

***Going Public in Poland: Case-by-Case Privatizations,
Mass Privatization and Private Sector Initial Public
Offerings***

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Abstract

This study compares the characteristics and the price behavior of case-by-case privatization initial public offerings, private sector initial public offerings and the mass privatization program in Poland over the first eight years after the reopening of the Warsaw Stock Exchange in April 1991. There is evidence that the Polish government is market-oriented in the sense of Perotti (1995), trying to build up reputation for its privatization policy over time by underpricing and selling a higher fraction at the initial offer. In the long-run private sector initial public offerings tend to underperform whereas case-by-case privatization initial public offerings experience neither an under- nor an overperformance. What is surprising in this context is the significantly negative long-run after-market performance of the certificates and shares of the mass privatization program.

Keywords: Poland, Privatization, Initial public offerings, Underpricing, Long-run performance

JEL classification: G18; G32; G38

Summary

In the past decade a lot of state enterprises have been privatized in nearly every Central and Eastern European transition economy. Poland provides the unique opportunity to compare the short and long run price behavior of three groups of firms listed on the Warsaw Stock Exchange: (i) Case-by-case privatizations via a public share offer, (ii) private sector initial public offerings and (iii) certificates and shares of the mass privatization program. The results for the short run price behavior reveal that all three groups are significantly underpriced (investigation period: April 1991 - December 1998). The underpricing of case-by-case privatizations and private sector IPOs can best be explained by investor's demand: A higher demand for an issue leads to a higher underpricing. In accordance with the political uncertainty hypothesis (Perotti, 1995) the underpricing of case-by-case privatizations is higher if a higher fraction of the capital is sold at the initial offer.

The long-run performance of Polish case-by-case privatizations is neither (significantly) positive nor negative over the first three years of aftermarket trading. This non negative long-run performance is consistent with a market-oriented government trying to build up reputation for the privatization program in the course of time. On the other hand, the long-run performance of private sector IPOs tends to be negative. This is in line with the evidence for many developed markets. The three year aftermarket performance of the certificates and shares of the mass privatization program is even worse than the negative performance of private sector IPOs. This is surprising as Polish government officials tried to design the mass privatization program in a way to create an efficient corporate governance structure. One reason might be that there are too few incentives for the management of the privatized firms to restructure efficiently.

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, South America or Central and Eastern Europe. As Perotti and van Oijen (1999) show, by reducing political risks privatization programs in emerging economies are able to provide an essential part for the development of the local capital market and the development of the economy of the corresponding country.

Two types of privatization methods can be distinguished: (i) Case-by-case privatization, in which state enterprises are sold case by case (one after the other) and (ii) mass privatization programs (MPPs), in which a multitude of firms are sold at the same time. In most cases the aim of MPPs is to transfer a big number of state enterprises into the ownership of the citizens. They are characterized by the fact that every citizen is entitled to receive a particular number of certificates (vouchers) free of charge or at a very low price.

This study examines the going public process in Poland. After a break of more than 50 years due to communism the share trading on the Warsaw Stock Exchange (WSE) started on April 16th, 1991 with five privatizations (Tonsil, Prochnik, Krosno, Kable and Exbud). April 16th, 1991 is also the start of the investigation period of this study. 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 as a first step. Only four years later a mass privatization program (MPP) was started.

The aim of this paper is to investigate the price behavior of three groups of firms listed in the WSE and to analyze differences between these groups. The three groups are: (i) Case-by-case privatization initial public offerings (IPOs), (ii) private sector IPOs and (iii) certificates and shares of the MPP. For every firm and the MPP the analysis of the price behavior starts with the subscription period and the issue price and ends three years after the first trading day on the WSE. In a first step the initial return and the un-

derpricing are documented and possible reasons for differences in the underpricing levels are examined. The analysis of the latter uses classical explanation models, which should be of importance for the private sector IPOs as well as models especially designed for privatizations (see Perotti (1995) and Biais and Perotti (1997)). In a second step the long-run performance for the first three years of aftermarket trading is examined.

In contrast to conventional (private sector) initial public offerings (IPOs)¹ empirical studies investigating the characteristics and the price behavior of public offer share privatizations have emerged only recently. One of the first studies in this context was carried out by Perotti and Guney (1993). They documented that privatization programs have strong regularities across countries. Governments mostly sell only a part of a state enterprise at the initial offer and retain a significant stake for a long interval of time.

Menyah and Paudyal (1996) investigate the initial return and the long-run performance of privatization and private sector IPOs in the UK. Privatization IPOs offer a significant (market adjusted) underpricing of +38.70%, compared to 3.48% for private sector issues. The long-run performance is also better for privatization IPOs with a significant buy-and-hold abnormal return (BHAR) of +60.97%, in contrast to only +3.01% (not significant) for private sector IPOs. A comparison of privatization and private sector IPOs in Malaysia is provided by Paudyal et al. (1998). Privatization IPOs are significantly more underpriced than private sector IPOs. The market-adjusted long-run performance over the first three years shows no significantly positive or negative performance for both privatization and private sector IPOs. Dewenter and Malatesta (1997) examine the initial returns for privatization and private sector IPOs in eight countries. On average there are no significant differences in the underpricing of these two groups. While UK privatizations experience a significantly higher underpricing than their private counterparts, in Canada and Malaysia the underpricing of privatizations is significantly smaller.

¹ See e.g. Loughran, Ritter and Rydqvist (1994) for an international comparison.

Jones et al. (1999) examine a 59-country sample of 630 privatization IPOs (share issue privatizations) during the period 1977-1997. Their results show that privatization IPOs are significantly underpriced (mean: 34.1%, median: 12.4%). A comparison to private sector IPOs (see e.g. Loughran, Ritter and Rydqvist (1994)) shows that their documented underpricing is approximately similar to conventional (private sector) IPOs. Jones et al. document that the underpricing in privatization IPOs is influenced by several factors. The underpricing increases if a high fraction of the share capital is sold at the initial offer. Therefore, if a government wants to sell a larger stake, the issue price is fixed at a lower level, which results in a higher underpricing. In addition they document that the underpricing level increases with a country's income inequality and with the size of the firms.

The long-run aftermarket performance for a 36-country sample of 264 privatization IPOs (period: 1981-1997) is examined by Megginson et al. (1998). Regardless of which benchmarks are used, the performance for all holding periods (one, three and five years) is significantly positive. In addition, privatization IPOs making a seasoned equity offering (SEO) do not underperform (and not overperform) in the long-run. This is in contrast to e.g. the evidence for the US (see Loughran and Ritter (1995)), where companies after a SEO significantly underperform in the long-run.

Several reasons are provided in the literature why the long-run performance of privatization IPOs might be better compared to private sector IPOs: (i) The informational asymmetry about the value of the firm is lower than for private sector IPOs. Privatization IPOs are often big companies and well-known by the population. (ii) A government wanting to carry out a privatization program over a longer period will do its best to ensure that their privatization IPOs are going to be an economic as well as political success. In this context it is especially important that people get a positive view of the government's privatization program in order to attract domestic retail investors again for future privatizations. (iii) Private sector IPOs are often sold after an especially good operating performance, which results in a negative long-run performance.² For privati-

² See e.g. Jain and Kini (1994).

zations there exists multiple evidence that the financial and operating performance significantly improves after privatization (see Megginson et al. (1994), Boubakri and Cosset (1998) or D'Souza and Megginson (1999)).

Several models have been designed to explain the price behavior of private sector IPOs. The most notable among them are the winner's curse model (Rock (1986)), signaling models (see Allen and Faulhaber (1989), Grinblatt and Hwang (1989) and Welch (1989)), the ex-ante uncertainty hypothesis (see Beatty and Ritter (1986)) or the reputation hypothesis (see e.g. Carter and Manaster (1990)).

The price behavior of privatizations have especially been modeled by Perotti (1995) and by Biais and Perotti (1997). Perotti (1995) distinguishes in his model between two types of governments: market-oriented and populist governments. A market-oriented government is characterized by the fact that it wants to privatize state owned enterprises seriously and irreversibly. This does not apply to populist governments. Whether a government is market-oriented or populist can only be realized by the market if there are concrete signals. Only announcing to be a market-oriented government is not enough.

What signals can a government send out to be recognized as market-oriented? Perotti (1995) shows that if the uncertainty about the future privatization policy is high (this applies especially to emerging markets) a larger fraction has to be sold at the initial offer. Otherwise the market would get the impression that the government possibly does not want to give up control rights over the state enterprise. Depending on the level of political uncertainty the offer also has to be underpriced.

