

# Valuation of Large Blocks of Shares and the Private Benefits of Control

**Vladimir Atanasov\***  
Department of Finance  
Penn State University  
609 Business Administration Building  
University Park, PA 16802  
[vaa3@psu.edu](mailto:vaa3@psu.edu)

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# Valuation of Large Blocks of Shares and the Private Benefits of Control

## **Abstract**

This study analyzes the valuation of large blocks of shares by institutional investors. Using a unique data set, the existence of private benefits of control for different sized blocks is documented. The data and empirical methodology allow me to compute an estimate of the value of control that is free of selection bias, and accounts for coalition formation and the endogeneity of firm ownership structure. The conditional expected prices of shares in majority blocks are found to be about ten times higher than then the prices of shares in small minority blocks. Further exploration of the determinants of portfolio choices documents that institutions prefer to obtain large blocks in smaller firms, and in firms located in their geographical proximity. Investors with more capital are more likely to bid for large blocks and to form bidding coalitions.

JEL codes: G32, G34, D44, L33

## I. Introduction

Equity entitles its owner to the right to receive a stake in all future cash flows of a company or its liquidation value, and the right to vote. If an investor is sufficiently large, she can utilize her right to vote in two ways. First, compared to small shareholders, a large shareholder has both higher incentives and better opportunities to monitor management and improve firm performance<sup>1</sup>. The activities of the large shareholder lower agency costs in the firm and increase the cash flows for all shareholders. Second, a controlling shareholder or a coalition can attain direct monetary or other private benefits of control at the expense of the cash flows of smaller shareholders<sup>2</sup>. In the extreme case when the legal environment does not offer any protection of the ownership rights of small shareholders, the owner of a majority interest in a company can expropriate fully all assets and cash flows of the company. In such settings, the ownership of sufficient control rights becomes a strong necessary condition to receive any cash flows after investing in equity.

The central goal of this study is to measure the value of private benefits of control associated with large blocks of equity. Isolating the value of voting rights from equity prices and especially

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<sup>1</sup> The literature on this subject is large. Notable theoretical studies include Shleifer and Vishny (1986), Grossman and Hart (1988), and Harris and Raviv (1988). For a survey see Shleifer and Vishny (1997).

<sup>2</sup> Abstracting from non-pecuniary control benefits like reputation or pure utility from having control, the direct effect for minority shareholders from the private benefits of control secured by a large shareholder is always negative *ex post*, after the large shareholder has increased firm value through monitoring. The existence of private benefits of control also has an indirect effect on minority shareholders wealth. Bebchuk and Jolls (1999) and Atanasov (2001) show that large shareholders (or managers) will spend more effort on increasing firm cash flows if they expect to receive a larger part of these cash flows. Private benefits of control may also make value-enhancing takeovers feasible by alleviating the free-riding problem. Empirical findings in Barclay and Holderness (1989) or Holderness and Sheehan (1988) demonstrate that in the US the overall effect of changes in control or the existence of majority shareholders for small shareholders wealth is positive. The results in these studies suggest that the existence of private benefits of control may not necessarily make small shareholders worse off, especially in economies where shareholder protection is good.

determining the size of the private benefits of control has been a major research question in corporate governance research. The current study employs a unique data set of differently priced bids submitted by institutional investors (the Bulgarian privatization funds) for shares of a large number of firms privatized in the Bulgarian mass privatization auctions. The empirical methodology applied below and the unique dataset allow for a thorough empirical analysis of the value of control.

Theoretically, voting power is measured by power indices like the Shapley-Shubik index or the Banzhaf index. These measure the *ex ante* bargaining power in the distribution of control benefits or the potential to be pivotal in a voting contest. One result from the theoretical work on measures of control is that while cash flow rights per share are constant regardless of the number of shares in a block, the value of control associated with a block of equity depends on the size of the block and the whole ownership structure of the company. As the size of an equity block increases, its voting rights may become disproportionately more valuable, because the owner of the block gains the potential to participate in controlling coalitions or even to become a majority shareholder and unilaterally govern the company. The control premium embedded in the price of each share is not independent of the identity of the investor holding the share and the distribution of equity among other investors. This fact makes impossible to measure control benefits using market prices<sup>3</sup>. The existence of bids at different prices for shares in the same company at the Bulgarian mass privatization auctions thus provides a natural experiment to detect private benefits of control.

Extant empirical evidence about the premium for control is offered by two broad sets of studies that also utilize the existence of more than one price for shares in the same company. The

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<sup>3</sup> Another reason why the value of control of a large block is hard to estimate is that besides control benefits, the accumulation of a large block of shares is also associated with liquidity costs and insufficient diversification. Examples of theoretical models analyzing these issues are Bolton and von Thadden (1998) and Maug (1998). The costs of holding large blocks confound the inference about the value of control, which in most cases is significant only in large blocks.

first approach is to document the premium of negotiated block transactions to the market price of publicly traded companies<sup>4</sup>. The price of a negotiated block transaction provides an estimate for the control benefits of the owner of one large block. The premium for control measured this way reflects also the bargaining power of the two parties in the transaction, and is affected by a selection bias because only occasions when a major shareholder decides to sell his stake are observed. Unlike studies of block transfers, the data in this paper contains the universe of valuations of all large investors that submitted a bid for shares in a particular company. The value of control associated with different sized blocks can be directly measured while controlling for selection bias.

The second group of studies examines the price differential between the share classes of dual-class firms<sup>5</sup>. Dual-class shares firms offer an opportunity to researchers to isolate the value of control by comparing the prices for shares that have similar dividend rights but different voting rights. The disadvantage of this approach is that it measures the voting power of the marginal shareholder multiplied by the probability of a control contest. If ownership is concentrated or the

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<sup>4</sup> Barclay and Holderness (1989, 1991), and Bebchuk (1994) show that on average large blocks trade at a premium in the USA, which implies that the private benefits of control dominate the costs of holding large blocks in public corporations. Based on Barclay and Holderness (1989) the control premium is found to be 20% of the stock price of publicly traded US companies. In contrast, Wruck (1989) and Hartzel and Smith (1993) find that large, privately placed blocks trade at a discount. Consistent with the notion that a large block may not have a large control value but always bears liquidity and undiversification costs, Barclay, Holderness, and Sheehan (2000) suggest that the discount of privately placed blocks (compared to the premium on publicly traded blocks) is caused by the fact that the holders of these blocks are more likely to refrain from active participation in firm governance, and forego the opportunity to gain private benefits of control. The recent cross-country study of Dyck and Zingales (2001) finds that the premium for control in 39 countries ranges from -4% to 65%.

<sup>5</sup> Some examples include Lease, McConnell, and Mikkelson (1983), and Zingales (1994). For a survey and a cross-country study of dual-class share firms see Nenova (2001). Based on results in Nenova (2001), the value of control measured by this approach ranges for different countries from as low as 0% to as high as 50% of the stock price.

market for corporate control is weak, the price differential of dual-class shares strongly underestimates the benefits of control of the major existing shareholders.

Both dual-class share and negotiated block transactions studies take the existing firm ownership structure as given and then measure control benefits as a function of ownership. A violation of the assumption that ownership is exogenous to control may lead to incorrect inference about the size of the private benefits of control due to the well-known simultaneity bias. Several studies have indeed shown that ownership is endogenously determined by the level of private benefits of control in a company<sup>6</sup>. These theoretical results and empirical findings entail a revisit of the evidence on the size of private benefits of control based on dual-class shares firms or negotiated block transactions. The Bulgarian mass privatization process provides a natural solution for the endogeneity of ownership structure and control problem, because the privatization constitutes an exogenous shock to ownership. The ownership structure of all privatized firms is afterwards created from scratch as a result of the investor bidding at the auctions.

The data in the study allows for the identification of bidding coalitions and voting agreements. Coalitional agreements change the control power of a block and they are accounted for in the estimation of control premiums. The opportunity to identify coalitions also generates unique insights about the value of forming coalitions, the distribution of gains among the coalitional partners, and the use of repeated interactions to alleviate incomplete contract problems.

The second goal of this study is to document the determinants of the investment decisions of large institutions in an economy where private benefits of control are especially large. When control benefits are substantial, the expected return of an investment becomes a function of the ownership structure of the company and especially of the size of the investment. The relationship between

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<sup>6</sup> Demsetz and Lehn (1985), Bebchuk (1999), Lamba and Stapledon (2001)

expected return and investment size complicates the portfolio problem of a large shareholder and makes classic portfolio theory results inapplicable. Recent work in Atanasov (2001) develops several empirically testable predictions about the factors that may increase the likelihood of an investor to include in his portfolio a large block of shares of a particular company<sup>7</sup>. The model shows that when a large block, in terms of percentage of total firm equity, is more valuable than a small block, an investor with a fixed budget constraint will prefer to buy large blocks in smaller firms. The investor can thus reduce the amount of diversifiable risk of her portfolio because the weight of each of these investments will be smaller. Similarly, an investor with a larger available capital will consider buying large blocks in more and larger firms than an investor with smaller capital. Last, investors will be more likely to buy large blocks in firms with lower unique risk and higher private benefits of control. The dataset of this study provides a convenient ground for testing these predictions.

In accordance with the main goals of this work, the following hypotheses are tested:

*(1) Substantial benefits of control exist. The value of the control premium is higher than the documented premium in previous research*

*(2a) Investors will be more likely to buy large blocks in smaller firms*

*(2b) Investors with larger capital will be more likely to buy large blocks*

*(2c) Investors located in the geographic proximity of a firm will be more likely to invest in this firm*

Hypothesis 1 states that the premium for control estimated using bid prices for large blocks should be higher than the premium found in negotiated block transaction and dual-class shares studies. This quantitative prediction about the size of the estimated premium for control is generated

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<sup>7</sup> There are only a few other examples of studies that model a portfolio problem with corporate governance features: Amihud and Barnea (1974), Gambarelli (1982), and Admati, Pfleiderer and Zechner (1994).

by two claims. The first claim, which was discussed above, is that the methodology and data limitations of both sets of existing studies may understate the value of the private benefits of control accruing to large blockholders. The second claim is that shareholder protection in Bulgaria is worse than that in developed markets or more mature emerging markets<sup>8</sup>. Weak minority shareholder protection translates into more opportunities for expropriation and respectively larger benefits of control<sup>9</sup>.

Hypotheses 2a, and 2b are straightforward. Hypothesis 2c is proposed as an attempt to address the prediction that investors will prefer firms with higher benefits of control and lower risk<sup>10</sup>. The preference of investors towards firms located in their geographic vicinity has been documented in Coval and Moskowitz (1999). There, the authors motivate the existence of this preference with asymmetric information. Investors may be in a position to gather more accurate information about firms in their geographical vicinity. Better-informed investors face less subjective uncertainty and respectively lower risk. Although not discussed in Coval and Moskowitz (1999) or the rest of the literature on home bias, monitoring or control issues may also contribute to the reasons why investor are more likely to include local firms in their portfolios. Controlling shareholders that are located close to a firm may be able to monitor managers better because the shareholders can more precisely ascertain managerial performance or can closely oversee firm

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<sup>8</sup> Black, Kraakman, and Tarassova (2000) well document the total lack of protection of minority shareholders in Russia, another country in transition, and describe the various ways that controlling shareholders have used to thoroughly expropriate the wealth of small shareholders.

<sup>9</sup> Dyck and Zingales (2001) propose that widespread tax evasion can also contribute to the existence of large private benefits of control because most firm cash flows are kept off the official books. Bulgaria also scores very highly on tax evasion.

<sup>10</sup> A previous draft using a much smaller data set posted an additional hypothesis that investors with expertise in a particular industry will be more likely to invest in firms in this industry. The results were consistent with the hypothesis. The reason that it is omitted here is due to data availability. See Appendix A for more details.

operations. Majority owners may also find more opportunities to extract private benefits of control from geographically adjacent firms. If firm unique risk and expected control benefits are important factors to consider when making investment decisions, and geographical proximity can reduce uncertainty and increase control benefits, then investors will be more likely to bid for firms located in their region.

In order to explore the predictions of the hypotheses outlined above, I estimate a polychotomous selection model developed by Lee (1983). The main finding is that blocks with *ex-ante* higher expected voting power are valued at higher prices. After controlling for selection and simultaneity biases, the value of shares in controlling blocks is estimated to be as high as ten times the value of shares in small blocks. This evidence supports the first hypothesis that private benefits of control exist and are the dominant factor of investors' valuations when investor protection is weak and respectively the cash flow rights of minority investors are of negligible value. The estimated premium for control is much larger than the documented premium in the USA and other developed markets. This finding is consistent with the conjecture that the size of private benefits of control is inversely related to the level of minority investor protection<sup>11</sup>.

The results offer strong support for the portfolio selection hypotheses. Smaller firms are very attractive targets for large investors. Institutions with more capital are more likely to submit large bids. Investors submit significantly more bids for firms in the same region. The overall results support the hypotheses developed in Atanasov (2001) and extend the findings of Coval and Moskowitz (1999) that investors have a strong preference for local firms.

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<sup>11</sup> See La Porta et al. (2000), Dyck and Zingales (2001), and Nenova (2001) and the papers cited within for other studies that document this relationship.

The remainder of the paper is structured as follows. The next section describes the institutional details of the Bulgarian mass privatization scheme. Section III discusses the data and provides illustrative summary statistics. Section IV develops the testable predictions from the hypotheses and supports them with univariate statistics. Section V introduces the econometric model, reports the results of the multivariate hypotheses tests, and provides estimates of the value of control. Section VI summarizes the main findings of the paper and concludes. Details about the creation of the data set are reported in Appendix A, while Appendix B contains a description of the implementation of the Lee (1983) selection model.

## **II. Institutional Framework**

### *II.A. The Mass Privatization Auctions<sup>12</sup>*

The Bulgarian government started the process of mass privatization at the beginning of 1996. Every Bulgarian voter could acquire 25,000 vouchers for a nominal fee. These vouchers could be used to bid for shares of 1,040 firms offered in three auction rounds. Each auction round was held as a set of simultaneous (one for each firm) sealed-bid, discriminatory (“pay-your-bid”) auctions with a reserve price. All unsold firm shares in one round were offered in the next round with a lower reserve price. At the same time, all vouchers submitted in unsuccessful bids were returned to the investors and could be used again in subsequent rounds.

In the first round, 968 firms were offered, 64 additional firms were offered in the second round, and another 8 firms were introduced in the third. In about 80% of the firms, more than 51% of the shares were offered for mass privatization. The remaining 20% of the firms, some of the

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<sup>12</sup> See Miller and Petranov (2000) for more information about the Bulgarian Mass Privatization Scheme and the key participants in the auctions.

biggest and most important Bulgarian state-owned enterprises, offered 10% to 45% of their shares to the public. The remaining equity in these firms was either owned by an outside investor or was kept by the government to be sold for cash at a later date. Before the auctions started, 10% of the firm equity allocated for mass privatization was offered to employees. In most firms employees took advantage of this option, effectively reducing the supply of shares available for bidding at the auctions. Still, after the three auction rounds were over, almost all vouchers had been used and about 15% of the shares had not been bought and remained property of the State.

### *II.B. The Privatization Funds*

The Mass Privatization Law introduced a new legal entity, the privatization fund (PF). As stated in the law, the funds were created so that individual investors could achieve diversification and to create in each firm large shareholders that would engage actively in monitoring managers or restructuring. Besides participating on their own in the auctions, individual investors could also deposit their vouchers in a PF and in exchange receive shares in the portfolio subsequently acquired by the PF at the auctions. A total of 81 privatization funds were registered. After their registration was complete, the funds had several months during which they could advertise in public media, employ distribution agents, or use other channels to market themselves to the public. After the marketing campaign was over, the PFs had collected about 75% of the total number of vouchers distributed. The other 25% remained with individuals.

The sponsors of the PFs participated with a relatively small amount of capital (a minimum of about \$200,000) compared to the total equity of the funds. This separation of ownership and control generated the possibility of large agency costs between the fund founder-managers and the participating individual shareholders that deposited their vouchers in the fund. Another issue is that if the founders believed that they could be soon replaced in a control contest, they could opt for

short-term gains by investing in liquid securities, then converting these to cash, and transferring the proceeds to their own accounts. As it turned out, soon after the auctions were over, the managers of most funds solidified their position by raising the fund equity capital or otherwise changing the fund charter up to the point where they had 50%, 67%, or more of the voting shares and secured complete control over the distribution of cash flows. After this demonstration of one-shot extreme agency costs, from agents the managers became principals.

If most managers expected that they will be able to execute successfully the charter amendments, establish full control over their PF, and appropriate all cash flows associated with it, it can be safely assumed in the analysis below that they submitted bids for large blocks that maximize the expected utility of holding the whole fund portfolio. In the sections below, the words Privatization Fund, institutional investor, or large investor will substitute for the founder-managers of the privatization funds, who are the only decision makers and utility maximizers regarding the fund portfolios.

### *II.C. Bidding Coalitions and Trading Agreements*

The PFs were limited by law from acquiring more than 34% of the shares of a single enterprise during the auction rounds. The 34% upper limit on blocks acquired by a single fund in a firm was restrictive and this facilitated the formation of bidding coalitions where two or more funds agree to jointly bid for a firm and acquire a 51% or larger block of shares<sup>13</sup>. Conversations with managers of the PFs revealed that a common coalitional bidding scheme is as follows. A fund interested in securing majority control in a firm decides to submit a bid for 34% of the capital of the

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<sup>13</sup> Another possible strategy available to the PFs is to bid for the maximum 34% block and hope that no other large bidder enters the auction. This strategy can be costly compared to securing majority through a coalitional bid because

firm. Then, the fund signs a preliminary contract with another fund, where the second fund commits to acquiring an additional 17% on behalf of the first fund. It is agreed that the 17% block will be transferred to the 34% holder at a later date. Usually such contracts were agreed between the same two funds in the case of more than one firm with the two funds interchanging roles as the 34% and 17% buyer. Such repeated interactions guaranteed that the obligations under the contracts would be honored. Other coalitional agreements included two funds submitting equally sized bids as long-term strategic alliances to share control of a firm, or a 34% bidder using several other funds to buy smaller blocks on his behalf.

About nine months after the end of the last auction, all firms that were offered in the mass privatization auctions were registered on the Bulgarian Stock Exchange (BSE). This allowed the PFs to freely exchange blocks of shares acquired in the auctions and fulfill their coalitional contract agreements. Consequently, within several months after their shares started trading on the BSE most firms had a majority holder – a single PF, a coalition, or another large investor<sup>14</sup>.

### **III. Data<sup>15</sup>**

#### *III.A. Sample Selection*

Names and descriptions of all variables used in this study are reported in Table I. The study focuses on the bids of the Bulgarian privatization funds for firms that were offered on the second

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control over the firm could be contested. The holder of the 34% would have to spend cash and purchase more shares on the stock exchange in order to accumulate a majority block and insulate herself from any hostile bidders.

<sup>14</sup> Some coalitional agreements for majority blocks were executed on behalf of a third party, an investor that was interested in acquiring a privatized firm but was not registered as a privatization fund. At the BSE the majority block was transferred to this third party in exchange for cash.

<sup>15</sup> A description of the data sources and details about the creation of the data set are included in Appendix A.

round of the Bulgarian mass privatization auctions<sup>16</sup>. A total of 820 firms had shares available for purchase on the second auction round. Table II reports the distribution of these 820 firm across different categories depending on the amount of equity offered for purchase on the second round and the type of bids submitted for each firm<sup>17</sup>. Firms where control cannot be obtained because they have less than 50% of their shares available at the second round are much less likely to attract bids by privatization funds. Out of 157 firms where less than 50% of their capital was allocated for mass privatization, 93 firms or 59% receive no bids. Similarly, no PFs bid for 58% of the firms that offered more than 50% for mass privatization but had less then 50% of equity left unsold on the second auction round. These firms do not attract many large bids either, with only 3 to 10% of the firms receiving at least one large bid. Conversely, large bidders preferred to bid for firms where control is possible and especially for firms where no footholds were established on the first auction round. More than 50% of these firms receive at least one large bid, and only 30 to 42% of the firms do not receive a bid by a PF.

The purpose of this paper is to study the valuation of equity blocks revealed in bid prices. It is unavoidable in such study to drop firms that are in the original population but receive no bids and respectively no information about the value of their equity is revealed. A deletion of these firms may miss important information about the population and impose a possible selection bias. To account for this bias, the empirical regularities about the probability of a firm receiving a bid of certain size are explored using a multinomial logit model. The results in Table III demonstrate that smaller firms and firms with zero or smaller established footholds on the previous auction round are

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<sup>16</sup> The bid data for the first auction round was not available, and there were much fewer firms left on the third round.

<sup>17</sup> For the most part of the paper, two types of bids will be considered: small bids, which will be independent bids for less than 25% of firm equity, and large bids, which will be bids for more than 25% of firm equity or bids in majority coalitions.

more likely to receive a large bid. The strongest result in the table is the effect of the availability of 50% or more of firm equity at the second auction round on the submission of large and small bids. Firms, where the majority of shares was still unclaimed, are much more likely to receive a large bid. On the contrary, smaller bidders preferred firms where either the majority block was still held by the government or some of the shares in the majority block were already purchased on the first auction round. The results in Table III are confirmed by estimating Poisson models explaining the number of small and large bids that were submitted for a firm. The results from the Poisson model estimation are reported in Table IV. Smaller firms and firms where the majority of shares are still available receive a larger number of large bids and fewer small bids.

In order to concentrate only on firms where majority control is possible and where no significant stakes were acquired at the first auction round, all subsequent empirical tests will be performed on the sample of all firms that have more than 50% of their vouchers available for purchase at the second round. An additional filter imposed is that firms should have not more than 1% of their shares bought by PFs on the first round<sup>18</sup>. There are 299 firms that satisfy these conditions. The PFs submitted bids for 180 of the 299 eligible firms and the empirical analysis will concentrate on this subset of firms. Of these firms, 35 are introduced for the first time on the second round. The remaining firms were introduced on the first round, but still had most of their shares available on the second round. Table V compares these firms to the rest of the firms that receive at least one auction bid by a privatization fund, but either have less than 50% of their equity available

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<sup>18</sup> The reason to drop from the sample 13 additional firms, where a majority is still available but there were blocks obtained by PFs on the first round, is to rule out dynamic block purchases or coalitional agreements, where one PF obtains a partial stake in a company on the first round and then on the second round either increases the stake by buying more shares or contacts another fund to do so in their account. Only a dynamic bidding and coalition formation model

for purchase, or more than 1% of their equity was bought by PFs on the first auction round.

Although the differences between the variables are not statistically significant, both the means and medians suggest that the sample firms are smaller, receive more large bids, and attract fewer small bids.

Before proceeding to further econometric tests of the size of the control premium for the final sample firms, it is necessary to discuss whether the results from this sample will be representative for the population of publicly traded firms in Bulgaria. The estimation sample consists of 180 firms out of more than a thousand firms eventually listed on the Bulgarian Stock Exchange. A brief analysis of the sample selection scheme reveals that, if anything, these 180 firms have on average smaller control benefits than the whole population of publicly traded firms. First, the sample firms are all firms where the Bulgarian government offered a majority of their shares on the mass privatization auctions. The majority blocks in the largest and most profitable firms that were most attractive to potential strategic investors were kept by the government to be sold for cash to one of these investors. Second, the main part of the sample consists of firms where a majority block was left untouched by bidders on the first auction round. It is natural to expect that the sample firms have lower control benefits than the firms that did not fall into the sample because the latter firms were sold out on the previous round. These two selection biases combine for the overall conclusion that there is no evidence that the control premium estimated over the sample firms will overstate the average control premium in the Bulgarian market. It is more likely that the sample results will be negatively biased estimates for the premium in the population.

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can fully control for such occasions. Such model is beyond the scope of this paper. Furthermore, the main results of the paper remain unchanged if the 13 firms are included in the estimation.

### *III.B. Bids by Privatization Funds*

Out of the 81-fund universe, 72 funds submit at least one bid for a firm in the 180-firm sample. The remaining 9 funds are dropped from further analysis. A total of 615 bids are submitted by the 72 funds. As was discussed in Section II.C, many funds submitted coalitional bids to jointly acquire a large, and in most cases, majority stake in a company. The empirical analysis of the value of control has to account for these coalitional bids because the voting power of the participants in coalitions is different than the voting power of single bidders. Appendix A briefly describes the procedure used to identify coalitional bids. The majority of the 615 bids, a total of 393, are bids submitted by coalitional partners (coalitional bids), while 222 bids are independently submitted (single bids).

The distribution of bid size, measured as percent of total firm equity for single bids is shown in Figure 1. More than 50%, 118 out of 222, of all single bids are for the maximum allowed 34% stake. The distribution of coalitional bids is shown on Figure 2. The striking difference with Figure 1 is that 17% bids are very common in a coalitional setting, and quite rare as a single bid choice. This is due to the frequent use by the PFs of the 34% + 17% coalitional bidding scheme described earlier. To complete the analysis of the choice of bid size, Figure 3 presents the sum of bid sizes of all members of a coalitional bid in a firm. The vast majority of coalitions seek to achieve uncontested control by bidding jointly for 51% or more of firm equity.

The percent of equity offered for mass privatization will be important in the determination of the expected voting power of each block of shares. Out of the 180 firms that receive at least one bid, 100 firms offer 67%. Effectively, 60.3% of the shares in most of these firms were available for purchase, because 6.7% were offered to employees. The second largest group is the 47 firms that

offer 90% for mass privatization, and effectively 81% of their capital was available on the second auction. Of the remaining 33 firms, 22 offer 70%, 2 firms offer 75%, 8 offer 80%, and one – 85%.

There is a large difference in the expected voting power of blocks of particular size in firms that offer less than 75% of their capital for mass privatization and firms that offer more than 75%. The critical value of 75% arises due to the institutional detail that 10% of the shares for mass privatization are given to employees. This results in an effective supply of shares at the auctions of 67.5% or higher for a firm with 75% or more equity offered for mass privatization. In such firms there is a possibility of two funds to own each a block close to 34%. The existence of two shareholders with one third of firm voting shares gives a lot of power to smaller shareholders and reduces the expected control value of a 34% block. In contrast, in firms that offer 67% or 70% for mass privatization only one 34% shareholder can exist. This generates high expected voting power for a 34% block, because its owner will be unconditionally the largest shareholder in the firm. Most of the empirical tests below will be performed separately for each of the two sub-samples, the sample of 122 firms with less than 75% and the sample of 58 firms with more than 75% of their equity offered for mass privatization.

The sample of firms with less than 75% offered for mass privatization will be the main focus of the paper. First, the expected power per share of bids in these firms is strictly increasing in bid size and the tests of Hypothesis 1 will have more power. Second, there are a lot more small and large bids submitted for these firms as opposed to the group of firms with more than 75% offered for mass privatization. Third, a manager of a large PF disclosed that the big PFs were seriously considering mostly the less than 75% firms, because the other group contained either very small firms or firms in remote geographic locations.

### *III.C. Bids by Individual Investors*

The bids submitted by individual investors were ignored in the previous sub-sections of Section III. The reason for that is that the price and quantity data on each individual bid is not available. There are aggregate statistics on the overall demand for each firm at the second auction round. This information in conjunction with the PF bid data can be used to infer the demand submitted by individuals. Indirect inference regarding the pricing of these bids can be obtained by comparing the submitted bids for PFs and individual demand with the after-auction allocations. This sub-section will detail the results from the analysis of individual bidding at the second auction round and attempt to cast more evidence on the hypotheses in the introduction.

The first set of tests will involve the determinants of aggregate individual investor demand for each of the 820 firms offered on the second auction round<sup>19</sup>. Aggregate individual demand is computed as the difference between total firm demand and the sum of all PF bids submitted for a firm. Table VI present a regression model of the determinants of aggregate individual demand. After comparing these results with the evidence about the determinants of PF demand in Table IV, it turns out that individual demand and PF demand are driven by similar factors. Individuals are more likely to bid for firms that received large interest by both large and small PF bidders. The strongest individual demand is for the 64 new firms introduced on the second auction round. Same as the PFs, individuals prefer smaller firms and do not bid for firms where the government kept the majority block or firms with large PF ownership from the first auction round. The only difference is that individual demand is the highest in firms where less than 50% of the shares are available on the second auction round.

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<sup>19</sup> A similar approach was used by Hingorani, Lehn, and Makhija (1997) in their study on the Czech Mass Privatization auctions.

There are two explanations for the relationships between individual and PF demand. The first one is that in many firms the managers organized the employees to bid their vouchers for shares in their firm in a form of pseudo Employee-Manager Buy-Outs (EMBO-s). These employee-manager coalitions were seeking to obtain control over their firms and preempt a PF takeover. At the second auction round new such coalitions were most likely to form in the newly introduced firms. The puzzling result that individuals most prefer firms with some ownership acquired at the auction round (but not PF ownership) fits also this explanation because some of the individual demand on the second auction round may be due to further participation of employees in EMBO coalitions formed on the first auction round. Unfortunately, there is no publicly available information on these coalitions and without the individual bid pricing data they cannot be identified.

The second reason is that in an environment where control benefits are very large and a majority owner can expropriate almost all cash flows in a firm, it is optimal for small investors to seek firms where a control contest is most likely. The best-case scenario is if two unrelated PFs each get 34% of the shares, and then start competing for the shares owned by individuals in a race who is going to secure a majority first. This is consistent with the result that individuals were bidding for firms with the highest PF demand.

It would have been great to analyze the distribution of prices submitted by thousands of individuals for the firms and compare that to the prices by the PFs, but the data on prices for bids submitted by individuals is not available. As a second best, I will provide some circumstantial evidence about the pricing of individual bids using the fact that the data set includes the final allocation to both PFs and individuals after the end of the second auction round. This data can be used to see what percentage of individual demand is satisfied, and whether some individual bids are crowded out by higher priced PF bids. If PF submit higher priced bids than individuals, they will get

a disproportionate amount of the allocated shares at the end of the auction. Under the null hypothesis all bids are submitted at the same prices. In this case, the allocation of shares will be proportional to the bid amount as percentage of total demand of shares. A test of the hypothesis that PF bids are at higher prices than individual bids can be then constructed by comparing the final win allocations of PFs and individuals with the null allocations. By construction, the test has to focus only on firms where there is over subscription (share demand is higher than shares offered for sale). Table VII of the paper reports the average null and actual allocations of large and small PF bids and individual bids. The actual PF allocations are higher than the null allocations. Given that the over subscription is moderate on average (25%) and respectively the magnitude of the crowding out of individual bids by higher-prices PF bids is small, these results show that individuals were submitting lower priced bids<sup>20</sup>. An even stronger result appears in Table VII. Large PF bids are submitted at higher prices than both small PF bids and individual bids. This result is consistent with Hypothesis 1 of the paper.

To summarize the findings of Section III, in Bulgaria, as in most of the other transitional economies, there are very few working mechanisms that enforce the interests of small shareholders. Usually obtaining the largest holding in a company or participating in a majority coalition is the only way for an investor to make sure the managers are working in his/her best interest and that no other large shareholder can secure the private benefits associated with control. Consistent with this notion, most strategic investors were bidding for firms where control was possible to obtain and where no toeholds by other PFs were acquired at the previous round. More than 50% of the PF bids are either for the maximum allowed amount of 34% of firm shares or are submitted as a part of a

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<sup>20</sup> In unreported regressions of the abnormal share allocations of individual investors (Actual Allocations – Null Allocations) the coefficient on the number of large PF bids is negative and the only statistically significant estimate.

coalitional agreement<sup>21</sup>. If institutional investors rationally choose to submit only optimally sized bids, then their strong preference for submitting large bids reveals that the control benefits of holding a large block dominate the costs of less diversification and lack of liquidity. The prevalence of large bids, given an assumption that investors are rational utility maximizers, adds support to the first part of Hypothesis 1 that substantial benefits of control exist.

Besides the large players in the Bulgarian mass privatization, individual investors also take into account the existence of large private benefits of control into their bidding behavior. They are either bidding for oversubscribed firms at the second auction round, where the possibility of a control contest was higher, or some participate in employee-manager coalitions and attempt to take control of their companies directly. The indirect inference about the bid prices submitted by individual investors reveals that they submit lower priced bids than the bids of privatization funds, especially large PF bids.

## **IV. Hypotheses, Empirical Predictions, and Univariate Statistics**

### *IV. A. Testable Predictions of the Hypotheses*

#### **IV.A1. Hypothesis 1**

Even without maintaining a theoretical model of the relationship between block size and control power, it is a straightforward conclusion that blocks of less than several percent of firm equity will have very little voting power, while blocks of substantial size like 30% are very likely to exercise significant power. If voting power can be converted into benefits of control, then large

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<sup>21</sup> A question may arise why any small bids are submitted at all. The main reason to submit a small bid is the expectation that another fund will acquire a 34% block in the firm. After the firm starts trading on the stock exchange,

blocks of shares will be more valuable than small blocks of shares. The auction literature has established that bid prices are monotonously increasing in bidder value. Given this result, the prices of bids for large blocks should be higher than the prices of small block bids. This implication of Hypothesis 1 provides a strict way of testing it.

A simple univariate test that can be used to document the relationship between block size and bid price is to compare the average prices bid for large blocks with the average prices bid for small blocks and test whether the difference between the two is positive. The model can be easily extended to account for additional factors that influence bid prices. The multivariate extension is to estimate a regression equation with bid price as the dependent variable. The independent variables in the equation include firm and investor specific controls and a dummy equal to 1 if a block is large and 0 otherwise. The coefficient on this dummy variable is an estimate of the mean difference between the prices of large and small blocks controlling for other observable factors. This difference provides an estimate of the premium that investors are willing to pay to acquire control.

The above approach to detect control benefits and estimate their size is similar to Barclay and Holderness (1989) and the rest of the block transaction studies, but instead of observing only one block trade at a particular point of time and comparing its price to the price at the stock market, in this study blocks of different size for the same firm can be simultaneously observed and their prices can be compared. Another institutional feature of the data is that a large number of bids are submitted in coalitional agreements to jointly acquire a majority block. Compared to single bidders, the participants in these coalitional bids have different expectations about the power that they will

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the minority block can be sold for cash to this large shareholder. Other small bids are submitted due to a binding budget constraint. Also, some one-shot coalitional arrangements may be misidentified as single bids.

acquire if their bids are successful. As a result, the value of control and respectively the price of a bid of particular size will depend on whether a bid is coalitional or single. These features of the data and institutional framework allow for exploration of the value of control of a finer classification of bid types. A richer set of evidence regarding the existence and value of the private benefits of control can be generated.

#### **IV.A2. Hypothesis 2a**

Atanasov (2001) shows that several factors beyond risk and expected return influence the optimal portfolio choices of a large investor when control is valuable. One of these factors is the size of a firm in terms of total value of equity. If an investor purchases a large proportion of the equity of a large firm, the investor will take a position with a substantial weight in her portfolio. A single investment with a large portfolio weight is normally associated with high diversifiable risk. An investor that seeks to acquire controlling blocks will therefore prefer to invest in smaller firms and reduce the total risk of her portfolio. Hypothesis 2a implies that the choice to invest in a significant percent of firm equity will be negatively affected by firm size<sup>22</sup>.

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<sup>22</sup> The derivation of this prediction implicitly assumes that firm size is uncorrelated with the amount of private benefits of control per share that can be secured by a large shareholder. Besides the direct effect on the probability of submitting large bids through the risk and budget constraint, firm size may have an indirect effect through its correlation with the control benefits. To my knowledge in the corporate governance literature there is no established functional relationship between firm size and control benefits per share. Some previous studies have claimed that large firms have larger opportunities for self-dealing. If this is the case, then the coefficient on firm size in investment choice model will understate the negative effect of firm size on the probability of submitting large blocks. If private benefits of control are easier to secure in smaller firms, then a negative coefficient of firm size may capture either risk or control effects and the empirical test of hypothesis 2a has to be interpreted with caution.

The existence of this relationship can be documented using first a univariate comparison of the average firm size of small and large bids. A multivariate test will involve a discrete choice model of investment decisions. The dependent variable is an indicator equal to 0 if an investor does not submit a bid for a firm, and equal to 1, 2, etc., if an investor submits a bid of a particular size range. Hypothesis 2a implies that one of the explanatory variables in such model has to be firm size and that this variable should negatively affect the probability of submitting large bids.

#### **IV.A3. Hypothesis 2b**

Larger investors can afford to submit large bids in firms with higher market capitalization, and submit more bids. The weight of any single investment in the portfolio of an investor with a substantial investment capital is smaller than the weight of this same investment in the portfolio of a smaller investor. As a result, the unique risk born by the larger investor is smaller and this increases the likelihood of this investor to take larger (in terms of monetary value) positions. Hypothesis 2b implies that large bids will be submitted by large investors. This relationship can be detected by comparing the average investor size in small and large bids. A similar argument to the above discussion of Hypothesis 2a leads to the choice of investor capital as another explanatory variable in the probability model of bid submission. The effect of this variable on large bid submission should be positive.

#### **IV.A4. Hypothesis 2c**

The discussion in the Introduction posited that, given a maintained hypothesis that regional proximity can reduce investment uncertainty and increase control benefits, if control benefits are valuable, the effect of regional proximity on the probability of submitting large bids should be positive. This suggests that a measure of the geographical distance between an investor and a firm has to be included as one of the factors influencing the decision to bid for a privatized firm.

#### *IV. B. Univariate Tests of the Hypotheses*

The remainder of this section will report results from several univariate summary statistics as exploratory tests of the hypotheses developed above. The tests involve the computation of the average prices, firm size and PF capital of the small bid observations in the data and a comparison of the results with the average prices, firm size and PF capital of large bid observations.

Table VIII contains the results of these simple mean comparisons. Focusing on the sub-sample of firms with less than 75% of their capital of mass privatization, indeed large bids are submitted at higher prices. The premium for control using raw prices is 26%. Large bidders also pay a 67% higher premium over the reserve price than small bidders. The summary statistics in Table VIII are also consistent with Hypotheses 2a and 2b. The average firm size of a large bid is three times smaller than the average firm size of a small bid, while large bidders have 58% more capital (the difference of the medians is much larger). Consistent with the claim that small bids can have a high control value per share in firms with more than 75% of their capital offered, the prices of these bids are higher. In general these firms are very small and the differences between the average firm size for large and small bids are small. Large bids were submitted by larger PFs. The results of the tests have to be interpreted with caution because the standard deviations of all mean estimates are very large and none of the differences in means are statistically significant. One of the reasons for this lack of statistical significance of the mean comparisons is the high heterogeneity in sample firm quality.

Conclusions about the difference in prices using unconditional averages may be flawed because, as the discussion in the previous sub-section indicated, large bids may be submitted for different types of firms than small bids. Table IX separates the sample of firms into three categories, firms receiving only small bids, firms receiving only large bids, and firms receiving both small and

large bids. The control premium using average prices of small and large bids submitted for each firm type does not substantially differ. Using only firms receiving both small and large bids, large bids have on average 26% higher prices, and pay a 55% higher premium over the reserve price. For the group of firms in Panel B, the price difference of bids is negligible, with large bids having a small premium.

Another comparison of the prices of large and small bids is to compute the premium of large bids over small bids for each firm that receives both types of bids and then compute the average firm level premium across all such firms. The computation of the price difference between large and small bids for each firm alleviates the effect for firm specific unobservables and affords a cleaner measure of the control premium. The average premium of the 37 firms with less than 75% offered for mass privatization is 32.3% (median 18.3%)<sup>23</sup>. A non-parametric exploration reveals that in 28 of the 37 firms the highest-price bid is large, while in only five firms the highest-price bid is small (in 4 firms the highest bids are one large and one small bids submitted at the same price<sup>24</sup>). The percentage of small bids among all bids submitted for the 33 firms without ties is 27%, while they are the maximum bid in only 15% of the firms.

Another measure of the control premium that also accounts for firm specific unobservables is to compare the prices of different sized bids that are part of the same coalitional agreement to acquire a majority block in a firm. Results from this analysis are reported in Table X. An empirical fact that biases the analysis against finding significant results is that most coalitional bids are submitted at the same price. This is due to the reciprocal arrangements where two funds exchange

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<sup>23</sup> There are only seven firms with more than 75% for mass privatization that receive both small and large bids. The premium computed for these firms is -116% (median 2.7%). This is driven by one outlier where the premium was -1000%, a small bid was submitted at 10 times higher price than a large bid.

<sup>24</sup> These may be unidentified coalitional agreements.

roles in being the dominant and supporting member of a coalition across different firms. These agreements increase the bargaining power of the minority participants in bidding coalitions, because they have the opportunity to punish deviation from the original contract using their superior position in another firm. Nevertheless, the mean price difference between large and small coalitional bids is 8.5% when all bids are used and 17% when only bids at different prices are used. In comparison, coalitional bids when two funds submit same-sized bids have negligible price differences.

To summarize the findings of the exploratory univariate analysis, large bids have a moderately sized price premium of between 17 and 32% over small bids; they are submitted for significantly smaller firms, and by PFs with more capital. The summary statistics are consistent with the hypotheses, but the control premium is not very large. The reasons for that are the discussed above selection bias and the inherent lack of other controls in the univariate mean comparisons.

## **V. Valuation of Large Blocks: Econometric Model and Results**

### *V.A. Econometric Model*

The previous section identified the predictions of the hypotheses and translated these predictions into statistical tests of the signs of certain estimated coefficients and into evaluation of conditional mean differences. Afterwards these predictions were tested using univariate summary statistics methods. This section proposes a more advanced econometric model for the unbiased estimation of these coefficients and conditional means.

In order to provide evidence on the central question of this study, whether private benefits of control exist and to estimate their size, I have to document whether the difference between the prices submitted for large blocks of shares and the prices submitted for small blocks of shares is

positive and significantly different than zero. At first glance, an OLS model of bid prices regressed on firm and fund controls and dummies for different bid sizes will provide the required evidence<sup>25</sup>. However, investors will submit small or large sized bids only when this action is optimal among all other alternatives. A comparison of bid prices using a classic regression model ignores the underlying decision process of the privatization funds and suffers from the selection bias discussed in the Introduction. Because of this selection bias the difference between the prices submitted for large and small bids will understate the magnitude of the private benefits of control. Furthermore, three hypotheses were developed earlier that predict what are the determinants of the investment decisions of the institutions in this study. These hypotheses can be tested using a probability model of bid size submission as a function of variables that proxy for fund capital, firm size, and geographic proximity between a fund and a firm.

Both the selection bias of an OLS bid price model and the empirical test of Hypotheses 2a, 2b, and 2c can be addressed using a methodology developed in Lee (1983). The method involves a two-stage estimator. In the first stage every privatization fund chooses for each of the 180 firms in the sample between several mutually exclusive alternatives. At a minimum, these alternatives can be: (0) not to bid; (1) to submit a bid for a small block; and (2) to submit a bid for a large block. Other alternatives, like the submission of coalitional bids can be easily added to the choice set of an investor. When choosing among the alternatives, every PF will pick the one alternative that offers her the highest utility. The first stage selection process is then estimated as a multinomial logit model. At least one of the right-hand-side variables in the logit model has to be uncorrelated with

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<sup>25</sup> An OLS regression of bid price regressed on bid size and controls was estimated in a previous draft. The coefficient on bid size was positive and statistically significant.

bid price. This variable will act as an instrument in the identification of the first-stage selection model.

The second-stage estimation involves running for each of the positive bid decisions of the investors a separate OLS regression of the form:

$$y_{ij} = \beta_j' X_{ij} + \varphi_j' \lambda_{ij} + \varepsilon_{ij}$$

Where the  $i$  subscript denotes observation and the  $j$  subscript denotes the different choice at the first stage. The dependent variable  $y_{ij}$  is bid price,  $X_{ij}$  is a vector of firm specific and fund specific regressors, and  $\lambda_{ij}$  is a selection correction term that is a function of the predicted values from the multinomial logit model estimated at the first stage. The purpose of this selection term is to control for the endogenous decision of the funds to submit a bid of particular size for the firms in the sample.

Last, the estimated coefficients and the means of the right-hand-side variables are used to compute the conditional expected prices for bids in each of the investment choice categories. The value of these conditional expected prices can be then used to compute an estimate of the premium for control that is free of selection bias. The two-stage methodology is described in more detail in Appendix B.

## *V.B. Model Estimation*

### **V.B1. First-stage Selection Equation**

The first decision that has to be made is to determine the set of alternatives faced by the PFs in their investment decision for each firm. The model in this section will have three investment choices – no bid, small bids, and large bids. The model will be extended to six investment choices in the Section V.D.

Given the discussion in Section IV.A, three instruments are included in the first stage investment selection equation. The first variable is the total number of firm shares (*firmshr*). The shares of all privatized firms have the same par value (1,000 Bulgarian Levs). The number of shares is therefore equivalent to the firm book value of equity. Theoretical foundation for the inclusion of this variable is provided by Hypothesis 2a. The second variable is the number of vouchers owned by each PF at the beginning of the second auction round (*capital2*). This variable is included as a direct test of Hypothesis 2b. The third instrument is a dummy *REGION* (equal to 1 if a fund is located in the same regional center as a firm). The choice of this dummy is motivated by Hypothesis 2c. The last variable in the multinomial logit equation is reserve price (*reservep*). It is included to control for the fact that only bid prices above the reserve price for each firm can be submitted.

As was discussed in Section III, there are fundamental differences in control values between, on one hand, 67% and 70% firms, and on the other hand, 75%, 85%, and 90% firms. These differences in the control premium imply that the selection model has to be estimated separately for these two groups of firms. Accordingly, control premiums for different-sized blocks have to be computed separately.

## **V.B2. Second-stage regressions**

The second stage of the model consists of the estimation of two separate OLS regressions. The dependent variable bid price (*Bidpric2*) in the second-stage regression analysis takes only positive values. Lee (1984) gives a detailed explanation why in this case a log transformation of the dependent variable is required.

Four independent variables are used. The first one is reserve price (*reservep*). This variable controls for the fact that the PFs have to submit a price equal to or larger than the reserve price

announced by the government<sup>26</sup>. The second variable is a dummy equal to 1 if the firm was introduced for the first time on the first auction (*Alfirm*). This variable measures the effect of negative information about a firm if a firm was introduced on the previous auction round and attracted no interest from any privatization funds on that round. Its coefficient is expected to be negative. The third variable is the number of serious bids (bids for more than 15% of the firm shares) submitted for a firm (*Nmedbids*). This variable is a proxy for the level of competition in an auction and for unobservable firm quality that generates high demand from large bidders<sup>27</sup>. The last variable is the selection term (*lambda*), created using the estimates of the first-stage selection equation. Details about its computation are included in Appendix B.

## *V.C. Results*

### **V.C1. Results about the investment choice hypotheses**

Table XI reports the results from the estimation of the first-stage investment choice model. The model is first estimated using the whole 180-firm sample. As a robustness check the model is also estimated using a restricted sample of only firms that receive both small and large firms. This alleviates a potential problem if firms that receive only large bids are systematically different than firms that receive only small firms and these differences are not controlled by the independent variables. Hypothesis 2a is consistent with the evidence in the table. The coefficient on firm value of equity (*firmshr*) is negative and statistically significant for large blocks (*choice1* = 2) in the

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<sup>26</sup> A set of regressions are estimated using the  $\log(1+premium)=\log(Bidprice/reserveprice)$  as the dependent variable. Results were very similar. The estimates from these regressions are slightly more difficult to use when computing expected mean prices for blocks of different size. That is why they are dropped in favor of a model with raw bid prices as dependent variable and reserve price as one of the controls. Moreover, the Bulgarian government might have revealed additional information about each firm in its choice for reserve price.

model for firms with less than 75% offered for mass privatization, and positive and statistically significant for small blocks ( $choice1 = 1$ ). Based on the coefficients, a one-standard-deviation increase in firm equity decreases the odds of submitting a large bid by 86% in favor of submitting a small bid. The difference in the effect of firm size on the probability of small and large bid submission is statistically significant based on a Wald test.

If we compare the odds-ratios for submitting a bid versus not submitting bid, the value of equity of a firm positively affects the likelihood of submitting small bids. A one-standard-deviation increase in firm equity increases the odds of submitting a small bid by 13% compared to submitting no bid, and decreases the odds of large bids by 64%. The finding that small bids are more likely to be submitted than large bids in large firms offers additional indirect support of Hypothesis 2a. It confirms the idea that if in large firms it is less likely for large and especially majority blocks to be assembled, then a small block has a higher expected control power and respectively a higher probability to be submitted. The conclusions regarding Hypothesis 2a are robust to the estimation sample. This is true for most of the other coefficients in both the first and second-stage estimation. For brevity only the coefficients estimated using the whole sample will be discussed.

Hypothesis 2b is strongly supported by the data. Large investors are more likely to submit larger bids. A one standard deviation increase in *capital2* increases the odds of submitting a large bid by 42% as opposed to submitting a small bid. This result confirms the conjecture that only large investors in a market where control is valuable can afford to construct a portfolio of large and possibly controlling blocks without paying a the cost of high diversifiable risk.

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<sup>27</sup> Using the number of all bids by PFs or the ratio of shares demanded to shares offered as alternative proxies for firm quality and auction competition does not substantially change the results.

Last, Hypothesis 2c is also consistent with the data. Regional proximity dramatically increases the likelihood of submitting both large and small bids. The effect of regional proximity is almost the same for large and small bid submission. Given the coefficients in Table XI changing the dummy *REGION* from 0 to 1 increases the odds of submitting a small bid by 151% and the odds for submitting a large bid by 117% versus not bidding.

### **V.C2. An estimate of the private benefits of control**

The estimation output from the second-stage regression equations is reported in Table XII. All control variables have the expected signs. One finding that has to be stressed is that the coefficient of *lambda* is negative in the regression for large bids and positive in the regression for small bids. This finding supports the suggestion expressed in the Introduction that the possibility of selection bias will in general understate the value of the private benefits of control. Both regressions have a respectable explanatory power, which gives confidence in the estimates of the control benefits below.

The estimation results in Table XII cannot readily answer the central question of this study: do benefits of control exist. The answer to this question and a calculation of the value of control require the computation of the expected values for bid prices (*Lbidpric2*) corresponding to bids for different sized blocks. The expected bid prices are evaluated at the means of the right-hand side continuous variables and for each value of the dummy *Alfirm*<sup>28</sup>. The results from this conditional mean computation for each of the two investment choices are included in Table XIII. After correcting for the selection and endogeneity biases, I find that institutions submit higher prices for large blocks of shares compared with small blocks of shares. The estimated value of control is

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<sup>28</sup> See Lee (1984) for a similar approach and an explanation why the correction term *lambda* should not be used in the computations of the expected value of the dependent variables.

enormous. The prices of large blocks are about ten times higher than the prices of small blocks. Results are robust to computing the model over the much smaller sub-sample of firms receiving both small and large blocks. The only change is the explosive behavior of expected prices in the restricted model for firms with more than 75% for mass privatization. This is due to the small sample size (10 small and 23 large-bid observations), which is not sufficient to estimate precisely the parameters of the model. The instability of the model to small sample sizes will be manifested again in the extended model in the next sub-section.

#### *V. D. Results from an Extended Model*

The data allows for the original scheme of no bid, small bid, and large bid to be extended further to account for the possibility of a coalition to acquire uncontested majority control in a firm. Because in most of the coalitional bids the two or more members participate with different sized bids, the coalitional choice can be separated into two categories: submit a small, supporting bid, or submit a large, dominant bid in the coalition. These choices reflect the fact that in most cases one fund is seeking control over a firm and asks other partners to acquire on his behalf the complementary 17% required for a majority block to be secured. Also, the original small bid category can be further divided into small and medium sized bids. The final set of possible choices is extended to six alternatives: 0) no bid; 1) submit a small single bid; 2) submit a medium single bid; 3) submit a large bid; 4) submit a small bid as a part of a coalition seeking to acquire jointly 51% or more of firm capital; and 5) submit a large bid as a part of a coalition seeking to acquire jointly 51% or more of firm capital. The following cutout values for the alternatives are chosen<sup>29</sup>. Small bids are bids with size less than 15% of firm equity. Medium bids are bids between 15% and

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<sup>29</sup> Due to the strong clustering of bids around 17% and 34% the choice of actual cutout values does not have a large effect on the results.

25% of firm equity. Large bids are single bids for 25% to 34% of firm equity, or coalitional bids for a total of less than 50%<sup>30</sup>. Small coalitional bids are bids for less than 25% of firm equity, which are a part of a coalition seeking 50% or more. Large coalitional bids are bids for more than 25% of firm equity, which are a part of a majority seeking coalition.

The first-stage multinomial logit estimation results of the extended model are reported in Table XIV. The model is estimated only over the original 180 firm sample because the sub-sample of firms with both small and large bids leaves some investment choices with a very small number of observations. The results from the original model are enriched with several new findings. Regarding Hypothesis 2a, larger investors are not only less likely to submit smaller bids, but also they are much more likely to participate in majority coalitions. One explanation for this result is that the large PFs have more to gain by forming coalitions with similar-sized PFs. The possibilities for tit-for-tat coalitional bidding are much higher when the two funds are large, because they can enforce the coalitions in more firms. Also a large fund can generate more competition if it is left outside the coalitional circle.

The effect of firm size is similar to the one in the original model and consistent with Hypothesis 2b. Small and medium bids are submitted for larger firms, while the three large bid choices are more likely to be tendered for smaller firms. The negative effect of firm size is stronger for coalitional bids.

One interesting finding in the test of Hypothesis 2c is that regional proximity has the weakest effect on the likelihood of submitting small coalitional bids. This confirms the fact that the large member of a coalitional bid is the party interested in achieving control, while the smaller

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<sup>30</sup> The number of such bids across all firms is less than 15. That is why they are grouped together with single large bids - the closest bid type corresponding to their expected control power.

member is usually participating in exchange for receiving a similar favor in another firm. The strongest effect of regional proximity is on the probability of submitting a small independent bid.

The next step after completing the first-stage estimation of the extended model is to compute conditional expected prices for each of the five different investment choices. The results are in Table XV. Besides reinforcing the findings in Table XIII that a large control premium exists, the extended choice set allows for further evidence on the relative pricing of bids that have different expected voting power. The model also allows measuring the value of forming a majority coalition. Coalitions expect to earn an unconditional majority in a firm and that is why, keeping bid size constant, they submit higher prices than single bidders. The average price of shares in coalitional majority bids, computed as the weighted average of the large and small coalitional bid prices, is about 45% higher than the average price of shares in combinations of one large single bid and one medium single bid.

The estimated conditional prices for the sample of firms with more than 75% of their shares available for mass privatization are quite extreme. This is most likely due to the fact that there are only ten small and eight medium single bids submitted for these firms and the respective coefficients for these investment choices are very noisily estimated<sup>31</sup>. This is another illustration of the suggestion that the Lee (1983) selection model is not stable if the sample size is small. The bootstrapped p-values correctly detect the high instability of the coefficients and are not statistically significant.

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<sup>31</sup> An alternative explanation of the high prices for medium single bids is related to the previous analysis that in such firms the possibility of two large shareholders to appear simultaneously after the auction gives a disproportionate bidding power to a medium shareholder in the firm. The power per share of such a shareholder exceeds the power per share of the large competitors. The expected gains from such disproportionate power may be reflected in the expected bid price for medium bids.

## **VI. Conclusion**

The Bulgarian mass privatization setting offers a convenient opportunity to observe the behavior of institutional investors in an extreme case where a majority holding in a company has a large value and small blocks of shares are almost worthless because there are no mechanisms that protect the rights of minority shareholders. In this environment, institutional investors are forced to acquire large blocks of shares and choose control over diversification and liquidity. The results of this study support the hypotheses developed in Atanasov (2001). Besides risk and expected return, other factors like investor capital, firm size, and expected control benefits influence the portfolio decisions of large investors.

The study offers a bias-free estimate of the size of the private benefits of control in an emerging market. The premium for control is computed to be orders of magnitude larger than the control premium documented in the USA and several times larger than the premium implied by the difference of prices of dual class shares in other developed markets. The large difference in the control premium in Bulgaria, as opposed to the value of control in the USA and other developed countries, is mostly due to differences in the legal environments. An extensive literature starting from DeAngelo, DeAngelo, and Rice (1984) and extended and summarized by Holderness and Sheehan (2000) has empirically shown that the American legal system leaves majority shareholders few opportunities to extract wealth from small shareholders. That is why the value of control in the US is usually very small.

In comparison, the legal environment in Bulgaria does not strongly protect the ownership rights of small shareholders. The developments after the privatization auctions clearly illustrate this fact. During the first month after all firms started trading on the Bulgarian Stock Exchange the overall trading volume was high. The main part of the trading consisted of cross-trades where

privatization funds were exchanging minority blocks as part of the coalitional agreements described in Section II. Individual investors were not buying any shares at the stock exchange and were selling to the large shareholders the shares they acquired at the mass privatization auctions<sup>32</sup>. The small investors that sold their shares at this stage managed to secure a sizable return. This is not true for the majority of small shareholders that kept their shares. In many firms after a large shareholder obtained majority, either through cross-trades or buying shares from individuals, he diluted the ownership rights of the remaining shareholders. Consequently, the stock prices of most firms with a majority shareholder dropped dramatically. At that time many companies went private with the shares of minority shareholders being frozen-out at large discounts compared to the stock prices during the period of large block accumulation. Now all equity of the privatized companies is concentrated into the hands of large investors and there is virtually no trading in small blocks of shares on the BSE.

One strong conclusion can be made after observing this process. When the value of control rights constitutes the main component of stock prices, investors that consider buying equity in such markets have to focus on predicting the probability of control contests and invest only in companies that do not have a majority shareholder and several large shareholders are competing for acquiring control. Any earnings forecasts or other fundamental analyses of the future performance of the companies are not very relevant for the decision making of small shareholders because the value of cash flow rights is almost zero if there is not enough voting power to enforce them.

At the end, two caveats have to be made. First, one possible critique of the methodology is that the investment decisions of each of the institutional investors should be modeled not separately

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<sup>32</sup> This behavior of individual investors is consistent with the predictions of Milnor and Shapley (1978) about the trading of the ocean of atomistic shareholders when a large shareholder exists.

for every firm, but for whole portfolios of firms. To my knowledge there is still no empirical methodology in the literature to address this scenario. To make the econometric model tractable, I had to make one strong assumption – the bidding decisions of each fund for different firms are not correlated. This independence assumption is violated because every PF has a single budget to be distributed among all bids she submits. A comprehensive empirical analysis at the portfolio level will not only relax the strong independence assumption, but also provide further evidence on the factors influencing the investment decisions of institutions in a high private benefits of control environment.

Second, the portfolio of firms acquired at the first round of the mass privatization auctions may determine the bidding behavior of the privatization funds at the second auction round. For example, an institution that has managed to acquire large blocks in a substantial number of firms of a particular industry at the first round may be more likely to submit high prices when bidding for other firms in the same industry at the second round of the auctions. An analysis of the dynamic bidding decisions of the privatization funds on all three auction rounds and the subsequent trading at the Bulgarian Stock Exchange requires a dynamic discrete choice framework. Creating this structural model and estimating its parameters offer venues for future research.

## APPENDIX A.

### Data Description, Sources, and Manipulations

The data include all individual bids of each of the 81 PFs in the second auction round of the Bulgarian mass privatization auctions. Each bid contains fund code, firm code, bid price and number of shares asked. A total of 772 bids from 72 funds were submitted for the 180 firms in the sample. In some cases a fund submits multiple bids with different prices for the same firm<sup>33</sup>. Whenever this situation occurs, all bids by the fund are aggregated into a single bid with price equal to the weighted average of the prices of all bids submitted by the fund and size equal to the sum of the sizes of all bids, submitted by the fund. Hence, there is one observation per fund-firm in the data to a total of 623 fund-firm observations. Seven bids for one share (5 of those submitted by a single fund) and one bid where, due to a typing error, a fund submitted a bid price that is lower than the reserve price are dropped from the sample. The final sample has 615 bid observations.

A fund may submit bids for more than one firm and correspondingly several funds may decide to bid for the same firm. The distribution of the number of funds that bid for a firm is in Table XVI. In the second auction round, competition between funds is not very intense. In more than 50% of the firms only one single fund or a coalition of two funds submits a bid. The distribution of the number of firms that a fund decided to bid for can be found in Table XVII. The distribution is quite uniform except several extreme cases of the funds with most capital submitting bids for up to 50 firms.

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<sup>33</sup> There are 78 occasions that a PF submits 2 bids with different prices for the same firm, 33 occasions of 3 bids and 10 occasions of more than 3 bids. The maximum number of bids by one fund for one firm is 23.

Firm specific data are attained from the *Catalogue of All Firms Offered for Mass Privatization*. From there are collected data on fiscal year 1995 total sales, number of employees, and line of business. The same edition contains data on total number of shares, and the percentage of the total number of shares offered for mass privatization. Reserve price, minimum and maximum price at which an investor acquired shares, shares offered, and shares demanded for each firm offered on the second auction round are available in electronic form from the Center for Mass Privatization, Sofia, Bulgaria (CMP). The CMP created 28 regional centers roughly corresponding to the administrative district division of Bulgaria. The final ownership structure of each firm included stakes by each PF and the aggregate amount of shares owned by individuals was also obtained in electronic form from the CMP. Data about the regional center where each firm is located was provided by Rumen Sokolov.

Fund specific variables are collected from the fund prospectuses submitted to the Bulgarian Securities and Exchange Commission. The prospectuses contain information about the city of incorporation of each fund. This information is used to allocate each fund to one of the 28 regional centers created by the Center for Mass Privatization.

Based on the fund prospectuses are outlined three types of funds:

1. Industry-oriented funds – funds that specialize in a single industry or are founded by managers in the industry,
2. Regional funds – funds that specialize in a certain geographical region and their founders are from the same region, and
3. Diversified funds - all remaining funds.

Among the 81 privatization funds, 23 are industry oriented or manager sponsored, and 14 are regional funds. The remaining 44 funds announce in their prospectuses that they will form a

diversified portfolio of firms without any particular industry or regional specialization. Only 2 of the 44 diversified funds declare that they will form a liquid and well-diversified portfolio of minority stakes. The rest of the “diversified” funds are still planning to spend at least 70% of their vouchers to bid for controlling blocks.

An important variable that influences the likelihood of a fund investing in a firm is a measure of the geographic proximity of the fund and the firm. A simple and conservative way to generate such variable that is implemented in this study is to create a dummy *REGION* equal to 1 if a fund is located in the same regional center as the firm. This variable is conservative because a fund may be 50-60 miles away from a firm and the firm can be still in another regional center. The variable thus measures only close geographical proximity.

In a previous draft another dummy - *INDUSTRY* was created. *INDUSTRY* was equal to 1 if an industry-focused fund submitted a bid for a firm is in the same industry. There is no unified industry classification in Bulgaria equivalent to the SIC system. As a result, the decision that a firm matches the industry specialization of a fund was subjectively made based on information about the main lines of business of the firm reported in the *Catalogue of All Firms Offered for Mass Privatization*. The manual creation of the dummy was possible for the 40 firms (2440 observations) included in the sample of the previous draft. The time required to compile the same variable for the 180 firms (12960 observations) in the extended sample of this draft is clearly prohibitive.

The empirical methodology of this paper requires the identification of bids where two or more funds agree before the auction to jointly acquire a block in a firm. This is not a straightforward task because the coalitional contracts are not publicly available<sup>34</sup>. A description of the algorithm used to perform this identification is as follows. First, the ownership data of the 1040 privatized

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<sup>34</sup> Some identified coalitions were confirmed in conversations with privatization fund managers.

firms immediately after the three auctions is screened to find pairs of funds that have an abnormal number of occasions where the two funds own blocks of shares in the same firm. Then, these potential suspects of coalitions are further explored to find in how many of these occasions the two funds own complementary blocks to a majority block or are the only two owners. These firms are recorded as jointly controlled by the suspect coalitional pair. About 50 pairs jointly control five or more firms and the owner of the large and the owner of the supporting block change across the controlled firms.

Next, the bid data from the second and third auction round are filtered to find occasions where bids at the same price are submitted. The probability of a two bids in a firm to have the same price is very low. If in more than one occasion the same two funds submit bids at the same price, the fund pair is also qualified as a suspect coalition. After the suspect coalitions are identified, manually the 615 bids in the data set are examined. A bid is classified as a coalitional if both members of a suspect ownership or bidding coalitional pair bid for the same firm and their bids are complementary, and/or submitted at the same or very close price. Additionally, coalitional bids of three funds are identified if these funds are connected through suspect coalitional pairs and their bids are at the same price or complementary to a large block. If more than three coalitional partners bid for a firm, and the sum of their bids is greater than the total amount of available shares, coalitional pairs are identified based on closeness between the partners in terms of number of interactions and same-price bidding occasions.

## APPENDIX B

### Description of Lee (1983) Polychotomous Selection Model<sup>35</sup>

For each of the 180 firms in the sample are created 72 observations for the 72 funds that submitted at least one bid. An indicator variable  $choice1_{ik}$  is created to be equal to 0 if a fund  $k$  does not make a bid for a firm  $i$  OR he is not the participant with the largest bid in a minority coalition ( $coalpct2 \leq 50\%$ ); equal to 1 if a fund  $k$  submits a bid for a firm  $i$  and the size of the bid as percent of firm capital,  $bidpct2 < 25\%$ ; and equal to 2 if  $bidpct2 > 25\%$  OR the bid is participating in a majority coalition ( $coalpct2 > 50\%$ ).

At the first stage of the model I estimate a multinomial logit model with a dependent variable  $choice1 = j, j = 0, 1, 2$ . After estimating the parameter vector of the model  $[\gamma_1, \gamma_2]$ , the predicted probabilities for each choice  $j$  are computed using the following formulae:

$$\hat{P}_j = prob(choice1 = j, j > 0) = \frac{\exp(\hat{\gamma}'_j Z)}{1 + \exp(\hat{\gamma}'_1 Z) + \exp(\hat{\gamma}'_2 Z)} \quad (1)$$

$$\hat{P}_0 = prob(choice1 = 0) = \frac{1}{1 + \exp(\hat{\gamma}'_1 Z) + \exp(\hat{\gamma}'_2 Z)} \quad (2)$$

where  $Z$  is the matrix of left hand side variables of the logit equation.

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<sup>35</sup> This appendix describes the basic selection model estimated in Section V.B. The extended selection model in Section V.D. can be easily derived from the basic by model by changing the dependent variable in the first-stage multinomial equation to an indicator variable  $choice2_{ik}$  that is equal to 0 if a fund  $k$  does not make a bid for a firm  $i$  OR he is not the participant with the largest bid in a minority coalition ( $coalpct2 \leq 50\%$ ); equal to 1 if a fund  $k$  submits a bid for a firm  $i$  and the size of the bid as percent of firm capital,  $bidpct2 < 15\%$ ; equal to 2 if  $15\% \leq bidpct2 < 25\%$ ; equal to 3 if  $25\% \leq bidpct2 < 34\%$  and the bid is single OR a coalition of two or more funds including fund  $k$  bids for minority ( $coalpct2 \leq 50\%$ ) and fund  $k$  is the fund with the largest sized bid; equal to 4 if a coalition of two or more funds including fund  $k$  bids for majority ( $coalpct2 \geq 50\%$ ) AND  $bidpct2 < 25\%$ ; and equal to 5 if  $coalpct2 \geq 50\%$ , AND  $bidpct2 \geq 25\%$ . At the second stage five instead of two regressions are estimated.

Then I calculate the terms  $\lambda_j$ , which are vectors with a typical element  $\lambda_{ij}$  given by:

$$\lambda_{ij} = \frac{\phi(\Phi^{-1}(P_{ij}))}{P_{ij}} \quad (3)$$

Where  $\phi(x)$  and  $\Phi(x)$  are the p.d.f. and the c.d.f. of the standard normal distribution and  $\Phi^{-1}(x)$  denotes the inverse function of  $\Phi(x)$ .  $\lambda_j$  are parallel to what Heckman (1976) calls the "inverse of the Mill's ratio". The difference of Lee (1983) is that one further transformation involving  $\Phi^{-1}(x)$  is computed.

After forming  $\lambda_j$ , at the second stage, two separate OLS regressions are estimated (one for each  $j > 0$ ) of the following form:

$$\text{Log}(\text{bidprice})_j = \beta_j' X_j + \varphi_j' \lambda_j + \varepsilon_j \quad (4)$$

Where  $X_j$  is a matrix of left-hand side regressors,  $\varphi_j = \sigma_j \rho_j$ ,  $\sigma_j$  is the standard deviation of  $\varepsilon_j$ , and  $\rho_j$  is the correlation between  $\varepsilon_j$  and a transformation of the errors from the logit equation.

Lee (1983) proves that under certain normality assumptions OLS provides consistent estimates of the parameter vector  $\theta_j = [\beta_j, \varphi_j]$ .

The only complication is that the errors are heteroskedastic and the Variance-Covariance matrix  $V_j$  of the parameters  $\theta_j$  should be estimated using the expression<sup>36</sup>:

$$V_j = (\tilde{X}_j' \tilde{X}_j)^{-1} \left[ \sum_{i=1}^{N_j} \tilde{\varepsilon}_i^2 \tilde{x}_i \tilde{x}_i' + \tilde{X}_j' D^* \text{COV}^* D \tilde{X}_j \right] (\tilde{X}_j' \tilde{X}_j)^{-1} \quad (5)$$

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<sup>36</sup> The original expression is found in Lee (1982), who cites White (1980) as the source of the result and proof. Details for the actual implementation into a GAUSS program are available from the author

where  $N_j$  is the number of observations in the regression corresponding to choice  $j$ ,  $D$  is the matrix of derivatives of  $\lambda_j$  with respect to the logit parameters  $\gamma$ ,  $COV$  is the variance-covariance matrix of these parameters, and  $\tilde{X}_j = [X_j, \lambda_j]$

After the parameter vectors  $\beta_j$  are estimated in (4), the conditional mean prices for each choice are computed as:

$$E(\text{price}_j) = \beta_j' \bar{X} \quad (6)$$

where  $\bar{X}$  is the vector of average values for the continuous variables and equal to 0 or 1 for the dummy variables.

Last, the p-values of the hypothesis that the conditional mean price for  $\text{choice1} = 2$  is greater than the conditional mean price for  $\text{choice1} = 1$  are computed using bootstrapping. The exact details of the bootstrapping are as follows. A sample of size  $N = 180 \times 72$  is drawn from the original data set. The two-stage estimates of  $\beta_j$  are computed for the drawn sample and then the conditional mean prices are computed using (6). This process is repeated for 1000 drawn samples. At the end, it is counted in how many samples  $E(\text{bidprice} | \text{choice1}=2) > E(\text{bidprice} | \text{choice1} = 1)$ . One minus this proportion gives the p-value of a one-sided test for equality between the conditional bid prices of  $\text{choice1} = 2$  and  $\text{choice1} = 1$ .

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**Table I**  
**Names and descriptions of all variables**

Variable	Description
<u>Firm Specific:</u>	
firmshr	Total number of firm shares
masspriv	Percent of firm shares offered for mass privatization
reservp	Reserve price
MP40	A dummy equal to 1 if a firm has less than 50% of its shares originally allocated for mass privatization
pctoff50	A dummy equal to 1 if a firm has more than 50% of its shares available for sale on the second auction round
SumPFpct1	A variable denoting the sum of all equity blocks, measured as percent of firm equity, purchased by PFs on the first auction round
Bidtype	An indicator variable equal to 0 if a firm receives no bids; equal to 1 if a firm receives only large bids; equal to 2 if a firm receives only small bids; and equal to 3 if a firm receives both small and large bids
Nmedbids	Number of medium or larger bids submitted for a firm
A1firm	A dummy equal to 1 if a firm is introduced at the first auction round, and was still eligible for inclusion in the sample, and equal to 0 if the firm is first introduced at the second auction
<u>Fund Specific:</u>	
capital2	Total number of vouchers bid on the second round
<u>Firm-Fund Bid Specific:</u>	
REGION	Dummy equal to 1 if the privatization fund is located in the same regional center as the firm
bidpric2	Bid price or weighted average price if multiple bids by a single fund
Lbidpric2	Log(bidpric2)
bidshr2	Bid size or total number of shares demanded by a fund if multiple bids
bidpct2	bidshr2 / firmshr
coalpct2	The sum of bidpct2 for all members of a bidding coalition in a firm.
choice1	An indicator variable equal to 0 if a PF does not submit a bid for a firm, equal to 1 if bidpct2 < 25%, and equal to 2 if bidpct2 > 25% or coalpct > 50%
choice2	An indicator variable equal to 0 if a PF does not submit a bid for a firm, equal to 1 if coalpct2 < 15%, equal to 2 if 15% ≤ coalpct2 < 25%, equal to 3 if 25% ≤ coalpct2 < 50%, equal to 4 if coalpct2 ≥ 50% AND bidpct2 ≤ 25%; and equal to 5 if coalpct2 ≥ 50% AND bidpct2 > 25%

**Table II.**

**Distribution of all firms available on the second auction round across different types**

A total of 820 firms have shares available for purchase on the second auction round. These firms are classified into five different firm types. Firm Type 1 includes firms that have less than 50% of their shares available for mass privatization. Firm Types 2 to 4 include firms offering more than 50% of their equity for mass privatization and were introduced for the first time on the first auction round. Firm Type 2 includes all firms that have more than 50% of their shares available for mass privatization but have less than 50% of equity left for purchase on the second auction round. Firm Type 3 includes firms with more than 50% of their shares available for purchase on the second auction round but have more than 1% of their total equity purchased by PFs on the first auction round. Firm Type 4 includes firms that have more than 50% of their shares available for purchase on the second auction round and less than 1% of equity was won by PFs on the first auction round. Firm Type 5 includes all firms which are offered for the first time on the second auction round and have more than 50% of their equity allocated for mass privatization. Small PF bids are single bids for less than 25% of firm equity; large bids are bids for more than 25% of firm equity or bids participating in majority coalitions.

	<b>Firm Type 1</b>	<b>Firm Type 2</b>	<b>Firm Type 3</b>	<b>Firm Type 4</b>	<b>Firm Type 5</b>
Firms Receiving no bids	93	200	9	104	15
Firms receiving only large bids	4	21	4	92	24
Firms receiving only small bids	60	106	1	19	1
Firms receiving both small and large bids	0	15	8	34	10
<b>Total</b>	<b>157</b>	<b>342</b>	<b>22</b>	<b>249</b>	<b>50</b>

**Table III.**

**A multinomial model of the probability of a firm to receive bids of particular type**

The dependent variable is *Bidtype* - an indicator equal to 0 if a firm receives no bids; equal to 1 if a firm receives only large bids; equal to 2 if a firm receives only small bids; and equal to 3 if a firm receives both small and large bids. Small PF bids are single bids for less than 25% of firm equity; large bids are bids for more than 25% of firm equity or bids participating in majority coalitions. *Bidtype* = 0 is the comparison group. The independent variables are described in Table I. The multinomial logit model is estimated using maximum likelihood. Standard errors are in parentheses.

<b>Variable</b>	<b><i>Bidtype</i> = 1</b>	<b><i>Bidtype</i> = 2</b>	<b><i>Bidtype</i> = 3</b>
firmshr	-1.10162** (0.5404)	0.13476 (0.0879)	-0.04240 (0.2652)
SumPFpct	-0.03874* (0.0115)	-0.00341 (0.0041)	-0.01003 (0.0113)
pct50	1.66406* (0.2802)	-1.30776* (0.2759)	1.82515* (0.3983)
Constant	-1.56310* (0.2639)	-0.52367* (0.1498)	-2.71272* (0.3760)
Observations = 820			
Pseudo R <sup>2</sup> = 0.1380			
Likelihood Ratio $\chi^2 = 269.14$			
Prob > $\chi^2(3) = 0.0000$			

\* significant at 1% level; \*\* significant at 5% level; \*\*\* significant at 10% level

**Table IV.**

**A Poisson model of determinants of the number of bids of particular type that a firm receives**

The dependent variable in the model reported in the first column is the number of large bids (single bids for more than 25% of firm equity or coalitional bids for more than 50%) submitted for a firm, including firms with zero large bids.

The dependent variable for the second model is the number of small bids (single bids for less than 25% of firm equity) submitted for a firm. The independent variables are described in Table I. The Poisson model is estimated using maximum likelihood. Standard errors are in parentheses.

Variable	Number of Large Bids	Number of Small Bids
firmshr	-1.50921* (0.3085)	0.12752* (0.0187)
SumPFpct	-0.02312* (0.0056)	-0.00327 (0.0025)
pctoff50	1.97315* (0.1530)	-0.73332* (0.1316)
Constant	-1.27300* (0.1526)	-0.49294* (0.0850)
Observations	820	820
Pseudo R <sup>2</sup>	0.2766	0.0439
Likelihood Ratio X <sup>2</sup>	705.09	71.75
Prob >X <sup>2</sup> (3)	0.0000	0.0000

\* significant at 1% level; \*\* significant at 5% level; \*\*\* significant at 10% level

**Table V.**

**Comparison of in-sample firms with the rest of the firms that received at least one bid**

The estimation sample of the paper includes 180 of the original 820 firms that were available on the second auction round. Of the remaining 640, 422 received no bids. The table compares the 180 sample firms to the 218 non-sample firms that receive at least one PF bid but are not included in the estimation. Standard deviations of the means of all variables are in parentheses. Small PF bids are single bids for less than 25% of firm equity; large bids are bids for more than 25% of firm equity or bids participating in majority coalitions.

	Sample Firms		Non-sample firms	
	Mean	Median	Mean	Median
Firmsshr	146,801 (432,869)	53,456	397,564 (1,129,147)	102,847
Number of bids	3.4167 (2.7358)	2	2.1096 (1.6856)	1
Number of large bids	2.8167 (2.5945)	2	0.4566 (1.0801)	0
Number of small bids	0.4556 (0.7347)	0	1.4384 (1.1923)	1
Number of obs.	180	180	218	218

**Table VI.****Determinants of demand by individual investors**

The dependent variable in the regression is individual demand as percent of firm equity. It has been constructed as total firm demand minus the sum of all bids submitted by PFs for the firm. The description of all independent variables is in Table I. The model is estimated using OLS. Standard deviations of the coefficients are in parentheses. Small PF bids are single bids for less than 25% of firm equity; large bids are bids for more than 25% of firm equity or bids participating in majority coalitions.

Variable	Coefficient
firmshr	-0.01377** (0.0065)
Number of large bids	0.02923* (0.0041)
Number of small bids	0.02113* (0.0069)
MP40	-0.06326* (0.0215)
Pctoff50	-0.07591* (0.0202)
SumPFpct1	-0.00145* (0.0004)
A1 firm	-0.28343* (0.0245)
Constant	0.37065* (0.0300)
Obs.	820
F-stat	44.78
Prob	0.000
R-squared	0.2723

\* significant at 1% level; \*\* significant at 5% level; \*\*\* significant at 10% level

**Table VII****A comparison of actual win allocations and null allocations of different bid types**

The table contains mean null and actual win allocations of different bid types in different firm types. Small PF bids are single bids for less than 25% of firm equity; large bids are bids for more than 25% of firm equity or bids participating in majority coalitions. Null allocations for each bid type are computed as:

$$((\text{sum of shares in bids of this type}) / (\text{sum of all shares submitted})) * (\text{pct of firm equity offered on second round})$$

The win allocation are computed as the sum of all share allocations to bids of particular type after the second auction round. Only firms where the number of shares demanded is greater than the number of shares available on the second auction round are used. Median values are in parentheses.

	Large PF null allocations	Large PF wins	Small PF null allocation	Small PF wins	Individual null allocation	Individual wins
Firms with large bids N = 69	0.5346 (0.5526)	0.5649 (0.5851)	n.a.	n.a.	0.1139 (0.0457)	0.0832 (0.0115)
Firms with small bids N = 2	n.a.	n.a.	0.0670 (0.0670)	0.1028 (0.1028)	0.7352 (0.7352)	0.6995 (0.6995)
Firms with both small and large bids N = 36	0.4179 (0.4435)	0.4579 (0.5050)	0.0990 (0.0746)	0.0839 (0.0562)	0.0923 (0.0271)	0.0666 (0.0058)

**Table VIII.****Summary statistics of different sized bids**

Small PF bids are single bids for less than 25% of firm equity; large bids are bids for more than 25% of firm equity or bids participating in majority coalitions. *Bidpric2* is in vouchers. Premium is computed as  $(Bidpric2 - reservep) / reservep$ . *Capital2* is nominated in thousand vouchers.

**Panel A. Masspriv < 75%**

	Mean Values		Median Values	
	Small Bids	Large Bids	Small Bids	Large Bids
Bidpric2	609.85	769.55	504.00	610.50
Premium	0.467	1.132	0.083	0.515
Firmsshr	330,819	121,297	122,542	47,681
Capital2	374,139	588,938	128,666	517,739

**Panel B. Masspriv > 75%**

	Mean Values		Median Values	
	Small Bids	Large Bids	Small Bids	Large Bids
Bidpric2	1364.98	1000.36	655.00	603.00
Premium	2.158	1.294	0.281	0.484
Firmsshr	37,298	50,190	36,503	23,045
Capital2	272,325	431,316	74,758	260,417

**Table IX.****Summary Statistics of Bid Prices for Different Types of Firms**

Small PF bids are single bids for less than 25% of firm equity; large bids are bids for more than 25% of firm equity or bids participating in majority coalitions. Prices are in vouchers. Premium is computed as  $(Bidpric2-reservep)/reservep$ . Medians values are in parentheses.

**Panel A. Masspriv < 75%**

	Prices		Premium	
	Small Bids	Large Bids	Small Bids	Large Bids
Firms with small bids	572.06 (505)	n.a.	0.0813 (0.0121)	n.a.
Firms with large bids	n.a.	758.37 (587)	n.a.	1.1197 (0.4502)
Firms with both	623.52 (503)	788.25 (672)	0.6059 (0.1190)	1.1539 (0.7366)

**Panel B. Masspriv > 75%**

	Prices		Premium	
	Small Bids	Large Bids	Small Bids	Large Bids
Firms with small bids	1190.25 (456)	n.a.	1.6484 (0.0968)	n.a.
Firms with large bids	n.a.	902.62 (593)	n.a.	1.0478 (0.4645)
Firms with both	1504.76 (902)	1637.82 (1091)	2.5654 (0.9245)	2.8970 (1.3717)

**Table X.****Prices of two-fund coalitional bids**

There are 190 coalitional agreements that generated 393 total coalitional bids for the 180 firms in the sample. 13 of the 190 agreements are between 3 funds and are dropped from the analysis. In 13 of the remaining 177 coalitions, both funds submit bids of equal sizes. The rest are coalitions where one fund has a dominant role by submitting a larger sized bid. The most common example of these agreements is a 34% + 17% scheme. The premium for different-sized coalitional bids is defined as (price of larger-sized bid – price of smaller-sized bid) / (price of smaller-sized bid). The majority of coalitional bids are at the same price due to reciprocal agreements between the two funds.

	Coalitions of different sized bids	Coalition of same sized bids
# obs. where premium < 0	16	n.a.
# obs. where premium = 0	86	10
# obs. where premium > 0	62	3
Mean premium for all obs.	0.0840	0.009
Median premium for all obs.	0	0
Mean premium if premium $\neq$ 0	0.1767	0.0371
Median premium if premium $\neq$ 0	0.0513	0.0151

**Table XI.****First-stage multinomial logit estimation results**

The dependent variable is *choice1*: equal to 0 if a PF does not submit a bid for a firm, equal to 1 if the bids is single and  $bidpct2 \leq 25\%$ , and equal to 2 if  $bidpct2 > 25\%$  or  $coalpct2 \geq 50\%$ . *Choice1* = 0 (no bid) is the comparison group. The independent variables are described in Table I. The multinomial logit model is estimated using maximum likelihood. Standard errors for each coefficient are in parentheses. The multinomial logit model is estimated over two samples. The first sample contains all 180 firms in the original sample (122 firms with  $masspriv < 75\%$  and 58 firms with  $masspriv \geq 75\%$ ). The second sample contains only firms that receive both small and large bids (37 firms with  $masspriv < 75\%$  and 7 firms with  $masspriv \geq 75\%$ ). The odds-ratio computes the changes in the probability of submitting a large bid versus a small bid after increasing the continuous variables by one standard deviation, or changing the dummy from 0 to 1. The Wald test is a test of the restriction that the coefficients on each independent variable are equal across the equation for small bids and the equation for large bids.

**Panel A. Masspriv < 75%**

		<b>All firms</b>		<b>Firms with small and large bids</b>	
	<b>Variable</b>	<b>Choice1 = 1</b>	<b>Choice1 = 2</b>	<b>Choice1 = 1</b>	<b>Choice1 = 2</b>
capital2	Coefficient	0.00111*	0.00220*	0.00104*	0.00192*
		(0.0003)	(0.0004)	(0.0004)	(0.0002)
	Odds-ratio		1.4192		1.3564
	Wald test p-value		0.0009		0.0282
firmshr	Coefficient	0.00025***	-0.00096*	0.00005	-0.00043
		(0.0001)	(0.0003)	(0.0002)	(0.0003)
	Odds-ratio		0.5379		0.6620
	Wald test p-value		0.0014		0.1130
REGION	Coefficient	0.92132*	0.77193	0.64020	0.83548*
		(0.3368)	(0.6129)	(0.4001)	(0.2484)
	Odds-ratio		0.8612		1.2157
	Wald test p-value		0.6853		0.6671
Reservp	Coefficient	-0.00054	-0.001744*	-0.00096	-0.001194
		(0.0009)	(0.0004)	(0.0013)	(0.0008)
Constant	Coefficient	-5.14216*	-3.27240*	-3.76631*	-3.06729
		(0.4389)	(0.1991)	(0.5454)	(0.3459)
		Observations = 8784		Observations = 2072	
		Pseudo R <sup>2</sup> = 0.0968		Pseudo R <sup>2</sup> = 0.0715	
		Likelihood Ratio $\chi^2 = 347.68$		Likelihood Ratio $\chi^2 = 99.15$	
		Prob > $\chi^2(20) = 0.0000$		Prob > $\chi^2(20) = 0.0000$	

\*significant at 1% level; \*\*significant at 5% level; \*\*\* significant at 10% level

**Table XI.**

**First-stage multinomial logit estimation results**

**Panel B. Masspriv  $\geq 75\%$**

		<b>All firms</b>		<b>Firms with small and large bids</b>	
<b>Variable</b>		<b>Choice1 = 1</b>	<b>Choice1 = 2</b>	<b>Choice1 = 1</b>	<b>Choice1 = 2</b>
capital2	Coefficient	0.00035 (0.0007)	0.00136* (0.0002)	0.00040 (0.0009)	0.00156* (0.0005)
	Odds-ratio		1.3886		1.4893
	Wald test p-value		0.1490		0.2373
firmshr	Coefficient	-0.00692 (0.0059)	0.00028 (0.0011)	0.00029 (0.0283)	-0.03254*** (0.0187)
	Odds-ratio		1.5844		0.5784
	Wald test p-value		0.2277		0.3261
REGION	Coefficient	2.48296* (0.4114)	1.13925* (0.2298)	1.98903* (0.7974)	0.93567*** (0.5625)
	Odds-ratio		0.2609		0.3488
	Wald test p-value		0.0120		0.2585
Reservp	Coefficient	-0.00042 (0.0012)	0.00094* (0.0014)	0.0001332 (0.0022)	-0.00036 (0.0013)
Constant	Coefficient	-5.49028* (0.6852)	-4.13251* (0.6303)	-4.18579* (1.6801)	-2.45572* (0.9934)
		Observations =4176 Pseudo R <sup>2</sup> =0.0588 Likelihood Ratio $\chi^2$ = 98.19 Prob > $\chi^2$ (20) = 0.0000		Observations =392 Pseudo R <sup>2</sup> =0.0919 Likelihood Ratio $\chi^2$ = 24.55 Prob > $\chi^2$ (20) = 0.0019	

\*significant at 1% level; \*\*significant at 5% level; \*\*\* significant at 10% level

**Table XII.**  
**Second-stage regression results**

The dependent variable is *Lbidpric2*. In each panel two regressions (one for each investment choice) are estimated. The regressions are estimated over two samples. The first sample contains all 180 firms in the original sample (122 firms with *masspriv*<75% and 58 firms with *masspriv*≥75%). The second sample contains only firms that receive both small and large bids (37 firms with *masspriv*<75% and 7 firms with *masspriv*≥75%. *Lambda* is the selection correction term. Details about its formulation are in Appendix B. The rest of the independent variables are described in Table I. Lee (1983) t-stats are in parentheses.

**Panel A. Masspriv < 75%**

Variable	All firms		Firms with small and large bids	
	Choice1 = 1	Choice1 = 2	Choice1 = 1	Choice1 = 2
reservp	0.0020* (3.46)	0.0021* (10.66)	0.0028* (4.20)	0.0020* (5.85)
Nmedbids	0.0384** (1.35)	0.0364* (3.67)	0.0317 (1.06)	0.0240*** (1.78)
A1firm	-0.2328 (-1.22)	-0.2322* (-3.65)	-0.2424 (-1.42)	-0.2794** (-2.46)
lambda	0.7278* (2.97)	-0.2226* (-4.05)	1.0759** (2.50)	-0.0982 (-1.06)
Constant	3.4959* (6.03)	6.0235* (36.16)	2.7291* (3.13)	5.9530* (20.30)
R <sup>2</sup>	0.5003	0.3857	0.5495	0.4148
Obs.	64	334	47	125

**Panel B. Masspriv ≥ 75%**

Variable	All firms		Firms with small and large bids	
	Choice1 = 1	Choice1 = 2	Choice1 = 1	Choice1 = 2
reservp	0.0031 (1.35)	0.0014* (6.58)	-0.0003 (-0.11)	0.0002 (0.25)
Nmedbids	0.1217*** (1.83)	0.0408 (1.63)	0.2550*** (2.39)	0.23404* (6.59)
A1firm	0.4329 (0.52)	-0.2083 (-1.36)	2.5621 (1.55)	1.4542* (3.43)
lambda	0.2256 (0.45)	-0.1681 (-0.84)	-0.7548 (-0.96)	-0.9041** (-2.53)
Constant	3.9656* (3.17)	6.0728* (13.63)	5.7003** (2.82)	6.1363* (8.48)
R <sup>2</sup>	0.4127	0.3857	0.7130	0.7789
Obs.	18	173	10	23

\* significant at 1% level; \*\* significant at 5% level; \*\*\* significant at 10% level

**Table XIII.****Conditional expected bid prices**

The conditional mean bid prices for each bid choice are evaluated at the means of the continuous independent variables *reservp* and *Nmedbids* using the parameter vector estimates in Table XII. The means for the first two columns in each table are computed at *A1firm* = 0, the means in the second two columns at *A1firm* = 1. Bootstrapped p-values for  $H_0: E[\text{bidprice of large blocks}] - E[\text{bidprice of small blocks}] \leq 0$  are in parenthesis. Details about the bootstrapping are included in the last paragraph of Appendix B. Due to lack of sufficient number of observations, the bootstrapping methodology breaks in 24% of the runs in the last model in Panel B.

**Panel A. Masspriv < 75%**

	<b>Round 2 Firms (A1firm = 0)</b>		<b>Round 1 Firms (A1firm = 1)</b>	
	<b>Log Value</b>	<b>Voucher Equivalent</b>	<b>Log Value</b>	<b>Voucher Equivalent</b>
<i>All firms (122 firms)</i>				
Large blocks, 334 bids	7.0787 (0.006)	<b>1186</b>	6.8465 (0.008)	<b>941</b>
Small blocks, 64 bids	4.5225 (n.a.)	92	4.2897 (n.a.)	73
<i>Only firms receiving small and large bids (37 firms)</i>				
Large blocks, 125 bids	6.8800 (0.039)	<b>973</b>	6.6007 (0.051)	<b>736</b>
Small blocks, 47 bids	3.9934 (n.a.)	54	3.7510 (n.a.)	43

**Panel B. Masspriv ≥ 75%**

	<b>Round 2 Firms (A1firm = 0)</b>		<b>Round 1 Firms (A1firm = 1)</b>	
	<b>Log Value</b>	<b>Voucher Equivalent</b>	<b>Log Value</b>	<b>Voucher Equivalent</b>
<i>All firms (58 firms)</i>				
Large blocks, 173 bids.	6.9667 (0.233)	1,061	6.7584 (0.400)	861
Small blocks, 18 bids	6.0696 (n.a.)	433	6.5025 (n.a.)	667
<i>Only firms receiving small and large bids (7 firms)</i>				
Large blocks, 23 bids	7.9668 (0.293)	2,884	9.4210 (0.462)	12,346
Small blocks, 10 bids	7.5006 (n.a.)	1,809	10.0627 (n.a.)	23,451

**Table XIV.****First-stage multinomial logit estimation results. Extended Model**

The dependent variable is *choice2*: equal to 0 if a PF does not submit a bid for a firm, equal to 1 if *bidpct2* < 15%, equal to 2 if  $15\% \leq \textit{bidpct2} < 25\%$ , equal to 3 if  $25\% \leq \textit{bidpct2}$  OR  $\textit{coalpct2} < 50\%$ , equal to 4 if  $\textit{coalpct2} \geq 50\%$  AND  $\textit{bidpct2} \leq 25\%$ ; and equal to 5 if  $\textit{coalpct2} \geq 50\%$  AND  $\textit{bidpct2} > 25\%$ . *Choice2* = 0 (no bid) is the comparison group. The independent variables are described in Table I. The multinomial logit model is estimated using maximum likelihood. Standard errors are in parentheses. The odds-ratio computes the changes in the probability of submitting a *choice2* >1 bid versus a *choice2* = 1 bid after increasing the continuous variables by one standard deviation, or changing the dummy from 0 to 1. The Wald test is a pairwise test of the restriction that the coefficients on each independent variable are equal across the equation for *choice2* = 1 bids and the each equation corresponding to *choice2* > 1 bids.

**Panel A. Masspriv < 75%**

Variable		<i>Choice 2= 1</i>	<i>Choice2 = 2</i>	<i>Choice2 = 3</i>	<i>Choice2 = 4</i>	<i>Choice2 = 5</i>
capital2	Coefficient	-0.00007 (0.0006)	0.00195* (0.0004)	0.00161* (0.0002)	0.00265* (0.0002)	0.00227* (0.0002)
	Odds-ratio		1.9179	1.7217	2.4102	2.1274
	Wald test p-value		0.0035	0.0062	0.0000	0.0001
firmsshr	Coefficient	0.00032 (0.0002)	0.00016 (0.0002)	-0.00023 (0.0003)	-0.00151** (0.0007)	-0.00250* (0.0008)
	Odds-ratio		0.9192	0.7511	0.3889	0.2337
	Wald test p-value		0.5642	0.0962	0.0163	0.0011
REGION	Coefficient	1.33667* (0.4114)	0.28449 (0.6129)	1.07069* (0.2559)	0.18583 (0.3423)	0.92025* (0.2501)
	Odds-ratio		0.3492	0.7665	0.3164	0.6478
	Wald test p-value		0.1528	0.5804	0.0306	0.3642
Reservp	Coefficient	0.00086 (0.0011)	-0.00235*** (0.0014)	-0.00192* (0.0008)	-0.00158** (0.0007)	-0.00168* (0.0007)
Constant	Coefficient	-6.18233* (0.5776)	-5.39267* (0.6303)	-4.2200* (0.3400)	-4.63483* (0.3518)	-4.18708* (0.3194)
Observations = 8784						
Pseudo R <sup>2</sup> = 0.0882						
Likelihood Ratio $\chi^2$ = 389.13						
Prob > $\chi^2(20)$ = 0.0000						

\*significant at 1% level; \*\*significant at 5% level; \*\*\* significant at 10% level

**Table XIV.**

**First-stage multinomial logit estimation results. Extended model**

**Panel B. Masspriv  $\geq 75\%$**

<b>Variable</b>		<b>Choice2 = 1</b>	<b>Choice2 = 2</b>	<b>Choice2 = 3</b>	<b>Choice2 = 4</b>	<b>Choice2 = 5</b>
capital2	Coefficient	-0.00162 (0.0016)	0.00147*** (0.0008)	0.00054 (0.0004)	0.00156* (0.0004)	0.00182* (0.0003)
	Odds-ratio		2.7159	2.0091	2.7901	3.0360
	Wald test p-value		0.0897	0.1976	0.0588	0.0383
firmshr	Coefficient	-0.00244 (0.0056)	-0.02712 (0.0197)	0.00073 (0.0016)	-0.00029 (0.0031)	-0.00036 (0.0018)
	Odds-ratio		0.2066	1.2254	1.1910	1.1426
	Wald test p-value		0.2265	0.5476	0.6437	0.6971
REGION	Coefficient	2.43373* (0.6656)	2.56718* (0.7559)	1.33766* (0.3442)	0.27999 (0.6426)	1.28295* (0.3282)
	Odds-ratio		1.1427	0.3342	0.1160	0.3164
	Wald test p-value		0.8941	0.1401	0.0193	0.1183
Reservp	Coefficient	0.00086 (0.0011)	-0.00494*** (0.0029)	-0.00067 (0.0005)	-0.00123** (0.0006)	-0.00099 (0.0004)
Constant	Coefficient	-6.44611* (0.7597)	-4.41224* (1.3603)	-4.2200* (0.3400)	-4.63483* (0.3518)	-5.21452* (0.3194)
Observations =4176						
Pseudo R <sup>2</sup> = 0.0588						
Likelihood Ratio $\chi^2 = 121.22$						
Prob > $\chi^2(20) = 0.0000$						

\*significant at 1% level; \*\*significant at 5% level; \*\*\* significant at 10% level

**Table XV.****Conditional expected bid prices. Extended model**

The conditional mean bid prices for each bid choice are evaluated at the means of the continuous independent variables *reservp* and *Nmedbids* and the parameter vector estimates from unreported second-stage OLS regressions of the same type as the ones presented in Table XII. The means for the first two columns in each table are computed at *A1firm* = 0, the means in the second two columns at *A1firm* = 1. Bootstrapped p-values for  $H_0: E[\text{bidprice of X type of block}] - E[\text{bidprice of small blocks}] \leq 0$  are in parenthesis. Details about the bootstrapping are included in the last paragraph of Appendix B. Due to lack of sufficient number of observations, the bootstrapping methodology breaks in 56% of the runs in the model in Panel B

**Panel A. Masspriv < 75%**

	Round 2 Firms (A1firm = 0)		Round 1 Firms (A1firm = 1)	
	Log Value	Voucher Equivalent	Log Value	Voucher Equivalent
Large coalitional blocks	7.2952 (0.023)	1,473	7.1437 (0.012)	1,266
Small coalitional blocks	6.9479 (0.037)	1,041	6.8213 (0.018)	917
Large single blocks	7.1662 (0.057)	1,295	6.8517 (0.036)	945
Medium single blocks	6.0868 (0.214)	440	6.2097 (0.144)	498
Small blocks	4.8824 (n.a.)	132	4.7384 (n.a.)	114

**Panel B. Masspriv ≥ 75%**

	Round 2 Firms (A1firm = 0)		Round 1 Firms (A1firm = 1)	
	Log Value	Voucher Equivalent	Log Value	Voucher Equivalent
Large coalitional blocks	7.1041 (0.296)	1,217	6.7765 (0.489)	877
Small coalitional blocks	6.3584 (0.317)	577	6.1696 (0.511)	478
Large single blocks	6.2973 (0.362)	543	6.2032 (0.525)	494
Medium single blocks	8.4461 (0.287)	4,657	8.2135 (0.447)	3,690
Small blocks	2.1465 (n.a.)	9	6.4267 (n.a.)	618

**Table XVI**

**Distribution of the number of funds that decide to bid for a certain firm**

This table reports the number of bids received for each of the firms in the sample. 72 Privatization Funds submitted bids for the 180 firms in the sample. Whenever a PF submits more than one bid for the same firm, the bids are aggregated into a single bid.

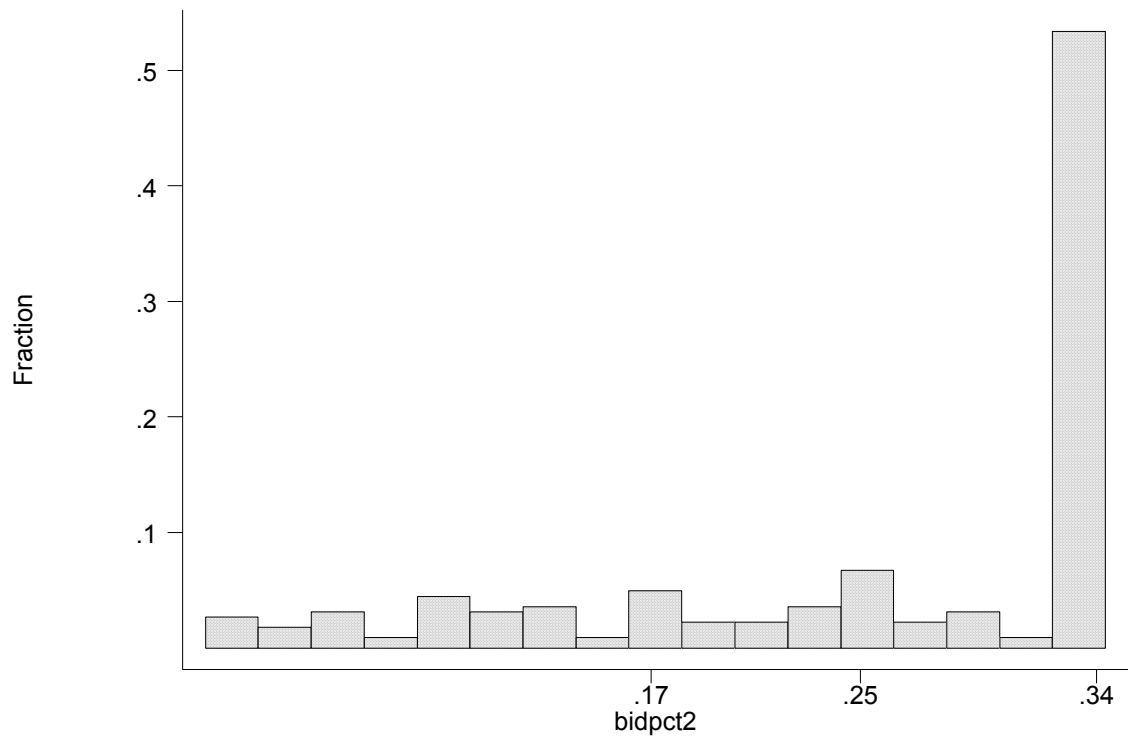
Number of funds that bid for a certain firm	Number of firms
1	38
2	54
3	24
4	24
5	11
6	8
7	6
8	6
9	2
10	1
11	1
12	1
13	2
15	1
16	1
Total: 180	

**Table XVII**

**Distribution of the number of firms that a fund bid for**

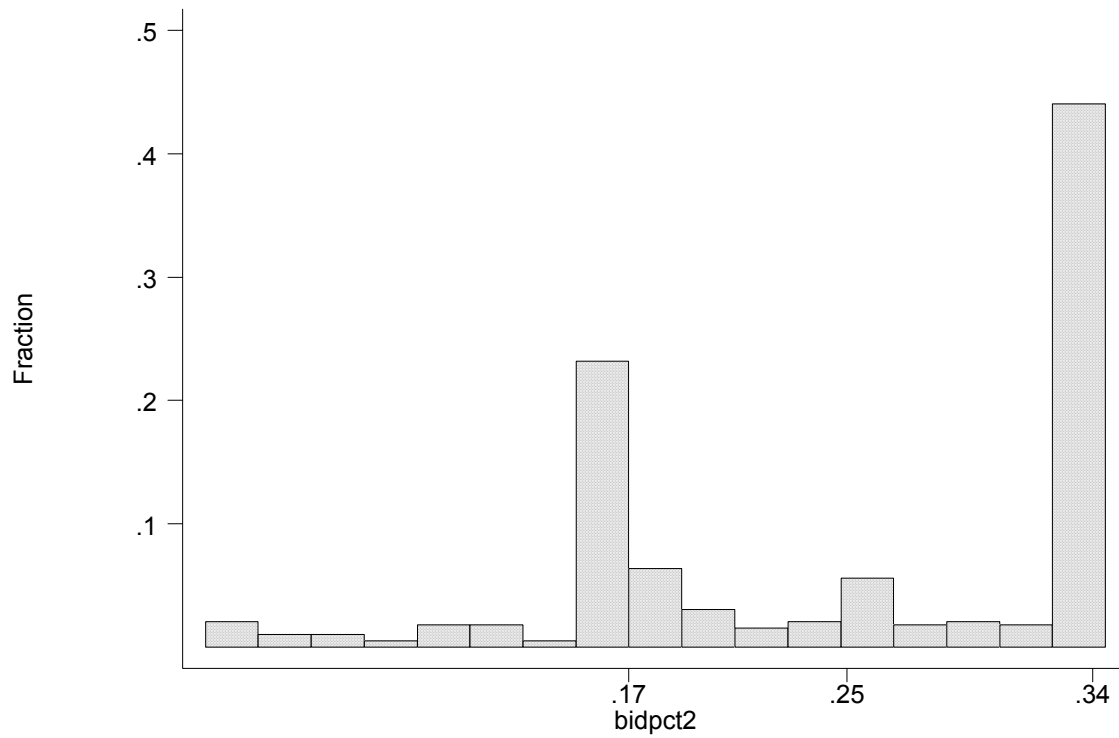
This table reports the number of firms that each of the Privatization Funds submitted bids for. 72 Privatization Funds submitted at least one bid for the firms in the sample. The maximum number of firms that a fund bids for is 50.

Number of firms that a fund bids for	Number of funds
1	7
2	7
3	8
4	9
5	5
6	2
7	5
8	3
9	1
10	3
11	3
12	3
13+	16
Total: 72	



**Figure 1. Distribution of the number of single bids by percentage of equity (*bidpct2*).**

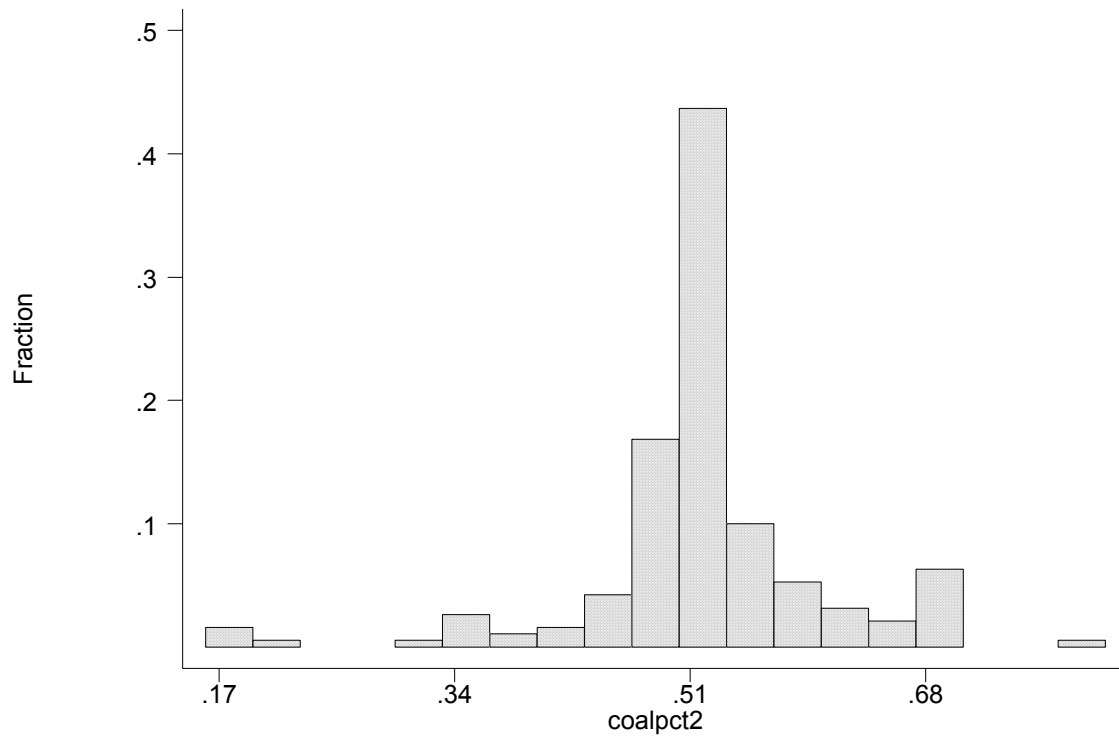
On the x-axis is bid size measured as percent of firm equity (*bidpct2*). On the y-axis is the relative frequency of bids. A total of 222 single bids were submitted for the 180 firms in the sample. The maximum allowed bid is for 34% of firm shares. 118 of the bids are for the maximum bid size.



**Figure 2. Distribution of the number of coalitional bids by percentage of equity (*bidpct2*)**

On the x-axis is the bid size measured as percent of firm equity (*bidpct2*). On the y-axis is the relative frequency of bids.

A total of 393 coalitional bids are submitted for the 180 firms in the sample.



**Figure 3. Distribution of the number of coalitional bids by the sum of percentage of equity (*coalpct2*)**

On the x-axis is *coalpct2*, equal to the sum of bid sizes (*bidpct2*) for all members in a coalitional bid. On the y-axis is the relative frequency of such bids. The 393 coalitional bids were reduced to a total of 190 observations, keeping one observation per coalition-firm.