The Effect of Repatriation Tax Costs on Internal Capital Markets and Firm Financing

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Abstract

This paper investigates how U.S. repatriation taxes constrain a firm's internal capital market and affect firm debt financing decisions. The U.S. tax system allows multinationals to defer payments of domestic taxes on active foreign earnings until the firm repatriates cash from overseas operations. Foley et al. (2007) provide empirical evidence that this tax rule motivates firms to retain cash overseas. In this paper, we test to what extent firms issue external debt to meet domestic cash needs, rather than incurring the repatriation tax. We further predict cross-sectional differences in the relation between repatriation tax costs and firm financing high-intangibles firms and in the period following certain tax rules that improved a firm's ability to borrow on a short-term basis from foreign subsidiaries. This paper adds to the literature on internal capital markets by showing how U.S. tax frictions impede the domestic use of internal capital held by foreign subsidiaries, thereby inducing firms to access external financing sources. We also provide evidence to policy makers by showing that, to the extent repatriation taxes and trapped foreign cash are associated with increased U.S. external debt for which interest payments are deductible, the U.S. system of deferral may be more costly to the U.S. government than currently estimated.

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1. Introduction

U.S. multinationals are estimated to hold approximately $2 trillion of cash overseas. One explanation for these large foreign cash holdings is that the U.S. tax system of deferral, which defers the U.S. taxation of active foreign subsidiary earnings until these earnings are repatriated to the U.S., motivates firms to retain cash in foreign subsidiaries (Foley, Hartzell, Titman, and Twite, 2007). Prior literature shows that the large amounts of locked-out foreign cash affect firm investment (Faulkender and Petersen, 2012; Hanlon, Lester, and Verdi, 2015; Edwards, Kravet, and Wilson, 2016) and dividend policies (Nessa, 2017). This paper examines how this U.S. tax policy affects firm financing. Specifically, firms with significant offshore cash and high repatriation tax liabilities may be constrained domestically if the amount of cash generated in the U.S. is insufficient to meet domestic operational, investment, and payout needs. We study to what extent multinationals with significant repatriation tax liabilities use external U.S. debt financing to meet these domestic cash needs.

Theory and prior empirical work show that using internal capital to fund operations within a firm is generally less costly than external capital (Gertner, Powers, and Scharfstein, 1994; Stein, 2002), such that value-maximizing managers will select internal capital to fund domestic cash needs. Despite this predicted ordering of firm financing, firms with a significant amount of cash on their balance sheets are tapping the external debt market rather than using internal cash holdings. For example, Ebay (with 90% of cash offshore) issued $3 billion in debt in July 2012. Apple (with 79% of cash offshore in 2013) satisfied investor demands for return of capital by borrowing $17 billion in 2013. Microsoft (with 85% of cash offshore for its fiscal year ending June 2011) sold $4.75 billion in bonds in September 2010 to finance dividends and share repurchases, and they announced a new borrowing of $17 billion as recently as January 2017.

Frictions created by repatriation taxes, as well as other U.S. tax rules limiting the use of foreign assets in domestic operations, may explain the use of external debt financing by Microsoft, Ebay, Apple, and other multinationals.[1] In addition to imposing a repatriation tax liability upon foreign dividend payments to the U.S., tax rules also limit a firm's ability to loan funds from foreign operations to the U.S. by recasting many (but not all) of these loans as deemed dividends. For multinationals, the internal cost of capital will reflect this repatriation tax liability and therefore could be higher than the firm's external cost of capital. Consequently, it may be more efficient for multinationals with trapped foreign cash to use external debt financing rather than incur and pay the U.S. repatriation tax cost.

Indeed, a sample of firms surveyed state that they avoid the repatriation tax liability by raising capital in the U.S. debt market (Graham, Hanlon, and Shevlin, 2010). Furthermore, prior work finds that the probability of issuing debt is positively related to the amount of permanently reinvested earnings in foreign subsidiaries (Albring, 2006; Petzel and Salbador, 2016).[2] We directly test if repatriation tax liabilities are positively related to domestic borrowing using data from the Bureau of Economic Analysis on domestic debt. These tests allow us to i) quantify the extent to which firms use this strategy to minimize U.S. tax liabilities, and ii) provide empirical evidence on the type of firm that engages in this type of cross-border tax planning.

Prior literature suggests that we may not observe a positive association between repatriation

[1] Statements by corporate management validate that all three of these borrowings were motivated by U.S. tax policies and repatriation tax costs. For example, Ebay's CFO stated that the domestic debt issuances were intended to "get the wonderful benefit of an extremely low tax rate, but also get our cash geographically where we would like it to be to enable us to acquire and redistribute cash effectively" (Mead and Kucera, 2012).

[2] Albring (2006) and Petzel and Salbador (2016) measure the probability that a firm will issue debt as a function of the firm's permanently reinvested foreign earnings (as disclosed in firm financial statements). Both studies find that permanently reinvested earnings are positively associated with the likelihood of debt issuance, although they are conducted on relatively small samples (156 manufacturing firms for the period 1993 through 2002 in Albring (2006) and 222 Fortune 500 firms in Petzel and Salbador (2016)) and focus on only public debt issuances. We view our study as complementary to these papers in that we directly test the relation with domestic debt levels to measure the extent to which this occurs among a large sample of multinational firms.

tax costs and external debt financing. Desai, Foley, and Hines (2007) show that – despite repatriation taxes – approximately 30% of U.S. MNCs' foreign affiliates continue to pay dividends to the U.S. parent for U.S. investment and repayment needs. Furthermore, firms have alternative methods for accessing the capital of foreign subsidiaries. For example, Altshuler and Grubert (2003) find that firms circumvent the repatriation tax by employing complex ownership, borrowing, and investment strategies within the foreign affiliate structure that result in relatively low or no additional repatriation tax. Firms may also avoid deemed dividend treatment on intercompany loans from foreign subsidiaries by structuring a short-term revolving loan program in which the U.S. parent effectively borrows from a number of different subsidiaries.[3] Another reason we may not observe a positive association is because firms can trim domestic operations and investment to save domestic cash rather than pay for external capital.[4] Finally, Guenther, Njoroge, and Williams (2016) suggest that firms use cash tax savings, such as those achieved by deferring repatriation of foreign earnings, to *pay down* debt, which would result in a negative relation between firm borrowing and repatriation tax costs. Therefore, the relation between repatriation tax costs and firm financing is an empirical question.

To test our hypothesis, we use data for a sample of U.S. multinational C corporations from Compustat and the Bureau of Economic Analysis (BEA) over the period 1999 through 2012. As noted above, the BEA data allow us to observe detailed financial statement information of U.S.

[3] Sec. 956 of the Internal Revenue Code limits U.S. entities from borrowing from foreign subsidiaries by recasting these loans as deemed dividend payments. However, tax rules permit an exception to this rule by allowing foreign subsidiaries to make short-term loans to the U.S. parent. Companies can exploit the tax rules so that these loans are effectively long-term borrowings if the U.S. entity settles the loan with one foreign subsidiary and takes out a loan with another foreign subsidiary on the same day. HP employed such a "revolving loan program" between subsidiaries in Belgium and the Cayman Island (Permanent Subcommittee, 2013). See further discussion in Sec. 2.

[4] Two concurrent working papers study the relation between repatriation taxes and the cost of debt. Blaylock et al. (2016) find a positive association between the cost of debt and an interaction of a repatriation tax indicator and foreign earnings. Ma et al. (2016) find a positive association between interest spreads and the repatriation tax cost. Both papers interpret the results as evidence that banks will charge firms with high repatriation tax liabilities higher fees to borrow. Neither of these papers tests if firms choose to actually borrow more despite this higher cost.

parent companies and their foreign affiliates, which is otherwise not publicly available. We regress measures of external domestic debt financing (from the BEA) on a firm's estimated repatriation tax cost, controlling for other determinants of corporate financing decisions such as size, investment spending, growth opportunities, and domestic and foreign financial performance.[5] We observe that repatriation tax costs are positively related to the level of firms' domestic debt; a one-standard-deviation increase in repatriation tax costs is associated with an approximately 3.3 percent increase in domestic borrowing amounts. This result is consistent with multinational firms with locked-out cash borrowing greater amounts in the U.S. to meet domestic cash needs.