A market-oriented government is willing to accept lower gross proceeds due to the underpricing. The economic advantage of the privatization is more important for it than the disadvantage of lower gross proceeds. In 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). A market-oriented government with difficulties in signaling its identity can, in addition to selling a larger frac-

tion at a lower price, equip the privatization IPO with a fixed issue price and distribute a larger portion of the offer to domestic retail investors and employees (see Biais and Perotti (1997)).

In addition Biais and Perotti (1997) document that a privatization program can be successful if median class voters receive a sufficient amount of shares. As 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. In order to attract median class voters to buy enough shares so that their political preferences are similar to those of the government, underpricing is necessary in most cases. The more income inequalities there are in the population, the poorer are the median class voters and the higher the underpricing has to be to persuade them to buy shares.

This study contributes to the existing literature in several ways:

- (1) An Eastern European emerging market is examined completely from the reopening of the stock market. Other studies, like Jones et al. (1999), Megginson et al. (1998), Dewenter et al. (1997) or Huang and Levich (1998) investigate several markets from all over the world as well as for developed and emerging markets jointly. Their results are of high importance but they are often averages over all the countries under investigation. It is also of interest to examine testable hypotheses for a single (Eastern European) emerging market. The investigation of a single market can provide additional insights as the database is more homogeneous. This is valid especially regarding listing requirements, the legal framework as well as the political and economic environment.
- (2) A share privatization program is examined right from the beginning. This allows e.g. testing to what extent a build-up of reputation concerning the privatization program takes place over time and whether the hypotheses of Perotti (1995) and Biais and Perotti (1997) apply to Poland.
- (3) In addition to privatization IPOs also private sector IPOs are examined and both groups are compared to each other. This allows investigating the differences be-

tween privatization and private sector IPOs. 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 and Paudyal et al. (1998), who compare these groups for Malaysia. The studies of Huang and Levich (1998) and Dewenter and Malatesta (1997) also compare privatization and private sector IPOs but they only analyze the underpricing. This study is therefore the first one to compare the long-run performance of privatization and private sector IPOs for an Eastern European emerging market.

- (4) Finally, the initial and aftermarket price behavior of the case-by-case privatization program and the private sector IPOs is compared to those of the mass privatization program (MPP). Such a comparison has not yet been made in the literature.

The following section describes the database used and provides descriptive statistics for the IPO groups. In the third section the empirical evidence regarding the initial returns is presented and possible reasons for the underpricing are examined. Section four deals with the aftermarket performance and section five gives a summary of the findings.

2. Data

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 reopened on April 16th 1991 with the listing of five firms. From April 1991 till the end of 1998 altogether 187 firms went public with a listing on the WSE. 101 firms started trading on the main market of the WSE, 68 on the parallel market and 18 in the free market. In total only four firms were delisted (three mergers and one going private). At the end of 1998 therefore 183 firms were listed on the WSE: 117 in the main market, 51 in the parallel market and 15 in the free market. The differences to the number of going public can be explained by changes from one market segment to another. The parallel market started on 22.4.1993 and the free market on 20.2.1997.

This study uses the two biggest market segments: the main and parallel market. They comprise the biggest and most liquid firms trading on the WSE. The investigation period starts with the reopening of the WSE on April 16th 1991 and ends on December 31st 1998. Of the 169 firms going public in the main and parallel markets only those are used which (i) made a public offer before trading on the WSE and (ii) for which all necessary information (i.e. especially issue price, issue volume, demand multiple, contract type (fixed price or tender), rationing information, dividend payment, seasoned equity offering information) were available. Therefore the final sample comprised 149 firms (93 from the main market and 56 from the parallel market).

To build up the database the following sources were used:

(i) Historical Database of the Warsaw Stock Exchange (WSE): daily stock prices, dividend payments, number of outstanding shares, price-earnings ratios, first trading day on the WSE;

(ii) WSE Fact Book, several editions: issue prices, first trading day, ownership origin of listed companies, dividend payments, stock splits, mergers, delistings.

(iii) REUTERS Business Briefing Archives:³ 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 in (i), (ii) and (iii) was checked and completed using information available of the Polish stock market in Reuters 3000 Equities History as well as in Datastream.

For investigation purposes the database of 149 firms was divided into two parts: (i) privatization IPOs and (ii) private sector IPOs. In the sample of *Privatization IPOs* all those firms are included which are classified as Public Offering by State Treasury in the

³ Comprehensive business database, with access to national and international news wires, news papers, trade journals, research reports and news pictures.

Fact Book 1999 of the WSE. These are firms controlled by the Polish state and for most of them 100% of the shares are held by the state.

In contrast to the privatization programs in Russia, the Czech Republic and Slovakia, an MPP was carried out in Poland only in a second phase of the privatization program. At the end of 1994, within the framework of the program, 15 National Investment Funds (NIFs) were established in the form of joint-stock companies. 512 small- and medium-sized state enterprises took part in the MPP. In March 1995, each fund took a majority holding (33%) in 33 to 34 enterprises and a minority holding in all other companies participating in the MPP. In this way, the 15 NIFs held a total of 60% of the shares of each company. Up to 15% of the shares of each participating company were made available free of charge to its employees, and 25% were retained by the State Treasury.⁴

In the MPP each adult Pole was entitled to receive one National Investment Funds (NIF) certificate for a fee of 20 PLN, which could later be converted into shares of the 15 NIFs (one share of each of the 15 funds for one certificate). The certificates were distributed between November 22nd, 1995 and November 22nd, 1996. The WSE began listing the certificate on July 15th 1996. The conversion process of one certificate into 15 NIF shares began on May 12th, 1997 and lasted until the end of 1998. Trading in the 15 NIF shares began on June 12th, 1997.⁵

In total about 25.55 NIF certificates were converted into NIF shares. More than 91% of the 28 million citizens who were eligible for the MPP took part. Since the certificate was officially traded on the WSE Polish citizens had the opportunity to decide whether to sell the certificate on the aftermarket or to convert them into NIF shares.

To compare the price behavior of an investment in the MPP with those of the case-by-case privatization IPOs, a separate MPP sample is used. It starts on July 15th 1996 with the listing start of the certificate on the WSE. Until June 11th, 1997 the market prices of the certificate and from June 12th, 1997 until July 14th, 1999 the market prices of the 15

⁴ See WSE Fact Book (1999) and Dietrich et al. (1996).

⁵ See WSE Fact Book (1999).

NIF shares are used. The price history of the MPP sample therefore comprises three years, which enables a comparison with the three-year long-run aftermarket performance of the two IPO samples.

Table 1 presents descriptive statistics of all samples. The sample *All Issues (All)* consists of 149 firms, the sample *Privatization IPOs (PIPOs)* of 51 firms and the sample *Private Sector IPOs (IPOs)* of 98 firms. First, about 85.5% of the total gross proceeds of 15,874.73 million PLN comes from the 51 PIPOs (13,498.27 Million PLN). The mean gross proceeds for the PIPO firms (264.67 million PLN) are more than 11 times higher than for the private sector IPOs (23.33 million PLN; median values: 42 million PLN versus 14.03 million PLN). The mean as well as the median values are significantly different from each other (see Table 2). This has two reasons: (i) First, PIPO firms are larger than private sector IPOs. (ii) Second, the fraction sold at the initial offer is more than twice as high for the PIPO firms (63.9%) as the corresponding value for the private sector IPOs (average value 32.22%). Table 2 shows that the two samples significantly differ in this respect from each other. This applies to the mean as well as the median.

Privatization IPOs and private sector IPOs not only differ with respect to the gross proceeds but also significantly depending on whether secondary or primary shares are sold at the initial offer. 93.4% of the gross proceeds for all PIPO firms consist of secondary shares and for two thirds of all privatization IPOs only secondary shares are sold.

The high fraction of the capital sold at the initial offer and the huge portion of secondary shares can be viewed as a first indication that the Polish government is market-oriented in the sense of Perotti (1995). A big portion of secondary shares is an indication that the government is trying to privatize fast. Issuing only primary shares, a large reduction of the fraction held by the state can only be reached through a huge capital increase. This has the disadvantage that (i) the state treasury would receive no money and (ii) the firm suddenly gets an extreme amount of money, which it could perhaps not use properly. By privatizing through selling secondary shares the managers and the new owners can decide on their own when and to what extent they will raise new capital.

In contrast to privatization IPOs only primary shares are sold at the initial offer in 84.7% of all private sector IPOs. Their going public process obviously serves to increase the capital base.

