Public vs. Private Firms:
Easy Money Flows to Easy Investments

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Abstract

This study explores the forces that distinguish public firms from private firms in Korea. Consistent with previous U.S. studies, public firms have relatively large cash holdings compared to private firms in Korea. However, the more significant difference lies in the composition of long-term (fixed) assets. Compared to private firms matched on size and industry, public firms invest considerably in intangible fixed assets (denoted by non-PP&E) but sparingly in tangible fixed assets (denoted by PP&E). Public firms allocate a substantial proportion of equity issue proceeds to investments in non-PP&E—particularly, the equity holdings of related firms—but only a paltry proportion to investments in PP&E. This tendency is more prominent for public firms that belong to Chaebol groups. However, public firms do not allocate cash flows or debt issue proceeds significantly more in favor of non-PP&E relative to PP&E. Overall, our findings suggest that in the absence of a proper governance mechanism, the advantage of issuing equity with relative ease could induce public firms to seek growth with the type of investments that are easy to implement and manage—rather than with capital expenditures that require such complications as managing factories and dealing with labor unions.

JEL classification: D22, D92, G31, G32, G34
Key words: private firms, public firms, access to public equity markets, investments, intangible assets, cash reserves, capital structure

1. Introduction

How do public and private firms differ in their investment and financial policies? There is a growing literature on this topic. Recently, Asker, Farre-Mensa and Ljungqvist (2015) document that public firms invest less than private firms do, while Gao, Harford and Li (2013) show that public firms hold more cash reserves than private firms do and Michaely and Roberts (2012) demonstrate that public firms smooth dividends to a greater extent than private firms do.

In this study, we explore the forces that separate public firms from private firms in an emerging stock market, specifically, Korea. This study departs from previous research in two ways. First, we focus on public firms' advantage over private firms in terms of their ability to raise equity frequently and in large amounts. Specifically, we seek to determine whether and how this advantage shapes public firms' asset structures or investments differentially than those of private firms. Previous studies do not specifically consider the link between equity financing and corporate investment and financial policies. Second, unlike previous studies that look at public and private firms in the U.S. or the U.K., we investigate firms that operate in an institutional environment that differs markedly from that of the U.S. and the U.K. in terms of, for example, investor protection. Examining Korean firms also provides a benefit in terms of data availability, as the Korean governance has since 1981 required that privately held firms be audited by an outside accounting firm at least annually if a firm meets certain conditions (e.g., book assets exceed 10 billion Korean won). This regulation makes available large numbers of private firms' financial statements for use in our investigation.

Our investigation begins with construction of common-size financial statements for private and public firms that are matched on firm size and industry. Consistent with the U.S. findings of Gao, Harford and Li (2013), public firms hold relatively large cash holdings compared to private firms in our sample of Korean firms. However, the most significant difference on the asset side of the balance sheet lies in the mix of tangible fixed assets (e.g., plants and machines) and intangible fixed assets (e.g., investments in other firms, patents and brands). Compared to private firms, public firms hold more intangible fixed assets (denoted by non-PP&E) but hold fewer tangible fixed assets (denoted by PP&E). For example, the mean value of the ratio of non-PP&E to total assets for public firms is 22.8%, compared to 16.7% for private firms. On the liabilities and equity side, there is a wide gap in the use of external equity (i.e., the sum of common stock and capital surplus) between public and private firms. The mean value of the ratio of external equity to total assets for public firms is 52.9%, while it is 20.2% for private firms.

We compare the firm characteristics associated with the decision to issue equity for public and private firms. Not surprisingly, our logit regression results show that public firms are more likely to

issue equity than private firms are. More importantly, public firms' equity issuance is associated with low profitability, whereas that of private firms is associated with high profitability. Further, public firms' equity issuance is positively (negatively) associated with the amount of non-PP&E (PP&E) on the balance sheet, while this pattern does not hold among private firms. These findings indicate a link between investments in non-PP&E and public firms' listing status of public firms (or the ease with which they raise equity capital).

We then determine how public and private firms allocate equity issue proceeds to various uses—including adding to cash reserves, repaying debt, investing in fixed assets and investing in working capital—by estimating a system of regression equations under a set of cross-equation restrictions. Our results show that our sample Korean firms add significantly to cash reserves out of equity issue proceeds, which is consistent with what McLean (2011) reports for U.S. firms. However, the difference in this behavior between public and private firms is relatively small. Instead, the most remarkable difference in the allocation of equity issue proceeds lies in relative investments in PP&E and non-PP&E. Public firms invest considerably in non-PP&E but only sparingly in PP&E out of equity issue proceeds, as the percentage of equity issue proceeds allocated to investments in non-PP&E and PP&E are 39.48% and 1.65%, respectively, for public firms. In contrast, private firms invest in non-PP&E and PP&E more evenly out of equity issue proceeds, as the percentage of equity issue proceeds allocated to investments in non-PP&E and PP&E are 21.06% and 31.15%, respectively, for private firms.

Our detailed analysis of the composition of non-PP&E reveals that the equity holdings of related firms is by far the largest component of non-PP&E and this is particularly true for public firms. For public firms as a whole, the equity holdings of related firms account for 21.6% of noncurrent assets and 49.9% of non-PP&E. Further, despite the fact that the equity holdings of related firms make up a smaller portion of noncurrent assets than PP&E—which makes up more than half of noncurrent assets—the equity holdings of related firms account for as much as 68.5% of the change in noncurrent assets for public firms as a whole. Therefore, the equity holdings of related firms appear to be the dominant item that drives the growth of noncurrent assets (as well as non-PP&E) for public firms over time.

In additional analyses, we investigate whether the lopsided allocation of equity issue proceeds by public firms in favor of increasing non-PP&E (vs. PP&E) is unique for these proceeds. We find that, unlike equity issue proceeds, other forms of capital, such as cash flows and debt issue proceeds, do not significantly increase non-PP&E relative to PP&E for public firms. For example, public firms in the top quartile in terms of the amount of debt issue proceeds increase their PP&E and non-PP&E by

24.2% and 26.4%, respectively, on average, over three years relative to the level of assets at the beginning of the period. By contrast, public firms in the top quartile in terms of the amount of equity issue proceeds increase non-PP&E considerably by 63.1% but increase PP&E only by 11.7% over the same three-year window. Moreover, these firms in the top equity-issue-proceeds quartile increase the equity holdings of related firms—the largest component of non-PP&E—considerably by 33.9% over the three-year window. Therefore, equity issue proceeds are unique in that public firms tilt the allocation of those proceeds predominantly in favor of non-PP&E (as well as the equity holdings of related firms) relative to PP&E.

We also inquire into whether our key findings are linked to poor corporate governance. Under the assumption that Chaebol-affiliated firms are poorly governed compared to non-Chaebol-affiliated firms, we hypothesize that Chaebol-affiliated firms invest more heavily in non-PP&E—as well as the equity holdings of related firms—out of equity issue proceeds than non-Chaebol-affiliated firms do. The premise of this hypothesis is that investments in non-PP&E reflect agency conflicts, as non-PP&E investments are easier to manage than are those in in PP&E (which require such complexities such as managing factories and dealing with labor unions). By applying the Heckman two-step approach to control for a self-selection bias associated with equity issuance, we find that Chaebol firms do increase non-PP&E (and the equity holdings of related firms) significantly more than non-Chaebol firms do when they raise equity capital.

Finally, we estimate investment regressions to determine whether public firms invest more or less than private firms do, depending on the kind of investments. Our results suggest that public firms invest more in intangible assets (that is, non-PP&E) but invest less in tangible assets (that is, PP&E) than private firms do. However, there is little difference in the amount of investments in noncurrent assets (that is, the sum of PP&E and non-PP&E) between public and private firms. Further, public-firm investments tend to be more responsive to changes in investment opportunities—for which we use sales growth as a proxy—than private-firm investments, regardless of whether we measure investments as changes in PP&E, non-PP&E, or noncurrent assets. These observations from our Korean sample are at odds with Asker et al.'s (2015) findings that public firms generally invest less than private firms do and that public-firm investments are less responsive to changes in investment opportunities than are private-firm investments in the U.S.

The present study helps to clarify the financial and investment behavior of public firms vs. private firms by analyzing an emerging stock market in which corporate governance mechanism is relatively weak. Unlike previous research on U.S. firms (e.g., Gao et al., 2013; Asker et al., 2015), we focus on public firms' advantage in terms of their ability to raise equity with relative ease in order to

identify the forces that distinguish public firms from private firms. We find that, compared to private firms, public firms use substantial amounts of external equity (i.e., the sum of common stock and capital surplus) in their capital structures and hold considerably high levels of non-PP&E in their asset structures. We demonstrate that there is a connection between these two key observations from public firms' capital and asset structures. That is, public firms issue equity more frequently and in greater amounts than private firms do. Unlike cash flows or debt issue proceeds, public firms' equity issue proceeds flow predominantly to investments in non-PP&E—particularly, the equity holdings of related firms—relative to investments in PP&E.

