Journal of Corporate Finance 43 (2017) 39–57

Contents lists available at ScienceDirect

Journal of Corporate Finance

journal homepage: www.elsevier.com/locate/jcorpfin

Internal capital market inefficiencies, shareholder payout, and abnormal leverage☆

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ARTICLE INFO

Article history:
Received 15 December 2016
Accepted 16 December 2016
Available online 21 December 2016

1. Introduction

This study investigates how internal capital market inefficiencies influence capital return to equity shareholders via dividends and repurchases. A company's allocation of capital resources between its different business units (or subsidiaries) is commonly referred to as its internal capital market (Williamson, 1975; Gertner et al., 1994; Stein, 1997; Shin and Stulz, 1998). Consequently, internal capital market inefficiencies refer to constraints placed on companies' ability to allocate capital resources between the business units and to return capital to corporate headquarters, if needed. Because it offers a clear delineation of internal funds between business units, we use the disaggregation of cash between foreign and domestic subsidiaries to measure internal capital market inefficiencies.[1]

Multinational firms return capital to shareholders through increases in firm value or via repurchases and dividends. Prior studies provide evidence that equity investors discount foreign cash holdings (Harford et al., 2016; Chen, 2015) suggesting that foreign cash plays a role in firm value. Our study examines whether or not the delineation between foreign cash and domestic cash is associated with shareholder payouts. Payout policy is an important issue as firms determine how and when to distribute cash to shareholders (Brav et al., 2005; DeAngelo and DeAngelo, 2006). The payout decision becomes increasingly complex as U.S. multinational firms generate cash in foreign subsidiaries.[2] Managers must determine if cash should be held in foreign subsidiaries or repatriated with the possibility of being distributed to shareholders. The repatriation decision depends on repatriation costs, volatility of foreign operations, foreign investment opportunities and both external and internal agency costs (Desai et al., 2007; Arena and Kutner, 2015; Hanlon et al., 2015, among others). These potential restrictions on a firm's ability to distribute foreign cash may cause firms to encounter internal capital market inefficiencies. As such, the first objective of this paper is to determine whether there is a perceptible difference between foreign cash and domestic cash in their relation to shareholder payouts.

☆ The authors would like to thank Larry Abbott, Brad Blaylock, Keith Czerney, Carol Ann Frost, David Godsell, Binod Guragai, Don Herrmann, Derek Johnston, Tony Kang, Michelle Nessa, Tom Omer, Annelies Renders, Scott Seavey, Wayne Thomas, Emre Unlu and workshop participants at the 2016 EAA Annual Congress, Kansas State University, and University of North Texas for their helpful comments. They also thank Scott Dyreng for the Exhibit 21 data and Burch Kealey for DirectEdgar.

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[1] We focus on the levels of cash holdings given that we are interested in the firm's use of cash holdings as it relates to shareholder payouts.

[2] Moody's (2014) estimates that foreign subsidiaries hold $947 billion in cash.

http://dx.doi.org/10.1016/j.jcorpfin.2016.12.009

Prior literature provides evidence of a positive association between total cash and the level of shareholder payouts (Fama and French, 2001; DeAngelo et al., 2006; Chay and Suh, 2009).[3] However, research has not provided evidence of the association between the disaggregated components of cash (i.e., foreign vs. domestic) and shareholder payouts and whether there is a distinct difference. While we predict that domestic and foreign cash have different associations with shareholder payout indicating internal capital market frictions, there are reasons why we may not find the predicted differences. For instance, firms can borrow on passive foreign investments (Desai et al., 2007) or use existing domestic cash to fund cash distributions. Additionally, firms can initiate foreign mergers and acquisitions or engage in sophisticated tax planning to avoid repatriation costs to gain access to foreign cash (Martin et al., 2015).[4] In these cases, there would be no difference between domestic and foreign cash in their association with the level of shareholder payouts.

Our analysis uses a sample of 4186 multinational firms comprising 20,088 firm-year observations from 1995 through 2013. We document that domestic, not foreign cash drives the positive association between total cash and the level of shareholder payout. Further, the difference between foreign cash and domestic cash and their association with shareholder payouts is statistically and economically significant. Specifically, a one standard deviation increase in domestic cash increases the subsequent years' level of total payout by 33%. In contrast, a one standard deviation increase in foreign cash leads to an increase in total payout of <1% in the following year. We also provide evidence that the association between domestic cash and total payout is driven by repurchases more so than dividends. This is not surprising given the stickiness of dividends and flexibility of repurchases (Brav et al., 2005). The differential association between domestic and foreign cash and their association with shareholder payouts suggests that internal capital market inefficiencies are associated with a decrease in shareholder payouts.

Multinational firms often have the ability to diminish internal capital market inefficiencies by accessing external capital markets. Therefore, we next examine how external capital constraints affect internal capital market inefficiencies. Prior literature provides evidence that repatriation tax costs increase foreign cash levels and thus reduce the level of cash distributed to shareholders (Desai et al., 2007; Blouin and Krull, 2009; Dharmapala et al., 2011; Arena and Kutner, 2015; Nessa, 2016; among others). We argue that repatriation tax costs serve as a first-order constraint on internal capital markets and that managers consider other factors (i.e., foreign investment opportunities, foreign operation volatility, external agency costs and internal agency costs) when deciding to repatriate foreign cash. Therefore, while we control for repatriation costs, the second objective of this study is to examine whether lower external capital constraints reduce the internal capital market inefficiencies arising from holding foreign cash.

The cost to access external capital for multinational firms may affect the association between foreign cash and shareholder payouts (Almeida et al., 2011). Prior literature provides evidence that firms with costly external financing are reluctant to distribute greater amounts of cash to shareholders (Almeida et al., 2004; Bates et al., 2009). One strategy that a firm can use to access foreign cash without triggering repatriation costs is for the parent company to borrow against the foreign cash. Microsoft and Apple are two examples of companies who have issued debt in recent years with the intention to distribute the proceeds to shareholders. We use the investment grade threshold of Standard and Poor's (S&P) credit ratings as a proxy for a firm's cost of external capital.[5] We find that a one standard deviation increase in foreign cash *increases* shareholder payouts by 11% for investment grade firms. However, for non-investment grade firms, a one standard deviation increase in foreign cash *decreases* shareholder payouts by 11%. Accordingly, foreign cash holdings of firms with lower external capital constraints (i.e., investment grade firms) are more positively associated with shareholder payouts than the foreign cash holdings of firms with greater capital constraints (i.e., non-investment grade firms). This suggests lower external capital constraints mitigate internal capital market inefficiency effect on payouts.

In light of the findings described above, we also perform additional analysis to investigate a potential negative consequence of internal capital market inefficiencies from foreign cash holdings. Specifically, we investigate whether shareholder-payout firms issue abnormal amounts of debt in the presence of foreign cash holdings. If foreign cash holdings create internal capital market inefficiencies, as suggested by our findings in conjunction with the prior literature (e.g., Harford et al., 2016) then firms may issue abnormal amounts of debt for payouts to satisfy shareholder demands. The findings support this conjecture and are consistent with firms issuing abnormally high levels of debt when faced with internal capital market inefficiencies from foreign cash. In further analysis, we find the results are significant for firms with both strong and weak financial health. This finding is potentially concerning as it suggests that not only financially strong firms but also financially weak firms are issuing debt to return cash to shareholders in the presence of foreign cash holdings. While on average, a firm is more likely to issue debt to fund shareholder payout, we also find that majority shareholders play a key part in whether or not the firm issues debt. Our results suggest that majority shareholders are likely to encourage managers to issue debt to fund repurchases.

We make several contributions to literature. First, the literature on internal capital markets has primarily focused on the allocation of resources from the parent to/among subsidiaries and its influence on capital investment decisions (Williamson, 1975; Gertner et al., 1994; Stein, 1997; Shin and Stulz, 1998; Rajan et al., 2000; Datta et al., 2009). In this study, we focus on internal

[3] The primary focus of these studies is not the association between total cash and shareholder payouts. Instead, these studies primarily control for total cash. Nevertheless, the coefficient associated with the control variable of total cash is positive.

[4] A significant motivation behind the increased number of recent foreign mergers (referred to as "inversions") is access to foreign cash. Approximately 50 U.S. firms have reincorporated overseas through inversion over the past decade, most of them since 2008 (McKinnon, 2014). Lowering tax rates generally gets more coverage by the media and Capitol Hill, but accessing foreign cash is also an important factor motivating inversions. As an example, Medtronic and Covidien were subject to similar tax rates before their 2015 merger, but it was speculated that their merger would provide Medtronic access to its foreign cash, which comprises most of their $14 billion in cash holdings (Thomas, 2014).

[5] We find similar results when using the interest coverage ratio or the SA Index (Hadlock and Pierce, 2010) to measure external constraints.

capital markets and the impact on the parent company's ability and willingness to extract cash from its subsidiaries for distribution to external shareholders. Additionally, we identify a unique way to measure and investigate the impact of internal capital market inefficiencies (i.e., the differential association between domestic and foreign cash and shareholder payouts).

Second, prior literature provides evidence that repatriation costs encourage the accumulation of foreign cash in firms (Foley et al., 2007) and reduce shareholder payout (Nessa, 2016). In addition, prior studies examine certain economic consequences of the accumulation of foreign cash such as value-destroying foreign acquisitions (Hanlon et al., 2015; Edwards et al., 2016), decreasing cash valuations (Campbell et al., 2015; Chen, 2015; Yang, 2015; Harford et al., 2016), and the impact on domestic performance (Downes et al., 2016; Harford et al., 2016). This study provides evidence that suggests foreign cash holdings play an economically significant role in shareholder payouts. Specifically, firms that are in lower financial health are still likely to issue debt in order to return cash to shareholders.

Finally, prior studies focus on the inability to access foreign cash as a result of repatriation costs. They primarily argue that foreign cash is "trapped" overseas as a result of repatriation taxes. However, we show firms with lower external capital constraints can overcome internal capital market inefficiencies from foreign cash holdings and return cash to shareholders. Managers are willing to issue debt instead of accessing foreign cash to distribute cash to shareholders. This is an important finding as it suggests foreign cash is not trapped for firms with lower external capital constraints as these firms are still able to initiate shareholder payouts.

The next section reviews the relevant literature and develops hypotheses. Section 3 presents the research methodology and sample selection. Section 4 discusses the empirical results, Section 5 presents additional analysis, and Section 6 concludes the paper.

2. Prior literature and hypothesis development

2.1. Internal capital market

Internal capital market refers to how companies allocate resources between the parent company and its subsidiaries (Williamson, 1975; Gertner et al., 1994; Stein, 1997; Shin and Stulz, 1998). Inefficiencies within internal capital markets arise when costs and constraints are placed on the ability of firms to allocate capital to or extract capital from different segments. Prior literature examines whether internal capital markets lead to efficiency gains or losses resulting from allocating capital resources. The majority of the literature suggests internal capital markets lead to more efficient allocation of resources to divisions or segments with capital investment needs (Weston, 1970; Williamson, 1986; Gertner et al., 1994; Stein, 1997; Matsusaka and Nanda, 2002). Also, literature suggests diversification leads to more efficient allocation of internal capital resources and improves access to external capital markets (Hadlock et al., 2001; Maksimovic and Phillips, 2002). This study investigates internal capital markets in a different setting — extracting resources from subsidiaries for shareholder payouts. In particular, we investigate the disaggregation of cash holdings between foreign and domestic subsidiaries of U.S. multinational firms and how the disaggregation influences shareholder payouts.

2.2. Cash levels, repatriation and shareholder payouts

Foley et al. (2007) and Hanlon et al. (2015) examine the determinants of foreign cash using data from the Bureau of Economic Analysis (BEA) and find repatriation costs and foreign earnings are two important factors that increase the amount of cash held by foreign subsidiaries. With the increased availability of public data, recent studies have examined factors that influence firms to disclose foreign cash (Yang, 2015) and the valuation of foreign cash (Chen, 2015; Yang, 2015; Harford et al., 2016). Other studies examine the investment implications of foreign cash and provide evidence that firms who retain cash abroad are more likely to make unprofitable foreign acquisitions (Hanlon et al., 2015; Edwards et al., 2016). While these studies provide evidence of an association between foreign cash and firms' investment decisions, we take the next step by examining the association between foreign cash and multinational firms' payout decisions.

Seminal payout policy research includes Lintner (1956), Modigliani and Miller (1958), and Miller and Modigliani (1961). Lintner (1956) models current dividends as dependent upon current period earnings and prior period dividends. Modigliani and Miller's (1958) (MM) irrelevance theorems show any capital structure and dividend policies are optimal because of similar shareholder wealth. Subsequent papers have documented additional dividend determinants such as investment opportunity, size, and life cycle stage (Fama and French, 2001; DeAngelo et al., 2006). Recent research also finds evidence that not all of MM's theorems hold once the assumptions are relaxed. For example, DeAngelo and DeAngelo (2006 p. 294) suggest MM's dividend irrelevance is partly a consequence of the assumption that all free cash flow is distributed every period ("MM assume away the value-relevant payout/retention decision.").

The prior literature uses the level of cash as a control variable in the model that examines the level of shareholder payout. DeAngelo et al. (2006) examine the relation between total cash and subsequent dividends and provide evidence of a positive association. The level of dividends increases monotonically across cash holding quartiles (Opler et al., 1999, Table 3). Similarly, Chay and Suh (2009) find a positive relation between cash and the level of total payout. Although the majority of the prior literature finds a positive association between total cash and the level of payouts, Louis and Urcan (2015) use total cash as a control variable and find that it is negatively related to the level of dividend payments.

Multinational firms have varying incentives to accelerate or delay the extraction of foreign cash from subsidiaries to the parent company. A firm's untimely extraction of foreign cash from its subsidiaries could be an indication of internal capital market inefficiencies. The acceleration of foreign cash extraction would potentially increase the level of shareholder distributions. One reason for managers to repatriate foreign cash and return it to shareholders is to use corporate payouts as a pre-commitment device to mitigate agency costs between managers and shareholders (Jordan et al., 2014).

Another reason for managers to accelerate the repatriation of foreign cash is because internal agency frictions resulting from domestic parent managers' restricted ability to monitor foreign subsidiary managers can influence firms' decisions to extract foreign cash from subsidiaries and subsequently distribute cash to shareholders. Shroff et al. (2014) provide evidence that as agency frictions increase, parent-company management becomes more involved in the investment decisions of foreign subsidiaries. Specific to our setting, Hanlon et al. (2015) and Edwards et al. (2016) find that firms with high levels of permanently reinvested earnings (PRE) held as cash are more likely to make value-destroying acquisitions of foreign target firms. This suggests that managers of foreign subsidiaries choose to use foreign cash for value-destroying investments rather than allocate the cash to the parent company and distribute the cash to shareholders. Consequently, Desai et al. (2007) find that internal agency problems increase the likelihood of multinationals repatriating foreign earnings suggesting that multinationals are more likely to obtain cash held by foreign subsidiaries to avoid foreign operation managers making self-maximizing decisions.

However, there are also reasons corporate managers at parent companies may delay the extraction of foreign cash from subsidiaries. Given that prior literature provides evidence of an increase in foreign cash associated with repatriation costs (Foley et al., 2007), it is likely that a portion of the total cash balance is not available to the U.S. parent for dividend distribution. Consistent with this argument, prior literature provides evidence that repatriation tax costs increase foreign cash levels and thus reduce the level of cash distributed to shareholders (Arena and Kutner, 2015; Dharmapala et al., 2011; Blouin and Krull, 2009; Desai et al., 2007; among others). Furthermore, agency conflict between corporate managers at headquarters and shareholders (external agency cost) may result in CEOs extracting private benefits of control by over-investing foreign cash for empire-building (Jensen, 1986; Hope and Thomas, 2008), funding value destroying capital projects (Shin and Stulz, 1998), and allowing rent-seeking behavior by subsidiary managers (Datta et al., 2009). Accordingly, external agency costs also likely delay foreign cash extraction from subsidiaries. These studies provide ample reason for examining how payout policy varies with the disaggregated cash balances. We argue that foreign cash, as a result of the costs associated with holding foreign cash (i.e., repatriation, external agency, internal agency, etc.), potentially creates internal capital market inefficiencies. Therefore, we predict that foreign cash is less likely to be relied on by management when determining the level of cash distributed to shareholders.

Hypothesis 1. The association between foreign cash and shareholder payout is less than the association between domestic cash and shareholder payout.

2.3. External capital constraints

Prior literature provides arguments for and against the repatriation of foreign earnings. Hartman (1985) argues that the foreign subsidiary should reinvest its foreign earnings if the foreign after-tax rate of return is greater than the domestic after-tax rate of return. However, when the foreign after-tax rate of return is less than the domestic after-tax rate of return, the foreign subsidiary should repatriate its foreign earnings. This argument results in an irrelevance theorem arguing that repatriation tax costs are unavoidable because they reduce both the opportunity cost of investment and the return on investment by the same amount. Contrary to the theoretical results of Hartman (1985), empirical studies provide evidence that repatriations from foreign subsidiaries to the parent company are less likely when the firm faces greater costs (i.e., repatriation, external agency, internal agency, etc.), resulting in the accumulation of foreign cash leading to greater internal capital market inefficiencies.

Although repatriation and agency costs increase managers' motivation to delay foreign cash repatriations and thus exacerbate internal capital market inefficiencies, we posit that the access to external financing can ease this internal friction. For example, firms can issue debt in instances when accessing foreign cash is costly (Albring, 2006; Thomasson and Xydias, 2010; Schaefer, 2013). The pecking order hypothesis predicts that information asymmetry between managers and investors creates a preference ranking related to financing sources (Myers and Majluf, 1984). Firms work through the pecking order beginning with internally available funds, followed by debt, and then equity. Foreign cash increases internal capital market inefficiencies and therefore reduces the repatriation of foreign cash to the parent company (Desai et al., 2007). A reduction in access to internal capital can incentivize managers to issue debt to satisfy the firm's investment and payout decisions. However, this path is only available to those firms that have the ability to obtain external capital.

Faulkender and Petersen (2012) provide evidence that capital-constrained firms spent a majority of repatriated funds from the American Jobs Creation Act (AJCA) on approved domestic investment. In contrast, Dharmapala et al. (2011) and Blouin and Krull (2009) find that a majority of AJCA repatriated funds were used for shareholder payouts. If capital-constrained firms distributed cash to shareholders using repatriated funds under the AJCA, then it would support our argument that foreign cash should increase shareholder payout in the presence of relatively inexpensive external capital. Given the mixed evidence of the use of AJCA repatriated funds, the impact of lower external capital constraints on the association between foreign cash and shareholder payouts remains an empirical question.

Foreign cash can potentially be used as collateral for borrowing funds that are subsequently used for shareholder payout. Therefore, we expect relatively inexpensive access to external capital to reduce the negative association between foreign cash and the level of shareholder payout.

Hypothesis 2. The association between foreign cash and shareholder payouts is greater (less negative or more positive) when there are lower external capital constraints compared to when there are greater external capital constraints.

3. Research methodology

3.1. Sample selection

This study uses a sample of 20,088 firm-year observations for the period 1995 through 2013. The study excludes financial firms because of the different regulations that govern their cash and payout policies. Data are obtained from Compustat and CRSP. Panel A of Table 1 outlines the sample selection process. The sample is limited to multinational firms based on non-missing values of foreign pretax income (Compustat item PIFO). The estimation of foreign cash is described below and is the second largest restriction to the sample. Estimating foreign cash limits the sample to the period 1995 through 2013 based on machine

Table 1
Sample selection and distribution.

Panel A: sample selection

Firm-year observations from Compustat	163,844
Less: non-multinational firms	(120,293)
Less: missing data to calculate foreign cash	(21,237)
Less: missing returns data	(1507)
Less: missing Compustat data for control variables	(719)
Total firm-year observations	*20,088*

Panel B: sample distribution by year

Year	N	%
1995	1720	8.56%
1996	1824	9.08%
1997	1848	9.20%
1998	1210	6.02%
1999	1023	5.09%
2000	1005	5.00%
2001	992	4.94%
2002	975	4.85%
2003	1004	5.00%
2004	989	4.92%
2005	941	4.68%
2006	880	4.38%
2007	891	4.44%
2008	922	4.59%
2009	935	4.65%
2010	947	4.71%
2011	884	4.40%
2012	878	4.37%
2013	220	1.10%
Total	*20,088*	*100.0%*

Panel C: Sample distribution by industry

Industry	SIC code	N	%
Oil and gas	13, 29	860	4.28%
Food products	20	421	2.10%
Paper and paper products	24–27	728	3.62%
Chemical products	28	2202	10.96%
Manufacturing	30–34	1399	6.96%
Computer equipment and services	35, 73	4686	23.33%
Electronic equipment	36	2182	10.86%
Transportation	37, 39, 40–42, 44, 45	1435	7.14%
Scientific instruments	38	1927	9.59%
Communications	48	466	2.32%
Durable goods	50	570	2.84%
Retail	53, 54, 56, 57, 59	393	1.96%
Eating and drinking establishments	58	82	0.41%
Entertainment services	70, 78, 79	298	1.48%
Health	80	274	1.36%
Others		2165	10.78%
Total		20,088	100.00%

Table 1 presents the sample selection and sample distribution. Panel A outlines the sample selection. Panel B presents the sample distribution by year. Panel C presents the sample distribution by industry.

readable Exhibit 21 data available from Dyreng et al. (2012). Panel B presents the sample distribution by year.[6] Panel C presents the sample distribution by industry. As expected, those firms that have the ability to transfer operations across borders as a result of greater intangible assets compared to capital assets (e.g., computer equipment and electronic equipment) are more likely to report foreign pretax income.

The final sample comprises 4186 distinct multinational firms. Of the 20,088 firm-year observations, there are 4770 firm-year observations that distribute cash via both dividends and repurchases in the same period. There are 2857 (4213) firm-year observations that distribute cash by dividends (repurchases) only. The analysis uses a Tobit regression given that the lower level of cash distributed to shareholders is censored at zero.

3.2. Estimating foreign cash

We use a similar methodology to Campbell et al. (2015) for estimating the amount of foreign cash a firm holds in its foreign subsidiaries. Campbell et al. (2015) validate the measure of foreign cash by comparing the estimate to proprietary data obtained from the Bureau of Economic Analysis (BEA). Multinational firms are required to report foreign cash balances to the BEA and thus are deemed reliable. Campbell et al. (2015) provide evidence of a correlation >70% between the foreign cash estimate and the BEA reported foreign cash.[7]

The following equation estimates foreign cash:

$$CASH_{i,t} = \sum \beta_k DA_{i,t} * COUNTRY_{k,i,t} + \sum \gamma_k FA_{i,t} * COUNTRY_{k,i,t}. \quad (1)$$

Where *CASH* is total worldwide cash; *DA* is domestic assets calculated as total worldwide assets minus foreign assets; *COUNTRY* is a vector of all countries where the firm has foreign subsidiaries located per Exhibit 21 contained within the 10-K (Dyreng et al., 2012) and *FA* is total foreign assets. *CASH*, *DA*, and *FA* are scaled by worldwide assets. Each γ_k represents the increase in cash per dollar of foreign assets for firms with a material subsidiary in country *k*. As such, the total estimated foreign cash is the sum of the estimated coefficients multiplied by the foreign assets and the vector of country indicator variables. Specifically, total foreign cash is estimated as follows: $FA_{i,t} * \sum(\gamma_k * \text{Country}_{k,i,t})$. Domestic cash is determined by subtracting the foreign cash estimate from total cash.

3.3. Cash levels and shareholder payouts

This study examines how internal capital market inefficiencies arising from greater levels of foreign cash affects shareholder payouts. We first investigate whether there is a differential association between foreign and domestic cash in period $t-1$ and shareholder payouts in period *t*. The regression to test Hypothesis 1 is estimated as follows[8]:

$$\begin{aligned} Payout_{i,t} = {} & \alpha_0 + \alpha_1 Foreign\ Cash_{i,t-1} + \alpha_2 Domestic\ Cash_{i,t-1} + \alpha_3 Earnings_{i,t-1} + \alpha_4 Size_{i,t} + \alpha_5 Leverage_{i,t} + \alpha_6 MTB_{i,t} \\ & + \alpha_7 Sales\ Growth_{i,t} + \alpha_8 CapEx_{i,t-1} + \alpha_9 Firm\ Age_{i,t} + \alpha_{10} RE/BV_{i,t-1} + \alpha_{11} Returns_{i,t} + \alpha_{12} Options_{i,t} \\ & + \alpha_{13} St.Dev.Earnings_{i,t} + \alpha_{14} Repatriation\ Cost_{i,t-1} + \alpha_{15} Dividends_{i,t-1} + \alpha_{16} Repurchases_{i,t-1} \\ & + Year\ Fixed\ Effects + Industry\ Fixed\ Effects + \varepsilon_{i,t}. \end{aligned} \quad (2)$$

Eq. (2) is estimated separately for each of the following dependent variable measures for *Payout*: *Total Payout*, *Dividends*, and *Repurchases*. *Total Payout* is equal to the sum of cash distributions from dividends and share repurchases, all scaled by lagged noncash assets. *Dividends* is defined as total dividends scaled by lagged noncash assets. *Repurchases* is equal to the purchase of common and preferred stock less any decrease in the redemption of preferred stock or less any decrease in preferred stock if the redemption value of preferred stock is missing, all scaled by lagged noncash assets. A Tobit regression is used to estimate Eq. (2) given that many firms do not distribute cash to shareholders resulting in a dependent variable equal to zero. *Foreign Cash* is equal to the estimated foreign cash described in Section 3.2, scaled by lagged noncash assets. *Domestic Cash* is equal to total cash minus foreign cash scaled by lagged noncash assets.[9] Hypothesis 1 predicts $\alpha_1 < \alpha_2$.

Control variables are based on the extant literature examining payout policy (Fama and French, 2001; DeAngelo et al., 2006; Grullon et al., 2011). *Earnings* is income before extraordinary items scaled by lagged noncash assets. *Size* is equal to the natural logarithm of lagged noncash assets. *Leverage* is current plus noncurrent debt scaled by the sum of the market value of equity, current debt and noncurrent debt. *MTB* is the market value of equity scaled by book value of equity. *Sales Growth* is current period sales minus prior period sales, all scaled by prior period sales. *CapEx* is total capital expenditures scaled by lagged noncash assets.

[6] Data availability for 2013 is limited due to the Exhibit 21 data necessary for estimating foreign cash. Results are similar in magnitude and significance if observations from 2013 are omitted from the analysis.

[7] We further validate the measure by comparing actual disclosed foreign cash balances to the estimated foreign cash balances. Firms started to disclose foreign cash in 2007 voluntarily (Harford et al., 2016; Yang, 2015). We hand collect foreign cash amounts from the firm's 10-K annual report for 995 firm-year observations. Our untabulated findings show that estimated foreign cash and actual disclosed foreign cash have a correlation of 60%.

[8] All variables are also defined in Appendix A. Standard errors are robust standard errors (White, 1980) clustered by firm (Petersen, 2009) in order to control for heteroscedasticity and autocorrelation of the error term.

[9] We also estimate Eq. (2) using *Total Cash*, defined as total cash (Compustat variable CH) scaled by lagged noncash assets (Lie, 2000; DeAngelo et al., 2006; Dittmar and Mahrt-Smith, 2007).

Firm Age is equal to the natural logarithm of the number of years that the firm has appeared in the Compustat database. *RE/BV* is retained earnings scaled by book value of equity.

We also include controls for past stock returns (*Returns*), stock options (*Options*), and volatility of earnings (*St. Dev. Earnings*). *Returns* is measured as the firm's stock return compounded monthly for the two-year period ending before the current year. *Options* is calculated as the annual percentage change in total diluted shares outstanding as if no repurchases occurred the current year. *St. Dev. Earnings* is measured as the standard deviation of earnings for the current and previous four years. *Repatriation Cost* represents the estimated additional tax burden if foreign subsidiary earnings are repatriated. *Repatriation Cost* is calculated as the greater of zero or 35% multiplied by the sum of the prior three years' pretax foreign income minus the sum of the prior three years' foreign tax expense, all scaled by lagged noncash assets. We include repatriation costs given Arena and Kutner (2015) find evidence of a change in repatriation costs associated with payout levels. We also included lagged values of shareholder payouts (*Dividends* and *Repurchases)* because they can be sticky from the previous year.

3.4. External capital constraints

Hypothesis 2 predicts lower external capital constraints decrease internal capital market inefficiencies that result from holding foreign cash. To test Hypothesis 2, we include interactions between low external financing constraint indicator variables and both foreign and domestic cash. The regression is estimated as follows[10]:

$$\begin{aligned} Payout_{i,t} = {} & \beta_0 + \beta_1 Foreign\ Cash_{i,t-1} + \beta_2 Domestic\ Cash_{i,t-1} + \beta_3 Foreign\ Cash_{i,t-1} * Low\ External\ Financing\ Cost_{i,t} \\ & + \beta_4 Domestic\ Cash_{i,t-1} * Low\ External\ Financing\ Cost_{i,t} + \beta_5 Low\ External\ Financing\ Cost_{i,t} + Controls \\ & + Year\ Fixed\ Effects + Industry\ Fixed\ Effects + \varepsilon_{i,t}. \end{aligned} \tag{3}$$

Controls includes all control variables from Eq. (2). Hypothesis 2 predicts $\beta_3 > 0$. *Low External Financing Cost* is measured using two separate proxies. The first measure is *Investment Grade,* an indicator variable equal to one when the Compustat S&P credit rating is BBB or better and equal to zero otherwise. Firms with investment grade ratings are expected to have lower external capital constraints. Using Compustat S&P credit ratings results in a significant decline in the sample size. Therefore, we use a second measure to capture the cost of external financing. The second measure is *Interest Coverage*, equal to earnings before interest, taxes, depreciation and amortization scaled by interest expense. In the regression, we use an indicator variable equal to one for those firms with an interest coverage ratio greater than the annual median.

4. Results

4.1. Descriptive statistics

Table 2 presents the descriptive statistics for the 20,088 firm-year observations used for this study. On average, total cash distributed to shareholders comprises 4% of lagged noncash assets. This is driven more by repurchases (i.e., 3% of lagged noncash assets) than dividends (i.e., 1% of lagged noncash assets). Total cash holdings comprise 29% of lagged noncash assets. However, foreign cash accounts for 6% and domestic cash accounts for 24%.[11] S&P credit ratings are only available from Compustat for 6073 firm-year observations.

Table 3 includes the Pearson correlation matrix for the variables used in the regression analyses. All correlations that are bold and italicized are significant at the 10% level. Consistent with the prior literature (DeAngelo et al., 2006; Chay and Suh, 2009), total cash has a positive and significant correlation with total payout. Repurchases, and not dividends, drives this univariate correlation. Additionally, domestic cash and foreign cash have positive associations with total payout.

4.2. Cash levels and shareholder payouts

Before testing Hypothesis 1, we examine baseline associations between the level of shareholder payout and total cash. Table 4 presents the coefficient estimates from both the baseline regression and Eq. (2) used to test Hypothesis 1. The dependent variable is *Total Payout*, *Dividends*, and *Repurchases* in Panel A, B, and C, respectively. In Panel A, the coefficient associated with *Total Cash* is positive and significant (t-statistic = 6.79). Consistent with prior literature, column (1) presents evidence that total cash increases the level of payouts (Opler et al., 1999; DeAngelo et al., 2006). The results are economically meaningful as well. An increase from the first quartile to the third quartile of total cash is associated with a 16% increase in the level of shareholder payouts (i.e., increases *Total Payout* by 1% of noncash assets).[12] The control variable coefficients are generally consistent with prior literature. Specifically, *Size*, *Firm Age*, *RE/BV*, *Returns* and lagged payouts are positively associated with the level of total shareholder payouts. *Leverage*, *Sales Growth*, *CapEx*, *Options*, and *St. Dev. Earnings* are all negatively associated with the level of total payouts.

[10] Similar to Eq. (2), Eq. (3) is estimated separately for *Total Payout*, *Dividends*, and *Repurchases.*

[11] The sum of the means for *Foreign Cash* and *Domestic Cash* to not equal the mean of *Total Cash* due to winsorization. In untabulated findings, the mean of unwinsorized *Foreign* and *Domestic Cash* is equal to the mean of *Total Cash.*

[12] [(Total cash coefficient = 0.022) * (0.287 Q3 − 0.029 Q1)] / (0.036 = μ Total Payout)

Table 2
Descriptive statistics.

	N	Mean	St. Dev.	Q1	Median	Q3
Total Payout	20,088	0.036	0.075	0.000	0.004	0.037
Dividends	20,088	0.009	0.021	0.000	0.000	0.010
Repurchases	20,088	0.030	0.102	0.000	0.000	0.019
Total Cash	20,088	0.288	0.559	0.029	0.095	0.287
Foreign Cash	20,088	0.062	0.108	0.000	0.009	0.081
Domestic Cash	20,088	0.240	0.538	0.004	0.052	0.221
Earnings	20,088	−0.045	0.628	−0.023	0.047	0.102
Size	20,088	5.625	2.199	3.965	5.579	7.195
Leverage	20,088	0.204	0.204	0.034	0.144	0.312
MTB	20,088	2.998	4.046	1.275	2.107	3.591
Sales Growth	20,088	0.161	0.439	−0.016	0.090	0.233
CapEx	20,088	0.068	0.072	0.025	0.045	0.083
Firm Age	20,088	3.042	0.680	2.565	3.091	3.584
RE/BV	20,088	−0.283	3.641	−0.250	0.354	0.751
Returns	20,088	0.188	0.745	−0.227	0.073	0.397
Options	20,088	0.102	0.300	−0.006	0.011	0.076
St. Dev. Earnings	20,088	0.134	0.310	0.020	0.046	0.118
Repatriation Cost	20,088	0.002	0.006	0.000	0.000	0.000
$Dividends_{t-1}$	20,088	0.009	0.020	0.000	0.000	0.010
$Repurchases_{t-1}$	20,088	0.026	0.070	0.000	0.000	0.016
Investment Grade	6073	0.473	0.499	0.000	0.000	1.000
Interest Coverage	20,088	53.180	278.400	2.591	7.686	21.140

Table 2 presents the descriptive statistics for the variables used to test our hypotheses. See Appendix A for variable definitions. All continuous variables presented here and included in regression analysis are winsorized at the 1 and 99% level.

In column (2) total cash is disaggregated into its foreign and domestic components. The coefficient associated with *Foreign Cash* is insignificantly different from zero. However, the coefficient associated with *Domestic Cash* is positive and significant (t-statistic = 6.59) providing evidence that the strong positive association between total cash and total shareholder payout is driven by domestic cash and not foreign cash. In addition to the difference in these coefficients being statistically different from zero (p-value = 0.046), the economic results provide evidence that domestic cash has a much stronger association with total payouts compared to foreign cash. For example, domestic cash accounts for 15 of the 16% increase in total payouts described above. Therefore, we conclude that total payout levels are more responsive to higher levels of domestic cash compared to higher levels of foreign cash.

Panels B and C separate the dependent variable into *Dividends* and *Repurchases*, respectively. Similar to the findings of Louis and Urcan (2015), total cash is negatively related to the level of dividends (i.e., column 1 of Panel B presents a negative but insignificant coefficient associated with total cash), but is positively associated with the level of repurchases. More importantly, there are differences in the relations between foreign and domestic cash and both dividends and repurchases. For example, in Panel B, the coefficient associated with *Foreign Cash* is negative and significant (t-statistic = −3.39) while the coefficient associated with *Domestic Cash* is insignificantly different from zero. Additionally, the coefficient associated with *Foreign Cash* is significantly less than that associated with *Domestic Cash* (p-value = 0.002). In Panel C, the positive association between repurchases and total cash is driven by the positive association between domestic cash and repurchases. Specifically, the coefficient associated with *Domestic Cash* is positive and significant (t-statistic = 6.18) while the coefficient associated with *Foreign Cash* is insignificantly different from zero. Further, the difference in these coefficients is statistically significant (p-value = 0.029). Economically, a one standard deviation increase in foreign cash (domestic cash) is associated with a 0 (74) percent increase in the level of repurchases.[13] Taken as a whole, Table 4 presents evidence that is consistent with Hypothesis 1. We conclude that foreign cash and domestic cash have significantly different associations with total payouts, dividends, and repurchases. Therefore, the results suggest that foreign cash increases internal capital inefficiencies by constraining firms' ability to pay out cash to shareholders. We expect to find similar results if firms hold foreign cash for foreign investment opportunities. Although it is possible that foreign cash is held by foreign subsidiaries as a result of greater investment opportunities abroad, Hanlon et al. (2015) and Edwards et al. (2016) provide evidence that this may not be the case. Specifically, both of these studies provide evidence that firms with trapped foreign resources are more likely to make unprofitable foreign acquisitions. Unprofitable acquisitions are consistent with our results as they would further exacerbate internal capital market inefficiencies that the multinational firm faces, thus reducing shareholder payout.

The fact that the foreign cash-total shareholder payouts relation is driven by repurchases is not surprising. Prior literature provides evidence that firms seek to maintain a consistent dividend payment stream to shareholders, and that dividends are more likely to be paid from permanent cash flows (Brav et al., 2005; Guay and Harford, 2000; Jagannathan et al., 2000). On the other hand, repurchases are more flexible compared to dividend payments (Allen and Michaely, 2003; Brav et al., 2005; DeAngelo et al., 2006). To the extent that foreign cash repatriations may not be uniform each period because of repatriation costs and tax strategies, share repurchases allow a more flexible (compared to dividends) means of shareholder payout of foreign cash.

[13] $[\alpha_1\ (-0.001) * \sigma$ Foreign Cash $(0.108)] / \mu$ Repurchases $(0.03) = -0.0036$. $[\alpha_2\ (0.041) * \sigma$ Domestic Cash $(0.538)] / \mu$ Repurchases $(0.03) = 0.735$.

Table 3
Correlation matrix.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	*Total Payout*																					
2	*Dividends*	***0.447***																				
3	*Repurchases*	***0.780***	***0.091***																			
4	*Total Cash*	***0.101***	***−0.046***	***0.147***																		
5	*Foreign Cash*	***0.119***	***0.044***	***0.084***	***0.177***																	
6	*Domestic Cash*	***0.078***	***−0.051***	***0.130***	***0.983***	***0.019***																
7	*Earnings*	***0.072***	***0.097***	−0.005	***−0.405***	***0.041***	***−0.423***															
8	*Size*	***0.149***	***0.267***	***0.034***	***−0.312***	***0.206***	***−0.342***	***0.233***														
9	*Leverage*	***−0.210***	***−0.141***	***−0.142***	***−0.291***	***−0.153***	***−0.266***	***0.049***	***0.214***													
10	*MTB*	***0.143***	***0.081***	***0.113***	***0.143***	***0.087***	***0.128***	***−0.067***	***−0.023***	***−0.239***												
11	*Sales Growth*	***−0.027***	***−0.061***	***−0.012***	***0.161***	***0.014***	***0.163***	***−0.115***	***−0.156***	***−0.103***	***0.136***											
12	*CapEx*	***−0.035***	***−0.051***	0.000	***0.166***	***−0.067***	***0.179***	***−0.100***	***−0.101***	***−0.055***	***0.079***	***0.122***										
13	*Firm Age*	***0.129***	***0.278***	***0.025***	***−0.168***	***0.123***	***−0.185***	***0.132***	***0.498***	***0.059***	***−0.066***	***−0.197***	***−0.212***									
14	*RE/BV*	***0.054***	***0.110***	***−0.018***	***−0.159***	***0.015***	***−0.161***	***0.177***	***0.233***	***0.036***	***−0.374***	***−0.056***	−0.009	***0.119***								
15	*Returns*	***−0.023***	***−0.018***	−0.011	0.003	0.003	0.000	***0.054***	***−0.050***	***0.097***	***−0.068***	***0.079***	***−0.017***	***−0.028***	***−0.034***							
16	*Options*	***−0.029***	***−0.035***	0.000	***0.046***	***0.025***	***0.044***	***−0.063***	***−0.072***	***−0.068***	***0.128***	***0.336***	***0.062***	***−0.130***	***−0.039***	***0.093***						
17	*St. Dev. Earnings*	***−0.032***	***−0.112***	***0.031***	***0.424***	0.003	***0.430***	***−0.446***	***−0.292***	***−0.154***	***0.148***	***0.197***	***0.127***	***−0.227***	***−0.219***	−0.010	***0.110***					
18	*Repatriation Cost*	***0.187***	***0.119***	***0.124***	***0.051***	***0.275***	0.004	***0.090***	***0.192***	***−0.120***	***0.058***	***−0.020***	***−0.026***	***0.144***	***0.036***	0.001	***−0.026***	***−0.046***				
19	*Dividends*$_{t-1}$	***0.327***	***0.729***	***0.086***	***−0.066***	***0.038***	***−0.071***	***0.102***	***0.283***	***−0.122***	***0.080***	***−0.076***	***−0.044***	***0.289***	***0.126***	***−0.039***	***−0.046***	***−0.116***	***0.111***			
20	*Repurchases*$_{t-1}$	***0.397***	***0.126***	***0.327***	***0.080***	***0.105***	***0.061***	***0.040***	***0.083***	***−0.143***	***0.117***	***−0.012***	−0.006	***0.058***	***0.038***	***−0.025***	***−0.049***	***0.020***	***0.161***	***0.123***		
21	*Investment Grade*	***0.061***	***0.065***	***0.041***	***0.100***	***−0.032***	***0.103***	***−0.037***	***−0.329***	***−0.365***	***0.060***	***0.038***	***0.036***	***−0.101***	***−0.031***	−0.008	***0.018***	***0.074***	***−0.016***	***0.071***	***0.051***	
22	*Interest Coverage*	***0.117***	***0.086***	***0.066***	***0.044***	***0.093***	***0.023***	***0.152***	***−0.021***	***−0.168***	***0.028***	***0.026***	−0.003	***0.013***	***0.047***	***0.028***	***0.017***	***−0.056***	***0.085***	***0.055***	***0.069***	***0.068***

Table 3 presents the bivariate Pearson correlation matrix for the variables used in hypotheses testing. All correlations in bold italics are significant at the 10% level. See Appendix A for variable definitions.

Table 4
Shareholder payouts and the disaggregation of total cash.

Panel A: total payout and cash levels

	(1) Total payout	(2) Total payout
Total Cash	**0.022*** (6.79)**	
Foreign Cash		**0.001 (0.07)**
Domestic Cash		**0.022*** (6.59)**
Earnings	0.012 (1.58)	0.012 (1.56)
Size	0.009*** (15.07)	0.009*** (15.04)
Leverage	−0.083*** (−13.94)	−0.084*** (−14.15)
MTB	0.001*** (2.97)	0.001*** (3.04)
Sales Growth	−0.009** (−2.34)	−0.009** (−2.38)
CapEx	−0.092*** (−5.28)	−0.091*** (−5.25)
Firm Age	0.010*** (5.79)	0.010*** (5.74)
RE/BV	0.001** (2.52)	0.001** (2.53)
Returns	0.003** (2.41)	0.003** (2.40)
Options	−0.007* (−1.89)	−0.007* (−1.92)
St. Dev. Earnings	−0.019*** (−3.35)	−0.018*** (−3.33)
Repatriation Cost	0.836*** (4.18)	0.506* (1.95)
$Dividends_{t-1}$	1.244*** (17.87)	1.242*** (17.83)
$Repurchases_{t-1}$	0.439*** (21.36)	0.440*** (21.35)
Intercept	−0.094*** (−4.92)	−0.095*** (−4.87)
Industry fixed effects	Included	Included
Year fixed effects	Included	Included
p-Value: *Foreign Cash = Domestic Cash*		0.0464**
N	20,088	20,088
Log likelihood	6637.032	6636.335

Panel B: dividends and cash levels

	(1) Dividends	(2) Dividends
Total Cash	**−0.002 (−1.12)**	
Foreign Cash		**−0.015*** (−3.39)**
Domestic Cash		**−0.000 (−0.21)**
Earnings	−0.000 (−0.08)	−0.000 (−0.01)
Size	0.004*** (10.18)	0.004*** (10.39)
Leverage	−0.024*** (−7.85)	−0.024*** (−7.91)
MTB	−0.000 (−0.58)	−0.000 (−0.51)
Sales Growth	−0.001 (−0.65)	−0.001 (−0.52)
CapEx	−0.017*** (−2.76)	−0.017*** (−2.80)
Firm Age	0.008*** (8.42)	0.008*** (8.38)
RE/BV	0.001*** (2.69)	0.001*** (2.71)

Table 4 *(continued)*

Panel B: dividends and cash levels

	(1) Dividends	(2) Dividends
Returns	0.001***	0.001***
	(2.87)	(2.86)
Options	0.000	0.001
	(0.55)	(0.70)
St. Dev. Earnings	−0.025***	−0.026***
	(−3.17)	(−3.21)
Repatriation Cost	−0.130*	−0.091
	(−1.71)	(−1.20)
$Dividends_{t-1}$	1.024***	1.021***
	(31.76)	(31.52)
$Repurchases_{t-1}$	0.015**	0.015**
	(2.31)	(2.30)
Intercept	−0.048***	−0.049***
	(−7.11)	(−7.24)
Industry fixed effects	Included	Included
Year fixed effects	Included	Included
p-Value: *Foreign Cash = Domestic Cash*		0.002***
N	20,088	20,088
Log likelihood	11,478.384	11,489.817

Panel C: repurchases and cash levels

	(1) Repurchases	(2) Repurchases
Total Cash	**0.041*** (6.43)**	
Foreign Cash		**−0.001 (−0.05)**
Domestic Cash		**0.041*** (6.18)**
Earnings	0.010	0.010
	(0.87)	(0.86)
Size	0.015***	0.015***
	(10.40)	(10.06)
Leverage	−0.116***	−0.118***
	(−10.01)	(−10.14)
MTB	0.001	0.001
	(1.19)	(1.26)
Sales Growth	−0.023***	−0.023***
	(−3.06)	(−3.08)
CapEx	−0.118***	−0.116***
	(−3.38)	(−3.34)
Firm Age	0.011***	0.010***
	(3.36)	(3.30)
RE/BV	−0.000	−0.000
	(−0.30)	(−0.30)
Returns	0.004*	0.004*
	(1.66)	(1.67)
Options	−0.008	−0.008
	(−1.02)	(−1.03)
St. Dev. Earnings	−0.019**	−0.018**
	(−2.30)	(−2.26)
Repatriation Cost	1.104***	0.560
	(3.38)	(1.31)
$Dividends_{t-1}$	0.322***	0.318**
	(2.60)	(2.57)
$Repurchases_{t-1}$	0.677***	0.679***
	(16.85)	(16.77)
Intercept	−0.213***	−0.215***
	(−4.69)	(−4.63)
Industry fixed effects	Included	Included
Year fixed effects	Included	Included
p-Value: *Foreign Cash = Domestic Cash*		0.029**
N	6073	20,088
Log likelihood	−1039.887	−1042.533

Table 4 presents the estimated coefficients from Eq. (2) which is also shown below. The dependent variable is *Total Payout* in Panel A, *Dividends* in Panel B, and *Repurchases* in Panel C. Standard errors are estimated using robust standard errors clustered by firm. ***, **, * represents statistical significance at the 1%, 5%, and 10% level, respectively. All significance levels are based on two-tailed tests. See Appendix A for variable definitions.

4.3. External capital constraints

Table 5 presents the estimated coefficients used to test Hypotheses 2. Similar to Table 4, the dependent variable is *Total Payout*, *Dividends*, and *Repurchases* in Panels A, B and C, respectively. The first measure of the cost of external financing is S&P credit ratings which results in using a restricted sample of 6073 firm-year observations. The first column is estimated using *Investment Grade* as the measure for lower external capital constraints. Using the full sample, the second column uses *Interest* Coverage to proxy for lower external capital constraints. Panel A shows that the coefficient associated with *Foreign Cash* is negative and significant while the coefficient associated with *Domestic Cash* is insignificantly different from zero for the smaller sample, but positive and significant for the full sample. Further evidence shows that these coefficients are statistically different at the 5% level. The main effects represent the association between foreign cash/domestic cash and total payout for firms that have greater external capital constraints. This evidence is consistent with our findings previously presented and shows that foreign cash plays a role in increasing internal capital market inefficiencies when it comes to shareholder payouts.

Using both proxies, Panel A presents evidence of an increase in the association between foreign cash and total shareholder payout for firms with lower external capital constraints. Specifically, the coefficients associated with the interaction between *Foreign Cash* and *Investment Grade,* and *Foreign Cash* and *Interest Coverage* are positive and significant (t-statistics = 2.93 and 3.58) confirming our prediction. In both instances, foreign cash has a positive association with the level of total payouts for firms facing lower external capital constraints. For non-investment-grade firms, a one standard deviation increase in foreign cash is associated with an 11% decrease in shareholder payout. However, for investment grade firms, a one standard deviation increase in foreign cash is associated with an 11% *increase* in shareholder payout. We argue this increase as a result of foreign cash is attributed to investment grade firms' ability to access external capital at a relatively lower cost. For completeness, we compare the interaction of *Domestic Cash* and *Investment Grade* and show that domestic cash is not significantly different from foreign cash for investment grade firms. We interpret these results to imply that foreign cash creates internal capital market inefficiencies related to payouts, but these internal inefficiencies are alleviated for firms with lower external capital constraints. Accordingly, there is not a difference in the relation between shareholder payouts and either foreign or domestic cash for the investment grade firms.

In Panel B, the dependent variable is the level of dividends. Similar to Panel A, the differences between foreign cash and domestic cash are significant across both columns. Also, the evidence provides similar findings for Hypothesis 2 when using *Investment Grade* to proxy for low financing costs. The coefficient for the interaction between *Foreign Cash* and *Investment Grade* is positive and significant (t-statistics = 3.07). Furthermore, Panel C, where the level of repurchases as the dependent variable, provides findings consistent with Panel A when using both proxies for low financing costs. The coefficients for the interaction between *Foreign Cash* and *Investment Grade,* and *Foreign Cash* and *Interest Coverage* are positive and significant (t-statistics = 1.80 and 3.48). These findings provide additional support for Hypothesis 2.

In summary, we find the positive association between total cash and the level of shareholder payout is driven by domestic cash and not foreign cash. We further provide evidence that lower external capital constraints serve to ease the internal capital market inefficiencies that are brought on by greater foreign cash holdings.

5. Additional analysis

5.1. Abnormal leverage, foreign cash, and shareholder payouts

Our findings raise an important empirical question: are firms issuing abnormally high levels of debt due to internal capital market inefficiencies in an effort return cash to shareholders? Anecdotally, multinational firms have recently begun to "access" foreign cash by issuing bonds in the domestic market. These multinational firms include companies such as Apple, Microsoft, Oracle and Cisco. The interest rates associated with these bonds are at an all-time low which makes issuing bonds a less costly means of creating liquidity compared to extracting foreign cash from subsidiaries (i.e., interest rates are less than repatriation, external agency, and internal agency costs). Additionally, we provide evidence consistent with foreign cash creating internal capital market inefficiencies for firms returning cash to shareholders, but certain firms alleviate these frictions with low external financing costs. Consequently, the additional debt issuances by shareholder-payout firms with foreign cash holdings could have negative consequences. Therefore, we examine whether firms are issuing abnormally high amounts of debt when they have greater foreign cash and are simultaneously returning cash to shareholders via dividends and repurchases. We do so by estimating the following model:

$$\begin{aligned} \textit{Abnormal Leverage}_{i,t} = {} & \gamma_0 + \gamma_1 \textit{Foreign Cash}_{i,t-1} + \gamma_2 \textit{Domestic Cash}_{i,t-1} + \gamma_3 \textit{Foreign Cash}_{i,t-1} * \textit{Dividends}_{i,t} \\ & + \gamma_4 \textit{Foreign Cash}_{i,t-1} * \textit{Repurchases}_{i,t} + \gamma_5 \textit{Industry Leverage}_{i,t} + \gamma_6 \textit{Size}_{i,t} + \gamma_7 \textit{MTB}_{i,t} \\ & + \gamma_8 \textit{Sales Growth}_{i,t} + \gamma_9 \textit{CapEx}_{i,t-1} + \gamma_{10} \textit{Firm Age}_{i,t} + \gamma_{11} \textit{RE/BV}_{i,t-1} + \gamma_{12} \textit{Repatriation Cost}_{i,t-1} \\ & + \gamma_{13} \textit{Dividends}_{i,t-1} + \gamma_{14} \textit{Repurchases}_{i,t-1} + \textit{Year Fixed Effects} + \textit{Industry Fixed Effects} + \varepsilon_{i,t}. \end{aligned} \tag{4}$$

Notes to table 4:
$\textit{Payout}_{i,t} = \alpha_0 + \alpha_1 \textit{Foreign Cash}_{i,t-1} + \alpha_2 \textit{Domestic Cash}_{i,t-1} + \alpha_3 \textit{Earnings}_{i,t-1} + \alpha_4 \textit{Size}_{i,t} + \alpha_5 \textit{Leverage}_{i,t} + \alpha_6 \textit{MTB}_{i,t} + \alpha_7 \textit{Sales Growth}_{i,t} + \alpha_8 \textit{CapEx}_{i,t-1} + \alpha_9 \textit{Firm Age}_{i,t} + \alpha_{10} \textit{RE/BV}_{i,t-1} + \alpha_{11} \textit{Returns}_{i,t} + \alpha_{12} \textit{Options}_{i,t} + \alpha_{13} \textit{St. Dev. Earnings}_{i,t} + \alpha_{14} \textit{Repatriation Cost}_{i,t-1} + \alpha_{15} \textit{Dividends}_{i,t-1} + \alpha_{16} \textit{Repurchases}_{i,t-1} + \textit{Year Fixed Effects} + \textit{Industry Fixed Effects} + \varepsilon_{i,t}$ The variables of interest and their corresponding coefficient estimates and t-statistics are shown in bold font.

Table 5
Shareholder payouts, foreign cash, and financial constraints.

Panel A: total payout and financial constraints		
	(1) Total payout	(2) Total payout
Foreign Cash	−0.036*	−0.041***
	(−1.87)	(−2.78)
Domestic Cash	−0.001	0.014***
	(−0.05)	(3.30)
Foreign Cash * Investment Grade	**0.073*** **	
	(2.93)	
Domestic Cash * Investment Grade	**0.100*** **	
	(4.76)	
Foreign Cash * Interest Coverage		**0.070*** **
		(3.58)
Domestic Cash * Interest Coverage		**0.030*** **
		(4.20)
Investment Grade	0.003	
	(0.91)	
Interest Coverage		0.016***
		(6.45)
Earnings	0.080***	0.003
	(3.12)	(0.40)
Size	0.003***	0.009***
	(2.82)	(14.94)
Leverage	−0.079***	−0.050***
	(−9.62)	(−7.92)
MTB	0.000*	0.001***
	(1.89)	(2.92)
Sales Growth	−0.025***	−0.010***
	(−4.84)	(−2.63)
CapEx	−0.041*	−0.095***
	(−1.88)	(−5.49)
Firm Age	0.001	0.009***
	(0.54)	(5.63)
RE/BV	0.001***	0.001*
	(2.96)	(1.91)
Returns	0.008***	0.002
	(3.79)	(1.19)
Options	−0.005	−0.008**
	(−1.55)	(−2.23)
St. Dev. Earnings	0.027	−0.014***
	(1.29)	(−2.80)
Repatriation Cost	0.363	0.742***
	(1.47)	(3.68)
$Dividends_{t-1}$	0.667***	1.193***
	(6.60)	(17.78)
$Repurchases_{t-1}$	0.406***	0.430***
	(12.77)	(21.41)
Intercept	−0.033**	−0.107***
	(−2.16)	(−5.89)
Industry fixed effects	Included	Included
Year fixed effects	Included	Included
p-Value: *Foreign Cash = Domestic Cash*	0.058*	0.001***
p-Value: *Foreign Cash * Investment Grade = Domestic Cash * Investment Grade*	0.396	
p-Value: *Foreign Cash * Interest Coverage = Domestic Cash * Interest Coverage*		0.054*
N	6073	20,088
Log likelihood	5835.664	6784.850

Panel B: dividends and financial constraints		
	(1) Dividends	(2) Dividends
Foreign Cash	−0.024***	−0.014**
	(−2.76)	(−2.34)
Domestic Cash	−0.003	−0.003
	(−0.60)	(−1.12)
Foreign Cash * Investment Grade	**0.030*** **	
	(3.07)	
Domestic Cash * Investment Grade	**0.005**	

(continued on next page)

Table 5 *(continued)*

Panel B: dividends and financial constraints

	(1) Dividends	(2) Dividends
	(0.55)	
Foreign Cash * Interest Coverage		**−0.000**
		(−0.06)
Domestic Cash * Interest Coverage		**0.007****
		(2.08)
Investment Grade	0.006***	
	(4.50)	
Interest Coverage		0.007***
		(7.53)
Earnings	0.030***	−0.002
	(3.62)	(−0.74)
Size	0.002***	0.004***
	(3.82)	(10.31)
Leverage	−0.019***	−0.012***
	(−6.28)	(−4.34)
MTB	0.000	−0.000
	(0.68)	(−0.47)
Sales Growth	−0.005	−0.001
	(−1.57)	(−0.83)
CapEx	−0.010	−0.019***
	(−0.87)	(−3.10)
Firm Age	0.004***	0.008***
	(4.55)	(8.31)
RE/BV	0.000**	0.001**
	(2.55)	(2.34)
Returns	0.001	0.001
	(0.86)	(1.32)
Options	−0.002	0.000
	(−1.46)	(0.49)
St. Dev. Earnings	−0.022*	−0.023***
	(−1.93)	(−2.98)
Repatriation Cost	−0.072	−0.118
	(−0.72)	(−1.60)
$Dividends_{t-1}$	0.660***	1.007***
	(21.40)	(31.50)
$Repurchases_{t-1}$	0.005	0.013**
	(0.51)	(2.01)
Intercept	−0.027***	−0.054***
	(−3.80)	(−7.69)
Industry fixed effects	Included	Included
Year fixed effects	Included	Included
p-Value: *Foreign Cash = Domestic Cash*	0.061*	0.053*
p-Value: *Foreign Cash * Investment Grade = Domestic Cash * Investment Grade*	0.079*	
p-value: *Foreign Cash * Interest Coverage = Domestic Cash * Interest Coverage*		0.334
N	6073	20,088
Log likelihood	7800.406	11,566.857

Panel C: repurchases and financial constraints

	(1) Repurchases	(2) Repurchases
Foreign Cash	−0.045	−0.070***
	(−1.59)	(−2.62)
Domestic Cash	0.006	0.037***
	(0.40)	(4.24)
Foreign Cash * Investment Grade	**0.066***	
	(1.80)	
Domestic Cash * Investment Grade	**0.120*****	
	(3.26)	
Foreign Cash * Interest Coverage		**0.115*****
		(3.48)
Domestic Cash * Interest Coverage		**0.020**
		(1.63)
Investment Grade	0.005	
	(1.02)	
Interest Coverage		0.022***
		(4.11)

Table 5 *(continued)*

Panel C: repurchases and financial constraints	(1) Repurchases	(2) Repurchases
Earnings	0.065**	0.001
	(2.30)	(0.11)
Size	0.003*	0.015***
	(1.79)	(10.15)
Leverage	−0.103***	−0.074***
	(−7.42)	(−6.00)
MTB	0.000	0.001
	(0.97)	(1.19)
Sales Growth	−0.042***	−0.024***
	(−5.36)	(−3.15)
CapEx	−0.034	−0.123***
	(−0.99)	(−3.58)
Firm Age	−0.001	0.010***
	(−0.17)	(3.15)
RE/BV	0.001**	−0.001
	(2.07)	(−0.62)
Returns	0.011***	0.002
	(3.34)	(0.83)
Options	−0.011*	−0.009
	(−1.88)	(−1.16)
St. Dev. Earnings	0.027	−0.014*
	(1.02)	(−1.78)
Repatriation Cost	0.364	1.029***
	(1.08)	(3.04)
$Dividends_{t-1}$	−0.094	0.258**
	(−1.16)	(2.05)
$Repurchases_{t-1}$	0.541***	0.668***
	(11.86)	(16.74)
Intercept	−0.084**	−0.230***
	(−2.14)	(−5.30)
Industry fixed effects	Included	Included
Year fixed effects	Included	Included
p-Value: *Foreign Cash = Domestic Cash*	0.056*	0.001***
p-Value: *Foreign Cash * Investment Grade = Domestic Cash * Investment Grade*	0.299	
p-value: *Foreign Cash * Interest Coverage = Domestic Cash * Interest Coverage*		0.008***
N	6073	20,088
Log likelihood	2410.100	−976.302

Table 5 presents the estimated coefficients from Eq. (3) which is also shown below. The dependent variable is *Total Payout* in Panel A, *Dividends* in Panel B, and *Repurchases* in Panel C. Standard errors are estimated using robust standard errors clustered by firm. ***, **, * represents statistical significance at the 1%, 5%, and 10% level, respectively. All significance levels are based on two-tailed tests. See Appendix A for variable definitions.

$$Payout_{i,t} = \beta_0 + \beta_1 Foreign\ Cash_{i,t-1} + \beta_2 Domestic\ Cash_{i,t-1} + \beta_3 Foreign\ Cash_{i,t-1} * Low\ External\ Financing\ Cost_{i,t} + \beta_4 Domestic\ Cash_{i,t-1} * Low\ External\ Financing\ Cost_{i,t} + \beta_5 Low\ External\ Financing\ Cost_{i,t} + Controls + Year\ Fixed\ Effects + Industry\ Fixed\ Effects + \varepsilon_{i,t}.$$

The variables of interest and their corresponding coefficient estimates and t-statistics are shown in bold font.

All variables except for *Abnormal Leverage* and *Industry Leverage* are previously defined. *Industry Leverage* is defined as the industry annual median of total debt to market value of assets. *Abnormal Leverage* is based on the signed residuals from the following leverage model (Frank and Goyal, 2009):

$$TDM_{i,t} = \theta_0 + \theta_1 Industry\ Leverage_{i,t} + \theta_2 Tang_{i,t-1} + \theta_3 MTB_{i,t-1} + \theta_4 Profit_{i,t-1} + \theta_5 Assets_{i,t} + \theta_6 CPI_i + Year\ Fixed\ Effects + Industry\ Fixed\ Effects + \varepsilon_{i,t}. \quad (5)$$

TDM is total debt scaled by market value of assets.[14] *Tang* is net property, plant and equipment scaled by total assets. *Profit* is operating income before depreciation scaled by total assets. *Assets* is the natural logarithm of total assets. *CPI* is the expected changes in the consumer price index over the coming year obtained from the Federal Reserve Bank. Estimated coefficients from Eq. (5) are consistent with Frank and Goyal (2009) and are presented in Appendix B.

Table 6 presents the estimated coefficients from Eq. (4). Full sample evidence is presented in Column (1). The coefficients of interest are γ_3 and γ_4, which estimates *Foreign Cash*'s interactions with *Dividends* and *Repurchases*. Both coefficients are positive and significant (t-statistics = 3.53 and 1.79, respectively). Although firms with greater foreign cash and domestic cash have lower leverage (i.e., the coefficients associated with *Foreign Cash* and *Domestic Cash* are negative and significant), when firms issue dividends or make repurchases is associated with an increase in abnormal leverage.

[14] Results are similar if *TDM* is scaled by book value of assets.

Table 6
Abnormal leverage, foreign cash, and shareholder payouts.

	(1) Full Sample	(2) Above Interest Coverage Median	(3) Equal to or Below Interest Coverage Median	(4) Large Block Holders	(5) Small Block Holders
Foreign Cash	−0.035*	0.006	−0.053*	−0.067**	−0.011
	(−1.81)	(0.36)	(−1.87)	(−2.11)	(−0.44)
Domestic Cash	−0.932***	0.001	−0.034***	0.000	−0.012**
	(−8.55)	(0.51)	(−6.13)	(0.04)	(−2.37)
Foreign Cash * Dividends	**1.904*** **	**0.846***	**2.113****	**0.805**	**1.099**
	(3.53)	**(1.73)**	**(2.20)**	**(1.02)**	**(1.10)**
Foreign Cash * Repurchases	**0.117***	**0.043**	**0.027**	**0.274****	**−0.161**
	(1.79)	**(0.70)**	**(0.20)**	**(2.55)**	**(−0.88)**
Industry Leverage	−0.073***	−0.132***	−0.167***	−0.072*	−0.099***
	(−3.27)	(−5.28)	(−5.90)	(−1.86)	(−2.63)
Size	0.007***	0.005***	0.000	0.018***	0.007***
	(5.68)	(3.88)	(0.16)	(6.32)	(3.34)
MTB	−0.000	0.005***	−0.001	−0.001	0.001
	(−1.11)	(8.24)	(−1.30)	(−0.96)	(1.01)
Sales Growth	0.003	0.008**	0.004	−0.011	0.001
	(1.05)	(2.51)	(0.95)	(−1.23)	(0.13)
CapEx	−0.190***	−0.197***	−0.142***	−0.270***	−0.136***
	(−6.97)	(−7.63)	(−3.71)	(−4.39)	(−2.61)
Firm Age	−0.014***	−0.013***	−0.015***	−0.020***	−0.011*
	(−3.29)	(−3.41)	(−2.70)	(−2.61)	(−1.74)
RE/BV	−0.001**	0.001	0.001*	−0.002**	0.000
	(−2.47)	(1.33)	(1.92)	(−2.33)	(0.03)
Repatriation Cost	−1.552***	−0.322	−1.641***	−1.388***	−1.628***
	(−5.41)	(−1.45)	(−3.11)	(−2.97)	(−3.75)
$Dividends_{t-1}$	−0.932***	−0.137	−1.128***	−0.583***	−0.645***
	(−8.55)	(−1.59)	(−4.98)	(−3.48)	(−3.97)
$Repurchases_{t-1}$	−0.030*	0.021	−0.013	−0.059*	−0.039
	(−1.80)	(1.51)	(−0.58)	(−1.84)	(−1.17)
Intercept	0.075	−0.073**	0.212***	0.151***	−0.146***
	(1.54)	(−2.46)	(4.99)	(4.90)	(−3.93)
Industry fixed effects	Included	Included	Included	Included	Included
Year fixed effects	Included	Included	Included	Included	Included
N	18,338	8302	10,036	5172	5237
adj. R^2	0.04	0.11	0.06	0.06	0.04

Table 6 presents the estimated coefficients from Eq. (4) which is also shown below. The dependent variable is *Abnormal Leverage*. Standard errors are estimated using robust standard errors clustered by firm. ***, **, * represent statistical significance at the 1%, 5%, and 10% level, respectively. All significance levels are based on two-tailed tests. See Appendix A for variable definitions.

$$Abnormal\ Leverage_{i,t} = \gamma_0 + \gamma_1 Foreign\ Cash_{i,t-1} + \gamma_2 Domestic\ Cash_{i,t-1} + \gamma_3 Foreign\ Cash_{i,t-1} * Dividends_{i,t} + \gamma_4 Foreign\ Cash_{i,t-1} * Repurchases_{i,t} + \gamma_5 Industry\ Leverage_{i,t} + \gamma_6 Size_{i,t} + \gamma_7 MTB_{i,t} + \gamma_8 Sales\ Growth_{i,t} + \gamma_9 CapEx_{i,t-1} + \gamma_{10} Firm\ Age_{i,t} + \gamma_{11} RE/BV_{i,t-1} + \gamma_{12} Repatriation\ Cost_{i,t-1} + \gamma_{13} Dividends_{i,t-1} + \gamma_{14} Repurchases_{i,t-1} + Year\ Fixed\ Effects + Industry\ Fixed\ Effects + \varepsilon_{i,t}.$$

The variables of interest and their corresponding coefficient estimates and t-statistics are shown in bold font.

We next partition the sample based on potential external pressures that two significant stakeholders, debt holders and majority shareholders, place on managers making the decision of whether or not to issue debt to payout cash to shareholders. The first setting we examine is whether or not issuing abnormally high amounts of debt for shareholder payouts exists only for firms that are financially healthy (i.e., firms with a low cost of external financing). Debt holders, through debt covenants, can constrain managers from further borrowing and issuing shareholder payouts because of the potential increase in risk to existing debt holders (Kalay, 1982). Accordingly, firms with greater slack in their covenants (i.e., financially healthy firms) are more likely to borrow additional funds to make shareholder payouts than firms that have less slack in their debt covenants. Columns (2) and (3) include firms with low and high external financing costs, respectively. To maximize the sample size, the interest coverage ratio is used to measure the cost of external financing. While companies such as Apple and Microsoft can afford to issue debt to return cash to shareholders, it is unclear whether weak financial firms are taking on abnormal levels of debt. Column (2) confirms the anecdotal evidence regarding companies such as Apple and Microsoft. However, column (3) provides evidence that firms that are in weaker financial health (i.e., have greater external capital constraints) are also taking on abnormally high levels of debt to pay dividends. Specifically, the coefficient associated with the interaction between *Foreign Cash* and *Dividends* is positive and significant (t-statistic = 2.20), implying that firms with high external financing costs are issuing debt to pay dividends in the presence of greater foreign cash. The findings provide evidence consistent with shareholder-payout firms issuing abnormally high amounts of debt in the presence of foreign cash. Even more concerning is that our results suggest not only financially healthy firms but also financially weak firms are issuing debt to return cash to shareholders. Said another way, financially weak firms with internal capital market inefficiencies from foreign cash holdings acquiesce to shareholder demands and borrow additional funds to issue shareholder payouts.

The second external pressure that we examine is the ability of majority shareholders to encourage managers to participate in shareholder payouts at the expense of using internal funds for new investments. Columns (4) and (5) partition the sample into

firms with large and small block holder ownership, respectively. We obtain ownership data from Thomson Reuters ownership and retain all firms with majority shareholders that own >5% of the shares outstanding. We then form a ratio of majority shareholder concentration as the total percentage of shares owned by majority shareholders. Large (small) block holders are identified as those firm-years above (below) the median of majority shareholder concentration. For large block holding firms, the coefficient associate with Foreign Cash and Repurchases is positive and significant (t-statistic = 2.55) suggesting that a larger percentage of majority stakeholders encourages managers to issue debt to return cash to shareholders via repurchases. We interpret this finding as evidence that managers appease majority stakeholder requests by issuing debt in order make repurchases. This suggests that internal capital market inefficiencies from foreign cash holdings could indirectly relate to the negative consequence of abnormally high levels of debt used to return cash to shareholders via repurchases.

6. Conclusions

The financial press has presented conflicting views about whether firms' foreign cash holdings affect their ability to distribute cash to shareholders (Bulkeley, 2007; Jannarone and Silver, 2009; Drucker, 2010; Casselman and Lahart, 2011; Winkler, 2011; Murphy, 2012; Linebaugh, 2013). However, prior research has not investigated the impact of foreign cash holdings on the level of cash distributed to shareholders. Accordingly, the objectives of this study are to examine whether internal capital market inefficiencies created by foreign cash are associated with the level of shareholder payouts and determine whether lower external financing constraints can alleviate these inefficiencies.

Using a sample of 4186 multinational firms comprising 20,088 firm-year observations from 1995 through 2013, we provide evidence that the association between foreign cash and shareholder payouts is statistically and economically less than the association between domestic cash and shareholder payouts. This is important as prior studies have not been able to provide large-scale evidence of the association between foreign cash and the level of shareholder distributions. The results are consistent with foreign cash holdings creating internal capital market inefficiencies.

Next, we investigate a mechanism to reduce the internal capital market inefficiencies resulting from greater foreign cash holdings. We examine whether firms with lower external capital constraints can alleviate the internal capital market frictions from foreign cash. Our results provide evidence supporting financially healthy firms being able to overcome the internal capital market inefficiencies. Specifically, for the average investment grade firm, the negative association between foreign cash and shareholder payout becomes positive, exhibiting a 22% increase in the level of cash distributed to shareholders. In response to these findings, we perform additional analysis to investigate whether firms are issuing abnormally high debt in the presence of foreign cash. The results suggest firms with foreign cash holdings are indeed issuing large amounts of debt to return cash to shareholders. Also, not only financially healthy firms but also financially weak firms are issuing debt for shareholder payouts. Our results also provide evidence that majority shareholders are one external pressure that encourages managers to issue debt to fund shareholder payout instead of new investments. These findings bring to light another potentially negative consequence of internal capital market inefficiencies from foreign cash.

Prior literature on internal capital markets has focused mainly on the efficient allocation of resources from the parent to the subsidiaries for capital investments purposes (Williamson, 1975; Gertner et al., 1994; Stein, 1997; Shin and Stulz, 1998; Rajan et al., 2000; Datta et al., 2009). We contribute to prior literature on internal capital markets by focusing on parent companies' willingness and ability to extract resources from their subsidiaries to return cash to shareholders. Additionally, we identify a unique way to measure internal capital market inefficiencies by using disaggregated cash between foreign and domestic and their differential relation with shareholder payouts. Furthermore, our findings extend prior studies that examine payout policy within multinational firms. Arena and Kutner (2015) show that repatriation costs affect the level of cash distributed to shareholders. We contribute to this literature by showing lower external capital constraints serve to reduce the internal capital inefficiencies that are in place as a result of foreign cash holdings. Additionally, our study extends the prior literature that examines the consequences of foreign cash accumulation. Prior studies examine the investment implications of foreign cash (Hanlon et al., 2015; Edwards et al., 2016). We provide evidence that foreign cash accumulation is associated with payout policy in addition to investment policy. Additionally, our findings suggest another negative consequence associated with internal capital market inefficiencies from foreign cash is firms issuing abnormally high debt.

The evidence presented in our study does not come without limitations. Although Hanlon et al. (2015) and Edwards et al. (2016) provide evidence that firms make unprofitable foreign investments with trapped foreign resources, it is still possible that firms are using foreign cash to fund profitable foreign investments and thus foreign cash would not be creating internal capital market inefficiencies. Additionally, it is difficult to disentangle the firms' internal capital market inefficiencies with its access to external capital. For example, it is not clear whether foreign cash increases or decreases the cost to external financing and thus our variable of interest, foreign cash, may also be associated with our measures of the cost of external finance.

Appendix A. Variable definitions (with Compustat codes in parentheses)

Hypothesis testing variables	
Total Payout	The sum of *Dividends* and *Repurchases*.
Dividends	Total dividends paid (DVC) scaled by lagged noncash assets (AT − CHE). Missing values of dividends within Compustat are treated as zeros.

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Hypothesis testing variables	
Repurchases	Total repurchases scaled by lagged noncash assets (AT − CHE). A repurchase is identified as a positive value for purchases of common and preferred stock (PRSTKC) less any decrease in the redemption value of preferred stock (PSTKRV) in the prior year, or minus the decrease in preferred stock (PSTK) in the prior year, if the redemption value is missing.
Total Cash	Total cash (CHE) scaled by lagged noncash assets (AT − CHE).
Foreign Cash	Cash balance held by foreign subsidiaries (estimated using methodology provided by Campbell et al. (2015) scaled by lagged noncash assets (AT − CHE).
Domestic Cash	Total Cash (CHE) minus estimated foreign cash scaled by lagged noncash assets (AT − CHE).
Earnings	Income before extraordinary items (IB) scaled by lagged noncash assets (AT − CHE).
Size	Natural logarithm of lagged noncash assets (AT − CHE).
Leverage	Long-term (DLTT) plus short-term portions of long term debt (DLC) scaled by the sum of market value of equity (PRCC_F*CSHO), long-term (DLTT), and short-term portions of long term debt (DLC).
MTB	Market value [shares outstanding (CSHO) multiplied by the stock price (PRCC_F)] scaled by book value of equity (CEQ).
Sales Growth	Total sales (SALE) minus lagged total sales, all scaled by lagged total sales.
CapEx	Capital expenditures (CAPX) scaled by lagged noncash assets (AT − CHE).
Age	Natural logarithm of the number of years that firm has appeared in Compustat.
RE/BV	Ratio of retained earnings (RE) divided by book value of common equity (CEQ).
Returns	Firm monthly compounded stock return for the two years prior to period *t*.
Options	Annual percentage change in total diluted shares outstanding of firm as if no repurchases were made during year *t*.
St. Dev. Earnings	Standard deviation of *Earnings* for the current and prior four years.
Repatriation Cost	The greater of zero or 35% multiplied by the sum of the prior three years' pretax foreign income (PIFO) minus the sum of the prior three years' foreign tax expense (TXFO), scaled by lagged noncash assets (AT − CHE).
Investment Grade	Indicator equal to 1 if the firm has an S&P Credit Rating equal to or above BBB, and equal to zero otherwise.
Interest Coverage	Earnings before interest, taxes, depreciation and amortization (EBITDA) scaled by interest expense (XINT). The continuous variable is presented in the descriptive statistics and an indicator for above/below the median is used in the regression analysis. Observations with missing or zero values for XINT are excluded from analysis.
Abnormal leverage variables	
TDM	Total debt (DLC + DLTT) scaled by market value of assets. Market value of assets is the market value of equity (PRCC_C*CSHPRI) plus total debt (DLC + DLTT) plus preferred liquidation value (PSTKL) minus deferred taxes and investment tax credit (TXDITC).
Industry Leverage	Industry annual median of *TDM*.
Abnormal Leverage	Signed residuals from Eq. (5).
Tang	Net property plant and equipment (PPENT) scaled by total assets (AT).
Profit	Operating income before depreciation (OIBDP) scaled by total assets (AT).
Assets	Natural logarithm of total assets (AT).
CPI	The expected changes in the consumer price index over the coming year obtained from the Federal Reserve Bank.

Appendix B. Abnormal leverage estimation

Table B1 presents the estimated coefficients from Eq. (5) used to estimate firms' abnormal leverage. The sample size is larger than that used to test our hypotheses because it includes all firms from Compustat with non-missing data needed to estimate Eq. (5). Coefficient estimates and the adjusted R-squared are consistent with Frank and Goyal (2009). T-Statistics are presented in parentheses.

Table B1
First stage prediction of abnormal leverage.

	(1) TDM
Industry Leverage	0.631***
	(128.70)
Tang	0.090***
	(34.59)
MTB	−0.023***
	(−73.32)
Profit	−0.091***
	(−38.76)
Assets	0.010***
	(33.30)
CPI	0.052***
	(3.42)
Intercept	−0.089
	(−1.59)
N	131,822
adj. R^2	0.28

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