Biais and Perotti (1997) show that, if there is great uncertainty about the future privatization policy, a market-oriented government having difficulties in signaling its identity can privatize successfully by additionally using fixed-price offers (firm commitment offerings). As Benveniste and Busaba (1997) note, this can generate a higher demand for an issue. The empirical evidence shows first that only 59% of all privatization IPOs in the sample are equipped with a fixed issue price and, second, that the average demand measured by the demand multiple for the privatization IPOs is only a little higher than for the private sector IPOs (2.75 versus 2.07). The mean and median demand multiple values of the two samples are not significantly different from each other (see Table 2).⁶

Table 1 and 2 also show that the time period from the start of the subscription period till the first trading day is significantly lower for privatization IPOs than for private sector IPOs (61 days vs. 101 days). Assuming that the risk of an issue increases with this time period and that investors demand a premium to take this risk, it is sensible for a government to decrease this period to be able to get a higher issue price.

Biais and Perotti (1997) predict that governments allocate shares in a political inspired manner. To achieve political goals governments divide issues in several tranches and prefer e.g. employees and domestic retail investors when assigning a certain number of shares to each tranche. In Poland trade unions have historically been very powerful. It can therefore be expected that the government will particularly try to participate the employees of the state enterprises on offer. On average (median) 19.4% (18.7%) of the shares sold during the initial offer are sold to employees. This value is more than twice as high as the international evidence in Jones et al. (1999). For a 59-country sample they report an average (median) portion sold to employees of 8.5% (7.0%). This underlines

⁶ In a tender offer the issue price is not fixed before the start of the subscription period. Only a minimum issue price and sometimes also a maximum issue price are fix in advance.

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.

3. Initial Return

3.1 Buy-and-Hold Return and Buy-and-Hold-Abnormal Return

The starting point to investigate the initial returns is the calculation of buy-and-hold returns (BHRs) as well as buy-and-hold-abnormal returns (BHARs). The BHR for IPO i corresponds to the initial raw return and is defined as

$$\text{BHR}_i = \frac{P_{i,1} - P_{i,0}}{P_{i,0}}, \quad (1)$$

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

$$\text{BHAR}_i = \text{BHR}_i - \text{BHR}_{\text{WIG},i} = \text{UP}_i \quad (2)$$

where BHAR_i is the buy-and-hold abnormal return of IPO i , $\text{BHR}_{\text{WIG},i}$ is the buy-and-hold return of the Warsaw Stock Exchange Index (WIG) and UP_i is the underpricing of IPO $_i$.⁷ Analogous to (1) the BHR for the WIG-Index is defined as

⁷ The WIG is a value weighted share price index comprising all firms listed on the main market.

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

$\text{WIG}_{i,0}$ represents the WIG-Index on the first day of the subscription period of IPO i and $\text{WIG}_{i,1}$ is the WIG-Index at the end of the first trading day of IPO i . In addition wealth relatives (WR) are calculated. In accordance with Ritter (1991) the WR of IPO i (WR_i) is defined as

$$\text{WR}_i = \frac{1 + \text{BHR}_i}{1 + \text{BHR}_{\text{WIG},i}}. \quad (4)$$

Table 3 shows BHRs (initial raw returns), BHARs (underpricing) and wealth relatives for all samples. The average underpricing of Polish IPOs (sample *All Issues*) is +35.57% and is significantly different from zero. The same applies to the median (+15.14%). About a quarter of all Polish IPOs are overpriced ($\text{BHAR} < 0$). The null hypothesis of no (average) underpricing has to be rejected. With the trading strategy of investing a similar amount of money in each of the 149 Polish IPOs in the sample *All Issues* at the issue price and selling each IPO on its first trading day an investor would have earned an initial raw return of +41.29% (not allocation adjusted).

The BHRs and the underpricing of the *Privatization* and the *Private Sector IPO* sample are significantly different from zero. The empirical evidence in other studies concerning the underpricing of privatization and private sector IPOs is not unambiguous. There is evidence for a higher underpricing of privatization IPOs (see e.g. Menyah and Paudyal (1996) for the UK or Paudyal (1998) for Malaysia) as well as evidence for no significant difference between the two groups (see e.g. Dewenter and Malatesta (1997) for 8 countries or Jones et al. (1999) for 59 countries).

From the model of Perotti (1995) it could be concluded that for a market-oriented government the underpricing of privatization IPOs should be higher than for private sector IPOs. The reason for this is that in order to build up reputation and to signal its identity a market-oriented government sells state enterprises for issue prices which are below the

prices owners other than the state would demand and receive. If the price on the first trading day corresponds to the firm value, the initial return for privatization IPOs should therefore be higher. This hypothesis is also in line with the observation that the PE-ratio of privatization IPOs is significantly lower than for private sector IPOs.

A comparison of privatization IPOs and private sector IPOs shows that on average privatization IPOs have an underpricing which is about 40 percentage points above those of private sector IPOs. But this huge difference in the mean is not significantly different from zero at conventional significance levels (see Table 4, Panel A). Only the difference in the underpricing-median is significant at the 10%-level. The main reason for the large mean underpricing of privatization IPOs is one issue: Bank Slaski. After an issue price of 50 (new) PLN the market price on the first trading day rose to 675 (new) PLN. The resulting BHR of +1,250% caused a lot of criticism for the privatization policy and also political consequences. Without Bank Slaski the underpricing of the privatization IPOs drops to +39.96% (Median: +18.01%, Wealth Relative: 1.384), but is also significantly different from zero at the 1%-level.

The average underpricing of Polish privatization IPOs is a little higher than the +34.1% (Median: +12.4%) reported in Jones et al. (1999) for the 59 country sample of 303 share issue privatizations. A comparison with the initial return of the MPP shows a hardly surprising result: The issue price in the MPP was fixed as a fee at a very low level of 20 PLN to guarantee that a lot of Polish citizens take part in the program. The closing price of the certificate on the first trading day was 104 PLN. Each Polish citizen taking part in the MPP achieved an immediate profit of 84 PLN or +420%.

The model of Perotti (1995) predicts that in an environment of high uncertainty about the future privatization policy, issues of which the government sells a higher fraction at the initial offer should experience a higher underpricing. The empirical evidence in Table 4, Panel B, shows that this applies for the mean initial return of Polish privatization IPOs. The differences in the mean BHR, BHAR and WR are all significantly different from zero at the 10%-level. The median differences are all positive but not significant. The distribution of the differences is therefore strongly skewed to the right. No signifi-

cant differences can be observed in the mean and median values for the private sector IPOs.

The uncertainty about the future privatization policy is expected to be highest at the start of a privatization process. This implies that the fraction sold at the initial offer and the underpricing should be highest at the start of the privatization program. A market-oriented government should build up reputation regarding its privatization policy in the course of time. If this applies to Poland the fraction sold at the initial offer and the underpricing should decrease over time. 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 1998 (subperiod four).

Table 5 reports the empirical results. First, for PIPOs the fraction sold from the capital at the initial offer decreases in the course of time (see Table 5, Panel B). The average (median) fraction sold is in the first subperiod 86.1% (90.0%), 63.6% (68.3%) in the second subperiod, 54.6% (60.1%) in the third subperiod and 49.3% (47.4%) 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 Table 5, Panel A). 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 13.8% (14.8%) in the last subperiod. The low underpricing and the high fraction sold in the first subperiod would suggest a populist government. A populist government tries to maximize gross proceeds and therefore sells higher fractions at the initial offer at not too small issue prices, resulting in a lower underpricing. But another interpretation is that the first subperiod has been used as a test phase by the Polish government. This view is supported by the fact that the price-earnings (PE) ratios (and therefore the issue prices) are very low in the first subperiod. In addition, state-owned enterprises sold in the first subperiod are very small compared to PIPOs in the remaining periods. The average (median) gross proceeds of PIPOs in the second to fourth subperiod are about 19 (3) times larger than in the first subperiod.

A further analysis of the PE-ratios additionally supports the view that the Polish government is market-oriented. In all subperiods but the last the average and median PE-ratios of PIPOs are below those of private sector IPOs (see Table 5, Panel C). A populist government would not sell state enterprises over such a long time at prices which are consistently below those of private sector IPOs. In accordance with the model of Perotti (1995) this results indicate that the Polish government deliberately sold state enterprises at low prices to build up reputation and to signal its identity as market-oriented. This evidence is in addition confirmed by the fact that for private sector IPOs the underpricing levels, the fractions sold at the initial offer and the PE-ratios do not behave similar compared to PIPOs. In the course of time the fraction sold is nearly constant at around 30%, the underpricing level decreases, but on a much lower level than for PIPOs and the mean as well as median PE-ratios do not vary much. In the last period (1997 till 1998) the underpricing level and the PE-ratios of PIPOs and private sector IPOs are nearly similar. Only the mean and median fraction sold at the initial offer are higher for PIPOs (49.3% and 47.4%, respectively) compared to private sector IPOs (30.3% and 30.0%, respectively). This is an indication that the process of building up reputation has nearly reached an end in Poland.