Based on our results, we assess two hypotheses that pertain to differences in financial and investment policies between public and private firms: (i) the lower-cost of capital hypothesis and (ii) the agency conflict hypothesis.[1] First, the lower cost-of-capital (or financial constraints) hypothesis postulates that public firms invest more than private firms do, as public firms can raise equity capital at a lower cost (or because private firms are financially constrained). The support for this hypothesis is rather weak because public firms invest less in PP&E than private firms do, whereas the opposite is true in the case of non-PP&E. Still, the observation that public-firm investments are more responsive to investments to changes in investment opportunities than private-firm investments are, irrespective of the form of investments, supports this hypothesis.

Second, our findings lend support to a version of the agency conflict hypothesis, which posit that in the absence of a proper monitoring mechanism—as is common in emerging stock markets—firms seek growth through investments that are relatively easy to perform and manage instead of through capital expenditures. According to our findings, public firms allocate a lopsided proportion of equity issue proceeds to non-PP&E and the equity holdings of related firms and this tendency is more prominent among Chaebol firms (i.e., firms that are assumed to be governed poorly). Therefore, in the absence of effective governance mechanisms, public firms capitalize on their ability to raise equity capital with ease to invest in assets that are easy to acquire and manage, rather than those that require such complications as managing factories and dealing with labor unions. On the other hand, our findings do not support another version of the agency conflict hypothesis, which Asker et al. (2015) propose, that posits that public-firm managers choose to underinvest as a result of short-termist pressures, given that public firms in Korea outinvest private firms at least in the category of non-

[1] We also consider the firm maturity hypothesis, which posits that, as firms age, they run out of growth opportunities in the form of investments in tangible fixed assets so they seek an alternative growth path by investing in intangible fixed assets. However, we find (in untabulated results) that firm age, measured by the number of years since the firm's foundation, is not significantly related to the proportion of investments in non-PP&E vs. PP&E for either private or public firms. Therefore, the firm maturity hypothesis does not provide a viable reason for why public firms invest significantly more in non-PP&E than they do in PP&E.

PP&E.

The rest of the paper is organized as follows. Section 2 describes data and sample construction; Section 3 conducts empirical analyses and discusses results; Section 4 concludes the paper.

2. Data and sample construction

Our dataset consists of private and public firms in Korea over the period 2000-2013. The main source of our data is the *FnGuide* database that provides financial statement information for both private and public firms as well as stock prices for public firms. In order to maintain continuity throughout the sample period, our firm characteristic variables are constructed from separate financial statements—instead of from consolidated financial statements that Korean firms began to prepare in 2009. To construct our dataset, we begin with all firms (both active and inactive) that are covered by the database over the period 1999-2013. We drop firm-years if book assets or sales are missing. We also drop firm-years if book equity or revenue is zero or negative. Further, we remove firms if the corporation registration number or industry classification code (KSIC2) is missing. We also exclude firm-years in which the firm performs IPOs. We also drop firm-years for which there are duplicate corporate registration numbers or there are more than one stock symbols. Finally, we discard firm-years in which (one-year) sales growth and operating profitability (defined as operating income scaled by book assets) cannot be obtained. These screens leave us with 241,818 firm-years over the period 2000-2013. This screening procedure is described in Appendix Table A.1.

We then construct a matching sample of private and public firms. To do so, we select private and public firms that are similar along two dimensions: firm size and industry. Prior studies base their sample construction on these two dimensions (e.g., Gao, Harford and Li, 2013; Asker et al., 2015) as well. To elaborate, for each private firm (more precisely, private firm-year) that survives the above screening, we seek to identify a public firm (more precisely, a public firm-year) that is closest in book assets (TA) in the same industry at the 5-digit Korean SIC level. We require the ratio of the book assets of the private firm and the matching public firm to be less than 1.5 (i.e., $\max(TA_{public}, TA_{private})/\min(TA_{public}, TA_{private}) < 1.5$). If the pubic firm that meets these requirements is not found, we drop the private firm. We implement this matching procedure for each year over our sample period. In the end, we arrive at the matching sample (a total of 25,094 firm-years and 6,356 unique firms) consisting of equal numbers of private firm-years and public firm-years (12,547 each).[2]

[2] In comparison, Asker et al. (2015) impose a less lenient matching rule on firm size, requiring the ratio of the book assets of the private firm and the matching public firm to be less than 2 (i.e., $\max(TA_{public}, TA_{private})/\min(TA_{public}, TA_{private}) < 2$), instead of less than 1.5 in our procedure. However, when we apply this relatively lenient rule on our dataset, the Kolmogorov-Smirnov test fails to reject sameness of the distributions of private firms and public firms in firm size. This leads us to impose a relatively strict matching rule.

We use a number of variables that are created using financial statement information for private and public firms in our matching sample. The definitions of the variables used in our investigation are provided in Appendix Table A.2. To deal with extreme values, we winsorize all variables at the 1st and 99th percentiles.

3. Empirical results

3.1. Common-size financial statements for public and private firms

We begin our investigation by constructing common-size financial statements—balance sheet, income statement, and cash flow statement—for our sample consisting of equal numbers of public and private firms that are matched on size and industry.

Table 1 provides these three statements in Panels A, B and C, respectively. We present these statements for all firms, private firms and pubic firms in Columns (1), (2) and (3), respectively, in each Panel. We also divide public firms into two groups: those traded at the KOSPI market and those at the KOSDAQ markets of Korea Exchange (KRX) in Columns (4) and (5), respectively.[3] To construct the common-size balance sheets in Panel A, we scale balance sheet items by total assets for each firm-year so these items are transformed into ratios. We then calculate the mean and median values of the ratios. In Panels B and C, we scale income statement and cash flow statement items by net sales for each firm-year before calculating the mean and median values of these items.

Common-size balance sheet

In the first part of Panel A of Table 1, we examine key asset items (scaled by total assets). First, we find that private firms tend to hold relatively small cash reserves compared to public firms, as the mean and median values of cash holdings are lower for private firms (14.2% and 8.5%, respectively) than they are for public firms (16.5% and 12.2%, respectively). Gao et al. (2013) report a similar observation in which private firms hold more cash reserves than public firms do in the U.S.[4] However, this observation is at odds with what is predicted from the precautionary motive for holding cash because this motive is supposedly high for private firms due to their restricted access to external financing.

Second, compared to private firms, public firms hold fewer tangible fixed assets (denoted by PP&E) but more intangible fixed assets (denoted by non-PP&E). The mean and median values of

[3] The KOSDAQ market was established more recently in 1996, and firms in that market are relatively younger and smaller, compared to firms in the KOSPI market.

[4] We note that the magnitude in the difference between cash reserves of public and private firm is relatively small in our Korean sample, compared to what Gao et al. (2013) report from their U.S. sample.

PP&E held by public firms are 27.5% and 25.4%, respectively, which are lower than the corresponding values for private firms (31.1% and 28.1%, respectively). In contrast, the mean and median values of non-PP&E for public firms (22.8% and 17.8%, respectively) are greater than the mean and median values of non-PP&E for private firms (16.7% and 10.1%, respectively). These findings could indicate that public firms rely more on intangible fixed assets (e.g., investments in other firms, patents and brands) and less on tangible fixed assets (e.g., plants and machines) for growth and survival than public firms do. We note that, in terms of mean and median values, the magnitude of the difference in non-PP&E between public and private firms is greater than the magnitude of the difference in cash holdings (as well as PP&E) between the two groups. Therefore, what separate public firms most from private firms on the assets side the balance sheet appears to be their relatively large holdings of non-PP&E.

Turning to the liabilities-and-equity side of the common-size balance sheet, there is evidence that private firms use more debt than public firms do, as the mean and median book debt ratios—defined as total debt divided by total assets—of private firms are higher (25.4% and 23.2%, respectively) than those of public firms (22.3% and 19.7%, respectively). There is also evidence that private firms use supplier credit more than public firms, as the mean and median values of account payables (21.3% and 17.3%, respectively) of private firms are higher than those of public firms (15.0% and 12.5%, respectively). This heavy use of supplier credit by private firms could be an indication that their restricted access to external financing impels them to diversify financing sources.

In our view, however, the most glaring difference on the liabilities and equity side lies in external equity (defined as the sum of common stock and capital surplus). There is a wide gap in the amount of external equity between public and private firms. Both mean and median values of external equity for public firms (52.9% and 36.2%, respectively) are considerably higher than the corresponding values for private firms (20.2% and 13.0%, respectively). While this may not be surprising given the ability of public firms to issue public equity, the magnitude of the gap is remarkably large. A related finding is that the mean and median values of retaining earnings are lower for public firms (6.8% and 18.6%, respectively) than they are for private firms (25.5% and 23.0%, respectively).

