means a skewness-adjusted test statistic with p-values using a bootstrapping procedure is employed (see Lyon, Barber and Tsai (1999)). For the medians a Wilcoxon-Signed-Rank-Test is used. Test statistics in parentheses.

Panel A: Warsaw Stock Exchange (WIG) Index as benchmark.

Samples	Period	BHR (%)		WR	BHAR (%)		positive	negative
		Issues	Benchmark		Mean	Median	positive	negative
All	1 year	73.26 [a]	48.17 [a]	1.169	25.09	-20.21 [a]	29	54
		(4.352)	(6.017)		(1.765)	(-2.744)		
	2 years	234.32 [a]	179.13 [a]	1.198	55.19	-34.90 [a]	29	54
		(4.771)	(6.249)		(1.628)	(-2.744)		
	3 years	225.14 [a]	213.68 [a]	1.037	11.46	-61.09 [a]	28	55
		(6.090)	(8.109)		(0.396)	(-2.964)		
PIPOs	1 year	70.93 [a]	59.38 [a]	1.072	11.55	-24.97 [b]	12	26
		(3.069)	(3.940)		(0.659)	(-2.271)		
	2 years	442.46 [a]	326.99 [a]	1.275	115.47	-27.81	17	21
		(4.169)	(5.154)		(1.645)	(-0.692)		
	3 years	435.08 [a]	395.61 [a]	1.080	39.47	-41.70	15	23
		(5.944)	(7.097)		(0.661)	(-1.298)		
IPOs	1 year	75.22 [a]	38.70 [a]	1.263	36.53 [b]	-16.41	17	28
		(3.115)	(5.037)		(1.783)	(-1.640)		
	2 years	58.55 [a]	54.27 [a]	1.028	4.28	-43.48 [a]	12	33
		(2.855)	(8.320)		(0.265)	(-3.130)		
	3 years	47.86 [a]	60.05 [a]	0.924	-12.19	-70.81 [a]	13	32
		(2.351)	(10.947)		(-0.404)	(-2.489)		

[a] Significant at the 1% level.
[b] Significant at the 5% level.

Table 8 (continued): Long-Run Aftermarket Performance

Panel B: Equally weighted stock market index as benchmark.

Samples	Period	BHR (%) Issues	BHR (%) Benchmark	WR	BHAR (%) Mean	BHAR (%) Median	positive	negative
All	1 year	73.26 [a] (4.352)	55.68 [a] (5.043)	1.113	17.58 (1.089)	-14.93 [a] (-2.744)	29	54
	2 years	234.32 [a] (4.771)	212.74 [a] (5.329)	1.069	21.61 (0.703)	-28.91 [a] (-2.964)	28	55
	3 years	225.14 [a] (6.090)	233.90 [a] (6.898)	0.974	-9.10 (-0.285)	-40.68 [a] (-2.964)	28	55
PIPOs	1 year	70.93 [a] (3.069)	70.76 [a] (3.251)	1.001	0.17 (0.038)	-14.42 (-1.947)	13	25
	2 years	442.46 [a] (4.169)	408.29 [a] (4.689)	1.067	34.23 (0.562)	-37.16 (-1.298)	15	23
	3 years	435.08 [a] (5.944)	461.32 [a] (6.599)	0.953	-26.99 (-0.433)	-39.08 (-1.622)	14	24
IPOs	1 year	75.22 [a] (3.115)	42.95 [a] (4.511)	1.226	32.28 (1.700)	-14.93 (-1.938)	16	29
	2 years	58.55 [a] (2.855)	47.60 [a] (5.51)	1.074	10.95 (0.578)	-28.85 [a] (-2.832)	13	32
	3 years	47.86 [a] (2.351)	41.85 [a] (4.166)	1.042	6.01 (0.313)	-42.07 [b] (-2.534)	14	31

[a]   Significant at the 1% level.
[b]   Significant at the 5% level.

Panel C: Difference between PIPOs and IPOs.

Period	Warsaw Stock Exchange (WIG) Index BHR (%) Issues	WIG	BHAR (%) Mean	Median	Equally weighted (EW) stock market index BHR (%) Issues	EW	BHAR (%) Mean	Median
1 year	-4.29 (-0.091)	20.69 (0.816)	-24.98 (0.742)	-8.56 (-0.585)	-4.29 (-0.091)	27.82 (0.783)	-32.11 (-0.887)	0.51 (-0.026)
2 years	383.91 [b] (2.303)	272.72 [a] (3.057)	111.20 (1.090)	15.67 (0.923)	383.91 [b] (2.303)	360.70 [a] (2.999)	23.28 (0.268	-8.31 (-0.558)
3 years	387.22 [a] (3.734)	335.56 [a] (4.831)	51.66 (0.744)	29.11 (0.229)	387.22 [a] (3.734)	419.48 [a] (4.966)	-33.01 (-0.520)	2.99 (0.037)

[a]   Significant at the 1% level.
[b]   Significant at the 5% level.

45

Table 9: Test for Differences in the Long-Run Aftermarket Performance

Comparison of the 3-year BHAR for different groups of firms: (a) Issues of which a large or a small fraction of the share capital is sold at the initial offer (Panel A). Values above the median are defined as large and values below the median as small. (b) Issues with a high or a low de-mand multiple (Panel B). As a cut-off point between high and low values the medain is used. It is tested whether the differences in the 3-year BHARs of the specified groups are significantly different from zero. Test statistics in parentheses.

Panel A: 3-year BHARs (%) - Large versus small fraction of the share capital sold (F).

| | WIG Index | | | | Equally weighted stock market index | | | |
| | | | Difference | | | | Difference | |
	Large F	Small F	Mean	Median	Large F	Small F	Mean	Median
PIPO	86.90	-7.97	94.87	2.19	-8.18	-45.80	37.62	-24.62
			(0.722)	(0.161)			(0.318)	(-0.307)
IPO	12.04	-35.36	47.40	-0.57	34.10	-20.86	54.96	11.14
			(0.990)	(0.059)			(1.110)	(0.727)

[a] Significant at the 1% level.

[b] Significant at the 5% level.

Panel B: 3-year BHARs (%) – High versus low demand multiple (D).

| | WIG Index | | | | Equally weighted stock market index | | | |
| | | | Difference | | | | Difference | |
	Strong D	Weak D	Mean	Median	Strong D	Weak D	Mean	Median
PIPO	-75.41	132.46	-207.87 [b]	-142.76 [b]	-130.68	56.95	-187.63 [b]	-130.79 [b]
			(-2.190)	(-2.451)			(-1.996)	(-2.510)
IPO	-8.47	-14.24	5.77	1.81	11.40	3.04	8.36	2.77
			(0.121)	(0.062)			(0.167)	(0.024)

[a] Significant at the 1% level.

[b] Significant at the 5% level.