3.2 Explanations for the level of underpricing

To examine the level of underpricing for Polish IPOs, the most common explanation models are tested. The samples *All Issues*, *Privatization IPOs* and *Private Sector IPOs* are investigated separately. This allows getting additional insight into the differences between privatization IPOs and private sector IPOs.

(a) Winner's Curse

In Rock's model (1986) underpricing is a necessary equilibrium condition in a world of informational asymmetry between groups of informed and uninformed investors. An informed investor can distinguish between underpriced and overpriced new issues and

will therefore submit purchase orders only if the offer price is less than the true value of the stock. If, on the other hand, the issue is overpriced, only uninformed investors submit purchase orders and they subsequently receive a full allocation.

For underpriced issues, both uninformed and informed investors submit purchase orders and the allocation is subsequently rationed between the two groups. This creates a situation where the average first-day return conditional upon receiving shares is lower than the average first-day return conditional upon submitting a purchase order. Therefore, uninformed investors face a "winner's curse": The chance of being allocated shares in overpriced new issues is greater than in underpriced issues. To keep uninformed investors participating in the IPO market, issues are underpriced to ensure them a non-negative, market-adjusted rate of return. To test whether Rock's (1986) winner's curse hypothesis holds for the sample under investigation, it is necessary to calculate allocation-adjusted abnormal returns. This requires information on the amount of rationing.

In contrast to most other countries, the allocation rates are published in Poland. For firm commitment offerings the rationing is done using a uniform allocation rate. Uniform means that for oversubscribed issues all orders are rationed proportionally. If for particular groups of investors (e.g. retail investors, institutional investors, employees, foreign investors) a particular amount of shares is reserved in advance, each group of investors has their own allocation rate. Therefore for firm commitment offerings an exact allocation-adjusted initial return can be calculated. For tender offers there are two possibilities: (i) a uniform allocation rate for all orders or (ii) an allocation depending on the submitted price. To calculate allocation-adjusted initial returns for tender offers in (ii) an average allocation rate is used as an approximation.

The results in Table 6 show that the allocation-adjusted BHARs (allocation-adjusted underpricing) is much lower than the non-adjusted values (see Table 3). This can be explained by the fact that first a low issue price and therefore a higher underpricing generates a higher demand for an issue and that second a higher demand leads to a lower allocation rate. The correlation between the demand multiple and the underpricing

is +0.39 and between the demand multiple and the allocation rate is -0.80. Both values are significantly different from zero at the 1%-level.

The allocation-adjusted BHARs are also significantly different from zero for all samples. Therefore the underpricing of Polish IPOs can only partly be explained by the winner's curse. In the multiple regression analysis below the demand multiple is used as an explanatory variable. The results presented above suggest that a positive relationship between the underpricing level and the demand multiple can be expected.

(b) Ex-ante uncertainty about the firm value

Another testable implication of Rock's model (1986) is that the level of underpricing required to attract uninformed investors into the market increases with the ex-ante uncertainty about the true value of the firm. The greater the ex-ante uncertainty, the greater is the advantage of becoming an informed investor. Beatty and Ritter (1986) suggest that there should be a positive relationship between the underpricing and the non-observable ex-ante uncertainty. In order to test their proposition it is necessary to use a proxy for the ex-ante uncertainty. The standard deviation of daily returns during the first two trading months of aftermarket trading (exclusive of the initial return) is used as a proxy in the multiple regression analysis. According to Beatty and Ritter's model (1986) a positive relationship can be expected between the underpricing and the ex-ante uncertainty.

For another test whether asymmetric information between managers/owners and investors affects the underpricing level the firm size can be used. The larger the firm on offer, the more the firm should be known to potential investors and the lower the underpricing should be. Therefore the market value of the issues (on the first trading day) is used as a proxy for firm size as an explanatory variable in the multiple regression analysis below. If asymmetric information about the firm value leads to a higher underpricing, the relationship between underpricing and size should be negative.

(c) Signaling Hypothesis

Studies by Allen and Faulhaber (1989), Grinblatt and Hwang (1989) and Welch (1989) suggest that underpricing may itself be a costly signal of the intrinsic value of the issuing firm. In the Welch (1989) signaling approach 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. Underpricing is therefore supposed to be a sort of "appetizer" for following issues in the aftermarket.

High-quality firms (= high underpricing) should therefore only offer a smaller part of their share capital at the initial issue and make subsequent issues in the aftermarket. If this explanation model applies, the level of underpricing should be proportional to the frequency of seasoned issues and inversely proportional to the percentage fraction sold from the share capital. To test this proposition the fraction sold at the initial offer and a dummy variable for the seasoned equity offerings (SEOs) is used in the multiple regression analysis.

(d) Political uncertainty

The model of Perotti (1995) predicts that if the government is market-oriented the relationship between to underprice level and the fraction sold at the initial offer should be positive. This is in contrast to the prediction of a negative relationship by the traditional IPO signaling models.

According to Biais and Perotti (1997) a market-oriented government can generate support for its privatization program by allocating more shares to median class investors. It can achieve this aim on a large scale by selling a larger portion at the initial offer. Therefore the underpricing should be higher for those issues of which a relatively large portion is sold at the initial offer and of which a relatively large portion is allocated to domestic retail investors. This higher underpricing is necessary to generate demand from this particular group of investors.

3.3 Multiple Regression Model

To test the above models and hypotheses the following regression models are tested:

$$\text{Model I: } UP_i = \alpha_0 + \alpha_1 \cdot DM_i + \alpha_2 \cdot Size_i + \alpha_3 \cdot Risk_i + \alpha_4 \cdot SEO_i + \alpha_5 \cdot LF_i + \varepsilon_i$$

$$\text{Model II: } UP_i = \alpha_0 + \alpha_1 \cdot DM_i + \alpha_2 \cdot Size_i + \alpha_3 \cdot Risk_i + \alpha_4 \cdot SEO_i + \alpha_5 \cdot LFS_i + \varepsilon_i$$

UP_i is the underpricing, DM_i the demand multiple, $Size_i$ the logarithmic market value and $Risk_i$ the standard deviation of daily returns over the first two months in the after-market (proxy for the ex-ante uncertainty), for IPO i . SEO_i , LF_i and LFS_i are dummy variables. SEO_i is coded one if a seasoned offering is made within 3 years of the IPO and zero otherwise; LF_i is coded one if a large fraction of IPO i is sold (i.e. a fraction above the median fraction) and zero otherwise; LFS_i is coded one if a large fraction of IPO i is sold and if the portion of the capital owned by domestic retail investors after the issue is at least 25% (and zero otherwise). Thus, in model II an additional investigation is made to find out whether it is important for the underpricing level to whom a government sells shares if it sells a large fraction.

3.4 Regression Results

Table 7 shows the following regression results for models I and II: First, the demand multiple (DM) is significantly positively related to the underpricing level. This applies to the sample *All Issues* as well as the two subsamples *Privatization IPOs* and *Private Sector IPOs*. This result is evidence that part of the underpricing can be explained by the winner's curse model. The better an issue is rated based on the relationship between issue price and market value, the higher is the underpricing and the more orders are placed by informed investors, which results in a higher demand. Second, the ex-ante uncertainty (at least the used proxy) has no explanatory power. This applies to privatization IPOs as well as private sector IPOs.

Third, the underpricing level of privatization IPOs is significantly positively related to the firm size. The larger the firm the higher the underpricing. According to the explanation hypothesis of an asymmetric information distribution between managers/owners and investors about the firm value, smaller firms should have a high underpricing because they are less known. But exactly the opposite is true of privatization IPOs. This supports the hypothesis that the Polish government sells big and well-known state enterprises at a lower issue prices to build up reputation. This enables the government to generate support for its privatization policy. This interpretation is also supported by the fact that the variable size is not in a significantly positive relationship with the underpricing level for private sector IPOs.

Fourth, underpricing is for privatization IPOs no signal for a „good“ firm in the context of the traditional signaling hypotheses. No significantly positive relationship between the underpricing level and the SEO activity is observable. This is in contrast to the evidence for private sector IPOs. For them, the relationship between underpricing and SEO activity is significant (at the 10%-level). Private sector IPOs increasing their share capital by making an SEO experience a higher underpricing.

Fifth, the hypothesis that for privatization IPOs the underpricing increases with the fraction sold at the initial offer can be supported (significant at the 10%-level). The underpricing is the higher, the higher the fraction sold. These observations are in line with the model of Perotti (1995). In contrast to privatization IPOs there is no significant relationship between fraction sold and underpricing observable for private sector IPOs.