Common-size income statement

In analyzing common-size income statement, the key question is whether profitability differs substantially between private and public firms. Panel B shows that our sample private firms tend to be more profitable than their public firm counterparts in both operating and net income. The mean values of both operating and net margins for private firms are higher (5.2% and 4.2%, respectively) than the

corresponding mean values for public firms (-3.8% and -17.8%). These gaps in margins are narrow in median values, partly because the median values of operating and net margins of public firms are positive (3.4% and 2.4%, respectively). This indicates that our sample of public firms includes a large number of negative profitability firms, although the median firm in this sample makes a profit. It appears that the profitability differential between private and public firms does not arise from interest expense, as the mean and median values of interest expense are about the same for private and public firms. Instead, a chunk of the profitability differential can be traced to relatively high SG&A expenses of public firms (24.3% in mean), compared to private firms (19.0% in mean).

Common-size cash flow statement

In Panel C, we analyze key cash flow statement items (scaled by net sales) for our sample firms. Consistently with the profitability differential that favors private firms in Panel B, the mean and median values of cash flow from operating activities (CFO) are higher for private firms (5.4% and 5.9%, respectively) than they are for public firms (-1.6% and 4.0%, respectively). On the other hand, the mean and median values of cash flow from investing activities (CFI) are more negative for public firms (-16.8% and -5.6%, respectively) than they are for private firm (-8.7% and -4.7%, respectively). This suggests that public firms tend to spend more cash in capital expenditures and acquisitions than private firms do. Turning our attention to cash flow from financing activities (CFF), we find that, not surprisingly, the average public firm raises more capital from equity issuance than the average private firm, as the mean value of financing by equity issuance for public firms is 11.0%, which is considerably higher than the corresponding mean for private firms (only 0.9%). On the other hand, the median value of financing by equity issuance is zero for both public and private firms, suggesting that the majority of our sample firms do not issue equity every year.

3.2. Firm characteristics that predict equity issuance for public and private firms

Common-size financial statements above show that public firms indeed raise more external equity than private firms do, which is not surprising given the listing status of public firms. Still, private firms also issue equity from time to time, although the frequency and amount are not comparable to those of public firms. To gain insights into the differences between private and public firms, we now analyze whether firm characteristics associated with equity issue decisions are different between private and public firms.

Table 2 reports results of logit regressions in which the dependent variable is the log odds of issuing equity. We include a standard set of firm characteristics including profitability, leverage,

growth and firm size as explanatory variables along with year-fixed effects to control for potential market timing. We also include the amount of tangible and intangible fixed assets (PP&E and non-PP&E, respectively) as additional explanatory variables in light of the importance of distinguishing between these asset types from common-size financial statements.[5] In Column (1), where we include all sample firms consisting of private and public firms matched on size and industry, the public firm dummy—an indicator variable that equals 1 for public firms and 0 for private firms—has a significant positive coefficient (1.0808). This is not surprising because it suggests that public firms are more likely to issue equity than private firms are.

In Columns (2) and (3), we estimate logit regressions separately for private and public firms. First, the coefficient on profitability (ROA) in these regressions provides an interesting contrast. This coefficient is significantly positive (0.5453) in Column (2) for private firms, whereas it is significantly negative (-3.5406) in Column (3) for public firms. Therefore, profitability is positively associated with equity issuance among private firms, whereas the opposite is true among public firms. On the other hand, several other firm characteristics, such as leverage (LT Debt), cash holdings, sales growth and firm size, have the same signs on their respective coefficients for private and public firms. These findings suggest that equity issuance is more likely to be performed if the firm has high leverage, low cash holdings and high sales growth, and is small, irrespective of whether the firm is private or public.

The last two firm characteristics, PP&E and non-PP&E (both scaled by total assets) in the regressions provide important insights into the determinants of equity issuance of public firms vs. private firms. In Column (2), the coefficients on both PP&E and non-PP&E are not significant for private firms. In contrast, in Column (3), these coefficients are both significant with opposite signs for public firms, as the coefficient on PP&E is negative (-0.9009) and the coefficient on non-PP&E is positive (0.5807). Hence, our findings suggest that, among public firms, the likelihood of issuing equity is negatively associated with the amount of PP&E but negatively associated with the amount of non-PP&E.

In sum, in contrast to private firms, public firms' equity issuance is negatively associated with profitability. This negative association for public firms is consistent with the finding of previous U.S. studies (e.g., Hovakimian, Hovakimian and Titman, 2004) and also consistent with the pecking order hypothesis that firms issue equity as a last resort due to adverse selection costs. Intriguingly, among public firms, equity issuance is more (less) likely to be performed by firms with large amounts of non-PP&E (PP&E). Coupled with the observations from common-size balance sheet above, this observation points to a link between investments in non-PP&E and the listing status of public firms.

[5] Previous research includes the PP&E-to-assets ratio—a proxy for asset tangibility—as an explanatory variable in the regression of security issuance (e.g. Hovakimian, Hovakimian and Titman, 2004).

3.3. Uses of equity issue proceeds

We now analyze how public and private firms allocate equity issue proceeds to various uses including adding to cash reserves, repaying debt, investing in fixed assets and investing in working capital. Our results above suggest that it is important to distinguish between PP&E and non-PP&E. For example, compared to private firms, public firms hold greater (lower) amounts of non-PP&E (PP&E) and their equity issuance is positively (negatively) associated with non-PP&E (PP&E). Along these lines, our focus of this analysis is placed on whether public firms use equity issue proceeds relatively more to invest in non-PP&E than to invest in PP&E, as compared to private firms.

In our investigation, we construct a system of six equations in which the dependent variables represent uses of the proceeds and the key explanatory variable is equity issue proceeds (*EQUISS*). The dependent variables include: (i) adding to cash reserves (*ΔCash*); (ii) repaying short-term debt (*ΔSTDebt*); (iii) repaying long-term debt (*ΔLTDebt*); (iv) investment in PP&E (*ΔPP&E*); (v) investment in non-PP&E (*Δnon-PP&E*) and (vi) investment in net working capital (*ΔNWC*). In each equation, we control for the change in retained earnings (*ΔRE*)—which is associated with profitability—along with other firm characteristics including firm size (*log(Assets*)), sales growth (*SGR*) and leverage (*LTDebt/Assets*).

$$\Delta CASH = \beta_{11} EQUISS + \beta_{21} \Delta RE + \gamma_1 \text{controls} + \varepsilon_1 \quad (1)$$

$$\Delta STDebt = \beta_{12} EQUISS + \beta_{22} \Delta RE + \gamma_2 \text{controls} + \varepsilon_3 \quad (2)$$

$$\Delta LT\ debt = \beta_{13} EQUISS + \beta_{23} \Delta RE + \gamma_3 \text{controls} + \varepsilon_3 \quad (3)$$

$$\Delta PP\&E = \beta_{14} EQUISS + \beta_{24} \Delta RE + \gamma_4 \text{controls} + \varepsilon_4 \quad (4)$$

$$\Delta non\text{-}PP\&E = \beta_{15} EQUISS + \beta_{25} \Delta RE + \gamma_5 \text{controls} + \varepsilon_5 \quad (5)$$

$$\Delta NWC = \beta_{16} EQUISS + \beta_{26} \Delta RE + \gamma_6 \text{controls} + \varepsilon_6 \quad (6)$$

We scale the five dependent variables as well as the two main explanatory variables, *EQUISS* and *ΔRE*, by lagged total assets. In estimating the above equation system, we impose cross-equation restrictions that the uses of funds sum to the amount of equity issue proceeds.[6] Due to these restrictions, the estimated coefficient on *EQUISS* in a given equation can be interpreted as a percentage of equity issue proceeds that are allocated to a particular use (i.e., the dependent variable).

