Size of Financing Need and the Choice between Asset Sales and Security Issuances

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We study the effect of the size of financing need on a firm's choice between selling assets and issuing securities to finance its investments. The balance sheet effect predicts that a firm prefers to sell assets when the financing need is relatively small as there is less information asymmetry regarding the value of a (small) subset of its assets. When the financing need is large, a firm prefers issuing securities to selling assets. We find evidence supporting the prediction. Our findings remain unchanged when we employ measures of financing need that are relatively independent of the actual amount of financing raised.

Firms raise external capital by issuing financial claims in the form of debt or equity. The pecking order theory recommends first using internal funds and then issuing a security with the least information asymmetry. The market timing theory suggests issuing a security that is overvalued in the market (Baker and Wurgler, 2002). An often-overlooked source of capital is asset sales. In this article, we study the choice between two financing sources: issuing securities versus selling assets. We focus on one potential determinant of this choice: the size of a firm's financing need.

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The theoretical work of Edmans and Mann (2018) identifies the balance sheet effect. It helps establish a relation between the size of financing need and the choice between an asset sale and a security issuance. In their model, the assets-in-place of a firm consists of core and noncore assets.[1] The values of both assets are unknown. The firm finances the assets-in-place by securities such as debt and equity, which gives the existing securityholder a claim on the firm's total assets. The information asymmetry regarding the value of the firm's relatively small asset is less than that regarding the value of its financial securities. Therefore, when the financing need is small, the firm prefers an asset sale. In contrast, when the financing need is large, the firm prefers a security issuance. The underlying economic arguments are as follows. The new securityholders have claims on the entire firm, that is, on the entire balance sheet of the firm, which includes the funds raised. The value of the funds (cash) raised is known with certainty, which helps reduce the valuation uncertainty of the firm's assets-in-place. The asset purchasers, however, have claims only on the purchased assets. They do not have claims on the entire balance sheet, thus on the funds raised. When the financing need is sufficiently large, the information asymmetry regarding valuation of the firm's financial securities is less than that for a relatively large asset. Thus, the balance sheet effect predicts that a firm will sell assets when its financing need is relatively small but will issue securities when its financing need is large.

For empirical analyses, we use firm-year observations from flow-of-funds statements for 1971–2016. Using the cash-flow identity of sources for funds and uses of funds, we identify 2,403 firm-years as asset sales and 26,275 firm-years as security issuances. In both cases, firms use proceeds for investments purposes. We begin our analysis by using the actual amount of financing raised to measure a firm's financing need. The average value of financing raised through an asset

[1] We consider noncore assets as a subset of the firm's total assets.

sale is 4.5% of total assets. In contrast, the average value of financing raised through a security issuance is 12.3% of total assets. Furthermore, the number and percentage of asset sales decline with an increase in financing need. For example, when the amount raised is between 1% and 2% of total assets, the number of asset sales is 628, which is 15% of 4,130—the combined number of asset sales and security issuances for that financing size. When a firm's financing need exceeds 12% of its assets, we do not observe any asset sales. The number of security issuances, however, is 8,835. This data pattern provides evidence for the balance sheet effect.[2] The multivariate regressions confirm the data pattern by showing that the odds of an asset sale over a security issuance decrease with the size of financing need.

In our initial analysis, we do not directly observe a firm's demand for financing. Instead, we observe the amount the firm is able to raise. This equilibrium outcome is the result of mutual decisions by financing providers (asset or security buyers) and the firm requiring financing. Therefore, our measure of the size of financing need is not exogenous. To address this concern, we use a firm's level of external finance dependence as a measure of its size of financing need (Demirguc-Kunt and Maksimovic, 1998; Ross, Westerfield, Jaffe, and Jordan, 2009).[3] We define external finance dependence as the difference between a firm's actual growth rate and the internal growth rate. The internal growth rate is the theoretical growth rate from the percentage-of-sales-based approach of the financial planning model. A firm can achieve the internal growth rate by using only internally generated funds. A firm's large external finance dependence indicates a higher level of financing need. Our main results remain unchanged with this alternative measure of a firm's size of financing need.

[2] Figure 1 in Section II.E shows this pattern.

[3] We also perform a two-stage regression. In the first-stage regression, we regress actual amount raised on supply-related variables. In the second-stage regression, we use the residual from the first-stage regression as a proxy for a firm's size of financing need.

In theory, the balance sheet effect applies equally to debt and equity. The purchasers of newly issued debt or equity have claims on the entire firm, similar to those of existing securityholders, and the cash raised from both sources appear on a firm's balance sheet. The data, however, reveal differing patterns for a firm's financing choice between asset sales and debt issuances, and between asset sales and equity issuances.[4] We observe a significant decline in the proportion of asset sales relative to debt issuances with a small change in the size of financing need (2% of total assets to 3% of total assets). In contrast, the proportion of asset sales relative to equity issuances remains almost constant until the financing size increases to 11% of total assets. Therefore, these patterns suggest that a firm switches from asset sales to equity issuances at a much higher level of financing need than when switching from asset sales to debt issuances. This is intuitive. Equity financing is expensive and the firm will issue equity only when the financing need is sufficiently large so that issuing debt is no longer adequate. In a reduced sample where the size of financing need is less than 12% of total assets, we find that the balance sheet effect is four times larger for debt issuances versus asset sales than for equity issuances versus asset sales.

We also analyze how the balance sheet effect plays out in the Myers and Majluf (1984) framework. Myers and Majluf (1984) consider the possibility of splitting assets, stating that "if [part of assets-in-place] can be sold at intrinsic value, the firm treats the proceeds as additional slack and looks again at its issue-invest decision" (p.202). They pose a question for future research: What will happen if the firm is able to sell an asset only at a discount? Intuitively, the firm sells the asset at a discount, if the valuation uncertainty of the asset precludes the asset purchaser in determining its "true" value. This situation is more likely to hold when the asset under consideration is large. In this case, the firm prefers issuing a financial security to selling an asset

[4] Figure 3 in Section III.C shows these patterns.

at a discount. Thus, the balance sheet effect under the Myers and Majluf (1984) framework predicts that for small investment expenditures, the firm prefers internal financing, but when investments increase, the likelihood of external financing also increases. The data patterns and regression results support this prediction. The odds of external financing over internal financing increase with the size of investment need.

Our research is relevant to academics as well as practitioners. We believe our paper is the first to carry out an empirical investigation of a firm's financing choice between asset sales and security issuances. We analyze the effect of investment need on a firm's choice of internal versus external financing, which is also novel to the corporate finance literature. Our comprehensive data set of all U.S. industrial firms, emphasis on data patterns, and rigorous empirical analyses are particularly useful to practitioners in their corporate decision making.

The article proceeds as follows. Section I provides the related literature and underpinnings of our hypotheses. It also shows how cash-flow identity guides our empirical analyses. Section II describes the sample and variables. Section III reports the results. Section IV presents the balance sheet effect in the Myers and Majluf (1984) framework of internal versus external financing. Section V demonstrates the sensitivity of the balance sheet effect to firm characteristics. Section VI provides concluding remarks.

I. Related Literature and Motivation

A. Hypotheses Development

Our research is at the intersection of the corporate restructuring and financing literatures. In an asset sale (divestiture) transaction, a conglomerate sells an existing division, segment, subsidiary, or product line to a third party. In return, the selling firm often receives cash, and in some cases receives shares or a combination of cash and shares from the buying firm. The

shareholders' wealth, on average, increases when a conglomerate announces an asset sale (see, among others, Rosenfeld, 1984; Jain, 1985; Mulherin and Boone, 2000; Dittmar and Shivdasani, 2003).[5] Firms engage in corporate restructuring via an asset sale to modify the firm's asset portfolio and scope.[6] Corporate restructuring is also associated with efficient resource allocation, increased focus on the core business, and reduction in debt to attain optimal capital structure after the divestiture. These factors are associated with the observed shareholders' wealth gains upon an asset sale (Bates, 2005; Clayton and Reisel, 2013; Dittmar and Shivdasani, 2003; Hite, Owers, and Rogers, 1987; John and Ofek, 1995; Lang, Poulsen, and Stulz, 1995). Maksimovic and Phillips (2001) show that the probability of an asset sale is related to a firm's organization and buyers' and sellers' ex ante efficiency gains.

Asset sales are also a source of financing. A conglomerate seeking to finance an investment opportunity of its growing business division may sell another division when access to external capital is limited (Borisova and Brown, 2013; Hovakimian and Titman, 2006; Lang et al., 1995). Nanda and Narayanan (1999) show the conditions where a two-division firm is undervalued or overvalued in the market, resulting in an asset sale or equity offering. In their model, the financial strength of a division with less informative cash flows drives misvaluation. If this is a strong division, the market undervalues the firm.[7] If this is a weaker division, the market overvalues the firm. Because managers know which division has more or less informative cash flows, they are

[5] Eckbo and Thorburn (2013) survey empirical research on asset sales.

[6] The other commonly used forms of restructuring are spinoffs and equity carve-outs. In a spinoff, a conglomerate distributes subsidiary shares to its existing shareholders. In an equity carve-out, a conglomerate consummates an initial public offering of some portion of the subsidiary. We exclude spinoffs and equity carve-outs because cash is not raised in a spinoff, and the firm sells partial ownership of a subsidiary during the first stage of a carve-out, thereby retaining the option of reacquisition, spin off, or sell-off of the remaining portion in the second stage (Desai, Klock, and Mansi, 2011; Perotti and Rossetto, 2007).

[7] Desai and Gupta (2016) show that value creation upon asset sales increases with an increase in cash-flow informativeness among its divisions.

also aware if the firm is over- or undervalued. To fund investment opportunities, an overvalued firm issues equity and an undervalued firm sells the weaker division.

Arnold, Hackbarth, and Puhan (2018) investigate the financing choice between an asset sale and an equity issuance from the perspective of the bondholder-shareholder conflict. In a firm with large debt obligations, its managers working in the interest of shareholders forgo positive NPV projects because debtholders have first claim on the income from new projects. This results in an underinvestment problem (Myers, 1977). Additionally, an increase in firm income reduces asset volatility, making debt safer (Wei and Zhang, 2006) and transferring wealth from equityholders to bondholders. Financing through an asset sale ameliorates the underinvestment problem. An asset sale reduces the size of assets-in-place, thereby increasing the risk of debt and transferring wealth from bondholders to equityholders. The friction costs in selling assets, such as legal fees, asset specificity, and liquidity, however, are higher. Therefore, firms trade off the reduction in wealth transfer from equityholders to bondholders with the higher cost of selling assets when making the financing choice.

The work of Edmans and Mann (2018) provides a theoretical foundation for our study. They construct a model where a firm's type is based on the quality of its assets-in-place and synergy among its assets. This firm can either sell part of its noncore assets or issue financial claims such as debt or equity for financing purposes. When the financing need is low, the information asymmetry of noncore assets is lower than that of a security. In this case, an asset-pooling equilibrium is sustainable. Under this equilibrium, all firms regardless of type sell noncore assets to raise financing. This supports the conventional view, as suggested in the pecking order theory, that the firm should avoid issuing a claim of higher information asymmetry.

There is, however, an important difference between financing through a security issuance and an asset sale. New securityholders (debt- or equityholders) have claims on the total assets of the firm, in other words, on the entire balance sheet of the firm. In contrast, asset purchasers have claims only on the purchased noncore assets. In addition, the amount raised by security issuance remains on the balance sheet of a firm and it is known with certainty, which in turn can reduce the information asymmetry associated with the valuation of a financial security. If the amount of financing is sufficiently large, the security-pooling equilibrium is sustainable. Under this equilibrium, all firms regardless of type issue financial securities such as debt or equity. Therefore, the balance sheet effect suggests that the size of financing need determines a firm's choice between an asset sale and a security issuance.

H1: The likelihood of a security issuance over an asset sale increases with the size of financing need.

The balance sheet effect also applies in the Myers and Majluf (1984) framework. In this framework, a firm's financing choice is between an internal financing source and an external financing source. Myers and Majluf (1984) suggest a firm should prefer internal financing and turn to external financing only as a last resort. They do not consider how the size of investment need influences the financing choice. An extension of Edmans and Mann's (2018) balance sheet effect on the Myers and Majluf (1984) framework provides the second hypothesis.

H2: The likelihood of external financing over internal financing increases with size of the investment need.

B. Cash-Flow Identity and the Empirical Setup

The work of Chang, Dasgupta, Wong, and Yao (2014) guides our empirical efforts. They analyze how a firm uses its cash flow in a given year. Their study is motivated by the following cash-flow identity based on flow-of-funds data:[8]

$$Investment_t + \Delta Cash_t + Div_t = CF_t + \Delta D_t + \Delta E_t + AssetSale_t. \quad (1)$$

The left-hand side of Equation (1) is the uses of funds in a given year (*t*)−investment (*Investment*), change in cash holdings (Δ*Cash*), and cash dividends (*Div*)—and the right-hand side is the sources for funds for that year—cash flow (*CF*), debt issuance (Δ*D*), equity issuance (Δ*E*), and proceeds from asset sales (*AssetSale*). The negative values of Δ*D* and Δ*E* imply the uses of cash for debt repayment and share repurchases, respectively. By rearranging the preceding equation, we obtain the following:

$$Investment_t = Internal_t + AssetSale_t + SecIss_t, \quad (2)$$

where for a given year *t*, *Internal* is the funds available to a firm internally and it is cash flow (*CF*) minus change in cash holdings (Δ*Cash*).[9] We define external financing through security issuance (*SecIss*) as the change in debt issuance plus the change in equity issuance minus dividend payment (Bradshaw, Richardson, and Sloan, 2006; Butler, Cornaggia, Grullon, and Weston, 2011; Lewis and Tan, 2016). A positive value for *SecIss* indicates the funds are obtained from debt and net equity issuance, whereas a negative value for *SecIss* indicates the funds are used for debt retirement or net equity repurchases after dividends. Equation (2) states that, in a given year, the firm can finance its investments using either internally generated funds during that year or external sources. With external sources, it can raise finances by either selling existing assets to a third party or issuing financial securities such as debt or equity in the capital market.

[8] In Chang et al.'s (2014) cash-flow identity, a firm's investments are net of asset sale proceeds. We keep asset sales separate from investments because we consider an asset sale as a potential source of financing.

[9] *Internal* is operating cash flow net of change in working capital minus change in cash holding, and *Investment* is the cash used for capital expenditures, acquisitions, and other investments.

We define the variable *Inv_Int* as investment expenditure net of internally generated funds. It is the difference between *Investment* and *Internal*. Therefore, the modified version of Equation (2) is as follows:

$$Inv\_Int_t = AssetSale_t + SecIss_t. \quad (3)$$

Equation (3) states that in a given year *t*, after using all internally generated funds during that year, a firm can finance its remaining investment need through external financing sources such as selling assets or issuing financial securities. Equations (2) and (3) provide the conceptual framework for our empirical work.

II. Data and Variables

A. Sample Selection

The sample comprises firms incorporated and located in the United States, and are listed on the New York Stock Exchange (NYSE), American Stock Exchange (AMEX), or NASDAQ. The sample period is 1971–2016, and the main data source is the flow-of-funds statements from Standard & Poor's (S&P) Compustat. We exclude financial institutions (Standard Industrial Classification [SIC] codes 6000–6999), utilities (SIC codes 4900–4999), and not-for-profit and governmental organizations (SIC codes above 8000). Furthermore, we exclude observations with missing data on beginning-year total book value of assets and Compustat accounting format codes. The initial sample consists of 120,415 firm-year observations. We adjust dollar values to 2000 dollar values using the gross domestic product (GDP) deflator. Following Chang et al. (2014), Almeida and Campello (2010), and Almeida, Campello, and Weisbach (2004), we exclude firm-year observations where the market value of total assets is less than $1 million, the book value of asset growth is above 100%, and sales is less than $1 million. We also exclude firm-year observations where total assets are less than debt and the market-to-book ratio is less than 0 or

greater than 10. This results in a sample of 105,490 firm-year observations. Merging with the Center for Research in Security Prices (CRSP) data set further reduces the sample to 101,121 firm-year observations. We winsorize the cash-flow identity variables of Equation (1) at the 1st percentile level on both sides.[10] We provide detailed variable definitions in Appendix A.

We ensure that cash-flow identity holds in our data. Following Chang et al. (2014), we exclude firm-year observations for which the absolute value of the difference between the right-hand and left-hand side variables in Equation (1) is more than 1% of beginning-year total assets. This results in a sample of 76,968 firm-year observations involving 7,134 firms.[11]

B. Dependent Variable

Our dependent variable is a categorical variable, *Outcome*. It categorizes a given firm-year observation in one of four mutually exclusive categories. These categories are whether a transaction involves 1) financing through an asset sale; 2) financing through a security issuance; 3) repossession of a security through an equity repurchase, debt repayment, or debt retirement; and 4) neither significant financing through external sources nor significant repossession of a security. To define these categories, we use combinations of Equation (3) variables: investment net of internal financing (*Inv_Int*), asset sale proceeds (*AssetSale*), and proceeds from a security issuance or payouts for repossession of a security (*SecIss*).

The first category (*AS*) represents external financing through an asset sale. The categorical variable *Outcome* equals one if the following conditions are met: 1) asset sale proceeds (*AssetSale*) are at least 1% of beginning-year total assets, 2) asset sale proceeds are more than security issuance proceeds (*SecIss*), and 3) investment net of internal financing (*Inv_Int*) is positive. The second category (*SI*) represents financing through security issuance. *Outcome* equals two under the

[10] Specifically, we winsorize ΔD, $\Delta E\text{-}Div$, *Investment*, *CF*, and $\Delta Cash$.
[11] We could not compute cash-flow identity for 990 firm-year observations because of missing data.

following conditions: 1) security issuance amount (*SecIss*) is at least 1% of beginning-year total assets, 2) security issuance proceeds are more than asset sale proceeds, and 3) investment net of internal financing is positive.[12] The third category (*Repo*) represents using funds to repurchase a financial security. *Outcome* equals three if: 1) security issuance amount (*SecIss*) is negative, 2) absolute value is at least 1% of beginning-year total assets, and 3) investment net of internal financing (*Inv_Int*) is negative. Finally, the fourth category (*DN*) represents "do nothing," that is, instances when a firm neither raises money through an asset sale and a security issuance nor repurchases securities. *Outcome* equals four if a given firm-year observation is not covered by any of the previously mentioned three categories. In our sample, we have 2,403 asset sales, 26,275 security issuances, 35,987 security repossessions, and 12,303 do-nothing firm-year observations.

C. Independent Variables

1. Variable of Interest

Our independent variable of interest helps validate the balance sheet effect. As mentioned earlier, the balance sheet effect establishes the relation between a firm's size of financing need and its financing choice between an asset sale and a security issuance. To begin, we use the actual transaction amount as a proxy for the size of financing need. *FinSize* is the amount raised through an asset sale or a security issuance, or the amount used to repossess a security. For the asset sale category (*AS*), *FinSize* is the proceeds from an asset sale (*AssetSale*). For the security issuance category (*SI*), *FinSize* is the proceeds from a security issuance (*SecIss*). For the repossession and

[12] In our data, we have 2,757 firm-year observations where both *AssetSale* and *SecIss* are above 1% of the beginning year total assets, suggesting that in a given year a firm undertakes both asset sale and security issuance to finance its investment expenditures. Among those observations, for 525 firm-year observations the asset sale amount is more than that from security issuance. The average values of asset sale and security issuance proceeds are 0.056 and 0.031, respectively. We categorize these firm-year observations in the asset sale category. For the remaining 2,232 firm-year observations, the security issuance amount is more than that from the asset sale. The mean values of security issuance and asset sale proceeds are 0.144 and 0.027, respectively for these observations. We categorize these observations as security issuance. In unreported results, all our results remain unchanged when we exclude these observations from our main sample.

do-nothing categories (*Repo* and *DN*), *FinSize* is the sum of *AssetSale* and *SecIss*. In addition to *FinSize*, we use investment net of internal financing, *Inv_Int*, as our second variable of interest.[13]

2. Control Variables

The control variables capture a firm's capital structure, growth potential, size, age, information environment, recent stock performance, profitability, and financing constraints. Arnold et al. (2018) show that financing through an asset sale helps reduce (underinvestment problem) by reducing the size of assets-in-place. *Leverage* is the ratio of book value of total debt to total assets. Highly levered firms are more likely to sell assets to reduce the wealth transfer from equityholders to bondholders. The proxy for a firm's growth opportunities is its Tobin's q (*Q*). It is the ratio of market to book value of assets. A firm with higher growth opportunities prefers to protect its assets and is likely to issue a financial security. Firm size (*Size*) is the market value of assets. *Tangibility* is a measure of asset redeployment. It is the ratio of net property, plant, and equipment to total assets (Chang et al., 2014). *SalesGth* is the percentage change in sales over previous-year sales. We measure a firm's information environment using its idiosyncratic volatility (*IdioVola*), which is the residual of the market model computed using daily stock returns over the previous year. *ExcessRet* is the average of monthly excess returns, measured as the difference between the firm and the value-weighted market index returns. The profitability of a firm is the ratio of net income to total assets (*ROA*). *KZ-index* controls for a firm's financing constraints (Kaplan and Zingales, 1997).[14] We use the values of control variables for the previous year and winsorize each variable at the 1st percentile level on both sides of its distribution.

[13] From Section III.B.2 onward, we also use a firm's external financing dependence from the previous year as a proxy for its financing need for the current year.

[14] Following Lamont, Polk, and Saaá-Requejo (2001), we compute the *KZ-index* as per the following equation:

$$KZ - index = -1.002 \times Cash\ Flows\ /\ K + 0.283 \times Q + 3.139 \times Debt\ /\ Total\ Capital + -39.368 \times Dividends\ /\ K + -1.315 \times Cash\ /\ K,$$

where *Cash Flows* is the sum of income before extraordinary items and depreciation and amortization; *K* is the property, plant, and equipment; *Q* is the ratio of market capitalization plus total shareholder's equity minus the book

D. Sample Distribution

Table I reports the frequency distribution of the sample based on the categorical variable *Outcome*. Panel A shows the distribution using five-year intervals. The highest number of asset sales are during 1986–1990 (418 observations), which coincides with a period of focus-increasing activities among conglomerates (Comment and Jarrell, 1995). The highest number of security issuances are during 1996–2000 (5,086 observations). Panel B reports the industrywide distribution of sample observations. The two-digit SIC codes are from the U.S. Department of Labor. In our data, the largest incidences of asset sales (42%) and security issuances (55%) are in the manufacturing sector.

[Table I here]

Table II reports summary statistics for the independent variables based on the outcome categories.[15] For the outcome categories of asset sales and security issuances, we report mean, median, standard deviation, and 10th and 90th percentile values, whereas for the outcome categories of repossessions and do nothing, we report mean and median values. Panel A reports statistics for the cash-flow identity variables in Equation (1), Panel B reports statistics for the proxies of size of financing need that we generate using cash-flow identity variables, and Panel C reports statistics for the control variables.

[Table II here]

As shown in Table II, the average amount of funds raised from an asset sale is 4.5% of beginning-year total assets. In contrast, the average size of funds raised from a security issuance

value of common equity minus deferred tax assets to the total shareholder's equity; *Debt* is the sum of total long-term debt, notes payable, and debt in current liabilities; *Total Capital* is the sum of total long-term debt, debt in current liabilities, and total stockholders' equity; *Dividends* is the sum of preferred and common dividends; and *Cash* is the cash and short-term investments.

[15] Table B1 in Appendix B reports summary statistics for the independent variables in the overall sample.

is approximately 12% of total assets. Similarly, the 90th percentile values of financing size are 9% of total assets for an asset sale and 31% of total assets for a security issuance. These distributions suggest that an asset sale (a security issuance) is preferred for low (high) financing need, and that a security issuance is the only choice for a very high level of financing need. A typical firm selling assets tends to have more internal funds than a firm selling securities, 9% versus 4% of total assets. The level of investment for a firm issuing securities is higher than for a firm selling assets. In an untabulated statistic, the correlation coefficient between *FinSize* and *Inv_Int* is 0.8261 in 28,678 firm-year observations in the asset sale and security issuance categories.

Comparing the control variables, a firm selling assets is more levered. A firm issuing securities tends to have more growth opportunities, higher excess returns, lower profitability, and greater financing constraints. Finally, in terms of the firm size and idiosyncratic volatility, the firms selling assets and firms issuing securities are comparable.

E. Asset Sales Pattern over Financing Size

Figure 1 shows the incidence of asset sales for different sizes of financing need. On the *x*-axis, we show the amount of funds raised relative to total assets in 12 bins. The first financing size bin is for firm-years when the financing size is between 1% and 2% of total assets, and the last bin is for firm-years when the financing size is above 12% of total assets. The left *y*-axis shows the number of asset sales (light gray bars) for a given financing size bin. The right *y*-axis shows the percentage of asset sales, which for a given financing size bin is the ratio of the number of asset sales to total number of asset sales and security issuances, expressed in percentages. We also report the number of firm-year observations in each financing size bin (in parentheses close to a triangle). The sum of number of observations in parentheses is 28,678, which is the combined number of asset sales and security issuances in our sample.

[Figure 1 here]

As shown in Figure 1, the number and percentage of asset sales gradually decline with the size of financing need. When the financing need is between 1% and 2% of total assets, the number of asset sales is 628 and the number of security issuances is 3,502. Hence, the number of asset sales is 15% of the total. When the financing need is between 2% and 3% of total assets, the number and percentage of asset sales are 410 and 13%, respectively. This shows the sensitivity of asset sales to the size of financing need. When the financing need is between 10% and 11% of total assets, the number and percentage of asset sales are only 71 and 8%, respectively. Finally, when the financing need is above 12% of total assets, the number of asset sales is 0, but the number of security issuances is 8,835. Therefore, when the financing need is large, the only financing method used is security issuance.

Overall, Figure 1 indicates an inverse relation between the size of a firm's financing need and its likelihood of selling assets for investment purposes. This finding supports the prediction of the balance sheet effect.

III. Results

This section provides the results of a multivariate analysis of the balance sheet effect. We start with a baseline multivariate analysis. Then, we show how we address methodological concerns regarding the proxy for financing need. Finally, we assess the balance sheet effect separately for subsamples of debt issuances and equity issuances.

A. Baseline Results for a Multivariate Analysis

For the baseline results, we use a multinomial logistic regression model to compare asset sales with security issuances and asset sales with no external financing transactions. The dependent variable refers to the *AS*, *SI*, and *DN* categories for firm-year observations of asset sales, security

issuances, and no external financing transactions, respectively. We exclude firm-year observations of repossessions of financial securities.[16] More formally, the empirical specification for the choice between an asset sale and a security issuance is as follows:

$$\log\left(\frac{\Pr(SI)_{i,t}}{\Pr(AS)_{i,t}}\right) = \gamma_0 + \gamma_1 \times X_{i,t} + \gamma_2 \times Z_{i,t-1} + \varepsilon_{i,t}, \quad (4)$$

In Equation (4), *X* is a proxy for a firm's size of financing need. The vector *Z* comprises the control variables. The subscripts *i* and *t* denote firm and year, respectively. The coefficient of interest is γ_1. Its positive sign indicates that an increase in the size of financing need increases the likelihood of a security issuance over an asset sale. Year dummy variables are included to control for time fixed effects, and standard errors are clustered at the firm level to control for multiple transactions by a firm during the sample period.

Table III reports the baseline results. In Specification (1), the amount of financing raised (*FinSize*) is a proxy for the size of a firm's financing need. In Specification (2), actual investment by a firm (*Investment*) is a measure of financing need, and internally available funds are included as an additional control variable. In Specification (3), net investment through external financing (*Inv_Int*) is a proxy for the size of financing need. In our data and as shown in Figure 1, the samples of asset sales and security issuances overlap when the size of financing need (*FinSize*) is below 12%. Above that level, there are 8,835 security issuances but no asset sales. Therefore, to examine the financing choice when the financing need is small enough for both asset sales and security issuances to be feasible, we limit our sample to the firm-years when the financing size is less than 12% of beginning-year total assets (Specification (4)). We report the results for the choice of no external financing (*DN*) versus asset sales (*AS*) only for Specification (1) for the sake of brevity.

[16] When we include the observations of repossessions, the log-likelihood function of our multinomial logistic regression model fails to converge. One possible explanation is that in the case of a repossession, the firm uses the funds, resulting in the negative value of the size of financing need.

[Table III here]

As shown in Table III, the coefficients on *FinSize* (Specification (1)), *Investment* (Specification (2)), and *Inv_Int* (Specification (3)) are positive for regressions explaining a firm's choice between an asset sale and a security issuance. They suggest that the likelihood of issuing securities versus selling assets increases with the size of financing need. For a meaningful interpretation, we use coefficients from the restricted sample (Specification (4)). The coefficient for *FinSize* is 8.068. This suggests that a 1 percentage point increase in the amount of financing raised relative to beginning-year total assets increases the log odds of issuing a security to selling an asset by 0.08068, holding the values of all other independent variables constant. This change is statistically significant at the 1% level. In other words, a 1 percentage point increase in the size of financing need increases the odds of a security issuance by 8.4% ($e^{0.01 \times 8.068} - 1$). For the full sample, Specification (1), the odds of a security issuance increases by 18% with a 1 percentage point increase in the size of financing need.

With regard to the control variables, Table III reveals that the likelihood of a security issuance over an asset sale increases with growth opportunities, firm size, past stock market performance, and financing constraint, and it decreases with leverage, firm age, and asset tangibility. The coefficient of 0.144 on the natural logarithm of firm size indicates that a 1 percentage point increase in firm size increases the log odds of a security issuance by 0.0014. This change is statistically significant at the 1% level. It seems that big firms prefer security issuances to asset sales. Perhaps, the availability of a credit rating provides big firms with easy access to the capital market.

In summary, the findings of Table III and the data pattern in Figure 1 support the prediction of the balance sheet effect (H1). The likelihood of a security issuance increases with the size of financing need.

B. Methodological Concerns Regarding the Exogeneity of Financing Size

In the previous analysis, we use equilibrium financing amount (*FinSize*) and net investment through external sources (*Inv_Int*) as measures of a firm's size of financing need. These equilibrium outcomes are the result of mutual decisions between financing providers (securities or assets buyers) and the firm requiring financing. The amount of financing a firm can raise depends on whether potential suppliers of capital are willing to provide it. In particular, fluctuations in the market values of securities and assets may affect a firm's decision whether to sell assets or issue securities when it needs additional financing. The firm can also decide to do both in an attempt to equalize the marginal financing costs across potential sources. Therefore, the actual amount of financing raised is an outcome variable rather than an exogenous variable. The following subsections document how we address this concern.

1. Two-Stage Regression Model

In the first approach, we use a two-stage regression model. In the first-stage regression, we use variables related to the financing supply to explain the actual amount raised. In the second-stage regression, to explain a firm's financing choice, we use the residual from the first-stage regression as a proxy for a firm's size of financing need. The underlying intuition is to disentangle the supply of capital and the demand for capital from the observed equilibrium size of capital. The first-stage regression allows the supply side to be removed from the equilibrium amount and its residual captures the demand side.

The challenge is to identify supply-related factors, because any factor chosen is subject to the criticism that it does not capture the supply effect in totality and has some demand effect.[17] We use firm growth opportunities, firm excess return, and the credit spread of the economy to proxy for the supply channel. The annual variable *CreditSpread* is the difference in yields for Baa- and Aaa-rated corporate bonds; the data source is the FRED database of the U.S. Federal Reserve.

Using all firm-year observations including those of repossessions, we run a first-stage regression in which our chosen supply-related controls and year dummies explain the observed financing size. Then, we use the residual from the first-stage regression as one of the dependent variables in the second-stage logit regression model of the subsamples of asset sales and security issuances. In Specification (2), we restrict the sample to financing size less than 12% of total assets. In Specification (3), we use investment net of internal capital instead of financing size. Overall, the results in Table IV are similar to those in Table III. The odds of security issuance versus asset sale increases with the size of financing need.[18]

[Table IV here]

2. External Finance Dependence as a Measure of Financing Need

In the second approach, we use a measure of financing need that is relatively independent of the actual amount of financing raised. The percentage sales approach of the pro forma financial planning model provides the following equation:

$$EFN_t = A_{t-1} \times g_t - PM_{t-1} \times S_{t-1} \times (1 + g_t) \times b_{t-1}, \quad (5)$$

[17] This issue is also pertinent in the consumer credit literature. The availability of Mintel data on credit card solicitations helps in creating a proxy for the supply of credit (Ru and Schoar, 2016). Unfortunately, we do not have data available on offers made by asset purchasers or security buyers. This is a limitation of our study.

[18] In unreported analysis, we use aggregate growth opportunities at the industry level and aggregate stock market return, instead of firm-level growth opportunities and excess return, as supply-related factors. The results remain unchanged.

where *EFN* is the external financing needed, *A* is total assets, *g* is the projected growth in sales, *PM* is the profit margin, *S* is sales, and *b* is the retention ratio. The subscript *t* denotes the year for which we are making the projections. Equation (5) assumes: 1) the firm currently operates at 100% capacity; 2) to meet the sales growth, total assets need to grow at the same rate as sales; 3) the profit margin, ratio of net income after taxes and interest to sales, remains constant over time; and 4) the retention ratio, ratio of retained earnings to net income, also remains constant over time.

The first part of the right-hand side of Equation (5) indicates the amount of additional assets (investment) required in year *t* to meet sales growth. The second part is the estimated retained earnings generated in year *t*. The internal growth rate, g^{IR}, is the growth rate at which the external financing needed in Equation (5) equals zero. By solving the equation, we obtain the following theoretical formula of the internal growth rate:

$$g_t^{IR} = \frac{ROA_{t-1} \times b_t}{1 - ROA_{t-1} \times b_t} = \frac{RE_t}{A_{t-1}}, \tag{6}$$

where *ROA* is the ratio of net income to total assets and *RE* is retained earnings. The internal growth rate indicates the level of growth a firm can achieve in a given year *t* without depending on any external financing sources. If a firm's asset growth exceeds its internal growth rate, it needs external financing.

We define a firm's external finance dependence (*EFD*) as the difference in the actual growth rate and the internal growth rate. A positive value of *EFD* for a given year suggests a firm was dependent on external financing to fund asset growth for that year. In other words, the internally generated funds were not sufficient and the firm had to rely on external financing. A negative value of *EFD* suggests that the internally generated funds were sufficient for asset growth that year. The larger the value of *EFD*, the higher is the demand for external financing.

For the empirical analysis, we compute the actual growth rate for a given year as the percentage change in total assets over the previous year. The theory states that the internal growth rate is the ratio of estimated retained earnings to previous-year total assets. Our proxy for the internal growth rate of a firm in a given year is the ratio of actual retained earnings for that year to total assets for the previous year. We winsorize the actual growth rate and internal growth rate before computing external finance dependence.

Our research question involves the effect of a firm's external finance dependence on the odds of issuing securities over selling assets. To further increase the independence of the variable of interest (*EFD*) from the outcome variable of financing choice, we use the previous-year value of *EFD*. That is, the choice of financing at time *t* is a function of *EFD* at time *t*–1. The reasoning is as follows. Based on the previous-year actual growth rate and estimated internal growth rate, we can classify a firm as either dependent or not dependent on external capital. A firm highly dependent on external financing has either large growth in total assets or large losses or a combination of the two. As an example, a small and growing firm tends to have higher asset growth. In addition, this firm may be in the early life-cycle stage, thereby having negative retained earnings. Suppose that, in the current year, this firm needs to invest. The managers will first use internally generated funds, if available. To meet an investment shortfall, they must decide whether to sell assets or issue financial securities. Based on its dependency on external financing in the previous year, the firm is likely to issue securities in the current year. It may not have enough assets to sell or may have productive assets with which it does not want to part. A similar analogy can be made for a large, profitable, and mature firm, which are more likely to sell assets.[19]

[19] We refer to Ross et al. (2009) and Brealey, Myers, and Marcus (2009) for a basic understanding of the external financing needed. Demirguc-Kunt and Maksimovic (1998) use external finance dependence as a measure of financing need to evaluate the impact of a country's legal and financial market development on its economic growth. Durnev and Kim (2005) measure external finance dependence as the difference between the actual growth and the sustainable

Table B2 of Appendix B reports summary statistics for the actual growth rate, our proxy for the internal growth rate, and external finance dependence (*EFD*) for all four categories (asset sales, security issuance, repurchase, and do nothing). The data are available for 2,374 asset sales and 25,295 security issuances. A firm in the asset sales category has, on average, an actual asset growth rate of 11% the year before it sells the assets. The same statistic for a firm in the security issuance category is 24%, which suggests that the security-issuing firm grows at a faster rate than the asset-selling firm. The average internal growth rate for an asset-selling firm is 17%, whereas the same statistic for a security-issuing firm is −17%. These divergent numbers indicate that a typical firm before a security issuance experiences negative retained earnings, whereas a firm before an asset sale generates higher internal capital. The average and median values of *EFD* for the asset sales sample is −0.059 and −0.159, respectively. The same statistics for the security issuance sample are 0.418 and −0.004. These differences suggest that security-issuing firms seem to have a greater dependence on external capital than do asset-selling firms.

Figure 2 shows the pattern of asset sales for different levels of external finance dependence. To plot this graph, we first distribute 27,669 firm-year observations of asset sales and security issuances in deciles based on their values of *EFD*.[20] We then count the number of asset sales (category: *AS*) for each decile. The number of asset sales decreases as we move from the 1st decile to the 10th decile. Overall, we observe that the number of asset sales decreases with a firm's dependence on external financing, whereas the number of security issuances increases. This

growth rate. The sustainable growth rate is the level of growth a firm can achieve by relying on internal sources and the external debt market. If a firm wants to achieve a growth rate higher than the sustainable growth rate, it must raise external equity. The underlying assumption in computing the sustainable growth rate is that the firm's debt-to-equity ratio remains the same. For our study, the internal growth rate is more appropriate than the sustainable growth rate, as we are mainly interested in a firm's financing choice between an asset sale and a security (debt and equity) issuance.

[20] The average values of *EFD* for deciles 1 through 10 are −0.556, −0.354, −0.250, −0.160, −0.070, 0.031, 0.162, 0.387, 0.901, and 3.686, respectively.

pattern seems to confirm the prediction of the balance sheet effect. Next, we assess the effect of external finance dependence on a firm's financing choice in a multivariate setting.

[Figure 2 here]

Table V reports the results of the empirical analysis of the effect of a firm's external finance dependence on its financing choice between issuing securities and selling assets, while controlling for other factors that may affect this choice. Specifications (1) and (2) use a logit regression model on the subsamples of asset sales and security issuances, and Specification (3) uses a multinomial logistic regression model on the full sample. The coefficient of 0.439 on *EFD* in Specification (2) indicates that a 1 percentage point increase in a firm's external finance dependence increases its odds of issuing securities over selling assets by 0.4%.

[Table V here]

For additional robustness checks, we use industry-level external finance dependence as suggested in Rajan and Zingales (1998).[21] They define external finance dependence for an industry as the ratio of capital expenditures minus funds from operations to the capital expenditures of all firms operating in that industry. In addition, we run a change regression model based on Lin, Ma, Malatesta, and Xuan (2013). We find that the balance sheet effect continues to hold. We document the results in Appendix C.

Taken together, the results in Tables IV and V show that the balance sheet effect holds. The odds of issuing securities over selling assets increases with the size of financing need.

C. Balance Sheet Effect for Debt Issuances and Equity Issuances

The balance sheet effect predicts that the likelihood of both debt and equity issuances over asset sales will increase with the size of financing need. To test this conjecture, we repeat the

[21] Duchin, Ozbas, and Sensoy (2010) and Dell'Ariccia, Detragiache, and Rajan (2008) use this same industry-level measure of external finance dependence.

analyses, separating the security issuance category into debt issuance and equity issuance subcategories.

We categorize a given security issuance as a debt issuance if the amount from the debt issuance is more than that from the equity issuance net of dividends. Similarly, we consider a given security issuance as an equity issuance if the amount from equity issuance net of dividends is more than that from debt issuance.[22] Therefore, in our multinomial logit analysis, we redefine the outcome variable. It equals one for the asset sale category (*AS*), two for the debt issuance category (*DI*), three for the equity issuance category (*EI*), and four for the security repossessions category (*Repo*). Finally, the fifth category represents the do-nothing category (*DN*) where a firm-year observation is not part of the first four categories. For the debt issuance category, the amount raised (*FinSize*) is the proceeds from debt issuance, and for the equity issuance category, that amount is the proceeds from equity issuance net of dividends.

Table B3 in Appendix B reports summary statistics for the debt issuance and equity issuance samples. The number of observations for the debt issuance category is 17,570 and for the equity issuance category is 8,704. The average values of *FinSize* for debt issuances and equity issuances are 0.116 and 0.135, respectively. The 10th and 90th percentile values of *FinSize* for the debt issuance subsample are 0.020 and 0.274, respectively. These statistics for the equity issuance subsample are 0.014 and 0.388, respectively. These descriptive statistics indicate that the amount raised by a typical asset sale is significantly smaller than the amount raised by either debt or equity issuance. We observe a similar pattern for *Inv_Int*, the net investment after using all internal capital. Regarding a firm's external finance dependence, we observe that the average value of *EFD*

[22] Recall that we define external financing through security issuance (*SecIss*) as the change in debt issuance plus the change in equity issuance minus dividend payment.

for a debt issuer is 0.126, whereas for an equity issuer it is 1.033. This suggests that equity-issuing firms are highly dependent on the external market for their asset growth.

Figure 3 shows the incidence of asset sales versus debt issuances and asset sales versus equity issuances for different sizes of financing need. On the *x*-axis, the amounts raised relative to total assets are categorized according to asset sales, debt issuances, or equity issuances in 12 financing size bins. The leftmost bin represents firm-year observations when the funds raised are between 1% and 2% of asset value, and the rightmost bin represents observations when the funds are more than 12% of asset value. The left *y*-axis shows the number of asset sales (light gray bars) and the right *y*-axis shows the percentage of asset sales. The dashed line with a triangle ($-\Delta-$) shows the ratio of the number of asset sales to the combined number of asset sales and debt issuances, expressed in percentages. The dashed-dot line with a circle ($-\cdot o -\cdot$) shows the ratio of the number of asset sales to the combined number of asset sales and equity issuances, again expressed in percentages. We report the total number of firm-year observations next to the data points. The number in parentheses near a triangle is the sum of asset sales and debt issuances for a given financing size bin. The number in brackets near a circle is the sum of asset sales and equity issuances for a given financing size bin. The sum of these numbers minus asset sales is 26,677, which is the number of asset sales and security issuances in our sample.[23]

[Figure 3 here]

The plot of asset sales versus debt issuance in Figure 3 is similar to that of asset sales versus security issuance in Figure 1. Among the 1,673 firms that raise funds between 1% and 2% of assets, 38% of firms sell assets and the remaining 62% issue debt securities. When we move to the next financing size bin, that is, 2% to 3% of total assets, the percentage of firms selling assets falls

[23] In our sample, the number of asset sales is 2,403. We lose 1 security issuance observation for this analysis.

to 26%—a decline of 12 percentage points. We do not observe a similar pattern for asset sales versus equity issuances. When the size of financing need is 1% to 2% of total assets, the proportion of asset sales is 31% of 2,036—the combined number of asset sales and equity issuances. When the amount raised is 2% to 3% of total assets, the proportion of assets sales decreases by just 1 percentage point. In fact, the ratio of the number of asset sales to the sum of asset sales and equity issuances remains almost flat until the financing is 11% of total assets. Looking at the incidence of asset sales versus debt issuances for the financing need of 11% of total assets, only 8% of sample firms sell assets and the remaining 92% issue debt. In our data, when the size of financing need is above 12%, we observe 0 asset sales, 6,387 debt issuances, and 3,273 equity issuances.[24]

Overall, Figure 3 suggests that a firm switches from an asset sale to an equity issuance at a much higher level of financing need than when switching from an asset sale to a debt issuance. It seems that the balance sheet effect is stronger for the financing choice of asset sale versus debt issuance than for asset sale versus equity issuance.

Table VI reports the results of a multinomial logistic regression model. The sample excludes the security repossessions category. For brevity, we report the results for asset sales versus debt issuances and asset sales versus equity issuances, and not for asset sales versus the do-nothing category. Specifications (1) and (2) use *FinSize* as the measure of a firm's financing need. In Specification (2), we use a reduced sample of observations where *FinSize* is below 12% of beginning-year total assets. In Specification (3), we use a firm's dependence on external finance as a measure of financing need.

[Table VI here]

[24] It should be noted that the sum of debt issuances and equity issuances for a given financing size bin is not equal to the number of security issuances for that same financing size bin, as reported in Figure 1. This is caused by the migration of firm-year security issuance across financing size bins, because we define security issuance as the sum of debt issuance and equity issuance.

As per the results of Specification (1), the coefficient of *FinSize* for the choice of debt issuance (equity issuance) versus asset sale is 23.147 (23.048). Therefore, the magnitude of the balance sheet effect is same for the choice of both asset sale versus debt issuance and asset sale versus equity issuance. However, if we limit the sample to observations when the amount raised is less than 12% of beginning-year total assets, we find differences. As reported in Specification (2), the coefficient of 20.178 on *FinSize* indicates that with a 1 percentage point increase in financing size, the odds of issuing debt over selling assets increase by 21%. In contrast, the coefficient of 4.658 on *FinSize* indicates that with a 1 percentage point increase in financing size, the odds of issuing equity over selling assets increase by only 4%. When using external finance dependence as a measure of financing need, as shown in Specification (3), we again find that the balance sheet effect influences a firm's financing choice between an asset sale and a debt issuance as well as between an asset sale and an equity issuance. A 1 percentage point increase in a firm's external finance dependence increases the odds of issuing debt over selling assets by 0.3%. The same level of change increases the odds of issuing equity over selling assets by 0.5%.

In summary, the results of Table VI provide evidence supporting the balance sheet effect for a firm's financing choice between an asset sale and a debt issuance as well as between an asset sale and an equity issuance. In addition, the threshold of financing amount at which the firm is indifferent between an asset sale and an equity issuance is high.

IV. Financing Need and the Choice between External and Internal Financing

Myers and Majluf (1984) recognize the possibility of separating assets-in-place from growth opportunities. They show that if a firm can sell its entire assets-in-place at the intrinsic value, the issue-invest problem in their model disappears. Myers and Majluf (1984) further broach the idea of splitting assets-in-place by stating that "if [part of assets-in-place] can be sold at

intrinsic value, the firm treats the proceeds as additional slack [internal capital] and looks again at the issue-invest decision" (p. 202). They leave for future research the possibility of an asset sale when the firm is unable to sell the assets at their intrinsic value.[25] The theory of Edmans and Mann (2018) fills this gap. They show that when the asset under consideration is small, the firm is likely to sell that asset at its intrinsic value because there is less information asymmetry regarding its valuation. In such cases, an asset sale is a better source of financing. Conversely, there is more information asymmetry regarding the valuation of a large asset. For greater financing needs, the firm prefers issuing securities. In this section, we report the results of an analysis assessing whether the size of investment need affects a firm's choice of external financing versus internal financing. We begin by constructing a revised categorical variable, then provide summary statistics and data patterns, and finally report the results of multivariate regressions.

We modify the variable construction because the research question has changed. We define the variable *Slack* as the sum of internally generated funds (*Internal*) and asset sale proceeds (*AssetSale*). Now, Equation (2) informs how much of the investment need has been financed through financial slack (internal capital) and how much through capital provided by the external market. We then compare *Slack* with the amount raised through security issuance (*SecIss*). Based on the variables in the modified Equation (2)—*Investment*, *Slack*, and *SecIss*—we redefine the category variable. The first category (*Int*) is for financing through internal resources including asset sales. The outcome variable equals one if the following conditions are met: 1) financial slack is at least 1% of beginning-year total assets, 2) financial slack is more than the amount from security issuances, and 3) the investment is positive. The second category (*Ext*) is for financing

[25] As per Myers and Majluf (1984), "What if the [part of] asset-in-place can only be sold at a discount? What if the potential buyer does not know its true value? What if [part of] sale of the asset-in-place reduces [the growth opportunities]? These questions are worth exploring" (p. 202).

through external sources of security issuance. The outcome variable equals two under the following conditions: 1) the security issuance amount is at least 1% of beginning-year total assets, 2) the security issuance amount is more than the financial slack, and 3) the investment is positive. The third category (*NINV*) refers to instances when a firm repurchases/issues securities, but the investment amount is negative. The outcome variable equals three if the following conditions are met: 1) the absolute value of the security issuance is at least 1% of beginning-year total assets and 2) the investment is negative. Finally, the fourth category (*REM*) is for the "remaining" firm-year observations not covered under the three previously mentioned categories.

Table VII reports the summary statistics. The number of firm-year observations for the internal resource and external capital categories are 54,204 and 14,434, respectively. The average value of financial slack for a firm financing the investment through internal resources is 13% of its beginning-year total assets. For a firm that relies on external capital for investment purposes, the average proceeds from a security issuance are 17% of its beginning-year total assets. More important, the typical investment size for firms relying on internal capital is 10% of their beginning-year total assets, whereas for firms dependent on the external capital market it is 16%. It seems that larger investment need is associated with a higher incidence of external financing. The average and median values of external finance dependence, *EFD*, are 0.494 and 0.037, respectively, for the external category (*Ext*). These statistics are −0.026 and −0.198 for the internal category (*Int*), which is intuitive. If a firm can generate sufficient internal funds, it is less likely to be dependent on external financing.

[Table VII here]

Before the multivariate regression models, we plot the patterns of external financing versus internal financing for different levels of investment size in Figure 4. On the *x*-axis, we separate the

investment sizes into 5% intervals of beginning-year total assets. The left *y*-axis shows the number of firm-year observations (light gray bars) for the external category (*Ext*). The right *y*-axis shows the ratio of the number of external financing observations to the sum of internal financing and external financing observations, expressed as percentages. A large number of observations, both internal and external financing, are concentrated in the 0% to 5% of investment size range. This is also evident from the median values of investment for these two groups in Table VII. As investment need increases, the number of both external and internal financing observations declines. More important, the proportion of external financing observations gradually increases with investment need, suggesting the presence of the balance sheet effect.

[Figure 4 here]

Table VIII reports regression results for the firm's choice between external and internal financing. Specifications (1) and (2) are the logit and multinomial logit models, respectively, using *Investment* as the variable of interest. Specifications (3) and (4) are robustness checks. Specification (3) is a two-stage regression model. In the first-stage ordinary least squares regression, *Investment* is the dependent variable, and in the second-stage logit regression, the residual of *Investment* is the variable of interest. In Specification (4), dependence on external financing (*EFD*) replaces *Investment* as the variable of interest.

[Table VIII here]

The results in Table VIII show that a firm's likelihood of raising money through external sources increases with its size of investment need. The coefficient of 3.755 on *Investment* (Specification (1)) suggests that a 1 percentage point increase in a firm's investment requirement increases its odds of using external sources versus internal sources by 3.8%. This indicates that the balance sheet effect provides a new perspective for understanding a firm's issue-invest problem.

Conventional wisdom suggests that a firm prefers internal capital to security issuance. However, empirical results show that firms seem to change their position as the size of investment need increases. We find similar results for the multivariate logistic regression (Specification (2)) and the two-stage regression model (Specification (3)) as well as when we replace investments by external finance dependence (*EFD* in Specification (4)).

Overall, the results in Table VIII suggest that the balance sheet effect is also applicable in the Myers and Majluf (1984) framework. As the size of investment need increases, a firm is more likely to resort to external financing over internal financing (H2).

V. Balance Sheet Effect and Firm Characteristics

In Table III, we report that firm characteristics explain a firm's financing choice between asset sale and security issuance. The likelihood of a security issuance increases with growth opportunities and size. We also find some evidence that the likelihood of an asset sale increases with firm leverage. In this section, we report the results of tests assessing sensitivity of balance sheet effect to firm characteristics. We focus on three firm characteristics – growth opportunity, leverage, and firm size.

We use a sample of 19,843 observations of asset sales and security issuances where the amount of financing is less than 12% of total assets. We categorize firm-year observations as high growth (above-median) or low growth (below-median). The variable *HighQ* equals one if a firm-year observation has an above-median Tobin's Q, and zero otherwise. Similar definitions apply to the dummy variables *HighLev* and *BigSize*, based on the leverage and firm size, respectively.[26]

[26] The median values of Tobin's Q, leverage, and ln(size) for the sample of 19,843 observations are 1.336, 0.229, and 5.92, respectively.

Figures 5–7 show the data pattern for a given dummy category. As shown in Figure 5, the number of asset sales and the proportion of asset sales to security issuances are lower for high-growth firms at each level of financing size. A growing firm is less likely to sell off its growth-generating asset, and a value firm might sell assets to generate growth opportunities. More important, trends in the proportion of asset sales to financing size are similar for subsamples of high-growth and low-growth firms. This observation indicates that sensitivity of financing choice to the size of financing for a low-growth firm is no different from that for a high-growth firm.

[Figure 5 here]

Figure 6 shows the number and proportion of asset sales for a given financing size for high leverage and low leverage firms. First, the patterns suggest that a firm with a high leverage is more likely to sell an asset for financing purposes. This supports the hypothesis that an asset sale helps reduce the bondholder-shareholder conflict (Arnold et al., 2018). Second, trends in the incidence of an asset sale to the size of financing need look similar for high and low leverage firms, suggesting indifference in the balance sheet effect for both groups.

[Figure 6 here]

Figure 7 shows the number of asset sales and the proportion of asset sales to security issuances at different levels of financing need, for big and small firms. In our data, the number of asset sales is same for big and small firms when the financing raised is between 1% and 2% of total assets (314). After that, for each level of financing need, the number and proportion of asset sales for small firms is higher than that for big firms. These findings suggest that big firms have better access to the capital market (e.g., availability of credit rating) for a security issuance. More important for our research, we observe dissimilar trends in asset sales for big and small firms when the size of financing need increases. For big firms, we find that the percentage of asset sales

gradually decreases with an increase in financing size. However, for small firms, we find a flat pattern when the financing need is 4% to 9% of total assets. This finding suggests that sensitivity of choice of financing to the amount raised for larger firms is higher than that for smaller firms. In other words, the balance sheet effect seems to magnify with firm size.

[Figure 7 here]

Table IX reports the results of the logit regression model, where the dependent variable equals one if the firm-year observation is a security issuance (*SI*) and zero if it is an asset sale (*AS*). We focus on the interaction coefficient of *FinSize* and a dummy variable (*HighQ*, *HighLev*, or *BigSize*). A positive value suggests that an increase in a given firm characteristic increases the sensitivity of financing choice to the size of financing need. As reported in Table IX, we do not find notable significance for any of the interaction terms. In Specification (7), we find mild support (statistical significance at the 10% level) for leverage affecting the balance sheet effect. Overall, the balance sheet effect seems to be unrelated to firm characteristics.[27]

[Table IX here]

VI. Conclusions

[27] The theory in Edmans and Mann (2018) focuses on selling noncore assets versus issuing securities. The availability of noncore assets in a firm indicates a higher probability of selling assets. Furthermore, a firm is less likely to sell its productive assets, either core or noncore, to finance new investments, particularly if these assets can be used as collateral to raise new debt financing. In contrast, a firm is more likely to sell value-destroying noncore assets. Because our sample construction is based on accounting data, not transaction-level data, we can observe the amount raised from an asset sale, but we do not know whether this amount is from selling noncore assets or core assets. We partially address this limitation by using segment-level data from Compustat. Our hypotheses are: 1) the probability of an asset sale is higher for a multisegment firm, and 2) a multisegment firm with fewer productive assets is more likely to undertake an asset sale. We create a dummy variable that equals one if a firm reports sales in more than one business segment or geographical area, and zero otherwise. We create three continuous variables to measure asset productivity of a multisegment firm. First, we identify firms with large variations in investment opportunities across segments. A firm with higher dispersion in investment opportunities is more likely to have more obvious "underperforming" segments (relative to its other segments), which perhaps will lead to a higher probability of asset sales. We measure a segment's investment opportunity as the median Tobin's Q of firms operating in the same three-digit SIC industry as the segment. The other two measures of asset productivity are relative value added and relative investment efficiency across segments (Rajan, Servaes, and Zingales, 2000). In unreported results, we find inconclusive evidence supporting our hypotheses. The likelihood of asset sales versus security issuances does not depend on whether a firm is a multisegment firm or a single-segment firm. In addition, among the sample of multisegment firms, we find an insignificant effect of asset productivity measures on the financing choice between asset sales and security issuances.

An empirical investigation of a firm's choice to obtain financing through an asset sale or a security issuance (debt or equity offering) has not been done in the corporate finance literature. Our research helps fill in this gap. We focus on the size of financing need as a potential determinant of a firm's financing choice between an asset sale and a security issuance. The theoretical work of Edmans and Mann (2018) identifies the balance sheet effect. It predicts that the probability of a security issuance (asset sale) increases (decreases) with the size of financing need.

Our results show that the likelihood of a security issuance versus an asset sale increases with the size of financing need, supporting the prediction of the balance sheet effect. Our results are robust to alternative measures of a firm's financing need that are relatively independent of the actual amount of financing raised. We observe that a firm switches from an asset sale to an equity issuance at a much higher level of financing need than it does for a debt issuance. We also find that the prediction of the balance sheet effect applies in the Myers and Majluf (1984) framework of a firm's choice between external and internal financing. The probability of external financing increases with the size of investment need of a firm. We are hopeful that our research is beneficial to both academics and practitioners.

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Table I. Year- and Industry-Based Distribution of the Sample

This table reports the frequency distribution of the sample by year (Panel A) and industry (Panel B) based on the outcome categories. The sample includes 76,968 firm-year observations involving 7,134 firms from 1971 to 2016. The main data source is the flow-of-funds statements from Compustat. The sample selection procedure is described in Section II.A. We categorize a given firm-year observation in one of four mutually exclusive categories: whether a transaction involves financing through an asset sale (*AS*), financing through a security issuance (*SI*), repossession of securities through either an equity repurchase or debt repayment (*Repo*), and no significant financing or repurchasing, "do-nothing" (*DN*). To define these categories, we use combinations of variables from the equation: $Inv\_Int_t = AssetSale_t + SecIss_t$, where *Inv_Int* is the investment net of internal financing, *AssetSale* is asset sale proceeds, *SecIss* is financing through security (debt or equity) issuance or repurchase of securities, and *t* denotes the current year. The *AS* category includes observations where *AssetSale* is at least 1% of beginning-year total assets, *AssetSale* is more than *SecIss*, and *Inv_Int* is positive. The *SI* category includes observations where *SecIss* is at least 1% of beginning-year total assets, *SecIss* is more than *AssetSale*, and *Inv_Int* is positive. The *Repo* category includes observations where the *SecIss* is negative, *SecIss* is at least 1% of beginning-year total assets, and *Inv_Int* is negative. Finally, the *DN* category includes all observations that are not in any of the previously mentioned three categories. For Panel B, the two-digit Standard Industrial Classification (SIC) is as per the U.S. Department of Labor.

Panel A. Year-Based Distribution

Years	**Outcome Category**				**Total**
	AS	***SI***	***Repo***	***DN***	
1971–1975	137	755	1,175	378	2,445
1976–1980	177	1,052	1,610	401	3,240
1981–1985	355	1,977	2,711	753	5,796
1986–1990	418	3,351	4,233	1,337	9,339
1991–1995	311	4,141	5,095	1,761	11,308
1996–2000	323	5,086	4,979	1,849	12,237
2001–2005	277	3,916	5,298	2,150	11,641
2006–2010	192	2,873	5,272	1,864	10,201
2011–2016	213	3,124	5,614	1,810	10,761
Total	2,403	26,275	35,987	12,303	76,968

Panel B. Industry-Based Distribution

Industry	**2-Digit SIC**	**Outcome Category**				**Total**
		AS	***SI***	***Repo***	***DN***	
Agriculture, forestry, and fishing	01-09	17	102	169	42	330
Mining	10-14	279	1,800	1,510	519	4,108
Construction	15-17	63	558	535	196	1,352
Manufacturing	20-39	1,003	14,382	21,898	7,141	44,424
Transportation, communications, electric, gas, and sanitary services including unregulated utilities	40-48	346	1,730	2,378	670	5,124
Wholesale trade	50-51	115	1,362	1,695	518	3,690
Retail trade	52-59	243	2,226	3,199	1,001	6,669
Services	70-79	337	4,115	4,603	2,216	11,271
Total		2,403	26,275	35,987	12,303	76,968

Table II. Descriptive Statistics Based on the Outcome Category

This table reports summary statistics for variables based on the outcome category. The four categories are defined in Section II.B and Table I. *Internal* is the difference in operating cash flows and change in cash holdings. *SecIss* is the proceeds from security issuance or the amount used for the repossession of a security. *AssetSale* is the proceeds from asset sale. *Investment* is the cash used for capital expenditure, acquisitions, and other investments. *Inv_Int* equals *Investment* minus *Internal*. *FinSize* is the amount raised through an asset sale or a security issuance, or the amount paid for repurchasing securities. *Leverage* is the ratio of the book values of total debt to total assets. *Q* is the ratio of market to book value of assets. *Size* is the market value of assets. *Age* is the number of years the firm has appeared on the Center for Research in Security Prices (CRSP) database before the firm-year observation. *SalesGth* is the annual growth in sales for the current year. *Tangibility* is the ratio of net property, plant, and equipment to total assets. *ExcessRet* is the average of the monthly excess returns, measured as the difference in the firm and value-weighted market index returns. *ROA* is net income divided by total assets. *IdioVola* is the residual of the market model and is computed based on daily returns of the previous year. *KZ-index* is the measure to capture the degree of a firm's financing constraints. We use beginning-year data for the control variables. The abbreviations *N*, SD, and P refer to the number of observations, standard deviation, and percentile, respectively.

Variables	**Asset Sales (*AS*) (*N* = 2,403)**					**Security Issuances (*SI*) (*N* = 26,275)**					**Repossessions (*Repo*) (*N* = 35,987)**		**Do Nothing (*DN*) (*N* = 12,303)**	
	Mean	**Median**	**SD**	**P10**	**P90**	**Mean**	**Median**	**SD**	**P10**	**P90**	**Mean**	**Median**	**Mean**	**Median**
Panel A. Cash-Flow Identity Variables														
Internal	0.086	0.076	0.094	-0.008	0.201	0.036	0.042	0.149	-0.126	0.194	0.121	0.110	0.062	0.050
SecIss	-0.005	-0.004	0.029	-0.039	0.026	0.123	0.072	0.134	0.017	0.307	-0.065	-0.050	0.000	0.000
AssetSale	0.045	0.035	0.030	0.013	0.094	0.003	0.000	0.010	0.000	0.008	0.003	0.000	0.001	0.000
Investment	0.126	0.108	0.103	0.021	0.263	0.162	0.126	0.161	0.014	0.378	0.060	0.051	0.063	0.050
Panel B. Variables of Interest														
Inv_Int	0.040	0.026	0.040	0.006	0.095	0.126	0.075	0.135	0.018	0.313	-0.061	-0.046	0.001	0.001
FinSize	0.045	0.035	0.030	0.013	0.094	0.123	0.072	0.134	0.017	0.307	-0.062	-0.047	0.001	0.000
Panel C. Control Variables														
Q	1.300	1.100	0.700	0.800	1.970	1.850	1.450	1.200	0.890	3.370	1.630	1.330	1.630	1.310
Leverage	0.270	0.264	0.194	0.003	0.535	0.224	0.201	0.189	0.000	0.489	0.226	0.208	0.179	0.128
ln(*Size*)	5.820	5.690	1.760	3.650	8.160	5.890	5.790	1.790	3.620	8.300	6.430	6.350	5.950	5.860
ln(*Age*)	2.580	2.640	0.840	1.390	3.660	2.300	2.400	0.940	1.100	3.470	2.760	2.830	2.290	2.400
SalesGth	0.155	0.041	0.951	-0.241	0.347	0.274	0.086	1.143	-0.238	0.551	0.139	0.038	0.187	0.045
Tangibility	0.454	0.426	0.237	0.150	0.798	0.304	0.238	0.236	0.053	0.686	0.301	0.258	0.259	0.198
ExcessRet	-0.017	-0.080	0.449	-0.510	0.504	0.027	-0.059	0.517	-0.511	0.629	0.047	-0.016	-0.011	-0.084
ROA	0.002	0.023	0.109	-0.104	0.080	-0.012	0.028	0.156	-0.177	0.100	0.041	0.050	-0.017	0.026
IdioVola	0.491	0.426	0.268	0.235	0.830	0.512	0.447	0.271	0.239	0.875	0.419	0.345	0.535	0.465
KZ-index	0.319	0.358	1.009	-0.823	1.503	0.517	0.580	0.964	-0.531	1.617	-0.683	-0.426	0.167	0.129

Table III. Size of Financing Need and Financing Choice: Baseline Results

This table reports the results of a multinomial logistic regression for the outcome categories asset sales (*AS*), security issuance (*SI*), and do nothing (*DN*). The categories are defined in Section II.B and Table I. We exclude observations of security repossessions (*Repo*). Variables are defined in Section II.C and Table II. For brevity, we report the regression results of the category *DN* versus *AS* only for Specification (1). Specification (4) is the reduced sample where *FinSize* is less than 12% of beginning-year total assets. Each specification includes year dummies to control for time fixed effects. Clustered standard errors at the firm level are in parentheses below the coefficients.

Variables	**(1)**		**(2)**	**(3)**	**(4)**
	SI* vs. *AS	***DN* vs. *AS***	***SI* vs. *AS***	***SI* vs. *AS***	***SI* vs. *AS***
FinSize	16.452	-1069.944			8.068
	(0.718)***	(40.524)***			(1.217)***
Investment			20.601		
			(1.099)***		
Internal			-22.154		
			(1.043)***		
Inv_Int				20.795	
				(1.097)***	
Leverage	-0.681	-0.064	-0.751	-0.657	-0.618
	(0.224)***	(0.359)	(0.225)***	(0.227)***	(0.223)***
Q	0.357	0.299	0.394	0.349	0.353
	(0.058)***	(0.067)***	(0.062)***	(0.057)***	(0.057)***
ln(*Size*)	0.144	0.162	0.150	0.150	0.137
	(0.025)***	(0.037)***	(0.026)***	(0.026)***	(0.025)***
ln(*Age*)	-0.261	-0.141	-0.268	-0.266	-0.252
	(0.039)***	(0.059)**	(0.040)***	(0.039)***	(0.038)***
SalesGth	0.006	0.049	-0.000	-0.003	0.005
	(0.031)	(0.056)	(0.032)	(0.031)	(0.031)
Tangibility	-2.520	-1.962	-2.434	-2.649	-2.460
	(0.158)***	(0.270)***	(0.155)***	(0.162)***	(0.153)***
ExcessRet	0.160	0.306	0.186	0.165	0.147
	(0.053)***	(0.098)***	(0.055)***	(0.054)***	(0.053)***
ROA	-0.220	-0.176	-0.003	-0.280	-0.174
	(0.242)	(0.358)	(0.238)	(0.243)	(0.242)
IdioVola	-0.317	-0.275	-0.325	-0.276	-0.317
	(0.128)**	(0.221)	(0.131)**	(0.131)**	(0.127)**
KZ-index	0.189	0.101	0.147	0.152	0.185
	(0.032)***	(0.069)	(0.033)***	(0.033)***	(0.032)***
Constant	1.903	11.889	2.001	1.956	2.151
	(0.827)**	(1.184)***	(0.846)**	(0.860)**	(0.823)***
Pseudo R^2	0.752		0.703	0.703	0.718
Observations	40,632		40,632	40,632	31,861

***Significant at the 0.01 level.
**Significant at the 0.05 level.

Table IV. Robustness Check: Two-Stage Regression

This table reports the results of a two-stage regression model. The first stage is the ordinary least squares (OLS) regression where the dependent variable is our variable of interest, *FinSize* or *Inv_Int*. The second stage is the logit regression for the choice between an asset sale and a security issuance. Specification (2) is the reduced sample where *FinSize* is less than 12% of beginning-year total assets. In both stages, each specification includes year dummies to control for the time effects. The abbreviation Res refers to residuals from the first-stage regression. Variables are defined in Table II. Cluster standard errors at the firm level are in parentheses below the coefficients.

Variables	**Using *FinSize***			**Using *Inv_Int***	
	(1)		**(2)**	**(3)**	
	Full Sample		**Reduced Sample**	**Full Sample**	
	1st-Stage OLS	**2nd-Stage Logit *SI* vs. *AS***	**2nd-Stage Logit *SI* vs. *AS***	**1st-Stage OLS**	**2nd-Stage Logit *SI* vs. *AS***
Res(*FinSize*)		16.430	8.036		
		(0.716)***	(1.215)***		
Res(*Inv_Int*)					20.537
					(1.073)***
Q	0.009	0.508	0.428	0.009	0.536
	(0.000)***	(0.057)***	(0.057)***	(0.000)***	(0.055)***
Leverage		-0.660	-0.599		-0.564
		(0.224)***	(0.222)***		(0.228)**
ln(*Size*)		0.142	0.135		0.144
		(0.025)***	(0.025)***		(0.026)***
ln(*Age*)		-0.261	-0.252		-0.257
		(0.039)***	(0.038)***		(0.039)***
SalesGth		0.005	0.004		-0.002
		(0.031)	(0.031)		(0.031)
Tangibility		-2.522	-2.461		-2.650
		(0.158)***	(0.153)***		(0.161)***
ExcessRet	0.004	0.227	0.179	0.004	0.245
	(0.001)***	(0.053)***	(0.053)***	(0.001)***	(0.054)***
ROA		-0.233	-0.185		-0.262
		(0.242)	(0.241)		(0.244)
IdioVola		-0.323	-0.322		-0.284
		(0.128)**	(0.127)**		(0.129)**
KZ-index		0.187	0.183		0.137
		(0.032)***	(0.032)***		(0.032)***
CreditSpread	0.061			0.067	
	(0.090)			(0.091)	
Constant	-0.083	1.719	2.062	-0.088	1.515
	(0.096)	(0.833)**	(0.829)**	(0.097)	(0.867)*
R^2	0.017			0.017	
Pseudo R^2		0.193	0.112		0.222
Observations	76,968	28,459	19,688	76,968	28,459

***Significant at the 0.01 level.
**Significant at the 0.05 level.
*Significant at the 0.10 level.

Table V. Robustness Check: External Finance Dependence

This table reports the results of a firm's financing choice between an asset sale and a security issuance in given year *t* using the previous year's external finance dependence as a variable of interest. A given firm-year observation can be in any of the four mutually exclusive categories (*AS*, *SI*, *Repo*, or *DN*). The categories are defined in Table I. Specifications (1) and (2) use subsamples of asset sales and security issuances, and Specification (3) uses the full sample. Each specification includes year dummies to control for time effects. The external finance dependence (*EFD*) is growth in total assets over the previous year minus the ratio of retained earnings to previous-year total assets. The other variables are defined in Table II. Cluster standard errors at the firm level are in parentheses below the coefficients.

Variables	**Logit Model**		**Multinomial Logit Model**		
	(1)	**(2)**	**(3)**		
	SI* vs. *AS	***SI* vs. *AS***	***SI* vs. *AS***	***Repo* vs. *AS***	***DN* vs. *AS***
EFD	0.653	0.439	0.317	-0.000	0.323
	(0.070)***	(0.073)***	(0.052)***	(0.053)	(0.053)***
Q		0.460	0.363	0.173	0.052
		(0.067)***	(0.054)***	(0.053)***	(0.053)
Leverage		-1.090	-1.714	3.398	-2.318
		(0.218)***	(0.258)***	(0.258)***	(0.267)***
ln(*Size*)		0.076	0.080	0.037	0.168
		(0.025)***	(0.024)***	(0.025)	(0.025)***
ln(*Age*)		-0.173	-0.169	0.030	-0.273
		(0.042)***	(0.040)***	(0.042)	(0.042)***
SalesGth		0.011	0.013	-0.008	-0.042
		(0.029)	(0.027)	(0.027)	(0.028)
Tangibility		-2.010	-2.065	-3.056	-2.911
		(0.147)***	(0.152)***	(0.157)***	(0.162)***
ExcessRet		0.229	0.259	0.270	0.016
		(0.052)***	(0.054)***	(0.055)***	(0.057)
ROA		0.240	0.202	1.041	0.624
		(0.255)	(0.228)	(0.243)***	(0.235)***
IdioVola		-0.598	-0.556	-0.138	0.256
		(0.126)***	(0.121)***	(0.126)	(0.126)**
KZ-index		0.360	0.474	-0.810	0.083
		(0.028)***	(0.040)***	(0.038)***	(0.039)**
Constant	2.530	2.811	3.308	2.633	4.579
	(0.735)***	(0.805)***	(0.786)***	(0.779)***	(0.776)***
Pseudo R^2	0.046	0.116		0.169	
Observations	27,669	27,480		74,172	

***Significant at the 0.01 level.
**Significant at the 0.05 level.

Table VI. Financing through Asset Sales versus Debt or Equity Issuances

This table reports the results of a multinomial logistic regression of financing choice between an asset sale and a debt issuance, and between an asset sale and an equity issuance. For a given firm-year observation, the dependent variable is in any of the five mutually exclusive categories: *AS*, *DI*, *EI*, *Repo*, or *DN*. The categories *AS*, *SI*, *Repo*, and *DN* are defined in Table I. The subcategories *DI* and *EI* are part of the security issuance (*SI*) category. We place a firm-year observation in the *DI* (*EI*) subcategory if the proceeds from debt issuance are higher (lower) than from equity issuance. The sample excludes observations of security repossessions (*Repo*). The variables of interest are *FinSize* and *EFD*. *FinSize* is the actual amount of financing raised through asset sales, debt issuances, or equity issuances. *EFD* is the growth in total assets over the previous year minus the ratio of retained earnings to previous-year total assets. The other variables are defined in Table II. Except for *FinSize*, all variables are measured at their one-year lag value. For brevity, we do not report the results of *DN* versus *AS*. Each specification includes year dummies to control for time fixed effects. Clustered standard errors at the firm level are in parentheses below the coefficients. Specification (2) is the reduced sample where *FinSize* is less than 12% of beginning-year total assets.

Variables	**(1)**		**(2)**		**(3)**	
	DI* vs. *AS	***EI* vs. *AS***	***DI* vs. *AS***	***EI* vs. *AS***	***DI* vs. *AS***	***EI* vs. *AS***
FinSize	23.147	23.048	20.178	4.658		
	(0.932)***	(0.938)***	(1.402)***	(1.516)***		
EFD					0.322	0.495
					(0.066)***	(0.068)***
Leverage	-1.645	-1.766	-1.360	-2.203	-1.376	-1.496
	(0.239)***	(0.251)***	(0.242)***	(0.266)***	(0.219)***	(0.232)***
Q	0.087	0.673	0.028	0.682	0.224	0.772
	(0.060)	(0.062)***	(0.061)	(0.063)***	(0.063)***	(0.064)***
ln(*Size*)	0.166	0.092	0.144	0.173	0.089	0.002
	(0.026)***	(0.028)***	(0.026)***	(0.029)***	(0.024)***	(0.027)
ln(*Age*)	-0.151	-0.719	-0.117	-0.704	-0.079	-0.465
	(0.040)***	(0.045)***	(0.041)***	(0.047)***	(0.041)*	(0.046)***
SalesGth	0.007	-0.003	0.009	-0.005	0.011	0.010
	(0.033)	(0.034)	(0.032)	(0.035)	(0.028)	(0.030)
Tangibility	-2.308	-3.349	-2.211	-3.355	-1.791	-2.725
	(0.163)***	(0.182)***	(0.162)***	(0.192)***	(0.149)***	(0.171)***
ExcessRet	-0.183	0.794	-0.203	0.810	-0.078	0.920
	(0.060)***	(0.061)***	(0.061)***	(0.063)***	(0.056)	(0.058)***
ROA	0.868	-1.249	0.577	-0.737	0.955	-0.891
	(0.264)***	(0.271)***	(0.261)**	(0.278)***	(0.250)***	(0.258)***
IdioVola	-0.490	0.326	-0.535	0.402	-0.869	-0.156
	(0.136)***	(0.145)**	(0.137)***	(0.155)***	(0.128)***	(0.138)
KZ-index	0.590	0.133	0.578	0.106	0.569	0.072
	(0.038)***	(0.039)***	(0.040)***	(0.043)**	(0.036)***	(0.034)**
Constant	1.300	0.709	1.402	0.936	3.042	2.362
	(0.885)	(1.060)	(0.868)	(1.166)	(0.797)***	(0.949)**
Pseudo R^2	0.589		0.607		0.138	
Obs.	40,631		31,040		39,125	

***Significant at the 0.01 level.
**Significant at the 0.05 level.
*Significant at the 0.10 level.

Table VII. Financing through Internal versus External Sources: Summary Statistics

This table reports summary statistics for our analysis of the effect of the size of investment need on the choice of external versus internal financing. We categorize a given firm-year observation in one of the four mutually exclusive categories: whether a transaction involves internal financing (*Int*), external financing through a security issuance (*Ext*), repossession of securities where the investment is negative (*NINV*), and no significant financing or repurchasing, "remaining" (*REM*). These categories are formed using combinations of variables of the equation: $Investment_t = Slack_t + SecIss_t$, where *Investment* is the investment need of the firm, *Slack* is the sum of internally generated funds and asset sale proceeds, *SecIss* is financing through security issuance or repurchase of securities, measured in the current year *t*. The *Int* category includes observations where financial slack is at least 1% of beginning-year total assets, it is more than the amount from security issuances, and the investment is positive. The *Ext* category includes observations where the security issuance amount is at least 1% of beginning-year total assets, it is more than that of the financial slack, and the investment is positive. The *NINV* category includes observations where the absolute value from security issuance is at least 1% of beginning-year total assets and the investment is negative. Finally, the *REM* category includes observations that are not included in the three previously mentioned categories. The variable external finance dependence (*EFD*) is the growth in total assets over the previous year minus the ratio of retained earnings to previous-year total assets. Other variables are defined in Table II. Except for *Slack*, *SecIss*, *and Investment*, all variables are measured at their one-year lag value. The abbreviations *N*, SD, and P refer to the number of observations, standard deviation, and percentile, respectively.

Variables	**Internal (*Int*) (*N* = 54,204)**					**External (*Ext*) (*N* = 14,434)**					***NINV*** **(*N* = 3,894)**	***REM*** **(*N* = 4,436)**
	Mean	**Median**	**SD**	**P10**	**P90**	**Mean**	**Median**	**SD**	**P10**	**P90**	**Mean**	**Mean**
Slack	0.129	0.113	0.079	0.043	0.235	-0.014	0.001	0.126	-0.156	0.111	0.032	-0.072
SecIss	-0.026	-0.022	0.062	-0.099	0.036	0.174	0.125	0.152	0.032	0.398	-0.094	0.036
Investment	0.104	0.076	0.097	0.020	0.220	0.161	0.101	0.167	0.017	0.402	-0.062	-0.044
EFD[a]	-0.026	-0.198	0.899	-0.575	0.509	0.494	0.037	1.561	-0.383	1.700	0.064	1.442
Q	1.670	1.350	1.020	0.840	2.850	1.780	1.400	1.140	0.880	3.170	1.540	1.900
Leverage	0.216	0.197	0.180	0.000	0.460	0.242	0.223	0.191	0.001	0.511	0.231	0.168
ln(*Size*)	6.300	6.230	1.980	3.760	8.980	5.650	5.530	1.750	3.460	8.000	6.260	5.810
ln(*Age*)	2.630	2.710	0.900	1.390	3.780	2.220	2.300	0.960	0.690	3.400	2.740	1.930
SalesGth	0.173	0.051	0.908	-0.164	0.347	0.281	0.081	1.188	-0.275	0.582	0.100	0.240
Tangibility	0.321	0.273	0.223	0.069	0.671	0.281	0.217	0.223	0.050	0.641	0.217	0.182
ExcessRet	0.042	-0.024	0.442	-0.410	0.527	0.014	-0.078	0.536	-0.542	0.649	0.010	-0.066
ROA	0.037	0.046	0.101	-0.041	0.128	-0.028	0.020	0.159	-0.211	0.084	-0.006	-0.144
IdioVola	0.433	0.365	0.248	0.198	0.750	0.547	0.479	0.285	0.255	0.934	0.506	0.672
KZ-index	-0.303	-0.041	1.365	-2.447	1.198	0.689	0.769	0.948	-0.340	1.755	-0.837	0.342

[a] Number of observations: *Int*: 53,109; *Ext*: 13,694; *NINV*: 3,817; *REM*: 4,072.

Table VIII. Balance Sheet Effect and External versus Internal Financing

This table reports the results of the balance sheet effect on a firm's choice between external and internal financing. The definition of four categories *Ext*, *Int*, *NINV*, and *REM* are given in Table VII. The variable *Investment* is the size of investments of the firm. The external finance dependence (*EFD*) is the growth in total assets over the previous year minus the ratio of retained earnings to previous-year total assets. Other variables are defined in Table II. Except for *Investment*, all variables are measured at their one-year lag value. Clustered standard errors at the firm level are in parentheses below the coefficients. OLS refers to ordinary least squares, and Res refers to residuals.

Variables	**(1)**	**(2)**			**(3) Two-Stage**		**(4)**
	Logit	**Multinomial Logit**			**OLS**	**Logit**	**Logit**
	Ext* vs. *Int	***Ext* vs. *Int***	***NINV* vs. *Int***	***REM* vs. *Int***	**Dep. Var. *Investment***	***Ext* vs. *Int***	***Ext* vs. *Int***
Investment	3.755	3.761	-318.098	-309.977			
	(0.117)***	(0.118)***	(10.186)***	(10.251)***			
Res(*Investment*)						3.755	
						(0.117)***	
EFD							0.123
							(0.012)***
Leverage	-0.914	-1.037	0.865	-3.969		-0.914	-2.033
	(0.108)***	(0.107)***	(0.215)***	(0.265)***		(0.108)***	(0.118)***
Q	-0.023	-0.005	-0.324	-0.047	0.021	0.055	0.028
	(0.014)*	(0.014)	(0.044)***	(0.038)	(0.000)***	(0.014)***	(0.014)**
Ln(*Size*)	-0.055	-0.062	0.146	0.200		-0.055	-0.055
	(0.009)***	(0.009)***	(0.021)***	(0.023)***		(0.009)***	(0.009)***
Ln(*Age*)	-0.185	-0.193	-0.035	-0.826		-0.185	-0.094
	(0.016)***	(0.016)***	(0.035)	(0.042)***		(0.016)***	(0.016)***
SalesGth	0.020	0.020	0.042	0.041		0.020	0.030
	(0.010)**	(0.010)**	(0.034)	(0.034)		(0.010)**	(0.010)***
Tangibility	-1.208	-1.171	0.277	-0.202		-1.208	-0.547
	(0.073)***	(0.072)***	(0.171)	(0.209)		(0.073)***	(0.071)***
ExcessRet	-0.033	-0.093	-0.219	-0.256	0.024	0.058	-0.000
	(0.024)	(0.023)***	(0.068)***	(0.069)***	(0.001)***	(0.024)**	(0.023)
ROA	-2.715	-2.515	0.760	-0.690		-2.715	-1.922
	(0.117)***	(0.115)***	(0.254)***	(0.232)***		(0.117)***	(0.117)***
IdioVola	0.044	0.012	0.332	0.516		0.044	-0.168
	(0.060)	(0.054)	(0.130)**	(0.137)***		(0.060)	(0.059)***
KZ-index	0.757	0.784	-0.138	0.688		0.757	0.989
	(0.022)***	(0.023)***	(0.029)***	(0.036)***		(0.022)***	(0.026)***
CreditSpread					0.092		
					(0.093)		
Constant	-1.745	-0.558	-0.888	1.750	-0.062	-1.571	-1.504
	(0.408)***	(0.075)***	(0.211)***	(0.229)***	(0.099)	(0.408)***	(0.397)***
Year dummies	Yes		No		Yes	Yes	Yes
R^2					0.055		
Pseudo R^2	0.185		0.467			0.185	0.169
Observations	68,170		76,348		76,968	68,170	66,412

***Significant at the 0.01 level.
**Significant at the 0.05 level.
*Significant at the 0.10 level.

Table IX. Balance Sheet Effect and Firm Characteristics

This table reports the sensitivity of financing choice to the size of financing need for firm characteristics. The dependent variable of the logit regression model equals one for security issuances (*SI*) and zero for asset sales (*AS*). The sample includes firm-year observations where the financing size is less than 12% of beginning-year total assets. The dummy variables *HighQ*, *HighLev*, and *BigSize* equals one if Tobin's Q, leverage, and firm size are above the median values, respectively. The outcome categories, *SI* and *AS*, are defined in Table I. The other variables are defined in Table II. Each specification includes year dummies to control for time fixed effects. Clustered standard errors at the firm level are in parentheses below the coefficients.

Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
FinSize	6.441	7.983	7.072	9.949	4.734	6.698	9.378
	(1.389)***	(1.358)***	(2.067)***	(1.982)***	(1.555)***	(1.454)***	(2.137)***
HighQ	0.859	0.449					0.560
	(0.100)***	(0.109)***					(0.108)***
HighLev			-0.322	0.069			0.103
			(0.106)***	(0.118)			(0.116)
BigSize					0.014	0.240	0.229
					(0.104)	(0.117)**	(0.116)**
HighQ × *FinSize*	-1.540	0.224					-1.078
	(1.954)	(1.991)					(1.967)
HighLev × *FinSize*			-1.280	-3.093			-3.994
			(2.269)	(2.299)			(2.255)*
BigSize × *FinSize*					2.580	2.697	3.082
					(2.362)	(2.366)	(2.397)
Q				0.374		0.383	
				(0.057)***		(0.056)***	
Leverage		-0.743				-0.449	
		(0.218)***				(0.225)**	
ln(*Size*)		0.147		0.122			
		(0.025)***		(0.025)***			
ln(*Age*)		-0.272		-0.248		-0.225	-0.243
		(0.038)***		(0.038)***		(0.038)***	(0.038)***
SalesGth		0.011		0.001		0.009	0.016
		(0.031)		(0.031)		(0.031)	(0.031)
Tangibility		-2.515		-2.537		-2.447	-2.587
		(0.153)***		(0.148)***		(0.153)***	(0.148)***
ExcessRet		0.123		0.149		0.133	0.109
		(0.053)**		(0.053)***		(0.052)**	(0.052)**
ROA		-0.072		-0.262		-0.292	-0.222
		(0.234)		(0.239)		(0.243)	(0.231)
IdioVola		-0.282		-0.354		-0.503	-0.493
		(0.128)**		(0.127)***		(0.119)***	(0.120)***
KZ-index		0.208		0.139		0.172	0.157
		(0.031)***		(0.033)***		(0.032)***	(0.033)***
Constant	1.757	2.463	2.257	2.044	2.000	2.790	3.003
	(0.760)**	(0.819)***	(0.769)***	(0.828)**	(0.740)***	(0.815)***	(0.800)***
Pseudo R^2	0.048	0.110	0.034	0.111	0.030	0.110	0.107
Observations	19,843	19,688	19,843	19,742	19,843	19,688	19,742

***Significant at the 0.01 level.
**Significant at the 0.05 level.
*Significant at the 0.10 level.

Figure 1. Incidence of Asset Sales and the Size of Financing Need

This figure shows the incidence of asset sales (and security issuances) for different sizes of financing need relative to beginning-year total assets. Financing size is the actual amount raised from an asset sale or security issuance. The *x*-axis shows the size of financing need in 12 bins. The leftmost bin includes observations where the amount raised is between 1% and 2% of total assets, and the rightmost bin includes observations where the amount raised is above 12% of total assets. The left *y*-axis shows the number of asset sales, which are the light gray bars. The right *y*-axis shows the percentage of asset sales. The dashed line with triangles shows the percentage of asset sales for a given financing size bin. The number in parentheses close to a triangle is the total number of asset sales and security issuances for a given financing size bin. As an example, when the financing need is above 12% of total assets, the number of asset sales is 0 and the number of security issuances is 8,835. The sum of numbers in parentheses is 28,678, which is the combined number of asset sales and security issuances in our sample. The abbreviations *AS* and *SI* denote the number of asset sales and number of security issuances, respectively. The number of asset sales and security issuances are based on the outcome category as defined in Section II.B and Table I.

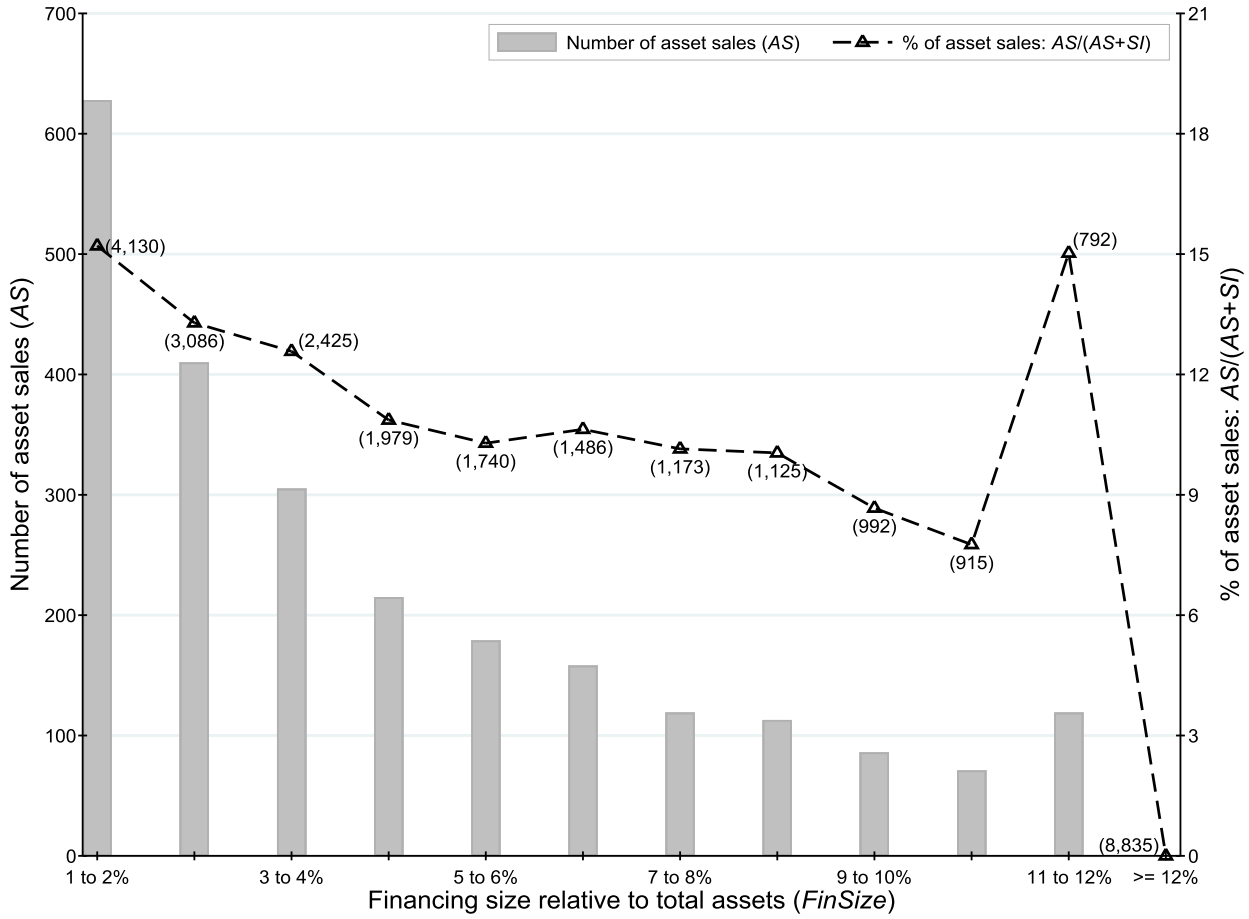


Figure 2. Incidence of Asset Sales and External Finance Dependence

This figure shows the number of asset sales (*AS*) for deciles of external finance dependence (*EFD*). Each decile contains roughly 2,767 observations of security issuances (*SI*) and asset sales. *EFD* is the growth in total assets over the previous year minus the ratio of retained earnings to previous-year total assets. The *EFD* deciles are based on one-year lag values. The number of asset sales and security issuances are based on the outcome category as defined in Section II.B and Table I.

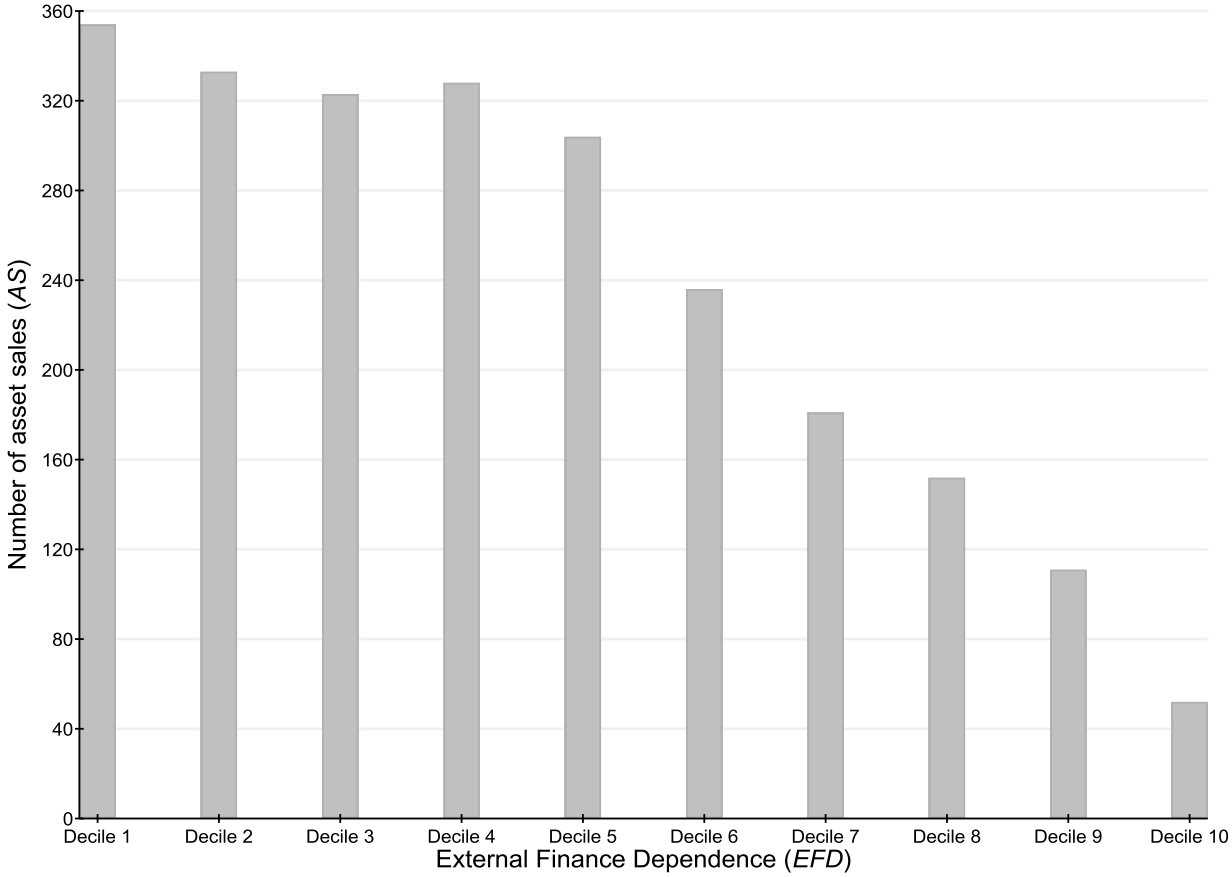


Figure 3. Incidence of Asset Sales, Equity Issuances, and Debt Issuances by Financing Need

This figure shows the incidence of asset sales, debt issuances, and equity issuances for different sizes of financing need relative to beginning-year total assets. It is similar to Figure 1 except that the security issuance category is divided into the two subcategories of debt issuances and equity issuances. Financing size is the actual amount raised from an asset sale, debt issuance, or equity issuance. The *x*-axis shows the size of financing need in 12 bins. The leftmost bin includes observations where the amount raised is between 1% and 2% of total assets, and the rightmost bin includes observations where the amount raised is above 12% of total assets. The left *y*-axis shows the number of asset sales, which are the light gray bars. The right *y*-axis shows the percentage of asset sales. The triangle (circle) shows the ratio of number of asset sales to the sum of asset sales and debt issuances (equity issuances) for a given financing size bin, expressed in percentages. The number in parentheses near the triangle is the sum of asset sales and debt issuances for a given financing size bin. Similarly, the number in brackets near the circle is the sum of asset sales and equity issuances for a given financing size bin. As an example, when the financing size is above 12% of total assets, the number of asset sales is 0 and the numbers of debt issuances and equity issuances are 6,387 and 3,273, respectively. The abbreviations *AS*, *DI*, and *EI* stand for the number of asset sales, debt issuances, and equity issuances, respectively. The number of asset sales, debt issuances, and equity issuances are based on the outcome category as defined in Sections II.B and III.C.

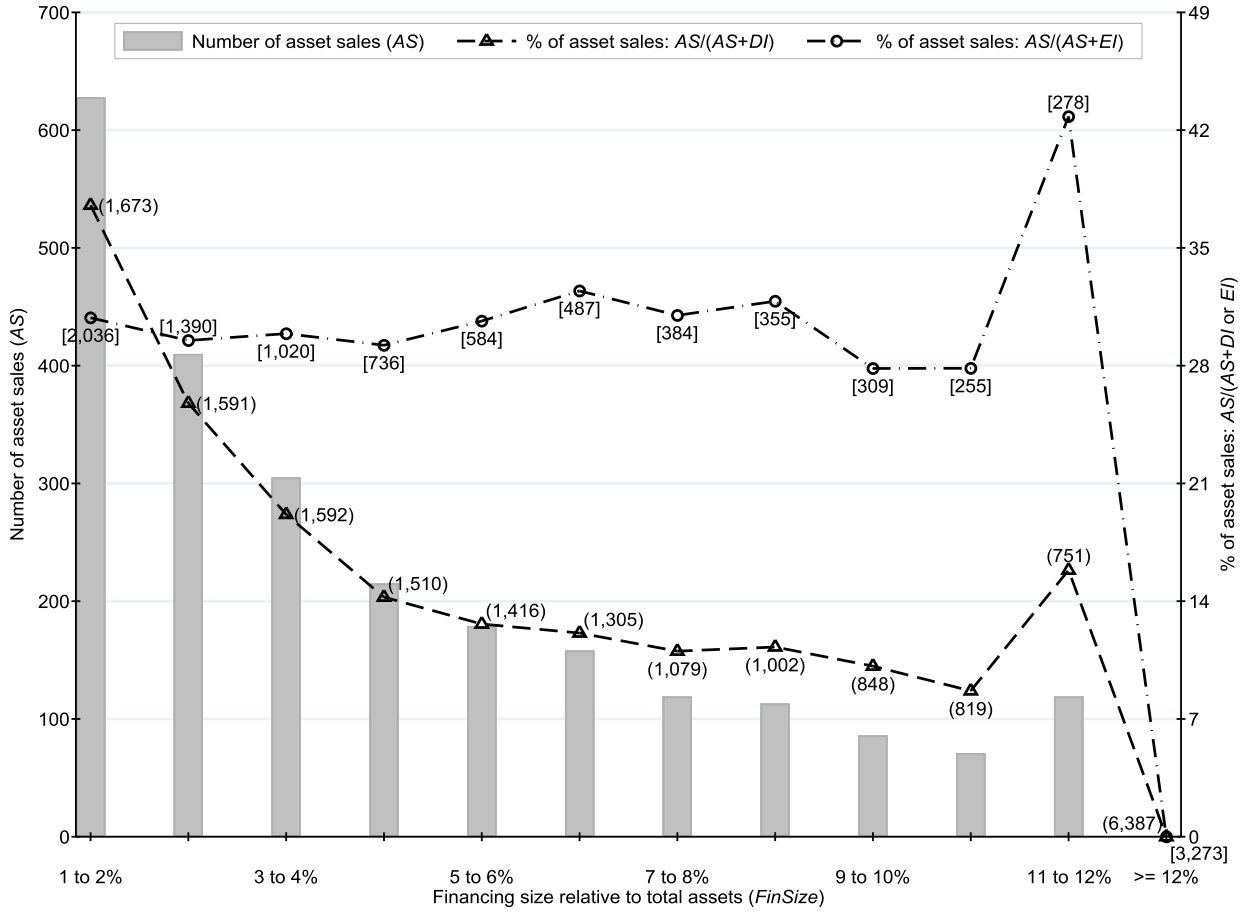


Figure 4. External versus Internal Financing with Levels of Investment

This figure plots the patterns of external financing (*Ext*) versus internal financing (*Int*) for different levels of investment in a given year relative to beginning-year total assets. The *x*-axis shows the investment relative to total assets. The left *y*-axis shows the number of firm-year observations (light gray bars) where the outcome category is *Ext*. The right *y*-axis shows the ratio of the number of external financing (*Ext*) to the sum of number of external financing (*Ext*) and internal financing (*Int*), expressed in percentages. The number in parentheses near the triangle is total of external financing and internal financing for a given investment size bin. As an example, when the investment is 5% of total assets, the number of firm-year observations is 22,259; 4,363 of which are external financing (20%) and remaining 17,896 are internal financing. The categories *Ext* and *Int* are defined in Table VII.

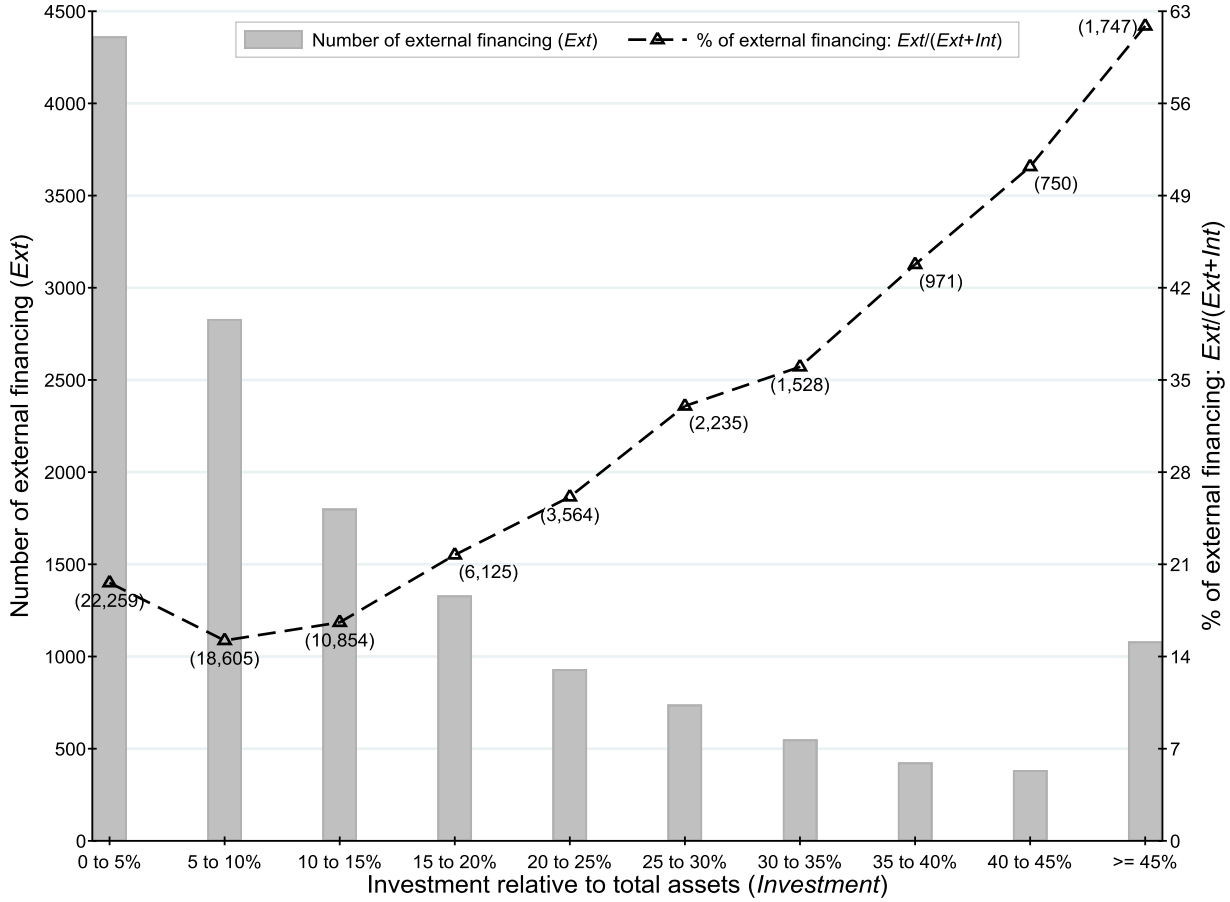


Figure 5. Balance Sheet Effect and Firm Growth Opportunities

We define low (high) growth based on the median value of Tobin's Q for firm-year observations of asset sales and security issuances when the financing need is less than 12% of beginning-year total assets. The left y-axis shows the number of asset sales, where the number of asset sales for high-Q firms is shown in the light gray bars, and the number of asset sales for low-Q firms is the sum of the light and dark gray bars. The right *y*-axis shows the percentage of asset sales. The dashed-dot line with a circle represents the percentage of asset sales for high-Q firms, and the dashed line with a triangle represents the percentage of asset sales for low-Q firms. As an example, when the financing need is 1% to 2% of total assets, the number of asset sales for high-Q firms is 207, which is 9.52% of the total number of asset sales and security issuances for high-Q firms in that financing size bin (2,174). Similarly, when financing need is again 1% to 2% of total assets, the number of asset sales for low-Q firms is 421, which is 21.52% of the total number of asset sales and security issuances for low-Q firms in that financing size bin (1,956). The abbreviations *AS* and *SI* refer to the number of asset sales and security issuances, respectively. The number of asset sales and security issuances are based on the outcome category as defined in Section II.B and Table I.

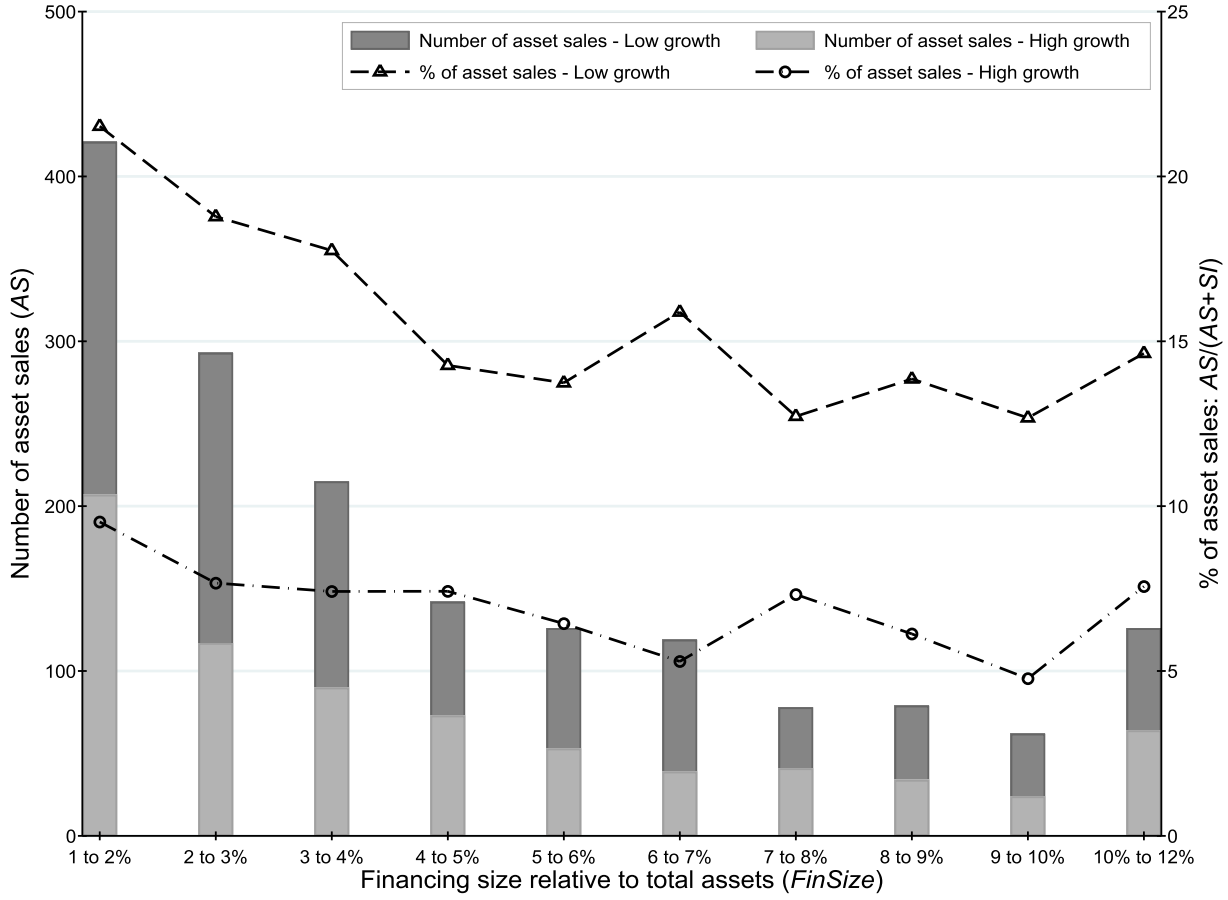


Figure 6. Balance Sheet Effect and Financial Leverage

We define low (high) leverage based on the median value of leverage for firm-year observations of asset sales and security issuances when the financing need is less than 12% of beginning-year total assets. The left y-axis shows the number of asset sales, where the number of asset sales for low leverage firms is the light gray bar and the number of asset sales for high leverage firms is the sum of the light and dark gray bars. The right *y*-axis shows the percentage of asset sales. The dashed-dot line with a circle represents the percentage of asset sales for low leverage firms, and the dashed line with a triangle represents the percentage of asset sales for high leverage firms. As an example, when the financing need is 1% to 2% of total assets, the number of asset sales for low leverage firms is 284, which is 11.66% of the total number of asset sales and security issuances for low leverage firms in that financing size bin (2,436). Similarly, when financing need is again 1% to 2% of total assets, the number of asset sales for high leverage firms is 344, which is 20.31% of total number of asset sales and security issuances for high leverage firms in that financing size bin (1,694). The abbreviations *AS* and *SI* refer to the number of asset sales and security issuances, respectively. The number of asset sales and security issuances are based on the outcome category as defined in Section II.B and Table I.

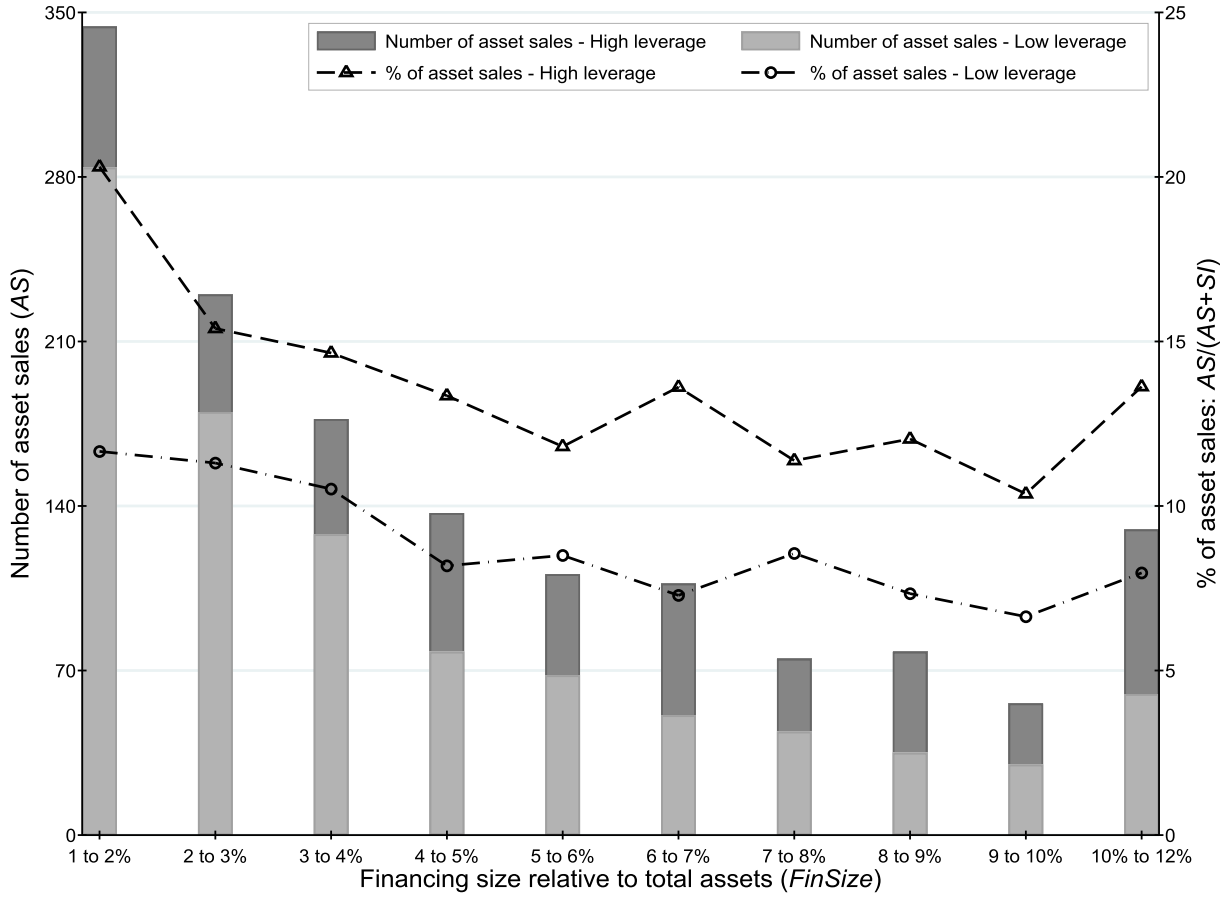
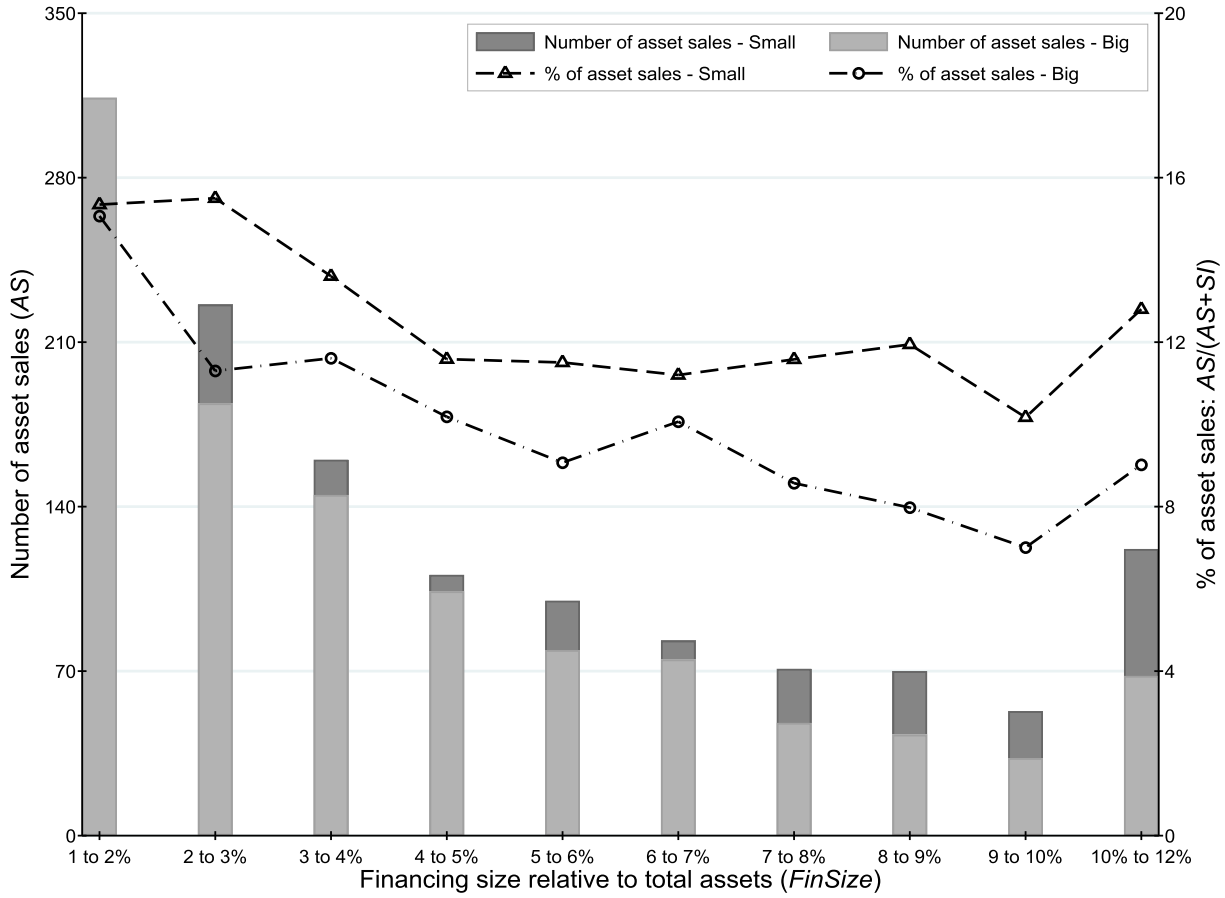


Figure 7. Balance Sheet Effect and Firm Size

We define small (big) firms relative to the median value of firm size for firm-year observations of asset sales and security issuances when the financing need is less than 12% of beginning-year total assets. The left *y*-axis shows the number of asset sales, where the number of asset sales for big firms is the light gray bar, and the number of asset sales for small firms is the sum of the light and dark gray bars. The right *y*-axis shows the percentage of asset sales. The dashed line with a triangle and the dashed-dot line with a circle refer to small and big size firms, respectively. As an example, when the actual amount of financing is 2% to 3% of total assets, the number of asset sales for big firms is 184, which is 11.3% of the total number of asset sales and security issuances for big firms in that financing size bin (1,628). Similarly, when the actual amount of financing is again 2% to 3% of total assets, the number of asset sales for small firms is 226, which is 15.5% of the total asset sales and security issuance for small firms in that financing size bin (1,458). When the financing need is 1% to 2% of total assets, the number of asset sales is 314, which is same for both small and big firms. The abbreviations *AS* and *SI* refer to the number of asset sales and security issuances, respectively. The number of asset sales and security issuances are based on the outcome category as defined in Section II.B and Table I.



Appendix A: Variable Definitions

Annual sales is the Compustat item *sale*. The market value of assets equals the book value of total assets (*at*) plus the market value of equity (*csho* × *prcc_f*) minus common equity (*ceq*) minus deferred taxes (*txdb*). If the fiscal year-end price *prcc_f* is missing, we replace it with the calendar year-end price (*prcc_c*). The book value of debt is total debt in current liabilities (*dlc*) plus total long-term debt (*dltt*).

Before the fiscal year ending July 15, 1988, a U.S. firm could report variables from the flow-of-funds statement in one of three format codes: the Working Capital Statement (format code = 1), the Cash Statement by Source and Use of Funds (format code = 2), or the Cash Statement by Activity (format code = 3). Effective the fiscal year ending July 15, 1988, all U.S. companies report these variables using the Statement of Cash Flows (format code = 7). Therefore, the variable definitions of cash-flow identity variables differ based on the format code used by a firm. We follow Chang, Dasgupta, Wong, and Yao (2014) to define cash-flow identity variables.[28] For brevity, here we report variable definitions using format code = 7 and refer the reader to the Table 1 of their paper.

We define *Investment* as capital expenditure (*capx*) plus increase in investment (*ivch*) plus acquisition (*acq*) minus sale of investment (*siv*) minus change in short-term investment (*ivstch*) minus other investing activities (*ivaco*). $\Delta Cash$ is the change in cash and cash equivalents (*chech*), and *Div* is cash dividends (*dv*). ΔD is long-term debt issuance (*dltis*) minus long-term debt reduction (*dltr*) plus change in current debt (*dlcch*). ΔE is the difference in sale of common and preferred stock (*sstk*) and purchase of common and preferred stock (*prstkc*). Cash flow (*CF*) is the sum of income before extraordinary items (*ibc*); extraordinary items and discontinued operation (*xidoc*); depreciation and amortization (*dpc*); deferred taxes (*txdc*); equity in net loss (*esubc*); gains in sale of property, plant and equipment and investment (*sppiv*); other funds from operation (*fopo*); and exchange rate effect (*exre*), minus the change in working capital. The change in working capital is defined as the sum of change in account receivable (*recch*), change in inventory (*invch*), change in accounts payable (*apalch*), accrued income taxes (*txach*), other changes in assets and liabilities (*aoloch*), and other financing activities (*fiao*). Following Arnold et al. (2018), Hovakimian and Titman (2006), and Borisova and Brown (2013), we define proceeds from an

[28] We thank Xin (Simba) Chang for helping us explain our doubts regarding the treatment of missing observations.

asset sale as the sale of PPE (*sppe*). For our empirical analysis, we divide all these variables by beginning-year total assets.

Appendix B: Summary Statistics

Table B1. Summary Statistics of Variables for the Full Sample

This table reports the summary statistics of the variables used in the study. The sample includes 76,968 firm-year observations for 7,134 unique firms from 1971 to 2016. *FinSize* is the amount raised through an asset sale or a security issuance or the amount of securities repurchased. *Investment* is the cash used for capital expenditures, acquisitions, and other investments. *Internal* is difference in operating cash flows and change in cash holdings. *Inv_Int* equals *Investment* minus *Internal*. *EFD* is the difference in actual growth rate and internal growth rate. *Leverage* is the ratio of the book values of total debt to total assets. *Q* is the ratio of the market to book values of assets. *Size* is the market value of assets in million USD. *Age* is the number of years the firm has appeared in the Center for Research in Security Prices (CRSP) database before the firm-year observation. *SalesGth* is the annual growth in sales for the current year. *Tangibility* is the ratio of net property, plant, and equipment to total assets. *ExcessRet* is the average of the monthly excess returns, measured as the difference in the firm and value-weighted market index returns. *ROA* is the ratio of net income to total assets. *IdioVola* is the residual of the market model and is computed based on daily returns of the previous year. *KZ-index* is the relative measure used to capture the degree of a firm's dependence on external financing. It is computed following Kaplan and Zingales (1997) and Lamont, Polk, and Saaá-Requejo (2001); see Section II for the computation of *KZ-index*. *CreditSpread* is annual average difference between the corporate Baa bond index and the Aaa bond index. All variables are adjusted for inflation using a gross domestic product deflator based on year 2000, and all continuous variables are winsorized at the 1st and 99th percentiles to reduce the influence of outliers. The abbreviations *N*, SD, and P refer to the number of observations, standard deviation, and percentile, respectively.

Variable	***N***	**Mean**	**SD**	**P1**	**Median**	**P99**
FinSize	76,968	0.015	0.119	-0.207	-0.004	0.493
Investment	76,968	0.098	0.125	-0.159	0.068	0.567
Internal	76,968	0.082	0.118	-0.301	0.083	0.387
Inv_Int	76,968	0.016	0.120	-0.207	-0.004	0.497
EFD	74,692	0.154	1.238	-0.845	-0.142	5.973
Leverage	76,745	0.219	0.186	0.000	0.197	0.777
Q	76,968	1.695	1.059	0.598	1.359	6.373
Size	76,968	3,096	8,692	8.938	424	59,677
Age	76,968	17.420	16.430	0.000	13.000	77.000
SalesGth	76,968	0.193	0.987	-0.952	0.052	7.242
Tangibility	76,968	0.300	0.223	0.011	0.246	0.890
ExcessRet	76,968	0.029	0.471	-0.771	-0.040	2.109
ROA	76,914	0.013	0.138	-0.706	0.038	0.239
IdioVola	76,953	0.472	0.272	0.130	0.398	1.533
KZ-index	76,638	-0.107	1.376	-3.929	0.141	2.476
CreditSpread	46	1.100	0.399	0.601	1.029	2.326

Table B2. Summary Statistics of Actual Growth Rate, Internal Growth Rate, and External Finance Dependence

This table reports summary statistics of variables used in the computation of a firm's external finance dependence based on the outcome category. The actual growth rate for a given year is the percentage change in total assets over the previous year. The internal growth rate of a firm in a given year is the ratio of actual retained earnings for that year to total assets for the previous year. A firm's external finance dependence (*EFD*) is the difference in the actual growth rate and the internal growth rate. The values of actual growth rate, internal growth rate, and external finance dependence are their one-year lag values. The four outcome categories (*AS*, *SI*, *Repo*, and *DN*) are defined in Section III.B and Table I; *AS* is asset sales, *SI* is security issuances, *Repo* is repossessions, and *DN* is do nothing. The abbreviations SD and P refer to standard deviation and percentile, respectively.

Category	**Obs.**	**Mean**	**Median**	**SD**	**P10**	**P90**
Panel A. Actual Growth Rate						
AS	2,374	0.1110	0.0688	0.3179	-0.1303	0.3588
SI	25,295	0.2439	0.1217	0.5471	-0.0948	0.6161
Repo	35,275	0.0993	0.0534	0.3044	-0.1057	0.3056
DN	11,748	0.2806	0.0755	0.7740	-0.1365	0.7193
Total	74,692	0.1772	0.0756	0.4987	-0.1087	0.4657
Panel B. Internal Growth Rate						
AS	2,374	0.1702	0.2370	0.5290	-0.1588	0.5677
SI	25,295	-0.1747	0.1749	1.3090	-1.0973	0.5378
Repo	35,275	0.2120	0.3095	0.7007	-0.2042	0.6996
DN	11,748	-0.1487	0.1835	1.2477	-1.0672	0.5942
Total	74,692	0.0230	0.2432	1.0494	-0.5760	0.6369
Panel C. External Finance Dependence (EFD): Actual Growth Rate minus Internal Growth Rate						
AS	2,374	-0.0592	-0.1593	0.6017	-0.4897	0.3777
SI	25,295	0.4186	-0.0042	1.4873	-0.4118	1.5256
Repo	35,275	-0.1127	-0.2421	0.7764	-0.6233	0.3706
DN	11,748	0.4294	-0.0677	1.6296	-0.4931	1.7607
Total	74,692	0.1542	-0.1423	1.2384	-0.5452	0.9094

Table B3. Summary Statistics of the Debt and Equity Issuance Samples

This table reports summary statistics for variables based on the outcome categories debt issuances (*DI*) and equity issuances (*EI*). The outcome categories, *DI* and *EI*, are defined in Section III.C. A firm's external finance dependence (*EFD*) is the difference in the actual growth rate and the internal growth rate. The other variables are defined in Table II. Except for *Internal*, *SecIss*, *AssetSale*, *Investment*, *Inv_Int*, and *FinSize*, all variables are measured at their one-year lag value. The abbreviations *N*, SD, and P refer to the number of observations, standard deviation, and percentile, respectively.

Variables	**Debt Issuances (*DI*) (*N* = 17,570)**					**Equity Issuances (*EI*) (*N* = 8,704)**				
	Mean	**Median**	**SD**	**P10**	**P90**	**Mean**	**Median**	**SD**	**P10**	**P90**
Internal	0.055	0.054	0.122	-0.074	0.192	-0.002	0.012	0.185	-0.235	0.197
SecIss	0.116	0.077	0.115	0.020	0.274	0.135	0.058	0.167	0.014	0.388
AssetSale	0.004	0.000	0.011	0.000	0.010	0.002	0.000	0.008	0.000	0.004
Investment	0.176	0.138	0.156	0.026	0.387	0.136	0.098	0.168	-0.007	0.347
Inv_Int	0.120	0.081	0.116	0.022	0.281	0.138	0.060	0.167	0.015	0.391
FinSize	0.116	0.077	0.115	0.020	0.274	0.135	0.058	0.167	0.014	0.388
EFD[a]	0.126	-0.085	1.011	-0.445	0.698	1.033	0.309	2.038	-0.304	3.212
Q	1.560	1.310	0.880	0.860	2.520	2.430	1.940	1.510	1.010	4.710
Leverage	0.256	0.237	0.179	0.026	0.504	0.159	0.072	0.193	0.000	0.448
ln(*Size*)	6.040	5.970	1.870	3.650	8.550	5.590	5.530	1.580	3.570	7.620
ln(*Age*)	2.460	2.560	0.900	1.100	3.610	1.970	2.080	0.910	0.690	3.090
SalesGth	0.252	0.079	1.086	-0.177	0.463	0.317	0.107	1.249	-0.379	0.742
Tangibility	0.341	0.285	0.235	0.074	0.718	0.231	0.152	0.218	0.037	0.581
ExcessRet	-0.026	-0.084	0.446	-0.506	0.477	0.134	0.010	0.622	-0.519	0.940
ROA	0.005	0.029	0.117	-0.084	0.085	-0.046	0.028	0.210	-0.357	0.129
IdioVola	0.475	0.405	0.262	0.222	0.822	0.587	0.587	0.587	0.587	0.587
KZ-index	0.584	0.683	0.973	-0.581	1.681	0.381	0.388	0.931	-0.467	1.444

[a] Numbers of observations for *EFD* are 17,134 in the *DI* sample and 8,160 in the *EI* sample.

Appendix C: Additional Robustness Checks

For additional robustness checks, first, we use a measure of external finance dependence as suggested by Rajan and Zingales (1998). For constructing this measure, we use all firm-year observations in Compustat from 1970 to 2016. For a given firm-year, external finance dependence is the ratio of capital expenditures (Compustat item: *capx*) minus funds from operations (*fopt*) to capital expenditures. In case of missing data on funds from operations, following Duchin et al. (2010), we use the sum of income before extraordinary items (*ibc*); depreciation and amortization (*dpc*); deferred taxes (*txdc*); equity in net loss/earnings (*esubc*); sale of property, plant, and equipment; and investments minus gain/loss (*sppiv*) and funds from other operations (*fopo*). For a given year, external finance dependence at the industry level is the median value of external finance dependence of firms operating in that industry. The industry classification is based on the three-digit SIC code. To separate the effect of external finance dependence from the firm's choices such as asset sales, security issuances, repossessions, and do nothing, we use the previous-year value of external finance dependence.

In unreported statistics, the mean and standard deviation of beginning-year external finance dependence for the sample of 2,403 asset sales are −0.152 and 1.51, respectively. These statistics for the sample of 26,272 security issuances are 0.155 and 3.71, respectively. The *t*-statistic for the comparison of the means for the two samples is 8.00. This result suggests that a firm issuing securities (selling assets) is more (less) likely to operate in an industry that is more (less) dependent on external finance. In Table C1, we report the results of a multivariate analysis. As shown in the table, among the regressions that exclude firm growth opportunities (*Q*) as an independent variable, the odds of issuing securities over selling assets increases with external finance dependence. When we include firm growth opportunities, the direction of the balance sheet effect remains, but the statistical significance diminishes.

[Insert Table C1 here]

Second, we follow Lin, Ma, Malatesta, and Xuan (2013) and run a change regression to control for exogeneity of *FinSize*. In particular, we regress *Outcome* on the change in *FinSize* and on changes in control variables. The change regression controls for time-invariant heterogeneity that may be associated with determining the financing choice instead of *FinSize*. If the choice of financing source and the size of financing need are jointly determined by an omitted firm characteristic that stays constant over time, the change regression controls for such time-invariant firm characteristics.

Summary statistics are in Table C2. We find a positive relation between the likelihood of a security issuance versus an asset sale with external financing when we use change regressions (see Table C3) to control for time-invariant firm characteristics.

[Insert Table C2 here]

[Insert Table C3 here]

Table C1. Balance Sheet Effect Using an Industry-Based Measure of External Finance Dependence

This table reports the results of analysis using an industry-level measure of external finance dependence. The dependent categorical variable represents four outcome categories: asset sales (*AS*), security issuances (*SI*), security repossessions (*Repo*), and do nothing (*DN*). These categories are defined in Table I. *EFD_RZ* is industry-median external finance dependence as suggested in Rajan and Zingales (1998). For computing this measure, for each firm-year observation in Compustat, we first compute firm-level external finance dependence as the ratio of capital expenditures minus funds from operations to capital expenditures. Then, for a given industry-year observation, we define external finance dependence, *EFD_RZ*, as the median value of external finance dependence of firms operating in that industry. The industry classification is based on three-digit SIC codes. The other variables are defined in Table II. The first three specifications use the logit model of a firm's financing choice between asset sales (*AS*) and security issuances (*SI*). Specifications (4) and (5) use the multinomial logit model of all categories. For brevity, we report the results of security issuance versus asset sales. We use one-year lag values of all independent variables. Each specification includes year dummies to control for time fixed effects. Clustered standard errors at the firm level are in parentheses below the coefficients.

	Logit Model			**Multinomial Logit Model**	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
	SI* vs. *AS	***SI* vs. *AS***	***SI* vs. *AS***	***SI* vs. *AS***	***SI* vs. *AS***
EFD_RZ	0.025	0.035	0.008	0.029	0.004
	(0.006)***	(0.011)***	(0.011)	(0.010)***	(0.007)
Q			0.546		0.498
			(0.066)***		(0.055)***
Leverage		-1.025	-0.614	-1.739	-1.432
		(0.200)***	(0.211)***	(0.235)***	(0.234)***
ln(*Size*)		0.127	0.075	0.128	0.105
		(0.024)***	(0.025)***	(0.022)***	(0.022)***
ln(*Age*)		-0.397	-0.300	-0.364	-0.269
		(0.038)***	(0.037)***	(0.037)***	(0.035)***
SalesGth		0.053	0.034	0.034	0.026
		(0.033)	(0.031)	(0.028)	(0.026)
Tangibility		-2.287	-2.048	-2.297	-2.023
		(0.147)***	(0.148)***	(0.150)***	(0.145)***
ExcessRet		0.168	0.265	0.193	0.331
		(0.049)***	(0.051)***	(0.052)***	(0.053)***
ROA		-0.078	-0.479	0.144	-0.324
		(0.213)	(0.238)**	(0.205)	(0.200)
IdioVola		-0.385	-0.492	-0.349	-0.149
		(0.127)***	(0.123)***	(0.120)***	(0.111)
KZ-index		0.305	0.295	0.431	0.413
		(0.025)***	(0.026)***	(0.036)***	(0.036)***
Constant	2.418	3.555	2.819	3.824	2.703
	(0.737)***	(0.811)***	(0.805)***	(0.784)***	(0.179)***
Pseudo R^2	0.025	0.094	0.108	0.153	0.151
Observations	28,675	28,456	28,456	76,345	76,345

***Significant at the 0.01 level.

Table C2. Summary Statistics of the Change Regression Model

This table reports summary statistics for variables used in the change regression model. The symbol Δ refers to the change in the value for a given variable compare to its value of the previous year. The variables are defined in Table II. The abbreviations *N*, SD, and P refer to the number of observations, standard deviation, and percentile, respectively.

Variable	*N*	Mean	Median	SD	P10	P90
Δ*Inv_Int*	62,192	-0.0026	-0.0001	0.1416	-0.1431	0.1348
Δ*Leverage*	61,950	-0.0018	-0.0003	0.0948	-0.0761	0.0849
Δ*Q*	62,192	-0.0234	0.0000	0.7469	-0.6274	0.5350
Δln(*Size*)	62,192	-0.0207	0.0212	0.5784	-0.4039	0.4250
Δln(*Age*)	62,192	0.1078	0.0690	0.1398	0.0235	0.2877
Δ*SalesGth*	62,192	-0.0998	-0.0102	1.0810	-0.4549	0.3549
Δ*Tangibility*	62,106	-0.0009	-0.0013	0.0776	-0.0466	0.0474
Δ*ExcessRet*	62,192	0.0174	0.0019	0.6665	-0.6586	0.7143
Δ*ROA*	62,148	-0.0017	0.0013	0.1166	-0.0847	0.0753
Δ*IdioVola*	62,182	0.0007	-0.0041	0.1720	-0.1659	0.1698
Δ*KZ-index*	61,901	-0.0192	-0.0252	1.0219	-0.9692	0.9197

Table C3. Robustness Check: Change Regression Model

This table reports the results of a multinomial logistic regression of financing choice, that is, security issuance (*SI*) versus asset sales (*AS*) and do nothing (*DN*) versus asset sales on changes in firm characteristics from the previous year to the current year. The outcome categories, *AS*, *SI*, and *DN*, are defined in Table I. For brevity, we report the regression results only for the choice of security issuance versus asset sales. The variables are defined in Table II. The *p*-values in parentheses below the coefficients are corrected for firm-level clusters.

Variable	**(1)**
Δ*Inv_Int*	5.672
	(0.000)***
Δ*Leverage*	1.470
	(0.000)***
Δ*Q*	-0.0299
	(0.435)
Δln(*Size*)	0.386
	(0.000)***
Δln(*Age*)	3.051
	(0.000)***
Δ*SalesGth*	-0.005
	(0.828)
Δ*Tangibility*	-1.975
	(0.000)***
Δ*ExcessRet*	-0.082
	(0.062)*
Δ*ROA*	-0.296
	(0.224)
Δ*IdioVola*	-0.247
	(0.119)
Δ*KZ-index*	0.065
	(0.009)***
Constant	0.864
	(0.187)
Pseudo R^2	0.126
Observations	61,609

***Significant at the 0.01 level.
*Significant at the 0.10 level.