Sixth, model II shows that the underpricing for privatization IPOs is especially large if a large fraction is sold and if in addition domestic retail investor receive a large portion at the initial offer. If the governments wants to increase the number of shareholders and therefore also the acceptance of the privatization policy among the citizens, it uses a low issue price, which lead to a higher underpricing. This empirical evidence is in accordance with the model of Biais and Perotti (1997).

4. Aftermarket Performance

The aim of this section is to examine the aftermarket performance of Polish IPOs and the MPP. Besides the short-run aftermarket performance, which permits conclusions about the price adjustment process, the long-run performance within three years of the first trading day is analyzed. The latter is of multiple interest: First, the long-run performance of privatization IPOs is important for a market-oriented government that is trying to build up reputation and support for its privatization policy. It should be interested in making sure that the long-run performance of privatization IPOs is not negative. Second, the same applies to the long run price behavior of the MPP the Polish government carried out in the mid nineties.

Third, for private sector IPOs often a negative long-run performance is documented (see e.g. Loughran, Ritter and Rydqvist (1994)). What has not been documented in the literature yet is whether private sector IPOs in a transition economy in which the government has been carrying out a privatization program for several years behave in the same manner as private sector IPOs in developed markets or whether significant differences are observable. Fourth, in a transition economy the restructuring of firms plays an important role. The question arises as to whether one aspect of the restructuring efforts, the raising of new capital, has a measurable influence on the long-run performance and, if so, in which direction.

4.1 Methodology

To measure the performance of IPOs in the aftermarket buy-and-hold returns are calculated in a first step for each IPO i . 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 IPO i ($BHR_{i,T}$) is defined as

$$\text{BHR}_{i,T} = \left[\prod_{t=1}^T 1 + R_{i,t} \right] - 1 \quad (5)$$

where $R_{i,t}$ is the return of IPO i in period t and $t=1$ indicates the first trading day in the aftermarket.

BHRs are calculated for the following time periods: $T = 1$ week, 2 weeks, 1 month, 2 months, 1 year, 2 years and 3 years. With this the short- and long-run price behavior of Polish IPOs on the aftermarket can be investigated. During the investigation period four delistings occurred: three mergers and one going private. The performance measurement for the first three years of aftermarket trading has to take into account only one merger (Bank Gdansk). The three other delistings are outside the first three years. For Bank Gdansk the returns of the absorbing firm (BIG) are used from the delisting till the third anniversary.

The aftermarket performance is measured against the WIG-Index as a benchmark. The use of market indices as benchmarks is common in the literature (see e.g. Keloharju (1993) for the Finnish IPO market, Kunz and Aggarwal (1994) for the Swiss IPOs market or Paudyal (1998) for the IPO market in Malaysia). A second possibility is to use a matching firm adjustment procedure (cf. e.g. Ritter (1991) or Loughran and Ritter (1995)). This requires a sufficient number of potential matching firms (Non IPOs). But this is not the case for Poland.

In a similar way to (5) the BHR of the WIG-Index for IPO i ($\text{BHR}_{i, \text{WIG}, T}$) is calculated as

$$\text{BHR}_{i, \text{WIG}, T} = \left[\prod_{t=1}^T 1 + R_{i, \text{WIG}, t} \right] - 1 . \quad (6)$$

$R_{i, \text{WIG}, t}$ is the return of the WIG-Index in period t , where $t=1$ indicates the first trading day in the aftermarket. Therefore, buy-and-hold returns over identical intervals are calculated for each IPO and its corresponding reference portfolio. To measure the market-

adjusted performance buy-and-hold abnormal returns (BHARs) and wealth relatives (WRs) are used.

Another important point in measuring the long-horizon abnormal performance of security prices is the usage of appropriate test statistics. As the simulation results of Kothari and Warner (1997), Barbar and Lyon (1997) and Lyon, Barbar 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 mention especially 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 also 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, Barbar and Tsai (1999)) and a non parametric Wilcoxon-Signed-Rank-Test are used to test the null hypothesis of no abnormal long-run performance.⁸

4.2 Results

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 January 1st, 1996. This leads to a reduction of the sample *All Issues* to 57 firms, the sample *Privatization IPOs* to 33 firms and the sample *Private Sector IPOs* to 24 firms.

⁸ As a result of their simulation analyses concerning the long-horizon security price performance, Kothari and Warner (1997) recommend using nonparametric and bootstrap tests to reduce misspecification.

To examine the aftermarket performance of the MPP for the first three years market prices of the National Investment Funds certificate are used from 15.7.1996 till 11.6.1997 and the market prices of the 15 National Investment Funds (NIFs) shares from 12.6.1997 till 14.7.1999.

Panels A and B of Table 8 show the aftermarket performance for the different samples. 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 *All Issues* e.g. the average BHAR over the first two month is -4.47% (Median: -6.16%). A slight negative short-run aftermarket performance can also be observed for privatization IPOs and the private sector IPOs. All mean and median values are not significantly different from zero. This result leads to the conclusion that for Polish IPOs there is full price adjustment on the first trading day.

The long-run performance for the first three years shows clear differences between the samples. The sample *All Issues* does not experience a significantly negative or significantly positive performance (mean-BHAR: +20.09%; median-BHAR: -45.42%, WR: 1.052). The same applies to privatization IPOs: the mean-BHAR is relatively high and positive (+61.45%), but the median-BHAR is negative (-23.67%). Both values are not significantly different from zero at conventional significance levels.

This evidence for the privatization IPOs is in contrast to the international evidence found by Megginson et al. (1998). Using country indices as benchmarks, they document for a 36-country sample of 134 privatization IPOs a significantly positive aftermarket performance for the first three years of aftermarket trading (mean-BHAR: +54.9%, median-BHAR: +26.0%). But it has to be noted that this result is primarily caused by the very strong performance of UK privatization IPOs. If UK privatization IPOs are excluded from the sample, the Mean-BHAR decreases to +30.1% and the Median value drops to -6.3%. For non-UK privatization IPOs the long-run performance is therefore no longer unambiguous.

In contrast to the evidence for privatization IPOs private sector IPOs experience a significantly negative performance over the first three years (see Table 8, Panel A and B). The mean-BHAR (-36.77%) as well as the median-BHAR (-59.11%) are significantly different from zero at the 10%-level. Private sector IPOs in Poland therefore behave in a similar manner as private sector IPOs of other markets do: they significantly underperform in the long-run.⁹

These results show that privatization IPOs and private sector IPOs differ from each other with respect to the long-run price behavior. 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 privatization IPOs. The non-negative long-run performance of the Polish privatization IPOs can be viewed as additional evidence that the Polish government is market-oriented.

The evidence of the long-run performance for the MPP is surprising. In strong contrast to the evidence for the privatization IPOs (case-by-case privatization) and the expectations in Perotti (1995) the long-run aftermarket performance of the MPP within the first three years after the first trading day of the NIF certificate is significantly negative at the 1%-level: mean-BHAR = -69.41%, median-BHAR: -74.22% (see Table 8). The same applies to the BHRs: mean-BHR = -39.9%, median-BHR: -44.7%. An investor buying a NIF certificate on its first trading day and converting the certificate into 15 NIF shares thereafter lost 39.9% of his initial investment over the first three years!

Compared to the volume of case-by-case privatizations in Poland the MPP is of less importance. This gives rise to the hypothesis that the MPP was initiated by the government mainly as a device to intensify the participation of Polish citizens in the privatization process. The very low issue price is an indication that the government tried to generate a positive mood for its privatization policy among the citizens. But the negative aftermarket performance of the MPP opposes this aim.

⁹ See e.g. the evidence for US-IPOs in Loughran and Ritter (1995) or for Finnish IPOs in Keloharju (1993).

Now the following question arises: What is the total performance over three years for a Polish citizen buying a NIF certificate at the issue price of 20 PLN, converting it into shares of the 15 NIFs and selling the 15 NIF shares three years after the first trading day? This question is of importance for a market-oriented government because if the originally very high initial return disappears over time, a possibly positive political effect of the MPP would only be small or even negative. Table 8 shows the performance results including the allocation-adjusted initial return in panels C and D.

A Polish citizen experiences a significantly positive BHR of +212.7% (BHAR: +95.24%) from the issue price of 20 PLN till the third anniversary of public trading. Because of the small issue price the MPP provides (despite the negative aftermarket performance) a significantly better performance than an alternative investment in the Polish Stock Market (WIG-Index). But it remains unclear why the MPP provides a significantly negative aftermarket performance in relation to the case-by-case privatizations. The next one to two years will show whether the negative performance trend of the MPP lasts or whether the performance of the MPP (inclusive of initial return) will collapse with those of the case-by-case privatization program.