[6] These restrictions are as follows.

$$\beta_{11} - \beta_{12} - \beta_{13} + \beta_{14} + \beta_{15} + \beta_{16} = 1 \quad (R1)$$

$$\beta_{11} - \beta_{12} - \beta_{13} + \beta_{14} + \beta_{15} + \beta_{16} = 1 \quad (R2)$$

$$\gamma_1 - \gamma_2 - \gamma_3 + \gamma_4 + \gamma_5 + \gamma_6 = 0 \quad (R3)$$

For example, if the estimated coefficient of β_{11} is 0.2030, that would mean that 20.30 percent of a dollar of equity issue proceeds add to cash reserves.[7]

In Panel A, we estimate the equation system for the full sample consisting of private and public firms that are matched on size and industry. The estimated coefficients on the equity issue proceeds (*EQUISS*) suggest that the primary use of equity issue proceeds is investments in non-PP&Es (38.88%), followed by adding to cash reserves (32.34%). Surprisingly, only a tiny proportion of equity issue proceeds appear to be allocated to investments in PP&E (2.02%) by our sample firms. However, as Panels B and C show, private and public firms are markedly different in their allocation of equity issue proceeds to investments in PP&E and non-PP&E. In Panel B in which we estimate the equation system separately for private firms, private firms use 31.15% and 21.06% of equity issue proceeds to investments in PP&E and non-PP&E, respectively. In contrast, in Panel C in which we estimate the equation system separately for public firms, public firms use as much as 39.48% of the proceeds for investments in non-PP&E, whereas they use only 1.65% of equity issue proceeds for investments in PP&E. Therefore, public firms spend a disproportionately large percentage of equity issue proceeds on non-PP&E relative to PP&E. Their investments in PP&E out of equity issue proceeds are close to zero. However, private firms allocate a high percentage of equity issue proceeds to investments in PP&E relative to non-PP&E.

Another notable difference between private and public firms is in financing net working capital. According to our estimates, private firms spend as much as 23.86% of equity issue proceeds in financing net working capital (*ΔNWC*), compared to public firms that allocate a relatively small proportion (14.30%) to this use. On the other hand, the difference in the percentage of equity issue proceeds that private and public firms use to add to cash holdings is relatively small, as these percentages are 30.25% and 33.50% for private and public firms, respectively.

To summarize, the most remarkable difference in the allocation of equity issue proceeds between public and private firms lies in relative investments in PP&E and non-PP&E. Public firms invest mainly in non-PP&E (39.48%) out of equity issue proceeds, whereas they allocate a paltry amount to PP&E (1.65%). In contrast, private firms invest more in PP&E (31.15%) out of equity issue proceeds than in non-PP&E (21.06%).

3.4. Key components of intangible fixed assets

In the next analysis, we look into details of intangible fixed assets for our sample firms in order

[7] In unreported results, we control for firm-specific effects by de-meaning every variable (i.e., by taking the deviation from a given firm's mean) before estimating the system of equation. The results remain qualitatively similar to those reported in this table.

to determine which component of intangible fixed assets is most important in separating public firms from private firms.

Panel A of Table 4 reveals that the equity holdings of related firms are the largest item in non-PP&E, as its weight in noncurrent assets is 18.4% for all sample firms. More importantly, the weight of this component in noncurrent assets is greater for public firms (21.6%) than for private firms (12.8%). The weight of this item in intangible fixed assets is also greater for public firms (49.9%) than it is for private firms (44.0%). In Panel B, we break down the change in noncurrent assets—as well as the change in non-PP&E—into changes in their components. The purpose here is to determine which component is the primary contributor to the growth of noncurrent assets. We learn that the change in noncurrent assets comes mostly from the change in non-PP&E (vs. the change in PP&E) and that this pattern is more prominent for public firms. For public firms, the change in non-PP&E accounts for as much as 79.7% of the change in noncurrent assets, whereas the change in PP&E explains only 20.3% of that change. Further, the equity holdings of related firms—the largest component of non-PP&E—are responsible for a significant portion of the change in noncurrent assets (68.5%) for public firms. For private firms, however, this component is responsible for only approximately 30% of the change in noncurrent assets. In Panel C, we find that the contribution of the equity holdings of related firms to changes in noncurrent assets is even greater for public firms when we restrict our attention to equity issuing firm-years. This component accounts for as much as 81.9% of the change in noncurrent assets of public firms; in comparison, it is responsible for only 18.9% of the change in noncurrent assets of private firms.

In a nutshell, the equity holdings of related firms are by far the largest item of non-PP&E and this is especially so for public firms. Despite the fact that this item is a relative small component of noncurrent assets—because PP&E makes up more than half of noncurrent assets—this item is responsible for the overwhelming majority of the change in noncurrent assets for public firms, particularly, when public firms issue equity.

3.5. Additional Analyses

3.5.1. Contribution of different funding sources to non-PP&E and equity holdings

One of our key findings above is that public firms allocate a considerably high proportion of equity issue proceeds to investing in non-PP&E, while their allocation of those proceeds to investing in PP&E is close to zero. In this additional analysis, we determine whether the lopsided allocation of funds in favor of non-PP&E is unique to equity issuance or common for other forms of capital such as cash flows and debt issue proceeds.

In Table 5, we sort public firm-years into subgroups based on the amount of funds raised through three forms of capital—cash flows, debt issuance and equity issuance—in Panels A, B and C, respectively. We measure the amount of funds from a given form of capital over a three-year period from year 1 through year 3 (scaled by total assets). For example, we sum cash flows (or debt issue proceeds or equity issue proceeds) from year 1, year 2 and year 3 and then scale this sum by total assets in year 0. For a given form of capital, we create five subgroups in a two-step procedure. First, we partition entire public firm-years into two samples depending on whether financing from that form of capital is non-positive or positive. Second, we further partition firm-years with positive financing into quartiles on the basis of the amount of financing from that form of capital. Lastly, for each of the five subgroups, we calculate the mean and median values of the increases in PP&E, non-PP&E and equity holdings over three year periods (denoted by ΔPP&E3y, Δnon-PP&E3y and ΔEqtHold3y, respectively). These increases are scaled by total assets in year 0 before the means and medians are calculated.

We learn from the table that cash flows and debt issue proceeds tend to increase non-PP&E more than they do PP&E, but not in a lopsided fashion as in the case of equity issue proceeds. For example, in Panel A, firms in the top cash-flows quartile experience increases in PP&E and non-PP&E (over three years relative to beginning-of-the-period total assets) by 9.8% and 15.2%, respectively, in terms of mean values. In Panel B, firms in the top debt-issue-proceeds quartile go through increases in PP&E and non-PP&E by 24.2% and 26.4%, respectively. In contrast, in Panel C, for firms in the top equity-issue-proceeds quartile, the increase in non-PP&E is considerably greater (63.1%) than the increase in PP&E (11.7%). Also, for this subgroup, the increase in the equity holdings of related firms (33.9%) is also considerably greater than that in PP&E (11.7%). Therefore, equity issue proceeds appear to be unique in that public firms tilt the allocation of those proceeds predominantly in favor of non-PP&E (also the equity holdings of related firms) relative to PP&E.

3.5.2. Do Chaebol-firms invest greatly in non-PP&E and equity holdings from equity issuance?

In the next additional analysis, we ask whether the disproportionately large investments of public firms in non-PP&E—as well as the equity holdings of related firms—are linked to poor corporate governance. We assume that Chaebol-affiliated firms are not subject to proper governance mechanism, compared to non-Chaebol-affiliated firms. We then hypothesize that Chaebol-affiliated firms are more likely to invest heavily in non-PP&E—as well as the equity holdings of related firms—out of equity issue proceeds than non-Chaebol-affiliated firms. The basis of this hypothesis is the notion that investments in non-PP&E reflect agency conflicts, as non-PP&E could be relatively easy to manage

without hassles associated with investments in PP&E (such as managing factories and dealing with labor union).

To test this hypothesis, we employ the Heckman two-step approach in order to control for endogeneity associated with a self-selection bias. We restrict our attention to public firms in our sample in this analysis. In the first step, we estimate the probit regression of the decision to issue equity and then extract the inverse Mills ratio. In the second step, we estimate the regression of the increase in non-PP&E (or the increase in the equity holdings of related firms) on the Chaebol-firm dummy along with other explanatory variables, particularly, the inverse Mills ratio. The Chaebol-firm dummy is equal to one for Chaebol-affiliated firms and zero otherwise. In an alternative specification for the second-stage regression, we consider the interaction of the Chaebol-firm dummy and equity issue proceeds as a key explanatory variable. These second-stage regressions include only those firm-years in which firms issue equity.

Table 6 reports the results of the second-stage regressions. In Columns (1) and (2), the results suggest that Chaebol firms increase non-PP&E and equity holdings more than non-Chaebol firms do when they raise equity capital, as the coefficients on the Chaebol-firm dummy are positive and significant in both Columns. Further, in Columns (3) and (4), Chaebol firms appear to allocate a higher proportion of equity issue proceeds to increasing non-PP&E and equity holdings than non-Chaebol firms do. This inference is obtained because the interaction of the Chaebol-firm dummy and equity issue proceeds has a significantly positive coefficient, while equity issue proceeds have also a significantly positively coefficient in both Columns (3) and (4). In a nutshell, these observations are suggestive of the link between our key findings and corporate governance (or lack thereof). That is, when effective monitoring mechanism is not in place as in the case of Chaebol firms, firms tend to invest in the type of assets that are relatively easy to manage, specifically, non-PP&E and equity holdings of related firms, out of equity issue proceeds.

