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INITIAL AND AFTERMARKET PERFORMANCE OF EGYPTIAN SHARE ISSUE PRIVATIZATION

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Abstract

The phenomenon of under pricing initial public offerings is documented for 53 Egyptian share issue privatizations (SIPs) between 1994 and 1998. In the long run, I find mixed results. SIPs sustain their positive performance and provide investors with abnormal returns over a one-year period, however, over 3 and 5 year horizons, the results document negative abnormal returns. The initial excess returns are determined by ex-ante uncertainty and demand multiplier, while the aftermarket abnormal returns are dominated, mainly, by initial excess return and price-earning ratio, in addition to ex-ante uncertainty and demand multiplier. The empirical findings of this paper are consistent with the initial public offerings market in which investors are over optimistic towards the performance of these issues but grow more pessimistic over time.

I. Introduction

During the past two decades, the privatization process has become one of the most important economic phenomena in the world. Roche (1996) argues that around $6 trillion would be raised through privatization over the next 20 years. More than $85 billion for privatization were handled through public share offering from the period 1980-1985 (Euromoney 1996). Additionally, Megginson, Nash, Natter and Schwartz (2000) indicate that over $700 billion has been raised through the sale of shares in state-owned enterprises (SOEs) around the world since the early 1980s.

Most empirical studies on privatization focus on examining the financial and operating performance of privatized firms in both developed and emerging economies, relying on some accounting performance measures[1]. However, The analysis of initial and aftermarket performance of share issue privatizations (SIPs) in developed countries and some emerging economies has only attracted researchers in the past few years. Yet little is known about the behavior of SIPs on a broader menu of emerging markets.

This paper contributes to the existing literature on privatization, by providing additional evidence on the short- and long-run performance of SIPs in emerging markets by concentrating on the Egyptian experiment. Testing the performance of SIPs in a single country would add further insights to this topic as the data set of this paper tends to be more homogeneous relative to cross-country studies. The first aim of the study is to analyze the performance of Egyptian SIPs in the short and long-run. The second aim is to address the determinants that explain the level of underpricing, if any, in the short-run and the aftermarket performance of SIPs. I use several hypothesized factors that have been documented in literatures for developed and emerging economies to understand whether the initial and aftermarket performance of Egyptian SIPs are driven by same factors.

The results, using a sample size of 53 privatized firms over the period 1994-1998, indicate that SIPs yield economically and statistically significant positive initial excess returns and abnormal positive returns up to one year. In contrast, it is found that SIPs produce significant negative returns for investors over 3 and 5 year horizons. The results using multivariate and step-wise regressions show that initial excess returns are determined by ex-ante uncertainty and demand multiplier, while the aftermarket abnormal returns are dominated, mainly, by initial excess return and price-earning ratio, in addition to ex-ante uncertainty and demand multiplier. The empirical findings of this paper are consistent with the fact that investors are over-optimistic about the performance of initial public offerings (IPOs) but grow more pessimistic afterwards, in which the phenomenon of underpricing disappears over time.

[1] For a complete list of recent works in privatization, see Megginson and Netter (2001).

In the following section I review the empirical evidence of studies that examine the performance of IPOs, whether private issues (PIPOs) or SIPs, and provide theoretical arguments behind their performance. Section III highlights data selection and specifies the methodology of measuring initial returns and after market performance of SIPs, as well as determines the statistical technique used to investigate the behavior of SIPs and the factors that drive it. The empirical findings in Section IV constitute the main thrust of the paper. Finally, the summary and concluding remarks are in Section V.

II. Literature Review and Theoretical Arguments

A- Initial Returns

Most empirical studies show significant initial positive returns for IPOs. Lougharan, Ritter and Rydqvest (2001) update their information of the Pacific-Basin Finance Journal article (1994) and find that the average initial returns for 38 countries is as low as 5.4 percent for Canada and as high as 256.9 percent for China. Several researchers document such positive initial return for IPOs[2]

There are many explanations behind underpricing IPOs. One explanation is that investors always worry about the future performance of IPOs, and this is reflected in terms of "ex-ante uncertainty". To attract investors to such offers, under pricing might be required to convince uninformed investors to buy. In turn, the greater the ex-ante uncertainty, the greater the underpricing should be to transfer uninformed investors to informed investors. Ritter (1984) and Beatty and Ritter (1986) indicate a positive relationship between the level of underpricing and non-observable ex-ante uncertainty.

Another explanation is related to the percentage of shares allocation, also known as "demand multiplier", which argues a negative relationship between the percentage of allocation and underpricing or a positive relationship between demand multiplier and the level of underpricing.[3]

Allen and Faulhaber (1989), Grinblatt and Hwang (1989) and Welch (1989) provide another reason for underpricing IPOs, which is known as "signaling approach". They argue that firms sometimes tend to offer prices below intrinsic values in order to signal their quality to investors and then they will have a possibility to offer subsequent seasoned issues in higher prices. Also Perotti (1995) argues that governments might prefer gradual sales by offering smaller

[2] See for example; Jenkinson and Mayer (1988) for the UK and France; Perotti and Guney (1993) for Malaysia, Spain and Turkey; Dewenter and Malatesta (1997) for 8 countries; Choi and Nam (1998) for 30 countries; Paudyal, Saadouni and Briston (1998) for Malaysia; Jelic and Briston (1999) for Hungary; Jones, Megginson, Nash and Netter (1999) for 59 countries; and Aussenegg (2000) for Poland.

[3] Rock (1986) in his model; "winner's curse" and Paudyal et al. (1998); the absorption capacity of the market

portions of the firm and retaining the higher percentage in order to signal their commitment to privatization. Accordingly, one should expect a negative relationship between the proportion of shares offered and the level of underpricing.

Following the argument given above, it is obvious that in the early stage of privatization, where privatizations are uncommon and uncertain, governments need to succeed in selling their SOEs. To do so, they tend to make prices of SIPs undervalued to enable investors to achieve positive returns when these shares are traded in the secondary markets, so that governments will be able to continue selling their SOEs in the future. In this respect, timing might play a role in determining initial returns as higher returns are expected to be associated with earlier privatization.

Lastly, the degree of underpricing might depend upon market volatility; in other words, governments will try to minimize the probability of unsuccessful issues by lowering prices as long as market volatility is high and in turn a positive relationship between market volatility and the level of underpricing is expected.

B- Aftermarket Performance

Contrary to initial performance of IPOs, mixed results for performance of these issues in the long-run have been found. Levis (1993) documents positive long-run returns for investors in 12 UK privatized firms from 1980-1988. Also, Menyah, Paudyal and Inganyete (1995), for a sample of 40 firms, indicated that UK privatizations were underpriced and that investors achieved long run positive abnormal returns. Similarly, Menyah and Paudyal (1996) documents positive returns for the UK privatized firms. Although numerous other academic studies show the same findings[4], several researches find insignificant and/or negative long-run performance for IPOs.[5]

The after market performance could be explained by the above mentioned determinant variables that might affect initial performance of SIPs. However, it is worthwhile to highlight another important possible explanation for the aftermarket performance in addition to these factors. Levis (1993) and Paudyal et al. (1998) argue that initial abnormal returns might be due to initial over-optimism in the market, so such issues should under-perform the market in the long-run. In contrast, if IPOs attain their equilibrium value in initial return, the long-run performance should not be significantly different from the market performance. Given this argument, one should expect an inverse relationship between initial abnormal returns and long-run performance.

III Data Selection and Methodology:

A. Data Selection

The data set for this study is determined by analyzing Egyptian firms that had been privatized since 1994 and had at least one year trading in the stock exchange. As seen in Table 1, the total number of privatized firms reached 184 firms in February 2001. However, excluding some types of privatization, namely: liquidations, asset sales and leases, this leaves only 111 firms. Since many of these firms are not actively traded in the stock market, in particular those firms that were sold to employees, shareholders association and anchor investors, they have to be dropped because returns data were not available. This generates a final sample size of 53 firms that went public through the stock market. I rely on two major sources to build the database of this study: the technical office of public enterprise sector, which provides complete information about privatized firms, method of privatization, issue prices, percentage of equity sold, and date of privatization. The second source is the capital market authority as it has complete data of demand multiplier, rationing of SIPs, daily prices, stock split, number of outstanding shares, dividend payments, and market and industries indices, which I use as benchmarks.