4.3 Restructuring Hypothesis

As for IPOs there is also evidence of a significantly negative long-run performance for SEOs (see e.g. Loughran and Ritter (1995) for the US or Cai and Loughran (1998) for Japan). In contrast to this evidence Megginson et al. (1998) document a non-negative (zero) long-run performance for their 36-country sample of privatization IPOs. In transition economies changing to a market-oriented system most firms have a huge restructuring need. This requires not only a lot of technical and personal know-how, but also a lot of additional capital. This leads to the (restructuring) hypothesis that for firms absorbing new capital the restructuring process proceeds better and faster. If this hypothesis applies firms in an emerging market like Poland taking up new capital should provide a better long run performance than firms with no additional capital.

Table 9 shows the results of an analysis of the differences in the aftermarket performance between Polish IPOs making a SEO within the first three years and those without an SEO (NoSEO). In accordance with the restructuring hypothesis the SEO-firms experience a significantly better long-run performance than the NoSEO firms. The differences in the mean-BHAR of +180.35 percentage points is significantly different from zero at the 5%-level.

5. Summary

This study examines the going public process in Poland. In contrast to other papers the characteristics and the short-and long-run price behavior of three groups of firms are compared with each other: (i) Case-by-case privatization initial public offerings (PIPOs), (ii) private sector initial public offerings (IPOs) and (iii) certificates and shares of the mass privatization program (MPP). Unlike other Central and Eastern European countries (e.g. Russia, Czech Republic or Slovakia) Poland did not start the privatization process with an MPP; instead case-by-case privatizations were carried out over the first years of the transition. An MPP was started in the mid nineties with the distribution of National Investment Fund (NIF) certificates to Polish citizens, who after a while were able to convert the certificates into shares of 15 National Investment Funds (NIF shares). As the certificates were and the NIF shares still are officially traded on the WSE, this provides the rare opportunity to compare case-by-case privatizations and the MPP on the basis of their long-run performance.

The following questions are examined:

- (i) Can the Polish government in the sense of Perotti (1995) be classified as market-oriented and is a reduction in the political uncertainty about the future privatization policy observable in the course of time?

- (ii) How do case-by-case privatizations, private sector IPOs and the MPP differ with respect to underpricing? Is the underpricing of case-by-case privatizations and the MPP higher than those of private sector IPOs?
- (iii) How can the underpricing of case-by-case privatizations 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 do case-by-case privatizations?
- (iv) Are there differences in the long-run performance between case-by-case privatizations, private sector IPOs and the MPP? Which group has the best performance?
- (v) In a transition economy, companies have an increased restructuring need. Is the raising of new capital an indication for a faster restructuring process and can this be seen in the long-run performance?

The results of the investigations are as follows:

The comparison between case-by-case privatizations and private sector IPOs clearly shows that in accordance with Perotti (1995) the Polish government can be classified as market-oriented. At the start of the privatization process the uncertainty over the future privatization policy is highest. In that phase the Polish government sold a larger fraction of state owned enterprises during the initial offer. During the period under investigation (April 1991 till December 1998) this fraction dropped, which can be interpreted as an indication for a build-up of reputation. Compared to private sector IPOs case-by-case privatizations are sold at lower prices (lower PE-ratios). This applies especially to the first part of the privatization process. By contrast, a populist government would not sell state enterprises over a long period of time at prices that, on average, are below those of private sector IPOs.

Case-by-case privatizations as well as private sector IPOs show on average a significant underpricing. With a mean of +62% the underpricing of privatization IPOs is about 40 percentage points above the underpricing of private sector IPOs. But only the median

value of the underpricing difference is significantly different from zero (at the 10%-level). Because of a very low issue price the underpricing of the MPP is +352%. About 91% of the eligible Polish citizens collected their NIF certificates. Many people made use of the high initial return and sold their certificates shortly after collecting them.

The underpricing of case-by-case privatizations and private sector IPOs is caused to a large extent by the winner's curse. The allocation-adjusted underpricing drops by about 75% for privatization IPOs and 50% for private sector IPOs. With increased underpricing the demand for shares at the initial offer increases and a higher rationing follows. In accordance with Perotti (1995) the underpricing is higher if a higher fraction of the capital is sold at the initial offer. In contrast to that, the asymmetric information between managers/owners and investors about the firm value as well as the ex-ante uncertainty about the firm value have no explanatory power for the underpricing level of privatization IPOs. The same applies to signaling models.

The long-run performance shows interesting results. In contrast to Megginson et al. (1998), who examine the (average) long-run performance for a 36-country sample, Polish case-by-case privatizations do not show a significantly positive performance over the first three years of aftermarket trading. The long-run performance of private sector IPOs is significantly negative, which is similar to the evidence for many developed markets (see e.g. Loughran, Ritter and Rydqvist (1994)). The non negative long-run performance of case-by-case privatizations is consistent with a market-oriented government trying to build up reputation for the privatization program in the course of time. What is surprising is the significantly negative long-run performance of the MPP. After three years of aftermarket trading, its wealth relative (WR) of 0.495 is even below the WR for private sector IPOs (WR=0.802). One would not expect this for a market-oriented government. When the initial return is included in the long-run performance, the long-run performance for the MPP is significantly positive (BHR=+213%; BHAR=+95%). Therefore Polish citizens who did not sell their MPP certificates during the early stages of aftermarket trading did not lose money on their initial investment. The next one to two years will show whether the negative performance tendency of the

MPP lasts or whether the overall performance of the MPP collapses with those of the case-by-case privatization program.

Finally it is documented that Polish IPOs making an SEO during the first three years after the first trading day experience a significantly better long-run performance (BHAR=+180 percentage points) than IPOs without SEOs. This evidence is in contrast to the evidence of a negative long-run performance of SEO firms in developed markets but supports the restructuring hypothesis. Accordingly, firms in a transition economy trying to restructure fast should perform better in the long-term. SEOs can therefore be an indication of increased restructuring activities in a transition economy.

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Appendix

Table 1:

Descriptive statistics for the samples *All Issues (All)*, *Privatization IPOs (PIPOs)*, *Private Sector IPOs (IPOs)* and *Mass Privatization Program (MPP)* as well as gross proceeds.

	All	PIPOs	IPOs	MPP
No of cases	149	51	98	15 ^e
Gross proceeds: Total (million PLN)	15,784.73	13,498.27	2,286.46	510.95
Mean (million PLN)	105.94	264.67	23.33	-
Median (million PLN)	18.20	42.00	14.03	-
Gross proceeds: Primary shares (million PLN)	2,950.35	890.87	2,059.48	0.00
% of total gross proceeds	18.7	6.6	90.0	
Gross proceeds: Secondary shares (million PLN)	12,834.38	12,607.40	226.98	510.95
% of total gross proceeds	81.3	93.4	10.0	100.00
Fraction of capital sold in initial offer (%)	42.99	63.90	32.11	-
Portion of issues: only secondary shares	29.5	66.7	10.2	-
Portion of issues: only primary shares	57.0	3.9	84.7	-
Portion of issues: secondary and primary shares	13.5	29.4	5.1	
Portion of Firm Commitment Offerings	65.1	58.9	69.4	-
Portion of Tender Offerings	34.9	41.1	30.6	-
Mean Demand Multiple	2.30	2.75	2.07	-
Average PE-Ratio at issue price	20.86	8.89	27.09	n.a.
Days from the start of the subscription period till the first trading day	87.32	61.26	100.88	-
Mean fraction sold to employees (initial offer, %)	9.94	19.39	5.02	-

^e NIF certificate from 15.7.1996 till 11.6.1997 and 15 National Investment Funds shares (NIFs) thereafter.

Table 2:

Mean and median differences of several descriptive statistics: *privatization IPOs (PIPOs)* versus *private sector IPOs (IPOs)*. It is tested whether (i) the difference in the mean and (ii) 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.

	PIPOs versus IPOs	
	Mean	Median
Gross Proceeds: Total (million PLN)	241.34 ^a (2.854)	27.97 ^a (4.735)
Gross Proceeds: primary shares (million PLN)	-3.55 (0.643)	-13.65 ^a (4.835)
Gross Proceeds: secondary shares (million PLN)	244.89 ^a (2.979)	24.75 ^a (9.030)
Percent of capital sold in offer	31.80 ^a (6.886)	36.69 ^a (5.987)
Percent of issues with only secondary shares	56.5 ^a (7.691)	100.0 ^a (5.645)
Percent of issues with only primary shares	-80.8 ^a (-17.668)	-100.0 ^a (-8.076)
Demand Multiple	0.68 (1.130)	-0.02 (0.748)
PE-Ratio at issue price	-18.20 ^c (-1.849)	-7.46 ^a (-4.985)
Days from the start of the subscription period till the first trading day	-39.62 ^a (-4.850)	-34.50 ^a (-4.791)
Fraction sold to employees at the initial offer	14.37 ^a (5.074)	14.74 ^a (5.687)

^a Significant at the 1% level.