3.5.3. Do public firms invest more or less than private firms do?

The next question that we analyze is whether public firms invest more or less than private firms do. We also analyze whether public-firm investments are more or less sensitive to changes in investment opportunities than are private-firm investments. One can argue that the ease of raising equity capital allows public firms to invest substantially and to be highly responsive to changes in investment opportunities. However, a U.S. study of Asker et al. (2015) finds that compared to private firms, public firms invest less and are less responsive to changes in investment opportunities—observations that suggest that public-firm investments are influenced by short-termist pressures.

In Table 7, we replicate the regressions that are performed in Asker et al. (2015) using our sample of Korean firms. The key difference here, however, is that we break down investments into *ΔPP&E* and *Δnon-PP&E* in our estimation of investment regressions. In comparison, Asker et al. (2015) examine capital expenditures (i.e., *ΔPP&E*) or the sum of *ΔPP&E* and *Δnon-PP&E* (i.e., *Δnon-CA*), but do not consider *Δnon-PP&E* as a separate investment measure.

Panel A considers three measures of investments as the dependent variables: *Δnon-CA*, *ΔPP&E* and *Δnon-PP&E*, in Columns (1)-(3), respectively. In Column (1), the results show that public firms do not invest more than private firms do when the investment measure is *Δnon-CA*, as the coefficient on the public-firm dummy is not significant, albeit positive. Interestingly, however, public firms invest less than private firms do in the investment in PP&E, whereas the opposite is true in the investment in non-PP&E. In Column (2), the coefficient on the public-firm dummy is negative and significant (-0.0085), suggesting that public-firm investments in PP&E are lower than those of private firms. In contrast, in Column (3), the coefficient on the public firm dummy is positive and significant (0.0131), suggesting that public-firm investments in non-PP&E are greater than those of private firms.

In Panel B, we compare the responsiveness of public-firm and private-firm investments to changes in investment opportunities. Again, the dependent variables are the three investment measures—*Δnon-CA*, *ΔPP&E* and *Δnon-PP&E*—as in Panel A. We use two proxies for investment opportunities: sales growth and the synthetic Tobin's Q.[8] The key explanatory variable is the interaction of the public-firm dummy and investment opportunities. A significantly positive (negative) coefficient on this interaction would be an indication that public-firm investments are more (less) responsive to changes in investment opportunities than private-firm investments. The results in this panel suggest that the responsiveness tends to be greater for public firms than for private firms, although there is an exception. When we use sales growth as a proxy for investment opportunities in Columns (1), (2) and (3), the interaction of the public-firm dummy and sales growth has a significant positive coefficient in all three Columns. This indicates that public-firm investments are more responsive to changes in investment opportunities than private-firm investments for all three investment measures: *Δnon-CA*, *ΔPP&E*, and *Δnon-PP&E*. Further, when we use the synthetic Tobin's Q to proxy for investment opportunities, the interaction coefficient is significantly positive in Columns (4) and (6) but it is significantly negative in Column (5). Hence, with the exception for *ΔPP&E*, public-firm investments are more responsive to changes in investment opportunities than

[8] The synthetic Tobin's Q is estimated in the following two-step procedure as in Asker et al. (2014) and Campello and Graham (2013). That is, using the sample of public firms, we regress Tobin's Q on sales growth, return on assets, net income before extraordinary items, book leverage, and year and industry fixed effects. We then use the regression coefficients to generate predicted Q (i.e., synthetic Q) for each firm, both public and private.

private-firm investments when the synthetic Tobin's Q proxies for investment opportunities.

In sum, the answer to the question of whether public firms invest more or less than private firms do hinges on the form of investments. Specifically, public firms invest more in intangible assets (that is, non-PP&E) but invest less in tangible assets (that is, PP&E) than private firms do. However, there is little difference in the amount of investments in total noncurrent assets (that is, non-CA) between public and private firms. Further, public-firm investments tend to be more responsive to changes in investment opportunities than private-firm investments. These observations are at odds with the U.S. findings of Asker et al. (2015) that public firms invest less than private firms do and that public-firm investments are less responsive to changes in investment opportunities than private-firm investments.

4. Concluding remarks

Unlike previous research on U.S. firms (e.g., Gao et al., 2013; Asker et al., 2015), we focus on public firms' advantage of raising equity with relative ease in identifying the forces that distinguish public firms from private firms in Korea. We find that compared to private firms that are matched on size and industry, public firms use substantial amounts of external equity (that is, the sum of common stock and capital surplus) in their capital structure and hold considerably high levels of non-PP&E relative to PP&E in their asset structure. Our investigation reveals that there is a connection between the two key observations from the capital and asset structures of public firms. For example, public firms issue equity more frequently and in greater amounts than private firms do. Unlike private firms, public firms allocate a substantial proportion of equity issue proceeds to investing in non-PP&E but only a paltry proportion to investing in PP&E. This tendency is more salient for public firms that belong to Chaebol groups. However, public firms do not allocate cash flows or debt issue proceeds significantly more towards investments in non-PP&E than towards investments in PP&E.

In a nutshell, unlike cash flows or debt issue proceeds, equity issue proceeds predominantly flow to investments in non-PP&E—particularly, the equity holdings of related firms—relative to PP&E among public firms in Korea. Given that this tendency is stronger for Chaebol-affiliated pubic firms (i.e., those firms that are presumed to be governed poorly), a poor corporate governance system, which is typical in an emerging stock market, could be responsible at least partly for our findings. Overall, the current study presents evidence that in the absence of an effective governance mechanism, the privilege of raising equity with ease allow public firms to seek growth through assets that are easy to acquire and manage instead of through capital expenditures. On the other hand, there is little evidence that short-termist pressures drive public-firm investments in Korea, contrary to what the U.S. study of Asker et al. (2015) report.

Appendix

Table A.1: Sample construction procedure

Steps in sample construction	Number of firm-years
All observations that belong to nonfinancial firms in the *FnGuide* database over the period 2000-2013	241,818
Less: observations with missing total assets or sales revenue	(38,147)
Less: observations with shareholder's equity or sales revenue being zero or less than zero	(20,954)
Less: observations with missing corporation registration number or industry classification code (KSIC2)	(569)
Less: observations with duplicate corporation registration numbers and those with multiple stock symbols	(12,713)
Less: observations in which firms conduct IPOs	(1,146)
Less: observations in which (one-year) sales growth and operating profitability (defined as operating income scaled by book assets) are not available or calculated due to missing data	(35,350)
	132,939

	All firm-years	Public firm-years	Private firm-years
Cleaned sample	132,939	15,423	117,516
Matching sample	25,094	12,547	12,547
[Num. of unique firms]	[6,356]	[1,963]	[4,694]

Table A.2: Definition of variables

The table provides definitions of the variables used in this study. The numbers in parentheses are codes in *FnGuide* (our primary data source).

PP&E	Net property, plant and equipment (1001190030) divided by total assets (1001190010)
Non-PP&E	Non-current assets (1001190020) less PP&E (1001190030) divided by total assets (1001190010)
Cash	The sum of cash (1001190370) and current financial assets (1001190270) divided by total assets (1001190010)
Change in cash reserves (ΔCash)	The change from year t-1 to t of { cash (1001190370) + current financial assets (1001190270)} divided by total assets (1001190010)
Short-term debt issuance (ΔSTDebt)	The change from year t-1 to t of { short-term bond (1001181470) + short-term borrowing (1001121700) + current portion of non-current borrowings (1001190620) + current financial liabilities (1001190630)} divided by total assets (1001190010)
Long-term debt issuance (ΔLTDebt)	The change from year t-1 to t of { long-term bond (1001190460) + long-term borrowing (1001190470) + non-current financial liabilities (1001190480)} divided by total assets (1001190010)
Change in net working capital (ΔNWC)	The change from year t-1 to t of {(current assets (1001190240) - cash (1001190370) - current financial assets (1001190270)) – (current liabilities (1001190610) - short-term debt)} divided by total assets (1001190010)
Equity issue proceeds (EQUISS)	The sum of {paid-in-capital increase (1001330210) + selling of treasury shares (1001330260) - paid-in-capital decrease (1001330550) - share repurchase (1001330600)} divided by total assets (1001190010)
Change in retained earnings (ΔRE)	The change from year t-1 to t of retained earnings (1001130470) divided by total assets (1001190010)
Change in PP&E (ΔPP&E)	The change from year t-1 to t of net property, plant and equipment (1001190030) divided by total assets (1001190010)
Change in non-PP&E (Δnon-PP&E)	The change from year t-1 to t of non-current assets (1001190020) less PP&E (1001190030) divided by total assets (1001190010)
Equity holdings of related firms (ΔEqtHold)	Equity investment in related firms (1001111660)
Size	The natural logarithm of total assets (1001190010)
Long-term debt ratio (LTDebt/Assets)	Long-term debt (1001103990) divided by total assets (1001100010)
Profitability (ROA)	The sum of { operating income (1001211430) + depreciation expense (1001310330) + amortization expense (1001390020)} divided by total assets (1001100010)
Sales growth	1 year sales growth rate (3001201001)

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Table 1: Common-size financial statements for private and public firms

The table reports the mean and median (in square brackets) values of key items in balance sheet, income statement and cash flow statement in Panels A, B and C, respectively. Balance sheet items are scaled by total assets, whereas income statement and cash flow statement items are scaled by net sales. Column (1) covers all sample firms consisting of equal numbers of private and public firms that matched on size and industry over the period 2000-2013. Columns (2) and (3) cover private firms and public firms, respectively. In Columns (4) and (5), we break down public firms into firms listed in the KOSPI market and those listed the KOSDAQ market of the Korea Exchange (KRX), respectively. N is the number of firm-years that belong to a given group.