B. Methodology

This section highlights the methodology that I employ to achieve the objectives of this study. The initial excess returns and aftermarket performance are calculated using two benchmarks, the general market index and industry index. I utilize the parametric t statistic and the non-parametric signed-rank test to examine whether SIPs achieve abnormal returns for investors in the short-run and long-run. Additionally, multivariate models are constructed to better understand how such performance might be driven by a number of setting hypothesized variables.

1- Methods of Calculating Initial Excess Returns and Aftermarket Performance

SIPs initial returns are calculated by taking the difference between the offering price and the closing price of the first trading day as follows:

$$r_{i,t} = \frac{P_{i,t} - P_{i,t-1}}{P_{i,t-1}}, \quad (1)$$

[4] See, among others, Jelic and Briston (1999) for 25 Hungarian SIPs; Boardman and Laurin (2000) for 99 SIPs multiple countries; Boubakri and Cosset (2000) for 120 SIPs in 26 developing countries; Choi, Nam and Ryu (2000) for 204 SIPs from 37 countries; Megginson et al. (2000) for 158 SIPs from 33 countries; and Dewenter and Malatesta (2001) for 102 large SIPs).

[5] For more details, see Ritter (1991) for 1526 private initial public offerings (PIPOs) in the US; Aggarwal, Leal and Hernandez (1993) for 9 Chilean SIPs; Keloharju (1993) for 80 Finnish PIPOs, Paudyal et al. (1998) for 18 Malaysian SIPs; and Aussenegg (2000) for 83 PIPOs and SIPs in Poland.

where $r_{i,t}$ is the raw return for security *i* for period *t*, which refers here to the period from subscription for SIP to the closing of the first trading day, $P_{i,t}$ refers to the closing price of security *i* at the first trading day, and $P_{i,t-1}$ is the offer price of security *i* at the time of subscription.

However, the above equation does not properly measure the initial return for investors, as there are many other factors that could affect such return (see Keloharju, 1993; and Menyah et al. 1995). In this context, two points have to be explicitly mentioned: (i) in most cases of SIPs, investors could not get the amount of shares they applied for as demand for these shares exceeds the supply available for sale; hence the rationing of shares exists. In such situations, investors would bear extra costs for the amount of capital tied up in the subscription but not given any allocations. As a result, I take into account the cost of such an amount of money by deducting the risk-free opportunity cost for the period from the last day of subscription and the date of returning the part of capital tied up in the subscription but not given any allocations, usually the date of first trading day, from the initial returns. (ii) The second point is related to transactions cost that might include brokerage commission and other fixed costs. However, one could argue that brokerage commission would apply for SIPs as well as market portfolio. So, I only consider those costs related to SIPs. Since conditions for the above kinds of costs are not the same for each security, I follow SIPs case by case to calculate the initial return in an accurate way. I use the following equation to adjust the raw return for the above-mentioned costs.

$$r_{i,t} = \frac{P_{i,t} - P_{i,t-1}}{P_{i,t-1}} - \left[\frac{ARF_{t-1,t}(SD - TD)}{365} \times (1 - \Psi) + \frac{FTC_t}{P_{i,t-1}} \right] \quad (2)$$

where: $ARF_{t-1,t}$ represents the average risk-free rate from the date of subscription through the date of trading, given that the first trading day is presumed to be the date of refunding the amount of capital tied up in the subscription but not given any allocations;

$SD - TD$ is the difference in number of days between the date of first trading day and the last day of subscription date; Ψ refers to the percentage of shares allocated; and FTC_t is the total fixed cost for each security of firm *i*.

However, the market-adjusted return is calculated as the raw return on a stock, minus the benchmark return for the corresponding reference portfolio. An important issue here is to specify appropriate benchmarks. Although the control firm approach will avoid obstacles of the new listing bias, the rebalancing bias, and the skewness problem (Barber and Lyon, 1997), I could not follow this approach because most of listed firms in the Egyptian stock market are not actively traded and the market is too small to allow using such methodology. Alternatively, I use more than one index to serve as benchmarks: the general Egyptian Capital Market Index (CMI) and industry sector indices (IND), in which the latter indices serve as reference portfolios for SIPs according to their industry classification.

$$ar_{i,t} = r_{i,t} - r_{crp,t}, \quad (3)$$

where $ar_{i,t}$ is the abnormal return for security *i* for period *t;* and $r_{crp,t}$ is the return on corresponding reference portfolio for period *t*; and is calculated as follows:

$$r_{crp,t} = \frac{I_{i,t} - I_{i,t-1}}{I_{i,t-1}}, \quad (4)$$

where $I_{i,t}$ refers to the corresponding reference portfolio *i* (CMI and IND) at the end of the first trading day of security *i*; and, $I_{i,t-1}$ is the corresponding reference portfolio *i* (CMI and IND) at the time of subscription of security *i.*

Contrary to the simple and direct method of calculating initial returns, long-run performance seems to be more complicated and there is no consensus on the appropriate methodology of calculating long-run abnormal returns (see among others, Barber and Lyon, 1997; Kothari and Warner, 1997; Brav and Gompers, 1997; and Lyon, Barber and Tsai, 1999).

I, however, consider different methods and models: cumulative abnormal returns (CARs) and buy-and-hold abnormal returns (BHARs) methods, and the market-adjusted model and Sharp-Lintner CAPM.

The aftermarket performance period is defined as one-, three-, and five-year (252, 756, and 1,260 trading days, respectively) after the SIP listing exclusive of the initial return period. Since the initial return period is denoted by month 0, the aftermarket periods include 12, 36, and 60 months, where months are defined as 21-successive trading-day periods relative to the SIP listing date. In turn, the first month of SIP aftermarket performance incorporates time periods of event days 2-22, the second month incorporates time periods of event days 23-43 and so on. However, I follow each individual SIP over the period of calculation, so, if any firm de-listed before its anniversary, the aftermarket period is truncated[6].

[6] For the whole sample, no firm is de-listed over the period of the study.

Monthly market-adjusted returns are defined as the monthly raw return on a security i minus the monthly corresponding reference portfolio (CMI and IND) return for the same 21-trading-day period:

$$MAR_{i,t} = R_{i,t} - R_{crp,t}, \quad (5)$$

where: $MAR_{i,t}$ is the market-adjusted for security i for the aftermarket month t, $R_{i,t}$ refers to the raw return for security i for the aftermarket month t, and $R_{crp,t}$ is the raw return on corresponding reference portfolio for the aftermarket month t. So, the CAR for each individual SIP is:

$$CMAR_{i,s,e} = \sum_{t=s}^{e} MAR_{i,t}, \quad (6)$$

where: $CMAR_{i,s,e}$ is the cumulative abnormal return or market-adjusted return for security i from the event month s to the event month e, where s is the starting month after trading of SIP and e is the anniversary month of SIP (12,36, and 60 months) or until the date of de-listing due to mergers, acquisitions, takeovers, bankruptcies, non-trading, etc.

So, the average market-adjusted return on a portfolio of n securities for month t is defined as the equally weighted arithmetic average of the market-adjusted returns as follows:

$$Avg\, MAR_t = \frac{1}{n_t}\sum_{i=1}^{n_t} MAR_{i,t}, \quad (7)$$

where: $Avg\, MAR_t$ is the average market-adjusted return on a portfolio of SIPs for month t, and n_t is the number of securities of SIPs listed for the entire month t.