Next, we test how this positive relation between repatriation tax costs and domestic borrowing varies based on a firm's external cost of debt financing, estimated using measures of financial constraint. Specifically, any association between repatriation tax costs and external borrowing may differ for financially constrained firms that have more limited and/or more costly access to the external capital markets. Because these firms cannot inexpensively finance domestic cash needs through external capital sources, they may be more reliant on cross-border internal financing to fund domestic operations. We predict that the positive association between external financing and repatriation tax costs is weaker for financially constrained firms. In contrast, we find that the positive association between external financing and repatriation tax costs is actually *stronger* for financially constrained firms. This result suggests that – even though external capital is costly for these firms – it is still relatively cheaper than incurring the incremental U.S. tax due upon repatriation. Thus, firms appear willing to incur the relatively higher cost of debt capital instead of repatriating cash and incurring the associated tax to meet domestic operating needs.

[5] In future tests, we intend to also use the BEA data on foreign cash holdings to further estimate the amount of tax-induced foreign cash, following Hanlon et al. (2015).

We also test how the relation varies when the rules on intercompany foreign borrowing were relaxed following the recent financial crisis. As discussed previously, firms may circumvent the repatriation tax liability by borrowing from foreign subsidiaries under short-term revolving loan programs. Prior to 2008, firms could only borrow from foreign subsidiaries for 30-day periods, and the loans could not be outstanding for more than 60 total days during the year. Thus, any short-term revolving loan program would require significant attention to administer and may have been viewed as too costly or too risky by firms as a viable alternative to external borrowing. However, in 2008, the IRS issued guidance that extended the allowable period of loans to 60 days and permitted loans to be outstanding for 180 days during the tax year. In effect, these rules reduced the firm's internal cost of capital for tax years 2008 to 2010 by making it easier and less costly for firms to borrow from their foreign subsidiaries. Thus, we predict that, between 2008 and 2010, the positive association between external financing and repatriation tax costs is weaker, as firms may be more likely to first access less-costly internal foreign capital to fund domestic operations. Contrary to expectations, we find no difference in the relation for years 2008 to 2010 and even some weak evidence of a stronger positive relation in one specification. Finally, we test and find that the relation between repatriation tax costs and firm borrowing is most pronounced among "high-tech" firms, which we identify based on affiliation with a pharmaceutical or computer-related industry.

Our findings contribute to the literature by documenting how the U.S tax policy of worldwide tax with deferral affects firms' internal capital markets and external financing decisions. First, finance theory and prior empirical work that studies the internal capital market show that internal cash is generally the first source of firm financing. This paper contributes to this literature by showing the extent to which U.S. tax frictions impede the domestic use of internal foreign capital,

thereby inducing firms to access external financing sources. Second, we provide empirical evidence on the characteristics of firms that engage in this type of tax planning by showing that the positive association between repatriation tax costs and domestic borrowing is greater among high-intangibles firms. Third, this paper contributes to the literature that documents how the repatriation tax affects multinational firms (Foley et al., 2007; Hanlon et al., 2015; Edwards et al., 2016; Nessa, 2017). It is important to understand the effects on firm financing because, in addition to circumventing repatriation taxes, U.S. multinationals with external debt also benefit from U.S. interest deductions, which further reduce U.S. taxable income and cash taxes due. If repatriation taxes and trapped foreign cash are associated with increased U.S. external debt, the U.S. system of deferral may have much more significant tax revenue implications for policy makers than originally estimated.

The paper proceeds as follows: In Section 2, we discuss the relevant U.S. tax rules and outline prior literature on internal capital markets, capital structure, and U.S. tax considerations for multinationals. In Section 3, we discuss and motivate our hypotheses. Section 4 details the proposed sample selection procedures and research design. Section 5 discusses the empirical results, and Section 6 concludes.

2. U.S. Tax Policy & Prior Literature

2.1. Overview of Tax Rules for U.S. Multinationals

The United States taxes the worldwide income of companies incorporated in the U.S. However, there is an exception to the worldwide tax system known as deferral, which defers the U.S. taxation of foreign subsidiaries' operating earnings until the earnings are repatriated back to the U.S. parent as a dividend payment.[6] The foreign operating earnings of subsidiaries are subject to taxation, if

[6] Material passive income is generally taxed immediately under the rules of Subpart F of the U.S. Internal Revenue Code.

any, in the jurisdiction where they are earned or sourced, and any foreign tax paid on the earnings is allowed as a foreign tax credit when the earnings are repatriated and subjected to the U.S. tax system. As a result, a U.S. multinational will effectively pay worldwide tax at the higher of the U.S. or local country rate. Since 1986, most other countries have lowered their corporate tax rate below the U.S. rate; thus, given that the United States now has one of the highest statutory corporate tax rates in the world, most firms will remit additional U.S. tax upon repatriation.

A related rule under Internal Revenue Code Section 956 restricts long-term lending by foreign subsidiaries to domestic entities. Without Section 956, intercompany loans could be used to deploy foreign cash in domestic operations without the associated repatriation tax because these loans are technically not dividends paid out of foreign subsidiary earnings. U.S. tax rules prohibit this lending activity by recasting long-term loans as deemed dividends, which consequently subjects loans between foreign subsidiaries and related U.S. entities to the repatriation tax.[7] However, the provisions of Section 956 include exceptions for short-term loans. For example, short term loans made by a foreign subsidiary to a related U.S. entity are not subject to deemed dividend treatment if they are repaid within 30 days and if all loans made by the foreign subsidiary throughout the year are outstanding for less than 60 days total.[8] In response to the recent financial crisis, the 30/60 day periods were extended to 60/180 days for fiscal years ending after October 3, 2008 and before January 1, 2011 to help firms suffering from domestic liquidity problems.

2.2 Prior Literature

[7] Specifically, IRC Section 956 "Investment of Earnings in U.S. Property" requires that certain uses of foreign subsidiary cash be recast as deemed dividend payments to the U.S. parent, which in turn triggers the repatriation tax liability. These uses include i) purchase of tangible property in the U.S.; ii) purchase of a material share of a domestic corporation; iii) an obligation of a U.S. person; or iv) the right to the use of U.S. intangibles developed by a foreign subsidiary. The Treasury Regulations pertaining to IRC Section 956 elaborate that foreign assets used as collateral or foreign guarantees on U.S. obligations are also subject to repatriation taxes.

[8] The rules apply to foreign subsidiaries that are Controlled Foreign Corporations ("CFCs"). Briefly, a CFC is any foreign corporation more than 50 percent owned by U.S. shareholders who at least own 10% each.

Two separate lines of prior literature are relevant for studying the effects of repatriation tax costs on firm financing. We review both of these areas in this section.

2.2.1 Internal Capital Markets, Capital Structure, and the Internal/External Cost of Capital

Prior literature examines the relative costs and benefits to using internal versus external capital. Alchian (1969) and Williamson (1975) assert that a key advantage of an internal capital market is that it shields investment projects from the information and incentive problems of external financing. Gertner et al. (1994) revisit this assertion by comparing two types of centralized financing – external bank debt and the internal capital market. Their model finds that internal capital markets allow for more monitoring relative to the external capital providers in part because the internal market "brings a higher quality of information to bear on decisions than the external market" (discussion of Gertner et al. in Stein, 2002). These predictions suggest that the internal capital market benefits from higher quality – and likely greater – information, reducing asymmetry within the firm relative to asymmetry between the firm and its external capital providers. This in turn should also reduce the relative cost of internal capital.

Later theoretical and empirical work testing the costs and benefits of an internal capital market is mixed. Some prior papers find that the internal capital markets allow for the firm to raise more total external financing due to cross-collateralization and co-insurance of the various divisions (Lewellen, 1971) and to better allocate funds for "winner-picking" of projects (Stein, 1997). Other studies find that the additional funds that these larger firms attract may lead to overinvestment and challenge the Gertner et al. (1994) prediction that internal capital markets are better at redeploying capital. Specifically, these papers suggest that funds may be allocated "socialistically" because weaker divisions receive more funding than optimal (Rajan, Servaes, and Zingales, 2000; Scharfstein and Stein, 2000). However, the papers that document the "dark side"

of the internal capital markets do not challenge the first prediction in Gertner et al. (1994), which states that internal capital markets benefit from better monitoring, which in turn reduces the relative amount of information asymmetry within the firm as compared to between the firm and its external capital providers. In the paragraphs below, we discuss why tax costs may alter the predicted ordering of accessing internal capital first.

2.2.2 U.S. Multinational Tax Issues and Firm Financing

As discussed in Section 2.1, the U.S. has the highest corporate statutory rate in the OECD and one of the highest statutory rates in the world. Two ways in which multinational firms minimize their current U.S. tax burdens include i) shifting income out of the U.S., and ii) retaining and investing cash overseas to defer repatriation tax liabilities. First, firms can shift income out of the U.S. by either physically moving operations (which may occur for non-tax reasons, such as growth, operational, or competitive purposes) or by creating tax-efficient structures and transfer pricing arrangements (Klassen, Lang, and Wolfson, 1993; Hines and Rice, 1994; Grubert, 1998; Collins, Kemsley, and Lang, 1998; Klassen and Laplante, 2012; De Simone and Sansing, 2016; De Simone, Huang, and Krull, 2016; De Simone, Mills, and Stomberg, 2016; Dyreng and Markle, 2016). Under both approaches, the firm's overall tax liability is reduced because income is taxed at lower rates in foreign jurisdictions. Second, once income has been shifted outside of the U.S., multinational firms are motivated to retain the cash generated by the foreign operations due to the U.S. tax system of deferral (Hines and Hubbard 1990; Desai, Foley, and Hines, 2001). Foley et al. (2007) provide evidence that the firm's U.S. tax cost of repatriating earnings is positively related to the amount of foreign cash held. The purpose of this paper is to understand the potential implication of these tax minimization strategies on firm financing choices and on the relative cost of internal versus external capital.

Prior literature provides some evidence about how tax strategies may affect i) the location (U.S./foreign), ii) the type (debt/equity), iii) the cost, and iv) the source (internal vs. external) of firm financing. First, Desai, Foley, and Hines (2004) show that foreign subsidiaries of U.S. multinationals alter the location of external debt in response to local tax incentives; a 10 percent increase in higher local country rates is associated with 2.7 percent more subsidiary debt because the value of the interest deduction is greater in higher-tax countries.[9]

Second, tax minimization strategies may affect the type of financing (debt or equity); while equity generally must be issued by the U.S. incorporated parent company, firms can borrow in different locations. To focus on the effects of worldwide tax burdens on multinational capital structure decisions, prior papers have examined either the location of debt (such as Desai et al., 2004) or specific tax provisions, such as how the use of debt may limit available tax credits otherwise used to reduce repatriation tax liabilities (Collins and Shackleford, 1992; Froot and Hines, 1995; Newberry, 1998).[10,11] These findings suggest that firms may optimally trade-off the

[9] Faulkender and Smith (2016) study the relation between total debt and a firm's weighted average tax rate and find a positive relation: the higher the firm's tax rate, the more total debt that the firm has. This result also holds when measuring debt using only domestic borrowings. However, the paper does not test the relation between *domestic* debt and *foreign* tax rates, which is the focus of our paper.

[10] A firm's repatriation tax cost is the net tax differential between the U.S. tax liability and the taxes paid in the foreign jurisdiction, as the U.S. government allows the firm to claim these foreign taxes paid as a credit on their U.S. return (see Section 4.2.1). The calculation of the foreign tax credit involves many steps, but simplistically, entails calculating total foreign income (foreign revenue, minus expenses). For purposes of this foreign tax credit calculation, interest expense on debt – regardless of the location of such debt – must be allocated against foreign earnings to determine the amount of foreign taxes that can be credited. Consequently, the interest expense allocation effectively decreases foreign tax credits and increases the repatriation tax liability.

[11] These papers document that use of debt financing hinders a firm's ability to claim foreign tax credits, which otherwise would offset a firm's repatriation tax liability. In response to tax law changes that affected the foreign tax credit calculation, these studies find that common and preferred stock issuances were substituted for debt financing within the sample of multinational firms. Collins and Shackleford (1992) find that preferred stock issuances increase as an alternative source of capital to debt financing following the Tax Reform Act of 1986. Similarly, Froot and Hines (1995) find that firms substituted away from debt following this 1986 tax rule because the "loss of interest tax deductibility can increase a firm's cost of capital." Newberry (1998) revisits these studies and also finds that firms decrease the level of domestic debt after the foreign tax credit law changes and instead substitute with common and preferred stock.

type of financing (debt or equity) and the associated tax benefits – whether interest deductions or foreign tax credits – to minimize overall domestic tax burdens.

Tax minimization strategies may also affect the cost of external financing. In a concurrent working paper, Ma et al. (2016) posit that high expected repatriation taxes increase future cash flow uncertainty and may be associated with agency concerns and/or a lack of financial reporting transparency. They predict and find that the cost of debt capital for firms is positively associated with expected repatriation taxes, and that this relation is more pronounced for financially constrained and poorly performing firms. In another concurrent working paper, Blaylock et al. (2016) interpret their results as evidence of a positive relation between credit spreads and an interaction term that captures the level of foreign earnings and repatriation tax costs, but they find no evidence that agency concerns explain the finding. These findings suggest that firms appear to trade off the *cost* of external financing with tax benefits from shifting and holding earnings offshore.

Finally, the literature provides some evidence on how tax benefits affect the *source* of financing, which is the empirical question examined in this paper. In a survey of approximately 400 tax executives, approximately 44 percent state that they issue debt capital to avoid the repatriation tax (Graham et al. 2010). This current study is most closely related to Albring (2006) and Petzel and Salbador (2016), which measure the probability that a firm will issue debt as a function of the firm's permanently reinvested foreign earnings. These studies find that these tax costs of repatriating are positively associated with the likelihood of debt issuance using either a relatively small sample of manufacturing firms from 1993 to 2002 (Albring, 2006) or a more recent

sample of 222 S&P 500 firms (Petzel and Salbador, 2016).[12] Notably, Albring's (2006) results are not robust to measuring the dollar value of public debt issuances, which inhibits quantification of the additional borrowing that occurs. In contrast, we study whether and to what extent the level of domestic debt varies with firm's repatriation tax costs by studying a large sample of multinational firms from 1999 to 2012.[13,14]

3. Hypothesis Development

Firms need available capital for operating, investment, and payout purposes. The optimal source of capital to finance these cash needs are the least costly funds, considering explicit costs (e.g., cost of capital) and implicit costs (e.g., risk of bankruptcy). The cost of using internal capital is likely to be lower than the external cost of capital (exclusive of tax costs) due to strong internal monitoring incentives that decrease internal information asymmetry (Stein, 2002; Gertner et al., 1994). Therefore, prior literature predicts that the firm is expected to have less information asymmetry internally, relative to the amount of information asymmetry that exists between the firm and its external capital providers.

[12] Petzel and Salbador focus on testing whether the likelihood of debt issuances was different in the pre-AJCA (1998-2002) and post-AJCA (2006-2010) period. They find a positive association in the post-AJCA period but are not able to replicate the Albring (2006) result in the pre-AJCA period.

[13] Other related papers on the effects of repatriation taxes on firm financing focus on the responses of firms following the repatriation tax holiday enacted by the American Jobs Creation Act of 2004. The main purpose of this Act was to decrease the repatriation tax cost and encourage firms to bring back "trapped" foreign cash for domestic investment purposes; that is, this Act was intended to encourage firms to deploy internal foreign capital to the U.S. In response to this tax holiday, 843 firms repatriated approximately $312 billion (U.S. Senate Permanent Subcommitte on Investigations, 2011). Studies document mixed use of this foreign cash; Blouin and Krull (2009) and Dharmapala, Foley, and Forbes (2011) both find that the majority of funds (50 percent and 90 percent, respectively) were paid out to shareholders. Faulkender and Petersen (2012) challenge these earlier results and instead find that only a small portion was paid out to shareholders. Instead, they show that financially constrained firms complied with the intent of the law and used this cash for investment. See also Laplante and Nesbitt (2015) that uses the AJCA in a study of estimating the likelihood of having trapped cash. While these prior studies provide some information about the relative use of external or internal capital by U.S. multinationals in response to a specific legislative act, we contribute to the literature on how the U.S. tax system may affect firm financing decisions more generally.

[14] Chen (2014) examines the effect of repatriation tax costs on investors' valuation of cash holdings and finds a negative relation. In subsequent tests, she tests and finds that this relation is pronounced in firms with limited domestic borrowing capacity (as proxied by S&P domestic long-term issuer credit ratings). Harford et al. (2016) also investigate the valuation of foreign cash and discuss how the tax costs constrain the internal capital market (but do not test the relation between trapped foreign cash and domestic borrowing).

This relatively lower level of information asymmetry should translate into less costly internal capital because external capital providers will price-protect. Indeed, models of internal and external capital generally factor in costs of external finance but minimal or no costs of internal finance.[15] In these models, less internal "wealth" (retained earnings) translates into greater deadweight costs of external finance (Stein, 2002). Managers who seek to maximize firm value should therefore prefer internal capital when available. Indeed, in comparing internal and external capital sources, Gertner et al. (1994) conclude that use of internal capital relative to external capital "leads to higher liquidation values, net of [internal] monitoring costs." In summary, internal capital is predicted to maximize investment returns and, in turn, maximize firm value.

Firms may be constrained, however, in their use of internal financing because cross-country taxes (like the repatriation tax) can limit the ability of firms to move cash freely within the organization. Prior literature documents that U.S. firms have shifted a significant amount of income out of the U.S., whether for strategic and operational reasons, or to benefit from lower foreign tax rates (Grubert, 1998;Klassen and Laplante, 2012a; Klassen and Laplante, 2012b; Dyreng and Markle, 2016; De Simone et al., 2016). The U.S. system of deferral and the associated repatriation tax cost motivates firms to keep the cash or other assets generated by overseas operations offshore (Foley et al., 2007). Consequently, this tax policy creates an internal capital market friction that constrains the mobility of cash within the firm and raises the cost of using foreign cash for domestic purposes. Therefore, repatriation taxes may affect the theoretical prediction that firms will use internal capital first to meet domestic cash needs. Instead, a firm's

[15] For example, Froot, Scharfstein, and Stein (1993) and Stein (1997) develop a model in which a firm invests *I* at time 1, which yields a gross return of *f(I)* at time 2, where *f()* is an increasing concave function. *I* is financed internally *(w)* or externally via debt or equity *(e)*. The models assume deadweight costs associated with external finance, denoted $\theta C(e)$. Thus, the firm's problem is to maximize future investment [$f(I)/(1+r)$], net of the initial investment (*I*) and the deadweight costs of external finance [$\theta C(e)$], or (in full): $\max \frac{f(I)}{1+r} - I - \theta c(e)$. The firm's budget constraint is $I = e + w$.

external cost of capital could actually be *lower* than the cost of internal capital, inclusive of these repatriation taxes.[16] Therefore, we predict that firms will turn to the external capital market to meet domestic capital needs in our first hypothesis:

H1: The level of external domestic financing of U.S. multinationals is positively related to a firm's repatriation tax cost.

It is not clear ex ante that we would observe a positive relation between repatriation tax costs and external domestic debt financing. Using BEA data, Desai, Foley, and Hines (2007) show that approximately 30% of U.S. MNCs' foreign affiliates continue to pay dividends to the U.S. parent for U.S. investment and payout needs, despite the repatriation tax liability. Several papers suggest that firms have alternative methods other than dividend repatriation to return capital from foreign operations. Altshuler and Grubert (2003) show that firms employ different foreign organizational tax planning strategies, which permit firms to effectively repatriate foreign cash while minimizing the repatriation tax. Furthermore, firms may also avoid deemed dividend treatment on intercompany loans from foreign subsidiaries by borrowing (on a short-term basis) from foreign subsidiaries. Firms can also trim domestic operations and investment to save domestic cash rather than pay for external capital. Finally, Guenther, Njoroge and Williams (2015) suggest that firms use cash tax savings, such as those achieved by deferring repatriation of foreign earnings, to pay down debt. This paper would predict a negative association between repatriation tax costs and

[16] Prior literature provides an ordering for the use of internal versus external capital, exclusive of tax costs. By adding in tax costs, the cost to access internal capital should increase. However, this does not necessarily mean that information asymmetry with external capital providers will also increase. In fact, external capital providers may know and understand that the firm seeks external capital due to the repatriation tax. Therefore, our hypothesis assumes that the external cost of capital is constant (assuming no incremental information asymmetry between the capital providers and the firm due to the repatriation tax and therefore no additional price protection). Empirically, Ma et al. (2016) and Blaylock et al. (2016) interpret their results as evidence of a positive relation between repatriation tax costs and the cost of external debt financing.

firm borrowing. For these reasons, we may observe no relation between repatriation tax costs and external firm financing.

We next consider when the cost of internal capital, including potential tax costs, may still be lower for firms than obtaining external financing. Financially constrained firms generally have a higher external cost of capital than other firms. This higher external cost of capital raises the relative benchmark for comparing the benefits of incurring and paying the repatriation tax cost to accessing internal funds. Foley et al. (2007) find that financially constrained firms have less cash overseas; similarly, Dyreng and Markle (2016) find that financially constrained firms shift less income offshore. Collectively, the evidence in these studies supports that financially constrained firms would be more likely to access their internal capital than to obtain external financing. We therefore expect these financially constrained firms to have less incentive to borrow externally and predict the following:

H2: The positive relation between repatriation tax costs and external domestic debt financing is weaker for financially constrained firms.

Finally, we predict that the relation between repatriation tax costs and external firm financing changes following tax rule changes effective in 2008, 2009, and 2010. One way that firms can circumvent the repatriation tax liability is to engage in a revolving loan program with foreign subsidiaries. A 2012 report issued by the U.S. Senate Permanent Subcommittee on Investigations provides an example of how the multinational company HP accessed foreign cash under such strategy. The report shows that, in 2009, HP held $12.5B of foreign cash and only $0.8B in US cash. Using a revolving loan program, HP borrowed cash from one foreign subsidiary for the allowable period (30 or 60 days); on the last day of the period, it borrowed from another foreign subsidiary to repay the first loan, and then it repeated the borrowing/repayment at the end

of the second allowable period for a constant stream of available cash that the U.S. operations could use. For the first three quarters of FY2010, HP's foreign cash-rich subsidiaries in Belgium and the Cayman Islands loaned the U.S. operations between $6 and $9 billion.[17] This example shows that, while intercompany loans are generally recast as deemed dividends (on which repatriation taxes are due), firms may be able to exploit these rules to access internal capital held by foreign subsidiaries.

As a result of decreased domestic liquidity during the financial crisis, the IRS issued more favorable rules that allowed multinationals to more easily access foreign capital via short-term intercompany loans in 2008 through 2010 without having to incur the repatriation tax. Therefore, we expect that external financing decreases from 2008 to 2010, as the cash in the foreign subsidiaries was more accessible for use in domestic operations.[18] Thus, we predict the following:

H3: The positive relation between repatriation tax costs and external domestic debt financing is weaker from 2008 to 2010.

4. Research Design, Sample Selection, and Empirical Constructs

4.1.Research Design

To test the relation between repatriation tax costs and external firm financing, we use the following regression specification:

$$Debt_{i,t} = \alpha + \beta_1 REPAT_{i,t} + Controls + \varepsilon \qquad (1)$$

[17] The firm projected that, in 2010, the amounts of foreign and domestic would be $17.4B and $0.4B, respectively. An internal company presentation provided to the Subcommittee reported that these foreign cash pools are "the most important source of US liquidity for repurchases and acquisitions."

[18] We acknowledge that the financial crisis affected the overall amount of external borrowing that occurred during these years. Consequently, we would expect to observe an overall decline in the level of external borrowing across firms. In the test of this hypothesis, we focus on the relation between external borrowing and repatriation tax costs to understand if this relationship in particular changed during this period, controlling for other firm-level and macro-economic factors that affect the availability of capital.

Debt is a scaled measure of the dollar amount of domestic debt financing in year *t. REPAT* is the firm's repatriation tax liability in year *t* (following Hines, 1996 and Foley et al., 2007 and described in Section 4.2.1.). We define the controls in Section 4.2.4. We predict $\beta_1 > 0$.

To test our second hypothesis related to financially constrained firms, we use the following regression specification:

$$Debt_{i,t} = \alpha + \beta_1 REPAT_{i,t} + \beta_2 Fin\_Const_{i,t} + \beta_3 REPAT_{i,t} * Fin\_Const_{i,t} + Controls + \varepsilon \quad (2)$$

where *Fin_Const* is an indicator equal to one if the firm is considered financially constrained in year *t* (as outlined in Section 4.2.3.), or zero otherwise, and the other variables are the same as in Equation (1) and described in Section 4.2.4. Consistent with the first hypothesis, we expect that $\beta_1 > 0$ but that the coefficient that captures the interaction of *REPAT* and *Fin_Const* (β_3) will be negative, as evidence that external capital may be too costly for a subset of multinational firms, even after taking into account the repatriation tax liability.

Finally, to test the third hypothesis related to time-series differences in the effect of repatriation tax costs on firm financing, we use the following specification:

$$Debt_{i,t} = \alpha + \beta_1 REPAT_{i,t} + \beta_2 08\_10_t + \beta_3 REPAT_{i,t} * 0810_t + Controls + \varepsilon \quad (3)$$

where *08_10* is an indicator equal to one if the fiscal year end is between October 4, 2008 and December 31, 2010, or zero otherwise, and the other variables are the same as in Equation (1). Again, consistent with the other hypotheses, we expect that $\beta_1 > 0$ but that the coefficient that captures the interaction of *REPAT* and *08_10* (β_3) will be negative.

All regressions include year fixed effects where possible to control for underlying time trends that may affect firm financing decisions unrelated to repatriation tax costs (note the main

effect of *08_10* is omitted in Eq. (3) when year fixed effects are included). We also include industry fixed effects to control for similarities across multinational firms that may affect firm financing decisions but are unrelated to these tax costs. All variables are winsorized at the 1st and 99th percentiles. Finally, we report standard errors that are clustered by firm to account for within-firm correlation.

4.2.Empirical Constructs

4.2.1. Repatriation Tax Costs

We follow Hines (1996), Foley et al. (2007), and Hanlon et al. (2015) to construct a firm-level measure of repatriation tax costs. This measure reflects the incremental U.S. tax that is payable when firms repatriate foreign earnings that have been previously taxed in the overseas jurisdiction. To construct this measure, we first calculate the total U.S. tax that would be due on foreign earnings before a foreign tax credit by multiplying a firm's foreign income (PIFO) by the U.S. statutory rate (35 percent).[19] From this expected tax liability, we subtract the amount of foreign taxes paid (TXFO) as an estimate of the foreign tax credit. The higher of the net tax due, or zero, is the repatriation tax liability. We scale this amount by the firm's total assets.

While prior literature has used this measure to estimate repatriation tax costs, we acknowledge (as do the prior papers), that this measure reflects three assumptions: i) foreign reported earnings are an approximation of unobservable foreign taxable income, ii) use of annual foreign earnings is proportional to the total stock of foreign earnings that have not yet been repatriated, and iii) foreign tax rates applicable at the time foreign taxes are paid will be similar to actual foreign rates at the time of repatriation. To validate that this measure is indeed associated with foreign cash holdings, we replicate the results in Table 2 of Foley et al. (2007) and Table B1

[19] Foley et al. (2007) also use marginal tax rates as well as the statutory rate and arrive at similar empirical results.

from Hanlon et al. (2015) and present these results in Appendix B. Consistent with prior findings, we show that *REPAT* is positively and significantly associated with firms' cash balances, measured using total cash in Col. (1) as well as BEA foreign cash in Col. (2) and (3). This replication confirms that our sample is comprised of multinational firms that hold cash offshore due to the repatriation tax cost

4.2.2. Measures of External Financing

We construct two sets of measures of debt financing. We first construct three measures of consolidated total firm debt using publicly-available data from Compustat. The use of three measures ensures any result we observe is not sensitive to how the measure is scaled or transformed. These measures include *Debt*, the ratio of total liabilities (DLC+DLTT) to the firm's total assets (AT); *Log(Debt)*, the logarithm of total liabilities (DLC+DLTT); and *Mkt_Lev*, calculated as total liabilities (DLC+DLTT) divided by the sum of total debt and the market value of equity (CSHO*PRCC_F).

Second, we use BEA data to measure the amount of *domestic* debt financing; specifically, this is the amount of debt reported by the U.S. parent company on the BEA annual and benchmark surveys from 1999 through 2012 and excludes borrowings reported by foreign affiliates. We construct three analogous measures of domestic debt, including *Dom_Debt*, the ratio of total domestic debt reported in the BEA data to the firm's total assets (AT); *Log(Dom_Debt)*, the logarithm of total domestic debt; and *Dom_Mkt_Lev*, calculated as total domestic debt divided by the sum of domestic debt and the market value of equity (CSHO*PRCC_F).[20]

4.2.3. Measures of Constraint

[20] We also calculate this last ratio scaling by the sum of total debt and the market value of equity (i.e., the same scalar used in the Compustat measure) and find similar results.

To measure *Constraint*, we follow Hadlock and Pierce (2010) and create a size-age index. This index uses the firm's age and the amount of total assets as inputs into a formula that computes a score for the level of constraint.[21] After calculating the index for the firms included in the sample, we identify observations as constrained if they report an index value above the median of the sample index value.[22]

4.2.4 Control Variables

To control for the firm's demand for external financing, we first include *DomIncome* and *ForIncome*, the ratio of domestic income (PIDOM) or foreign income (PIFO) to total firm assets (AT). We include these proxies to control for geographic firm financial performance. We control for *Size*, the logarithm of firm's total assets, and *Dividend*, an indicator equal to one if the firm needs domestic cash for shareholder payout and zero otherwise. *BTM* is the ratio of total shareholders' equity (SEQ), divided by the market value of equity (CSHO*PRCC_F). To control for the variability in firm performance which may affect the firm's demand for external financing, we calculate the standard deviation of a firm's operating income (OIABDP) over the sample period and include *σ(OpInc)*. We control for the firm's investment spending by including *R&D*, the total amount of R&D expense (XRD) divided by the firm's assets, and *Capex*, the sum of capital expenditures (CAPX) divided by the firm's assets. Due to a significant number of missing values, we set *R&D* equal to zero if missing. Finally, we control for *Cash*, the firm's existing consolidated cash balance (CHE) divided by the firm's total assets. These measures capture similar constructs that have been shown in the prior literature to be related to firm financing, including firm size,

[21] Specifically, the index is calculated as (-0.737*Size)+(0.043*Size2)-(0.040*Age), where size is capped at the log of $4.5 billion, and age is winsorized at 37 years (p. 1929 of Hadlock and Pierce, 2010).

[22] We acknowledge that this is a consolidated firm-level measure of constraint; that is, it does not specifically capture whether the firm is *domestically* constrained because the assets used in the calculation are consolidated firm assets (including foreign cash and investments). In future tests, we intend to refine our calculation to better capture domestic constraint by using only domestic assets in the calculation of the size-age index.

financial performance, investment spending, and shareholder payout policies (Leary and Roberts, 2010; Naranjo, Saavedra and Lux, 2012; Frank and Goyal, 2003; Rajan and Zingales, 1995; Rauh and Sufi, 2010).

4.3.Sample Selection and Descriptive Statistics

We select all U.S. C Corporations in Compustat for the period 1999 through 2012.[23] We eliminate firms in the financial or utilities industries because they are subject to different regulatory provisions that may affect their tax profile (n=42,882 firm-year observations). We require data to construct the debt financing measures and control variables, which results in a loss of an additional 57,828 observations. Specifically, we require positive, non-missing data for total assets (AT), cash (CHE), and sales (SALE). We also require non-missing data to construct measures of the book value and market value of equity (CEQ, CSHO, PRCC_F), capital expenditures (CAPX), debt (DLTT and DLC), ordinary income (OIBDP), domestic and foreign income (PIDOM and PIFO), and fixed assets (PPENT). Finally, following Foley et al. (2007) and Hanlon et al. (2015), we drop firms with less than $100M of average assets over the sample period (n=3,695).[24] This results in a sample of 16,989 firm-year observations. Table 1, Panel A outlines these steps.

We then join this sample with the BEA data using EIN numbers, augmented with hand-matching of names. Table 1, Panel B shows that the final sample of firm-years with both Compustat and BEA data is 8,027 observations. Panel C of Table 1 shows how the Compustat and

[23] Foley et al. (2007) use the sample period 1982-2004 and use data from BEA "benchmark" studies, which are generally conducted every five years (1982, 1984, 1989, 1994, 1999, and 2004). This sample period was likely selected because foreign cash data were only collected on these benchmark surveys prior to 2000. Starting in 2000, the BEA began to request foreign cash data on annual surveys distributed in the intervening years. Therefore, we are able to construct a panel of U.S. parent and foreign affiliate data for consecutive years beginning in 1999 with both domestic debt and foreign cash data. We end the sample in 2012 because this is the most recent year for which BEA data is available.

[24] In robustness tests (untabulated), we re-estimate the results on a sample for which we do not impose the $100M of asset requirement. We find that – after joining with the BEA data – the sample is only increased by 115 observations and that the results are unchanged. Thus, imposing this requirement more closely aligns the Compustat sample with the characteristics of the firms included in the BEA sample.

BEA sample are distributed across the sample years. The number of observations increases within the Compustat sample shown in Col. (1), whereas the number of firms in the BEA sample in Col. (2) is relatively similar across the period. Column (3) shows the number of foreign affiliates that are represented by the BEA parent firms; in total, the BEA data reflect approximately 126,000 foreign affiliates.

Table 2 presents descriptive statistics. On average, the firms in the Compustat sample hold debt equal to approximately 21.4 percent of total assets. The average repatriation tax cost is approximately 0.4 percent of total assets; at the 95th percentile, firms report a tax cost equivalent to 2 percent of total assets. This amount is greater than the 0.2 percent average reported in Hanlon et al. (2015), likely due to the more recent sample period during which firms have been earning greater amounts of income offshore and retaining (rather than repatriating) these larger amounts in foreign jurisdictions. Firms report domestic income (foreign income) equal to 1.7 (2.3) percent of total assets. The firms in the Compustat sample are fairly large, with average assets of $4.6 billion. Approximately 42 percent of the companies in the sample pay dividends, and these firms spend 4.3 percent of total assets on R&D, and 4.5 percent of total assets on average on capital expenditures. Approximately 18.2 percent of total assets are held in cash.

The bottom three lines of Table 2 provide descriptive statistics using BEA data on the amount of domestic debt. Due to limitations on data disclosure, we cannot present firm-specific median, 5^{th} percentile, and 95^{th} percentile values for these three variables. Within the sample of firms with Compustat and BEA data, the level of domestic debt is approximately 42.3 percent of total firm assets, suggesting that this sample includes firms with greater debt than those in the Compustat sample.

5. Results

Table 3 presents results from estimating Eq. (1), in which we regress measures of total firm debt (Col. (1)-(3)) and domestic debt (Col. (4)-(6)) on *REPAT* and control variables. Across all six columns, we find that firm borrowing is positively and significantly associated with a firm's tax cost of repatriating earnings to the U.S. To interpret the results, we standardize *REPAT* and the control variables to have a mean of zero and a standard deviation of one (untabulated). The coefficient of 0.934 in Col. 1 means that a one-standard-deviation increase in a firm's repatriation tax cost is associated with an approximately 0.7 percentage point increase in total borrowing; given an average debt ratio of 0.214 (Table 2), this is equivalent to an approximately 3.3 percent increase in the amount of debt. Using more precise measurement of domestic debt in Col. (4)-(6), we confirm the finding: *domestic* borrowing is positively and significantly associated with *REPAT*. The coefficient of 1.825 suggests that a one-standard-deviation increase in a firm's repatriation tax cost is associated with an approximately 1.4 percentage point percent increase in domestic borrowing; given an average debt ratio of 0.42 in this sample, this is also equivalent to a 3.3 percent increase in the amount of domestic debt.[25] The results are also robust to three different measurements of domestic debt constructed from the BEA data; using the measures *Mkt_Lev* and *Dom_Mkt_Lev*, we find effects equivalent to a 4.3 percent and 3.4 percent increase, respectively, in domestic borrowing. Collectively, we interpret these results as evidence firms with high repatriation tax costs borrow more amounts in the U.S., possibly to avoid incurring the incremental U.S. tax liability.

In the remaining tables, we use only the BEA sample and measures of domestic debt constructed from the BEA data. Table 4 presents results from testing how the relation between

[25] The standardized coefficient on *REPAT* is 0.007 in the regression using the Compustat consolidated debt measure and 0.014 using the BEA domestic debt measure.

debt financing and repatriation tax costs varies for financially constrained firms. We include the variable *Fin_Const*, which is an indicator equal to 1 if the firm-year observation has an above-median value of the Hadlock and Pierce (2010) size-age index, and zero otherwise. Untabulated descriptive statistics show that firm-year observations identified as financially constrained report a size-age index value ranging from -3.92 to -3.40 (in comparison to unconstrained firm-years with an index value ranging from -4.63 to -4.50). Consistent with these index values, constrained firms are much smaller, reporting approximately $4.5 billion in total assets as compared to unconstrained firms with $12.6 billion in total assets.

We estimate a negative and significant coefficient on *Fin_Const* in Col. (1) of Table 4 (-0.039), consistent with financially constrained firms having lower levels of domestic borrowing because these firms are less able to access the capital market, or can only do so at a higher cost which reduces overall borrowing levels. We expected a negative coefficient on the interaction term, predicting that financially constrained firms were more likely to repatriate earnings and incur the repatriation tax than to pay for costly external finance. Instead, we find a positive and statistically significant coefficient on β_3 in Col. (1) of 2.084. This result suggests that – even though it may be difficult or costly for firms to access the capital markets – the cost of doing so is still less expensive than incurring the repatriation tax cost to access the firm's own foreign capital. Alternatively, these firms could have less foreign capital to access (Dyreng and Markle 2016). The result is robust to different measures of domestic borrowing also presented in Col. (2) and (3).

In Table 5, we present results from our test of the 2008 to 2010 period, when there were relaxed tax rules regarding loans from foreign subsidiaries. We create an indicator variable *0810* for the 2008 to 2010 time frame, as well as for an indicator variable *1112* for the post-2010 years of our sample period. Because we include year fixed effects in all estimations, we exclude the main

effects of these period indicator variables. The variable of interest is the interaction between *REPAT* and *0810*. We predicted a negative and significant coefficient on the interaction, consistent with firms using the relaxed 956 rules to borrow more funds from foreign subsidiaries, resulting in reduced demand for domestic external debt. Inconsistent with this expectation, we do not find a significant difference in the relation between repatriation tax costs and domestic debt during the 2008 to 2010 time period in two out of three columns and find some weak evidence of a *stronger* relation in Col. 4.

In Table 6, we perform an additional analysis of the firms based on the type of firm. Graham et al. (2011) find that repatriation and investment decisions of high intangibles firms are most sensitive to U.S. repatriation tax accounting and cash tax policies. This is perhaps because high intangibles firms are engaged in more net outbound income shifting (Grubert and Slemrod, 1998; De Simone, Mills and Stomberg, 2016). We create an indicator *High-tech*, which is equal to one for firms likely to have high level of intangibles or to generate mobile income based on Compustat reporting of a pharmaceutical or computer software industry affiliation, or zero otherwise. Untabulated descriptive statistics show that these firms have lower total assets (approximately $5.4 billion as compared to $9.5 billion), consistent with the fact that they likely have intangibles that have not been recorded on firm balance sheets but instead expensed as R&D activity; a lower ratio of domestic income to total assets (1.7 percent as compared to 3.4 percent), greater variability in operating income (*σ(OpInc)* of 0.053 as compared to 0.041), and higher amounts of R&D spending (5.6 percent of total assets as compared to 2.4 percent).

In Table 6, we observe a positive and significant coefficient of 3.104 in Col. (1) on the interaction term *REPAT*High-tech.* We also find a positive and significant coefficient in Col. (2) and (3). We interpret this result as evidence that these firms, which are more likely to shift income

out of the U.S. and hold cash offshore, also borrow more domestically, possibly to avoid incurring the repatriation tax and to meet domestic cash needs for operations, investment, and shareholder payout.

6. Conclusion

In summary, this paper examines how the U.S. repatriation tax cost affects firm debt financing decisions. The academic literature has begun to document the economic effects of these policies, but there is still much to know about how the large amount of foreign cash holdings, induced by repatriation tax liabilities, affect firms and the U.S. economy. We extend this line of literature by examining the important decision of how and why firms access external financing. Using internal capital markets theory, we revisit the prediction that firms will always use internal capital first to fund operations, investment, and payout policies. In our setting, this prediction does not seem to be valid, given that the repatriation tax cost makes internal capital expensive for some firms. We empirically test and show that higher repatriation tax costs are associated with greater levels of domestic borrowing. In so doing, we add to both the internal capital markets literature, as well as to policy discussions about the implications of the U.S. worldwide tax system.

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Appendix A

Variable Definitions

0810	An indicator equal to one for fiscal years 2008, 2009, and 2010, or zero otherwise.
1112	An indicator equal to one for fiscal years 2011 and 2012, or zero otherwise.
BTM	The ratio of the book value of equity to the market value of equity.
Capex	Total capital expenditures, scaled by total assets.
Debt	Total debt, scaled by total assets.
Div_Indicator	Indicator variable equal to one if the firm pays a dividend, or zero otherwise.
Dom_Debt	Total domestic debt (measured using BEA data), scaled by total assets.
Dom_Income	Pre-tax domestic income, scaled by total assets.
Dom_Mkt_Lev	Total domestic debt (measured using BEA data), scaled by the sum of domestic debt and the market value of equity.
For_Income	Pre-tax foreign income, scaled by total assets.
Foreign Cash	The natural logarithm of the ratio of foreign cash to net assets (total assets minus cash).
High-tech	An indicator equal to one if the firm's reported SIC is in the pharmaceutical or computer software industry, or zero otherwise.
Log(Debt)	The logarithm of total debt.
Log(Dom_Debt)	The logarithm of total domestic debt (measured using BEA data).
Mkt_Lev	The ratio of total debt to the sum of total debt and the market value of equity.
R&D	Total R&D expenses, scaled by total assets.
REPAT	Measures the incremental U.S. tax due upon repatriation of cash from foreign subsidiaries. This measure is calculated by multiplying foreign earnings by the statutory U.S. tax rate of 35%. From this, foreign taxes are subtracted as an estimate of the allowable foreign tax credit. The remaining liability is the estimated U.S. tax due upon repatriation. The maximum of this difference or zero is scaled by total assets (Foley et al., 2007).
Size	The natural logarithm of total assets.
σ(OpInc)	Standard deviation, over the sample period, of the ratio of the firm's EBITDA to total assets.
Total Cash	The natural logarithm of the ratio of total cash to net assets (total assets minus cash).

Appendix B

Replication of Foley et al. (2007) for the period 1999-2008

This table presents results for replicating the results documenting an association between a firm's repatriation tax and total worldwide cash (Col. 1) or foreign cash (Cols. 2-3) from Foley et al. (2007) and Hanlon et al. (2015). All variables are defined in Appendix A. The regression specification includes year and industry fixed effects. T-statistics are presented in parentheses. Standard errors are clustered by firm. The superscript asterisk *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Total Cash (Compustat) (1)	*Foreign Cash* (BEA) (2)	*Foreign Cash* (BEA) (3)
REPAT	**18.837*** **	**10.252***	**41.641*** **
	(7.483)	**(1.815)**	**(8.842)**
DomIncome	0.074	-1.765***	-1.372***
	(0.566)	(-4.687)	(-3.594)
ForIncome	-0.432	8.723***	
	(-1.040)	(8.957)	
Size	-0.033**	0.078***	0.084***
	(-2.173)	(2.608)	(2.664)
Div_Indicator	-0.339***	-0.062	-0.024
	(-7.752)	(-0.756)	(-0.288)
BTM	-0.011***	-0.002	-0.002*
	(-6.646)	(-1.414)	(-1.707)
σ(OpInc)	4.251***	2.876*	2.127
	(7.744)	(1.958)	(1.379)
R&D	6.551***	6.230***	5.440***
	(18.327)	(6.655)	(5.805)
Capex	-2.605***	-2.065*	-1.670
	(-5.865)	(-1.932)	(-1.504)
Lev	-2.348***	-0.661***	-1.058***
	(-23.109)	(-3.459)	(-5.523)
Industry FE?	Y	Y	Y
Year FE?	Y	Y	Y
Observations	16,989	5,167	5,167
R-squared	0.465	0.218	0.185

Table 1
Sample Selection

This table summarizes the sample selection procedures; Panel A (B) lists the data steps to construct the Compustat (BEA) sample. In Panel A, we retain non-financial and non-utility firms, as well as firm-years with necessary industry data. We require positive, non-missing data on assets (AT), cash (CHE), and sales (SALE); we also require non-missing data for equity (CEQ, CSHO, PRCC_F), capex (CAPEX), debt (DLTT, DLC), ordinary income (OIBDP), domestic and foreign income (PIDOM and PIFO), and fixed assets (PPENT) to construct variables used in the empirical tests. All variables are defined in Appendix A. Panel C provides the number of observations by year.

Panel A: Compustat Sample

	No. of obs. dropped	**No. of obs. remaining**
All U.S.-incorporated firms in Compustat, 1999-2012		121,394
Less: financial/utility firms, as well as firm-years missing industry data	(42,882)	78,512
Less: firm-years missing data necessary to calculate variables	(57,828)	20,684
Less: firms with less than $100m average assets	(3,695)	**16,989**

Panel B: BEA Sample

	No. of obs. dropped	**No. of obs. Remaining**
Compustat firm-year observations (from Panel A)		16,989
Less: Firm-years not matched to the BEA data	(8,962)	**8,027**

Panel C: Observations by Year

Year	**Compustat Sample** (1)	**BEA Sample** (2)	**# Foreign Affiliates** (3)
1999	901	511	9,651
2000	993	557	6,832
2001	1,027	544	6,807
2002	1,079	562	7,685
2003	1,140	567	7,938
2004	1,220	532	10,455
2005	1,268	569	8,341
2006	1,286	602	9,436
2007	1,353	568	9,149
2008	1,352	551	7,781
2009	1,343	713	13,600
2010	1,355	631	10,223
2011	1,367	575	9,554
2012	1,305	545	8,899
Total	**16,989**	**8,027**	**126,351**

Table 2
Descriptive Statistics

This table presents descriptive statistics for the variables used in Tables 3-6. Variables are defined in Appendix A. Due to disclosure requirements, we are unable to report firm-specific median, 5%, and 95% values for the variables constructed from BEA data.

Variable	# Obs.	Mean	Median	Std. Dev.	5%	95%
Debt	16,989	0.214	0.188	0.197	0.000	0.579
Log(Debt)	14,512	5.235	5.586	2.455	0.416	8.698
Mkt_Lev	16,989	0.211	0.144	0.226	0.000	0.700
REPAT	16,989	0.004	0.000	0.008	0.000	0.020
Dom_Income	16,989	0.017	0.029	0.127	-0.186	0.175
For_Income	16,989	0.023	0.014	0.049	-0.036	0.110
Size	16,989	7.021	6.829	1.591	4.753	9.999
Div_Ind	16,989	0.415	0.000	0.493	0.000	1.000
BTM	16,989	0.300	0.449	5.606	0.034	1.443
SD_OpInc	16,989	0.053	0.040	0.043	0.013	0.136
RD	16,989	0.043	0.014	0.064	0.000	0.175
Capex	16,989	0.045	0.032	0.044	0.007	0.131
Cash	16,989	0.182	0.115	0.184	0.008	0.590
Dom_Debt	8,027	0.420	-	0.238	-	-
Log(Dom_Debt)	8,024	6.761	-	1.759	-	-
Dom_Mkt_Lev	8,027	0.322	-	0.228	-	-

Table 3
Relation between Repatriation Tax Costs and Firm Debt

This table presents results for testing the relation between firm debt and a firm's repatriation tax cost. Col. (1)-(3) present results using publicly-available data on total consolidated firm debt from Compustat. Col. (4)-(6) present results using domestic debt from the BEA. All variables are defined in Appendix A. The regression specification includes industry and year fixed effects. T-statistics are presented in parentheses. Standard errors are clustered by firm. The superscript asterisk *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Total Debt (Compustat)			*Domestic Debt (BEA)*		
	Debt	*Log(Debt)*	*Mkt_Lev*	*Dom_Debt*	*Log(Dom_Debt)*	*Dom_Mkt_Lev*
	(1)	(2)	(3)	(4)	(5)	(6)
REPAT	**0.934****	**9.440****	**1.161*****	**1.825*****	**5.643*****	**1.361*****
	(2.149)	**(2.553)**	**(3.169)**	**(2.976)**	**(2.677)**	**(2.846)**
DomIncome	-0.279***	-1.585***	-0.518***	-0.342***	-0.734***	-0.826***
	(-10.485)	(-7.180)	(-20.168)	(-5.979)	(-4.858)	(-18.310)
ForIncome	-0.534***	-3.000***	-0.976***	-1.111***	-3.191***	-1.431***
	(-7.280)	(-5.425)	(-14.913)	(-9.538)	(-8.687)	(-15.121)
Size	0.019***	1.168***	0.016***	0.021***	1.068***	0.014***
	(8.249)	(72.679)	(6.275)	(5.241)	(98.407)	(3.711)
Dividend	-0.029***	-0.084*	-0.049***	-0.007	0.033	-0.040***
	(-4.328)	(-1.697)	(-7.103)	(-0.654)	(1.046)	(-4.230)
BTM	-0.001*	0.001	-0.003***	-0.003***	-0.004***	-0.001***
	(-1.873)	(0.363)	(-8.241)	(-5.746)	(-6.370)	(-12.344)
σ(OpInc)	0.046	0.415	-0.206**	0.164	-0.119	-0.072
	(0.455)	(0.497)	(-2.553)	(0.893)	(-0.221)	(-0.515)
R&D	-0.296***	-0.863	-0.749***	-0.440***	-0.869**	-1.091***
	(-4.558)	(-1.387)	(-12.816)	(-3.459)	(-2.179)	(-10.626)
Capex	0.090	0.715	-0.136*	-0.195	-0.546	-0.323***
	(1.162)	(1.495)	(-1.755)	(-1.508)	(-1.531)	(-2.798)
Cash	-0.354***	-3.624***	-0.397***	-0.445***	-1.590***	-0.437***
	(-18.504)	(-16.442)	(-23.739)	(-11.990)	(-12.418)	(-14.938)
Industry FE?	Y	Y	Y	Y	Y	Y
Year FE?	Y	Y	Y	Y	Y	Y
Observations	16,989	14,512	16,989	8,027	8,024	8,027
R-squared	0.266	0.698	0.391	0.213	0.874	0.436

Table 4

Financially Constrained Firms: Relation between Repatriation Tax Costs and Firm Debt

This table presents results for testing the relation between firm debt and a firm's repatriation tax cost and how this relation varies for financially constrained firms. We identify firms as financially constrained if they have a size-age score (calculated following Hadlock and Pierce, 2010) that is above the median value in the sample. All variables are defined in Appendix A. The regression specification includes industry and year fixed effects. T-statistics are presented in parentheses. Standard errors are clustered by firm. The superscript asterisk *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dom_Debt	*Log(Dom_Debt)*	*Dom_Mkt_Lev*
	(1)	(2)	(3)
REPAT	0.511	1.688	-0.213
	(0.613)	(0.587)	(-0.326)
Fin_Const	-0.039***	-0.122***	-0.035***
	(-3.124)	(-3.737)	(-3.402)
REPAT*Fin_Const.	**2.084****	**6.292***	**2.464*****
	(2.080)	**(1.939)**	**(3.386)**
DomIncome	-0.336***	-0.716***	-0.822***
	(-5.917)	(-4.770)	(-18.312)
ForIncome	-1.094***	-3.139***	-1.414***
	(-9.501)	(-8.700)	(-15.064)
Size	0.018***	1.059***	0.011***
	(4.423)	(94.182)	(3.044)
Div_Indicator	-0.014	0.011	-0.046***
	(-1.267)	(0.363)	(-4.849)
BTM	-0.003***	-0.004***	-0.001***
	(-5.735)	(-6.342)	(-12.158)
σ(OpInc)	0.172	-0.091	-0.068
	(0.942)	(-0.169)	(-0.484)
R&D	-0.421***	-0.809**	-1.074***
	(-3.329)	(-2.033)	(-10.538)
Capex	-0.186	-0.518	-0.313***
	(-1.440)	(-1.452)	(-2.750)
Cash	-0.436***	-1.561***	-0.430***
	(-11.713)	(-12.232)	(-14.536)
Industry FE?	Y	Y	Y
Year FE?	Y	Y	Y
Observations	8,027	8,024	8,027
R-squared	0.217	0.875	0.440

Table 5

2008-2010: Relation between Tax-Induced Foreign Cash and Firm Debt

This table presents results for testing the relation between firm debt and a firm's repatriation tax cost and how this relation varies for 2008 to 2010 under relaxed intercompany loan rules. All variables are defined in Appendix A. The regression specification includes industry and year fixed effects. t-statistics are presented in parentheses. Standard errors are clustered by firm. The superscript asterisk *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dom_Debt (1)	*Log(Dom_Debt)* (2)	*Dom_Mkt_Lev* (3)
REPAT	1.235*	4.361*	0.796
	(1.767)	(1.770)	(1.349)
***REPAT**0810**	**1.507**	**3.363**	**1.243***
	(1.612)	**(1.182)**	**(1.766)**
***REPAT**1112**	**0.426**	**0.797**	**0.718**
	(0.465)	**(0.282)**	**(0.928)**
DomIncome	-0.341***	-0.733***	-0.825***
	(-5.975)	(-4.847)	(-18.341)
ForIncome	-1.111***	-3.192***	-1.431***
	(-9.558)	(-8.702)	(-15.128)
Size	0.021***	1.068***	0.014***
	(5.229)	(98.403)	(3.703)
Div_Indicator	-0.007	0.034	-0.040***
	(-0.623)	(1.071)	(-4.204)
BTM	-0.003***	-0.004***	-0.001***
	(-5.747)	(-6.376)	(-12.348)
σ(OpInc)	0.164	-0.118	-0.073
	(0.895)	(-0.219)	(-0.519)
R&D	-0.438***	-0.866**	-1.089***
	(-3.445)	(-2.169)	(-10.588)
Capex	-0.191	-0.537	-0.318***
	(-1.475)	(-1.504)	(-2.754)
Cash	-0.445***	-1.590***	-0.437***
	(-11.969)	(-12.401)	(-14.926)
Industry FE?	Y	Y	Y
Year FE?	Y	Y	Y
Observations	8,027	8,024	8,027
R-squared	0.214	0.874	0.436

Table 6

High-technology Firms: Relation between Repatriation Tax Costs and Firm Debt

This table presents results for testing the relation between firm debt and a firm's repatriation tax cost and how this relation varies by industry of firm. We identify firms as "high-tech" if they are in pharmaceutical or computer-software industries. All variables are defined in Appendix A. The regression specification includes year fixed effects. T-statistics are presented in parentheses. Standard errors are clustered by firm. The superscript asterisk *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dom_Debt (1)	*Log(Dom_Debt)* (2)	*Dom_Mkt_Lev* (3)
REPAT	0.743	2.238	0.315
	(1.128)	(0.963)	(0.587)
High-tech	-0.047***	-0.121***	-0.029**
	(-3.535)	(-3.117)	(-2.560)
REPAT*High-tech	**3.104*** **	**9.155*** **	**3.084*** **
	(4.281)	**(3.880)**	**(5.580)**
DomIncome	-0.340***	-0.717***	-0.834***
	(-5.858)	(-4.690)	(-18.387)
ForIncome	-1.108***	-3.181***	-1.433***
	(-9.588)	(-8.703)	(-15.047)
Size	0.020***	1.066***	0.013***
	(5.119)	(99.079)	(3.544)
Div_Indicator	-0.006	0.034	-0.035***
	(-0.510)	(1.098)	(-3.830)
BTM	-0.003***	-0.004***	-0.001***
	(-5.692)	(-6.236)	(-12.362)
σ(OpInc)	0.076	-0.309	-0.123
	(0.426)	(-0.590)	(-0.897)
R&D	-0.316**	-0.634	-0.969***
	(-2.572)	(-1.638)	(-10.082)
Capex	-0.336***	-0.861**	-0.439***
	(-2.746)	(-2.481)	(-4.289)
Cash	-0.443***	-1.569***	-0.445***
	(-12.047)	(-12.453)	(-15.452)
Industry FE?	N	N	N
Year FE?	Y	Y	Y
Observations	8,027	8,024	8,027
R-squared	0.213	0.874	0.435