	(1) All firms (N=25,094)	(2) Private firms only (N=12,547)	(3) Public firms only (N=12,547)	(4) KOSPI firms (N=4,517)	(5) KOSDAQ firms (N=8,030)
Panel A: Balance sheet (scaled by book assets)					
Assets					
Cash	0.153	0.142	0.165	0.126	0.187
	[0.104]	[0.085]	[0.122]	[0.092]	[0.142]
Accounts receivable	0.235	0.251	0.219	0.216	0.220
	[0.206]	[0.218]	[0.198]	[0.198]	[0.198]
Inventory	0.115	0.123	0.107	0.116	0.102
	[0.090]	[0.094]	[0.087]	[0.099]	[0.081]
Total current assets	0.508	0.521	0.495	0.463	0.514
	[0.510]	[0.524]	[0.499]	[0.462]	[0.523]
PP&E	0.293	0.311	0.275	0.323	0.249
	[0.266]	[0.281]	[0.254]	[0.316]	[0.225]
Non-PP&E	0.198	0.167	0.228	0.213	0.237
	[0.140]	[0.101]	[0.178]	[0.167]	[0.186]
Total non-current assets	0.492	0.479	0.505	0.537	0.486
	[0.490]	[0.476]	[0.501]	[0.538]	[0.477]
Liabilities					
Accounts payable	0.181	0.213	0.150	0.163	0.142
	[0.145]	[0.173]	[0.125]	[0.138]	[0.115]
ST debt	0.161	0.173	0.148	0.148	0.149
	[0.122]	[0.131]	[0.114]	[0.119]	[0.111]
LT debt	0.076	0.080	0.073	0.072	0.073
	[0.024]	[0.022]	[0.026]	[0.027]	[0.026]
Total debt	0.238	0.254	0.223	0.222	0.223
	[0.213]	[0.232]	[0.197]	[0.197]	[0.197]
Equity					
External equity	0.366	0.202	0.529	0.400	0.602
	[0.245]	[0.130]	[0.362]	[0.311]	[0.399]
Retained earnings	0.162	0.255	0.068	0.160	0.017
	[0.210]	[0.230]	[0.186]	[0.207]	[0.173]
Shareholder's equity	0.521	0.467	0.575	0.552	0.588
	[0.516]	[0.441]	[0.579]	[0.554]	[0.592]
Panel B: Income statement (scaled by net sales)					
Cost of goods sold	0.772	0.753	0.791	0.799	0.787
	[0.833]	[0.826]	[0.839]	[0.852]	[0.829]
SG&A	0.217	0.190	0.243	0.177	0.281
	[0.122]	[0.107]	[0.139]	[0.110]	[0.163]
Operating income	0.007	0.052	-0.038	0.022	-0.072
	[0.043]	[0.052]	[0.034]	[0.040]	[0.029]

Interest expense	0.028	0.027	0.029	0.025	0.031
	[0.011]	[0.010]	[0.012]	[0.012]	[0.012]
Net income	-0.068	0.042	-0.178	-0.013	-0.271
	[0.031]	[0.037]	[0.024]	[0.031]	[0.019]

Panel C: Cash flow statement (scaled by net sales)

CF from operations	0.019	0.054	-0.016	0.033	-0.043
	[0.049]	[0.059]	[0.040]	[0.048]	[0.034]
CF from investing	-0.128	-0.087	-0.168	-0.072	-0.223
	[-0.051]	[-0.047]	[-0.056]	[-0.037]	[-0.075]
CF from financing	0.112	0.034	0.190	0.037	0.276
	[0.000]	[0.000]	[0.003]	[-0.009]	[0.020]
Financing by debt	0.039	0.034	0.044	0.005	0.066
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Financing by equity issuance	0.060	0.009	0.110	0.037	0.152
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]

Table 2: Logit regressions of the decision to issue equity for private and public firms

The table reports the results of logit regressions of the decision to issue equity. The dependent variable is the log odds of equity issuance that is constructed based on the dummy variable that equals 1 for firm-years in which the equity issue proceed is positive and 0 for all other firm-years. In Column (1), the regression includes all sample firms that consist of equal numbers of private and public firms that are matched on size and industry over the period 2001-2013. The key explanatory variable is the public-firm dummy that equals 1 for public firms and 0 for private firms. In Columns (2) and (3), the regressions include only private firms and public firms, respectively. PP&E and non-PP&E are scaled by total assets. The definitions of these variables are provided in Table A1. The numbers in the square brackets are firm-clustered standard errors. *, **, and *** indicate two-tailed significance at the 10%, 5%, and 1% levels, respectively.

	(1) All firms	(2) Private firms only	(3) Public firms only
Public-firm dummy	1.0808***		
	[0.041]		
ROA lag	-2.1442***	0.5453**	-3.5406***
	[0.154]	[0.242]	[0.212]
LT Debt lag	2.7940***	2.7172***	2.6998***
	[0.147]	[0.230]	[0.199]
Cash lag	-0.9746***	-1.4067***	-1.0145***
	[0.152]	[0.274]	[0.197]
Sales growth lag	0.1610***	0.0959***	0.2730***
	[0.019]	[0.021]	[0.045]
Log(Assets) lag	-0.3661***	-0.2194***	-0.4048***
	[0.021]	[0.035]	[0.028]
PP&E lag	-0.6314***	-0.2886	-0.9009***
	[0.128]	[0.191]	[0.185]
Non-PP&E lag	0.5016***	-0.2051	0.5807***
	[0.128]	[0.223]	[0.174]
Constant	4.5538***	1.5034**	6.5368***
	[0.390]	[0.643]	[0.521]
Num. of obs.	25,092	12,491	12,497
Industry FE	KSIC2	KSIC2	KSIC2
Year FE	YES	YES	YES
Chi^2	3,135	440.5	2,210
p_Chi^2	0.000	0.000	0.000
Pseudo R^2	0.136	0.0545	0.158
Dep. Var.=0	20,761	11,308	9,453
Dep. Var.=1	4,333	1,239	3,094

Table 3: Uses of equity issue proceeds estimated from a system of regression equations

Each Panel of the table reports seemingly unrelated regression (SUR) results for a system of six equations in which the dependent variables represent uses of equity issue proceeds: (i) adding to cash reserves (*ΔCash*); (ii) repaying short-term debt (*ΔSTDebt*); (iii) repaying long-term debt (*ΔLTDebt*); (iv) investment in PP&E (*ΔPP&Es*); (v) investment in non-PP&E (*Δnon-PP&Es*) and (vi) net working capital (*ΔNWC*). This regression is estimated with a set of cross-equation restrictions (R1)-(R6). In all six equations, the key explanatory variable is equity issue proceeds (*EQUISS*); the coefficient on this variable represents the percentage of a won of equity issue proceeds that flow to each of the six uses above (i.e., the dependent variables). The dependent variables and equity issue proceeds are scaled by lagged total assets. Other explanatory variables include the change in retained earnings (*ΔRE)* and lagged values of long-term debt (*LTD*), firm size (*Size*) as measure by total assets, and sales growth. *ΔRE* and *LTD* are scaled by lagged total assets. Panel A reports results estimated for the full sample. Panels B and C report results estimated separately for private and public firm-years, respectively. The full sample includes equal numbers of private and public firms that are matched on firm size and industry over the period 2000-2013. The definitions of these variables are provided in Table A1. The numbers in the square brackets are standard errors. *, **, and *** indicate two-tailed significance at the 10%, 5%, and 1% levels, respectively.