^b Significant at the 5% level.

^c Significant at the 10% level.

Table 3:

Mean and median values of initial buy-and-hold abnormal returns (BHARs) for the samples *All Issues (All)*, *Privatization IPOs (PIPOs)*, *Private Sector IPOs (IPOs)* and *Mass Privatization Program (MPP)*. BHARs are calculated as the difference between the buy-and-hold return (BHR) of the issue and the BHR of the WIG-Index. The BHR of each issue is defined as the percentage return using the issue price and the closing price on the first trading day. The BHR of the WIG-Index is defined as the return from the start of the subscription period to the close of the first trading day. It is tested whether (i) the mean and (ii) the median of BHRs and BHARs is 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: Initial Buy-and-Hold Return (BHR)

	All	PIPOs	IPOs	MPP^d
Mean	41.29 ^a (7.437)	67.77 ^a (3.891)	27.51 ^a (7.075)	420.00 -
Median	18.28 ^a (6.672)	19.00 ^a (4.349)	16.14 ^a (5.110)	420.00 -
Minimum	-51.06	-40.00	-51.06	-
Maximum	1250.00	1250.00	257.14	-
Number of firms:				
Positive	102	38	64	-
Negative	36	11	25	-
Zero	11	2	9	-
Total	149	51	98	-

Panel B: Initial Buy-and-Hold Abnormal Return (BHAR, Underpricing) and Wealth Relative (WR)

	All	PIPOs	IPOs	MPP^d
Mean	35.57 ^a (7.017)	62.05 ^a (4.084)	21.78 ^a (5.633)	352.10 -
Median	15.14 ^a (6.687)	19.73 ^a (5.362)	13.47 ^a (4.353)	352.10 -
Minimum	-72.95	-34.70	-72.95	-
Maximum	1,166.75	1,166.75	270.18	-
Wealth Relative	1.293	1.435	1.219	3.097
Number of firms:				
Positive	112	45	67	-
Negative	37	6	31	-
Zero	0	0	0	-
Total	149	51	98	-

^a Significant at the 1% level.

^b Significant at the 5% level.

^c Significant at the 10% level.

^d No significance values are reported as there is only one observation in the MPP (National Investment Funds certificate) concerning the initial return.

Table 4:

Mean and median differences of initial buy-and-hold returns (BHRs), buy-and-hold abnormal returns (BHARs) and wealth relatives (WR) for *Privatization IPOs (PIPOs)* versus *Private Sector IPOs (IPOs)* (Panel A) and mean and median differences of initial buy-and-hold returns (BHRs), buy-and-hold abnormal returns (BHARs) and wealth relatives for issues with a *large fraction sold* at the initial offer versus issues with a *small fraction sold* at the initial offer. Values above the median are defined as large and values below the median as small. It is tested whether (i) the difference in the mean and (ii) 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. The BHR of each issues is defined as the percentage return in using the issue price and the closing price on the first trading day. BHARs are calculated as difference between the buy-and-hold return (BHR) of the issue and the BHR of the WIG-Index. The BHR of the WIG-Index is defined as return from the start of the subscription period to the close of the first trading day. Test statistics in parentheses.

Panel A: Initial performance of *Privatization IPOs (PIPOs)* versus *Private Sector IPOs (IPOs)*

	PIPOs versus IPOs	
	Mean	Median
Buy-and-Hold Returns (BHR)	40.26 (1.434)	2.86 (0.574)
Buy-and-Hold Abnormal Returns (BHAR)	40.27 (1.587)	6.27 ^c (1.808)
Wealth Relative (WR)	0.216 (1.503)	0.058 (1.384)

Panel B: Initial performance of issues with a *large fraction sold* versus issues with a *small fraction sold*

	All		PIPOs		IPOs	
	Mean	Median	Mean	Median	Mean	Median
BHR	28.44	3.67	100.79 ^c	11.43	3.10	6.97
BHAR	32.34 ^c	1.99	84.57 ^c	7.06	12.47	11.71
WR	0.198 ^c	0.042	0.463 ^c	0.036	0.112	0.120

^a Significant at the 1% level.

^b Significant at the 5% level.

^c Significant at the 10% level.

Table 5:

Mean and median initial market-adjusted returns (underpricing), fraction sold from the share capital 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 subperiods.

Panel A: Underpricing (%)

Period	All			PIPOs			IPOs		
	No ^d	Mean	Median	No	Mean	Median	No	Mean	Median
91-92	14	11.85	13.14	14	11.85	13.14	-	-	-
93-94	25	110.67	21.09	12	190.95	71.39	13	36.56	21.09
95-96	35	33.80	23.93	11	46.76	29.24	24	27.87	15.27
97-98	75	15.78	8.72	14	13.79	14.83	61	16.24	4.52

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

Period	All			PIPOs			IPOs		
	No	Mean	Median	No	Mean	Median	No	Mean	Median
91-92	14	86.11	90.00	14	86.11	90.00	-	-	-
93-94	25	48.13	35.07	12	63.58	68.26	13	33.87	27.72
95-96	35	41.76	33.60	11	54.58	60.07	24	35.88	30.56
97-98	75	33.81	31.03	14	49.30	47.41	61	30.25	29.98

Panel C: Price-Earnings ratios at the issue

Period	All			PIPOs			IPOs		
	No	Mean	Median	No	Mean	Median	No	Mean	Median
91-92	14	3.76 ^e	2.60 ^e	14	3.76 ^e	2.60 ^e	-	-	-
93-94	25	13.07	10.32	12	10.27	9.17	13	15.66	12.15
95-96	35	11.36	12.83	11	6.14	4.83	24	13.75	10.99
97-98 ^f	74	18.98	14.80	14	17.50	18.93	60	19.33	14.18

^d Number of firms.

^e Price-Earnings ratios for 1992 only. The necessary information for 1991 is not available.

^f One private sector IPO has been excluded because of zero earnings.

Table 6:

Mean and median values of allocation-adjusted initial buy-and-hold abnormal returns (BHARs) for the samples *All Issues (All)*, *Privatization IPOs (PIPOs)*, *Private Sector IPOs (IPOs)* and *Mass Privatization Program (MPP)*. BHARs are calculated as difference between the buy-and-hold return (BHR) of the issue and the BHR of the WIG-Index. The BHR of each issue is defined as the percentage return in using the issue price and the closing price on the first trading day. The BHR of the WIG-Index is defined as return from the start of the subscription period to the close of the first trading day. It is tested whether (i) the mean and (ii) the median of BHRs and BHARs is 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: Allocation-adjusted initial buy-and-hold return (BHR)

	All	PIPOs	IPOs	MPP^d
Mean	18.82 ^a (7.518)	21.90 ^a (5.377)	17.22 ^a (5.425)	420.00 -
Median	8.48 ^a (5.932)	9.98 ^a (4.054)	8.13 ^a (4.368)	420.00 -
Minimum	-51.06	-20.00	-51.06	-
Maximum	257.14	218.75	257.14	-
Number of firms:				
Positive	102	38	64	-
Negative	36	11	25	-
Zero	11	2	9	-
Total	149	51	98	-

Panel B: Allocation-adjusted initial buy-and-hold abnormal return (BHAR, underpricing)

	All	PIPOs	IPOs	MPP^d
Mean	13.10 ^a (5.066)	16.18 ^a (4.174)	11.50 ^a (3.332)	352.10 -
Median	7.34 ^a (4.502)	9.89 ^a (3.721)	6.16 ^a (2.812)	352.10 -
Minimum	-72.95	-50.82	-72.95	-
Maximum	270.18	142.35	270.18	-
Wealth Relative	1.142	1.167	1.129	3.097
Number of firms:				
Positive	100	39	61	-
Negative	49	12	37	-
Zero	0	0	0	-
Total	149	51	98	-

^a Significant at the 1% level.

^b Significant at the 5% level.

^c Significant at the 10% level.

^d No significance values are reported as there is only one observation in the MPP (National Investment Funds certificate) concerning the initial return.

