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Abstract

We separate equity issuance proceeds into two parts: option proceeds generated by employee stock option exercises and non-option proceeds engendered by all other forms of equity issues. We document that over the period 1998-2013, the aggregate amount of option proceeds exceeds that of non-option proceeds for a large sample of U.S. firms. In particular, firms allocate option proceeds predominantly to cash holdings, followed by investment and equity repurchase, while non-option proceeds are mainly allocated to investment and cash holdings. Further analysis shows that financial constraints affect the allocation of equity issuance proceeds by shifting the use of option proceeds away from stock repurchases to investment and cash savings, while directing non-option proceeds away from investment to cash savings.

JEL classification: G30; G32; J33
Keywords: Employee Stock Option, Equity issuance, Cash Flow Allocation, Cash Holdings

I. Introduction

In recent years, the trend of offering stock options to employees has become increasingly widespread among U.S. firms. According to the National Center for Employee Ownership (NCEO), employee stock option holders have grown, as of 2012, from one to nearly nine million in number since the late 1980s.[1] In fact, based on our sample that consists of S&P 1500 and Nasdaq 100 firms over the period 1998-2013, we find that the value of employee stock options granted amounts to almost $1.4 trillion in aggregate.[2] As such options get exercised, firms effectively issue equity internally to their employees and experience a substantial amount of cash inflows, being proceeds from employee stock option exercises. Indeed, we find that such proceeds sum to a daunting $642 billion.[3] To put this amount into perspective, for the same set of firms over the sample period, the combined amount of all other forms of equity issuance, including initial public offerings (IPOs), seasoned equity offerings (SEOs), and private placements is only approximately $421 billion.

Despite such a growing significance of employee stock option proceeds, most of the academic research to date has been focused mainly on either equity issued to all equity investors, i.e., total equity issues as defined using Compustat cash flow statement, or equity issued mostly to outside investors, as defined using Thompson Financial SDC Platinum database, in the form of IPOs, SEOs, or private placements. It is noteworthy that equity issued to corporate insiders (i.e., employees) as a result of stock option exercises has been largely unexplored. In this paper, we therefore evaluate the importance of equity issued to employees relative to all other forms of equity issuance. In particular, we examine how firms put the resulting option proceeds to various uses and whether they exhibit any difference in

[1] See http://www.nceo.org.
[2] In an earlier paper, Hall and Murphy (2003) document that the aggregate value of stock options granted by U.S. companies increased drastically from $11 billion in 1992 to $119 billion in 2000.
[3] Using hand-collected data on S&P 100 firms over the period 1999-2001, Fama and French (2005) find that the value of equity issued to employees through compensation plans exceeds the value of equity issued through SEOs and private placements.

allocating option and non-option proceeds to specific uses of funds. Moreover, we examine whether financial constraints impact on the allocation of equity issuance proceeds and whether such constraints affect the allocation of option and non-option proceeds differently.

To address these research questions, we explicitly collect data on employee stock option exercises and separate equity issuance proceeds into two parts: option proceeds generated by employee stock option exercises and non-option proceeds engendered by all other forms of equity issues. Specifically, we relate non-option proceeds mostly to equity issues initiated by the firms' managers in the form of IPOs and SEOs. We believe that such a separation of equity issuance proceeds is important. In particular, understanding the different motives behind these equity issues helps us to appreciate the need to analyze them as two separate classes of equity issues and gives meaning and purpose to our analysis of the allocation of the resulting equity issuance proceeds. Specifically, uses of proceeds arising from IPOs or SEOs are typically pre-determined; these proceeds are usually spent according to the firms' prospectus. On the other hand, proceeds from the exercise of employee stock options are often uncertain in terms of amount and timing, and are therefore more ad-hoc and discretionary in nature. As such, understanding how option proceeds are allocated to various uses, such as investment, security repurchase, and cash reserve built-up, can not only provide important insights into the investment and financing conditions of the firms, but also shed more light on the potential agency conflicts that they could face.[4]

Our empirical analysis hinges upon the cash flow identity, as defined using the Compustat flow-of-funds data, that the sum of all uses of cash flow must be equal to the cash

[4] In fact, in a related paper, McKeon (2013) attempts to distinguish between two broad categories of equity issuance. That is, he regards equity issues resulting from the exercise of employee stock options as being a predominant part of "*investor-initiated*" issues while IPOs, SEOs and private placements are collectively known as "*firm-initiated*" issues.

flow itself.[5] Following Chang et al. (2013), we assume that firms make investment, cash holdings, dividend, and financing decisions jointly, subject to the constraint that uses of funds must equal sources of funds.[6] Given that total equity issues is reported as an aggregate figure in Compustat and is comprised of all forms of equity issuance that generate cash inflows to a firm, we separate option proceeds from other forms of equity issuance proceeds by defining the latter as non-option proceeds. To examine how firms allocate equity issuance proceeds to the various uses, we measure their allocation decisions using the coefficients on such cash inflows within a regression framework. That is, we individually regress the various uses of funds on all sources of funds (including option and non-option proceeds), controlling for firm fundamentals and year effects. As such, this framework has the methodological advantage of offering a complete view of the allocation of equity issuance proceeds by simultaneously tracking all uses of such cash inflows, interrelated among one another by virtue of the cash flow identity. The sensitivity of equity issuance proceeds to a particular use of funds therefore reveals how much of an additional dollar of proceeds is directed towards that use. Moreover, to the extent that investment, stock repurchase, and cash savings, the three most fundamental uses of equity issuance proceeds as suggested by the existing literature, are competing uses of funds, firms may exhibit a preference for one use over the other two. In gauging the relative importance of these uses, our analysis also reveals whether firms systematically prioritize their spending, thereby informing more about their cash spending behavior.

[5] Specifically, uses of cash flow include investment, cash savings, working capital needs, debt and/or equity repurchases, and dividends while the cash flow itself is comprised of total equity issues, debt issues, and operating cash flows.

[6] Gatchev, Pulvino, and Tarhan (2010) argue that when examining how firms allocate cash flows across the various uses of funds, one needs to simultaneously estimate the cash flow sensitivities to these uses and impose the constraint that these sensitivities sum to unity because failure to do so will result in erroneous coefficient estimates. Chang et al. (2013), however, show that this claim is false in that the single-equation model without linear constraints and the simultaneous-equation framework with linear constraints offer identical results as long as the cash flow identity holds in the data and the same set of explanatory variables is included in all the uses-of-funds equations.

Our results show that equity issued as a result of employee stock option exercises is growing in relative importance; the amount of option proceeds grew from being only 0.87 times as much as that of non-option proceeds in 1998 to being approximately 2.75 times in 2013, a three-fold increase, to say the least. In addition, we find that firms allocate option and non-option proceeds to different magnitude of uses. On one hand, firms add on average, 64 cents to their cash holdings in the same year that they receive a dollar of option proceeds. They also increase their investment and equity repurchases by 34 and 31 cents respectively, consistent with previous studies such as Babenko, Lemmon, and Tserlukevich (2011) and Bens et al. (2003). More importantly, addition to cash holdings constitutes the most significant use of option proceeds, more significant than other uses combined. On the other hand, firms only save 42 cents out of an extra dollar of non-option proceeds. Such proceeds are however, more intensively invested (56 cents as opposed to the 34 cents of option proceeds allocated to investment). In a contemporaneous setting, there is therefore a difference in the way firms allocate option and non-option proceeds to various uses, with the saving rate of option proceeds being higher than that of non-option proceeds.

Next, in examining the allocation of equity issuance proceeds in a dynamic setting, we find that in the year of option exercise, firms park a majority of their option proceeds as cash ($0.74 out of every dollar of option proceeds). This may result from managers being unable to predict the exact timing and amount of option proceeds, which are predominantly driven by the degree of in-the-moneyness of the options outstanding and hence, by market conditions. As such, managers may be caught off guard with these unexpected proceeds, parking them temporarily on the balance sheet as cash. We find however that, one year after the receipt of such option proceeds, these firms adjust their cash holdings downwards by repurchasing equity at a rate of 31 cents per dollar of option proceeds received a year ago. More importantly, two years post the option exercise year, there is no difference in the way

firms allocate option and non-option proceeds in that the dynamic cash saving rates for both types of proceeds are similar. In other words, despite the different motives behind the two types of equity issues as pointed out by McKeon (2013), a similar portion of both kinds are saved as cash. From a dynamic perspective, cash inflows from one source (employees) are no different from those arising from another (outside investors).

Last, we find that financial constraints affect the allocation of equity issuance proceeds. Using five different measures of financial constraints, we divide our sample into two groups, more and less financially constrained firms, and repeat the allocation analysis for each subsample.[7] Consistent with the costly external financing theories, we find that more financially constrained firms save a greater portion of their equity issuance proceeds than do less financially constrained firms. More importantly, financial constraints seem to have a different impact on the allocation of equity inflows, depending on whether they are option or non-option proceeds. That is, we find that financial constraints tend to shift the allocation of option proceeds (non-option proceeds) away from stock repurchase (investment) and towards investment (cash savings).

In getting our results, it is noteworthy that as opposed to McKeon (2013), who imputes the amount of investor- and firm-initiated issuances based on their relative sizes, we construct our sample by directly collecting data on employee stock option exercises. Our sample consists of 18,343 firm-year observations (2,112 firms) over the period 1998-2013. To the best of our knowledge, this is by far the largest sample of employee stock option exercises. This sample, we argue, provides a more accurate estimate of the number and amount of investor-initiated issues than that based on the identification rule of McKeon (2013). That is, McKeon (2013) defines investor-initiated issues as equity issues with

[7] Specifically, our five measures of financial constraints include firm size, the two financial constraint indices of Hadlock and Piece (2010) and Whited and Wu (2006), the firm's dividend paying status, as well as the existence of a credit rating for the firm.

amounts less than 2% of the respective firms' market equity and being predominately made up of proceeds from employee stock option exercises. In other words, they are issues which are passively receipted by managers, who make no contemporaneous issuance action on their part. Firm-initiated issues, on the other hand, are actively managed by managers, who make conscientious efforts in raising external capital and decide on the amount and timing of these issues. To be more specific, these are equity issues with amounts greater than 3% of market equity, the proceeds of which, are what we would define as non-option proceeds.

We note that under his rule, a firm can only be classified as having issued in a particular year, either investor- or firm-initiated equity, but not both. For example, should a firm receives an annual amount of option proceeds exceeding 3% of the market value of its equity, it will be mistakenly deemed as having issued firm-initiated equity. Moreover, given that equity issues with a size between 2 to 3% of market equity are deemed as ambiguous and therefore disregarded by McKeon (2013), his rule misses out on firms that receive moderate amounts of option and/or non-option proceeds. In fact, cross checking his rule against our more precise data, we find that for all sample years, more than 50% of our sample firms issue both types of equity. Furthermore, to the extent that investor-initiated issues are predominately made up of option proceeds, his rule systematically overestimates the amount of investor-initiated issues and is less accurate in imputing the quantity and amount of firm-initiated issues.

Our paper contributes to the literature by providing one of the first large-sample evidence on the allocation of equity issuance proceeds by U.S. firms. Unlike McKeon (2013), who uses an arbitrary rule to impute the amounts of investor-initiated issues, we explicitly collected a majority of them from various sources. As a result, we offer a relatively more accurate estimate of the magnitude of investor-initiated issues. To add on to his results that equity inflows are largely initiated by investors through the exercise of employee stock

options, we find that firms allocate to various uses, option and non-option proceeds in a different way. In particular, option proceeds are more greatly saved than are non-option proceeds. As such, although McKeon (2013) refutes the conjecture of McLean (2011) on the basis that most issues are investor-initiated and hence cannot be taken as evidence that firms issue equity to save cash, we find that firms do save the option proceeds even though the issuances per se does not originate from precautionary motives. This saving rate of option proceeds converges however, to that of non-option proceeds over the years following the option exercise year.

Additionally, in view of the sparse theoretical guidance on how the degree to which firms are financially constrained would affect the allocation of equity issuance proceeds, we seek to establish empirical evidence so as to inform theory.[8] In particular, we find that regardless of the degree of financial constraint, cash savings remains an important use of both option and non-option proceeds, with financially constrained firms saving relatively more out of both types of equity inflows. With these results, our paper attempts to fill a gap in the literature by documenting that cash savings is an important use of option proceeds. To be specific, although previous studies have investigated the impact of employee stock option exercises on firms' investment and security repurchase decisions, the literature is incomplete in that it neglects cash savings as another major outlet for option proceeds.[9] Such a lack of evidence is surprising in view of the increasing reliance of U.S. firms on stock options to compensate top managers and rank-and-file employees, and the significant amount of cash flows arising from these option exercises.

[8] For example, theory does not provide a clear answer to the question of whether firms facing more severe financial constraints should invest more or save more when they have additional cash flow. For example, Kaplan and Zingales (1997) show that even in a one-period model, investment-cash flow sensitivities do not necessarily increase with the degree of financing constraints.

[9] See among others, Babenko, Lemmon and Tserlukevich (2011) and Bens et al. (2003). We review the literature in greater details in Section II.

Furthermore, by examining how option and non-option proceeds are allocated to the various uses of funds, our paper attempts to update the literature, which to date, only informs about how option or non-option proceeds but not both, are allocated to a single use (such as investment or equity repurchase), as opposed to multiple uses of funds. In other words, our paper aims to provide a more complete picture about the equity inflow allocation decisions of U.S. firms by simultaneously examining their investment policies, stock repurchase activities and corporate cash policies, three of the most fundamental uses of equity issuance proceeds as suggested by prior research. To the extent that these three policies entail competing uses of equity issuance proceeds, our empirical framework also serves to gauge the relative importance of these uses.

The rest of the paper is organized as follows. Section II provides a brief discussion of the existing literature. Section III describes our sample and variables. Section IV develops the empirical models and presents the results. Section V concludes the paper.

II. Related Literature

In examining how equity issuance proceeds (i.e., both cash inflows from employee stock option exercises and from all other equity issues) are allocated across the various uses of funds, we bring together two strands of literature. First, by documenting how option proceeds are allocated across the various uses of funds, our paper contributes to the literature on the economic functions of stock options granted to employees on a large scale basis. Specifically, Hall and Liebman (1998) find a strong positive relation between firm performance and CEO compensation, driven almost entirely by changes in the value of stock and stock options held by the CEO. With this meaningful link between CEO pay and firm performance, they therefore posit that stock options help to mitigate agency costs by aligning the incentives of executives with those of their firms' owners. On the other hand, Yermack

(1995) finds that firms in less-regulated industries, firms which are difficult to monitor and firms which face financial constraints, are more likely to use stock options as a substitute for cash compensation. In fact, Core and Guay (2001) investigate the compensation schemes offered to employees other than the five highest-paid executive officers and find that non-executive employee stock options serve as a substitute for cash compensation when firms face cash flow constraints and when the costs of external capital are high. Oyer and Schaefer (2005) cite three possible explanations for granting stock options to middle managers. That is, stock option grants provide incentives to employees, induce them to sort their beliefs about their firms' prospects, as well as help to retain these employees. The authors argue that although these options serve as an inefficient incentive mechanism, they efficiently compensate and/or retain employees who are sufficiently optimistic about their firms' prospects. Chang et al. (2013) find that stock options granted to non-executive employees increase risk-taking incentive, enhance failure-bearing capacity, encourage long-term commitment, and promote teamwork of employees, leading to greater innovation success.

Besides serving the above-mentioned economic functions, employee stock options are essentially equity issues that generate cash inflows to the issuing firms. As such, proceeds from the exercise of these stock options represent a source of funds to the firms. Therefore, in finding that employee stock option exercises bring about an increase in investment, as well as an increase in the intensity of firms' equity repurchase activities, our paper closely relates to several studies about the use of proceeds from employee stock option exercises. For example, Kahle (2002) and Bens et al. (2003) examine the impact of stock options on a firm's stock repurchase decisions. Specifically, Kahle (2002) finds that the likelihood of a stock repurchase is high when the amount of total options (i.e., both executive and non-executive) exercisable, as a percentage of outstanding shares, is high. Moreover, once the repurchase decision is made, the amount of stock repurchased depends on the amount of total options

exercisable and not on the amount of executive options and unexercisable options. On the other hand, Bens et al. (2003) find that managers are likely to increase their stock repurchases when they worry about the dilution effect of outstanding employee stock options.

In analyzing how stock options affect the investments of firms, Bens, Nagar, and Wong (2002) find that firms, concerned about the dilution effect of outstanding employee stock options, cut back on their investments to repurchase stocks when they are experiencing a large number of option exercises. On the other hand, Babenko, Lemmon, and Tserlukevich (2011) show that firms invest, on average, $0.34 out of every dollar of option proceeds.[10] In addition, they find that only firms that are not financially constrained use option proceeds to repurchase stocks; financially constrained firms use these cash flows for their investments.

Second, by documenting that cash inflows arising from both employee stock option exercises and other forms of equity issues constitute the most important contributor to corporate cash holdings, our paper elaborates on the strand of literature that focuses only on the allocation of, either option proceeds or other equity inflows, to a particular use of funds, as opposed to various uses combined. Specifically, besides focusing on investment and stock repurchase as distinct uses of option proceeds, the literature also seems to suggest that cash savings is one of the three fundamental uses of cash inflows arising from employee option exercises. This is not surprising given that Keynes (1936) long argues that firms hold cash to protect themselves against adverse cash flow shocks that may force them to default on payments or forgo valuable investment opportunities. In fact, a number of empirical studies (e.g., Opler et al. (1999), and Bates, Kahle, and Stulz (2009)) find evidence supporting this precautionary motive of cash holdings.

Most notably, McLean (2011) finds that firms are more likely to issue stocks for cash saving purposes when they have greater precautionary motives. In particular, he examines

[10] Kim and Weisbach (2008) and Hertzel and Li (2010) find that when firms issue equity in general, they often use the resulting proceeds for investment. Moreover, these firms save a large portion of their equity issuance proceeds as cash.

how firms save out of the proceeds received from total equity issuances, including both option and non-option proceeds. He finds that, on average, firms save only $0.23 per dollar of equity issuance proceeds in 1970 and $0.60 per dollar in recent years, suggesting that the increase in equity issuance-cash saving sensitivity is due to greater precautionary motives rather than to market timing. In a recent study, McKeon (2013) differentiates firm-initiated equity issuances (IPOs, SEOs and private placements) from investor-initiated issuances (mainly employee stock option exercises) based on relative issue size, and argue however that the high cash saving rate of equity issuance proceeds documented by McLean (2011) is, to a large extent, driven by investor-initiated issuances. Given that investor-initiated issuances does not, by definition, involve any conscientious capital raising effort on the part of the firms' managers, McKeon (2013) argues against the conjecture brought forth by McLean (2011), that firms increasingly issue equity with the purpose of saving cash for precautionary motives.

The distinction, made by McKeon (2013), between firm- and investor-initiated equity issuances is certainly interesting. After all, the existing body of research on firm financing has been focused extensively on either equity issued to all equity investors (as defined using Compustat cash flow statement) or equity issued mostly to outside investors (as defined using Thompson Financial SDC Platinum database). Equity issued to corporate insiders (i.e., employees) as a result of stock option exercises however, has been largely unexplored. As such, by examining the cross-sectional variation in the allocation of both option and non-option proceeds, we not only shed more light on the dynamics of employee-related equity issues, but also inform about the differences exhibited by U.S. firms in allocating the two types of proceeds to not just one, but various uses. In doing so, we hope to provide a more complete picture of the equity inflow allocation decisions of U.S. firms, which are typically faced with more than one uses and sources of funds. To the extent that such uses are

competing among themselves for the firms' funds, our simultaneous-equation framework enables us to empirically gauge the relative importance of these uses.

Unlike McKeon (2013), who uses an arbitrary rule based on relative issue size, to impute the amounts of investor-initiated issues, we explicitly collected a majority of them from various sources.[11] As a result, we offer a more accurate contrast of the magnitude of firm- versus investor-initiated issues. In addition, it is noteworthy that while he examines the relation between market conditions and equity issuance, we focus on the allocation of equity issuance proceeds (i.e., both firm- and investor-initiated issues) to various uses.

III. Data, Variables and Summary Statistics

A. Data

We obtain data on broad-based employee stock option programs from three sources. The first source, the Investor Responsibility Research Centre (IRRC) Dilution Database, which covers S&P 1500 firms (i.e., S&P 500, S&P MidCap 400, and S&P SmallCap 600 firms) during the period 1998-2010, contains data on the firms' stock option programs based on the 10-K statements they file with the Securities and Exchange Commission (SEC). The data includes the weighted average exercise price and the number of stock options granted, cancelled, and exercised each year. However, after IRRC was acquired by Institutional Shareholder Services (ISS) in 2005, the number of options exercised become unavailable in the IRRC Dilution Database. Therefore, for the period 2005-2013, we rely on Compustat, which reports from 2004 onwards, the weighted average exercise price and the number of stock options granted, cancelled, and exercised each year. For firms with missing number of options exercised, we supplement the data with information from Capital IQ, which offers the number of options exercised for the period 1994-2011. Since Capital IQ does not provide the

[11] Specifically, using quarterly Compustat data and defining the equity issue size as the quarterly proceeds divided by market value of equity, McKeon (2013) defines investor-initiated (firm-initiated) equity issuances as those with issue size lower (higher) than 2% (3%).

exercise price of these options, we rely on the IRRC Dilution Database and Compustat as the primary sources of data and Capital IQ as the supplementary data source.

As the S&P 1500 index does not include a lot of technology firms which extensively grant stock options to employees, we follow Babenko, Lemmon, and Tserlukevich (2011) and hand-collect, for NASDAQ 100 firms that are not a part of the S&P 1500 index, data on employee stock options from the firms' 10-K statements filed with the SEC. We then merge the data on employee stock options with Compustat fundamental annual files to obtain firm financial information. Data on stock prices and returns are retrieved from the Center for Research on Security Prices (CRSP) files. Following common practice in the literature (e.g., Bates, Kahle, and Stulz 2009 and McLean 2011), we exclude financial firms (SIC 6000-6999) and utility firms (SIC 4900-4999). Also excluded are firms with missing data for option proceeds and other variables of interest as defined in Section II.B. Our final sample consists of 2,112 firms (18,343 firm-year observations) in the S&P 1500 and NASDAQ 100 indices over the period 1998-2013. The average coverage per firm is 8.7 years due to changes in index composition.

B. Variables and the Cash Flow Identity

Our empirical analysis hinges upon the following cash flow identity, as defined using the flow-of-funds (cash flow statement) data of Compustat:

$$Inv + \Delta Cash + ERep + DRep + \Delta WC + Div = EIsu + DIsu + CF + Other, \quad (1)$$

where the left-hand side of equation (1) comprises the uses of funds, namely tangible investment (*Inv*), cash savings as measured by the change in cash holdings ($\Delta Cash$), equity repurchase (*ERep*), debt repurchase (*DRep*), working capital needs as measured by the change in working capital (ΔWC), and cash dividends (*Div*). The right-hand side of equation (1) captures the major sources of funds, namely total equity issues (*EIsu*), debt issues (*DIsu*)

and operating cash flows (*CF*).[12] *Other* is the residual term that accounts for any rounding errors and misreported data that might cause the cash-flow identity to be unbalanced. According to Compustat's data manuals, the definitions of variables in equation (1) vary depending on which format code a firm follows in reporting the flow-of-funds data.[13] Appendix A details the construction of variables in equation (1) based on the different format codes of the flow-of-funds data.

As an aggregate figure reported in the statement of cash flows, *EIsu* includes all forms of equity issuance that give rise to cash inflows to a firm.[14] Among others, it include public equity offerings, private placements to outside investors, proceeds from employee stock purchase plans, and proceeds from stock option exercises (*OP*). Specifically, we define *OP*, one of the key variables of our interest, as the number of options exercised times the weighted average exercise price of stock options exercised in a given fiscal year.[15] To separate option proceeds from non-option proceeds, we define the latter equity issuance proceeds as *EIsu-OP*. In addition, following previous studies on cash flow sensitivities, we

[12] To simplify the analysis, we do not distinguish short-term debt issuances from long-term debt issuances. Specifically, *DIsu* is defined as the sum of long-term debt issues + the change in short-term debt.

[13] Effective for fiscal years ending July 15, 1988, Statement of Financial Accounting Standards (SFAS) #95 requires U.S. companies to report the Statement of Cash Flows (format code = 7). Prior to the adoption of SFAS #95, companies may have reported one of the following statements: Working Capital Statement (format code = 1), Cash Statement by Source and Use of Funds (format code = 2), and Cash Statement by Activity (format code = 3).

[14] More specifically, *EIsu* corresponds to Compustat Data Item Number 108 namely, Sale of Common and Preferred Stock (Statement of Cash Flows). It represents funds received from the issuance of common and preferred stock and includes the following items: (1) conversion of Class A, Class B, or special stock into common stock, (2) conversion of preferred stock and/or debt into common stock, (3) equity offerings, (4) exercise of stock options and/or warrants, (5) increase in capital surplus due to stock issuance, (6) issuance of warrants when combined with common stock, (7) related tax benefits due to issuance of common and/or preferred stock, (8) sale of common stock, (9) sale of preferred stock, (10) sale of redeemable preferred stock and (11) sale of stock. However, this data item excludes issuance of warrants, share issuance costs when reported separately and stock of subsidiary company.

[15] Babenko, Lemmon, and Tserlukevich (2011) point out that to the extent that employees are allowed to settle the exercise price using their common shares of the company, rather than cash, *OP* may overestimate the actual amount of cash that firms can receive from option exercises. However, by comparing the IRRC data with their hand-collected data on option proceeds from the Statement of Cash Flows, they find that alternative settlement methods of option exercises are uncommon in practice, and *OP* defined using the IRRC data is quite precise.

define cash flow as operating cash flows net of the change in working capital (CF-ΔWC).[16] The augmented cash flow identity can therefore be written as follows.

$$Inv + \Delta Cash + ERep + DRep + Div = OP + (EIsu - OP) + DIsu + (CF - \Delta WC) + Other \qquad (2)$$

All variables in the cash flow identity are scaled by one-year lagged book value of assets. To control for firm-specific characteristics, we include in our regression analysis, a number of firm characteristics as control variables. That is, the log of book value of assets, *Ln*(*Assets*), is included as a proxy for firm size. The market-to-book ratio (*MB*) is a proxy for both firm value and growth opportunities and is defined as (total assets + market value of equity - book value of equity) / total assets. *Sales growth* is the growth rate of net sales and serves as an alternative proxy for growth opportunities. *Leverage* is the ratio of total debt over total assets. *Tangibility* is a measure of the tangibility of firm assets and is defined as the net PPE-to-asset ratio. These control variables, as well as the variables in equation (1), are winsorized at the top and bottom 1% of their distributions to mitigate the effect of outliers. Dollar amounts are deflated to 2005 constant dollars using the GDP deflator.

C. Empirical Methodology

To examine how firms allocate equity issuance proceeds to the various uses of funds, we measure the allocation of equity issuance proceeds using the coefficients on such cash inflows within a regression framework. That is, we estimate five empirical models in which we individually regress the different uses of funds (i.e., *Inv*, *ΔCash*, *ERep*, *DRep*, and *Div*) on all sources of funds (including option and non-option equity issuance proceeds), firm-specific control variables, as well as year and firm fixed effects. Specifically, the regression equations are written as follow:

[16] See Bushman, Smith, and Zhang (2011), Dasgupta, Noe, and Wang (2011) and Gatchev, Pulvino, and Tarhan (2010).

$$Inv_{it} = \alpha^1 + \beta^1 OP_{it} + \varphi^1 \left(EIsu_{it} - OP_{it} \right) + \gamma^1 X_{it} + \delta^1 Y_{it-1} + f_i + y_t + \varepsilon_{it}^1, \quad (3)$$

$$\Delta Cash_{it} = \alpha^2 + \beta^2 OP_{it} + \varphi^2 \left(EIsu_{it} - OP_{it} \right) + \gamma^2 X_{it} + \delta^2 Y_{it-1} + f_i + y_t + \varepsilon_{it}^2, \quad (4)$$

$$ERep_{it} = \alpha^3 + \beta^3 OP_{it} + \varphi^3 \left(EIsu_{it} - OP_{it} \right) + \gamma^3 X_{it} + \delta^3 Y_{it-1} + f_i + y_t + \varepsilon_{it}^3, \quad (5)$$

$$DRep_{it} = \alpha^4 + \beta^4 OP_{it} + \varphi^4 \left(EIsu_{it} - OP_{it} \right) + \gamma^4 X_{it} + \delta^4 Y_{it-1} + f_i + y_t + \varepsilon_{it}^4, \quad (6)$$

$$Div_{it} = \alpha^5 + \beta^5 OP_{it} + \varphi^5 \left(EIsu_{it} - OP_{it} \right) + \gamma^5 X_{it} + \delta^5 Y_{it-1} + f_i + y_t + \varepsilon_{it}^5. \quad (7)$$

In equations (3) to (7), *X* includes *CF-* Δ*WC*, *DIsu*, and *Other*. *Y* represents the vector of firm-specific control variables, which include *Ln*(*Assets*), *MB*, *Sales growth*, *Leverage*, and *Tangibility*. We also include firm fixed effects (f) to control for unobserved firm heterogeneity as well as year dummies (y) to account for time effects. The sensitivity of equity issuance proceeds to a particular use of funds thus reveals how much of an additional dollar of equity issuance proceeds is directed towards that use. Accordingly, the allocation of option and non-option proceeds across the various uses of funds is captured by β^i and φ^i, respectively.

Within this integrated regression framework, our approach has a methodological advantage in that it offers a complete view of the allocation of equity issuance proceeds by simultaneously tracking all uses of such cash inflows, all of which are interrelated by the identity that the sum of all uses of cash flow must be equal to the cash flow itself. Notably, Chang et al. (2013) show that if the cash flow identity (equation (1)) holds in the data, the coefficients on each source of funds should add up to unity across equations (3) - (7) and the coefficients on each control variable in *Y* should sum to zero across the five equations. That is, $\sum_{i=1}^{5} \beta^i = 1, \sum_{i=1}^{5} \varphi^i = 1, \sum_{i=1}^{5} \gamma^i = 1,$ and $\sum_{i=1}^{5} \delta^i = 0.$ In other words, if any source of funds, such as internal cash flows or option proceeds, increases by one dollar while holding other sources of funds unchanged, then the change in all uses of cash flow must sum to one dollar. However,

if the shock stems from an exogenous or predetermined variable that represents neither a source nor a use of funds in the current period, the total response across different uses of cash must sum to zero.[17] In addition, Chang et al. (2013) demonstrate that estimating equations (3) - (7) in isolation is equivalent to estimating them as simultaneous equations, so long as the five specifications incorporate the same set of right-hand-side variables.[18]

D. Summary Statistics

Figure 1 shows the magnitude of the proceeds from option exercises over time. It presents the aggregate dollar value of total equity issues (*EIsu*), option proceeds (*OP*), and non-option proceeds (*EIsu* - *OP*) across all firms in our sample. In particular, the aggregate amount of *OP* is substantial, ranging from $14.6 billion in 1998 to $57.0 billion in 2013. Both *EIsu* and *OP* peak in 2007, the year before the 2008 financial crisis. Panel B plots *OP* as a percentage of *EIsu*. In aggregate, option proceeds account for a large fraction of total equity issues throughout the sample period, ranging from 46.4% in 1998 to 73.3% in 2013. Like the aggregate amount, option proceeds as a fraction of total equity issues peaks in 2006, dropping substantially over the 2008 financial crisis period and then rising sharply again. Panel C plots the ratio of option proceeds over non-option proceeds. Specifically, option proceeds were 0.87 times as large as non-option proceeds in 1998 and has been increasing drastically before dropping sharply around the 2008 financial crisis period and rising substantially again to 2.75 in 2013. This suggests that employee stock option exercises result in more cash flowing into firms than do other forms of equity financing as a whole.

[17] For instance, suppose the coefficient on *MB* is 0.1 in equation (3), suggesting that investment increases by 10% of total assets if *MB* increases by one. Since investment is a use of funds and total uses of funds must be equal to the total sources of funds, the net effect of the increase of *MB* on other use must sum to -10% of total assets, holding all source variables constant.

[18] This result is not surprising on account that the simultaneous equations (3) - (7) qualify as seemingly unrelated regressions (SURs). In fact, Kruskal's (1960) theorem implies that SUR estimates turn out to be equivalent to equation-by-equation OLS estimates if the same set of explanatory variables is included in each equation. This is exactly the case in our equations (3) - (7). See Greene (2008) (page 257-258) for a detailed proof.

[Insert Figure 1 Here]

Table 1 reports the descriptive statistics of our sample for the variables defined in Section III.B. The mean values of *OP* and *EIsu-OP* are 0.010 and 0.012, respectively, suggesting that the average size of non-option proceeds is greater than that of option proceeds. However, the median values of *OP* and *EIsu-OP* (0.004 and 0, respectively) indicate that firms receive cash from option exercises more often than from other equity issues. Given that the median value of *EIsu-OP* is zero and the 75th percentile is only 0.003, we infer that the high mean value of *EIsu-OP* is driven by other equity issues that are infrequent and lumpy. The mean (median) value of the residual term, *Other*, is -0.005 (0), suggesting that the cash flow identity holds well in our data.

[Insert Table 1 Here]

IV. Results

A. Contemporaneous allocation of equity issuance proceeds

To examine the allocation of equity issuance proceeds by U.S. firms, we estimate equations (3) - (7) as standalone regressions and report the results in Table 2. The *t*-statistics are computed using standard errors robust to both clustering at the firm level and heteroskedasticity. Column (1) presents the results for investment. The coefficient on *OP* is positive and statistically significant. Economically, this implies that on average, firms spend 34 cents on investment in response to every dollar of cash inflow arising from employee stock option exercises. This result is consistent with that of Babenko, Lemmon, and Tserlukevich (2011).

[Insert Table 2 Here]

More importantly, column (2) shows that cash savings is the most important use of option proceeds. Specifically, for each dollar of cash inflow arising from employee stock

option exercises, firms in our sample add an average of 64 cents to their cash holdings. This rate of cash saving is statistically significant and economically higher than the spending rate of option proceeds on investment. In contrast, we find that the reverse is true for non-option proceeds; firms spend a greater amount of such inflows on investments than they save as cash. Having said this, the saving rate of non-option proceeds is still high at an average of 42 cents per dollar of non-option proceeds.

To summarize, although firms allocate option and non-option proceeds differently, cash savings is still the most important use of both types of proceeds. Notably, given that as much as 64 cents out of each dollar of option proceeds are saved as cash, proceeds from employee stock option exercises constitute the largest portion of cash inflows saved by the firms. This is in sync with McLean (2011), who posits that firms issue equity for the purpose of accumulating cash, saving 60 cents out of every dollar of equity issuance proceeds. As such, by documenting that the increase in share issuance–cash savings in recent years is, to a large extent, driven by the high saving rate of option proceeds, our results seem to complement that of McLean (2011).

In column (3), we document that firms repurchase stock in response to cash inflows from employee stock option exercises. This is consistent with the results of Kahle (2002), Bens, Nagar, and Wong (2002) and Bens et al. (2003). Column (4) suggests that debt repurchase is negatively and significantly associated with the option proceeds (coefficient = -0.32; *t*-statistic = -5.0), implying that firms reduce debt retirement when employees exercise their stock options. One possible explanation is that inflows from option exercises improve corporate liquidity and enhance debt capacity, thereby reducing firms' incentive to retire debt. Another possible explanation is that firms may become underleveraged after employee stock options are exercised because employees are more likely to exercise their options when the equity value is high. Firms may therefore be reluctant to repurchase debt so as to avoid

further deviating from their target leverage ratios. Column (5) presents the results for dividends. Specifically, the coefficient on *OP* is positive and statistically significant (coefficient = 0.03; *t*-statistic = 3.2), suggesting that employee stock option exercises have a significant impact on dividend decisions. Note that the sum of the coefficients on *OP* across the five regressions is equal to one, thereby confirming the validity of these regressions which are based on the cash flow identity. Taken together, these results suggest that addition to cash holdings outweighs investment and stock repurchase as the most important outlet for equity issuance proceeds.

As a side note, out of each dollar of operating cash flow, firms allocate 48 cents to investment, save 35 cents as cash, repurchase equity with 6 cents, retire 10 cents of debt, and pay dividends with 1 cent. In addition, we find that firms issue debt mainly to retire existing debt; for each dollar of debt issuance proceeds received, 59 cents are used to repurchase debt, while 35 cents are allocated to investment and only 4 and 2 cents are parked as cash and used for stock repurchase, respectively. Finally, the coefficients on other control variables reveal that the rate of cash savings is lower for large firms than for firms with more tangible assets. As discussed above, the sum of the coefficients on every control variable across the five regressions is equal to zero.

B. Dynamic allocation of equity issuance proceeds

If the difference in cash saving rates of option and non-option proceeds is temporary, then we expect the increase in cash due to these equity issues to be reversed in subsequent years. Specifically, we add the lagged values (from *t*-3 to *t*-1) of *OP*, *EIsu-OP* and other sources of funds into equation (4). For ease of interpreting the coefficients, we scale all lagged variables by total assets at *t*-1, the same deflator for all contemporaneous sources-of-funds variables. Since we require firms to have at least three years of history for the sources-

of-funds variables, including option and non-option proceeds, the number of observations for this test is reduced from 18,343 to 11,297. The regression results with lagged sources-of-funds variables are presented in Table 3.

[Insert Table 3 Here]

Column (1) of Table 3 shows that the coefficient on concurrent *OP* remains statistically and economically significant after controlling for lagged values of various sources-of-funds. Moreover, the coefficient (0.74) is greater than that (0.64) in column (2) of Table 2. Further, the coefficient on OP_{t-1} is negative and statistically significant (coefficient = -0.32; *t*-statistic = -2.9), while the coefficients on OP_{t-2} and OP_{t-3} are statistically insignificant. The magnitudes of the coefficients indicate that firms retain, on average, 74 cents as cash holdings for every dollar of cash inflow arising from employee stock option exercises occurring in the same period. However, in the year following option exercises, firms do adjust their cash holdings downwards. In particular, for every dollar of cash inflow arising from employee stock option exercises at *t*-1, firms reduce their current cash holdings by an average of 32 cents, mainly through the repurchase of equity (31 cents). Given that the coefficients on OP_{t-2} and OP_{t-3} are statistically insignificant with a magnitude of only 0.01 and -0.08, respectively, we find no evidence that firms reduce their cash holdings two and three years after option exercises.

However, by adding up the coefficients on option proceeds from *t*-3 to *t*, one can infer that an average firm receiving a dollar of cash inflow from option exercises today, will still have 35 cents (= 0.74 – 0.32 + 0.01 - 0.08) parked on the balance sheet as cash three years later. Repeating the cash saving analysis for non-option proceeds, we find that three years post the issuance of such equity, firms still retain 32 cents (= 0.37 - 0.05 + 0.01 - 0.01) out of every dollar of non-option proceeds. That is, from a dynamic perspective, firms save option and non-option proceeds at similar rates. In fact, these equity issuance proceeds emerge,

among all cash inflows, as the most important contributor to corporate cash holdings. This is consistent with McLean (2011), who posits that firms issue equity for the purpose of cash savings.

As a robustness check, we re-estimate the models in Table 3 using the "event-year" Fama-MacBeth (1973) approach. In other words, we run Fama-MacBeth regressions by event year *t*, i.e., the number of years a firm is in our sample, rather than by calendar year. This will ensure that in measuring lagged option and non-option proceeds, we have sample firms with the same length of history for each cross-sectional regression at event year *t*. The results for the Fama-MacBeth regressions are qualitatively similar to those reported in Table 3 and are omitted to save space.

C. Financial constraints and the allocation of equity issuance proceeds

In the previous two sections, we use the cash flow identity regressions to illustrate how firms allocate their equity issuance proceeds across the various uses of funds. The next item on the research agenda is then to explore the ability of financial constraints in explaining the firms' equity inflow allocation decisions. To do this, we use five different measures of financial constraints namely, firm size as proxied by the natural logarithm of total assets, *Ln*(*Assets*), the two financial constraint indices of Hadlock and Piece (2010) and Whited and Wu (2006) (*HP* and *WW*, respectively), the firm's dividend paying status, as well as the existence of a credit rating for the firm.[19] In particular, a firm is classified as being

[19] The *HP* index measures a firm's financial constraints as a function of its age and size. That is, $HP = -0.737 \times Ln(Assets) + 0.043 \times (Ln(Assets))^2 - 0.040 \times Age$. Hadlock and Pierce (2010) argue that in many contexts, their index is a more reasonable measure of a firm's financial constraints than other types of constraint measures, such as the Kaplan and Zingales' (1997) index of constraints. The *WW* index is constructed based on a structural model that avoids the measurement errors associated with Tobin's *Q* in traditional tests. Specifically, *WW* = -0.091×*Cash Flows/Assets* - 0.062×*Dividend Payer* + 0.021×long-term debt/*Assets* - 0.044×*Ln*(*Assets*) + 0.102×industry median *Sale Growth* - 0.035×*Sale Growth*. By construction, the higher the scores of the *HP* or *WW* indices, the more financially constrained the firms are.

financially more (less) constrained in a given year if its *Ln*(*Assets*) is below (above) the 30th percentile, its *HP index* or *WW index* is above (below) the 70th percentile, it pays no (pays) dividends, or it does not have (has) a credit rating. Accordingly, we divide our sample into two groups, namely less and more financially constrained groups, and re-estimate equations (3) - (7) for each subsample. The results are reported in Table 4. For the sake of brevity, we do not tabulate the coefficients of other explanatory and control variables since they are similar to those reported in Table 2.

[Insert Table 4 Here]

Column (1) and (6) of Panel A present the results for investment. Most notably, regardless of the measure of financial constraints used, we find that for firms that are more financially constrained, there is a systematic increase in the intensity of their investments for a given dollar increase in the availability of options proceeds. The investment of less financially constrained firms are however, not sensitive to the availability of option proceeds. This is consistent with a large body of literature that examines the impact of financial constraints on corporate investment by estimating the empirical investment-cash flow sensitivity of firms.[20] In general, the literature suggests that the investment of more financially constrained firms should also vary with the availability of internally generated cash, rather than just with the availability of positive net present value projects. Thus, it is not surprising that we observe a similar effect between investment and equity inflows that are internally generated by employees. Our results therefore complement the literature by documenting another source of funds, cash flows arising from the exercise of employee stock options, to which corporate investment is sensitive to. As a side note, we also find that investment is sensitive to the availability of non-option proceeds for both more and less

[20] For a start, see Fazzari, Hubbard, and Petersen (1988). Also see Hubbard (1998) for an in-depth survey of the literature.

financially constrained firms. See column (1) and (6) of Panel B. This is not surprising given that equity is generally the marginal source of capital for investment.[21]

Column (2) and (7) of Panel A and B illustrate the difference in cash saving rates of option and non-option proceeds for both subsamples. We show that, relative to less financially constrained firms, firms that are more financially constrained save more out of both types of proceeds, consistent with the costly external financing theories, which put forth that financially constrained firms build up cash reserves in anticipation of future financing difficulty.[22] It is worthy to note that this result holds consistently across the five different measures of financial constraints. As such, by showing that financially constrained firms also build up their cash holdings with option proceeds when such inflows become available, our study supplements that of Almeida, Campello, and Weisbach (2004) and Khurana, Martin, and Pereira (2006), who find that financially constrained firms rely more on internal cash flows in building their cash holdings.

Column (3) and (8) of Panel A show that less financially constrained firms return more option proceeds to stockholders via stock repurchase than do more financially constrained firms. This is consistent with Babenko, Lemmon, and Tserlukevich (2011), who find that only firms that are not financially constrained use option proceeds to repurchase stocks; financially constrained firms use these cash flows for their investments. We do not however, find a statistically significant relation between the intensity of a firm's stock repurchase activity and the availability of non-option proceeds across almost all measures of financial constraints. To put the results in a nutshell, financial constraints seem to have a different impact on the allocation of equity inflows, depending on whether the proceeds are option- or non-option related. Specifically, we find that financial constraints tend to shift the

[21] See Brown, Fazzari, and Petersen (2009).
[22] Chang et al. (2013) document a similar finding.

use of option proceeds away from stock repurchases and towards investment and cash savings, while directing non-option proceeds away from investment and towards cash savings.

To further explore the dynamic cash saving behavior of our sample firms, we again partition our data into two subsamples, depending on whether the firms are more or less financially constrained. We then re-estimate the models in Table 3 and report the results in Table 5. For the sake of brevity, we do not tabulate the coefficients of other explanatory and control variables since they are similar to those reported in Table 3.

[Insert Table 5 Here]

Not surprisingly, we find that relative to their less financially constrained counterparts, firms that are more financially constrained save a greater portion of their option proceeds in the year of option exercises. Across all five measures of financial constraints, the coefficients on concurrent *OP* for more financially constrained firms remain statistically and economically significant after controlling for the lagged values of various sources-of-funds. On the other hand, although the coefficients on concurrent *OP* for less financially constrained firms have the same sign as those for more financially constrained firms, the coefficients are not as statistically significant as those for the financially less constrained firms.

More interestingly, although we find strong evidence that more financially constrained firms adjust their cash holdings downwards one year following the receipt of their option proceeds, there is weaker statistical evidence that this is the case for less financially constrained firms. In particular, contrary to those for more financially constrained firms, none of the coefficients on OP_{t-1} are statistically significant. Moreover, the coefficients on OP_{t-1} do not have the expected negative sign for less financially constrained firms defined on the basis of the *WW* index and the dividend paying status. As such, we deduce that the downward adjustment of cash holdings documented in Table 5, is to a large extent, driven by firms that are financially more constrained. Last but not least, we find little

evidence that firms (i.e., both more and less financially constrained firms) reduce their cash holdings two or three years after employee stock option exercises; the coefficients on OP_{t-2} and OP_{t-3} are mostly statistically insignificant for both subsamples. Repeating the cash saving analysis for non-option proceeds, we find a similar, albeit weaker, pattern as that for option proceeds.

To summarize, we find that although firms differ in the way they allocate option and non-option proceeds to various contemporaneous uses, they seem to exhibit dynamically similar cash saving rates for the two types of proceeds. More specifically, we find that a large part of these proceeds are retained as cash on the balance sheet. This finding lends support to McLean (2011), who puts forth that firms issue equity and save the proceeds out of precautionary motives. Notably, although McKeon (2013) discredits the conjecture of McLean (2011) on account that a majority of the equity issues under the latter's study is made up of investor-initiated issues which are passively receipted by the firms and hence cannot be taken as evidence that these firms issue equity with precautionary motives, we find that this is unlikely the case. Particularly, when the proceeds of these equity issues are more accurately defined as option and non-option proceeds in our sample, we find that firms still save as cash, a significant portion of their non-option proceeds, issues for which McKeon (2013) defines as involving conscientious capital raising effort on the part of the firms' managers. Having said this, even if such issuances per se do not originate from precautionary motives, we find that firms do accumulate precautionary cash balances by actively saving the resulting option proceeds.

V. Analysis of equity issues

To recap, McKeon (2013) defines investor-initiated issues as being predominately made up of employee stock option proceeds, whereas firm-initiated issues are regarded as all

other forms of equity issues, the proceeds of which, are what we would consider as non-option proceeds. In this section, we examine how accurate the identification rule of McKeon (2013) is in estimating the magnitude of option and non-option proceeds in our sample. Specifically, he distinguishes between investor- and firm-initiated issues using an "*ISSUE%"* rule, where *ISSUE*% is a variable defined as the ratio of common equity proceeds to end of period market equity.[23] According to his rule, equity issues with *ISSUE*% less than 2% are regarded as investor-initiated issues. To the extent that such issues are largely driven by employee stock option exercises, the option proceeds received by our sample firms should be less than 2% of the firms' market equity if his rule is accurate. Similarly, equity issues with *ISSUE*% greater than 3% are deemed as firm-initiated issues by McKeon (2013). Should his rule be accurate, the non-option proceeds received by firms in our sample should be no less than 3% of the values of their market equity.

Panel A of Table 6 explores the accuracy of the *ISSUE*% rule in imputing the quantity and amount of investor- and firm-initiated issues in our sample. Specifically, according to our actual sample data, there is a total 16,153 equity issues worth $642 billion, originating from employee stock option exercises throughout the sample period 1998-2013. Indeed, we find that a majority of these issues (15,265 of them with a value of $548 billion) have a relative issue size of less than 2%. Exploring other arbitrary values of *ISSUE*% beside the 2-3% as suggested by McKeon (2013), we find that increasing the cut-off percentage for investor-initiated issues does not improve the accuracy of the *ISSUE*% rule. As such, we deduce that the *ISSUE*% rule of McKeon (2013) is quite accurate in imputing the amount of

[23] That is, using the Compustat Fundamentals Quarterly file, McKeon (2013) computes the quarterly equity issuance proceeds of a firm by subtracting the previous quarter value of the proceeds from the sale of common and preferred stock (Compustat: SSTKY) from its current year-to-date value. To isolate common equity proceeds, he subtracts preferred equity proceeds from the total equity proceeds; preferred equity proceeds are calculated as increases in PSTKQ (or PSTKRQ where missing). As a side note, observations with negative values of quarterly proceeds, as well as those with missing SSTKY, are set to zero. He then computes the ratio of common equity proceeds to end of period market equity for each firm-quarter observation and refers to this variable as *ISSUE*%.

investor-initiated issues in our sample. However, we note that his rule, unlike our actual sample data, cannot be used in a regression framework to analyze the allocation of equity issuance proceeds. Moreover, we find that there are 338 investor-initiated issues worth $26 billion having an *ISSUE*% greater than 3% and would have been mistakenly classified by McKeon (2013) as firm-initiated. Also, 550 of the issues with a value of $68 billion would have been deemed as ambiguous and removed from his sample. Examining the actual non-option proceeds in our sample, we find that conditional on the issues being indeed firm-initiated, the *ISSUE*% rule systematically misclassify them as being investor-initiated; 9,967 issues worth $137 billion, out of a total of 11,035 non-option related issues worth $421 billion, have an *ISSUE*% less than 2%. Only 944 issues with a value of $273 billion are accurately classified as firm-initiated issues during the sample period, while 124 issues worth $11 billion would have been marked as ambiguous and disregarded by McKeon (2013).

In addition, we note that under his rule, a firm can only be classified as having issued in a particular year, either investor- or firm-initiated equity, but not both. For example, should a firm receives an annual amount of option proceeds exceeding 3% of the market value of its equity, it will be mistakenly deemed as having issued firm-initiated equity. Moreover, given that equity issues with a size between 2 to 3% of market equity are deemed as ambiguous and therefore disregarded by McKeon (2013), his rule misses out on firms that receive moderate amounts of option and/or non-option proceeds. In fact, cross checking his rule against our more precise data, we find that for all sample years, more than 50% of our sample firms issue both types of equity. For example, Panel B of Table 6 shows that our sample firms issue a total of 692 equity issues in the year 1998, 465 of which are from firms which issue equity to both employees and outside investors. In contrast, the *ISSUE*% rule predicts that 607 firms issue only investor-initiated issues, thereby overestimating the actual number of such issues in our sample.

On account that we directly collect data on employee stock option exercises from various sources, we argue that our sample provides a more accurate estimate of the number and amount of investor-initiated issues than that based on the identification rule of McKeon (2013). Having this said, we recognize that our definition of non-option proceeds as being akin to the firm-initiated issues of McKeon (2013) is also subject to a classification loophole. That is, in defining these issues as the difference between total equity issues and the proceeds from stock option exercises, we could be potentially classifying other employee-related equity issues (such as stock incentive and profit sharing plans) as being firm-initiated. However, we believe that such a loophole, if any, will only lead to an underestimation of the total amount of employee-related equity issues and bias our results against documenting the importance of these issues. Moreover, stock issued to employees under such plans are solely at the discretion of managers and may therefore be more appropriately classified as non-option proceeds, or what McKeon (2013) describes as, firm-initiated issues.

VI. Conclusion

In this paper, we first examine how U.S. firms allocate their equity issuance proceeds to several contemporaneous uses. In particular, we examine whether these firms differ in their allocations of proceeds from employee stock option exercises versus proceeds from all other forms of equity issues. Using a large sample of data on employee stock option exercises for S&1500 and Nasdaq 100 firms during the period 1998-2013, we separately regress the various uses of funds on all sources of funds, and find that for each dollar received from employee stock option exercises, an average firm saves $0.64 as cash, invests $0.34, and spends $0.31 on stock repurchase, reduces debt retirement by $0.32 and pays dividends of $0.03. On the other hand, for each dollar of non-option proceeds received, the firm saves $0.42 as cash, invests $0.56, reduces spending on stock repurchase by $0.01 and increases

debt retirement by $0.04. However, despite the differing contemporaneous allocation of option and non-option proceeds, we find that cash savings constitutes the most important use of both types of proceeds.

Next, we shift our analysis to a dynamic setting and find that despite their disparate contemporaneous allocations, the two types of proceeds have dynamically comparable cash savings rates. That is, cash from one source (employees) is saved no differently from cash from another (outside investors). Last, we examine whether financial constraints impact on the allocation of equity issuance proceeds and if yes, whether such constraints affect the allocation differently, depending on whether the proceeds are option- or non-option related. Most notably, we find that regardless of the degree of financial constraint, cash savings remains an important motive for equity issuance proceeds. Nevertheless, relative to their less financially constrained counterparts, more financially constrained firms save more out of both option and non-option proceeds. In sum, financial constraints affect the allocation of equity issuance proceeds by shifting the use of option proceeds away from stock repurchases to investment and cash savings while directing the use of non-option proceeds away from investment to cash savings.

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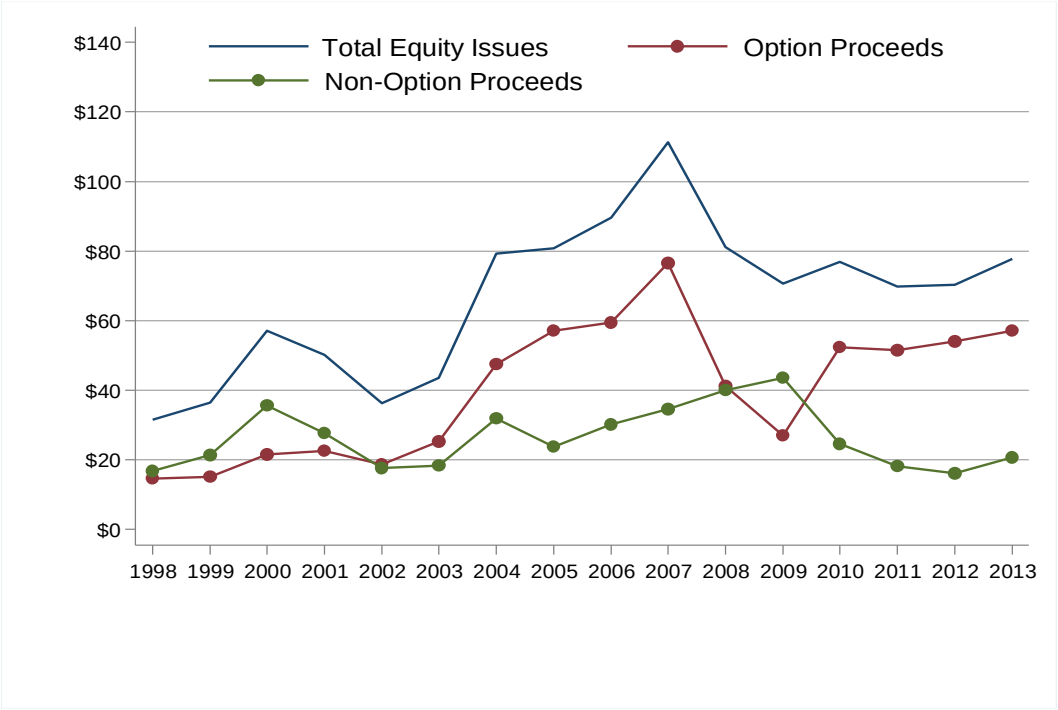
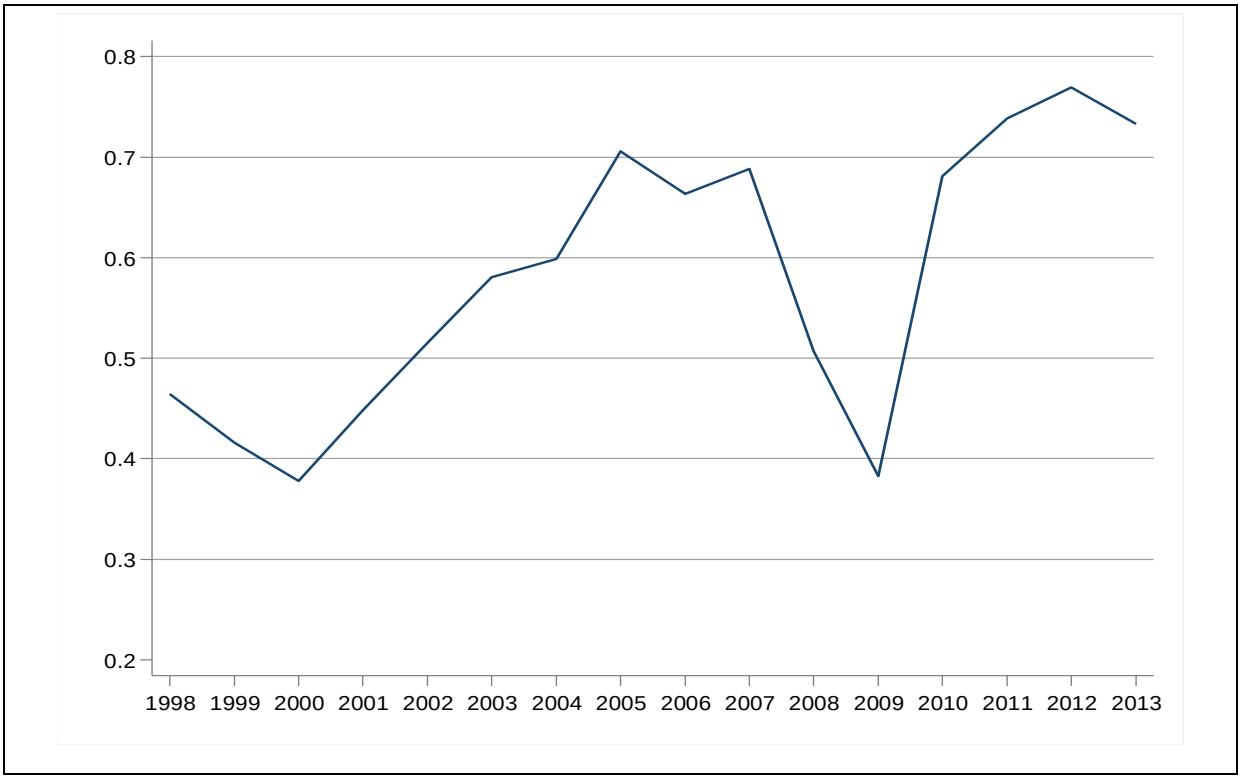
Figure 1. Evolution of employee stock option proceeds

The sample covers firms in the S&P 1500 and Nasdaq 100 indices for the years 1998 to 2013. Panel A presents the aggregate amount of total equity issues, option proceeds, and non-option proceeds by calendar year. Panel B presents the ratio of aggregate option proceeds over aggregate total equity issues by calendar year. Panel C presents the ratio of aggregate option proceeds over aggregate non-option proceeds by calendar year. Non-option proceeds is computed as the difference between total equity issues and option proceeds.

Panel A: Aggregate amount of total equity issues, option proceeds and non-option proceeds



Panel B: Option proceeds over total equity issues



Panel C: Option proceeds over non-option proceeds

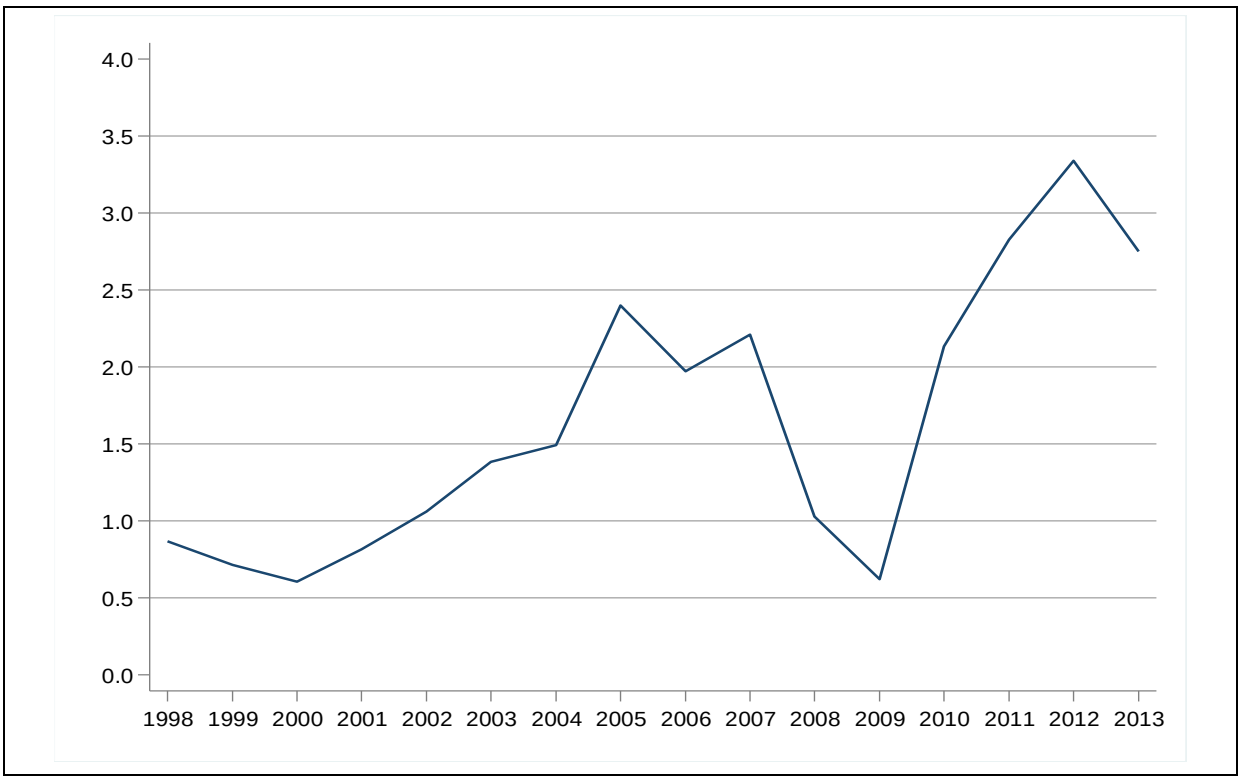


Table 1. Summary statistics

The sample covers firms in the S&P 1500 and the Nasdaq 100 indices for the years 1998 to 2013. The variables follow the cash flow identity equation and are all scaled by book assets.

$$Inv + \Delta Cash + ERep + DRep + Div = OP + (EIsu - OP) + DIsu + (CF - \Delta WC) + Other$$

OP is option proceed. *EIsu-OP* is non-option proceeds. *CF* is operating cash flows. *DIsu* is debt issues. *Other* is other cash flows. *Inv is* investments. $\Delta Cash$ is change in cash. *ERep* is stock repurchase. *DRep* is debt repurchase. ΔWC is change in working capital. *Div* is dividends. The detailed definitions for variables in the cash flow identity are in Appendix A. *MB* is the ratio of market assets over book assets. *Sales growth* is the annual growth rate of sales. *Ln*(*Assets*) is the log of book assets. *Leverage* is the ratio of total debt over book assets. *Tangibility* is the ratio of fixed-assets over book assets.

	Mean	**S.D.**	**25th**	**Median**	**75th**
			Sources of cash		
Option proceeds (*OP*)	0.010	0.016	0.001	0.004	0.013
Total equity issues (*EIsu*)	0.022	0.055	0.002	0.006	0.018
Other equity issues (*EIsu-OP*)	0.012	0.050	0.000	0.000	0.003
Operating cash flows (*CF*)	0.129	0.095	0.075	0.120	0.175
Debt issues (*DIsu*)	0.118	0.242	0.000	0.018	0.134
Other cash flows (*Other*)	-0.005	0.080	0.000	0.000	0.003
			Uses of cash		
Tangible investments (*Inv*)	0.100	0.146	0.025	0.064	0.137
Change in cash ($\Delta Cash$)	0.016	0.087	-0.016	0.004	0.039
Equity repurchase (*ERep*)	0.032	0.058	0.000	0.003	0.040
Debt repurchase (*DRep*)	0.092	0.178	0.000	0.020	0.096
Change in working capital (ΔWC)	0.012	0.056	-0.013	0.008	0.034
Dividends (*Div*)	0.011	0.020	0.000	0.000	0.015
			Firm characteristics		
Cash	0.167	0.176	0.032	0.102	0.245
MB	2.045	1.691	1.219	1.598	2.307
Sales growth	0.118	0.379	-0.008	0.079	0.186
Ln(*Assets*)	7.284	1.623	6.146	7.168	8.322
Leverage	0.209	0.184	0.027	0.192	0.326
Tangibility	0.262	0.217	0.094	0.195	0.371

Table 2. Contemporaneous allocation of equity issuance proceeds

Employee stock option data are collected from the IRRC dilution database, Compustat, and Capital IQ. Cash holdings data are obtained from Compustat. The sample covers S&P 1500 and Nasdaq 100 firms for the years 1998 to 2013. *OP* is option proceeds. *EIsu-OP* is non-option proceeds. *CF* is operating cash flows. *Disu* is debt issues. *Other* is other cash flows. *Inv* is investments. $\Delta Cash$ is change in cash. *ERep* is stock repurchase. *DRep* is debt repurchase. ΔWC is change in working capital. *Div* is dividends. The variables follow the cash flow identity equation and are all scaled by book assets.

$$Inv + \Delta Cash + ERep + DRep + Div = OP + (EIsu - OP) + DIsu + (CF - \Delta WC) + Other$$

MB is the ratio of market assets over book assets. *Sales growth* is the annual growth rate of sales. *Ln(Assets)* is the log of book assets. *Leverage* is the ratio of total debt over book assets. *Tangibility* is the ratio of fixed-assets over book assets. The regressions are run by ordinary least squares (OLS), with firm and year fixed-effects in all the regressions and *t*-statistics computed using standard errors robust to both clustering at the firm level and heteroskedasticity. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

	(1)	(2)	(3)	(4)	(5)
Dependent Variable:	*Inv*	*ΔCash*	*ERep*	*DRep*	*Div*
OP	0.34***	0.64***	0.31***	-0.32***	0.03***
	(3.5)	(7.5)	(6.5)	(-5.0)	(3.2)
EIsu-OP	0.56***	0.42***	-0.01	0.04	0.00
	(16.4)	(15.9)	(-1.6)	(1.5)	(1.4)
CF-ΔWC	0.48***	0.35***	0.06***	0.10***	0.01***
	(28.9)	(24.7)	(9.3)	(8.7)	(5.3)
DIsu	0.35***	0.04***	0.02***	0.59***	0.00
	(39.6)	(8.1)	(6.0)	(69.1)	(0.8)
Other	0.35***	0.11***	0.01	0.53***	-0.01***
	(13.3)	(6.4)	(1.1)	(23.2)	(-4.0)
MB	0.01***	-0.00***	0.00***	-0.01***	0.00***
	(5.7)	(-3.0)	(3.3)	(-6.5)	(2.8)
Sales growth	0.01**	0.00	-0.00***	-0.00	-0.00**
	(2.1)	(0.2)	(-5.1)	(-1.0)	(-2.4)
Ln(*Assets*)	-0.01***	-0.01***	0.01***	0.01***	0.00*
	(-4.5)	(-3.6)	(11.3)	(3.3)	(1.8)
Leverage	-0.18***	0.00	-0.07***	0.26***	-0.01***
	(-17.6)	(0.5)	(-17.1)	(27.9)	(-8.3)
Tangibility	-0.05***	0.11***	-0.02***	-0.04***	-0.00
	(-2.8)	(8.9)	(-3.5)	(-3.1)	(-1.1)
Observations	18,343	18,343	18,343	18,343	18,343
R-squared	0.56	0.29	0.48	0.83	0.68

Table 3. Dynamic allocation of equity issuance proceeds

Employee stock option data are collected from the IRRC dilution database, Compustat, and Capital IQ. Cash holdings data are obtained from Compustat. The sample covers S&P 1500 and Nasdaq 100 firms for the years 1998 to 2013. $\Delta Cash$ is the ratio of change in cash and cash equivalents over book assets. *OP* is the ratio of option proceeds over book assets. *EIsu-OP* is the ratio of non-option proceeds over book assets. *CF* is the ratio of operating cash flows over book assets. *DIsu* is the ratio of debt issues over book assets. *Other* is the ratio of other cash flows over book assets. *MB* is the ratio of market assets over book assets. *Sales growth* is the annual growth rate of sales. *Ln(Assets)* is the log of book assets. *Leverage* is the ratio of total debt over book assets. *Tangibility* is the ratio of fixed-assets over book assets. The regressions are run by ordinary least squares (OLS) with firm and year fixed-effects in all the regressions and *t*-statistics computed using standard errors robust to both clustering at the firm level and heteroskedasticity. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

Dependent Variable:	(1) *Inv*	(2) *ΔCash*	(3) *ERep*	(4) *DRep*	(5) *Div*
OP_t	0.31**	0.74***	0.30***	-0.39***	0.05***
	(2.3)	(6.2)	(4.4)	(-4.2)	(3.1)
OP_{t-1}	0.08	-0.32***	0.31***	-0.07	0.00
	(0.6)	(-2.9)	(4.9)	(-1.0)	(0.3)
OP_{t-2}	0.06	0.01	0.07	-0.15**	0.02
	(0.6)	(0.1)	(1.2)	(-2.1)	(1.5)
OP_{t-3}	0.15	-0.08	-0.00	-0.09	0.02
	(1.4)	(-0.9)	(-0.0)	(-1.5)	(1.4)
$(EIsu\text{-}OP)_t$	0.59***	0.37***	-0.02*	0.06	0.00
	(11.4)	(9.1)	(-1.9)	(1.5)	(0.4)
$(EIsu\text{-}OP)_{t-1}$	0.09***	-0.05*	-0.02***	-0.02	-0.00*
	(2.9)	(-1.9)	(-2.8)	(-1.6)	(-1.8)
$(EIsu\text{-}OP)_{t-2}$	0.02	0.01	-0.02***	-0.00	0.00
	(1.1)	(0.4)	(-4.1)	(-0.4)	(0.2)
$(EIsu\text{-}OP)_{t-3}$	0.03*	-0.01	-0.01***	-0.00	-0.00
	(1.9)	(-1.0)	(-2.7)	(-0.6)	(-0.1)
$(CF\text{-}\Delta WC)_t$	0.47***	0.37***	0.04***	0.11***	0.01***
	(18.9)	(18.1)	(4.1)	(6.6)	(5.8)
$(CF\text{-}\Delta WC)_{t-1}$	0.07***	-0.09***	0.04***	-0.02	0.01***
	(3.1)	(-5.0)	(5.2)	(-1.6)	(3.4)
$(CF\text{-}\Delta WC)_{t-2}$	0.02	-0.03*	0.01	-0.00	0.00*
	(1.2)	(-1.9)	(1.2)	(-0.1)	(1.8)
$(CF\text{-}\Delta WC)_{t-3}$	0.02**	0.00	-0.01**	-0.01**	0.00
	(2.3)	(0.3)	(-2.3)	(-2.5)	(0.6)
$DIsu_t$	0.35***	0.03***	0.01***	0.61***	0.00
	(28.6)	(4.9)	(4.1)	(53.3)	(1.1)
$DIsu_{t-1}$	-0.04***	0.00	-0.01***	0.04***	-0.00***
	(-6.1)	(0.9)	(-3.1)	(7.1)	(-3.4)
$DIsu_{t-2}$	-0.02***	0.01***	-0.00	0.01*	-0.00
	(-3.3)	(3.0)	(-0.9)	(1.9)	(-1.4)

$DIsu_{t-3}$	-0.00	0.00	-0.00	0.01	-0.00
	(-1.0)	(0.4)	(-0.8)	(1.2)	(-0.8)
$Other_t$	0.32***	0.13***	0.01	0.56***	-0.01***
	(7.8)	(4.9)	(0.5)	(17.5)	(-3.2)
$Other_{t-1}$	0.05	0.07***	-0.00	-0.12***	-0.00
	(1.4)	(2.6)	(-0.2)	(-3.3)	(-0.4)
$Other_{t-2}$	0.01	0.02	-0.01	-0.03	0.01
	(0.3)	(0.9)	(-0.5)	(-0.8)	(1.3)
$Other_{t-3}$	-0.00***	-0.00	0.00	0.01***	-0.00
	(-4.0)	(-1.4)	(0.8)	(5.8)	(-0.9)
MB	0.00	-0.00	0.00***	-0.00**	0.00*
	(1.0)	(-1.0)	(3.1)	(-2.2)	(1.8)
Sales growth	0.01**	0.00	-0.00	-0.01***	-0.00**
	(2.0)	(1.0)	(-1.6)	(-3.5)	(-2.2)
Ln(*Assets*)	-0.01***	-0.01*	0.01***	0.01***	0.00**
	(-3.7)	(-1.9)	(6.4)	(3.1)	(2.1)
Leverage	-0.14***	-0.02**	-0.08***	0.25***	-0.01***
	(-8.8)	(-2.0)	(-12.2)	(17.3)	(-3.1)
Tangibility	-0.03	0.12***	-0.04***	-0.05**	-0.00
	(-1.5)	(6.6)	(-4.1)	(-2.6)	(-0.2)
Observations	11,297	11,297	11,297	11,297	11,297
R-squared	0.57	0.29	0.56	0.86	0.74

Table 4. Financial constraints and the contemporaneous allocation of equity issuance proceeds

Employee stock option data are collected from the IRRC dilution database, Compustat, and Capital IQ. Cash holdings data are obtained from Compustat. The sample covers S&P 1500 and Nasdaq 100 firms for the years 1998 to 2013. Δ*Cash* is the ratio of change in cash and cash equivalents over book assets. *OP* is the ratio of option proceeds over book assets. *EIsu-OP* is the ratio of non-option proceeds over book assets. *CF* is the ratio of operating cash flows over book assets. *DIsu* is the ratio of debt issues over book assets. *Other* is the ratio of other cash flows over book assets. *MB* is the ratio of market assets over book assets. *Sales growth* is the annual growth rate of sales. *Ln(Assets)* is the log of book assets. *Leverage* is the ratio of total debt over book assets. *Tangibility* is the ratio of fixed-assets over book assets. Each year, a firm is classified as being financially more constrained if its *Ln(Assets)* is below the 30th percentile, its *HP* index or the *WW* index is above the 70th percentile, it pays no dividends, or has no credit rating. A firm is classified as being financially less constrained if its *Ln(Assets)* is above the 70th percentile, its *HP* index or the *WW* index is below the 30th percentile, it pays dividends, or has a credit rating. The regressions are estimated separately for more and less financially constrained subsamples. The regressions are run by ordinary least squares (OLS) with firm and year fixed-effects in all the regressions and t-statistics computed using standard errors robust to both clustering at the firm level and heteroskedasticity. ***, **, and * denote significance at the 1%, 5%, and 10% levels. All control variables are included in the regressions. Only the coefficients on *OP* are reported for brevity. The t-statistics are presented in parentheses.

		Less financially constrained firms					**More financially constrained firms**				
Constraint		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Measures:		*Inv*	*ΔCash*	*ERep*	*DRep*	*Div*	*Inv*	*ΔCash*	*ERep*	*DRep*	*Div*
Ln(Assets)	*OP*	-0.05	0.38***	0.90***	-0.25**	0.02	0.48***	0.67***	0.05	-0.24***	0.04**
		(-0.3)	(2.7)	(6.9)	(-2.0)	(0.9)	(3.2)	(4.8)	(0.7)	(-2.7)	(2.4)
	EIsu - OP	0.78***	0.06	0.02	0.14	-0.00	0.48***	0.47***	-0.00	0.04	0.00
		(8.0)	(1.0)	(0.6)	(1.4)	(-0.2)	(11.1)	(13.2)	(-0.2)	(1.6)	(1.4)
HP Index	*OP*	-0.16	0.51***	0.85***	-0.32**	0.12***	0.43**	0.77***	0.17**	-0.40***	0.04**
		(-0.7)	(2.6)	(6.4)	(-2.0)	(3.9)	(2.4)	(4.6)	(2.0)	(-4.1)	(2.0)
	EIsu - OP	0.63***	0.27***	0.01	0.10	-0.01	0.52***	0.44***	-0.01	0.05	0.01
		(5.5)	(3.1)	(0.2)	(1.1)	(-1.2)	(10.1)	(10.3)	(-0.7)	(1.5)	(1.6)
WW Index	*OP*	-0.26	0.38**	0.83***	-0.01	0.06	0.61***	0.73***	-0.02	-0.34***	0.01
		(-1.3)	(2.1)	(6.0)	(-0.0)	(1.6)	(3.4)	(4.4)	(-0.2)	(-3.2)	(1.0)
	EIsu - OP	0.91***	0.11	-0.04	0.05	-0.02**	0.53***	0.43***	-0.00	0.05	0.00
		(7.7)	(1.4)	(-0.8)	(0.4)	(-2.1)	(9.6)	(9.8)	(-0.0)	(1.3)	(0.6)
Dividend Payer	*OP*	-0.23	0.44***	0.70***	0.01	0.09***	0.59***	0.60***	0.20***	-0.41***	0.02**

			(-1.4)	(2.8)	(6.4)	(0.1)	(3.2)	(4.2)	(4.9)	(3.0)	(-4.5)	(2.2)
	EIsu - OP		0.79***	0.29***	-0.02	-0.07	-0.00	0.54***	0.42***	-0.02*	0.06*	0.00
			(8.6)	(5.4)	(-0.6)	(-0.8)	(-0.1)	(11.3)	(11.6)	(-1.8)	(1.7)	(1.0)
Credit Rating	*OP*		-0.02	0.35**	0.81***	-0.16	0.03	0.47***	0.64***	0.16**	-0.32***	0.05***
			(-0.1)	(2.5)	(7.7)	(-1.3)	(1.1)	(3.5)	(5.2)	(2.4)	(-3.8)	(3.7)
	EIsu - OP		0.56***	0.30***	-0.01	0.15**	-0.00	0.56***	0.42***	-0.01	0.03	0.00
			(7.3)	(5.7)	(-0.5)	(2.4)	(-0.3)	(11.2)	(10.7)	(-0.6)	(0.9)	(1.6)

Table 5. Financial constraints and the dynamic allocation of equity issuance proceeds

Employee stock option data are collected from the IRRC dilution database, Compustat, and Capital IQ. Cash holdings data are obtained from Compustat. The sample covers S&P 1500 and Nasdaq 100 firms for the years 1998 to 2013. $\Delta Cash$ is the ratio of change in cash and cash equivalents over book assets. *OP* is the ratio of option proceeds over book assets. *EIsu-OP* is the ratio of non-option proceeds over book assets. *CF* is the ratio of operating cash flows over book assets. *DIsu* is the ratio of debt issues over book assets. *Other* is the ratio of other cash flows over book assets. *MB* is the ratio of market assets over book assets. *Sales growth* is the annual growth rate of sales. *Ln(Assets)* is the log of book assets. *Leverage* is the ratio of total debt over book assets. *Tangibility* is the ratio of fixed-assets over book assets. Each year, a firm is classified as being financially more constrained if its *Ln(Assets)* is below the 30th percentile, its *HP* index or the *WW* index is above the 70th percentile, it pays no dividends, or has no credit rating. A firm is classified as being financially less constrained if its *Ln(Assets)* is above the 70th percentile, its *HP* index or the *WW* index is below the 30th percentile, it pays dividends, or has a credit rating. The regressions are estimated separately for more and less financially constrained subsamples. The regressions are run by ordinary least squares (OLS) with firm and year fixed-effects in all the regressions and t-statistics computed using standard errors robust to both clustering at the firm level and heteroskedasticity. ***, **, and * denote significance at the 1%, 5%, and 10% levels. All control variables are included in the regressions. Only the coefficients on *OP* are reported for brevity. The t-statistics are presented in parentheses.

Panel A: Dynamic Allocation of Option Proceeds (*OP*)

		Less financially constrained firms					**More financially constrained firms**				
Constraint		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Measures:		*Inv*	*ΔCash*	*ERep*	*DRep*	*Div*	*Inv*	*ΔCash*	*ERep*	*DRep*	*Div*
Ln(Assets)	OP_t	0.23	0.32*	0.70***	-0.28*	0.02	0.63***	0.68***	0.02	-0.37***	0.05**
		(1.0)	(1.9)	(4.8)	(-1.8)	(0.5)	(2.9)	(3.4)	(0.2)	(-2.8)	(2.1)
HP Index	OP_t	-0.10	0.42*	0.76***	-0.20	0.12***	0.48*	0.89***	0.17	-0.59***	0.05**
		(-0.4)	(1.9)	(5.1)	(-1.0)	(3.5)	(2.0)	(3.9)	(1.6)	(-4.4)	(2.2)
WW Index	OP_t	-0.09	0.33	0.65***	0.09	0.02	0.80***	0.77***	-0.06	-0.55***	0.03
		(-0.4)	(1.6)	(4.2)	(0.6)	(0.6)	(3.4)	(3.5)	(-0.6)	(-3.8)	(1.5)
Dividend Payer	OP_t	-0.23	0.40**	0.67***	0.10	0.06**	0.63***	0.79***	0.12	-0.56***	0.02**
		(-1.2)	(2.2)	(5.6)	(0.8)	(2.1)	(3.5)	(5.0)	(1.3)	(-4.7)	(2.2)
Credit Rating	OP_t	0.18	0.20	0.77***	-0.16	0.02	0.44**	0.84***	0.08	-0.43***	0.07***
		(0.9)	(1.2)	(6.6)	(-1.0)	(0.9)	(2.5)	(5.4)	(1.0)	(-3.9)	(3.8)
Ln(Assets)	OP_{t-1}	-0.30	-0.06	0.51***	-0.18	0.02	0.14	-0.41**	0.23***	0.06	-0.03
		(-1.3)	(-0.3)	(3.6)	(-1.1)	(0.8)	(0.7)	(-2.2)	(2.6)	(0.6)	(-1.2)

HP Index	OP_{t-1}	-0.16	-0.09	0.65***	-0.40**	-0.00	0.19	-0.43**	0.21**	0.05	-0.01
		(-0.6)	(-0.4)	(4.0)	(-2.3)	(-0.1)	(0.9)	(-2.2)	(2.2)	(0.5)	(-0.5)
WW Index	OP_{t-1}	-0.22	0.23	0.30**	-0.32**	0.02	0.27	-0.62***	0.25**	0.11	-0.02
		(-1.0)	(1.2)	(2.0)	(-2.4)	(0.6)	(1.2)	(-3.0)	(2.6)	(1.0)	(-0.9)
Dividend Payer	OP_{t-1}	-0.25	0.08	0.42***	-0.23**	-0.01	0.23	-0.46***	0.26***	-0.01	-0.01
		(-1.4)	(0.5)	(3.5)	(-2.0)	(-0.4)	(1.4)	(-3.1)	(3.3)	(-0.2)	(-0.8)
Credit Rating	OP_{t-1}	-0.33	-0.12	0.65***	-0.22	0.02	0.28*	-0.40***	0.16**	-0.04	-0.00
		(-1.4)	(-0.7)	(5.2)	(-1.4)	(0.8)	(1.8)	(-2.8)	(2.2)	(-0.4)	(-0.1)
Ln(Assets)	OP_{t-2}	-0.30	-0.15	0.19	0.25*	0.01	0.15	0.04	0.02	-0.20*	-0.01
		(-1.4)	(-1.0)	(1.5)	(1.7)	(0.5)	(0.9)	(0.3)	(0.2)	(-1.9)	(-0.4)
HP Index	OP_{t-2}	-0.06	-0.27	0.17	0.12	0.05	0.16	0.05	-0.07	-0.16*	0.02
		(-0.3)	(-1.5)	(1.3)	(0.8)	(1.5)	(0.9)	(0.3)	(-0.8)	(-1.7)	(1.5)
WW Index	OP_{t-2}	-0.05	-0.23	0.07	0.19	0.03	0.16	0.17	-0.10	-0.22**	-0.00
		(-0.3)	(-1.2)	(0.5)	(1.2)	(0.8)	(0.9)	(1.0)	(-1.3)	(-2.0)	(-0.4)
Dividend Payer	OP_{t-2}	-0.02	-0.43***	0.30**	0.13	0.02	0.10	0.15	-0.04	-0.22**	0.00
		(-0.1)	(-3.1)	(2.5)	(1.0)	(0.6)	(0.7)	(1.2)	(-0.6)	(-2.5)	(0.6)
Credit Rating	OP_{t-2}	0.28	-0.28*	0.05	-0.09	0.04*	0.03	0.10	0.01	-0.16*	0.01
		(1.6)	(-1.9)	(0.5)	(-0.7)	(1.8)	(0.3)	(0.8)	(0.2)	(-1.9)	(0.8)
Ln(Assets)	OP_{t-3}	-0.14	0.25*	0.14	-0.25	0.00	0.27	-0.09	-0.06	-0.11	-0.00
		(-0.7)	(1.7)	(1.1)	(-1.6)	(0.0)	(1.6)	(-0.7)	(-0.9)	(-1.3)	(-0.2)
HP Index	OP_{t-3}	0.13	0.00	0.02	-0.23	0.07***	0.12	0.00	-0.09	-0.04	0.01
		(0.5)	(0.0)	(0.2)	(-1.4)	(2.9)	(0.7)	(0.0)	(-1.3)	(-0.5)	(0.4)
WW Index	OP_{t-3}	-0.10	0.11	0.13	-0.10	-0.04	0.33*	-0.10	-0.09	-0.13	-0.01
		(-0.5)	(0.6)	(1.0)	(-0.6)	(-1.2)	(1.9)	(-0.7)	(-1.3)	(-1.4)	(-0.4)
Dividend Payer	OP_{t-3}	0.02	0.06	0.05	-0.09	-0.03	0.24*	-0.12	-0.03	-0.09	0.00
		(0.1)	(0.4)	(0.5)	(-0.8)	(-1.1)	(1.8)	(-1.0)	(-0.5)	(-1.2)	(0.0)
Credit Rating	OP_{t-3}	0.17	0.01	0.07	-0.29**	0.04**	0.20	-0.09	-0.07	-0.05	0.01
		(0.9)	(0.1)	(0.7)	(-2.3)	(2.2)	(1.5)	(-0.8)	(-1.1)	(-0.7)	(0.5)

Table 5. (Continued)

Panel B: Dynamic Allocation of Non-Option Proceeds (*EIsu-OP*)

Constraint Measures:		**Less financially constrained firms**					**More financially constrained firms**				
		(1) *Inv*	(2) *ΔCash*	(3) *ERep*	(4) *DRep*	(5) *Div*	(6) *Inv*	(7) *ΔCash*	(8) *ERep*	(9) *DRep*	(10) *Div*
Ln(Assets)	$(EIsu\text{-}OP)_t$	0.89***	0.13*	-0.04	0.05	-0.03**	0.48***	0.44***	-0.01	0.08*	0.01**
		(6.8)	(1.7)	(-1.4)	(0.3)	(-2.5)	(7.1)	(7.2)	(-0.3)	(1.8)	(2.0)
HP Index	$(EIsu\text{-}OP)_t$	0.63***	0.35***	-0.05*	0.08	-0.01	0.55***	0.43***	-0.02	0.04	0.00
		(5.0)	(3.7)	(-1.8)	(0.9)	(-1.5)	(7.8)	(6.8)	(-1.0)	(1.0)	(0.8)
WW Index	$(EIsu\text{-}OP)_t$	1.06***	0.13*	-0.13***	-0.03	-0.04***	0.54***	0.41***	-0.00	0.05	0.00
		(7.8)	(1.8)	(-2.9)	(-0.2)	(-3.0)	(7.3)	(6.5)	(-0.2)	(1.1)	(0.2)
Dividend Payer	$(EIsu\text{-}OP)_t$	0.91***	0.23***	-0.04	-0.10	-0.01	0.52***	0.44***	-0.02	0.06	0.00
		(9.0)	(5.2)	(-1.0)	(-1.0)	(-1.1)	(8.2)	(8.5)	(-1.1)	(1.4)	(0.0)
Credit Rating	$(EIsu\text{-}OP)_t$	0.69***	0.32***	-0.04**	0.03	-0.00	0.56***	0.39***	-0.01	0.05	0.00
		(7.2)	(5.3)	(-2.0)	(0.4)	(-0.4)	(8.4)	(7.3)	(-0.3)	(1.2)	(0.8)
Ln(Assets)	$(EIsu\text{-}OP)_{t-1}$	-0.05	-0.06	-0.01	0.14**	-0.03***	0.09**	-0.05	-0.01*	-0.02	-0.00
		(-0.9)	(-1.5)	(-0.4)	(2.2)	(-3.0)	(2.1)	(-1.5)	(-1.8)	(-1.5)	(-0.6)
HP Index	$(EIsu\text{-}OP)_{t-1}$	0.08	-0.09	-0.02*	0.04	-0.01	0.07	-0.03	-0.02*	-0.02	-0.00
		(1.0)	(-1.4)	(-1.8)	(0.7)	(-0.9)	(1.6)	(-0.8)	(-1.8)	(-1.2)	(-1.1)
WW Index	$(EIsu\text{-}OP)_{t-1}$	-0.02	-0.04	0.01	0.07	-0.02**	0.07	-0.06	-0.01	-0.01	0.00
		(-0.2)	(-1.1)	(0.3)	(0.9)	(-2.5)	(1.4)	(-1.3)	(-0.5)	(-0.5)	(0.3)
Dividend Payer	$(EIsu\text{-}OP)_{t-1}$	0.07	0.02	0.01	-0.09**	-0.02***	0.09**	-0.05	-0.02*	-0.02	-0.00
		(1.6)	(0.8)	(0.7)	(-2.1)	(-2.9)	(2.2)	(-1.6)	(-1.9)	(-1.0)	(-0.4)
Credit Rating	$(EIsu\text{-}OP)_{t-1}$	0.12**	-0.10***	-0.04***	0.03	-0.01***	0.08**	-0.03	-0.02*	-0.03*	-0.00
		(2.3)	(-2.6)	(-3.3)	(0.8)	(-2.8)	(2.0)	(-1.0)	(-1.8)	(-1.9)	(-0.8)
Ln(Assets)	$(EIsu\text{-}OP)_{t-2}$	-0.01	0.01	-0.04*	0.05	-0.01*	0.01	0.00	-0.01***	0.00	0.00
		(-0.3)	(0.6)	(-1.8)	(1.4)	(-1.9)	(0.3)	(0.1)	(-2.6)	(0.4)	(0.7)

HP Index	$(EIsu\text{-}OP)_{t-2}$	-0.05	0.02	0.01	0.02	-0.00	0.02	-0.00	-0.02***	0.00	0.00
		(-0.6)	(0.6)	(0.8)	(0.3)	(-1.2)	(1.2)	(-0.3)	(-3.7)	(0.4)	(0.4)
WW Index	$(EIsu\text{-}OP)_{t-2}$	-0.00	-0.02	-0.02	0.05	-0.01*	0.01	-0.01	-0.01	0.01	0.00
		(-0.0)	(-1.2)	(-0.8)	(1.2)	(-1.9)	(0.4)	(-0.5)	(-1.6)	(0.7)	(0.3)
Dividend Payer	$(EIsu\text{-}OP)_{t-2}$	0.02	0.02	-0.01	-0.03	-0.01	0.02	-0.00	-0.01***	-0.00	0.00
		(0.4)	(0.7)	(-0.3)	(-1.1)	(-1.0)	(1.2)	(-0.1)	(-3.0)	(-0.4)	(0.5)
Credit Rating	$(EIsu\text{-}OP)_{t-2}$	0.05	-0.01	-0.04***	0.01	-0.01**	0.02	-0.00	-0.02***	-0.01	0.00
		(1.6)	(-0.6)	(-3.5)	(0.2)	(-2.1)	(1.3)	(-0.1)	(-3.2)	(-0.5)	(1.4)
Ln(Assets)	$(EIsu\text{-}OP)_{t-3}$	-0.05	0.04**	-0.03	0.04	-0.00	0.03*	-0.03*	-0.01**	0.01	0.00
		(-1.4)	(2.1)	(-1.4)	(1.4)	(-1.1)	(1.7)	(-1.7)	(-2.4)	(0.6)	(0.3)
HP Index	$(EIsu\text{-}OP)_{t-3}$	-0.04	0.10**	-0.03*	-0.02	-0.01	0.03*	-0.02	-0.01**	-0.00	-0.00
		(-0.7)	(2.2)	(-1.7)	(-0.4)	(-1.5)	(1.9)	(-1.2)	(-2.5)	(-0.3)	(-0.3)
WW Index	$(EIsu\text{-}OP)_{t-3}$	-0.01	0.01	-0.02	0.03	-0.01	0.03**	-0.02*	-0.01***	0.00	-0.00
		(-0.4)	(0.7)	(-0.7)	(0.7)	(-1.0)	(2.0)	(-1.7)	(-2.6)	(0.1)	(-0.7)
Dividend Payer	$(EIsu\text{-}OP)_{t-3}$	0.01	0.01	0.01	-0.04	0.00	0.02	-0.01	-0.01**	-0.00	-0.00
		(0.3)	(0.3)	(0.2)	(-1.1)	(0.7)	(1.5)	(-1.0)	(-2.2)	(-0.2)	(-0.9)
Credit Rating	$(EIsu\text{-}OP)_{t-3}$	-0.03	0.04	-0.02***	0.01	-0.00	0.03**	-0.02	-0.01**	-0.01	0.00
		(-1.0)	(1.6)	(-3.2)	(0.6)	(-0.2)	(2.3)	(-1.6)	(-2.0)	(-0.7)	(0.3)

Table 6. Analysis of equity issues

Employee stock option data are collected from the IRRC dilution database, Compustat, and Capital IQ. Cash holdings data are obtained from Compustat. The sample covers S&P 1500 and Nasdaq 100 firms for the years 1998 to 2013. *ISSUE*% is defined as the ratio of common equity proceeds to end of period market equity. Employee-related equity issues refer to equity issued to employees due to the exercises of employee stock options. Non-employee-related equity issues relate to the difference between total equity issues and equity issued as a result of employee stock option exercises. Investor-initiated issues are equity issues with *ISSUE*% less than 2%, whereas firm-initiated issues are equity issues with *ISSUE*% greater than 3%.

Panel A: Employee- versus Non-Employee-Related Equity Issues

	Number of employee-related equity issues				Amount of employee-related equity issues (in $ billions)			
Cut-off Points	**< a**	**between a and b**	**> b**	**Total**	**< a**	**between a and b**	**> b**	**Total**
a = 2%, b = 3%	15,265	550	338	16,153	548	68	26	642
a = 2%, b = 5%	15,265	778	110	16,153	548	89	5	642
a = 3%, b = 4%	15,815	177	161	16,153	616	17	9	642
a = 4%, b = 6%	15,992	83	78	16,153	633	6	3	642
a = 5%, b = 6%	16,043	32	78	16,153	637	2	3	642

Table 6. (Continued)

	Number of non-employee-related equity issues				Amount of non-employee-related equity issues (in $ billions)			
Cut-off Points	**< a**	**between a and b**	**> b**	**Total**	**< a**	**between a and b**	**> b**	**Total**
a = 2%, b = 3%	9,967	124	944	11,035	137	11	273	421
a = 2%, b = 5%	9,967	238	830	11,035	137	33	251	421
a = 3%, b = 4%	10,091	65	879	11,035	148	12	261	421
a = 4%, b = 6%	10,156	111	768	11,035	160	24	237	421
a = 5%, b = 6%	10,205	62	768	11,035	170	15	237	421

Table 6. (Continued)

Panel B: Actual Sample Data and the Identification Rule of McKeon (2013)

		Based on Actual Sample Data						Based on the 2-3% *ISSUE* rule of McKeon (2013)					
Year	**Total no. of equity issues**	**Firms that issue employee- and non-employee related equity**		**Firms that issue employee-related equity only**		**Firms that issue non-employee related equity only**		**Firms that issue investor-initiated equity only**		**Firms that issue firm-initiated equity only**		**Firms that are disregarded**	
	#	#	%	#	%	#	%	#	%	#	%	#	%
1998	692	465	67%	201	29%	26	4%	607	88%	52	8%	33	5%
1999	747	529	71%	194	26%	24	3%	638	85%	72	10%	37	5%
2000	825	547	66%	228	28%	50	6%	679	82%	102	12%	44	5%
2001	872	611	70%	230	26%	31	4%	725	83%	104	12%	43	5%
2002	915	623	68%	265	29%	27	3%	765	84%	98	11%	52	6%
2003	936	644	69%	280	30%	12	1%	805	86%	90	10%	41	4%
2004	1,254	858	68%	387	31%	9	1%	1,036	83%	133	11%	85	7%
2005	1,319	890	67%	422	32%	7	1%	1,123	85%	96	7%	100	8%
2006	1,300	871	67%	421	32%	8	1%	1,099	85%	111	9%	90	7%
2007	1,265	818	65%	436	34%	11	1%	1,082	86%	93	7%	90	7%

2008	1,186	752	63%	399	34%	35	3%	1,037	87%	97	8%	52	4%
2009	1,103	661	60%	381	35%	61	6%	967	88%	113	10%	23	2%
2010	1,110	640	58%	443	40%	27	2%	1,001	90%	71	6%	38	3%
2011	1,068	627	59%	420	39%	21	2%	959	90%	64	6%	45	4%
2012	1,025	565	55%	426	42%	34	3%	950	93%	37	4%	38	4%
2013	939	531	57%	388	41%	20	2%	851	91%	50	5%	38	4%
Total	**16,556**	**10,632**		**5,521**		**403**		**14,324**		**1,383**		**849**	

Appendix A. Variables defined using the flow-of-funds data

Variables are defined using flow-of-funds data of Compustat. The variable definitions vary according to the format code (*scf*) a firm follows in reporting flow-of-funds data. Effective for fiscal years ending July 15, 1988, SFAS #95 requires U.S. companies to report the Statement of Cash Flows (*scf* = 7). Prior to adoption of SFAS #95, companies may have reported one of the following statements: Working Capital Statement (*scf* = 1), Cash Statement by Source and Use of Funds (*scf* = 2), and Cash Statement by Activity (*scf* = 3). Variables include the change in cash holdings (Δ*Cash*), investment (*Inv*), the change in working capital (Δ*WC*), cash dividends (*Div*), cash flows (*CF*), net debt issued (Δ*D*), and net equity issued (Δ*E*). PPE denotes property, plant, and equipment. We include in parentheses the Compustat XPF variable names in italics.

Variables	*scf* = 1	*scf* = 2	*scf* = 3	*scf* = 7
Inv	capital expenditure(*capx*) + increase in investment(*ivch*) + acquisition(*aqc*) + other uses of funds(*fuseo*) - sale of PPE(*sppe*) - sale of investment(*siv*)	same as *scf* = 1	same as *scf* = 1	capital expenditure (*capx*) + increase in investment(*ivch*) + acquisition(*aqc*) - sale of PPE(*sppe*) - sale of investment(*siv*) - change in short-term investment(*ivstch*) - other investing activities(*ivaco*)
Δ*Cash*	cash and cash equivalents increase/decrease (*chech*)	same as *scf* = 1	same as *scf* = 1	same as *scf* = 1
Div	cash dividends (*dv*)	same as *scf* = 1	same as *scf* =1	same as *scf* = 1
DIsu	long-term debt issuance(*dltis*) - changes in current debt(*dlcch*)	long-term debt issuance(*dltis*) + changes in current debt(*dlcch*)	same as *scf* = 2	same as *scf* = 2
DRep	long-term debt reduction(*dltr*)	long-term debt reduction(*dltr*)	same as *scf* = 2	same as *scf* = 2
EIsu	sale of common and preferred stock (*sstk*)	same as *scf* = 1	same as *scf* = 1	same as *scf* = 1
ERep	purchase of common and preferred stock(*prstkc*)	same as *scf* = 1	same as *scf* = 1	same as *scf* = 1
Δ*WC*	change in working capital(*wcapc*)	- change in working capital(*wcapc*)	same as *scf* = 2	-change in account receivable(*recch*) - change in inventory(*invch*) - change in account payable(*apalch*) - accrued income taxes(*txach*) - other changes in assets and liabilities (*aoloch*) - other financing activities(*fiao*)
CF	income before extra items(*ibc*) + extra items & discontinued operation(*xidoc*) + depreciation & amortization(*dpc*) + deferred taxes(*txdc*) + equity in net loss(*esubc*) + gains in sale of PPE & investment(*sppiv*) + other funds from operation(*fopo*) + other sources of funds(*fsrco*)	same as *scf* = 1	same as *scf* = 1	income before extra items(*ibc*) + extra items & discontinued operation(*xidoc*) + depreciation & amortization(*dpc*) + deferred taxes(*txdc*) + equity in net loss(*esubc*) + gains in sale of PPE & investment(*sppiv*) + other funds from operation(*fopo*) + exchange rate effect(*exre*)