	Dependent variable					
	ΔCash	ΔSTDebt	ΔLTDebt	ΔPP&E	Δnon-PP&E	ΔNWC
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: All firms						
EQUISS	0.3234***	-0.1443***	0.0185***	0.0202***	0.3888***	0.1418***
	[0.006]	[0.006]	[0.005]	[0.005]	[0.006]	[0.006]
ΔRE	0.2473***	-0.0914***	-0.0866***	0.1328***	0.2314***	0.2105***
	[0.004]	[0.004]	[0.003]	[0.003]	[0.004]	[0.004]
LT Debt lag	-0.0626***	0.1856***	-0.3189***	0.0077	-0.0657***	-0.0128**
	[0.006]	[0.006]	[0.005]	[0.005]	[0.006]	[0.006]
Size lag	-0.0042***	-0.0146***	-0.0037***	-0.0075***	-0.0038***	-0.0028***
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Sales growth lag	0.0026***	0.0054***	0.0090***	0.0053***	0.0029***	0.0036***
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Constant	0.0829***	0.2762***	0.0995***	0.1532***	0.0861***	0.0535***
	[0.012]	[0.013]	[0.011]	[0.011]	[0.013]	[0.012]
Num. of Obs.	25,094	25,094	25,094	25,094	25,094	25,094
R^2	0.064	0.042	0.135	-0.017	0.022	0.007
Panel B: Private firms only						
EQUISS	0.3025***	-0.0716**	0.1349***	0.3115***	0.2106***	0.2386***
	[0.025]	[0.028]	[0.022]	[0.026]	[0.019]	[0.030]
ΔRE	0.3258***	-0.1077***	-0.0488***	0.1307***	0.1853***	0.2016***
	[0.009]	[0.010]	[0.007]	[0.009]	[0.007]	[0.010]
LT Debt lag	-0.0208***	0.1758***	-0.1594***	0.0513***	-0.0259***	0.0118
	[0.007]	[0.008]	[0.006]	[0.008]	[0.006]	[0.009]
Size lag	-0.0062***	-0.0161***	-0.0035***	-0.0089***	-0.0019***	-0.0027***
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Sales growth lag	0.0005	0.0033***	0.0052***	0.0021**	0.0026***	0.0032***
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Constant	0.1197***	0.3095***	0.0851***	0.1740***	0.0487***	0.0522***
	[0.016]	[0.018]	[0.014]	[0.016]	[0.012]	[0.019]
Num. of obs.	12,547	12,547	12,547	12,547	12,547	12,547
R^2	0.106	0.055	0.053	0.036	0.062	0.032

Panel C: Public firms only

EQUISS	0.3350***	-0.1404***	0.0297***	0.0165***	0.3948***	0.1430***
	[0.006]	[0.006]	[0.006]	[0.005]	[0.008]	[0.006]
ΔRE	0.2263***	-0.0934***	-0.0966***	0.1200***	0.2544***	0.2094***
	[0.004]	[0.004]	[0.004]	[0.003]	[0.005]	[0.004]
LT Debt lag	-0.1039***	0.1922***	-0.4960***	-0.0509***	-0.1035***	-0.0455***
	[0.009]	[0.009]	[0.008]	[0.007]	[0.011]	[0.008]
Size lag	-0.0007	-0.0128***	-0.0026***	-0.0050***	-0.0073***	-0.0024***
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Sales growth lag	0.0053**	0.0130***	0.0145***	0.0108***	0.0095***	0.0019
	[0.002]	[0.002]	[0.002]	[0.002]	[0.003]	[0.002]
Constant	0.0163	0.2379***	0.0885***	0.1096***	0.1536***	0.0468***
	[0.018]	[0.019]	[0.017]	[0.015]	[0.023]	[0.017]
Num.of obs.	12,547	12,547	12,547	12,547	12,547	12,547
R^2	0.065	0.028	0.237	-0.051	-0.004	-0.020

Table 4: Detailed composition of intangible fixed assets (non-PP&E)

Panel A reports provides a breakdown of non-current assets into PP&E (i.e., tangible fixed assets) and non-PP&E (i.e., intangible fixed assets) and a further breakdown of non-PP&E into several components. The sample consists of equal numbers of private and public firms that are matched on size and industry over the period 2000-2013. The reported numbers are the proportion of each item in non-current assets. As an example, in order to arrive at 0.184 under the heading "equity holdings of related firms", we sum the equity holdings of related firms for all our sample firms and then divide this sum by the sum of total non-current assets for our sample firms. In the same column, 0.128 and 0.216 are obtained in the same manner separately for private firms and public firms. The reported numbers in the square brackets are the proportion of each non-PP&E item in non-PP&E. Panel B reports the weight of the change in each component of non-current assets in the change in non-current assets for firm-years in which firms issue equity issuance (that is, equity issue proceeds in the cash flow statement is positive). As an example, in order to arrive at 0.506 under the heading "Δequity holdings of related firms", we sum changes in this item for all firms and then divide this sum by the sum of the changes in non-current assets for all firms. For the reported numbers in square brackets, we divide the sum of the changes in this item by the sum of the changes in non-PP&E for a given group of firms. Panel C redoes Panel B for firm-years in which firms issue equity issuance.

Panel A: The weights of components in noncurrent assets

	PP&E	non-PP&E	Intangible assets	Invest. property	Long-term financial assets	Equity holdings of related firms	Long-term receivables	Deferred tax assets	Other noncurrent assets
All firms	0.619	0.381	0.028	0.012	0.098	0.184	0.032	0.015	0.012
		[1.000]	[0.074]	[0.032]	[0.258]	[0.483]	[0.083]	[0.038]	[0.031]
Private firms only	0.710	0.290	0.024	0.001	0.075	0.128	0.036	0.014	0.012
		[1.000]	[0.082]	[0.005]	[0.259]	[0.440]	[0.124]	[0.047]	[0.043]
Public firms only	0.566	0.434	0.031	0.018	0.112	0.216	0.029	0.015	0.012
		[1.000]	[0.071]	[0.043]	[0.259]	[0.499]	[0.067]	[0.035]	[0.027]

Panel B: The ratio of the change in each component to the change in noncurrent assets

	ΔPP&E	Δnon-PP&E	ΔIntangible assets	ΔInvest. property	ΔLong-term financial assets	ΔEquity holdings of related firms	ΔLong-term receivables	ΔDeferred tax assets	ΔOther noncurrent assets
All firms	0.361	0.639	0.037	0.007	0.011	0.506	0.030	0.025	0.021
		[1.000]	[0.058]	[0.011]	[0.017]	[0.793]	[0.047]	[0.040]	[0.033]
Private firms only	0.537	0.463	0.026	0.003	0.041	0.309	0.034	0.028	0.022
		[1.000]	[0.056]	[0.006]	[0.088]	[0.667]	[0.074]	[0.061]	[0.048]
Public firms only	0.203	0.797	0.047	0.011	-0.016	0.685	0.026	0.023	0.020
		[1.000]	[0.060]	[0.014]	-[0.020]	[0.859]	[0.033]	[0.028]	[0.025]

Panel C: The ratio of the change in each component to the change in noncurrent assets for equity issuing firm-years

	ΔPP&E	Δnon-PP&E	ΔIntangible Assets	ΔInvest. property	ΔLong-term financial assets	ΔEquity holdings of related firms	ΔLong-term receivables	ΔDeferred tax assets	ΔOther noncurrent assets
All firms	0.282	0.718	0.055	0.001	0.055	0.518	0.069	0.005	0.014
		[1.000]	[0.077]	[0.001]	[0.077]	[0.722]	[0.097]	[0.008]	[0.019]
Private firms only	0.678	0.322	0.044	0.001	0.021	0.189	0.032	0.020	0.015
		[1.000]	[0.137]	[0.005]	[0.066]	[0.586]	[0.098]	[0.063]	[0.046]
Public firms only	-0.079	1.079	0.066	0.000	0.086	0.819	0.104	-0.008	0.013
		[1.000]	[0.061]	[0.000]	[0.080]	[0.759]	[0.096]	-[0.007]	[0.012]

Table 5: Changes in PP&E, non-PP&E and equity holdings for subgroups classified by the amount of financing from three forms of capital

We sort public firm-years in our matching sample into subgroups based on the amount of funds raised through three forms of capital—cash flows, debt issuance and equity issuance—in Panels A, B and C, respectively. We measure the amount of funds from a given form of capital over a three-year period from year 1 through year 3 (scaled by total assets). For example, we sum cash flows (or debt issue proceeds or equity issue proceeds) from year 1, year 2 and year 3 and then scale this sum by total assets in year 0. For a given form of capital, we create five subgroups in a two-step procedure. First, we partition entire public firm-years into two groups depending on whether financing from that form of capital is non-positive (subgroup = 0) or positive. Second, we further partition firm-years with positive financing from that form of capital into quartiles (subgroup = 1, 2, 3, or 4) on the basis of the amount of financing. For each of the five subgroups in each Panel, we calculate the mean and median values of the increases in PP&E, non-PP&E and the equity holdings of related firms over three year periods (denoted by ΔPP&E3y, Δnon-PP&E3y and ΔEqtHold3y, respectively). These increases are scaled by total assets in year 0 before the means and medians are calculated.

Subgroup	N	Mean value of financing source	Mean			Median		
			ΔPP&E3y	Δnon-PP&E3y	ΔEqtHold3y	ΔPP&E3y	Δnon-PP&E3y	ΔEqtHold3y
Panel A: By cash flows (after excluding firm-years in which firms issue debt or equity)								
0 (non-positive)	957	-0.141	0.017	0.098	0.089	-0.011	0.017	0.004
1 (low)	721	0.034	0.039	0.093	0.073	-0.006	0.034	0.011
2	720	0.084	0.066	0.098	0.067	0.006	0.042	0.014
3	721	0.140	0.066	0.109	0.079	0.027	0.058	0.016
4 (high)	720	0.275	0.098	0.152	0.093	0.044	0.071	0.011
Panel B: By debt issue proceeds (after excluding firm-years in which firms issue equity)								
0 (non-positive)	3,839	-0.053	0.055	0.109	0.081	0.004	0.042	0.011
1 (low)	839	0.011	0.077	0.110	0.073	0.021	0.056	0.016
2	839	0.043	0.091	0.115	0.081	0.030	0.054	0.016
3	839	0.099	0.140	0.172	0.108	0.054	0.068	0.022
4 (high)	838	0.338	0.242	0.264	0.160	0.110	0.117	0.029
Panel C: By equity issue proceeds (after excluding firms-years in which firms issue debt)								
0 (non-positive)	3,839	-0.002	0.055	0.109	0.081	0.004	0.042	0.011
1 (low)	313	0.009	0.122	0.185	0.096	0.025	0.054	0.012
2	313	0.057	0.044	0.138	0.086	0.000	0.031	0.018
3	313	0.170	0.051	0.228	0.134	-0.008	0.016	0.000
4 (high)	313	0.671	0.117	0.631	0.339	-0.005	0.167	0.071

Table 6: Heckman second-stage regression of increases in non-PP&E and equity holdings on the Chaebol dummy and its interaction with equity issue proceeds

This table reports results of the second-stage regressions of the increases in non-PP&E (i.e., ΔPP&E) and the increase in equity holdings of related firms (i.e., ΔEqtHold). In the first-stage probit regression (untabulated), the dependent variable is the equity issuance dummy that equals one for firm-years in which firms issue equity and zero for other firm-years. Its explanatory variables includes return on assets, cash holdings, log(total assets), sales growth, PP&E (scaled by total assets), non-PP&E (scaled by total assets), industry fixed effects and year fixed effects as explanatory variables. This first-stage profit regression is estimated for public firm-years in our matching sample. The second-stage regressions (whose results are reported in this table) include only those firm-years in which firms issue equity among the public firm-years. In Columns (1) and (2), the key explanatory variable is the Chaebol-firm dummy that is equal to one for Chaebol-affiliated firms and zero otherwise. A Chaebol-affiliated firm is defined as the one that belongs to a business group in the list of large business conglomerates that is released by Korea Fair Trade Commission in any year during the year 2010-2013. In Columns (3) and (4), the key explanatory variable is the interaction of the Chaebol-firm dummy and equity issue proceeds (EQUISS). The definitions of these variables are provided in Table A1. The numbers in the square brackets are standard errors. *, **, and *** indicate two-tailed significance at the 10%, 5%, and 1% levels, respectively.

	Dependent variables			
	Δnon-PP&E	ΔEqtHold	Δnon-PP&E	ΔEqtHold
Indep. Var.	(1)	(2)	(3)	(4)
ROA lag	-0.1081**	-0.0883**	0.0163	-0.0063
	[0.047]	[0.036]	[0.040]	[0.030]
LT Debt lag	0.0281	0.0119	-0.0062	-0.0107
	[0.032]	[0.024]	[0.030]	[0.022]
Log(Assets) lag	-0.0659***	-0.0286***	-0.0330***	-0.0069**
	[0.005]	[0.004]	[0.004]	[0.003]
Sales growth lag	0.0143***	0.0045	0.0138***	0.0041
	[0.005]	[0.003]	[0.005]	[0.003]
Chaebol dummy	0.0588***	0.0255**	-0.0262	-0.0304**
	[0.018]	[0.012]	[0.016]	[0.013]
EQUISS			0.3467***	0.2285***
			[0.033]	[0.029]
Chaebol dum.×EQUISS			0.6108***	0.4012***
			[0.140]	[0.135]
Inverse Mills ratio	0.0533***	0.0158	0.0688***	0.0260**
	[0.017]	[0.012]	[0.015]	[0.012]
Constant	1.1337***	0.4976***	0.4883***	0.0724
	[0.092]	[0.066]	[0.074]	[0.053]
Num. of obs.	4,333	4,333	4,333	4,333
R^2	0.098	0.064	0.231	0.169
Industry FE	KSIC2	KSIC2	KSIC2	KSIC2
Year FE	YES	YES	YES	YES

Table 7: Investment regressions that compare investment behavior of private and public firms

The table reports results of regressions of investments. We consider three measures of investments as dependent variables: (i) the increase in noncurrent assets (*ΔnonCA*); (ii) the increase in PP&E (*ΔPP&Es*); and (iii) the increase in non-PP&E (*Δnon-PP&Es*). These investment measures scaled by lagged total assets. In Panel A, the key explanatory variable is the public firm dummy that equals 1 for public firms and 0 for private firms. A positive (negative) coefficient on this variable is an indication that public firms invest more (less) than private firms do. In Panel B, the key explanatory variable is the interaction of the public firm dummy and growth opportunity (public firm dummy × growth opportunity). A positive (negative) coefficient on this interaction is an indication that public-firm investments respond more (less) to changes in growth opportunities. We use two measures of growth opportunities: sales growth and synthetic Tobin's Q. These regressions are estimated on the matching sample that includes equal numbers of private and public firms that are matched on firm size and industry over the period 2001-2013. The definitions of these variables are provided in Table A1. The numbers in the square brackets are firm-clustered standard errors. *, **, and *** indicate two-tailed significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Do public firms outinvest private firms?

	Dependent variable		
	(1)	(2)	(3)
Indep. var.	ΔnonCA	ΔPP&E	Δnon-PP&E
Public-firm dummy	0.0032	-0.0085***	0.0131***
	[0.003]	[0.001]	[0.002]
Sales growth	0.0802***	0.0324***	0.0421***
	[0.003]	[0.002]	[0.002]
ROA	0.1066***	0.1681***	-0.0590***
	[0.011]	[0.006]	[0.008]
Constant	0.0728***	0.0488***	0.0223***
	[0.005]	[0.003]	[0.004]
Num. of obs.	25,094	25,094	25,094
R^2	0.071	0.105	0.045
Firm FE	NO	NO	NO
Industry FE	KSIC2	KSIC2	KSIC2
Year FE	YES	YES	YES

Panel B: Do public-firm investments respond more to changes in investment opportunity?

	Growth opportunity: Sales growth			Growth opportunity: Synthetic Q lag		
	Dep. Variable			Dep. Variable		
	(1)	(2)	(3)	(4)	(5)	(6)
Indep. var.	ΔnonCA	ΔPP&E	Δnon-PP&E	ΔnonCA	ΔPP&E	Δnon-PP&E
Public-firm dummy	0.0308***	-0.0045*	0.0322***	0.0205***	0.0111***	0.0099**
	[0.003]	[0.003]	[0.002]	[0.006]	[0.003]	[0.004]
Growth opportunity	0.0410***	0.0221***	0.0179***	0.0128***	0.0110***	-0.0009
	[0.004]	[0.003]	[0.003]	[0.003]	[0.002]	[0.002]
Pub. firm dum. × Growth opport.	0.0615***	0.0104***	0.0412***	0.0279***	-0.0058***	0.0317***
	[0.006]	[0.003]	[0.004]	[0.004]	[0.002]	[0.003]
ROA	0.3122***	0.2116***	0.0723***	0.3017***	0.2240***	0.0647***
	[0.016]	[0.010]	[0.011]	[0.028]	[0.014]	[0.021]
Pub. firm dum. × ROA	-0.3692***	-0.0940***	-0.2626***	-0.2608***	-0.0518***	-0.1999***
	[0.022]	[0.014]	[0.016]	[0.033]	[0.017]	[0.026]
Constant	0.0394***	0.0343***	0.0055*	0.0101	0.0130***	-0.0000
	[0.004]	[0.003]	[0.003]	[0.006]	[0.003]	[0.005]
Num. of obs.	25,094	25,094	25,094	13,801	13,801	13,801

Num. of firms	6,356	6,356	6,356	3,453	3,453	3,453
Year FE	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES