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The Going Public Decision of Business Group Firms

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Abstract

IPOs affiliated to business groups represent a large fraction of new issues in global markets. Groups are characterized by stronger private benefits of control and an internal funding advantage. Consistent with these features, group firms are more selective when going public than standalone firms. In particular, group IPOs are larger and older firms and engage less in market timing than standalone IPOs. Group firms invest less and are more profitable post-IPO. Private benefits of control also affect the within-group selection of IPO firm. Our findings illustrate novel selection effects in public markets due to pre-IPO control structures.

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A business group is a set of firms with a common controlling shareholder. More than 20% of listed firms in developed markets and close to 50% in emerging markets belong to business groups (La Porta, Lopez-de-Silanes, and Shleifer, 1999; Claessens, Djankov, and Lang, 2000; Faccio and Lang, 2002; Morck, Wolfenzon, and Yeung, 2005; Khanna and Yafeh, 2007). Given their relevance in public markets, it is not surprising that 23% of European initial public offerings (IPOs) since the year 2000 correspond to business group firms (see Figure 1). Moreover, since group firms are on average larger than standalone firms, 45% of the market capitalization of new issues can be accounted for by business group firms. Despite their importance in global markets, the IPOs of group firms have been largely overlooked.

In this paper, we shed light on the going public decision of business group firms vis-à-vis standalone firms. We derive novel predictions based on two key features of business groups, namely stronger private benefits of control and an internal funding advantage. These ingredients imply a stronger selectivity of group firms when contemplating the going public decision. We predict differences in ex-ante characteristics of group firms going public, and differences in the consequences of going public. We also study the going public decision among different firms within a group. We test our predictions with a sample of close to 6,000 IPOs in 16 European countries (2000-2016). Our data has three key advantages. First, we can observe firms before and after they go public, so we can build a panel of firms as they move from private to public status. Second, we can identify controlling shareholders more readily and map business groups. Third, we can compare group firms that go public with group firms that remain private in the same group. Overall, our predictions and results showcase that pre-IPO control structures produce important selection effects into public markets, with implications for post-IPO investment and performance, as well as for the timing of new equity issuances.

Our analysis is based on the idea that going public implies a tradeoff between raising capital and losing private benefits of control. Going public implies a loss of private benefits of control because public firms are affected by additional regulation and monitoring (Pagano and Roell, 1998; Benninga, Helmantel, and Sarig, 2005; Boot, Gopalan and Thakor, 2006; Doidge, Karolyi, Lins, Miller, and Stulz, 2009; Helwege and Packer, 2009). Private benefits are particularly large in business groups because groups involve multiple firms and the divergence between control and cash-flow rights is more pronounced in group firms (Bertrand, Mehta, and Mullainathan, 2002). Anticipating a larger loss of private benefits when going public, business groups are more reluctant to tap public markets. At the same time, internal capital markets reduce the need to tap public markets because group firms can support each other through internal reallocations (Hoshi, Kashyap, and Scharfstein, 1991; Gopalan, Nanda, and Seru, 2007, 2014; Bena and Ortiz-Molina, 2013; Buchuk, Larrain, Munoz, and Urzua, 2014; Almeida, Kim, and Kim, 2015). Overall, the combination of a larger loss of private benefits and an internal funding advantage makes group firms more selective than standalone firms when contemplating the going public decision.

We show that firms' pre- and post-IPO characteristics are consistent with the higher selectivity of group firms. First, group firms are on average 4 years older and more than twice as large in terms of assets than standalone firms when they go public, which is consistent with deferring the IPO decision relative to standalone firms. More importantly, using a differences-in-differences approach we find that group IPOs have higher return on assets (ROA) relative to standalone IPOs in the post-IPO period. We also find that group IPO firms grow less in terms of total assets, fixed assets, and acquisitions, and issue less equity than standalone IPO firms after going public. Investing in fewer but better projects is consistent with groups being endogenously more selective, i.e., applying a higher hurdle rate on new projects.

Beyond the average selectivity of group firms relative to standalone firms, the tradeoff between private benefits and cash-flow benefits implies selection effects within groups –i.e., the decision to take one firm in the group public while other firms remain private. Unlike standalone firms, business groups often have the flexibility to list different firms, or they have different vehicles from which they can raise capital from public markets. In a similar way as Almeida and Wolfenzon (2006)'s model of pyramidal ownership, the controlling shareholder faces a tradeoff between the loss of private benefits as a firm goes public and the cash-flow benefits of the new projects. If the firm at the bottom of the pyramid goes public, the cash-flow benefits of new projects must be shared with more outside shareholders. The advantage is that the controlling shareholder keeps private benefits at the top firms, which remain outside the scrutiny of the regulator and the market.

Conversely, if the firm at the top of the pyramid goes public, the loss of private benefits is more pronounced because the entire set of firms falls under the scrutiny of the market. However, by investing through a top-of-the-pyramid firm the controlling shareholder directly receives more cash-flow benefits from the new projects.

In the data we confirm the within-group selection effects that are predicted by the tradeoff between private benefits and cash-flow benefits. When the group has higher profitability, and hence higher cash-flow benefits of new projects, the likelihood of listing firms at the top of the pyramid goes up. When the group pyramid has more layers, i.e., when there are more opportunities and incentives for consuming private benefits, the likelihood of listing firms at the top goes down. We also find that the likelihood of listing firms at the top is higher in countries that have lower private benefits of control, e.g., countries with a common law legal origin (Djankov, La Porta, Lopez-de-Silanes, and Shleifer, 2008).

Finally, we study market timing, which has become an important motivation for going public decisions (Ritter, 2003; Henderson, Jegadeesh, and Weisbach, 2006). If stock prices are affected by sentiment swings, then firms can decide to go public to take advantage of a lower-than-rational cost of capital. The effect of sentiment should be more pronounced in firms with less internal funds (Baker, Stein, and Wurgler, 2003), which in our setup are the standalone firms. At the same time, the stronger desire to keep private benefits serves as a buffer that isolates group firms from market swings. Consistent with these predictions we find that group IPOs have weaker market timing features than standalone IPOs. Before firms go public the industry Tobin's q of group firms is lower than that of standalone firms, and, crucially, Tobin's q falls by less after group IPOs. This suggests smaller overvaluation at the time of group IPOs. We also find that the number of standalone IPOs is a better predictor of market-wide return reversals than the number of group IPOs, which again suggests that standalone IPOs are more motivated by market timing than group IPOs.

Overall, our findings shed light on the selection process of group firms into public markets. In that vein, post-IPO outcomes should not be interpreted as evidence of a *causal* effect of going public.[1] Instead, post-IPO outcomes are the result of the endogenous process by which group and standalone firms choose to go public. This process leads to firms with different characteristics and projects being listed (see Pagano, Panetta and Zingales, 1998, for a similar approach). Our results are interesting to understand the tradeoffs involved in IPOs, and hence to compare between alternative theories of the going public decision. For instance, our results are more consistent with private benefits of control (i.e., an agency model) than with models of asymmetric information or models where the need for owner diversification drives the going public decision (see Section 1).

We contribute to several strands of the literature. First, our paper contributes to the literature on the going public decision (see Lowry, Michaely, and Volkova, 2018, for a recent survey). Our results show that pre-IPO control structures have important implications for the self-selection process through which firms go public. Control pyramids make firms more selective when contemplating the going public decision, which leads to delays in listing, lower investment and higher profitability after listing, and moderates the influence of market timing. The low investment rate of group firms after IPOs, together with the prevalence of groups in many international markets, can help explain the apparent lack of an investment motive for going public, as documented by the previous literature (Pagano, Panetta, and Zingales, 1998; Kim and Weisbach, 2008; Chemmanur, He, and Nandy, 2010; Aslan and Kumar, 2011). Given that business group IPOs represent a large fraction of new equity issuances in international markets, our findings can shed light on differences in IPO motives and IPO consequences in many markets.

Our within-group results also contribute to the IPO literature. We show that when studying the going public decision it is important to consider control links with other firms, on top of the firm-level characteristics emphasized by the previous literature. The theoretical literature studies the decision to go public from the point of view of a single firm (see Zingales, 1995, Pagano and Roell, 1998, Chemmanur and Fulghieri, 1999, Benninga, Helmantel, and Sarig, 2005, Boot, Gopalan, and Thakor, 2006, among others). Instead, we show that controlling shareholders often have the choice of multiple firms to take public. Our comparison of group IPOs with other private firms *within* the

[1] For instance, Bernstein (2015) estimates the causal effect of going public on innovation.

same group is interesting because these firms provide a relatively clean set of control firms that could have been taken public. The firms that remain private share a common controlling shareholder with the IPO firm, and hence allow us to control for owner-specific traits in the going public decision (e.g., owner life-cycle motives or preferences for diversification).

Second, the related literature on the differences between public and private firms can also benefit from our results. The underlying question in that literature is whether a firm's listed status can have an impact on real outcomes such as investment, productivity, and innovation (e.g., Asker, Farre-Mensa, and Ljungqvist, 2015; Bernstein, 2015; Gilje and Taillard, 2015; Phillips and Sertsios, 2017). Like Maksimovic, Phillips, and Yang (2020), our results show that there are important selection effects at the birth of public firms. Differences in profitability and valuation between firms with various post-IPO ownership structures (Claessens, Djankov, Fan, and Lang, 2002; La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 2002; Masulis, Pham, and Zein, 2011) can be traced in part to an initial self-selection into public markets. In our case the fundamental reason is that private benefits provide stronger incentives for firms in groups to opt out of public markets. In a related vein, Boot, Gopalan and Thakor (2006), Helwege and Packer (2009), and Ewens and Farre-Mensa (2017) argue that the private benefits of control can explain the desire to remain private, particularly considering the drop in the number of U.S. IPOs (Kahle and Stulz, 2017) and cross-listings (Doidge et al., 2009) in the last decade.

Finally, our findings contribute to the business group literature by studying the impact of pyramidal structures on the incentives to tap public markets and invest. In Almeida and Wolfenzon (2006)'s seminal model of pyramid formation, the constitution of the pyramid is simultaneous to the decision of raising funds from public markets. Empirically speaking, the two decisions are often sequential rather than simultaneous. We apply similar trade-offs to those in Almeida and Wolfenzon (2006) to understand the selection into public markets, rather than the formation of pyramidal groups. While we argue that groups initially shy away from public markets to keep more private benefits, this is not to say that once listed private benefits are eliminated and play no role in subsequent financing decisions. For instance, Masulis, Pham, and Zein (2019) argue that, in large business groups with multiple firms already listed, the preference for control shapes the decision between raising funds through new IPOs instead of SEOs.

The rest of the paper is organized as follows. Section 1 presents the main empirical predictions regarding the going public decision of standalone firms and business group firms. Section 2 describes the data. Section 3 shows the main results. Section 4 concludes.

1. Hypotheses Development

1.1 Main Predictions

The literature on business groups discusses bright and dark sides of pyramidal ownership structures (Khanna and Yafeh, 2007). On the bright side, Almeida and Wolfenzon (2006) argue that pyramidal structures provide a financial advantage to set up new firms (see also Almeida, Park, Subrahmanyam, and Wolfenzon, 2011; Bena and Ortiz-Molina, 2013). By investing through an intermediate firm, the controlling shareholder has access to more cash flows than when investing directly in a project. The financial advantage is also related to internal capital markets within a group, i.e., transfers of resources between firms that can help firms survive negative shocks and relax financial constraints (Almeida, Kim, and Kim, 2015; Buchuk, Larrain, Muñoz, and Urzua, 2014; Gopalan, Nanda, and Seru, 2007, 2014). On the dark side, Bertrand, Mehta, and Mullainathan (2002) argue that pyramids, through the separation of ownership and control, give incentives to the controlling shareholder for "tunneling" or the extraction of private benefits. In summary, the bright side of pyramidal structures is the higher availability of internal funds, while the dark side is the stronger divergence of interest between controlling and minority shareholders.

We consider the interplay of these different forces in the going public decision of business group firms. We derive novel predictions that compare group firms with standalone firms, and between different group firms depending on their position in the pyramidal structure. In the on-line appendix we present a model that builds upon Almeida and Wolfenzon (2006)'s model of pyramids, and which formalizes the predictions that we discuss below.

Our analysis is based on the idea that going public implies a tradeoff between raising capital and losing private benefits of control. This basic tradeoff is present in many papers in the literature of the going public decision, e.g., Pagano and Roell, 1998; Benninga, Helmantel, and Sarig, 2005; Boot, Gopalan and Thakor, 2006; Doidge, Karolyi, Lins, Miller, and Stulz, 2009; Helwege and Packer, 2009, among others. Fresh capital allows the firm to invest in positive-NPV projects and receive cash-flow benefits. However, capital from public markets has the cost (for the controlling shareholder) of more constraints on the consumption of private benefits. These constraints come from two sources. First, regulation and disclosure requirements are typically tighter in public markets. Second, monitoring from institutional investors, analysts, the media, and underwriters is also stronger in public markets.

If internal funds are more abundant in group firms, then it follows that group firms can keep on investing without incurring in the loss of private benefits that tapping public markets implies. Group firms, unlike standalone firms, can stay outside public markets for a longer time because they can tap internal capital markets.

Beyond internal capital markets, business group firms have another feature that increases their tendency to stay outside public market. Compared to standalone firms, group firms face a larger loss of private benefits of control as they go public. The reason depends on the position of the firm in the ownership structure of the group. For firms high in the control pyramid, the loss is larger than in a standalone firm since going public implies a loss of private benefits in that firm and other firms controlled by it. Going public produces a multiplicative loss of private benefits in this case. In some sense, the entire group goes public and is affected by stronger regulation and monitoring when the firm at the top of the pyramid goes public. The reason is different for firms below in the control pyramid. When these firms go public the other firms above them in the control pyramid are protected from public scrutiny, and hence private benefits can still be extracted. However, for firms below in the pyramid the loss of private benefits is larger *relative* to the cash-flow benefits that the controlling shareholder gets from the new project. This happens because the divergence between control rights and cash flow rights becomes stronger as we move towards the bottom of the pyramid. Although controlling shareholders effectively control firms at the bottom of the pyramid, minority shareholders typically receive more cash-flow benefits (Morck, Wolfenzon, and Yeung, 2005).[2]

A larger loss of private benefits relative to the cash-flow benefits gained implies that group firms discount the possibility of going public more heavily than comparable standalone firms. Both forces -the internal funding advantage together with the stronger loss of private benefits—imply that business groups are, on average, more selective than standalone firms when contemplating the decision to go public.

Higher selectivity can be noticed ex-ante in that group firms defer going public compared to standalone firms as summarized in the next prediction.

Prediction 1: Group firms go public when they are older and larger than standalone firms.

Selectivity can also be seen in ex-post outcomes. Group firms pick fewer projects - effectively passing on projects that standalone firms take - but better projects (high profitability projects). The reason behind this selectivity is that business group firms apply a higher hurdle rate on investment opportunities because of the larger loss of private benefits associated with tapping public markets.[3] This selection effect of new projects implies that, following the IPO, the change in firm profitability (i.e., the profitability of the new projects) for group firms should be higher than for standalone firms.

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[2] Our analysis assumes that the potential private benefits per firm are the same in standalone and group firms, and simply that the incentives for extraction are different. If potential private benefits are higher in group firms, which is the working assumption in the literature (Morck, Wolfenzon, and Yeung, 2005), then our effects would be even stronger.

[3] We describe the mechanism as if group firms apply a higher discount rate because they anticipate the loss of private benefits associated with going public. Alternatively, even if the same private benefits are consumed after going public, we can think that market investors require a higher rate of return in exchange for the destruction of firm value that the private benefits imply. In other words, investors are willing to pay less than for a comparable standalone firm. From either point of view—the supply or the demand for IPOs— the result is that group firms are more selective in the going public decision.

The selectivity of group firms also implies that group firms invest less than standalone firms. These differences are predicted even if the motive for going public is the same in both types of firms, namely funding investment. The selection effect does not mean that group firms are inherently better firms or have access to better projects (because of the higher profitability), or that these are more conservative firms (because of the lower investment). It is simply that group firms apply a higher hurdle rate when evaluating new investments financed through the stock market. The next prediction summarizes these intuitions.

Prediction 2: Business group firms that go public:

i) Experience an increase in profitability relative to standalone firms that go public.

ii) Invest less than standalone firms that go public.

Internal capital markets on their own cannot easily explain Prediction 2. Higher availability of internal funds, through intra-group loans (Gopalan, Nanda, and Seru 2007; Buchuk, Larrain, Muñoz, Urzua, 2014) or intra-group equity investments (Gopalan, Nanda, and Seru, 2014; Almeida, Kim, and Kim, 2015), is consistent with group firms raising less public equity, but not with group firms investing less than standalone firms. Given a positive slope in the supply of funds, raising less equity implies a lower cost of raising capital. Therefore, if anything, a higher availability of internal funds suggests more investment and less selectivity through a lower cost-of-capital channel.

Our third prediction comparing business group firms and standalone firms deals with the interaction of rational firms and irrational markets (Malmendier, 2018). The market timing hypothesis argues that issuances are motivated by bursts of overvaluation. Firms act as arbitrageurs and sell expensive equity before optimism fades away, which leads to predictable price corrections after issuance. Following the market timing hypothesis, Baker, Stein, and Wurgler (2003) show that financially constrained firms are more sensitive to overvaluation. In our context, standalone firms are more constrained, since they do not have access to internal capital markets, and they want to invest more than group firms. Consequently, we expect to find that standalone firms have more features associated with market timing, e.g., going public when valuations are historically high.

Higher private benefits of control also act as a buffer that isolates group firms from market swings in the cost of financing. Standalone firms focus on the tradeoff between the cost of financing and the future cash flows of the project, while business group firms include additional private benefits in their calculation. Cheap financing may be enough to tempt a standalone firm to go public, but it may not be enough to tempt group firms since they need to be compensated for a larger loss of private benefits.

Both private benefits of control and internal capital markets predict a muted response of group firms to irrational swings in valuations.

Prediction 3: The IPOs of business group firms are less likely to coincide with high industry-level and market-level valuations than the IPOs of standalone firms. Reversals in valuations are more pronounced following standalone IPOs than group IPOs.

In our empirical tests we also explore a corollary of Prediction 3. Return predictability at the market-level should be related to the number of standalone IPOs, but less so to the number of group IPOs. According to Henderson, Jegadeesh, and Weisbach (2006) market timing is an important element of securities issuance around the world. Hence, our results can connect cross-country differences in the issuance-return predictability to the prevalence of business groups in a given market.

Finally, we explore within-group differences in the going public decision. Investment opportunities are sometimes firm-specific, but other times there is flexibility to allocate the new investment to different firms in the pyramidal structure of the group. As in Almeida and Wolfenzon (2006), the controlling shareholder faces a tradeoff between private benefits and cash-flow benefits. We argue that by listing a firm at the top of the pyramid there is a larger loss of private benefits because all firms in the group are affected by regulation and monitoring. However, the controlling shareholder can appropriate a large fraction of the cash-flow benefits of the new projects because cash-flow rights are high in the upper part of the pyramid. By listing the firm at the bottom of the pyramid, instead, the controlling shareholder can retain private benefits in the firms at the top, but there is dilution of the cash-flow benefits of the new projects with more shareholders in the pyramid.

Listing the firm at the top of the pyramid, and hence using this firm as vehicle for investment, is more attractive when the cash-flow benefits of the new project are large. This suggests that high profitability projects are more likely to be financed by listing a firm near the top of the pyramid. On the other hand, groups are more likely to take public the firms at the bottom of the pyramid when private benefits are high. In that case, avoiding market scrutiny of the firms at the top allows the controlling shareholder to preserve substantial private benefits. The next prediction summarizes the main tradeoff within groups:

Prediction 4: It is more likely that business groups take public those firms near the top of the control pyramid when:

i) New projects are more profitable.

ii) Private benefits of control are lower.

The first part of Prediction 4 is related to the higher likelihood of more profitable firms to be at the top of pyramids as shown by Almeida, Park, Subrahmanyam, and Wolfenzon (2011). In both situations the intention of the controlling shareholder is the same, namely, to retain as many cash-flow benefits as possible. The second part is more novel, and it rests on the idea that the consumption of private benefits across the entire group is constrained by going public with the firm at the top, while some private benefits can be saved by going public at the bottom.

1.2 Alternative Hypotheses

1.2.1 Asymmetric Information

Our conceptual framework incorporates elements from two of the three main families of theories in the IPO literature, namely agency theory and market timing (see Helwege, Pirinsky, and Stulz, 2007). The third family is related to asymmetric information and it corresponds to our main alternative hypothesis. Asymmetric information provides another rationale for the cost of external financing, and hence, in combination with the internal funding advantage of business groups, it can explain the delay of group firms in going public (Prediction 1).

In Leland and Pyle (1977)'s seminal model, the owner retains a larger fraction of the firm going public to signal the quality of the assets. This model can be consistent with our second prediction. Perhaps business group firms issue less equity and invest less to signal good quality, which is then reflected in high post-IPO profitability. Although potentially consistent with our prediction, the asymmetric information model does not really explain the source of the superior performance of group firms. In other words, it does not explain why all group firms are high-type firms in the language of asymmetric information models. Although potentially consistent with our second prediction, the asymmetric information model only appears to relabel the puzzle. In the agency model, instead, the higher selectivity of group firms is tied to the loss of private benefits of control.

Asymmetric information models also have trouble accounting for our third prediction related to market timing. Asymmetric information models do not imply long-run return predictability after financing decisions, because all information conveyed in the issuance decision is quickly reflected into prices (Myers and Majluf, 1984). These models can explain the tendency of firms to go public when valuations are high, because the cost of asymmetric information is low during bull markets (Lucas and McDonald, 1990), however they cannot account for the subsequent low returns, nor for the differences in returns according to ownership structures.

Finally, the asymmetric information model provides some different within-group predictions. Within a group, the owner retains a high cash-flow stake when listing the firm at the top of the pyramid. More cash-flow benefits accrue to minority shareholders when listing firms at the bottom of the pyramid. Hence, following Leland and Pyle (1977)'s logic stated above, we expect business groups to list top firms when the project is better, which is the same as our Prediction 4-i. However, by a similar logic, business groups should list top firms to signal quality when the informational environment is poor. Given that a poor informational environment is positively related to the extraction of private benefits, groups should list top firms when private benefits are high, which is opposite to our prediction 4-ii. Hence, the within-group evidence also provides a way to tell apart the agency and the asymmetric information models.

1.2.2 Diversification

Besides asymmetric information, another alternative hypothesis has to do with diversification. Business groups allow controlling shareholders to diversify their portfolios and hence they reduce the need to go public in search for diversification (Bodnaruk, Massa, Kandel, and Simonov, 2008). This could explain the delay of group firms in going public. In turn, higher diversification can induce more risk-taking and produce higher future profitability (Faccio, Marchica, and Mura, 2011). This would be consistent with higher post-IPO profitability of group firms.

However, it is not clear why diversification would be correlated with lower investment after IPOs, as implied by our second prediction. In fact, there is evidence of a lower cost of capital for diversified firms (Hann, Ogneva, and Ozbas, 2013), which should lead to higher instead of lower investment. The within-group predictions are not explained by the diversification hypothesis either. Overall, the diversification of business group can give similar predictions in some respects, but not others allowing the data to tell apart the underlying mechanisms.

1.2.3 Managerial Preferences and Skills

A higher hurdle rate, and hence higher selectivity in group firms, may also arise from managerial preferences and skills. For example, families, who often control business groups, can be more conservative and therefore appear to apply a higher hurdle rate to investment projects than other controlling shareholders. Similarly, families may have better skills and more experience, which allow them to select better projects. In a related way, more conservative or better managers can stay away from market timing impulses. Hence, managerial skills and preferences can be consistent with our Predictions 2 and 3. In this case the predictions are derived from sources that are different from private benefits of control as in our setup. However, as with previous alternative hypotheses, it is not clear how managerial preferences and skills would interact with the ownership structure of the group to explain our Prediction 4. Overall, the within-group predictions appear to be specific of a model with private benefits of control.

1.2.4 Rational Market Timing

A fair question is why a group firm would want to miss the opportunity to profit from overvaluation in the market. We argue that the larger loss of private benefits makes group firms want to pass on the opportunity because it is not as attractive for them as it for standalone. A model with fully rational markets can provide an alternative explanation without relying on private benefits. In such a model there is really no overvaluation, but simply firms with better and worse investment opportunities. Group firms would face fewer investment opportunities, which can explain lower industry valuations compared to standalone firms in the pre-IPO period (our prediction 3). The low investment rates of group firms that we find in the post-IPO period (our prediction 2) could also be consistent with the relative scarcity of investment opportunities. Under this hypothesis, there is no true opportunity to miss, since all firms get a fair price in comparison to their prospects. The valuations of group firms would follow different dynamics (different runups pre-IPO and smaller or no reversals post IPO) because they reflect different investment opportunities from those of standalone firms.

The challenge to this alternative hypothesis is to explain why group firms face a relative scarcity of investment opportunities, for example, given that group firms are spread over similar industries as standalone firms. Although consistent with some of our predictions, a model of rational market timing seems to relabel the puzzle more than explaining the valuation and investment profiles of group firms in comparison to standalone firms.

Finally, it is not clear how the within-group results (our prediction 4) might follow from this rational model that does not include private benefits of control. As our all our results can be explained with such a model of private benefits, we believe it is the most plausible explanation.

2. Data Description

Our data come from the merge of three databases. From *Zephyr* and *Dealogic* we get data on completed IPOs in 16 European countries between the years 2000 and 2016. Then we compile ownership structures for the IPO firms from *Amadeus*'s yearly DVDs. Crucially, *Amadeus* identifies the controlling shareholder, if there is one. Information on the ownership structures of private firms is an advantage of *Amadeus* in comparison to other datasets that only cover listed firms (e.g., *ORBIS* as in Aminadav and Papaioannou, 2020).[4] This is crucial for our tests that require pre-IPO ownership structures. The merge of *Zephyr, Dealogic,* and *Amadeus* gives us a sample of 6,055 IPOs. *Amadeus* also provides financial information for private and public firms.

We start by mapping the ownership relationships in the year prior to the IPO (year *t=-1*). We repeat this procedure before and after the IPO (between years *t=-2* and *t=2*).[5] We follow ownership stakes of at least 50% upstream and downstream the control structure. The 50% threshold is the standard to define control in private companies (Mork, Wolfenzon, and Yeung, 2005). We first go upstream to identify the ultimate controlling shareholder, which can be a family, an individual, or another firm (i.e., a public or private firm where no single shareholder owns 50% or more). Next, from the controlling shareholder we trace down all the ownership links, also

[4] Aminadav and Papaioannou (2020) manually trace the ownership structure of private firms that are controlling shareholders of listed firms in their sample, but they do not observe ownership structures before firms go public.

[5] There is little information for *t=-3* and previous years.

imposing a threshold of 50%. By going downstream, we can identify all other firms that are part of the same business group as the IPO firm. If the IPO firm is controlled by a shareholder that also controls other firms, then the firm is part of a business group. If the controlling shareholder does not control other firms and if the IPO firm itself does not control other firms, then the firm is a standalone IPO.

Table 1 provides a description of our sample. We have data for 4,664 standalone IPOs and 1,391 business group IPOs. In total there are 38,438 non-IPO firms affiliated to the business groups that had an IPO during this period (2000-2016). Although all the groups in our sample list a firm at some point, our definition of group does not require the prior existence of public companies in the ownership structure. Approximately 93% (=1,287/1,391) of the group IPOs in the sample represent the first listed firm in their groups. Only 7% (=104/1,391) of the groups have another public firm as part of the pyramid.

We provide several examples to illustrate the type of firms in our sample. First, the Baviera group –a group of private clinics- went public in 2007 in Spain. The IPO firm -Clinica Baviera- was the firm at the top of a pyramid with three layers (Figure A1 in the on-line appendix shows the ownership structure of the Baviera Group). Clinica Baviera went public after 15 years of incorporation and with USD 73 MM in sales. Two Baviera brothers (Eduardo and Julio) remained as controlling shareholders after the IPO. Besides the float of Clinica Baviera, minority shareholders with stakes of 30% or less were present in several firms in the second and third layers of the Baviera pyramid. A second example of a group firm going public was the IPO of Plusnet –an internet provider- in 2004 in the UK. Plusnet was in the third layer of an ownership structure ultimately controlled by a US listed company (Insight Enterprises). Plusnet had sales of USD 28 MM the year before the IPO.

Many of the firms going public in our sample also represent the archetypical standalone firm. For instance, Bioorganic Research and Services –a biotech company- was listed in Spain in 2012. Its single controlling shareholder, Dr. Victor Manuel Infante, kept a stake close to 60% after the IPO. The company had less than $1 MM in sales at the time of the IPO. European Business Jets, a company in the business of transporting executives and owned by several partners, was listed in 2005 in the UK. The company went public just months after its creation and with no earnings on record.

Figure 1 displays the evolution of business group and standalone IPOs by year. The number of total IPOs peaks in 2000, just before the dotcom crash, and in 2006 before the great recession. On average across years, 23% of IPOs correspond to business group firms. Since group firms are larger on average, group IPOs represent a larger fraction of the IPO market in terms of market capitalization than in terms of the number of IPOs. On average, 45% of the market capitalization of IPOs corresponds to business group firms.

Table 2 shows the distribution of standalone and group IPOs by country and industrial segment. Group IPOs account for about half of the firms going public in markets such as Finland and Spain. The overall average of 23% of group IPOs is relatively low because of the influence of the UK where only 15% of the IPOs are affiliated to business groups.[6] This is not surprising considering the previous literature that documents a lower prevalence of business groups in common law countries such as the UK and Ireland (Khanna and Yafeh, 2007). This also suggests that our process for identifying business groups in the data is well tuned.[7] When we exclude the UK and Ireland we find that the average of group IPOs in our sample is 30%. Group IPOs are well distributed across sectors (Panel B) implying that business groups are not a feature of only a few industries.[8]

We compute several variables that describe the structure of business group firms in our data. These ownership variables represent the relative standing of a firm *within* a given structure,

[6] Our main results are robust to excluding IPOs from AIM (London's market for small and medium size companies). See Panel C of Table A.2, Panel D of Table A.3, and Panel C of Table A.5.

[7] Our iterative process for identifying business groups is a good approximation, although not perfect. For instance, if a firm in one of the branches of the group has missing ownership data, then that firm and the firms that follow downstream are cut off from the group. Similarly, if the identity of the controlling shareholder is missing from the data or if the ownership stake is not reported, by default we classify the firm as standalone. This makes sense given that *Amadeus* often does not report very small ownership stakes. Our way of identifying business groups is conservative because we are strict in defining the boundaries of these ownership structures. If there are real differences between group firms and standalone firms, our conservatism only biases the results against finding differences in the data.

[8] Table A1 in the appendix shows the country distribution of business group firms that stay private in the same groups that had an IPO during this period. These firms are spread out over 47 countries.

so that we can test the within-group predictions of the model. To understand what these variables capture we present a stylized example of a group in Figure 2. In our example firm A goes public in year t. Suppose that firm A is controlled with a 70% stake by firm H (for “headquarters”), and that 100% of the shares of firm H are held by a family (F). Firm A controls two firms, B and C, with 60% and 90% stakes, respectively. In turn, firm C controls firm D with a 55% stake. In this example the group is composed of 5 firms (H, A, B, C, D), so the group’s size is 5.

We define the *position* of a firm as the corresponding layer of the pyramid in which the firm is placed. The position is 1 if the firm(s) is (are) at top of the pyramid (the controlling shareholder can directly own multiple companies). In our example, firm H has a position equal to 1; firm A has a position equal to 2, firms B and C have a position equal to 3, and firm D has a position equal to 4. Controlling shareholders such as families or individuals are not counted as part of the pyramid. A firm that is the controlling shareholder at the top of the pyramid is counted as part of the pyramid for the purposes of position. For example, if there is no family in our example, and hence the controlling shareholder is firm H, then firm H is still in position 1.

We define *group layers* as the maximum number of layers of the pyramidal structure, which in our example is 4. The *relative position* of a firm in a group is defined as *1- (position-1)/(group layers-1)*, which is related to the measure of position in Almeida et al. (2011). In our example, firms H, A, B, C, and D have relative position of 1, 2/3, 1/3, 1/3 and 0. This measure normalizes the size of the pyramid regardless of the number of layers. Top firms always have a relative position of 1, and bottom firms always have a relative position of 0.

The *stake* is the direct percentage of shares that the controlling shareholder has on a given firm. For instance, the stake is 100% for firm H, and 70% for firm A. The *cash-flow rights* of the controlling shareholder represent the ultimate ownership of the shareholder over the dividends of a firm. This measure is computed by multiplying the stakes in each link of the pyramid between the controlling shareholder and the firm. In our example, the cash-flow rights are 100% for firm H, 70% for firm A, and 42%(= 70% x 60%), 63%(= 70% x 90%) and (34,65% = 70% x 90% x 55%) for firms B, C, and D respectively. By construction, cash-flow rights are high at the top of the pyramid, so there is a positive correlation between cash-flow rights and relative position. We normalize cash-flow rights within the group so the cash-flow rights at the top of the pyramid are always 100%. In other words, we assume that the controlling shareholder always has a stake of 100% on the top firm. This assumption allows us to make fair comparisons between controlling shareholders that are themselves firms, and hence part of the pyramid, and controlling shareholders, such as families or individuals, that are outside the pyramid because they are not firms. For example, if the family in our example has a stake of 90% on firm H instead of the 100% we have assumed so far, then we replace 90% by 100% to compute cash-flow rights.

We also construct a measure of *diversification* of group firms. We consider the number of distinct two-digit SIC segments in which a firm is involved through direct and indirect control. For example, consider that firms A, B, C, and D, operate in the following two-digit SIC segments: 28, 44, 55, and 71. For firms B and D, which have no subsidiaries, diversification is equal to 1. Diversification for firm C is equal to 2, as it operates in SIC 55 and it directly controls firm D in SIC 71. Firm A operates in SIC 28, and it directly or indirectly controls firms in three different SIC segments, hence its diversification is 4.

Table 3 gives summary statistics of the ownership variables in groups. In the top panel, each group with an IPO represents one observation. The mean (median) number of firms in a group is 22.44 (5).[9] Groups are present in 5.79 industrial segments on average. The mean (median) group has 4.13 (3) layers. The middle panel describes IPO firms in business groups. The average relative position of an IPO firm in a group is 0.76, and cash flow rights are 92%. In the last panel of Table 3 we compute statistics across all group firms. The average relative position is close to half (0.45). Average cash-flow rights are 71%, which implies a small divergence between control and ultimate ownership. The model of Almeida and Wolfenzon (2006) is consistent with the low divergence of control and cash-flow rights that we find in our sample.

[9] Our main results are robust to excluding groups with more than 100 firms, which correspond approximately to the top 5% of the distribution of group size. See Panel D of Table A.2, Panel E of Table A.3, and Panel D of Table A.5.

Table 4 provides means of the different variables for standalone IPOs, group IPOs, and non-IPO group firms (excluding listed firms) the year before the IPO.[10] Book assets are measured in millions of Euros. Group IPO firms are on average more than twice as big as standalone IPO firms (€162 MM vs €72 MM), but the later are comparable to non-IPO firms in business groups (€66 MM). Group IPOs also have higher return on assets (ROA=EBITDA/total book assets) and tangibility (=fixed assets/total assets) than standalone IPOs and other group firms. The average group IPO is 11 years old (from company incorporation), while the average standalone IPO is about 7 years old. Standalone IPOs have higher cash holdings (=cash/total assets) than group IPOs. For each firm we report the Tobin's q (=book debt plus market equity over total assets) of its industry.[11] Standalone IPOs come, on average, from industries with relatively high q. Finally, Table 4 reports the primary shares offered at the IPO as a fraction of total shares offered (primary plus secondary). Primary shares present 87% of standalone IPOs, and only 75% of group IPOs. We have information on the split between primary and secondary shares for only 29% of the IPOs in our sample.

3. Results

3.1 Ex-ante differences between group IPOs and standalone IPOs

In Table 5, we run regressions with a binary dependent variable equal to 1 if the IPO firm belongs to a business group and 0 otherwise. The explanatory variables are measured the year before the IPO. In the first three columns, the sample includes group IPOs and standalone IPOs. Hence the coefficients showcase the difference between group and standalone IPO firms before they go public. The sample size is smaller than the initial IPO sample because the information on financials is often missing. We confirm some of the differences seen in Table 4, namely that group

[10] We use unconsolidated financial statements whenever available. If unconsolidated data is not available we use consolidated data, although we do not mix the two for a given firm across years to avoid jumps related to reporting standards. Our results are robust to excluding firms for which we use consolidated data (about 30% of the IPO sample) as can be seen in Panel A of Tables A.2, A.3, and A.5 of the on-line appendix. We also winsorize all our variables at the 2.5% level on each tail.

[11] Industry q is computed annually as the median of each two-digit SIC industry portfolios in each country. Our main results are robust to excluding IPOs from utilities, financials, and privatizations as can be seen in Panel B of Table A2, Panel C of Table A3, and Panel B of Table A5 of the online appendix.

IPOs are bigger, older, and have higher profitability than standalone IPOs. The impact of Tobin's q is small in these regressions that control for year fixed effects. In other words, much of the difference in Tobin's q seen in Table 4 comes from differential timing of group and standalone IPOs.

Our first prediction is that business group firms delay the going public decision compared to standalone firms. The regressions in Table 5 allows us to quantify this delay. For instance, using the coefficients in column 3, we find that increasing firm age by ten years increases the likelihood that the IPO belongs to a group by 8% (from a baseline likelihood of 43% in this sample). Similarly, if assets double, the likelihood that the IPO belongs to a group increases by 7.4%.

We also compare non-IPO group firms with standalone IPOs (columns 4-6 in Table 5). The previous differences between group IPOs and standalone IPOs are now smaller. For example, differences in size are negligible and not statistically significant. The coefficient on age is still strongly significant, but it is less than half the magnitude of the coefficient in the first three columns. These results imply that standalone IPOs are more like non-IPO group firms than group IPOs. Hence, group IPOs are larger, older and more profitable than standalone IPOs because groups chose to list firms with these characteristics, and not because all group firms are larger, older, and more profitable than standalone firms.

3.2 Ex-post differences between group IPOs and standalone IPOs

To test our second prediction, we run the following differences-in-differences regression:

$$Y_{it} = \delta(Post\,IPO_{it} \times BG_i) + \mu_i + t_t + \tau_t + \gamma X_{it} + \varepsilon_{it}. \qquad (1)$$

The dependent variable Y_{it} is a firm-level outcome (e.g., log of total assets). The sample for regression (1) includes all IPOs in our data. For each firm going public at *event time t=0*, we take observations between years *t=-2* and *t=2*. The dummy variable $Post\,IPO_{it}$ represents the year-ends that follow the IPO (years *t=0,1,2*) and captures all common changes seen after going public. The interaction between $Post\,IPO_{it}$ and the dummy for business group firms BG_i is our variable of interest. The coefficient on the interaction captures the difference between group firms and standalone firms after they go public. The regression controls for firm effects that are invariable before and after the IPO (μ_i). We include event time fixed effects (t_t) - which absorb the dummy $Post\ IPO_{it}$ - and calendar time fixed effects (τ_t). In our main specification we also control for concurrent investment opportunities as proxied by the Tobin's q of the industry. We do not include firm-level lagged control variables (e.g., lagged assets), as they also depend on the going public decision, and hence might be considered "bad controls" in the spirit of Angrist and Pischke (2009). However, our results are robust to their inclusion.[12] Standard errors are clustered by industry at the two-digit SIC level.

We report the results of the differences-in-differences regression in Table 6. We start in Panel A with a simple specification that includes the $Post\ IPO_{it}$ dummy and excludes event time fixed effects. This allows us to see the baseline effect on standalone IPOs. Across columns in Panel A we see a positive coefficient on the $Post\ IPO_{it}$ dummy. However, we find a negative coefficient on the interaction of $Post\ IPO_{it}$ and BG_i in all columns. Group IPO firms grow less than standalone IPO firms in terms of total assets, diversification (number of firms controlled in different industries), and PP&E. The effects are large. For example, total assets of standalone firms grow by 49 log points (from the coefficient on $Post\ IPO_{it}$ in column 1) in the post-IPO period, but 25 log points less than that in the case of group firms (coefficient on the interaction in column 1). These coefficients imply that the average firm in the sample grows by approximately €69 MM after the IPO, but only by €30 MM if it is a group IPO. Once we control for calendar and event time fixed effects in Panel B, the coefficient on the interaction barely changes in the case of total assets. Overall, these results imply a moderate, although still significant, investment motive in group firms that go public compared to standalone firms that go public. We also find effects on number of firms controlled, debt, and equity.

It is important to emphasize that the results in Table 6 do not correspond to the causal effect of going public (as in Bernstein, 2015), which is a standard interpretation of the differences-in-differences approach in other setups. Going public is not a treatment that arrives exogenously. In

[12] We report regressions that include lagged controls, including log assets, firm age, tangibility, financial leverage and cash/assets in Table A.3 (Panel B) of the on-line appendix.

fact, our predictions are about selection into public markets. Precisely by showcasing the outcomes that firms achieve after listing, Table 6 allows us to quantify the consequences of self-selection into public markets. In our setting, if there are differential treatment effects they are likely to work on the opposite direction of selection effects. Group firms are larger and potentially have access to a broader base of stock market investors, which can lower the cost of capital when going public. This would imply higher growth rates in group firms instead of lower growth rates like we find. In that sense, the selection effects we show are conservative estimates. As in any differences-in-differences we need to rule out non-parallel trends, or that the results are not simply the continuation of previous trends. In our case the break around the going public decision is the outcome of selection and not a treatment effect, but the break is still noticeable (see Figure A2 in the appendix).

We test the profitability prediction in Table 7. In Panel A we explore the ROA of group and standalone IPOs with the differences-in-differences approach. The interaction of $Post\ IPO_{it}$ and BG_i tries to capture the difference in profitability of the *new* projects of standalone and group firms after IPOs. Empirically speaking we can only observe firm-level ROA, which is a weighted average of the profitability of assets-in-place and new projects, but by including firm fixed effects we can focus on changes in profitability around the IPO decision and hence the profitability of the new projects. Consistent with our prediction we find a positive coefficient on the interaction of $Post\ IPO_{it}$ and BG_i. The coefficient on this interaction is 0.018 (t-stat 3.0) meaning that after IPOs the ROA of group firms is 1.8 percentage points higher than the ROA of standalone firms.

Notice that the ROA of standalone IPOs falls by 0.9 percentage points in the post-IPO period, while group IPOs have an increase in profitability (0.9%=-0.9%+1.8%). The drop in post-IPO profitability has been documented before in the literature (e.g., Pastor, Taylor, and Veronesi, 2009), and is not inconsistent with our prediction. The drop in profitability implies that the new projects of standalone IPOs are less profitable than their assets-in-place, but not necessarily that new projects are bad projects in an absolute sense. Our prediction is only that, as they go public, the new projects of group firms are more profitable than the new projects of standalone firms.

In Table 7 Panel B we dig deeper into the change in profitability after IPOs. We collapse the history of each IPO firm into a single observation. The dependent variable is a dummy variable for those IPOs that increase profits (in levels, not as a fraction of assets as in ROA) when comparing the post-IPO and the pre-IPO periods. The constant in column 1 can be interpreted as the fraction of IPOs that increase their profits in our sample, which is around 51%. This implies that in many cases the drop in ROA is a matter of growth in the denominator of the ratio (assets), rather than a fall in the numerator (EBITDA). We then include a dummy variable for business group IPOs. The business-group dummy captures the differential prevalence of increasing profits in group IPOs, which is almost 16% (column 2 in Panel B of Table 7). In other words, group firms are 16% more likely to increase profits after the IPO than standalone firms. This implies that the difference in ROA that we see in Panel A is not the mere consequence of group IPOs growing less in terms of assets. The effect of business groups also goes beyond the persistence of profits, which we capture with the dummy for positive profits pre-IPO (coeff. 0.15, t-stat 7.5). The differential impact of business groups remains significant after we control for IPO-year and country fixed effects (column 4 in Panel B of Table 7).

3.3 Evidence of Market Timing

In Table 8 we present the differences-in-differences regression of (1) using as dependent variable the Tobin's q of the industry of the IPO firm. In column 1, we present results excluding year fixed effects to gauge the differences in market timing across years. The $Post\ IPO_{it}$ dummy has a negative and significant coefficient (coeff. -0.097 in column 1) implying that valuations fall, on average, after IPOs of standalone firms, consistent with market timing. The decline in Tobin's q for group IPOs is less pronounced since the coefficient on the interaction of the $Post\ IPO_{it}$ dummy and the BG_i dummy is positive (coeff. 0.087, t-stat 3.2). The net effect on Tobin's q after group IPOs is still negative. The interaction is positive and strongly significant after we control for calendar and event time fixed effects (see column 3; coeff. 0.040, t-stat 4.4). As the distribution of industries is similar for group and standalone IPOs, this implies that within a year, business groups are less likely to list firms in industries with large expected reversals.

Figure 3 illustrates the dynamics of Tobin's q in event time for the industries of standalone and group IPOs. Consistent with our Prediction 3, the pre-IPO valuations are higher before standalone firms go public. Tobin's q is as high as 1.41 the year before the average standalone IPO, while Tobin's q is 1.36 before the average group IPO. The reversal after the IPO is more pronounced in standalone IPOs, although both valuations arrive to similar levels at the end of the IPO year. Valuations continue to fall in years *t=1* and *t=2*, particularly so for the industries of standalone firms. Combined, this evidence suggests that standalone IPOs are stronger market timers than group IPOs. This is not to say that standalone IPOs cause price reversals, but just that standalone firms time their listings more finely to market valuations.

Another test of the market timing hypothesis is to check the predictive power of standalone IPOs and group IPOs over future market returns. For this purpose, we run the following regression:

$$R_{mt+1} = \beta_1 Log(Standalone\ IPOs_{mt}) + \beta_2 Log(BG\ IPOs_{mt}) + \mu_m + \varepsilon_{mt+1}. \quad (2)$$

The dependent variable is the annual return of the main stock index in each country. The predictive variables correspond to the log number of standalone and group IPOs in the previous year in each market. The regression allows for different average returns in each market by including country fixed effects (μ_m).

Table 9 shows the results for the pooled regression in equation (2). We find a strong and significant coefficient on the total number of IPOs (column 1), which is consistent with the market timing ability of new issues (Ritter 2003; Henderson, Jegadeesh, and Weisbach, 2006). However, when we split new issues into standalone IPOs and group IPOs in column 2 we find that the predictive power comes from standalone IPOs (coeff. -0.057, t-stat -3.16), and not from group IPOs (coeff. -0.023, t-stat -1.0). This result points towards a stronger market timing component in standalone IPOs than group IPOs. The coefficients in column 2 imply that doubling the number of standalone IPOs predicts markets returns that are 5.7 percentage points lower next year, which is more than twice the negative effect of group IPOs. Overall, standalone IPOs give a more consistent signal about low future returns than group IPOs.

3.4 Within-group ex-ante differences in going public decisions

Figure 4 shows the distribution of relative position among group IPOs in our sample. Close to 60% of the group IPOs are firms at the top of the control pyramid (position=1). Approximately 15% correspond to firms at the bottom of their pyramids (position=0). Group IPOs have higher relative position than the average group firm (0.76 vs. 0.45 according to Table 3). Relative position is normalized by group size, so this result does *not* come from comparing groups with more firms (layers) and groups with fewer firms (layers).[13]

We conduct our analysis with the sample of group IPOs and group firms that remain private in those groups, i.e., only firms affiliated to business groups are included. The firms that remain private allow us to estimate marginal effects within a close set of substitute vehicles for raising capital that are controlled by the same shareholder. Our comparisons are made within each group since we include business group fixed effects. These fixed effects also allow us to control for owner-specific traits in the going public decision (e.g., owner life-cycle motives or preferences for diversification).

In Table 10 we show the results of a linear probability model where the dependent variable is a dummy for IPO firms. This variable takes a value of one for the firms that go public, and zero for the firms that remain private. Group firms that are already public are excluded from this analysis. All explanatory variables are lagged one year. We find that relative position is the best predictor of the going public decision. Going from the bottom of the pyramid (position=0) to the top of the pyramid (position=1) increases the likelihood of going public by 30.8% (column 1). This positive effect of relative position implies that, on average, the cash-flow benefits of going public are

[13] Table A4 in the on-line appendix reports averages of characteristics for firms with different relative positions. As perhaps can be expected, firms at the top are larger, although they are not older, and they are only slightly less profitable than other group firms.

stronger than the loss of private benefits of control. Size (log assets) and profitability also increase the likelihood of going public. Adding other firm characteristics in the rest of Table 10 does not dampen the effect of relative position. The main message of Table 10 is that the position of the firm in the ownership structure matters more than any other within-group difference.[14] Simply put, the ownership structure is key for the selection of group firms into public markets. Standard predictors, such as cash holdings or Tobin's q, have little explanatory power for the within-group decision of which firm goes public.[15]

The results in Table 10 imply that cash-flow benefits matter more than private benefits for the *average* group IPO in the sample. Following our Prediction 4 we now consider when cash-flow and private benefits *matter more* by studying the heterogeneity of the effect of relative position. For instance, we predict that groups with more profitable projects should list firms with high relative position. In Table 11 we use two proxies for the quality of new projects. First, we interact relative position with group ROA (=asset-weighted average ROA of group firms). The persistence in profits that we find in Table 7 suggests that past ROA is a good signal about future ROA. We find a positive coefficient on this interaction (see column 1, coeff. 0.47, t-stat 2.67), meaning that groups are more likely to list a firm with high relative position if group ROA is also high. Second, we interact relative position with group Tobin's q (=asset-weighted average Tobin's q of group firms). Industry Tobin's q has the advantage of being a forward-looking measure of profitability, but it can also be affected by market sentiment. Again, the coefficient on the interaction is positive, meaning that groups that face better investment opportunities, as measured by Tobin's q, tend to list firms with relative higher position.

The second part of Prediction 4 states that groups should list firms near the top of the pyramid when private benefits are low. We explore several proxies of private benefits at the market

[14] Replacing relative position for a dummy indicator of top firms in the pyramid gives very similar results. The results are also very similar if we use the cash-flow rights of the controlling shareholder instead of relative position, which is not surprising since relative position and cash-flow rights capture the same basic information about the control structure.

[15] Table A.5 in the on-line appendix presents several robustness checks for Table 10 in different subsamples (excluding firms with consolidated statements, excluding utilities and financial firms, among others). The results are robust.

and group levels. First, we use the legal origin of the country as a market-wide proxy for private benefits. Our prediction is that groups are more likely to list firms at the top of the pyramid in countries with a legal environment that puts more constraints on private benefits. We use a dummy for common law countries, given the evidence that these countries have more constraints on private benefits of control (La Porta, Lopez-de-Silanes, and Shleifer, 2008). The positive coefficient on the interaction of relative position and the dummy for common law countries is consistent with our prediction. Using the coefficients in column 3 of Table 11, a top position firm in a group from a common law country is 16.2% more likely to go public than a top position firm in a group from other countries. Next, in column 4 of Table 11 we use the anti-self-dealing index of Djankov, La Porta, Lopez-de-Silanes and Shleifer (2008), which measures legal and regulatory constraints on private benefits derived from transfer pricing and related party transactions. This index is correlated with legal origin, so it is not surprising that it works in a similar way as the previous common law dummy.