So, the cumulative market-adjusted return on a portfolio of n securities could be yielded by cumulating $Avg\, AR_t$ across e periods as follows:

$$CAMR_{s,e} = \sum_{t=s}^{e} Avg\, AMR_t, \quad (8)$$

where: $CMAR_{s,e}$ is the cumulative market-adjusted return on a portfolio of SIPs from the event month s to the event month e. However, CAR implicitly assumes monthly portfolio rebalancing, which is not based on a realistic ex-ante trading strategy. Therefore, I also consider an alternative method to compute one-, three-, and five year holding-period returns. BHRs are calculated over identical intervals for each individual SIP and its corresponding reference portfolio, hence, no survivorship bias or look-ahead bias will be involved using this procedure.

$$BHMAR_{i,T} = \left[\prod_{t=1}^{\min\{T,delisting\}} (1+r_{i,t}) - 1\right] - \left[\prod_{t=1}^{\min\{T,delisting\}} (1+r_{crp,t}) - 1\right] \quad T = \{252, 756, 1260\}, \quad (9)$$

where: $BHMAR_{i,T}$ is buy- and- hold market-adjusted return for security i, in period T, where T is the aftermarket trading day number 252, 756 and 1260, respectively; $t=1$ indicates the first aftermarket trading day; and $\min\{T, delisting\}$ refers to the earlier of the last day before de-listing of SIP. Since BHMAR is calculated for each individual SIP, the average BHMAR for a sample of n SIPs is given as follows:

$$Avg\, BHMAR_T = \frac{1}{n_t}\sum_{i=1}^{n_t} BHMAR_{i,T} \qquad T = \{252,756,1260\}, \quad (10)$$

where: $Avg\, BHMAR_T$ is the average BHMAR over the period T, n_t refers to the number of SIPs for each individual interval period (252,756,and 1260 days).

Following Ritter (1991) and others, I calculate the wealth relative (WR) measure to compare the $Avg\, BHR_T$ of a portfolio of SIPs relative to the $Avg\, BHR_T$ for the corresponding reference portfolio, so as to interpret the performance of SIPs. A wealth relative of greater than 1.00 means that SIPs outperform their corresponding reference portfolio and, vice-versa, a wealth relative of less that 1.00 is interpreted as underperformance of SIPs. The wealth relative as a performance measure could be defined as follows:

$$WR_T = \frac{1 + Avg\ BHR_{T,SIPs}}{1 + Avg\ BHR_{T,CRp}} \qquad T = \{252,756,1260\} \quad (11)$$

where: WR_T is the wealth relative over T periods; $Avg\ BHR_{T,SIPs}$ refers to buy-and-hold return for a portfolio of SIPs over T periods; and $Avg\ BHR_{T,CRp}$ is buy-and-hold return for a corresponding reference portfolio over T periods.

However, one can notice that performance measures using the above model are calculated without explicitly adjusting for betas. For this reason, I utilize the CAPM to calculate the abnormal return, where this model takes the risk factor into consideration.

$$CAPMAR_{i,t} = R_{i,t} - R_{f,t} - \beta_i [R_{crp,t} - R_{f,t}], \quad (12)$$

where: $CAPMAR_{i,t}$ is the abnormal return using CAPM; $R_{i,t}$ refers to the monthly return for security *i* in month *t*; $R_{f,t}$ is the risk-free rate proxied as short-term one-month rate for bank deposits; β_i is the risk of security *i* compared with the market (corresponding reference portfolio), and; $R_{crp,t}$ indicates the monthly return on the corresponding reference portfolio in month *t*. β_i is given from the CAPM regression, which refers to the slope from regressing $[R_{i,t} - R_{f,t}]$ on $[R_{crp,t} - R_{f,t}]$ for the estimation period. With the CAPMAR calculated, I apply the same two methods; CARs and BHARs mentioned previously.

Table 2 shows summary statistics for the initial and aftermarket raw returns of SIPs and the corresponding reference portfolios. It is clear that SIPs, on average, yield around 8.4 percent on the first trading day, that is, far above the average returns on corresponding reference portfolios. Some investors obtained superior initial returns as high as 55 percent and others achieved negative initial returns as low as 5 percent. Up to one year, SIPs seem to perform better than the market regardless of methods, models, and benchmarks. However, returns over 3 and 5 years for SIPs tend to be far below the performance of benchmarks, which indicate that, on average, investors who bought SIPs over these periods achieved less returns relative to the market. The table also shows the results of two tests to determine whether these variables can be adequately modeled by a normal distribution. Of particular interest here are the standardized skewness and standardized kurtosis. Values of these statistical tests outside the range of -2 to +2 indicate significant departures from normality, which would tend to invalidate many of the statistical procedures normally applied to this data. Since results show that values of the standardized skewness and standardized kurtosis for some variables are outside the range, these variables are not normally distributed[7]. As a result, the parametric test for the significant difference in mean should be interpreted with caution.

2. Test Statistics

I test the null hypothesis that the cross-sectional average initial excess return and long-run abnormal returns over different periods up to 60 months are equal to zero for a sample of *n* SIPs. For the market-adjusted model and CAPM, the following parametric test statistics are employed:

$$tar = \overline{ar_{i,t}} \big/ (\sigma(ar_{i,t} \big/ \sqrt{n}) \tag{13}$$

[7] For robustness, I also run chi-square goodness of fit and Shapiro-Wilks W test for normality. Both results yield similar results.

$$tCMAR = \overline{CMAR_{s,e}} \big/ (\sigma(CMAR_{s,e} \big/ \sqrt{n}) \tag{14}$$

$$tBHMAR = \overline{BHMAR_T} \big/ (\sigma(BHMAR_T \big/ \sqrt{n}) \tag{15}$$

$$tCCAPMAR = \overline{CCAPMAR_{s,e}} \big/ (\sigma(CCAPMAR_{s,e} \big/ \sqrt{n}) \tag{16}$$

$$tBHCAPMAR = \overline{BHCAPMAR_T} \big/ (\sigma(BHCAPMAR_T \big/ \sqrt{n}) \tag{17}$$

where: $\overline{ar_{i,t}}$, $\overline{CMAR_{s,e}}$, $\overline{BHMAR_T}$, $\overline{CCAPMAR_{s,e}}$, and $\overline{BHCAPMAR_T}$ are the sample averages of initial excess returns, and CRs and BHRs using the market-adjusted model and CAPM, and $\sigma(ar_{i,t})$, $\sigma(CMAR_{s,e})$, $\sigma(BHMAR_T)$, $\sigma(CCAPMAR_{s,e})$ and $\sigma(BHCAPMAR_T)$ are the cross-sectional sample standard deviations of initial excess returns, and CRs and BHRs using market-adjusted model and CAPM.

Under the null hypothesis, these test statistics follow a Student's *t*-distribution if the sample is normally distributed. Given the fact that some variables are not normally distributed, and they seem to be positively skewed in most cases, an alternative to the non-parametric test statistic is the Wilcoxon signed-rank test, which tests the null hypothesis that the median abnormal return is equal to zero. Even though the non-parametric test statistic is less sensitive to the presence of outliers, it is, however, less powerful than the t-test if the data all come from a single normal distribution. Hence, I use both test-statistics for the robustness of the results, but the findings from the parametric test should be treated with caution if their corresponding variables are not normally distributed.

3. Determinants of Initial Excess Returns and Aftermarket Performance

To analyze the determinants of the initial abnormal returns and aftermarket performance produced by SIPs, multiple regressions are performed based on several exogenous variables. From the selected literature in Section II, an initial checklist of possible independent variables are given below, together with hypothesized positive or negative relationships:

3.1. Initial Excess returns

Ex-ante uncertainty (Positive): The greater the ex-ante uncertainty, the greater is the underpricing required to transfer uniformed investors to informed investors. Following Ritter (1984) and Paudyal et al. (1998), I measure ex-ante uncertainty by the standard deviation of daily returns of each individual SIP one year following official listing.

Demand multiplier (positive): Based on Rock's model (1986), "winner's curse", and Paudyal et al. (1998) "absorption capacity of the market", a positive relationship between the level of underpricing and demand multiplier is expected.

Proportion of shares offered (negative): This hypothesis is known as "signaling approach", provided by Allen and Faulhaber (1989), Grinblatt and Hwang (1989), Welch (1989) and Perotti (1995). According to them, with IPOs firms tend to offer prices below intrinsic values to signal their quality to investors, then they will have a possibility to offer subsequent seasoned issues in higher prices. Hence, one should expect a negative relationship between the proportion of shares offered and the level of underpricing.

Timing (Negative): According to the previous arguments, it is expected that there is negative relationship between the level of underpricing and timing of privatization. I discriminate between types of privatization based on timing with reference to the median privatization date in the sample, where a dummy variable is set equal to one for recent privatization and to zero otherwise.

Market volatility (Positive): It is anticipated that this variable would have a positive impact upon the level of underpricing. Following Menyah et al. (1995) and Paudyal et al. (1998), I use a proxy of the standard deviation of daily market returns over two months prior to the application closing to measure market volatility. In addition to the above-listed variables, one could argue that investors might consider some account data that might affect share prices when a firm is traded in the stock market. Accordingly, price-earning ratio might play an important role in the initial returns; hence, I include this variable in the multiple regression equation expecting a negative relationship between the level of underpricing and the price-earning ratio.

Having the variables thus determined, I explore the explanatory power of these variables on the level of underpricing by estimating the following equation:

$$ar_{i,t} = \alpha + \beta_1 Exante_i + \beta_2 DM_i + \beta_3 PSO_i + \beta_4 Timing_i + \beta_5 MV_i + \beta_7 PER_i + \varepsilon_i \qquad (18)$$

where: $ar_{i,t}$ is the abnormal return of firm *i* that refers to the level of underpricing,; $Exante_i$ refers to the ex-ante uncertainty measured by the standard deviation of daily returns of firm *i* one year following official listing;

DM_i is the times shares over-subscribed for the firm *i*; PSO_i is the proportion of shares offered for the firm *i*. $Timing_i$ is a proxy for the time of privatization, which equals one if the firm *i* is privatized recently and zero otherwise,

MV_i refers to the market volatility, which calculated as the standard deviation of daily market returns over two months prior to the application close for the firm *i*, and

PER_i is price-earning ratio for the firm *i*.

3.2. Long-run Abnormal Returns

To better understand the magnitudes of observed aftermarket performance of SIPs, I conduct a cross-sectional regression that makes it possible to identify the significance of selected exogenous variables in the model. The independent variables in the regression equations are similar to those explained in initial excess returns, but there are two relevant points here: (i) First, the relationship between demand multiplier and long-run abnormal returns is expected to be negative, not positive as in the case of initial excess returns. The positive sentiment of investors is expected to diminish over time when they recognize that they were over-optimistic when subscribing heavily to buy SIPs, so the higher the demand multiplier for a given stock is, the lower the aftermarket performance would be. (ii) Second, I add another variable based on the argument that initial abnormal returns might be due to initial over-optimism in the market, so such issues should under-perform the market in the long-run. Consequently, one should expect an inverse relationship between initial excess returns and long-run abnormal performance. The following equation is estimated to explore the explanatory power of the model[8]:

$$AFTMARKAR_{i,T} = \alpha + \beta_1 ar_{i,t} + \beta_2 Exante_i + \beta_3 DM_i + \beta_4 PSO_i + \beta_5 Timing_i + \beta_6 MV_i + \beta_7 PER_i + \varepsilon_i \qquad (19)$$

where: $AFTMARKAR_{i,T}$ is the aftermarket abnormal return for security *i* over *T* periods, which takes several forms according to the method of calculation.

Clearly, there would be too many variables if all were included in one model. Instead, step-wise regressions are performed to determine the most efficient explanation of factors governing the abnormal returns in both short- and long-run.

IV. Empirical Results and Analysis

A. Initial Excess Returns

In this part of the analysis, I start with testing whether investors, on average, outperform the market through buying SIPs at subscription prices and selling them on the first trading day. The null hypothesis is that the mean (median) initial excess returns of investing in SIPs are not significantly different from zero.

As shown in Table 3, panel A, the initial excess return of investing in 53 SIPs between 1994 and 1998 yields an average of 8 percent. This average return would be obtained by an investor who bought SIPs at the offer prices and sold them at the end of the first trading day. Using two benchmarks, CMI and IND, the results from *t*-statistic reveal that the mean initial excess returns are

[8] Same model is employed over 1 and 3 years, while timing is excluded from the model over 5 years because more than 80 percent of firms sample size were privatized earlier.

significantly different from zero at the one percent level. However, since the distribution of initial returns are not normally distributed and they are not symmetric (positive skewness), as seen in Table 2, the implication from *t*-statistic should be treated with caution. Alternatively, I use the non-parametric Wilcoxon signed-rank test and document similar results. The median initial excess returns are around 5 percent and the test statistic rejects the null hypothesis of no significant median initial excess returns at the one percent level. Also, the results show that around 88.6 percent of SIPs (47 out of 53) provide inventors with positive initial excess returns. The evidence from these findings indicate that Egyptian SIPs are under-priced, in line with the findings reported in the literature for most IPOs, but the level of underpricing is lower than those observed in other countries (see for example, Lougharan et al. 1994).

The second part of the analysis deals with the determinants of the initial excess returns of SIPs or the level of underpricing. Panel B in Table 3 shows the results of the multivariate cross-sectional regression analysis for general and specified or step-wise regression models[9]. It is clear that the sign of the coefficients of all exogenous variables are consistent with the literature and the theoretical arguments, except PSO as it has a positive sign instead of the hypothesized negative sign. Even though this variable is not significant at any level in the regression models, it might be worthy to understand why it has a positive sign. In this context, Aussenegg (2000) argues that with higher political uncertainty, governments would sell a large proportion of their state-owned firms to transfer control right, which, as a result, forces the government to under-price more.

The regression models show the following results. First, there is a positive relationship between the ex-ante uncertainty and the level of the underpricing at the 5 percent level. This finding supports Ritter (1984) and Beatty and Ritter's (1986) argument that investors ask for a higher returns to compensate their worry about the future performance of IPOs. Second, a significant positive impact of the demand multiplier on initial excess returns at the one percent level. This means that investors of SIPs in Egypt bid for a higher price to get the quantity they apply for in the subscription period. Hence, the lower percentage of allocations because of the higher demand multiplier, the more investors rush to bid for higher prices in aftermarket trading. Consequently, SIPs increase and achieve initial excess return. The results from the Egyptian SIPs are consistent with the winner's curse model (Rock, 1986) and the absorption capacity of the market (Paudyal et al. 1998). However, other factors such as firm specific characteristics (price-earning ratio), market effects (market volatility) and privatization process (time of offers and fractions of issues) seem to have a little power in explaining the level of underpricing SIPs in Egypt. In sum, investors fear (ex-ante uncertainty) and hope (bidding for more SIPs in aftermarket trading) play the key role in explaining initial excess returns. The adjusted R-square is 62.8 and 63.4 percent using CMI and IND benchmarks, respectively. This implies that both models explain a large portion of the variability in the level of underpricing of SIPs in Egypt.

B. Aftermarket performance

The purpose of this part is to answer two questions. First, do SIPs sustain their initial excess returns and provide investors with positive abnormal returns over a long time horizon? Second, how the long-run performance of SIPs could be explained and what are the exogenous variables that might affect such returns?

As for the first question, the results given in Table 4 show the long-run abnormal returns of SIPs over one year (panel A), 3 years (panel B) and 5 years (panel C).

The SIPs over one year period yield positive returns (panel A), however, buy-and-hold strategy method produces, on average, higher returns for investors than CR method. The parametric test statistics are significant at the 5 percent level for all models, which means that investors achieve abnormal returns and they outperform the market over a one year period. The non-parametric Wilcoxon signed-rank tests confirm the same findings for the CAR method. However, the null hypothesis that the median abnormal returns of SIPs is not different from zero, using the BHAR method, can not be rejected. An interesting implication here is that if an investor buys each SIP for an equal amount of money at the closing price of its first trading day until the first anniversary, he would have to achieve a mean abnormal return as high as 42 percent and as low as 18 percent according to the model of calculation. The mean wealth relative of around 1.32 implies that an investor would have had to invest 24 percent less in each SIP than in each corresponding reference portfolio to achieve the same wealth after one year of public trading. Hence, it seems that SIPs sustain their positive initial performance in the long-run for up to one year.

Panels B and C provide results of the performance of SIPs over 3- and 5- year periods. It is found that the null hypothesis that the mean (median) abnormal returns are not different from zero is rejected at the one percent level for most models. However, both the *t*-statistic and z-statistic are clearly negative, implying that SIPs underperform the market in the long-run. The performance of Egyptian SIPs is somewhat disappointing for investors. The SIPs mean wealth relative of 0.71, in the best cases, implies that an investor would have to invest 41 percent more to get the same performance as the market. Moreover, as a worst situation, an investor would need to double his money to catch the market performance (the mean wealth relative is 51 percent only over 5-years using the CMI as a benchmark). Such results, then, support the idea that at some point after going

[9] Even though I listed results of all regression models, general and step-wise, I rely in the analysis on the latter only. The step-wise regression provides the best fitted model of the relationship between the dependent variable and explanatory variables by keeping only the significant variables in the final model

public the abnormal returns on IPOs may be negative (see among others, Ritter, 1991).

It is hard to explain why SIPs provide investors with positive abnormal returns in the short-run as well as in the long-run up to one year, but they could not sustain such performance longer since they underperform the market over 3- and 5-year periods. If we are talking about investors' over-optimism in the short-run, why do SIPs sustain their positive return after one year of trading? Does that mean investors need more than a year to realize that they were wrong and over-optimistic towards SIPs? There are two arguments which might explain the change in the behavior of Egyptian SIPs after one year: (i) First, for most SIPs, the government sells less than 100 percent in the first stage and keeps a controlling part of these stocks, so there is a possibility that the government manipulates accounting data before selling shares to investors and to continue to do so until it sells the majority of the firm. Consequently, when a new management team takes control of the privatized firms and posts new accounting data, investors realize that the economic situations of these firms do not reflect the fair values of their shares, so shares' prices decline sharply; (ii) Second, since some sectors of the economy were monopolized and the private sector could not enter those markets, SOEs had the whole market share. However, when the government sold those firms, it opened up the market and allowed the private sector to invest in these economic activities. Consequently, profitability of some privatized firms had to decline because of increasing competition. As a result, stock prices of these firms had to decrease to reflect the new economic situation facing these firms.

The second aim of this section is to understand the determinants of aftermarket abnormal performance of Egyptian SIPs. I perform several multivariate cross-sectional regressions over 1, 3, and 5 year periods[10]. The exogenous variables are the same used in explaining the initial excess returns. However, I add the latter one, initial excess returns, in the regression models. Table 5 reports the results obtained from the regression over different periods and for several methods and models of calculating the aftermarket abnormal returns.

As seen in panel B the aftermarket performance of SIPs over a one-year period is still driven by ex-ante uncertainty as documented for initial excess returns. However, two other factors prove to have negative impact on long-run abnormal returns: initial excess return and price earning ratio. This shows that investors might behave as profit takers, that is, benefit from the large increase in prices of SIPs in the short-run and then start to concentrate on some fundamental measures of stock price such as price earning ratio. All three variables are significant at the one percent level and the adjusted R-square, in a range of 42 to 50.7 percent, indicates a good fit and provides a very good explanation of the long-run abnormal returns of SIPs over one-year period.

Moving to panels B and C, the aftermarket abnormal returns of SIPs over 3 and 5 year periods are significantly affected by initial excess returns, price-earning ratio and demand multiplier. The negative coefficient for initial excess returns, indicating that investors were over-optimistic in the short run, is consistent with Levis (1993) and Paudyal et al. (1998). Whereas the negative coefficient for demand multiplier tends to support the argument of investors' sentiment, and reveals expectedly that firms with higher demand multipliers yield negative abnormal returns over longer horizons. The negative significant impact of price-earning ratio on aftermarket abnormal returns reflects that investors turn to be rational in relying on this measure in SIPs' valuation. The R-square of the fitted models provides a better explanation for the behavior of SIPs over a 3 years period compared with a 5 years period. The highest adjusted R-square over a 3 years period is 41.8 percent compared with 23.8 percent over a 5 years period, whereas the lowest R-square is 21.5 percent over a 3 year period compared with just 12.3 percent over a 5 years period. However, the significant coefficients of initial excess returns that are documented for all models might indicate that the Egyptian stock market was not efficient at the time of trading SIPs in the early stages.

V. Summary and Concluding Remarks

The paper examines the behavior of 53 Egyptian SIPs in the short-run and over several long-run periods from 1994 to 1998, and attempts to explain the reason behind such performance. My results show clearly that SIPs yield economically and statistically significant initial excess returns, in line with underpricing phenomenon of IPOs that has been widely documented in the literature. The behavior of SIPs in the aftermarket trading produces mixed results; positive abnormal returns for up to one year periods is documented. However, over 3 and 5 year periods, SIPs could not sustain their positive performance. Instead, they yield negative abnormal returns. For instance, a strategy of investing one pound in SIPs at the end of the first trading day and holding them for 3 or 5 years would have left investors with only 0.61 and 0.51 pounds, respectively, relative to each one pound invested in all firms listed in the Egyptian stock exchange. As Dewenter and Malatesta (2001) claim, the poor long-run returns may be attributed to systematically negative earnings surprises after the offers because of discretionary accruals in financial reports before offers. Consequently, the decline in profits reflects the reversal of pre-offers positive accruals, where SIPs would yield negative abnormal returns if the government manipulates financial reports of its SOEs. Another argument for such negative performance of SIPs in the long-run is related to the power of competition. In this context, it is worth

[10] I estimate the multivariate cross-sectional regression analyses using CMI and IND benchmarks but I report only results of IND benchmark in the analysis for the sake of space. However, results are similar using CMI or IND index. The results using CMI are available from the author upon request.

mentioning that some privatized firms, after going public, lost their monopoly positions as the government allowed private sector to invest in some sectors that were closed before. Hence, the profitability of privatized firms declined because of the increasing competition, and investors suffered poor long-run returns on SIPs as a result.

In an attempt to provide explanations for the initial excess returns and aftermarket performance of Egyptian SIPs, I estimate several multivariate cross-sectional regression models. The results indicate that ex-ante uncertainty and demand multiplier are the only significant variables in determining the initial excess returns, while the long-run abnormal returns are driven, mainly, by initial excess returns and price-earning ratio, in addition to demand multiplier and ex-ante uncertainty. The implication here is that investors over time tend to concentrate on some valuation models to determine stock prices.

The paper, however, leaves us with an resolved issue: the positive abnormal returns of SIPs in the short-run and the negative abnormal performance in the long-run. Is this phenomenon due to the fact that investors are over-optimistic at the date of offerings and short-run trading, which leads to short-run stock prices above their (fair) equilibrium level, and when they correct their mis-valuations over time this results in negative abnormal long-run returns? Or does the government deceive investors by manipulating financial reports of privatized firms in the pre-offer period? Or can the abnormal negative returns of SIPs be attributed to market inefficiency? It could be argued that by extending the sample period beyond 5 years, which this paper covers, additional evidence can be gained regarding some of the patterns of SIPs' behavior. More investigation is needed before the results of this paper can be interpreted more generally.

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Table 1: Number of Privatized Firms in Egypt

Year	Full Privatization				Partial Privatization			Yearly Total	
	Anchor Investor	Majority IPO*	ESA**	Liquidation	Minority IPO*	Asset Sales	Leases	Number	Value***
1990	–	–	–	1	–	–	-	1	n.a.
1991	–	–	–	3	–	–	–	3	n.a.
1992	–	–	–	1	–	–	–	1	n.a.
1993	–	–	–	6	–	–	–	6	n.a.
1994	3	-	7	2	2	–	–	14	664
1995	1	1	3	2	7	–	–	14	1215
1996	3	13	–	1	6	1	-	24	2791
1997	3	14	3	3	2	1	2	28	3396
1998	2	8	12	6	1	3	-	32	2361
1999	8	–	5	7	–	2	6	28	2784
2000	5	1	0	3	0	6	10	25	2476
Until Feb.2001	1	**0**	**0**	**2**	–	**3**	2	***8***	n.a.
Total	*26*	**37**	**30**	**37**	**18**	*16*	**20**	*184*	**15687**

Notes: In this table, I provide number of privatized firms classified by the method of sale, and year by year. I also present the value of privatized firms for each year and the total until February 2001; * Initial Public Offering, ** Employees shareholders association, *** Million of Egyptian pound (Current rate 1 L.E.=0.26 US$

Source: - The Egyptian Ministry of Public Enterprise Sector, (1998), *Privatization Program Performance from the Start to February 2001*, (Cairo: MPES).

Table 2: Basic Descriptive Statistics for Initial and Aftermarket Returns of SIPs

Panel A: Initial returns (53 firms)

	SIPs	MK	IND
Mean	**0.084**	**0.002**	**0.003**
Median	**0.05**	**-0.0004**	**0.0003**
Maximum	0.55	0.064	0.069
Minimum	-0.05	-0.026	-0.027
Standard deviation	0.11	0.012	0.013
Standard skewness	8.0	7.8	7.7
Standard kurtosis	13.7	22.3	22.5

Panel B: 12 months cumulative returns and buy-and-hold returns (53 firms)

	Cumulative returns					Buy-and-hold returns				
	SIPs	MAM		CAPM		SIPs	MAM		CAPM	
		CMI	IND	CMI	IND		CMI	IND	CMI	IND
Mean	**0.44**	**0.25**	**0.26**	**0.24**	**0.26**	**0.70**	**0.29**	**0.29**	**0.28**	**0.31**
Median	**0.34**	**0.19**	**0.19**	**0.12**	**0.15**	**0.24**	**0.22**	**0.17**	**0.12**	**0.15**
Maximum	2.36	0.67	1.04	0.98	1.03	5.54	0.93	1.55	1.23	1.53
Minimum	-0.86	-0.16	-0.10	-0.08	-0.08	-0.59	-0.16	-0.10	-0.08	-0.07
Standard deviation	0.70	0.26	0.24	0.26	0.28	1.20	0.33	0.32	0.33	0.38
Standard skewness	1.96	0.44	1.86	4.15	3.70	7.72	1.10	4.06	4.22	4.54
Standard kurtosis	0.58	-1.99	0.76	1.80	0.79	10.90	-1.88	4.52	1.73	2.35

Table 2: Contd.

Panel C: 36 months cumulative returns and buy-and-hold returns (51 firms)										
	Cumulative returns					Buy-and-hold returns				
	SIPs	MAM		CAPM		SIPs	MAM		CAPM	
		CMI	IND	CMI	IND		CMI	IND	CMI	IND
Mean	**0.12**	**0.65**	**0.61**	**0.54**	**0.50**	**0.18**	**0.92**	**0.82**	**0.72**	**0.67**
Median	**0.20**	**0.60**	**0.67**	**0.46**	**0.48**	**0.06**	**0.78**	**0.85**	**0.65**	**0.59**
Maximum	1.96	0.93	1.23	1.86	1.22	3.47	1.99	1.92	2.71	1.92
Minimum	-1.42	0.24	0.09	0.10	-0.08	-0.90	0.16	0.11	-0.02	-0.35
Standard deviation	0.82	0.19	0.20	0.34	0.34	0.87	0.39	0.37	0.55	0.64
Standard skewness	0.04	-0.56	-0.88	1.56	0.80	1.49	1.78	1.08	3.71	1.89
Standard kurtosis	-0.92	-1.44	1.99	1.41	-0.11	1.98	0.55	0.94	3.69	-0.38

Panel D: 60 months cumulative returns and buy-and-hold returns (33 firms)										
	Cumulative returns					Buy-and-hold returns				
	SIPs	MAM		CAPM		SIPs	MAM		CAPM	
		CMI	IND	CMI	IND		CMI	IND	CMI	IND
Mean	**0.48**	**1.00**	**0.93**	**0.86**	**0.73**	**0.33**	**1.63**	**1.47**	**1.39**	**1.12**
Median	**0.50**	**1.03**	**0.95**	**0.76**	**0.65**	**0.21**	**1.69**	**1.44**	**1.21**	**0.87**
Maximum	2.50	1.30	1.44	1.97	1.62	1.66	2.28	2.60	3.08	2.93
Minimum	-0.77	0.57	0.55	0.35	0.10	-0.78	0.53	0.76	0.55	-0.08
Standard deviation	0.75	0.17	0.15	0.41	0.43	0.72	0.39	0.34	0.71	0.79
Standard skewness	0.81	-1.92	1.05	1.93	0.89	0.85	-1.82	1.99	1.53	1.46
Standard kurtosis	0.18	0.79	1.98	0.39	-0.74	-0.98	1.11	1.37	-0.54	-0.32

Notes: The table shows basic descriptive statistics for initial and aftermarket raw returns of Egyptian share issue privatizations SIPs and their benchmarks. CMI is the capital market index, IND is the industry index, and MAM is the market-adjusted model. The table includes measures of central tendency, variability, and measures of shape I provide the mean, the median, the maximum, the minimum, and the standard deviation values for each return of SIPs and their corresponding reference portfolios. I list also the standard skewness and the standard kurtosis, which can be used to determine whether returns are normally distributed.

Table 3: Initial Excess Returns of SIPs and their Determinants

Panel A provides initial excess returns for 53 share issue privatizations (SIPs), which is calculated as: $ar_{i,t} = r_{i,t} - r_{crp,t}$, where $ar_{i,t}$ is the market-adjusted or excess return for security *i* for period *t*, in which *t* is the period from subscription for SIP to the closing of the first trading day, and $r_{crp,t}$ is the return on a corresponding reference portfolio, that is general market index or industry index. The *t*-statistic for the average excess returns is computed as $tar = \overline{ar_{i,t}} / (\sigma(ar_{i,t} / \sqrt{n})$, where $\overline{ar_{i,t}}$ is the sample average of initial excess returns, and $\sigma(ar_{i,t})$ is the cross-sectional sample standard deviation of initial excess returns. The *z* statistic is based on the Wilcoxon signed-rank test. I provide the number of firms that experience positive or negative initial excess returns, the mean and median values of initial excess returns, and the *t* and *z* statistics values with their significance level. Mean (median) wealth relative is calculated as the ratio of one plus the mean (median) initial raw returns of SIPs divided by one plus the mean (median) initial raw return on a corresponding reference portfolio.

Panel B shows the results from multivariate cross-sectional regression analysis based on the following model: $ar_{i,t} = \alpha + \beta_1 Exante_i + \beta_2 DM_i + \beta_3 PSO_i + \beta_4 Timing_i + \beta_5 MV_i + \beta_6 PER_i + \varepsilon_i$, where $ar_{i,t}$ is the initial excess return of firm *i* that refers to the level of underpricing, $Exante_i$ refers to the ex-ante uncertainty measured by the standard deviation of daily returns of firm *i* one year following official listing, DM_i is the times shares over-subscribed for the firm *i*, PSO_i is the proportion of shares offered for the firm *i*, $Timing_i$ is a proxy for the time of privatization that equals one if the firm *i* is privatized recently and zero otherwise, MV_i refers to the market volatility, which calculated as the standard deviation of daily market returns over two months prior to the application close for the firm *i*, and PER_i is price-earning ratio for the firm *i*. I provide general and step-wise models in which the latter determines the most efficient explanation of factors governing the initial excess returns. CMI is the capital market index, IND is the industry index, and DW is Durbin-Watson statistic.

Panel A: Initial abnormal returns for SIPs								
	Firms with > 0 abnormal return	**Firms with ≤ 0 abnormal return**	**Mean**	***t*-stat**	**Median**	***z*-stat**	**Mean wealth relative**	**Median wealth relative**
CMI	46	7	0.082	5.62*	0.051	5.74*	1.08	1.05
IND	46	7	0.081	5.58*	0.051	5.67*	1.08	1.05

Panel B: Multivariate cross- sectional regression analysis for the determinants of initial abnormal returns of SIPs

	CMI				**IND**			
	General Model		**Step-Wise Model**		**General Model**		**Step-Wise Model**	
	Coefficient	***t*-stat**	**Coefficient**	***t*-stat**	**Coefficient**	***t*-stat**	**Coefficient**	***t*-stat**
Intercept	-0.13	-2.14**	-0.07	-2.70*	-0.13	-2.13*	-0.07	-2.73*
Ex-ante	1.26	1.29	1.88	2.08**	1.34	1.35	1.94	2.12**
DM	0.03	7.00*	-0.03	9.03*	0.03	6.87*	0.03	8.88*
PSO	0.04	0.99	-	-	0.04	0.90	-	-
Timing	-0.03	-1.35	-	-	-0.03	-1.30	-	-
MV	-0.84	-0.21	-	-	-0.67	-0.17	-	-
PER	-0.006	-1.37	-	-	-0.006	-1.35	-	-
R^2 %	67.8		65.4		67.1		64.8	
Adj. R^2 %	63.6		64.1		62.8		63.4	
F-value	16.16*		47.2*		15.61*		46*	
DW-stat.	1.97		1.77		1.97		1.79	

Note: * Significant at the 1% level and ** Significant at the 5% level.

Table 4: Aftermarket Performance of SIPs

The tables provides aftermarket performance of share issue privatizations (SIPs) over one year (panel A), three years (panel B) and five years (panel C). The aftermarket abnormal returns are calculated based on buy-and hold returns and cumulative returns methods, using market-adjusted model and CAPM. The market adjusted return (MAR)= $R_{i,t} - R_{crp,t}$ where $R_{i,t}$ refers to the raw return for security i for the aftermarket month t, and $R_{crp,t}$ is the raw return on corresponding reference portfolio for the aftermarket month t. While $CAPMAR_{i,t} = R_{i,t} - R_{f,t} - \beta_i[R_{crp,t} - R_{f,t}]$, where $CAPMAR_{i,t}$ is the abnormal return using CAPM, $R_{i,t}$ refers to the monthly return for security i in month t, $R_{f,t}$ is the risk-free rate proxied as short-term one-month rate for bank deposits, β_i is the risk of security i compared with the market (corresponding reference portfolio), and $R_{crp,t}$ indicates the monthly return on the corresponding reference portfolio in month t. $CAR_{i,s,e} = \sum_{t=s}^{e} AR_{i,t}$, where $CAR_{i,s,e}$ is the cumulative abnormal return, which takes the form of MAR or CAPMAR, for security i from the event month s to the event month e, where s is the starting month after trading of SIP and e is the anniversary month of SIP (12, 36, and 60 months) or until the date of de-listing.

The $BHAR_{i,T} = \left[\prod_{t=1}^{\min\{T, delisting\}} (1 + r_{i,t}) - 1\right] - \left[\prod_{t=1}^{\min\{T, delisting\}} (1 + r_{crp,t}) - 1\right] \quad T = \{252, 756, 1260\}$, where $BHAR_{i,T}$ is buy- and-hold abnormal return for security i, which takes the form of MAR or CAPMAR, in period T, where T is the aftermarket trading day number 252, 756 and 1260, respectively, $t=1$ indicates the first aftermarket trading day, and $\min\{T, delisting\}$ refers to the earlier of the last day before delisting of SIP.

The t-statistic for the average aftermarket performance is computed as $tAR = \overline{AR_{i,t}} \Big/ \left(\sigma(AR_{i,t}) \Big/ \sqrt{n}\right)$, where $\overline{AR}_{i,t}$ is the sample average aftermarket abnormal return, which takes the form of MAR or CAPMAR, and $\sigma(AR_{i,t})$ is the cross-sectional sample standard deviation of aftermarket abnormal returns. The z statistic is based on the Wilcoxon signed-rank test. I provide the number of firms that experience positive or negative aftermarket abnormal returns, the mean and median values of aftermarket abnormal returns, and the t and z statistics values with their significance level. Mean (median) wealth relative is calculated as the ratio of one plus the mean (median) buy-and-hold aftermarket raw returns of SIPs divided by one plus the mean (median) buy-and-hold aftermarket raw return on a corresponding reference portfolio. CMI is the capital market index and IND is the industry index.

Panel A: 12 months cumulative and buy-and-hold abnormal returns (53 firms)

	CAR				BHAR			
	MAR		CAPM		MAR		CAPM	
	CMI	IND	CMI	IND	CMI	IND	CMI	IND
Firms with > 0 abnormal return	33.00	31.00	33.00	32.00	29.00	28.00	25.00	26.00
Firms with ≤ 0 abnormal return	20.00	22.00	20.00	21.00	24.00	25.00	28.00	27.00
Mean abnormal returns	0.19	0.22	0.20	0.18	0.41	0.41	0.42	0.39
t- statistics	2.25**	2.49**	2.44**	2.06**	2.27**	2.08**	2.33**	2.10**
Median abnormal returns	0.12	0. 07	0.16	0.06	0.05	-0.02	0.06	-0.004
z- statistic	2.09**	1.98**	2.14**	1.82***	1.46	0.96	1.43	1.18
Mean wealth relative					1.32	1.32	1.33	1.30
Median wealth relative					1.02	1.06	1.11	1.08

Panel B: 36 months cumulative and buy-and-hold abnormal returns (51 firms)

	CAR				BHAR			
	MAR		CAPM		MAR		CAPM	
	CMI	IND	CMI	IND	CMI	IND	CMI	IND
Firms with > 0 abnormal return	15.00	13.00	16.00	16.00	13.00	11.00	12.00	13.00
Firms with ≤ 0 abnormal return	36.00	38.00	35.00	35.00	38.00	40.00	39.00	38.00
Mean abnormal returns	-0.53	-0.49	-0.42	-0.37	-0.73	-0.64	-0.54	-0.48
t- statistic	-4.88*	-4.58*	-3.59*	-3.1*	-5.53*	-4.90*	-3.77*	-3.16*
Median abnormal returns	-0.56	-0.44	-0.39	-0.36	-1.07	-0.94	-0.68	-0.65
z- statistic	-4.1*	-3.97*	-3.19*	-2.96*	-4.68*	-4.41*	-3.82*	-3.52*
Mean wealth relative					0.61	0.65	0.69	0.71
Median wealth relative					0.60	0.57	0.64	0.67

Table 4: Contd.

Panel A: 60 months cumulative and buy-and-hold abnormal returns (33 firms)								
	CAR				BHAR			
	MAR		CAPM		MAR		CAPM	
	CMI	IND	CMI	IND	CMI	IND	CMI	IND
Firms with > 0 abnormal return	9	11	10	10	2	4	5	6
Firms with ≤ 0 abnormal return	22	20	21	21	29	27	26	25
Mean abnormal returns	-0.52	-0.45	-0.38	-0.25	-1.30	-1.14	-1.06	-0.79
t- statistic	-4.03*	-3.52*	-2.66**	-1.80***	-10.2*	-8.22*	-6.18*	-4.06*
Median abnormal returns	-0.50	-0.48	-0.55	-0.45	-1.30	-1.3	-1.18	-1.01
z- statistic	-3.32*	-2.95*	-2.46**	-1.75***	-4.77*	-4.54*	-4.32*	-3.28*
Mean wealth relative					0.51	0.54	0.56	0.63
Median wealth relative					0.45	0.50	0.55	0.65

Note: * Significant at the 1% level, ** Significant at the 5% level and *** Significant at the 10% level.

Table 5: Multivariate Cross-Sectional Regression Analysis of the Determinants of Aftermarket Abnormal Returns of SIPs

The table shows the results from multivariate cross-sectional regression analyses of the determinants of aftermarket abnormal returns over 1, 3, and 5 years. The following model is employed:

$$AFTMARKAR_{i,T} = \alpha + \beta_1 ar_{i,t} + \beta_2 Exante_i + \beta_3 DM_i + \beta_4 PSO_i + \beta_5 Timing_i + \beta_6 MV_i + \beta_7 PER_i + \varepsilon_i$$

where $AFTMARKAR_{i,T}$ is the aftermarket abnormal return for security i over T periods, which takes the form of cumulative returns or buy-and-hold returns using market-adjusted model or the CAPM, $ar_{i,t}$ is the initial excess return of firm i, $Exante_i$ refers to the ex-ante uncertainty measured by the standard deviation of daily returns of firm i one year following official listing, DM_i is the times shares over-subscribed for the firm i, PSO_i is the proportion of shares offered for the firm i, $Timing_i$ is a proxy for the time of privatization which equals one if the firm i is privatized recently and zero otherwise, MV_i refers to the market volatility, which calculated as the standard deviation of daily market returns over two months prior to the application close for the firm i, and PER_i is price-earning ratio for the firm i. I provide general and step-wise models in which the latter determines the most efficient explanation of factors governing the aftermarket abnormal returns. CMI is the capital market index, IND is the industry index, and DW is Durbin-Watson statistic.

Panel A: 12 months cumulative and buy-and-hold abnormal returns (53 firms)

	CAR								BHR							
	MAM				CAPM				MAM				CAPM			
	General Model		Step-wise model		General Model		Step-wise model		General Model		Step-wise model		General Model		Step-wise model	
	coeff.	t-stat	coeff.	t-stat	coeff.	t-stat	coeff.	t-stat	coeff.	t-stat	coeff.	t-stat	coeff.	t-stat	coeff.	t-stat
Intercept	0.71	1.48	0.58	2.1**	0.62	1.47	0.76	2.68*	1.13	1.04	0.31	0.45	0.89	0.87	0.62	0.91
ar	-0.62	-0.57			-1.35	-1.41	-1.35	-3.2*	-2.23	-0.90			-2.97	-1.28	-3.02	-3.6*
Ex-ante	3.24	4.31*	3.11	4.61*	3.04	4.6*	3.12	5.02*	8.46	5.01*	7.54	4.94*	8.5	5.37*	8.38	5.66*
DM	-0.23	-0.42			-0.005	-0.10			-0.027	-0.22			-0.001	-0.01		
PSO	0.24	0.82			0.25	0.95			0.13	0.19			0.18	0.29		
Timing	-0.11	-0.53			-0.01	-0.05			-0.16	-0.36			-0.15	-0.36		
MV	-1.51	-0.05			-0.25	-0.01			-0.43	-0.63			-0.39	-0.61		
PER	-0.14	-3.92*	-0.13	-5.5*	-0.13	-4.2*	-0.13	-5.8*	-0.25	-3.1*	-0.20	-3.8*	-0.23	-3.01*	-0.23	-4.3*
R2 %	54.1		51.1		54.6		53.5		48.0		44.2		49.9		49.1	
Adj. R2 %	46.9		49.2		47.6		50.7		40.0		42.0		42.1		46.0	
F-value	7.57*		26.2*		7.75*		18.83*		5.94*		19.84*		6.39*		15.75*	
DW-stat.	1.80		1.90		1.93		1.96		1.81		1.89		1.90		1.94	

Table 5: Contd.

Panel A: 36 months cumulative and buy-and-hold abnormal returns (51 firms)

	CAR								BHR							
	MAM				CAPM				MAM				CAPM			
	General Model		Step-wise model		General Model		Step-wise model		General Model		Step-wise model		General Model		Step-wise model	
	coeff.	t-stat	coeff.	t-stat	coeff.	t-stat	coeff.	t-stat	coeff.	t-stat	coeff.	t-stat	coeff.	t-stat	coeff.	t-stat
Intercept	0.81	1.32	1.12	3.67*	0.74	1.04	1.28	3.53*	0.23	0.28	0.20	0.28	-0.12	-0.14	-1.07	-5.1*
ar	-2.46	-2**	-2.35	-2.1**	-3.28	-2.1**	-3.11	-2.6**	-4.20	-2.2**	-4.16	-2.4**	-5.82	-2.7*	-6.12	-3.2*
Ex-ante	2.21	0.23			1.51	1.35			1.76	0.52			1.77	0.12		
DM	-0.09	-1.25			-0.10	-1.25			-0.18	-2.1**	-0.21	-2.2**	-0.24	-2.4**	-0.32	-3.96*
PSO	0.17	0.44			0.07	0.15			0.19	0.37			0.02	0.03		
Timing	-0.24	-1.05			-0.29	-1.10			-0.15	-0.48			-0.10	-0.28		
MV	-2.74	-0.72			-8.8	-0.24			-0.23	-0.005			-1.32	-0.23		
PER	-0.13	-3*	-0.16	-5.6*	-0.13	-2.6**	-0.16	-4.75*	-0.11	-2.1**	-0.12	-2.4**	-0.08	-1.20		
R2 %	45.0		42.6		41.0		36.8		32.7		32.0		27.7		24.6	
Adj. R2 %	36.1		41.8		33.6		34.2		21.8		27.7		16.5		21.5	
F-value	5.03*		31.7*		4.26*		22.6*		2.98**		7.38*		2.35**		7.83*	
DW-stat.	1.91		1.93		1.99		2.14		1.91		1.93		1.96		1.97	

Panel A: 60 months cumulative and buy-and-hold abnormal returns (33 firms)

	CAR								BHR							
	MAM				CAPM				MAM				CAPM			
	General Model		Step-wise model		General Model		Step-wise model		General Model		Step-wise model		General Model		Step-wise model	
	coeff.	t-stat	coeff.	t-stat	coeff.	t-stat	coeff.	t-stat	coeff.	t-stat	coeff.	t-stat	coeff.	t-stat	coeff.	t-stat
Intercept	1.37	1.70	1.1	2.1**	1.32	1.59	1.28	2.2**	0.39	0.46	0.11	0.20	-0.71	-0.65	-1.36	-4.1*
ar	-1.79	-1.08	-2.08	-2.2**	-2.86	-1.63	-2.22	-2.3**	-2.02	-1.13			-4.00	-1.8***	-4.62	-2.3**
Exanti	7.20	0.63			9.12	1.56			9.3	0.75			0.73	0.05		
DM	-0.03	-0.41			-0.01	-0.06			-0.04	-0.47			-0.15	-1.62	-0.19	-2.1**
PSO	0.29	0.47			0.36	1.27			1.12	1.11			0.92	0.82		
MV	-3.32	-0.05			-2.82	0.19			-2.40	-0.36			-4.57	-0.63		
PER	-0.18	-2.7*	-0.16	-2.9*	-0.17	-2.3**	0.15	-2.4**	-0.15	-2.1**	-0.15	-2.4**	-0.03	-0.33		
R2 %	31.0		28.9		32.8		23.3		29.6		16.1		24.3		16.1	
Adj. R2 %	19.2		23.8		22.6		20.7		18.9		13.2		9.6		12.3	
F-value	2.86***		5.68*		2.47***		4.31**		2.62***		5.56**		1.68		2.68***	
DW-stat.	1.93		1.98		1.91		1.95		2.12		n.a.		1.98		2.03	

Note: * Significant at the 1% level,** Significant at the 5% level and *** Significant at the 10% level.