Table 7:

Regression results of model I and II for *All Issues (All)*, *Privatization IPOs (PIPOs)* and *Private Sector IPOs (IPOs)*:

$$\text{Model I: } UP_i = \alpha_0 + \alpha_1 \cdot DM_i + \alpha_2 \cdot \text{Size}_i + \alpha_3 \cdot \text{Risk}_i + \alpha_4 \cdot \text{SEO}_i + \alpha_5 \cdot \text{LF}_i + \varepsilon_i$$

$$\text{Model II: } UP_i = \alpha_0 + \alpha_1 \cdot DM_i + \alpha_2 \cdot \text{Size}_i + \alpha_3 \cdot \text{Risk}_i + \alpha_4 \cdot \text{SEO}_i + \alpha_5 \cdot \text{LFS}_i + \varepsilon_i$$

where UP_i = Underpricing of issue i ; DM_i = demand multiple of issue i ; Size_i = logarithmic market value of issue i on the first trading day; Risk_i = two month aftermarket return standard deviation of issue i ; SEO_i = seasoned equity offerings within the first three years of aftermarket trading (dummy variable: 1 for at least one SEO and 0 otherwise); LF_i = large fraction sold at the initial offer (dummy variable: 1 if the fraction sold is above the median value and 0 otherwise); LFS_i = large fraction sold at the initial offer and small investors got more than 25% of the share capital (dummy variable: 1 if the fraction sold is above the median value and if after the issue more than 25% of the share capital is owned by small investors; 0 otherwise). t-values in parentheses.

Panel A: Model I

	All	PIPOs	IPOs
Intercept	-1.443 ^a (-3.008)	-3.065 ^b (-2.210)	-0.075 (-0.226)
Demand multiple (DM)	0.116 ^a (3.893)	0.137 ^b (2.131)	0.056 ^a (2.644)
Market value (Size)	0.197 ^a (2.871)	0.379 ^b (2.338)	0.041 (0.716)
Aftermarket volatility (Risk)	0.014 (1.375)	0.024 (1.425)	-0.003 (-0.779)
Seasoned equity offerings (SEO)	-0.004 (-0.025)	-0.165 (-0.339)	0.189 ^c (1.802)
Large fraction sold (LF)	0.289 ^c (1.665)	1.098 ^c (1.998)	0.144 (1.108)
Adjusted R ²	17.8%	24.8%	11.3%
F-value	7.401 ^a	4.302 ^a	3.477 ^a
Durbin-Watson-Statistic	2.050	1.865	2.214
Number of cases	149	51	98

^a Significant at the 1% level.

^b Significant at the 5% level.

^c Significant at the 10% level.

Table 7 (continued):**Panel B: Model II**

	All	PIPOs	IPOs
Intercept	-1.654 ^a (-3.565)	-3.475 ^b (-2.622)	-0.083 (-0.249)
Demand multiple (DM)	0.116 ^a (4.119)	0.152 ^b (2.619)	0.057 ^a (2.698)
Market value (Size)	0.241 ^a (3.568)	0.435 ^a (2.822)	0.048 (0.827)
Aftermarket volatility (Risk)	0.013 (1.460)	0.024 (1.476)	-0.003 (-0.678)
Seasoned equity offerings (SEO)	-0.036 (-0.213)	-0.033 (-0.071)	0.182 ^c (1.733)
Large fraction sold and small investors got more than 25% of share capital (LFS)	0.688 ^a (3.630)	1.518 ^a (2.910)	0.193 (1.546)
Adjusted R ²	23.3%	31.1%	11.4%
F-value	9.971 ^a	5.517 ^a	3.504 ^a
Durbin-Watson-Statistic	2.017	1.832	2.181
Number of cases	149	51	98

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

Table 8:

Performance (buy-and-hold abnormal returns (BHARs) and wealth relatives (WRs)) during the first three years of aftermarket trading for *All Issues (All)*, *Privatization IPOs (PIPOs)*, *Private Sector IPOs (IPOs)* and *Mass Privatization Program (MPP)*. BHARs are defined as difference between the buy-and-hold return (BHR) of the issue and the BHR of the WIG-Index over the same period. For the MPP the market prices of the National Investment Funds (NIF) privatization certificate and the market prices of the 15 National Investment funds (NIFs) are used. It is tested whether (i) the mean and (ii) the median of BHRs and BHARs is 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: Aftermarket performance *exclusive* initial returns: BHARs.

No. of Cases	All		PIPOs		IPOs		MMP ^d	
	57		33		24		15	
Period	Mean	Median	Mean	Median	Mean	Median	Mean	Median
1 week	-0.12	-3.09	0.68	-4.94	-1.22	-1.22	-0.77	-0.77
2 weeks	-0.39	-3.12	0.58	-3.12	-1.71	-2.65	-1.69	-1.69
1 month	-4.60	-9.04	-3.69	-7.28	-5.84	-12.30	-5.43	-5.43
2 months	-4.47	-6.16	-0.69	-0.71	-9.67	-13.83	4.28	4.28
1 year	13.06	-23.60	7.48	-26.68	20.74	-18.21	-0.81	0.53
2 years	61.09	-32.04	115.58	-29.37	-13.83	-47.35	-35.45 ^c	-43.15 ^a
3 years	20.09	-45.42	61.45	-23.67	-36.77 ^c	-59.11 ^c	-69.41 ^a	-74.22 ^a

Panel B: Aftermarket performance *exclusive* initial returns: WRs.

No. of Cases	All		PIPOs		IPOs		MMP	
	57		33		24		15	
Period								
1 week	0.999		1.007		0.991		0.992	
2 weeks	9.996		1.032		0.984		0.983	
1 month	0.956		0.964		0.944		0.943	
2 months	0.957		0.993		0.907		1.039	
1 year	1.083		1.047		1.135		0.993	
2 years	1.176		1.247		0.924		0.729	
3 years	1.052		1.114		0.802		0.495	

^a Significant at the 1% level.

^b Significant at the 5% level.

^c Significant at the 10% level.

^d For the first 11 months (15.7.1996 till 11.6.1997) the market prices of the National Investment Funds certificate are used. Thereafter the market prices of the 15 National Investment Funds are used. Significance values are therefore only reported for the mean and median values at the first, second and third anniversaries.

Table 8 (continued):**Panel C:** Aftermarket performance *inclusive* of allocation-adjusted initial returns: BHARs.

No. of Cases Period	All		PIPOs		IPOs		MMP^d	
	57		33		24		15	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
1 week	13.21 ^a	12.15 ^a	17.62 ^a	16.62 ^a	7.15	6.04	323.73	323.73
2 weeks	12.34 ^a	15.60 ^a	16.84 ^b	16.50 ^a	6.16	4.10	332.33	332.33
1 month	6.48	6.41	10.56	10.70 ^a	0.89	-4.53	305.74	305.74
2 months	6.10	7.81	12.65 ^c	12.72 ^b	-2.91	-9.31	406.69	406.69
1 year	28.06 ^c	-1.03	26.27	-2.35	30.53	-0.51	392.91 ^a	399.91 ^a
2 years	116.84 ^c	-15.29	201.94 ^c	1.95	-0.17	-40.28	276.53 ^a	236.49 ^a
3 years	56.32	-22.85	115.79	-10.71	-25.45	-40.94	95.24 ^a	70.26 ^a

Panel D: Aftermarket performance *inclusive* of allocation-adjusted initial returns: WRs.

No. of Cases Period	All	PIPOs	IPOs	MMP
	57	33	24	15
1 week	1.127	1.163	1.072	3.072
2 weeks	1.114	1.151	1.060	3.043
1 month	1.060	1.095	1.009	2.920
2 months	1.056	1.111	0.972	3.219
1 year	1.172	1.154	1.200	3.075
2 years	1.333	1.426	0.999	2.258
3 years	1.144	1.214	0.861	1.438

^a Significant at the 1% level.

^b Significant at the 5% level.

^c Significant at the 10% level.

^d For the first 11 months the market prices of the National Investment Funds certificate are used. Thereafter the market prices of the 15 National Investment Funds are used. Significance values are therefore only reported for the mean and median values at the first, second and third anniversaries.

Table 9:

Mean and median differences in long-run buy-and-hold abnormal returns (exclusive of initial return) and in wealth relatives (WR) for issues with at least one seasoned equity offering (SEO) within the first three years of aftermarket trading versus issues with no seasoned equity offering (NoSEO). It is tested whether (i) the difference in the mean and (ii) 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. BHARs are calculated as the difference between the buy-and-hold return (BHR) of the issue and the BHR of the WIG-Index over the same period.

SEO versus NoSEO				
Period	BHAR		WR	
	Mean	Median	Mean	Median
1 week	-1.45	6.34	-0.014	0.068
2 weeks	3.29	7.24	0.030	0.079
1 month	0.61	4.02	0.015	0.053
2 months	-0.29	-2.65	0.012	-0.011
1 year	52.92 ^b	12.13	0.363 ^b	0.116 ^c
2 years	92.28	9.89	0.161	0.271
3 years	180.35 ^b	33.16	0.319 ^b	0.356

^a Significant at the 1% level.

^b Significant at the 5% level.

^c Significant at the 10% level.