At the group level, we conjecture that the layers of the pyramidal structure can proxy for private benefits since more layers lead, on average, to a larger wedge between control and cash-flow rights, and hence to more incentives for the extraction of private benefits. Consistent with this idea, the interaction of relative position and the number of group layers is negative (column 5 in Table 11), implying that groups with more layers are less likely to list firms with a high relative position.[16] Column 6 and 7 show that the previous effects are robust to including all variables simultaneously, and to controlling for the firm characteristics used in Table 10.

In the last column of Table 11 we consider the fact that some groups may have jeopardized their private benefits by a previous listing in the group. In column 8 we exclude all groups that have listed firms beside the IPO firm. We find that the effects are very similar to the sample with all groups

[16] It is worth emphasizing that the effect of group layers is not mechanical. This could be the case if the mean relative position strongly decreases with the number of layers, and hence any firm, including the IPO firm, would be more likely to be drawn from a set of firms with lower relative position. In Figure A3 of the on-line appendix, we show that the relation between group layers and average relative position is basically flat. This is due to the fact that the average group size pre-IPO is not large and thus firms in bottom layers of the pyramid are not substantially more than firms at the top.

(column 7). This can perhaps be expected since by including group fixed effects we were already absorbing group-wide effects.

3.5 Alternative differences-in-differences

We now compare group IPOs and other group firms within the differences-in-differences framework. This serves two purposes. First, by comparing going-public to stay-private group firms we can check again the investment motive of the firm going public, which is implicitly assumed in our predictions. Table 6 already shows a significant investment motive in group firms, although less pronounced than for standalone firms. Second, it allows us to quantify potential spillover effects to firms that remain private within the group.

We estimate the following differences-in-differences regression:

$$Y_{it} = \gamma(Post\ IPO_{it} \times IPO_i) + \mu_i + t_t + \tau_t + \gamma X_{it} + \varepsilon_{it}. \quad (3)$$

The sample for regression (3) includes all group IPOs and the firms that remain private in the same business groups. The dummy variable IPO_i identifies the firm that goes public. The rest of the regression specification is the same as in equation (1).

In Table 12 we show the results for regression (3). As captured by the coefficient on the interaction, we find that the firm that goes public grows more than other group firms in the post-IPO period in almost all dimensions. For instance, we see that total assets grow by 48 log points (from the coefficient in column 1). This implies that, if it goes public, the average group firm grows by €67 MM in comparison to other group firms that remain private. The coefficients are quite consistent across regressions, implying similar growth rates in all variables. Overall, the results in Table 12 confirm the investment motive behind the going public decision.

A related way of studying the investment motive for business group firms is by comparing groups with completed IPOs and groups with withdrawn IPOs. Withdrawn IPOs are identified from *SDC-Thomson Reuters* and then manually matched to *Amadeus*. There are 603 withdrawn IPOs in our sample, out of which 263 are from business groups. In Panel A of Table 13 we compare the post-IPO (or post-IPO-attempt) period for firms that go public and firms that withdraw their IPOs. All firms in this sample belong to business groups. As before, we do not claim that this comparison provides a causal effect of going public, only that the comparison illustrates the selection of firms into public markets and the strength of the investment motive. We find that firms that complete the IPO invest more than firms that withdraw the IPO in almost all dimensions. For instance, the interaction of the post-IPO period and the Completed IPO dummy implies that total assets grow by 37 log points more in completed IPOs than withdrawn IPOs (column 1 Panel A), which corresponds to approximately €48 MM more.

In Panel B of Table 13 we focus on spillovers on non-IPO business group firms by comparing the firms that remain private in groups with a completed IPO and the firms that remain private in groups with a withdrawn IPO. We exclude IPO-attempt firms from this analysis. We find that private firms in groups with completed IPOs grow more in the post-IPO period in terms of assets, cash holdings and PP&E, but the effects are a fifth or less of the effects on the IPO firm. This is consistent with the existence of spillovers of the IPO through the internal capital markets of groups, but at the same time that these spillovers are limited.

Overall, the evidence shows that the impact on investment in the firm going public is much stronger than in other firms that remain private. The findings are consistent with the premise that the financing vehicle (the IPO firm) is also the investment vehicle. The results also suggest that transfers between group firms through internal capital markets do not make the effects of going public disappear in IPO firms, and that spillovers to other group firms are, at least in the short run, limited.

4. Conclusions

Business groups are a fixture of the corporate landscape in developing and developed countries. In this paper we study how business group affiliation affects the going public decision and how it relates to firms' outcomes after being listed. Our predictions, which are novel to the literature, illustrate the tradeoff between cash-flow benefits and private benefits of control in business groups.

We document that one in four European IPOs in 2000-2016 is affiliated to business groups. We find that group IPOs are larger and older than standalone IPOs, which suggests that group firms delay the decision to go public. Consistent also with stricter selectivity, we find that group firms engage less in market timing, and they invest less and are more profitable post IPO. In within-group comparisons we find that the likelihood of listing firms at the top of pyramidal structures increases with profitability and decreases with proxies for private benefits of control. Overall, our findings illustrate novel selection effects in public markets due to pre-IPO control structures.

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Figure 1: Group and standalone IPOs over the years

This figure shows the evolution of the total number of IPOs in our sample over the years (right axis) and the proportion that business groups represent (left axis). The blue (light) bar represents the fraction that the number of group IPOs represents relative to total IPOs. The red (darker) bar represents the fraction of the market value (MV) at the end of the first listing year that business group firms represent over total IPOs. On average, 23% of the new IPOs are business group firms and they account for 45% of the market value of new listings.

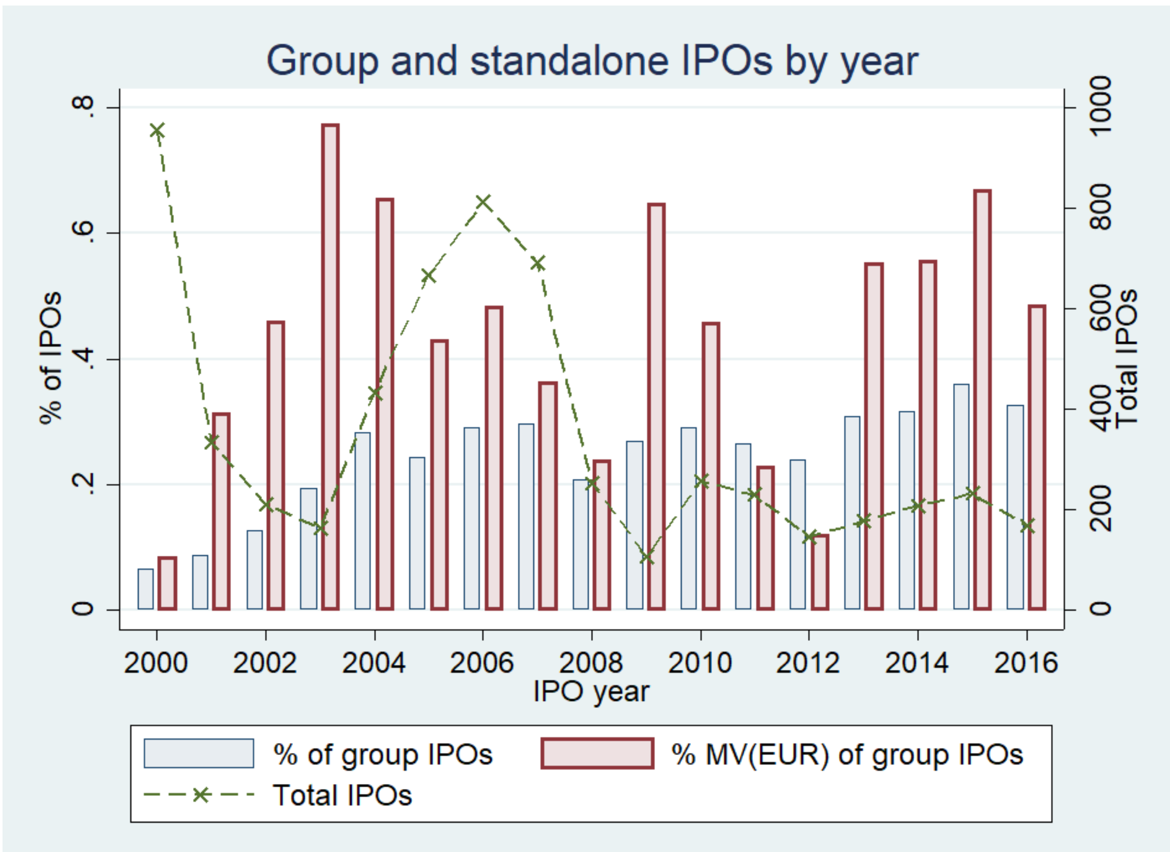

Figure 2: Example of a business group's ownership structure

Family F controls the holding company H with a 100% stake. Holding firm H controls firm A with a 70% stake, which in turn controls firms B and C with stakes of 60% and 90%, respectively. Firm C controls firm D with a 55% stake. In this example, the group size is five, with four layers (firm H in position one, firm A in position two, firms B and C in position three and firm D in position four). The relative position of firms H, A, B, C and D are 1, 2/3, 1/3, 1/3, and 0, respectively.

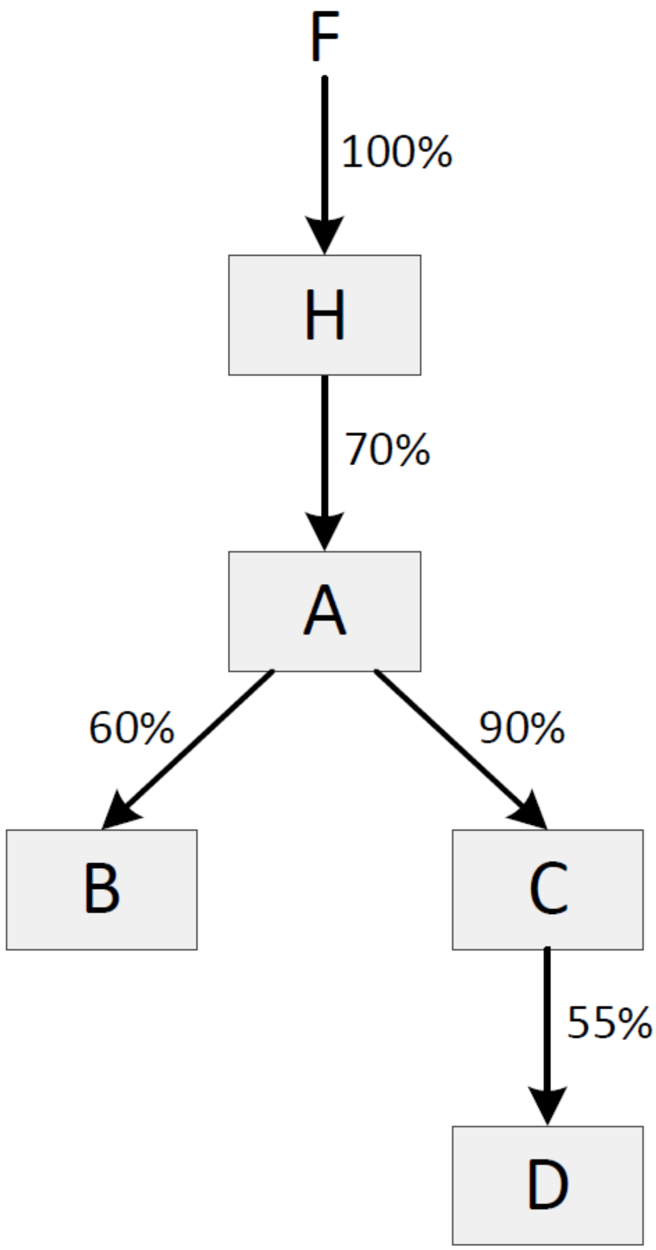

Figure 3: Industry Tobin's q around the IPO year

The figure displays the evolution of Tobin's q around the IPO event, for standalone and business group IPO firms. Tobin's q is the median value of the q of firms in the same country, industry (two-digit SIC code) and year as the IPO firm. Reported values represent averages of Tobin's q across categories (standalone and business groups) and event years.

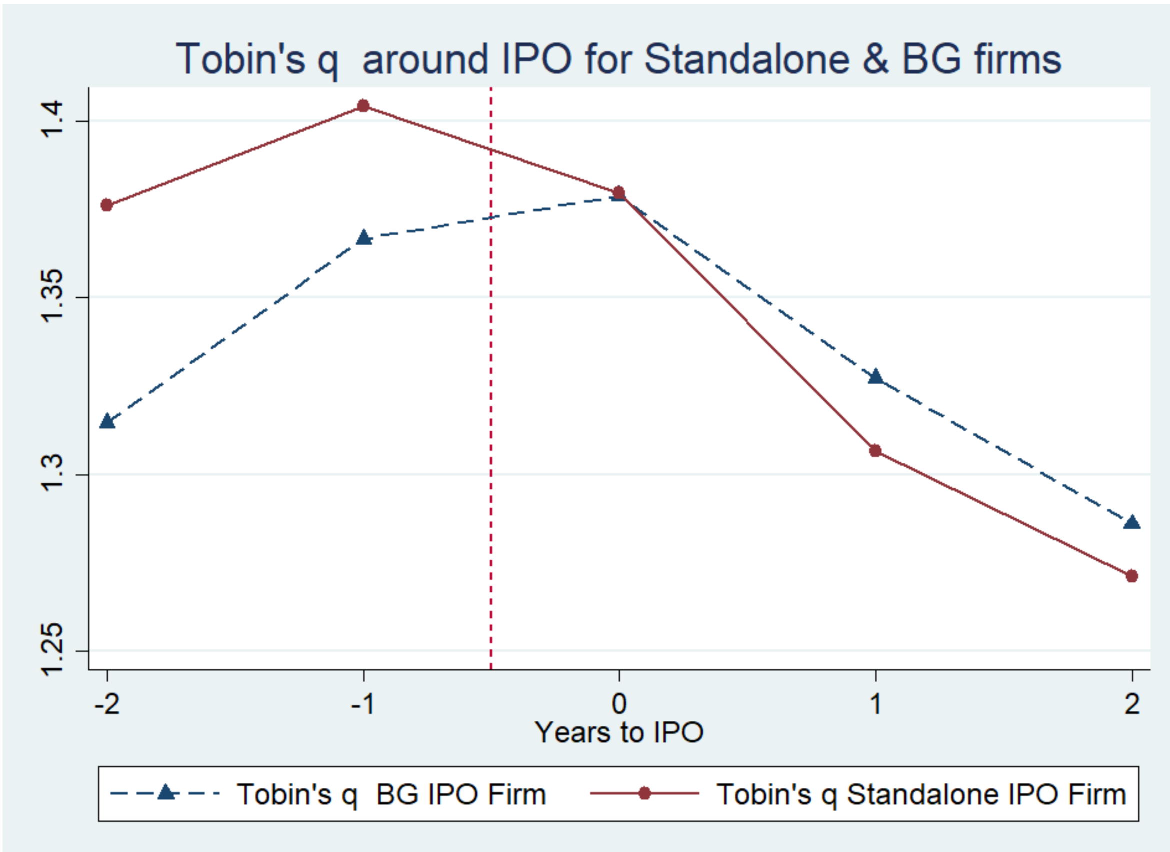

Figure 4: Histogram of relative position for going public firms in a business group

The figure displays the frequency of the variable relative position for IPO firms in business groups.

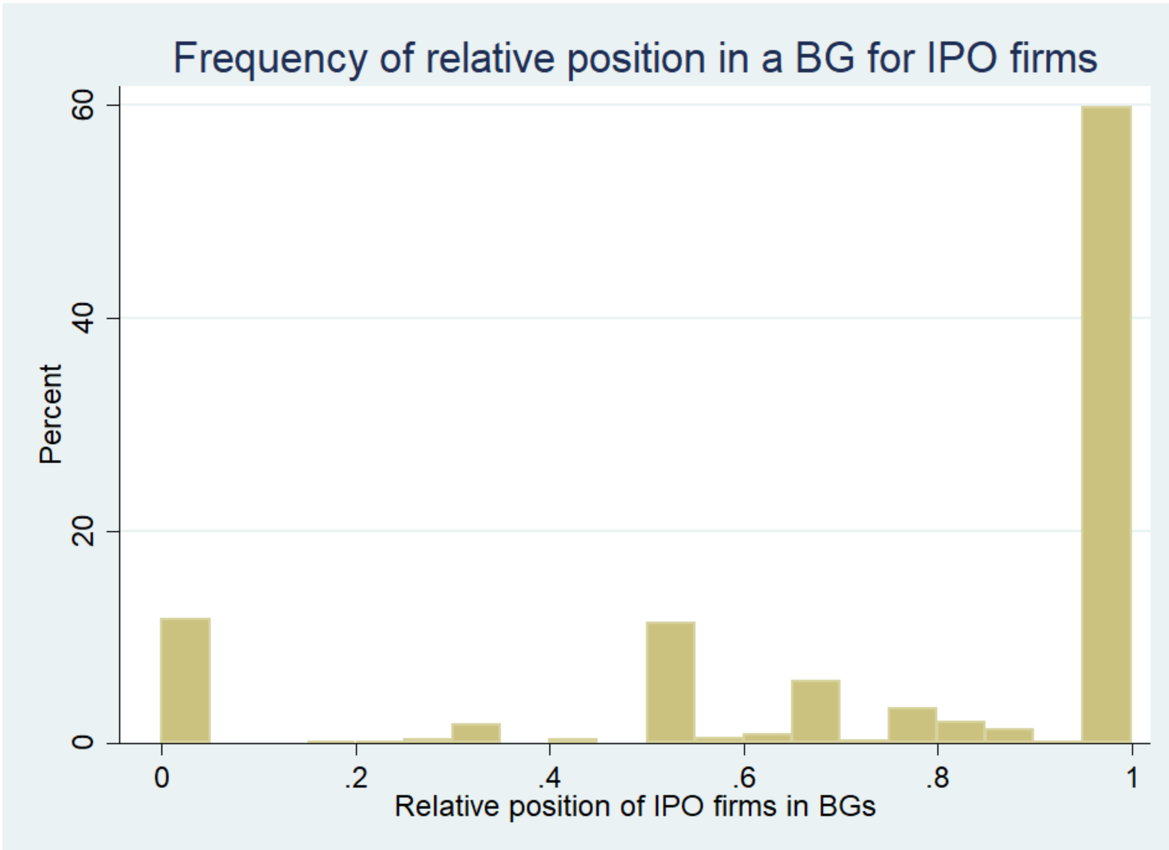

Table 1: Sample description

This table provides some descriptive statistics for our sample of firms for the year prior to the IPO. The first two lines show the number of standalone IPO firms and the number of European countries where these standalone IPOs took place in the period 2000-2016. The next two lines present the equivalent numbers for firms going public that are part of a business group. Lines 5 and 6 describe the total number of non-IPO firms from groups that took a firm public in the selected 16 countries in Europe during the sample period, and the number of countries where they operate. Non-IPO firms in a business group that took a firm public in the selected 16 countries in Europe can be headquartered outside those 16 countries (see Appendix Table A.1). Lines 7-8 display the number of business group IPOs according to whether the group had a listed firm in its ownership structure before the IPO.

Standalone IPOs	
# firms	4,664
# countries	16
BG IPO firms	
# firms	1,391
# countries	16
BG non-IPO firms	
# firms	38,438
# countries	47
BG characteristics	
By public ownership in the group	
# of BG without public ownership	1,287
# of BG with public ownership	104

Table 2: Distribution of standalone and group IPOs by country and industrial segment

Panel A displays the distribution of standalone and group IPOs according to the IPO listing country. The bottom lines of the panel display the total number of IPOs for the 16 European countries and the total number excluding IPO firms located in Ireland and the United Kingdom. Panel B displays the distribution of standalone and group IPOs according to the IPO firm's one-digit SIC code. There are fewer IPOs in panel B as SIC codes are missing for some IPOs.

Panel A: IPOs by Country

Country	Standalone IPOs	BG IPOs	% BG IPOs
Austria	38	17	31%
Belgium	60	33	35%
Denmark	59	29	33%
Finland	37	29	44%
France	464	205	31%
Germany	505	184	27%
Greece	170	17	9%
Ireland	62	6	9%
Italy	340	63	16%
Netherland	91	31	25%
Norway	141	91	39%
Portugal	13	6	32%
Spain	48	51	52%
Sweden	272	208	43%
Switzerland	59	2	3%
United Kingdom	2,305	419	15%
Total	4,664	1,391	23%
Excluding UK and IE	2,297	966	30%

Panel B: IPOs by Industry

One-digit SIC code	Standalone IPOs	BG IPOs	% BG IPOs
0	12	4	25%
1	320	61	16%
2	220	83	27%
3	280	104	27%
4	213	112	34%
5	346	122	26%
6	850	371	30%
7	998	283	22%
8	531	199	27%
Total	3,770	1,339	26%

Table 3: Summary statistics of ownership variables for business groups

This table displays summary statistics for the year prior to a group IPO. In the first panel, summary statistics are at the group level (i.e., each group with an IPO represents one observation). In the second panel, summary statistics are at the IPO-firm level. The last panel of the table displays statistics across all firms in the groups. Group size is the number of firms in a group. Diversification is the number of distinct two-digit SIC code firms in a group. Layers is the maximum number of layers from the top-level firm to the bottom-level firm in a group pyramid. R*elative position* of a firm in a group is defined as *1- (position-1)/(group layers-1).* C*ash-flow rights* of the controlling shareholder in a given firm is the ultimate ownership of the shareholder over the dividends of a firm. This measure is computed by multiplying the stakes in each link of the pyramid between the controlling shareholder and the firm. Cash-flow rights within the group are normalized, so the cash-flow rights at the top of the pyramid are always 100%.

Variable	Mean	Min	p25	p50	p75	Max	sd	N
Group-level variables								
Group size	22.44	2	3	5	13	931	67.49	1,391
Diversification	5.79	1	2	3	5	94	9.22	1,330
Layers	4.13	1	2	3	5	13	2.41	1,391
BG - IPO firms								
Relative Position	0.766	0	0.5	1	1	1	0.34	1,391
Cash Flow	92.65	0.01	100	100	100	100	19.2	1,391
BG - all firms								
Relative Position	0.45	0.00	0.25	0.50	0.67	1.00	0.26	39,829
Cash Flow	71.63	0.00	49.99	95.60	100.00	100.00	33.02	39,829

Table 4: Average characteristics of standalone IPOs, group IPOs, and non-IPO group firms

This table displays variable means for standalone IPO firms (col. 1), business group IPO firms (col. 2), and business group stay-private firms (col. 3) in the year prior to the IPO. The sample displayed in col. 3 exclude business group firms that were already publicly traded prior to the sample-period IPO. Assets are the book assets in 2019 millions of euros. ROA is return over assets (EBITDA over book assets). Age is the difference between the sample year and the incorporation year. Tangibility is PP&E (property plant and equipment) over book assets. Leverage is total debt over book assets. Cash/Assets is the ratio of cash holdings to book assets. Industry q is the median value of a firm's industry Tobin's q (=(market value of equity + book value of debt)/book value of assets), using listed firms in the same two-digit SIC code in the same country and year. % Primary shares is the fraction of primary shares relative to the total number of shares issued at the time of the IPO. Cols. 4-6 display the difference-in-means from columns 1-3. Significant at: *10%, **5% and ***1%.

Variable	(1) Standalone IPO	(2) BG IPO	(3) BG non-IPO	(4) (2)-(1)	(5) (3)-(1)	(6) (3)-(2)
Assets (MM)	72.720	162.745	66.705	90.025***	-6.015	-96.040***
Age	7.127	11.606	16.320	4.479***	9.193***	4.714***
ROA	0.007	0.061	0.041	0.054***	0.034***	-0.019***
Tangibility	0.397	0.478	0.319	0.081***	-0.079***	-0.160***
Leverage	0.511	0.557	0.505	0.046***	-0.006	-0.052***
Cash/Assets	0.226	0.143	0.187	-0.083***	-0.039***	0.044***
Tobin's q	1.404	1.366	1.283	-0.038***	-0.121***	-0.082***
% Prim. shares	0.872	0.751		-0.121***		

Table 5: Standalone IPOs vs. business group IPOs and non-IPOs

This table displays the regression results of linear probability models using data from the year prior to an IPO. Columns 1-3 compare standalone IPO firms and business group IPO firms. The dependent variable for these regressions (BG) is a dummy that takes a value of one if the firm taken public is part of a business group and 0 if it is a standalone firm. Columns 4-6 compare standalone IPO firms and stay-private business group firms in groups that took a firm public. The dependent variable for these regressions (BG) is a dummy that takes a value of one if the firm is a stay-private business group firm and 0 if it is an IPO standalone firm. Columns 1 and 4 include year fixed effects. Columns 2 and 5 additionally include industry fixed effects (two-digit SIC code level). Columns 3 and 6 also include market (exchange) fixed effects. Standard errors are adjusted by heteroscedasticity and clustered at the two-digit SIC code level. Significant at: *10%, **5% and ***1%.

	BG IPOs vs. standalone			Non-IPO BG firms vs. standalone		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	BG	BG	BG	BG	BG	BG
Log(assets)	0.066***	0.065***	0.074***	0.003	0.004	0.000
	(0.008)	(0.009)	(0.008)	(0.003)	(0.002)	(0.002)
Age	0.008***	0.008***	0.008***	0.003***	0.003***	0.003***
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
ROA	0.208***	0.196***	0.174**	0.146**	0.127*	0.108*
	(0.057)	(0.060)	(0.070)	(0.067)	(0.065)	(0.060)
Tangibility	0.045	0.037	0.006	-0.043**	-0.060***	-0.069***
	(0.045)	(0.048)	(0.050)	(0.019)	(0.017)	(0.014)
Leverage	-0.001	-0.007	0.003	0.055***	0.039***	0.044***
	(0.043)	(0.043)	(0.045)	(0.013)	(0.013)	(0.013)
Cash/Assets	-0.099	-0.119	-0.173**	-0.059***	-0.056***	-0.080***
	(0.074)	(0.074)	(0.076)	(0.021)	(0.021)	(0.021)
Tobin's q	0.047	0.063	-0.002	-0.021	0.021	0.016
	(0.048)	(0.048)	(0.046)	(0.018)	(0.020)	(0.017)
Observations	1,560	1,559	1,540	10,422	10,421	10,407
R-squared	0.205	0.242	0.292	0.104	0.138	0.238
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	Yes	Yes	No	Yes	Yes
Market FE	No	No	Yes	No	No	Yes
Industry cluster	Yes	Yes	Yes	Yes	Yes	Yes

Table 6: Difference-in-differences for standalone and group IPOs

This table displays the regression estimates from equation (1), which compares variables before and after an IPO for standalone and business group IPOs firms. The data spans from two years before the IPO up to two years later (five-event years). The dummy PostIPO takes a value of one for the IPO year and up to two years later, and zero for the two years before the IPO. The dummy BG takes a value of one if the firm taken public is part of a business group and zero if it is a standalone IPO firm. The key coefficient of interest is the interaction between PostIPO and BG. Panel A presents the results that include the dummy PostIPO, but excludes event-time fixed effects. Panel B presents the results that include event-time fixed effects, and the PostIPO dummy is dropped due to perfect collinearity with event-time fixed effects. Throughout, Industry Tobin's q and firm and calendar year fixed effects are included. In cols. 1-7 the dependent variable is the logarithm of one plus the variable in parenthesis: Book assets (col. 1), number of firms controlled downstream using 50% ownership links (col. 2), number of distinct two-digit SIC codes of firms controlled downstream (col. 3), cash holdings (col. 4), property plant and equipment (col. 5), book debt (Col. 6), and book equity (col. 7). Standard errors are adjusted by heteroscedasticity and clustered at the two-digit SIC code level. Significant at: *10%, **5% and ***1%.

Panel A

VARIABLES	(1) Log(assets)	(2) Log(contr. firms)	(3) Log(diver.)	(4) Log(cash)	(5) Log(PP&E)	(6) Log(debt)	(7) Log(equity)
BG x Post IPO	-0.257***	-0.251***	-0.165***	-0.039	-0.150***	-0.121***	-0.217***
	(0.029)	(0.025)	(0.026)	(0.053)	(0.051)	(0.042)	(0.040)
Post IPO	0.496***	0.057***	0.014	0.688***	0.211***	0.040	0.707***
	(0.035)	(0.018)	(0.013)	(0.041)	(0.046)	(0.044)	(0.042)
Observations	17,117	25,497	23,520	15,788	16,984	15,608	15,608
R-squared	0.915	0.699	0.690	0.796	0.911	0.903	0.896
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Event-time FE	No	No	No	No	No	No	No
Industry q	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry cluster	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Panel B

VARIABLES	(1) Log(assets)	(2) Log(contr. firms)	(3) Log(diver.)	(4) Log(cash)	(5) Log(PP&E)	(6) Log(debt)	(7) Log(equity)
BG x Post IPO	-0.259***	-0.250***	-0.165***	-0.047	-0.147***	-0.124***	-0.219***
	(0.028)	(0.026)	(0.026)	(0.053)	(0.051)	(0.041)	(0.039)
Observations	17,117	25,497	23,520	15,788	16,984	15,608	15,608
R-squared	0.915	0.701	0.691	0.797	0.912	0.903	0.896
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Event-time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry q	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry cluster	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 7: Before-and-After IPO profits

Panel A displays the regression estimates from equation (1), using ROA (EBITDA over Assets) as the dependent variable. The data spans from two years before the IPO up to two years later (five-event years). The key coefficient of interest is the interaction between PostIPO and BG. Column 1 presents the results that include the dummy PostIPO, but excludes and event-time fixed effects. Column 2 presents the results that include event-time fixed effects, and the PostIPO dummy is dropped due to perfect collinearity with event-time fixed effects. Industry Tobin's q, firm, and calendar year fixed effects are included in both columns. Standard errors are adjusted by heteroscedasticity and clustered at the two-digit SIC code level. For panel B we collapsed the panel data used in panel A into a cross-section. The dependent variable, *Profit Increase*, takes a value of 1 if a firm's EBITDA increases in the post-IPO period relative to the pre-IPO period, and zero otherwise. The explanatory variable in column 1 is the constant term, and captures the fraction of firms that increase their profitability post-IPO. Column 2 includes *BG dummy* as additional explanatory variable. This dummy takes a value of 1 for business group IPOs and 0 for standalone IPOs. Column 3 additionally includes a dummy that takes a value of 1 for firms with positive profits (EBITDA) in the pre-IPO period, and 0 otherwise. Column 4 also include IPO-year and country fixed effects. Robust standard errors are presented in parentheses. Significant at: *10%, **5% and ***1%.

Panel A

VARIABLES	(1) ROA	(2) ROA
BG x Post IPO	0.018***	0.016***
	(0.006)	(0.006)
Post IPO	-0.009**	
	(0.005)	
Observations	13,857	13,857
R-squared	0.758	0.759
Firm FE	Yes	Yes
Year FE	Yes	Yes
Event-time FE	No	Yes
Industry q	Yes	Yes
Industry cluster	Yes	Yes

Panel B

VARIABLES	(1) Profit increase	(2) Profit increase	(3) Profit increase	(4) Profit increase
Constant	0.514***	0.447***	0.367***	0.263**
	(0.010)	(0.013)	(0.016)	(0.111)
BG		0.160***	0.134***	0.123***
		(0.020)	(0.020)	(0.022)
Positive profit pre-IPO			0.150***	0.142***
			(0.020)	(0.022)
Observations	2,554	2,554	2,554	2,554
R-squared	0.514	0.526	0.536	0.548
IPO Year FE	No	No	No	Yes
Country FE	No	No	No	Yes
Robust SE	Yes	Yes	Yes	Yes

Table 8: Difference-in-differences for Tobin's Q of the industry of the IPO

This table displays the regression estimates from equation (1), which compares before-and-after an IPO for standalone and business group IPOs. The data spans from two years before the IPO up to two years later (five-event years). The dummy PostIPO takes a value of one for the IPO year and up to two years later, and zero for the two years before the IPO. The dummy BG takes a value of one if the firm taken public is part of a business group and zero if it is a standalone IPO firm. The dependent variable is industry q. Col. 1 present results from specifications that do not include calendar-year or event-time fixed effects; col. 2 present results that include calendar-year fixed effects but do not include event-time fixed effects; col. 3 includes both calendar-year and event-time fixed effects. Given the exclusion of event-time fixed effects in cols. 1 and 2, the specification allows to include the PostIPO dummy, while in the specifications displayed in col. 3 this term is dropped due to collinearity. Firm fixed effects are included in all regressions. Standard errors are adjusted by heteroscedasticity and clustered at the two-digit SIC code level. Significant at: *10%, **5% and ***1%.

VARIABLES	(1) Tobin's q	(2) Tobin's q	(3) Tobin's q
BG x Post IPO	0.087***	0.040***	0.040***
	(0.027)	(0.009)	(0.009)
Post IPO	-0.097**	0.007	
	(0.039)	(0.007)	
Observations	25,497	25,497	25,497
R-squared	0.624	0.763	0.763
Firm FE	Yes	Yes	Yes
Year FE	No	Yes	Yes
Event-time FE	No	No	Yes
Industry cluster	Yes	Yes	Yes

Table 9: Country-level regressions of market timing

This table displays the regression estimates from equation (2) for the pooled sample of 16 countries and 17 years (2000-2016). The dependent variable is next year's stock market returns in the country where the IPO firm took place: Mkt $return_{t+1}$. The main explanatory variable in col. 1 is the logarithm of one plus the number of total IPOs in year t: $log(IPO)_t$. The main explanatory variables in col.2 are the logarithm of one plus the number of standalone IPOs and the logarithm of one plus the number of business group IPOs in year t: $log(Standalone\ IPOs)_t$ and $log(BG\ IPOs)_t$, respectively. Robust standard errors are presented in parentheses. Significant at: *10%, **5% and ***1%.

VARIABLES	(1) Mkt ret (t+1)	(2) Mkt ret (t+1)
Log(IPOs)	-0.070***	
	(0.017)	
Log(Standalone IPOs)		-0.057***
		(0.018)
Log(Business group IPOs)		-0.023
		(0.023)
Observations	272	272
R-squared	0.099	0.096
Country FE	Yes	Yes
Robust SE	Yes	Yes

Table 10: Within-group ex-ante characteristics

This table displays regression results for linear probability models using the sample of business group firms in the year prior to a group-firm IPO. The dependent variable, IPO, takes a value of 1 for the going public firm in a group and 0 for the stay-private firms. Already listed firms at the time of the IPO are excluded from the analysis. Explanatory variables correspond to firm-level characteristics. All regressions include business group fixed effects along with year and industry fixed effects. Standard errors are adjusted by heteroscedasticity and clustered at the group level. Significant at: *10%, **5% and ***1%.

VARIABLES	(1) IPO	(2) IPO	(3) IPO	(4) IPO	(5) IPO	(6) IPO	(7) IPO	(8) IPO	(9) IPO
Relative position	0.308***	0.317***	0.327***	0.367***	0.335***	0.337***	0.382***	0.308***	0.383***
	(0.018)	(0.019)	(0.020)	(0.025)	(0.020)	(0.021)	(0.023)	(0.018)	(0.028)
Log(assets)		0.010***							0.012***
		(0.001)							(0.002)
Age			-0.000						-0.000*
			(0.000)						(0.000)
ROA				0.056***					0.076***
				(0.011)					(0.016)
Tangibility					0.018***				0.001
					(0.004)				(0.007)
Leverage						0.003			-0.002
						(0.004)			(0.007)
Cash/Assets							-0.023***		0.015*
							(0.005)		(0.009)
Tobin's q								0.005	0.007
								(0.005)	(0.008)
Observations	34,093	26,213	21,166	17,561	25,525	22,061	18,348	34,093	9,874
R-squared	0.324	0.356	0.356	0.378	0.351	0.353	0.380	0.324	0.426
BG FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
BG cluster	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 11: Within-group ex-ante characteristics: adding interactions

This table displays regression results for linear probability models using the sample of business group firms in the year before a group firm IPO. The dependent variable, IPO, takes a value of 1 for the going public firm in a group and 0 for the stay-private firms. Already listed firms at the time of the IPO are excluded from the analysis. The key explanatory variables are the interactions of Relative position with group- and country-level characteristics. Group ROA and Group q are weighted averages of firms' ROA and industry q, using as weights for each firm the fraction that a firm's asset represents for the group. Common law is a dummy variable that takes a value of 1 if the firm is listed in a common law country and 0 otherwise. High anti-self-dealing is a dummy variable that takes a value of 1 if the firm is listed in a country with an anti-self-dealing index (Djankov et al. 2008) above the median 0 otherwise. Log(group layers) is the logarithm of one plus the number of layers in a group. Column 6 includes all interactions simultaneously. Column 7 presents results after incorporating the firm-level controls used in Table 10. Column 8 excludes groups that already had a listed firm before the IPO. All regressions include group, industry, and year fixed effects. Standard errors are adjusted by heteroscedasticity and clustered at the group level. Significant at: *10%, **5% and ***1%.

VARIABLES	(1) IPO	(2) IPO	(3) IPO	(4) IPO	(5) IPO	(6) IPO	(7) IPO	(8) IPO
Relative position	0.288***	-0.017	0.269***	0.237***	1.441***	1.248***	1.450***	1.496***
	(0.020)	(0.070)	(0.020)	(0.021)	(0.048)	(0.080)	(0.110)	(0.122)
Relative position x Group ROA	0.470***					0.375***	0.549***	0.534***
	(0.176)					(0.128)	(0.167)	(0.166)
Relative position x Group q		0.253***				0.073*	0.105*	0.066
		(0.052)				(0.039)	(0.063)	(0.069)
Relative position x Common law			0.162***			0.065**	0.152***	0.107**
			(0.040)			(0.030)	(0.045)	(0.053)
Relative position x Anti-self-dealing				0.177***		0.048*	0.013	0.035
				(0.033)		(0.027)	(0.034)	(0.044)
Relative position x Log(group layers)					-0.595***	-0.569***	-0.661***	-0.645***
					(0.023)	(0.024)	(0.031)	(0.039)
Observations	34,093	34,093	34,093	34,093	34,093	34,093	9,874	5,722
R-squared	0.326	0.331	0.330	0.334	0.417	0.422	0.528	0.572
BG FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-level controls	No	No	No	No	No	No	Yes	Yes
Groups with listed firms	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
BG cluster	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 12: Difference-in-differences for IPO vs. non-IPO firms in a business group

This table displays the regression estimates from equation (3), which compares before-and-after an IPO for business group firms that went public and those that remained private. The data spans from two years prior to the IPO up to two years later (five-event years). The dummy PostIPO takes a value of one for the IPO year and up to two years later for all firms in a group regardless of whether they went public or not, and zero for the two years prior to the IPO. The dummy IPO takes a value of one if the firm underwent an IPO, and zero if it remained private. The key coefficient of interest is the interaction between PostIPO and IPO. All specifications include industry Tobin's q, firm, year, and event-time fixed effects. The PostIPO dummy is dropped due to perfect collinearity with event-time fixed effects. Standard errors are adjusted by heteroscedasticity and clustered at the two-digit SIC code level. Significant at: *10%, **5% and ***1%.

VARIABLES	(1) Log(assets)	(2) Log(cash)	(3) Log(PP&E)	(4) Log(debt)	(5) Log(equity)
IPO x Post IPO	0.488***	0.542***	0.478***	0.262***	0.644***
	(0.034)	(0.053)	(0.033)	(0.025)	(0.033)
Observations	54,806	36,428	53,405	46,479	46,479
R-squared	0.948	0.844	0.946	0.932	0.947
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Event-time FE	Yes	Yes	Yes	Yes	Yes
Industry q	Yes	Yes	Yes	Yes	Yes
Industry cluster	Yes	Yes	Yes	Yes	Yes

Table 13: Difference-in-differences for group firms with completed vs. withdrawn IPOs.

Panel A displays the regression results from difference-in-differences estimations comparing business group firms that underwent an IPO relative to business group firms that withdrew an IPO. The dummy Completed IPO takes a value of one if the firm underwent an IPO, and zero if it withdrew the IPO and remained private. Panel B displays the regression results from difference-in-differences estimations comparing business group firms that remained private in a group that completed an IPO relative to business group firms that remained private in a group that withdrew the IPO (we exclude the IPO-attempt firms from this sample). The dummy Completed IPO in the group takes a value of one if a firm in the group completed the IPO and zero if the group withdrew the IPO. The data spans from two years prior to the IPO up to two years later (five-event years). The dummy Post IPO takes a value of one for the completed or withdrew IPO year and up to two years later for all firms in a group that attempted an IPO, and zero otherwise. The key coefficient of interest in panel A is the interaction between Post IPO and Completed IPO and in panel B is the interaction between Post IPO and Completed IPO in a group. All specifications include industry Tobin's q, firm, year, and event-time fixed effects. The Post IPO dummy is dropped due to perfect collinearity with event-time fixed effects. Standard errors are adjusted by heteroscedasticity and clustered at the two-digit SIC code level. Significant at: *10%, **5% and ***1%.

Panel A: Completed vs. withdrawn IPOs in business group firms

VARIABLES	(1) Log(assets)	(2) Log(cash)	(3) Log(PP&E)	(4) Log(debt)	(5) Log(equity)
Completed IPO x Post IPO	0.378***	0.415***	0.342***	0.216**	0.477***
	(0.089)	(0.080)	(0.103)	(0.103)	(0.098)
Observations	6,622	5,985	6,585	6,154	6,154
R-squared	0.924	0.766	0.919	0.897	0.898
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Event-time FE	Yes	Yes	Yes	Yes	Yes
Industry q	Yes	Yes	Yes	Yes	Yes
Industry cluster	Yes	Yes	Yes	Yes	Yes

Panel B: Group firms that remain private in business groups with completed and withdrawn IPOs

VARIABLES	(1) Log(assets)	(2) Log(cash)	(3) Log(PP&E)	(4) Log(debt)	(5) Log(equity)
Completed IPO x Post IPO	0.057***	0.005	0.047*	0.065**	0.067***
	(0.014)	(0.016)	(0.025)	(0.026)	(0.020)
Observations	65,104	42,341	63,433	54,879	54,879
R-squared	0.952	0.850	0.950	0.941	0.952
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Event-time FE	Yes	Yes	Yes	Yes	Yes
Industry q	Yes	Yes	Yes	Yes	Yes
Industry cluster	Yes	Yes	Yes	Yes	Yes

Online Appendix

Appendix A: Model

A.1 Setup

There are three firms: one standalone firm (*S*) and two business group firms (*A* and *B*). All firms are initially private. The standalone firm *S* is controlled by a single shareholder who owns a fraction α_0 of the cash flow rights of the firm, where 0<α_0<1. The ownership structure of the business group is a straightforward pyramid. Firm *A* is controlled by a single shareholder who owns a fraction α_0 of its cash-flow rights. In turn, firm *A* owns a fraction α_1 of the cash-flows rights of Firm *B*, where 0<α_1<1. We assume that the controlling shareholder retains control of firms *A* and *B* irrespective of the fraction of cash-flow rights that she owns. Firm value V_j, where *j*={*A, B, S*}, is the discounted (risk-adjusted) cash-flow value of assets-in-place. Notice that this value excludes growth opportunities. To streamline notation V_A refers to the cash-flow value of assets in firm *A* excluding *A*'s investment in *B*.

Controlling shareholders derive utility from cash-flow values and the consumption of private benefits. Cash-flow values are reduced by the consumption of private benefits, hence private benefits are not a mere "amenity potential" (e.g., direct pleasure or status from controlling a firm) as suggested by Demsetz and Lehn (1985). Private benefits can involve perquisites, excessive executive compensation, favorable transactions with related parties, expropriation of corporate opportunities, and so on (Johnson et al., 2000). Cash-flow value is low (V^l) if private benefits are taken, and high (V^h) if private benefits are not taken. The controlling shareholder attaches a value of φ to each dollar that is diverted $d \equiv V^h - V^l$. While d is a firm-level characteristic about how much value is lost when private benefits are taken, we think of the parameter φ as being related to the contractual environment, such as legal rules, accounting practices, and so on. We assume that $\varphi > \alpha_0$, so $1 diverted is more valuable to the controlling shareholder than $1 of cash-flow value in the firm. For example, this can be the case if dividends are taxed and the diverted amount is not (or if it can be hidden). Under this assumption controlling shareholders choose to consume private benefits if firms remain private because $\varphi > \alpha_0$ implies that $\alpha_0 V^l + \varphi d > \alpha_0 V^h$. Naturally, the temptation to consume private benefits is stronger when the divergence between control and cash-flow rights is larger as it happens with firm B in the business group (because $\varphi - \alpha_0\alpha_1 > \varphi - \alpha_0$).

The model can accommodate other interpretations of private benefits besides expropriation from minority shareholders. For example, imagine that $\alpha = 1$, and therefore that there are no pre-existing minority shareholders. In this case it is possible that the firm is more valuable if managed by a professional CEO (Burkart, Panunzi, and Shleifer, 2003). This implies $d > 0$ in the sense that value is sacrificed if the current controlling shareholder follows her own business plan. Under this interpretation the parameter φ reflects the value that the controlling shareholder places on autonomy, and it is inversely related to outside monitoring (Boot, Gopalan, and Thakor, 2008). Yet another interpretation is that φ captures the biased optimism of the entrepreneur (Landier and Thesmar, 2009). Under any of these different interpretations we only need $\varphi > \alpha$ for our results to go through.

Growth opportunities are represented by a new project that requires investment *i* and produces a cash-flow value of *r*, where *r*>*i*. The project can be allocated to firm *A* or *B* in the group, or to the standalone firm *S*. Standalone firm *S* and group firm *B* have current cash-flow equal to *c*, which can be invested or distributed as dividend this period. Firm *A* has no cash flow. Hence, group cash-flow is *c*, just like in the standalone firm. The assumption regarding cash flows makes firms *S* and *B* completely analogous, except for their ownership structure, and therefore it makes comparisons straightforward.

The project can also be funded by raising capital from public equity markets. The capital market that standalone firms and group firms face is the same. Stock market investors operate in perfect competition. Everyone is risk neutral, and infinitely patient, so they do not discount the future. Hence, the market rate of return is zero. Going public implies that diversion is no longer possible in the IPO firm. In other words, the protection of minority investors in the public market is costless and perfect. Although this is not literally true in practice, what we care about is the difference in regulation, disclosure requirements, and monitoring between private and public firms. We also assume that private benefits cannot be consumed in firms controlled by the firm going public. In other words, if *A* goes public, diversion is no longer possible in *A* nor *B*. If *B* goes public, there is no diversion in *B*, but diversion is still possible in *A*.

Finally, we assume that the control structure is stable in the short run, or during the horizon in which the going public decision is taken. In other words, controlling shareholders are faced with the choice of going public or not, but they cannot modify the ownership structure in any other way (e.g., restructuring the group). Control structures are very stable in practice so this is a reasonable assumption (Donelli, Larrain, and Urzua, 2013).

A.2 Internal and external funds

There is a pecking order in this model in the sense that the controlling shareholder first tries to finance the project with internal funds. Internal funds allow the controlling shareholder to appropriate the positive NPV of the project without incurring the loss of private benefits. Firm B has cash equal to *c*, so if $c>i$ then the project can be internally funded by firm B. Firm *A* has access only to $\alpha_1 c$, which is the fraction of dividends that *A* receives from *B*. If $\alpha_1 c>i$ then the project can be internally funded by firm *A*.

This simple setup already illustrates two features of business groups that are present in the literature. First, by comparing the internal funds of firms A and B we can see the financial advantage of pyramidal investment noted by Almeida and Wolfenzon (2006). The higher availability of cash-flow in firm *B* vis-à-vis firm *A* ($c > \alpha_1 c$) makes the investment in *B* more likely. This comparison only refers to the feasibility of investment. Whether it is better for the controlling shareholder to finance the project internally in *A* or *B* requires more analysis. Second, the advantage of internal capital markets is also present in our setup. Firm *A*, although it has no cash of its own, can use group cash ($\alpha_1 c$) to invest in the project instead of raising funds from the market. As in Gopalan, Nanda, and Seru (2014), a group firm can use dividends from other affiliated firms to fund its own capital expenditures.

if $i>c$ the project is large enough to require outside funds. The firm going public needs to promise investors an appropriate rate of return, which is zero given the assumptions in our setup. In the case of the standalone firm going public, new investors receive a fraction β_S of the firm that is implicitly defined by the following break-even condition:

$$\beta_S(V_S^h + r) = i \qquad \text{(A.1)}$$

Going public is feasible if $\beta_S < 1$, which always hold given positive values of assets-in-place and a positive NPV project. Equation (A.1) shows that market investors internalize their positive effect in the valuation of assets-in-place because their presence limits the consumption of private benefits. We could also assume that the firm contributes cash flow c in the case of going public, i.e., it raises only $i - c$. This would not change any of the analysis because the controlling shareholder (together with other existing shareholders of the firm) appropriates all the NPV of the new project regardless of financing. The controlling shareholder is therefore indifferent between consuming dividends (his share is $\alpha_0 c$) or investing them in the project.

The break-even conditions for investors in the IPOs of firms *A* or *B* in the business group are the following:

$$\beta_A\left(V_A^h + \alpha_1 V_B^h + r\right) = i \tag{A.2}$$

$$\beta_B\left(V_B^h + r\right) = i \tag{A.3}$$

Again, going public is feasible in each case if $\beta_A < 1$ and $\beta_B < 1$, which always hold. Equation (A.3) for Firm *B* is completely analogous to equation (A.1) for the standalone firm. Equation (A.2) for firm *A* is slightly different, because the total value offered to new shareholders of *A* includes a stake in firm *B* equal to $\alpha_1 V_B^h$.

A.3 The Going Public Decision

From now on we focus on the more interesting case where the project is big enough so that going public is necessary to invest. Going public implies a tradeoff between getting the cash flow benefits of the new project and losing private benefits. We can frame the decision in terms of hurdle rates, $y \equiv \frac{r}{i} - 1$. Going public just makes up for the loss of private benefits when the project's internal rate of return is equal to the hurdle rate. Only projects that are more profitable than the hurdle rate are taken.

For simplicity, assume that diversion is the same in the three firms $d_S = d_A = d_B \equiv d$. Our first result is related to the different hurdle rates in standalone firms and business group firms:

Result 1: Hurdle rates for going public in the standalone firm (S) and business group firms (A and B) are as follows:

$$y_S = \left(\frac{\varphi}{\alpha_0} - 1\right)\frac{d}{i}$$

$$y_A = \left(\frac{2\varphi}{\alpha_0} - 1 - \alpha_1\right)\frac{d}{i}$$

$$y_B = \left(\frac{\varphi}{\alpha_0 \alpha_1} - 1\right)\frac{d}{i}$$

Hence, $y_A > y_S$ *and* $y_B > y_S$.

Proof: The benefits for the controlling shareholders of standalone and group firms of staying private when the project is large enough ($i > c$*) are the following:*

$$\alpha_0 V_S^l + \varphi d + \alpha_0 c \tag{A.4}$$

$$\alpha_0 V_A^l + 2\varphi d + \alpha_0 \alpha_1 V_B^l + \alpha_0 \alpha_1 c \tag{A.5}$$

The benefits of going public are as follows, considering that the business group has two possible vehicles (A and B) for going public:

$$\alpha_0 (V_S^h + r - i) + \alpha_0 c \tag{A.6}$$

$$\alpha_0 (V_A^h + \alpha_1 V_B^h + r - i) + \alpha_0 \alpha_1 c \tag{A.7}$$

$$\alpha_0 V_A^l + \varphi d + \alpha_0\alpha_1(V_B^h + r - i) + \alpha_0\alpha_1 c \qquad (A.8)$$

Equations (A.7) and (A.8) represent the benefit for the controlling shareholder of the group of going public with firm A and B respectively.

We define the hurdle rate (y) as the internal rate of return that leaves the controlling shareholder indifferent between going public and staying private. For the case of the standalone firm, this implies equating (A.4) and (A.6). For the case of going public with firm A, the hurdle rate can be obtained by equating (A.5) and (A.7). Similarly, for going public with firm B, the hurdle rate can be obtained by equating (A.5) and (A.8).

Although the market rate is zero, all hurdle rates are positive since they consider the loss of private benefits when going public. In a sense, d is an additional amount that the controlling shareholder must put into the project when financing through the stock market.

Result 1 implies that hurdle rates in business group firms are higher than in standalone firms, or that business group firms are more reluctant to go public than standalone firms. The reasons depend on the position of the firm in the ownership structure of the group. For firms high in the control pyramid, such as Firm *A*, the hurdle rate is higher than in a standalone firm since going public implies a loss of private benefits in that firm and other firms controlled by it. The loss of private benefits in Firm *B* explains the additional terms in y_A on top of the direct effect on *A* that is analogous to the standalone firm. For firms low in the control pyramid, such as Firm *B*, the hurdle rate is higher than in a standalone because the loss of private benefits is larger relative to the cash-flow benefits of the project. The ratio $\frac{\varphi}{\alpha_0\alpha_1}$ captures this stronger divergence between private benefits (φ) and cash flow benefits ($\alpha_0\alpha_1$) in firm B. Our result assumes that diversion is the same in the three firms, which is a conservative assumption. If diversion is higher in group firms, then the divergence in hurdle rates would be even stronger.

To study the effects of investor irrationality, assume that all valuations are affected by market sentiment $\epsilon \sim N(0,1)$. The break-even condition of investors in a standalone IPO is now $\beta_S(V_S^h + r)(1+\epsilon) = i$. If sentiment $\epsilon > 0$, then the controlling shareholder benefits by selling a piece of a firm that is worth $(V_S^h + r)$ at a higher price $(V_S^h + r)(1+\epsilon)$. Given the multiplicative effect of sentiment, all hurdle rates in the model change as follows: $y_{sent} = y - \epsilon$. Rational hurdle rates (y) are lower in standalone firms as shown in Result 1. If the distribution of projects is more densely populated in the region of low hurdle rates, then a fall in hurdle rates because of overvaluation ($\epsilon > 0$) affects the going public decision of standalone firms more than the going public decision of group firms. Alternatively, if standalone firms are more financially constrained in the sense that their waiting list of unfunded projects is larger than that of group firms, then sentiment affects standalone firms more.

A.4 Within Group Decision

The previous result compares a standalone firm with firms affiliated to business groups, but the hurdles rates of group firms (y_A and y_B) cannot be unambiguously ranked. We now dig deeper into the within group decision of going public. The project can in principle be allocated to any of the two firms in the group, *A* or *B*. The controlling shareholder faces a tradeoff between private benefits and cash-flow benefits than can be summarized as follows:

Result 2: Going public with firm A is preferable to going public with firm B if:

$$\alpha_0(1-\alpha_1)(r-i) > (\varphi - \alpha_0)d$$

Proof: It follows from assuming that the benefit in (A.7) is higher than the benefit in (A.8).

The term $\alpha_0(1-\alpha_1)(r-i)$ is the loss of cash-flow benefits when *B* goes public because the NPV of the new project is shared with former shareholders of B that receive a fraction $1-\alpha_1$ of the dividends. The term $(\varphi-\alpha_0)d$ represents the net loss of private benefits in firm *A* when this firm goes public. When the business group is considering a very profitable project it is more likely to list the firm at the top of the pyramid to avoid the dilution of cash-flow benefits with former minority shareholders. When the project is less profitable, the business group is more likely to list the firm at the bottom of the pyramid to retain the private benefits extracted at the top of the pyramid. This tradeoff is reminiscent of the decision to invest horizontally or in a pyramidal fashion as studied by Almeida and Wolfenzon (2006).

Appendix-Only References

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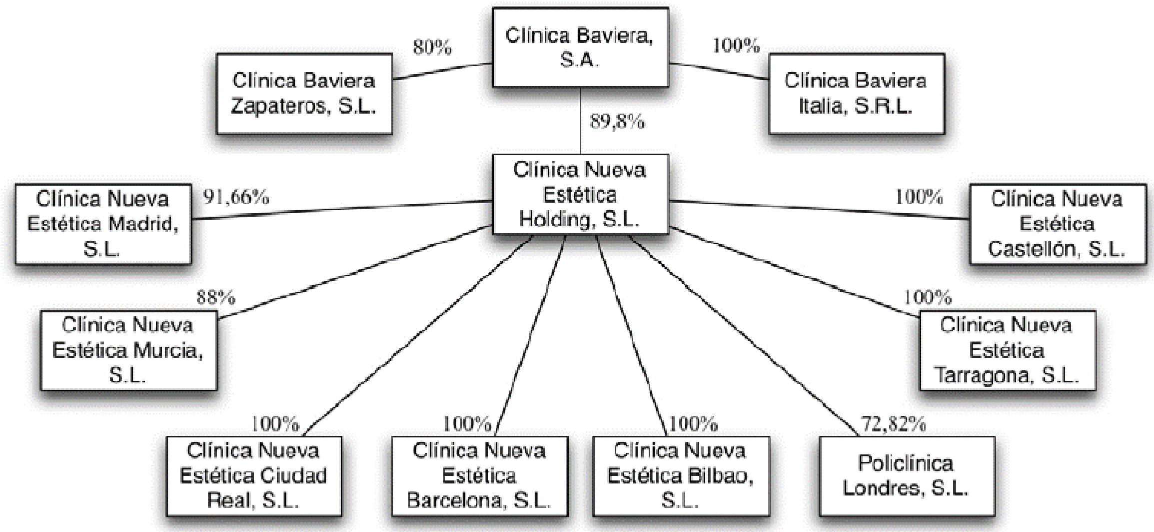
Figure A1: Baviera group IPO

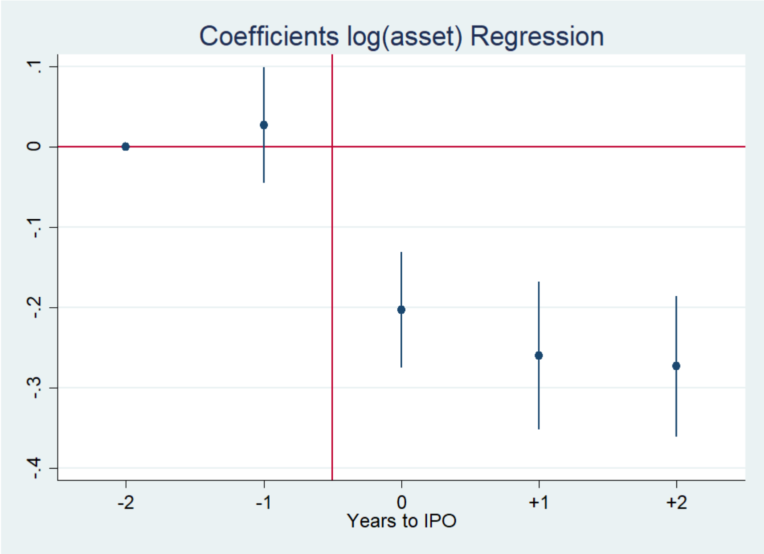


Source: IPO prospectus (page 135).

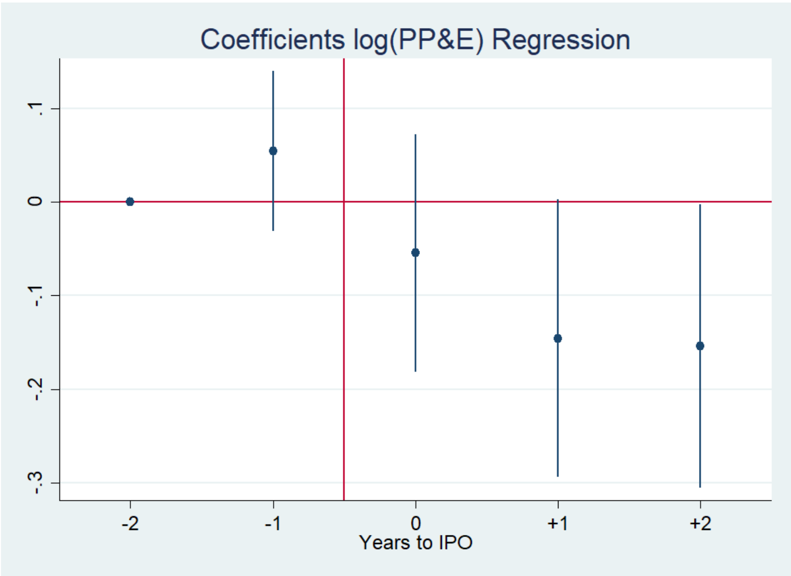
Figure A2: Event-year differential effects for standalone and group IPOs

The figures display the point-estimate coefficients and 95% confident intervals for panel regressions that interact event-years t={-1,0,1,2} around IPOs with business group affiliation: $Y_{it} = \delta_t(t \times BG_i) + \mu_i + t_t + \tau_t + \varepsilon_{it}$. The default event year is t=-2. The dependent variables are selected dependent variables used in the difference-in-difference estimations in Table 6. Standard errors are adjusted by heteroscedasticity and clustered at the two-digit SIC code level.

Panel A: Assets



Panel B: Investment (PP&E)



Panel C: Equity

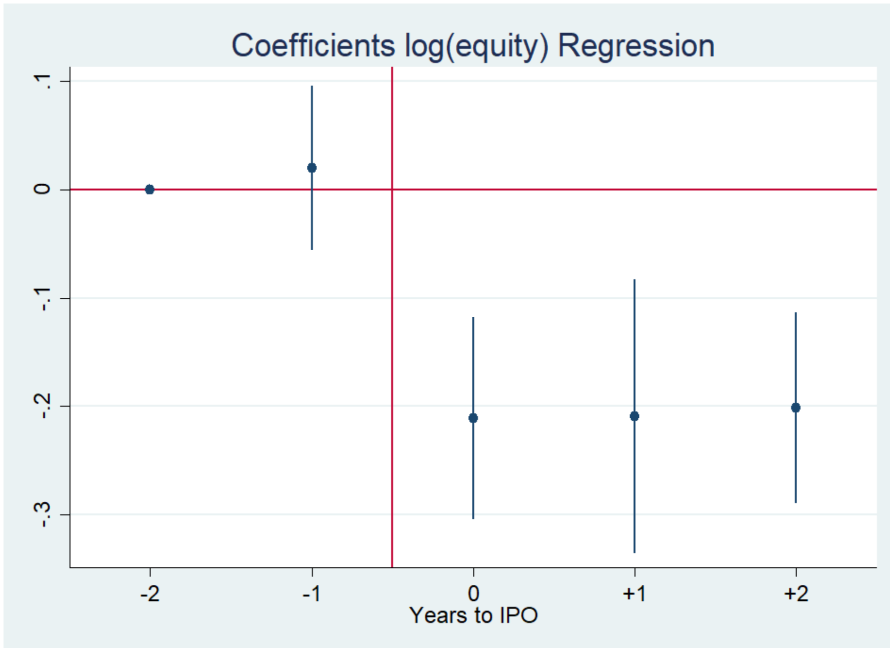


Figure A3: Cross-sectional correlations with group relative position

The figure displays the scatter plot and fitted values of the average relative position of a group and the logarithm of one plus the number of group layers. Each data point corresponds to one of the business groups in the data. The slope is statistically insignificant.

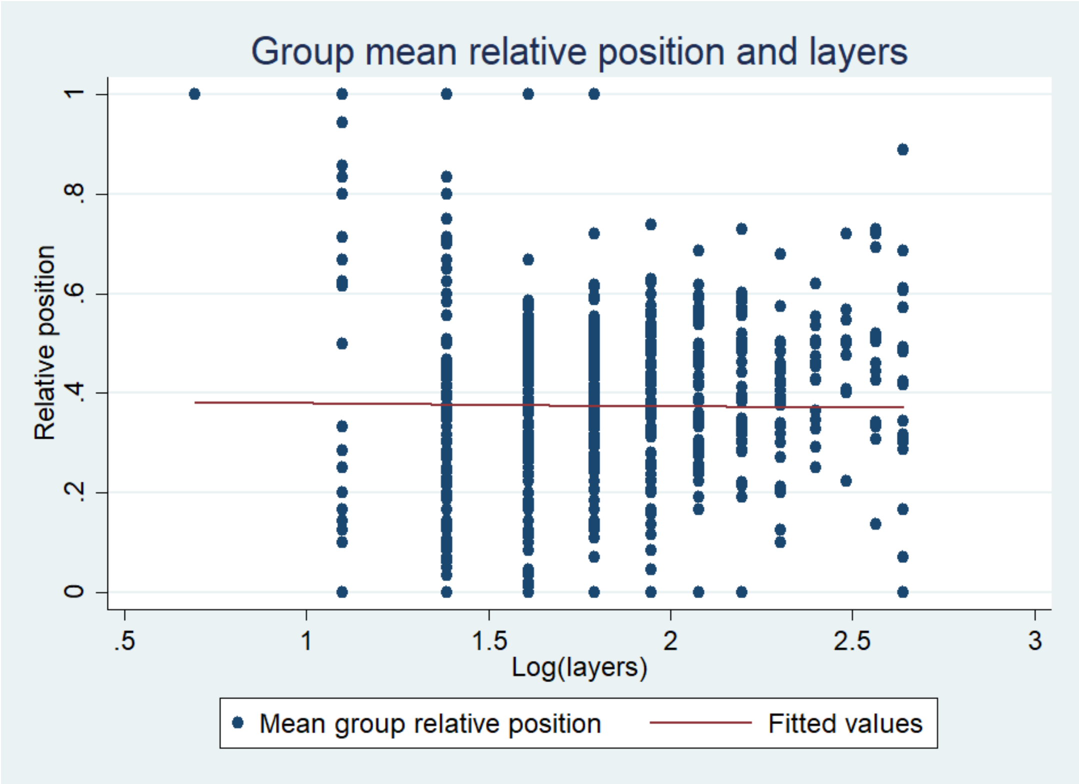


Table A1: Country of non-IPO firms in business groups with an IPO

This table displays the location of firms that did not undergo an IPO during the sample period of 2000-2016, but that are part of a business group that took a firm public in our sample.

Non-IPO firms of Business Groups

Country	BG non-IPO firms	Country	BG non-IPO firms
Austria	422	Malaysia	1
Belgium	959	Malta	2
Brazil	2	Mexico	3
Bulgaria	3	Morocco	3
Chile	2	Netherland	915
China	10	Nigeria	1
Croatia	1	Norway	1,844
Cyprus	1	Philippines	1
Czech Republic	6	Poland	11
Denmark	690	Portugal	517
Estonia	2	Romania	4
Finland	546	Russia	4
France	7,443	Serbia	1
Germany	5,608	Singapore	3
Gibraltar	1	Slovakia	3
Greece	114	South Korea	3
Hong Kong	1	Spain	2,321
India	2	Sweden	3,792
Ireland	218	Switzerland	259
Israel	1	United Arab Emirates	3
Italy	712	United Kingdom	11,986
Latvia	1	United States	13
Lesotho	1	Zambia	1
Luxemburg	1		
		Total	38,438

Table A.2: Replicating Table 5 with different samples.

This table displays the estimation results of Table 5, but excluding firms with consolidated financial statements (panel A), financial firms (SIC2 60-69), utilities (SIC2 49), and privatizations (panel B), firms listed in the London AIM stock exchange (panel C), and group firms belonging to groups with more than 100 firms (panel D).

Panel A: Excluding consolidated statements

	BG IPOs vs. standalone			Non-IPO BG firms vs. standalone		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	BG	BG	BG	BG	BG	BG
Log(assets)	0.017***	0.017***	0.024***	0.002	0.003	-0.001
	(0.006)	(0.006)	(0.005)	(0.003)	(0.003)	(0.002)
Age	0.009***	0.008***	0.007***	0.003***	0.003***	0.003***
	(0.002)	(0.002)	(0.002)	(0.000)	(0.000)	(0.000)
ROA	-0.002	-0.042	-0.083	0.148**	0.126*	0.108*
	(0.051)	(0.053)	(0.056)	(0.069)	(0.067)	(0.062)
Tangibility	-0.007	-0.016	-0.006	-0.045**	-0.062***	-0.070***
	(0.042)	(0.042)	(0.040)	(0.021)	(0.019)	(0.015)
Leverage	-0.010	-0.031	-0.021	0.056***	0.040***	0.043***
	(0.060)	(0.065)	(0.070)	(0.013)	(0.014)	(0.014)
Cash/Assets	-0.082	-0.074	-0.063	-0.058***	-0.055***	-0.079***
	(0.058)	(0.053)	(0.052)	(0.021)	(0.021)	(0.021)
Tobin's q	0.038	0.047	0.005	-0.022	0.020	0.016
	(0.032)	(0.031)	(0.043)	(0.019)	(0.020)	(0.017)
Observations	1,059	1,050	1,033	10,009	10,008	9,993
R-squared	0.121	0.183	0.306	0.107	0.142	0.243
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	Yes	Yes	No	Yes	Yes
Market FE	No	No	Yes	No	No	Yes
Industry cluster	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: Excluding financials, utilities, and privatizations

	BG IPOs vs. standalone			Non-IPO BG firms vs. standalone		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	BG	BG	BG	BG	BG	BG
Log(assets)	0.073***	0.075***	0.081***	0.005*	0.005	0.001
	(0.008)	(0.008)	(0.008)	(0.003)	(0.003)	(0.003)
Age	0.008***	0.008***	0.008***	0.004***	0.003***	0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)
ROA	0.147**	0.130**	0.105	0.174**	0.158**	0.139*
	(0.057)	(0.060)	(0.064)	(0.080)	(0.077)	(0.070)
Tangibility	0.046	0.064	0.029	-0.085***	-0.087***	-0.091***
	(0.056)	(0.054)	(0.053)	(0.019)	(0.021)	(0.017)
Leverage	-0.020	-0.042	-0.035	0.066***	0.051***	0.053***
	(0.042)	(0.040)	(0.041)	(0.017)	(0.016)	(0.014)
Cash/Assets	-0.141*	-0.159**	-0.196***	-0.097***	-0.088***	-0.112***
	(0.077)	(0.072)	(0.072)	(0.025)	(0.024)	(0.024)
Tobin's q	0.074	0.063	-0.006	-0.012	0.017	0.022
	(0.049)	(0.051)	(0.050)	(0.023)	(0.024)	(0.019)
Observations	1,177	1,176	1,158	7,558	7,556	7,545
R-squared	0.244	0.287	0.331	0.124	0.157	0.264
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	Yes	Yes	No	Yes	Yes
Market FE	No	No	Yes	No	No	Yes
Industry cluster	Yes	Yes	Yes	Yes	Yes	Yes

Panel C: Excluding London AIM

	BG IPOs vs. standalone			Non-IPO BG firms vs. standalone		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	BG	BG	BG	BG	BG	BG
Log(assets)	0.065***	0.065***	0.073***	0.002	0.002	-0.001
	(0.008)	(0.009)	(0.009)	(0.002)	(0.002)	(0.002)
Age	0.008***	0.008***	0.008***	0.003***	0.003***	0.003***
	(0.001)	(0.002)	(0.001)	(0.000)	(0.000)	(0.000)
ROA	0.230***	0.237***	0.196**	0.109	0.094	0.079
	(0.074)	(0.082)	(0.093)	(0.075)	(0.072)	(0.067)
Tangibility	0.071	0.067	0.042	-0.030*	-0.050***	-0.058***
	(0.048)	(0.053)	(0.056)	(0.016)	(0.014)	(0.012)
Leverage	-0.025	-0.017	0.002	0.046***	0.034***	0.034***
	(0.048)	(0.046)	(0.048)	(0.010)	(0.012)	(0.011)
Cash/Assets	-0.122*	-0.141*	-0.196**	-0.047**	-0.051**	-0.075***
	(0.071)	(0.074)	(0.076)	(0.022)	(0.022)	(0.021)
Tobin's q	0.052	0.061	0.001	-0.003	0.031	0.021
	(0.050)	(0.051)	(0.053)	(0.016)	(0.020)	(0.017)
Observations	1,352	1,348	1,329	9,928	9,927	9,913
R-squared	0.209	0.251	0.304	0.087	0.117	0.220
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	Yes	Yes	No	Yes	Yes
Market FE	No	No	Yes	No	No	Yes
Industry cluster	Yes	Yes	Yes	Yes	Yes	Yes

Panel D: Excluding large groups (group size >100)

	BG IPOs vs. standalone			Non-IPO BG firms vs. standalone		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	BG	BG	BG	BG	BG	BG
Log(assets)	0.061***	0.060***	0.069***	-0.009**	-0.010**	-0.014***
	(0.009)	(0.010)	(0.009)	(0.004)	(0.004)	(0.004)
Age	0.008***	0.008***	0.008***	0.007***	0.006***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
ROA	0.211***	0.198***	0.174**	0.237**	0.193**	0.164*
	(0.058)	(0.061)	(0.071)	(0.099)	(0.089)	(0.084)
Tangibility	0.037	0.024	-0.011	-0.087**	-0.119***	-0.136***
	(0.045)	(0.048)	(0.051)	(0.037)	(0.033)	(0.025)
Leverage	0.002	-0.005	0.005	0.104***	0.077***	0.081***
	(0.044)	(0.044)	(0.045)	(0.025)	(0.024)	(0.022)
Cash/Assets	-0.098	-0.124	-0.183**	-0.160***	-0.158***	-0.194***
	(0.076)	(0.075)	(0.079)	(0.045)	(0.046)	(0.044)
Tobin's q	0.046	0.061	-0.002	-0.037	0.024	0.014
	(0.047)	(0.048)	(0.044)	(0.030)	(0.033)	(0.026)
Observations	1,524	1,522	1,501	4,670	4,669	4,653
R-squared	0.190	0.228	0.277	0.132	0.185	0.280
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	Yes	Yes	No	Yes	Yes
Market FE	No	No	Yes	No	No	Yes
Industry cluster	Yes	Yes	Yes	Yes	Yes	Yes

Table A.3: Replicating Table 6 for different samples or using controls

This table displays the estimation results of Table 6, but excluding firms with consolidated financial statements in panel A, additionally controlling for lagged firm-level controls (log of assets, ROA, age, tangibility, leverage, and cash/assets) in panel B, further excluding financial firms (SIC2 60-69), utilities (SIC2 49), and privatizations in panel C, also excluding firms listed in the London AIM stock exchange in panel D, and additionally excluding group firms belonging to groups with more than 100 firms in panel E.

Panel A: Excluding consolidated statements

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	Log(assets)	Log(contr. firms)	Log(diver.)	Log(cash)	Log(PP&E)	Log(debt)	Log(equity)
BG x Post IPO	-0.430***	-0.299***	-0.207***	-0.270***	-0.387***	-0.203***	-0.498***
	(0.051)	(0.023)	(0.033)	(0.057)	(0.077)	(0.062)	(0.062)
Observations	13,266	21,592	19,717	12,140	13,137	11,948	11,948
R-squared	0.910	0.624	0.629	0.810	0.908	0.904	0.896
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Event-time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry q	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry cluster	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: Excluding consolidated statements and including lagged firm-level controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	Log(assets)	Log(contr. firms)	Log(diver.)	Log(cash)	Log(PP&E)	Log(debt)	Log(equity)
BG x Post IPO	-0.333***	-0.296***	-0.225***	-0.378***	-0.252***	-0.154**	-0.359***
	(0.078)	(0.049)	(0.048)	(0.084)	(0.076)	(0.075)	(0.066)
Observations	4,830	5,092	4,511	4,719	4,818	4,686	4,686
R-squared	0.966	0.802	0.801	0.872	0.959	0.956	0.955
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Event-time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry cluster	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Panel C: Excluding consolidated statements, financials, utilities, and privatizations, and including lagged firm-level controls

VARIABLES	(1) Log(assets)	(2) Log(contr. firms)	(3) Log(diver.)	(4) Log(cash)	(5) Log(PP&E)	(6) Log(debt)	(7) Log(equity)
BG x Post IPO	-0.306***	-0.251***	-0.234***	-0.450***	-0.193***	-0.055	-0.357***
	(0.091)	(0.050)	(0.035)	(0.098)	(0.065)	(0.060)	(0.083)
Observations	3,753	3,953	3,556	3,669	3,744	3,624	3,624
R-squared	0.965	0.800	0.803	0.882	0.958	0.960	0.953
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Event-time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry cluster	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Panel D: Excluding consolidated statements, financials, utilities, and privatizations, London AIM firms, and including lagged firm-level controls

VARIABLES	(1) Log(assets)	(2) Log(contr. firms)	(3) Log(diver.)	(4) Log(cash)	(5) Log(PP&E)	(6) Log(debt)	(7) Log(equity)
BG x Post IPO	-0.303***	-0.236***	-0.237***	-0.448***	-0.184***	-0.039	-0.381***
	(0.093)	(0.052)	(0.039)	(0.101)	(0.067)	(0.058)	(0.087)
Observations	2,981	3,138	2,812	2,917	2,974	2,876	2,876
R-squared	0.968	0.788	0.804	0.883	0.963	0.959	0.959
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Event-time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry cluster	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Panel E: Excluding consolidated statements, financials, utilities, and privatizations, London AIM firms, large groups, and including lagged firm-level controls

VARIABLES	(1) Log(assets)	(2) Log(contr. firms)	(3) Log(diver.)	(4) Log(cash)	(5) Log(PP&E)	(6) Log(debt)	(7) Log(equity)
BG x Post IPO	-0.264***	-0.245***	-0.218***	-0.401***	-0.137***	-0.064	-0.326***
	(0.087)	(0.045)	(0.042)	(0.098)	(0.045)	(0.065)	(0.073)
Observations	2,935	3,091	2,765	2,871	2,928	2,831	2,831
R-squared	0.967	0.782	0.764	0.884	0.963	0.958	0.958
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Event-time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry cluster	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table A.4: Firm characteristics by relative position terciles

This table displays variable means for group firms with relative position above 2/3 (col. 1), group firms with relative position between 1/3 and 2/3 (col. 2), group firms with relative position below 1/3 (col. 3) in the year before the IPO. Assets are the book assets in 2019 millions of euros. ROA is return over assets (EBITDA over book assets). Age is the difference between the sample year and the incorporation year. Tangibility is PP&E (property plant and equipment) over book assets. Leverage is total debt over book assets. Cash/Assets is the ratio of cash holdings to book assets. Industry q is the median value of a firm's industry Tobin's q (market to book ratio), using listed firms in the same two-digit SIC code in the same country and year. Cols. 4-6 display the difference-in-means from columns 1-3. Significant at: *10%, **5% and ***1%.

Variable		Rel. position				
	Top 1/3	Middle	Bottom 1/3	(2)-(1)	(3)-(1)	(3)-(2)
Assets (MM)	121.315	63.492	33.160	-57.822***	-88.154***	-30.332***
Age	15.998	16.801	15.050	0.803***	-0.949***	-1.752***
ROA	0.040	0.042	0.046	0.003	0.007**	0.004
Tangibility	0.402	0.324	0.247	-0.078***	-0.155***	-0.077***
Leverage	0.482	0.537	0.477	0.055***	-0.005	-0.060***
Cash/Assets	0.194	0.172	0.200	-0.022***	0.005	0.028***
Tobin's q	1.256	1.282	1.321	0.027***	0.066***	0.039***
Relative position	0.780	0.473	0.112	-0.306***	-0.668***	-0.361***

Table A.5: Replicating Table 10 for different samples

This table displays the estimation results of Table 10, but excluding firms with consolidated financial statements in panel A, additionally excluding financial firms (SIC2 60-69), utilities (SIC2 49), and privatizations in panel B, also excluding firms listed in the London AIM stock exchange in panel C, and additionally excluding group firms belonging to groups with more than 100 firms in panel E.

Panel A: Excluding consolidated statements

VARIABLES	(1) IPO	(2) IPO	(3) IPO	(4) IPO	(5) IPO	(6) IPO	(7) IPO	(8) IPO	(9) IPO
Relative position	0.111***	0.080***	0.074***	0.083***	0.084***	0.082***	0.094***	0.111***	0.082***
	(0.010)	(0.009)	(0.009)	(0.011)	(0.009)	(0.010)	(0.012)	(0.010)	(0.014)
Log(assets)		0.004***							0.004***
		(0.001)							(0.001)
Age			-0.000						0.000
			(0.000)						(0.000)
ROA				-0.003					-0.012
				(0.006)					(0.008)
Tangibility					0.008***				-0.002
					(0.002)				(0.004)
Leverage						-0.001			-0.011**
						(0.003)			(0.005)
Cash/Assets							-0.012***		0.001
							(0.003)		(0.005)
Tobin's q								0.000	-0.003
								(0.003)	(0.004)
Observations	32,589	24,735	19,974	16,293	24,055	20,741	16,985	32,589	8,972
R-squared	0.253	0.263	0.274	0.273	0.260	0.266	0.277	0.253	0.312
BG FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
BG cluster	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: Excluding consolidated statements, financials, utilities, and privatizations

VARIABLES	(1) IPO	(2) IPO	(3) IPO	(4) IPO	(5) IPO	(6) IPO	(7) IPO	(8) IPO	(9) IPO
Relative position	0.111***	0.081***	0.071***	0.084***	0.084***	0.082***	0.090***	0.111***	0.086***
	(0.011)	(0.011)	(0.011)	(0.014)	(0.011)	(0.012)	(0.013)	(0.011)	(0.018)
Log(assets)		0.005***							0.005***
		(0.001)							(0.001)
Age			0.000						0.000
			(0.000)						(0.000)
ROA				-0.001					-0.010
				(0.007)					(0.009)
Tangibility					0.012***				-0.004
					(0.004)				(0.006)
Leverage						-0.004			-0.018***
						(0.003)			(0.006)
Cash/Assets							-0.013***		-0.004
							(0.004)		(0.006)
Tobin's q								-0.000	-0.000
								(0.003)	(0.005)
Observations	22,005	16,576	13,337	11,148	16,028	13,670	11,938	22,005	6,458
R-squared	0.276	0.290	0.312	0.294	0.288	0.288	0.302	0.276	0.334
BG FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
BG cluster	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Panel C: Excluding consolidated statements, financials, utilities, privatizations, and London AIM firms

VARIABLES	(1) IPO	(2) IPO	(3) IPO	(4) IPO	(5) IPO	(6) IPO	(7) IPO	(8) IPO	(9) IPO
Relative position	0.103***	0.077***	0.070***	0.085***	0.082***	0.079***	0.090***	0.103***	0.087***
	(0.011)	(0.011)	(0.011)	(0.014)	(0.011)	(0.012)	(0.013)	(0.011)	(0.018)
Log(assets)		0.005***							0.005***
		(0.001)							(0.001)
Age			0.000						-0.000
			(0.000)						(0.000)
ROA				-0.001					-0.011
				(0.007)					(0.010)
Tangibility					0.011***				-0.005
					(0.004)				(0.006)
Leverage						-0.004			-0.018***
						(0.003)			(0.006)
Cash/Assets							-0.013***		-0.004
							(0.004)		(0.007)
Tobin's q								-0.001	0.000
								(0.003)	(0.005)
Observations	20,941	15,765	12,644	10,769	15,257	13,072	11,528	20,941	6,263
R-squared	0.270	0.283	0.309	0.294	0.282	0.283	0.300	0.270	0.334
BG FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
BG cluster	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Panel D: Excluding consolidated statements, financials, utilities, privatizations, London AIM firms, and large group firms

VARIABLES	(1) IPO	(2) IPO	(3) IPO	(4) IPO	(5) IPO	(6) IPO	(7) IPO	(8) IPO	(9) IPO
Relative position	0.203***	0.158***	0.155***	0.184***	0.171***	0.170***	0.183***	0.203***	0.194***
	(0.018)	(0.019)	(0.021)	(0.025)	(0.020)	(0.021)	(0.023)	(0.018)	(0.033)
Log(assets)		0.012***							0.009***
		(0.002)							(0.003)
Age			0.000						0.000
			(0.000)						(0.000)
ROA				-0.001					-0.021
				(0.018)					(0.025)
Tangibility					0.024**				-0.017
					(0.010)				(0.017)
Leverage						-0.006			-0.027*
						(0.009)			(0.015)
Cash/Assets							-0.025**		0.007
							(0.012)		(0.021)
Tobin's q								-0.003	-0.004
								(0.008)	(0.011)
Observations	8,576	6,276	4,900	4,209	6,087	5,204	4,625	8,576	2,481
R-squared	0.305	0.324	0.351	0.344	0.319	0.317	0.342	0.305	0.403
BG FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
BG cluster	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes