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UNIVERSITY OF CALIFORNIA,
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Repatriation Taxes and the Value of Cash Holdings

DISSERTATION

submitted in partial satisfaction of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

in Management

by

Xi Chen

Dissertation Committee:
Professor Terrence Shevlin, Chair
Professor Lucile Faurel
Professor Alexander Nekrasov
Professor Morton Pincus

2015

DEDICATION

To

Mom and Dad

TABLE OF CONTENTS

	Page
LIST OF TABLES	iv
ACKNOWLEDGMENTS	v
CURRICULUM VITAE	vii
ABSTRACT OF THE DISSERTATION	ix
CHAPTER 1: Introduction	1
CHAPTER 2: Prior Literature and Hypothesis Development	7
CHAPTER 3: Data and Key Variables	17
CHAPTER 4: Test Design and Empirical Results	21
CHAPTER 5: Conclusion	34
REFERENCES	36
APPENDIX A: Variable Definitions	51
APPENDIX B: Estimating Tax-induced Foreign Cash Holdings	53
APPENDIX C: Comparing Repatriation and Reinvestment Decisions	60

LIST OF TABLES

	Page
Table 1	Sample Selection and Descriptive Statistics 39
Table 2	Repatriation Tax Costs and the Value of Cash Holdings 40
Table 3	Repatriation Tax Costs and the Value of Cash Holdings: Conditional on the Actual level of Foreign Cash Holdings 41
Table 4	Valuation of Tax-induced Foreign Cash Holdings 43
Table 5	Testing H2a: Firms Partitioned Based on the Entrenchment Index 44
Table 6	Testing H2b: Firms Partitioned Based on Geographic Segment Disclosure 46
Table 7	Testing H2c: Firms Partitioned Based on Domestic Borrowing Capacity 47
Table 8	Testing H2d: Firms Partitioned Based on Investment in Financial Assets 48
Table 9	Difference-in-differences Analysis around AJCA 2004 49
Table 10	Repatriation Taxes and the Value of Cash Holdings, pre- and post-AJCA 2004 Analysis 50
Table B1	Descriptive Statistics – Foreign Cash Sample 57
Table B2	Predicting Foreign Cash Holdings 58
Table B3	Descriptive Statistics – Predicted Foreign Cash Holdings 59

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“Cash location and the cost of domestic borrowing” with Peng-Chia Chiu

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ABSTRACT OF THE DISSERTATION

Repatriation Taxes and the Value of Cash Holdings

By

Xi Chen

Doctor of Philosophy in Management

University of California, Irvine, 2015

Professor Terrence Shevlin, Chair

U.S.-domiciled multinational firms are taxed on a worldwide basis under a credit and deferral system. Consequently, multinationals earning profits from low-tax foreign countries have incentives to delay the repatriation of foreign earnings, resulting in high levels of offshore cash holdings. I hypothesize and find that investors' valuation of multinationals' total cash holdings is negatively associated with firm-specific tax costs of repatriation. Using a hand-collected sample of firms that disclose their foreign and domestic cash holdings separately, I find that the documented effect is driven by firms that hold a majority of cash overseas. I propose three explanations for my main finding: (1) repatriation taxes contribute to the buildup of foreign cash that can be subject to agency problems; (2) repatriation taxes make foreign funds less accessible, thereby increasing internal financing frictions; (3) repatriation taxes motivate excessive investments in financial assets, for which the rate of return is usually lower than firms' cost of capital. Cross-sectional results are consistent with all three explanations. Overall, this study provides new insights into the non-tax costs of multinationals' sensitivity to taxation.

CHAPTER 1: Introduction

U.S.-domiciled multinational firms are holding record high levels of cash offshore. At the same time, even cash-rich firms are borrowing to fund domestic operations and capital return programs.¹ This seemingly peculiar capital structure is largely due to repatriation taxes, which make it costly for firms to bring foreign cash home resulting in a mismatch between cash holdings and cash needs. Despite much attention to multinationals' foreign cash holdings and a few high-profile anecdotes, there is scant empirical evidence as to whether the presence of repatriation taxes affects how investors view these cash holdings. In this study, I aim to fill this void. I also investigate the mechanisms by which repatriation taxes affect investors' valuation of cash holdings. The objective is to shed light on whether, from the shareholders' point of view, retaining a significant amount of cash overseas is the most efficient allocation of firm resources, and whether firms sacrifice efficiency along other dimensions while looking for ways to save taxes.

In general, cash is a fungible asset that provides the same utility to its owner no matter where it is located. However, this might not be true for U.S.-based multinationals. In the U.S., firms are taxed on their worldwide income; that is, income earned in foreign jurisdictions is also subject to U.S. income tax. However, U.S. taxes on foreign income are generally deferred until such income is brought home – a process known as repatriation.² To mitigate double taxation of foreign income, the U.S. allows foreign tax credits to be taken for the amount of taxes firms pay to foreign governments.³ The residual U.S. taxes due upon repatriation (“repatriation taxes”) are equal to pre-tax foreign income times the difference between the U.S. and weighted average

¹ <http://www.bloomberg.com/news/2014-04-29/apple-returns-to-bond-market-to-scale-biggest-borrowers-ranks.html>

² There are some exceptions to the deferral rule. For example, passive income and payments between related parties, as defined in Subpart F, are immediately taxed by the U.S. tax authority. Earnings from foreign branches are also immediately taxed.

³ In general, the foreign tax credit is equal to foreign taxes paid on foreign taxable income, subject to limitations and expense allocation (Scholes et al. 2014).

foreign tax rates. Therefore, if a firm's weighted average foreign tax rate is lower than its U.S. rate, it has an incentive to delay repatriation to defer repatriation taxes. If the firm lacks foreign investment opportunities, then much of the foreign retained earnings will be held in the form of cash. Using proprietary data, Foley et al. (2007) show that firms facing higher repatriation taxes hold higher levels of cash, hold this cash abroad, and hold this cash in affiliates that would trigger high tax costs upon repatriation.

Financial reporting rules create an additional layer of incentives for firms to hold cash overseas. Because U.S. firms are taxed on their worldwide income, under accrual accounting, firms should accrue any incremental U.S. taxes due upon repatriation as *deferred tax expense* when they generate foreign taxable income, even if such income has not been repatriated. However, Accounting Principles Board Opinion No. 23 (APB 23, Indefinite Reversal Exception) provides an exception. When firms designate their unremitted foreign earnings as permanently or indefinitely reinvested (PRE), they do not need to accrue deferred tax expenses on those earnings; hence tax expenses are reduced and GAAP earnings are increased. Therefore, driven by reporting incentives, firms are willing to designate earnings from a low-tax country as PRE (Krull 2004; Blouin et al. 2012). Once foreign income is designated as PRE, it cannot be remitted and invested in the U.S. until the designation is reversed. When the foreign investment opportunity set is limited, PRE is held in the form of cash rather than being actively reinvested in operating assets.

In this paper, I investigate whether the potential repatriation taxes on foreign source income affect shareholders' valuation of cash holdings. Because total cash reported in balance sheets includes cash held by foreign subsidiaries that cannot be deployed by U.S. parent without incurring repatriation taxes, the value of cash holdings should be lower if a firm faces higher repatriation taxes. In the cross-section, repatriation taxes can lead to inefficiencies in firms' cash allocation

and usage decisions in three ways. First, cash retained overseas because of the tax costs of repatriation can be subject to agency problems. The recent surge of interest in foreign acquisitions and inversions indicates that large multinationals are desperately looking for opportunities to use their stockpiles of offshore cash (Hanlon, et al. 2015; Edwards et al. 2015; Kleinbard 2014).⁴ Jensen (1986) proposes that entrenched managers have incentives to waste free cash flow on perquisite consumption and non-value-maximizing investments. The agency cost of free cash flow is likely to be more severe when cash is located outside the U.S. because disclosure on foreign operations is limited under the current reporting regime. In addition, geographic distance and institutional differences make it difficult to monitor the use of foreign cash. Second, repatriation taxes make it costly for firms to access their foreign funds when cash is needed in the U.S.; therefore, internal financing frictions could arise. Third, there is an opportunity cost associated with cash retained overseas. Many firms invest their offshore cash in foreign or U.S. financial assets, the return of which is usually lower than firms' cost of capital.⁵ These inefficiencies in firms' cash retention and usage decisions will affect the value shareholders place on the cash that firms hold, and this forms the basis of my analysis.

Following Faulkender and Wang (2006), I estimate the value of cash holdings by regressing stock returns over the fiscal year on changes in cash and control variables. The coefficient on change in cash reflects investors' expectation of how cash will generate value in the future (e.g. investment, dividends). Prior studies document that cash is worth more for firms with good growth options and limited access to external capital (Pinkowitz and Williamson 2004). On

⁴ In an inversion, a U.S. firm changes its tax residence to a foreign country (usually a country with favorable tax rates) while remaining majority-owned by U.S. shareholders.

⁵ When firms invest foreign cash in financial assets, returns on those investments are included in Subpart F income and therefore deemed repatriated and taxed immediately in the U.S. However, firms still receive a tax deferral on the principal invested.

the other hand, if cash can easily be turned into private benefits or invested suboptimally, its value will be discounted by investors (Dittmar and Mahrt-Smith 2007).

I hypothesize and find that, when a firm faces higher tax costs of repatriation, investors assign a lower value to its total cash holdings. The effect is economically substantial. The value of \$1 change in cash for a firm with zero repatriation tax costs is \$1.43, while the value of \$1 change in cash for a firm with positive repatriation tax costs is \$1.22. Hence, there is a 21-cent discount due to potential repatriation taxes. Using a hand-collected sample of firms that disclose their foreign and domestic cash holdings separately, I find that the documented effect is driven by firms that hold a majority of cash overseas.

This result might not seem surprising because repatriation taxes represent a potential future tax payment, and we expect investors to factor future cash outflows into their valuation. To determine whether the discount I document is merely explained by investors' anticipation of future tax payments, I estimate the value of one-dollar *tax-induced* foreign cash and one-dollar *total* cash. I find that one-dollar *tax-induced* foreign cash is valued at 73.6 cents, while one-dollar *total* cash is valued at 1.107 dollars (a discount of 37 cents). Even if we assume a zero foreign tax rate and zero discount rate, future tax payment itself cannot fully explain this discount. Therefore, I hypothesize that repatriation taxes affect investors' valuation of cash holdings by creating inefficiencies in firms' cash retention and usage, and this forms the basis for my cross-sectional analyses.

In cross-sectional tests, I find that the negative relation between repatriation costs and the value of cash holdings is more pronounced for firms with entrenched managers and for firms that provide less disaggregated disclosure on foreign operations, consistent with less detailed disclosure making it more difficult for the board and shareholders to monitor foreign operations.

Second, repatriation taxes make foreign cash less accessible, and this is more likely to cause problems when the firm has limited ability to use external financing to counterbalance domestic cash deficiencies. Consistent with this prediction, I find that the negative effect of repatriation taxes on the value of cash holdings is concentrated in firms with limited domestic borrowing capacity as proxied by S&P domestic long-term issuer credit ratings. Lastly, using excess cash holdings to proxy for tax-motivated investment in financial assets (Bryant–Kutcher et al. 2008), I find that the negative relation between repatriation taxes and investors’ valuation of cash holdings is more pronounced for firms with high investment in financial assets, consistent with shareholders bearing an opportunity cost when capital resources are put to unproductive use.

My study contributes to the literature in the following ways. First, this is the first study that collects and uses firm-disclosed foreign cash data. Prior to this study, the only available source of foreign cash data are the Bureau of Economic Analysis (BEA) Annual Survey of U.S. Direct Investment Abroad (Foley et al. 2007; Blouin et al. 2014; Hanlon et al. 2015). However, the BEA foreign cash data are reported every five years in benchmark surveys. A consecutive time series of data are important for accounting studies as we use panel regressions and employ many change variables. In addition, the foreign cash data in my study are more recent than most prior studies employing BEA data. For example, the average foreign cash to total assets ratio (10.4%) in my study, is almost 14 times larger than that in Hanlon et al. (2015). Presumably because Hanlon et al. (2015)’s sample stops in 2004 while multinationals’ foreign cash holdings keep increasing after 2004.⁶ Therefore, my foreign cash sample is more recent and allows me to draw conclusions on issues that attract attention and debates today.

⁶ Redmiles (2008) estimates that firms repatriated \$312 billion under the American Jobs Creation Act of 2004. This number is later confirmed by Faulkender and Petersen (2012) who find the total repatriation to be \$298 billion. Nine years later, as of fiscal 2013, U.S. multinationals disclose a total foreign cash level of \$746 billion. <http://www.bloomberg.com/news/articles/2013-03-08/offshore-cash-hoard-expands-by-183-billion-at-companies>

Second, the study adds to our knowledge of the consequences of multinational firms' sensitivity to taxation. Previous research has shown that taxation plays an important role in multinationals' location, investment, and dividend repatriation decisions (Graham et al. 2011; Hines and Rice 1994; Altshuler et al. 2001). Firms move their operations and profits overseas and enjoy the benefits of U.S. tax deferral on foreign source income. Meanwhile, policymakers are concerned about the loss of tax revenue and job opportunities as a result of multinational tax planning. My study offers a new perspective on the consequences of U.S. tax deferral and I show that firms sacrifice investing and operating efficiencies when looking for ways to achieve tax efficiency. In other words, the benefit of U.S. tax deferral does not come without cost.

Third, prior studies (Collins et al. 2000; Bryant–Kutcher et al. 2008) find that the value of permanently reinvested earnings (PRE) is lower for firms reporting a positive tax on PRE and this effect is more pronounced when PRE is reinvested in financial assets. My study extends this literature by investigating specific mechanisms by which repatriation taxes lead to lower value of cash. I show that the discount not only comes from the market's anticipation of future tax payments, but also from various frictions induced by repatriation taxes. In particular, the discount is concentrated in firms with weaker corporate governance, less transparent disclosure on foreign operations, limited access to domestic debt markets, and excessive investment in financial assets. Therefore, my findings provide new insights into the non-tax costs of multinationals' sensitivity to taxation.

Fourth, the corporate finance literature on the functioning of internal capital markets has examined agency costs (such as division managers' rent-seeking behavior) and their effects on investment efficiencies (Scharfstein and Stein 2000). However, the role of repatriation tax costs on the functioning of internal capital markets has been overlooked. Repatriation taxes could

increase internal financing frictions and reduce capital allocation efficiencies by creating a barrier to capital mobility (Graham et al. 2010). Therefore, my study is relevant to research that looks at multinational firms' financing and capital allocation decisions.

Finally, this paper contributes to the literature that investigates investors' valuation of cash holdings. Prior research finds that the value of cash holdings declines with larger cash balance, higher leverage, better access to capital markets, and poorer governance (Dittmar and Mahrt-Smith 2007; Faulkender and Wang 2006). My findings suggest that location and mobility also play an important in how investors value cash holdings.

The remainder of the paper proceeds as follows. In Section 2, I review prior literature and form hypotheses. Section 3 describes the sample and data. Section 4 presents the research design and reports empirical results. Section 5 concludes.

CHAPTER 2: Prior Literature and Hypothesis Development

My study is closely related to two literature streams: (1) determinants and valuation of cash holdings; (2) multinational taxation and foreign dividend repatriation.

2.1 Determinants and Valuation of Cash Holdings

If capital markets are frictionless, cash holdings are irrelevant because there are no transaction costs (hence, no liquidity premium), no information asymmetry, and no agency costs. In reality, however, there are costs associated with buying and selling financial and real assets. In the presence of transaction costs, holding cash can help avoid cash shortfalls, which is very costly in some states of the world. On the other hand, the rate of return on cash is very low (i.e., there is

a liquidity premium).⁷ Furthermore, because of information asymmetry, external funds are usually more expensive than internal funds. Therefore, firms have a precautionary motive to hold cash, especially when cash flow is volatile, when the access to capital markets is limited, and when there are good growth options. To sum up, managers who maximize shareholder wealth should maintain a cash level at which the marginal benefits of cash holdings equal the marginal costs (Opler et al. 1999).

However, because of agency problems, managers' preferred level of cash holdings could differ from that of shareholders (Jensen 1986). Managers prefer to hoard cash because it reduces firm risk, and they stay in control for a longer time if risk is low. In addition, cash increases managers' discretion, so they can consume perquisites and gain more power through empire building. Moreover, entrenched managers prefer to retain cash in the company so that in the future they do not need to raise external funds and can avoid capital market scrutiny and monitoring. Overall, the presence of these agency costs could result in a cash balance that differs from the optimal level.

Faulkender and Wang (2006) argue that the value of one additional dollar of cash reserves should vary depending upon shareholders' expectation of how cash will be used. For example, the value of cash holdings is higher when access to capital markets is limited and when investment opportunity set is valuable (Pinkowitz and Williamson 2004). Furthermore, strong corporate governance can increase investor confidence in the efficiency of cash usage. Dittmar and Mahrt-Smith (2007) find that strong corporate governance increase the value of cash holdings.

⁷ The transaction cost motive for holding cash also implies that smaller firms hold more cash. If a firm wants to raise outside funds, it needs to pay a fixed cost upfront, as well as a variable cost that is proportional to the amount raised. Because of the fixed cost, larger firms enjoy economy of scale and hold less cash, while smaller firms tend to hold more cash (as a percentage of total assets).

2.2 Multinational Taxation and Foreign Dividend Repatriation

Hartman (1985) shows that, under a credit and deferral tax system, repatriation taxes on foreign earnings are irrelevant for the repatriation decision under two assumptions: (1) foreign and domestic tax rates are exogenous and constant; (2) repatriation is ultimately unavoidable. In the original Hartman model, only domestic and foreign risk-adjusted after-tax returns matter for the repatriation decision.⁸ However, there is growing empirical and anecdotal evidence that dividend repatriation decreases when the tax costs to do so increase (Desai et al. 2001; Desai et al. 2007). There are two cases under which the constant tax rate assumption in (1) can be violated. At the macro level, the U.S. statutory rate could change as a result of tax law changes (e.g., the Tax Reform Act of 1986), and tax holidays such as the American Jobs Creation Act of 2004 create a window during which firms can repatriate foreign earnings at a much lower tax cost. Second, at the micro level, tax costs of repatriation can vary over time for a specific firm. For example, if a firm has subsidiaries in both high-tax and low-tax jurisdictions, it can time repatriation from low-tax countries to coincide with repatriation from high-tax countries to minimize the residual U.S. tax.

Under APB No. 23, firms have incentives to designate foreign earnings from low-tax countries as “permanently reinvested” (PRE) to avoid recording deferred federal income tax expense. Krull (2004) finds that year-to-year changes in PRE are positively related to the difference between analyst forecasts and pre-managed earnings, consistent with firms using PRE to manage GAAP earnings. Blouin et al. (2012) find that the accounting rule creates disincentives

⁸ Note that the “irrelevance of repatriation taxes” theory holds only for mature foreign subsidiaries that are financed through their own retained earnings. If a foreign subsidiary is immature and relies on the parent’s capital injection, then the presence of repatriation taxes influences the level of initial capital. The higher the repatriation tax, the lower the initial investment. Since in most cases we care about dividend repatriation from profitable foreign subsidiaries, the effect of repatriation taxes on immature subsidiaries is not the primary focus of this study.

to repatriate foreign earnings to the U.S. and contributes to the accumulation of cash abroad. Graham et al. (2011) survey tax executives and find that APB No. 23 provides incentives for multinationals to move investment to, and retain earnings in, foreign locations.

Both tax rules and financial reporting rules provide firms incentives to defer dividend repatriation and a substantial amount of unremitted foreign earnings is held in the form of cash. Two recent studies investigate the investment implications of cash trapped overseas. Edwards et al. (2015) and Hanlon et al. (2015) examine the profitability of multinationals' foreign acquisitions and find that firms with high levels of foreign trapped cash make less profitable acquisitions. One key difference between my study and theirs is that they look at one possible use of trapped cash – foreign acquisitions – while my study provides general, large sample evidence that repatriation taxes could lower investors' valuation of cash holdings through agency problems, financing frictions, and investment inefficiencies.

Campbell et al. (2014) develop a model to estimate firms' cash holdings by country using financial statement data and Exhibit 21 disclosure and verify their model with the proprietary BEA data.⁹ Using estimates of cash holdings by country, they find that investors' valuation of cash holdings is decreasing in the level of foreign cash holdings. They also find that this effect is associated with cash held in tax havens, but *not* cash held in countries with uncertain business environments (i.e., those with greater instability and corruption, and weaker legal protections). Although their paper and my study both speak to the effect of location on the value of cash holdings, we have different focuses. They focus on characteristics of the country in which a firm holds cash (e.g., its legal environment, its economic stability, whether it is a tax haven, etc.), while I examine the interaction between cash location and firm characteristics (governance, debt

⁹ The Bureau of Economic Analysis conducts the Benchmark Survey of U.S. Direct Investment Abroad every five years. Major foreign subsidiaries are required to report detailed balance sheet information including cash holdings.

capacity, segment disclosure quality, etc.).¹⁰

Bryant–Kutcher et al. (2008) investigate the valuation of permanently reinvested earnings (PRE) and focus particularly on how investors value PRE differently when PRE is reinvested in financial rather than operating assets. They find that for firms that disclose (in footnote) a positive tax liability on PRE, PRE is negatively associated with firm value, consistent with investors being able to back out unrecognized future tax liability. They also find that the discount on PRE is concentrated in firms with high amounts of excess cash, which proxies for the likelihood of tax-motivated investment in financial assets. In this study, I focus on investors’ valuation of cash holdings rather than PRE for two reasons. First, PRE is an accounting designation and could be subject to managerial discretion (Krull 2004; Ayers et al. 2014).¹¹ Second, Blouin et al. (2014) estimate that 39 percent of PRE is in high-growth affiliates, and in my sample 50 percent of PRE is held in the form of operating assets. Therefore, although PRE and foreign cash are highly correlated, they measure different underlying constructs. PRE includes *both* operating and passive investments, while policymakers and shareholders are more concerned about PRE held in the form of *passive* assets, i.e., cash. In addition, I conduct a rich set of cross-sectional analyses to shed light on the underlying mechanisms by which repatriation taxes influence investors’ valuation of cash holdings. I view my paper and Bryant-Kutcher et al. (2008) as complementary; both add to our understanding of the effect of taxes on multinational firms’ business decisions and valuation.

¹⁰ Their conclusion also depends on the accuracy of the foreign cash estimation model, which relies on both the model specification and firms’ faithful disclosure of material foreign subsidiaries (Exhibit 21 in 10-K). However, firms can strategically hide some subsidiaries for tax avoidance or other reasons, as did Google and Oracle (Gramlich and Whiteaker-Poe 2013).

¹¹ For example, at the end of fiscal 2013, Apple designated \$54.4 billion foreign earnings as PRE, but its cash, cash equivalents, and marketable securities held by foreign subsidiaries were \$111.3 billion. At the same time, Apple recorded a \$18.044 billion deferred tax expense on unremitted foreign earnings, which suggests that not all foreign retained earnings will be designated as PRE.

<http://www.sec.gov/Archives/edgar/data/320193/000119312513416534/d590790d10k.htm>

2.3 Hypotheses

2.3.1 Main Hypothesis

Faulkender and Wang (2006) argue that the value of one additional dollar of cash reserves (to equity holders) is higher if that dollar is more likely to be used to (1) increase distributions to equity holders via dividend payments or share repurchases and (2) decrease the amount of cash that needs to be raised in the external capital markets. For multinational firms facing potential repatriation tax costs, foreign cash is unlikely to be distributed to equity holders in the near future and foreign cash also does not decrease the amount of cash that needs to be raised in the capital markets. In fact, because it is costly to bring foreign cash to the U.S., firms sometimes rely on external financing to fund their U.S. cash needs. Because repatriation taxes make foreign cash holdings less accessible, I hypothesize that the value of foreign cash holdings is lower when repatriation tax costs is higher. On the other hand, assuming that repatriation taxes do not affect U.S. investment opportunities and the parent firms' access to external financing, repatriation taxes should not affect the value of domestic cash holdings.

H1: Investors' valuation of total/foreign cash holdings is negatively associated with tax costs of repatriating foreign cash.

H1 is based on the assumption that repatriation taxes are unavoidable. If firms can tax plan to avoid (or reduce) the residual U.S. taxes due upon repatriation, then repatriation taxes are less relevant and I might not find my predicted results. For example, recently some companies are able to tap overseas cash by structuring consecutive short-term loans.¹² Although these tax planning strategies are not without cost, it is arguable that firms may find ways to avoid repatriation taxes. Multinationals with large amounts of cash overseas are also lobbying for a tax break (for example,

¹² Under the Internal Revenue Code, these loans are permitted to be outstanding for 90 days or less. See examples of Hewlett-Packard and General Electric at:
<http://online.wsj.com/news/articles/SB10001424127887323361804578388522312624686>

the Win America campaign). Moreover, retaining cash overseas can be optimal if foreign markets offer better growth opportunities. After we take into account these possibilities, whether repatriation taxes affect the value of cash holdings remains an empirical question.

Some may argue that not all foreign cash is located overseas. According to a report by the Senate Permanent Subcommittee on Investigations (2011), 46% of the 27 surveyed corporations' offshore tax-deferred corporate earnings were parked in U.S. banks and invested in U.S. financial assets. However, the possibility of parking foreign earnings in U.S. banks and investing in U.S. financial assets does not invalidate my hypothesis as these amounts still cannot be returned to shareholders or to fund U.S. operations without payment of the repatriation taxes. In addition, as I discuss above, there are three ways through which repatriation taxes can reduce the value of cash holdings. Parking foreign cash in U.S. banks could reduce misappropriation by foreign managers. Still, to effectively defer U.S. taxes, these funds can be invested only in government securities and stocks/bonds of unrelated U.S. corporations, which arguably do not yield high returns. Therefore, the fact that foreign cash is parked in the U.S. does not mean that this cash should not be discounted. As long as repatriation taxes lead to non-optimal use of cash, we should expect shareholders to place a lower value on this cash.

2.3.2 Cross-sectional Predictions

In addition to representing a future tax liability, there are three ways that repatriation tax costs can affect the value of cash holdings. First, repatriation tax costs contribute to the buildup of foreign cash, which could be subject to agency problems. Jensen (1986) proposes that managers have incentives to waste free cash flows or invest them in low-return projects. The Jensen-type agency problem is likely to be more severe in the multinational context because monitoring and assessing the use of foreign cash is more difficult due to geographic distance, institutional differences, and cultural differences. Two recent studies (Edwards et al. 2015; Hanlon et al. 2015)

find that firms with high levels of trapped cash are more likely to acquire foreign targets and that these acquisitions are less profitable. Managers can also use repatriation taxes and other restrictions as excuses for their cash hoarding behavior, but then invest these cash holdings in suboptimal ways. This is the “agency costs of free cash flow” hypothesis.

Second, repatriation taxes impose an additional cost to access foreign funds. Typically, a multinational firm has three capital sources: foreign funds, domestic funds, and external capital. A firm will choose the cheapest among the three to fund investments. If a firm has good domestic investment opportunities but domestic funds are not sufficient, and external financing is too expensive, then in the absence of repatriation taxes the firm should use foreign cash to fund the investment. However, repatriation taxes increase the cost of accessing foreign funds. In this case, if the potential domestic investment cannot generate a high enough return to cover the repatriation tax costs, the project will not be pursued. In short, if foreign funds are the marginal source of financing, repatriation taxes increase firms’ marginal cost of capital and reduce the net present value of projects. This is the “financing frictions” hypothesis.

Third, repatriation taxes increase firms’ incentives to invest in financial assets. Because repatriating foreign earnings is costly, if a firm lacks investment opportunities overseas, a lot of foreign funds will be invested in financial assets and earn very low rates of return.¹³ If there were no repatriation tax, these funds could be repatriated and invested in domestic projects or distributed to shareholders who can then invest them in other higher-return projects. Hence, the opportunity costs associated with investing in financial assets could be substantial. Anticipating this, investors will place a lower value on cash holdings. This is the “passive investment” hypothesis.

¹³ Kleinbard (2014) point out, “Cash today earns only negligible rates of interest. The meager earnings on the cash drag down earnings per share, while shareholders focus with laser intensity on that cash as more usefully deployed in their hands.”

The table below summarizes four cross-sectional predictions and how each of them relates to the proposed mechanisms above.

H1: Repatriation taxes negatively affect investors' valuation of cash holdings.

	Agency costs of free cash flow	Financing frictions	Passive Investment
Strong governance (H2a)	Less negative	No effect	No effect
Better segment disclosure	Less negative	No effect	No effect
Stronger domestic borrowing capacity (H2c)	No effect	Less negative	No effect
More investment in financial assets (H2d)	No effect	No effect	More negative

When repatriation tax costs are high, firms tend to defer dividend repatriation and build up excess cash holdings overseas. When cash is located outside the U.S., the Jensen-type agency problem becomes more severe because the geographical distance, institutional differences, and cultural differences make foreign operations more difficult to monitor. Strong corporate governance could potentially mitigate the lack of monitoring problem. Therefore, I hypothesize that strong corporate governance can moderate the negative effect of repatriation taxes on investors' valuation of cash holdings through enhanced monitoring.

H2a: The negative effect of repatriation costs on investors' valuation of cash holdings is less pronounced for well-governed firms.

High-quality disclosure reduces information asymmetry and curtails agency problems. Berger and Hann (2007) find that managers tend to withhold the segments with relatively low abnormal profits, suggesting that at the segment level managers' disclosure decisions are influenced by their agency cost motives. Starting from SFAS 131, most U.S. firms are no longer required to disclose earnings by geographic area. Hope and Thomas (2008) exploit the discretionary nature of geographic segment reporting and find that firms that stopped disclosing geographic earnings after SFAS 131 experience greater expansion of foreign sales, produce lower foreign profit margins, and have lower firm value in the post-SFAS 131 period. Their findings

suggest that disaggregated geographic segment disclosure play a monitoring role on firms' foreign investment behavior. Therefore, I hypothesize that the effect of repatriation tax costs on investors' valuation of cash holdings is more negative when the extent of disclosure on foreign segments is limited.

H2b: The negative effect of repatriation costs on investors' valuation of cash holdings will be more pronounced for firms with less detailed geographic segment disclosures.

If foreign funds were the marginal source of capital, the presence of repatriation taxes increases a firm's cost of capital and reduces the net present value of projects. For example, in the absence of repatriation tax, firms with a domestic cash deficiency can repatriate foreign cash to counter balance the cash shortage. In the presence of repatriation tax, firms have to (1) pay the residual U.S. tax, (2) raise capital in the U.S., or (3) forego potential investments. Firms with better credit ratings can counter balance this cash deficiency by raising debt. Therefore, the negative effect of repatriation taxes on investors' valuation of cash holdings should be less pronounced for these firms. Some subtleties need to be clarified here. Usually when there are external financing frictions, cash is more valuable (Pinkowitz and Williamson 2004; Faulkender and Wang 2006). However, in the presence of repatriation taxes, foreign cash is "restricted" in the sense that it cannot be used to counter balance domestic cash deficiency or be invested in domestic operations; therefore, investors are likely to place a lower value on the restricted cash holdings.

H2c: The negative effect of repatriation tax costs on investors' valuation of cash holdings is more pronounced when firms do not have a credit rating or have a poor credit rating.

When a firm runs out of foreign positive net present value projects, it should repatriate any excess funds to finance domestic investments or to repay shareholders. In the presence of repatriation taxes, it is costly to repatriate excess foreign funds, so firms often invest these funds in foreign and/or U.S. financial assets. Prior studies such as Hines and Rice (1994) and Altshuler

and Grubert (2002) demonstrate that deferring repatriation and reinvesting foreign retained earnings in financial assets could dominate all other options under certain conditions. However, De Waegenaere and Sansing (2008) show that reinvesting in financial assets might not be the dominant strategy when a different discount rate is used to discount cash flows on financial assets.

In Appendix C, I extend the Hartman (1985) model and show that whether investing in financial assets is a dominant strategy depends on the after-tax rates of return on financial versus domestic investments. For the result of Hines and Rice (1994) and Altshuler and Grubert (2002) to hold, the after-tax rate of return on financial assets must exceed the after-tax rate of return on domestic operating assets, which is unlikely to be the case. Even if the rate of return on domestic operations is low, shareholders have an outside option to withdraw money and invest in other firms. Therefore, the discount rate shareholders use to value cash flows from financial investments is likely to be higher than the after-tax rate of return on those investments, and shareholders bear an opportunity cost if an excess amount of cash is reinvested in passive financial assets.

If the negative effect of repatriation taxes on investors' valuation of cash holdings is partly driven by the opportunity cost, I expect to see a more negative effect for firms with higher tax-motivated investment in financial assets.

H2d: The negative effect of repatriation costs on investors' valuation of cash holdings will be more pronounced for firms with more investment in financial assets.

CHAPTER 3: Data and Key Variables

3.1 Data and Sample Selection

I use two overlapping samples for my analyses. The Compustat sample is constructed using the intersection of Compustat Fundamentals Annual file and the CRSP monthly file. The foreign cash sample is a subset of the Compustat sample, for which I manually collect foreign cash

holdings data from 10-K filings. I conduct my main analysis (H1) using both the Compustat sample and the foreign cash sample. However, because the foreign cash sample contains a limited time-series of data (the majority of firms have only two to three years of data available), and my cross-sectional tests impose additional data requirements, I use the Compustat sample to conduct cross-sectional analyses.

3.1.1 Compustat Sample

Table 1, Panel A describes the sample selection process. My initial sample includes all Compustat multinational firms from 1985 to 2013 (46,847 firm-years).¹⁴ I classify a firm as multinational if it has non-missing pre-tax foreign earnings (*pifo*) or current foreign tax expense (*txfo*). I exclude observations with a change in fiscal year end (46,498 firm-years remain). Then I exclude firms that are not incorporated in the U.S. because these firms may not be subject to U.S. tax laws (40,947 firm-years remain). Following prior research, I remove financial and utility firms because cash holdings of these firms are subject to regulatory supervision, and firms in these industries face different incentives (38,570 firm-years remain). I also exclude firm-years with missing SICs because my main regressions require industry dummies (38,443 firm-years remain). Next, I merge the Compustat dataset with CRSP to obtain monthly stock returns. Depending on the repatriation cost measure I use, my final sample varies between 30,316 and 30,793 firm-years. Although my main tests focus on a relatively small number of observations compared to the Compustat universe, U.S.-based multinational firms constitute a major fraction of the U.S. and world economy. For example, in 2011, only 20% of Compustat firms are considered multinational, but the total market value of these firms is 46% of the market value of all Compustat firms.

¹⁴ The sample period starts in 1985 because that is the first year the repatriation tax measures have a reasonable number of non-missing observations.

Table 1, Panel B presents summary statistics for the variables used in the main regressions. I winsorize all continuous variables at the 1% tails by year to reduce the impact of outliers. The distributions I obtain for these variables are largely consistent with those of prior studies.

3.1.2 Foreign Cash Sample

Because the Compustat sample does not contain foreign versus domestic cash breakdowns, to support my main analysis, I hand-collect a foreign cash sample from firms' 10-K filings. I start my hand-collection with the final Compustat sample. Starting from 2009, the SEC has been sending out comment letters to request multinationals to disclose cash held by their foreign subsidiaries and to discuss any liquidity and/or tax consequences. Because foreign cash disclosure is a recent phenomenon, for each firm, I start my hand-collection from the most recent fiscal year.

Within each 10-K, I search for a list of keywords pertaining to foreign cash disclosure.¹⁵ Most firms do not provide any information on cash held outside the U.S. For firms that do disclose, in most cases, I can find foreign cash-related disclosure under "MD&A – liquidity and capital resources." I assume that if a firm does not disclose foreign cash holdings in the current year, it also does not disclose foreign cash in prior years. I believe this is a valid assumption because (1) disclosure policy tends to be sticky over time, and (2) initiating and then suspending disclosure is perceived negatively by outsiders and is therefore costly for firms (Einhorn and Ziv 2008). To further validate this assumption, I select 100 firms and make sure that there is no "gap" in foreign cash disclosure. Therefore, the pattern of foreign cash disclosure is either (0,0,0,0,0,1,1) for disclosers or (0,0,0,0,0,0,0) for non-disclosers, but not (0,0,0,0,1,0,1). I am able to obtain 2,614 firm-years with foreign cash data available.

¹⁵ The keywords include: "held by", "held outside", "held in", "held at", "foreign subsidiar", "international subsidiar", "repatriat", "cash and cash equivalents", "cash, cash equivalents", "cash equivalents", "outside the U.S.", "outside the United States", "outside of the U.S.", "outside of the United States", and "non-U.S."

Table B1 (Appendix B) reports the descriptive statistics for the foreign cash sample. Among firms that disclose their foreign versus domestic cash holdings separately, foreign cash composes about 55% of total cash and 10.4% of total assets. The average foreign cash to total assets ratio (10.4%), is almost 14 times larger than what is documented in Hanlon et al. (2015). Presumably because Hanlon et al. (2015) use the Bureau of Economic Analysis Annual Survey of U.S. Direct Investment Abroad data, which stops in 2004, while the foreign cash holdings soar and the phenomenon starts to cause concern in more recent years. This also underlines the importance of using the more recent firm-disclosed foreign cash data.

3.2 Estimating the Tax Costs of Repatriation

Foley et al. (2007) estimate repatriation tax costs by first subtracting foreign tax expense (*txfo*) from the product of a firm's foreign pre-tax income (*pifo*) and U.S. statutory tax rate (or marginal effective tax rate). Then they scale the *maximum* of this difference and zero by total firm assets. I adopt their measure in my test.

- (1) *RepCost 1*: (foreign pretax income* $\text{marginal tax rate} - \text{current foreign tax expense}$)*100/total assets. I use marginal tax rate after interest obtained from Blouin et al. (2010).¹⁶ Following Foley et al. (2007), if repatriation cost is negative, I reset it to zero.
- (2) *RepCost 2*: similar to *RepCost 1*, but using statutory tax rate instead of marginal tax rate.

Table 1, Panel B presents the summary statistics for *RepCost 1* and *RepCost 2*. The means are 0.241 and 0.301, respectively. Foley et al. (2007) report 0.17 and 0.26. My mean values are

¹⁶ Note that the marginal tax rate is not computable by jurisdiction (Hanlon and Heitzman 2010); therefore the MTR estimate is the worldwide marginal tax rate and might not capture the marginal U.S. tax rate.

somewhat higher, probably due to the different sample periods.¹⁷ The correlation between my two repatriation cost measures is 0.93.

CHAPTER 4: Test Design and Empirical Results

4.1 The Faulkender and Wang (2006) Methodology

To estimate investors' valuation of cash holdings, I use the methodology developed by Faulkender and Wang (2006) as follows:

$$r_{i,t} - R_{i,t}^B = \beta_0 + \beta_1 \Delta Cash_{i,t} + \beta_2 \Delta Earn_{i,t} + \beta_3 \Delta NetAsset_{i,t} + \beta_4 \Delta R\&D_{i,t} + \beta_5 \Delta Interest_{i,t} \quad (1) \\ + \beta_6 \Delta Div_{i,t} + \beta_7 Cash_{i,t-1} + \beta_8 Leverage_{i,t} + \beta_9 NetFin_{i,t} + \beta_{10} Cash_{i,t-1} \\ * \Delta Cash_{i,t} + \beta_{11} \Delta Cash_{i,t} * Leverage_{i,t} + \varepsilon_{i,t}$$

The dependent variable is abnormal stock return over the fiscal year. The variable of interest is $\Delta Cash$. The coefficient β_1 can be interpreted as the dollar change in shareholder value resulting from a one-dollar change in the amount of cash held by the firm. Other explanatory variables are included to control for factors that are likely to be correlated with changes in cash that also affect stock returns, including profitability (*earnings*), financing (*net financing, interest, leverage, and dividend*), and investment (*R&D*). All explanatory variables (except for *leverage*) are scaled by lagged market value of equity. We should keep in mind that an implicit assumption of using stock returns to estimate the value of cash is that the stock market is efficient and prices cash holdings correctly.

4.2 Repatriation Taxes and the Value of Cash Holdings

To test whether repatriation tax costs affect the value of cash holdings (H1), I add two additional variables to Eq. (1): a repatriation cost measure, and its interaction with $\Delta Cash$.¹⁸ In Eq.

¹⁷ If I calculate the two measures using Foley et al.'s (2007) sample period (1984-2004), the means values (0.183 and 0.229) are quite close to theirs.

¹⁸ This is a typical approach to examine a variable's incremental effect on the value of cash holdings (see Dittmar and Mahrt-Smith, 2007; Liu and Mauer, 2011; Louis et al., 2012).

(2), a negative coefficient on $RepCost_{i,t-1} * \Delta Cash_{i,t}$ is consistent with my hypothesis that investors place a lower value on cash holdings of firms with high repatriation costs.¹⁹

$$r_{i,t} - R_{i,t}^B = \beta_0 + \beta_1 RepCost_{i,t-1} + \beta_2 RepCost_{i,t-1} * \Delta Cash_{i,t} + \beta_3 \Delta Cash_{i,t} + \sum \beta_k Control_{k,i,t} + Year FE + Industry FE + \varepsilon_{i,t} \quad (2)$$

Because the distribution of repatriation costs is right skewed (repatriation costs are left censored at zero by definition), I use a ranking system to account for the lack of normality in the variable.²⁰ I rank firms into quintiles by industry and year. Firm-years with $RepCost=0$ are assigned to quintile 1, and the remaining firm-years are assigned to four equal-sized quintiles (quintiles 2-5). Standard errors are clustered by year to account for cross-sectional correlation in stock returns. I include industry fixed effects to account for the possibility that the relation between repatriation taxes and the value of cash differs across industries. I also include a year fixed effect to account for macroeconomic trends that affect all firms.

Table 2 presents the regression results. In Columns (1) and (3), both repatriation cost measures are negatively associated with the value of cash holdings (coefficients on $\Delta Cash * RepCost$ are negative and significant). In Columns (2) and (4), I use an alternative ranking system in which I code $RepCost=0$ if a firm faces zero repatriation tax costs and 1 if a firm faces positive repatriation tax costs. The results are qualitatively similar. Taking *RepCost 1 in Column (2)* as an example, we see that the coefficient is -0.213, which means that an extra dollar of cash is worth 21.3 cents less to shareholders if firms face positive repatriation tax costs.²¹ Plugging in the value of mean lagged cash (0.166) and mean leverage (0.214), the value of \$1 change in cash for a firm

¹⁹ Eq. (2) includes the same set of control variables as in Eq. (1).

²⁰ Using continuous measures yields qualitatively similar results. I continue to find a negative and significant coefficient on $RepCost_{i,t-1} * \Delta Cash_{i,t}$.

²¹ Table 2 also shows that the magnitude of the main effect is larger when repatriation tax costs are measured using *RepCost1*. This is because *RepCost1* uses marginal tax rates to estimate U.S. tax liability, while *RepCost2* uses statutory tax rates. For most firm-years in my sample, marginal tax rates are lower than statutory tax rates, so *RepCost1* gives a lower estimate for repatriation taxes (also evident in Table 1, Panel B).

with zero repatriation tax costs is \$1.43, while the value of \$1 change in cash for a firm with positive repatriation tax cost is \$1.22.

Table 2 also shows that the marginal value of cash depends on the amount of cash the firm already has (the coefficient on $\Delta Cash * lagged\ Cash$ is negative). When the existing cash level is high, an additional dollar of cash is worth less. Also, the marginal value of cash is lower when leverage is higher (the interaction term $\Delta Cash * Lev$ is negative), because when leverage is high, an extra dollar is more likely to go to creditors first, and the value to equity holders is lower. Except for *NetFinancing*, the signs on the other control variables are consistent with those of Faulkender and Wang (2006).²²

4.3 Further Evidence Using the Foreign Cash Sample

In Table 2 I document that firm-specific repatriation tax costs are negatively associated with investors' valuation of *total* cash holdings. However, what Table 2 does not tell us is whether this negative relation is driven by firms with high *foreign* cash holdings. Repatriation taxes make foreign cash more costly to access but do not affect the accessibility of domestic cash. For firms with little foreign cash, even when repatriation tax costs are high, cash should not be discounted much. This could be the case if most foreign earnings are reinvested in foreign operating assets.

To provide further evidence in support of my main result, I re-estimate Equation (2) using the foreign cash sample. I expect the main result to be more pronounced for firms that hold a majority of cash outside the U.S. However, a concern with this estimation is that I am only able to observe foreign cash holding when firms disclose it. Because foreign cash disclosure is a firm decision – not a mandatory requirement, only certain firms enter the regression and there could be a selection problem. To the extent that firms that disclose foreign cash is a “nonrandomly selected”

²² I obtain a negative and significant coefficient on *Net Financing*, while in Faulkender and Wang (2006) this coefficient is positive and significant. But my result is consistent with that of Dittmar and Mahrt-Smith (2007).

sample, biases might arise. I use the Heckman inverse-Mills-ratio method to alleviate the potential self-selection bias.

Starting from 2011, the SEC has been sending out comment letters asking firms to disclose the amount of cash held outside the U.S., so I expect that receiving a foreign cash-related comment letter from the SEC is a key reason why firms start disclosing foreign cash. I use the SEC free text search to collect comment letters on firms' foreign cash disclosure. From 2011 to 2014, I identify 344 foreign-cash related comment letters.²³ In addition to the receipt of comment letters, I also include tax costs of repatriation, firm size, whether the firm is audited by a big four auditor, foreign earnings fraction, and year dummies as additional determinants. A more detailed description of these variables can be found in Table 3, Panel A.

I use a probit regression to model the determinants of foreign cash disclosure. Results are presented in Table 3, Panel A. In Specification 1, repatriation cost, size, and foreign earnings fraction are in continuous form, and in Specification 2, these three variables are in (0, 1) form based on pooled sample median. I reset these variables as binary to facilitate a more straightforward interpretation of the marginal effects. Receiving a foreign cash-related SEC comment letter is a very significant predictor of firms' foreign cash disclosure decision. Firms that receive a foreign cash-related comment letter are 18.43% more likely to disclose foreign cash in year t , compared to firms that do not receive a letter. Firms facing higher repatriation tax costs and firms with more extensive foreign operations are also more likely to disclose foreign cash holdings. Overall, the marginal effect of SEC comment letters is the largest among all determinants.

²³ To collect SEC comment letters, I follow Blouin et al. (2014) and search for the following text string using SEC free text search: (*"unremitted" or "undistributed" or "permanently reinvested" or "indefinitely reinvested" or "permanently reinvest" or "indefinitely reinvest"*). Then I manually read each comment letter and identify those that are related to foreign cash disclosure. I also collect the fiscal year end date of the 10-K on which the SEC is commenting.

Next, I partition the foreign cash sample into two groups based on their foreign cash to total cash ratio. The low (high) foreign cash subsample includes firms with below (above) median foreign cash to total cash ratio (the median ratio is 0.56). I include the inverse Mills' ratio from the first stage (using Specification 2) to correct for self-selection.²⁴ Four variables are excluded in the second stage – the receipt of comment letters, firm size, whether the firm is audited by a big four auditor, and foreign earnings fraction.

Results are reported in Table 3, Panel B. In Columns (1) and (2), I exclude year dummies, and in Columns (3) and (4) I include year dummies as in my main test in Table 2. The rationale for excluding year dummies in the second stage is that year dummies are significant predictors of foreign cash disclosure in the first stage, therefore, if year dummies are again included in the second stage, there will be a multicollinearity issue (VIF on Mills' ratio is 13.47). Whether year dummies are included in the second stage affects the coefficient estimates of the Mills' ratio. However, no matter what exclusion criteria I use, I obtain qualitatively similar coefficient estimates on $\Delta Cash * RepCost$.

For firms that hold a majority of cash overseas, repatriation costs have a significantly negative effect on investors' valuation of cash holdings. The coefficient on $RepCost_{i,t-1} * \Delta Cash_{i,t}$ for the high foreign cash group is -0.261 (-0.194), while the coefficient for the low foreign cash group is 0.126 (0.113) and insignificant. A pooled-sample t-test shows that the difference is significant across groups, suggesting that the negative effect of repatriation tax costs on the value of cash holdings is driven by firms that hold a majority of cash overseas.

²⁴ I choose to use the Mills' ratio calculated under Specification 2 because Specification 2 produces higher pseudo R-squared in the first stage. My inferences are the same if I use the Mills' ratio calculated using Specification 1.

4.4 Quantify the Effect

In Tables 2 and 3, I show that repatriation taxes have a significant negative effect on investors' valuation of cash holdings. On the surface, this result is not surprising because repatriation taxes represent a potential future cash outflow and we expect to observe a negative valuation effect. The objective of this section is to quantify the effect of repatriation taxes and to understand whether the discount I document is solely due to investors' anticipation of future tax-related cash outflows. However, this is not an easy task because (1) we do not know whether there is for sure a future tax payment (e.g. firms might take advantage of a future tax holiday and repatriate their foreign cash tax-free); (2) even if firms will pay repatriation taxes in the future, we do not know exactly when, \$1 tax liability 10 years later will largely differ from \$1 tax liability next year due to the time value of money; (3) the possibility of future losses and foreign tax credit carryback/carryforwards further complicate the task of estimating what is a "reasonable" discount. Hence, the estimate in this section only provides a rough idea of whether the discount on cash is merely due to investors' anticipation of future tax payments and the later cross-sectional analyses shed more light on this issue.

To quantify the effect of repatriation taxes on investors' valuation of cash holdings, I follow Hanlon et al. (2015)'s approach and partition foreign cash holdings into a tax-induced component and a controls-induced component. I use the foreign cash sample to estimate a first-stage regression in which I regress foreign cash holdings on repatriation taxes and other economic determinants. Details on the first-stage regression are presented in Table B2 of Appendix B. I then use the estimated coefficients to partition foreign cash into a tax-induced component (TIFC) and controls-induced component (CIFC) for the Compustat sample.

This partition allows a more straightforward comparison of the valuation of tax-induced versus other foreign cash. The descriptive statistics of the tax-induced and controls-induced foreign cash are presented in Table B3 of Appendix B. I estimate Eq. (3) below using the Compustat sample. I include changes in TIFC and CIFC scaled by lagged market value of equity as the main explanatory variables. I expect the tax-induced foreign cash component to have a lower value than the controls-induced component ($\beta_1 < \beta_2$). I include change in total cash to control for domestic cash changes and other changes in cash that are not modeled in the first stage. I also expect the tax-induced foreign cash component to be valued lower than total change in cash ($\beta_1 < \beta_3$).

$$r_{i,t} - R_{i,t}^B = \beta_0 + \beta_1 \Delta TIFC_{i,t} + \beta_2 \Delta CIFC_{i,t} + \beta_3 \Delta Cash_{i,t} + \sum \beta_k Control_{kit} + Year\ FE + Industry\ FE + \varepsilon_{i,t} \quad (3)$$

Table 4 reports the regression results. The coefficient on tax-induced foreign cash is 0.736, implying that a dollar of tax-induced foreign cash is valued at 73.6 cents. The coefficient on controls-induced foreign cash is 3.514. Since the first-stage control variables include well-documented economic determinants of cash holdings (volatility, growth, investment, etc.), the much larger coefficient on CIFC is expected. Also as expected, tax-induced foreign cash has a lower value than total cash (0.736 versus 1.107). Overall, the evidence in this section is consistent with H1 that repatriation taxes are negatively associated with investors' valuation of cash holdings. The magnitude of the discount on tax-induced foreign cash is so large that it cannot be fully explained by potential future tax liability even if we assume a zero foreign tax rate and zero discount rate. This suggests that other factors beyond tax liability play a role.

4.5 Cross-sectional Variation in the Effect of Repatriation Taxes on the Value of Cash Holdings

In this section, I examine three possible mechanisms by which repatriation taxes reduce investors' valuation of cash holdings.

4.5.1 Agency Costs of Free Cash Flow

Governance: H2a predicts that strong corporate governance reduces the negative effect of repatriation tax costs on the value of cash holdings by mitigating potential agency problems associated with foreign cash. I measure corporate governance using the Entrenchment Index (E-Index) from Bebchuk et al. (2009).²⁵ To identify firms with strong or weak governance, I rank the E-Index by industry and year. Firm-years with above (below) industry-year median E-Indexes are classified as weak (strong) governance firms. I then estimate Eq. (2) separately for strong and weak governance samples.

I expect the coefficient on $\Delta Cash * RepCost$ to be significantly negative for weakly governed firms, and insignificant or less negative for firms with strong governance. Results are reported in Table 5. For strongly governed firms, there is no significant association between repatriation costs and the value of cash holdings. For weakly governed firms, this relation is significantly negative for both repatriation cost measures, and a pooled-sample t-test suggests that the estimated coefficient on $\Delta Cash * RepCost$ is significantly more negative than that of the strong governance sample. The magnitude of the coefficient on $\Delta Cash * RepCost$ is also much larger than that of the full sample (-0.279 and -0.204 compared to -0.080 and -0.060 from Table 2), suggesting that the negative effect of repatriation taxes on the value of cash holdings is concentrated in weakly governed firms.

²⁵ Corporate governance is a complex construct, and there are many proxies for it (Larcker et al. 2007). It is important to select the measure that is most relevant to the research question. Bebchuk et al. (2009) investigate the relative importance of the 24 provisions included in the Gompers et al. (2003) G-Index. They find that only six of the 24 provisions are monotonically associated with economically significant reductions in firm value. Using these six provisions, they developed the Entrenchment Index. In addition, my hypothesis is that trapped cash is more easily misused by entrenched managers. Therefore, the Entrenchment Index captures the underlying “governance” construct more accurately than other available governance measures. I obtain qualitatively similar results if I use the G-Index instead.

Segment disclosure quality: Another setting where I test whether repatriation taxes lead to lower cash value through agency problems is segment disclosure. H2b predicts that detailed geographic segment disclosure should provide shareholders more relevant information on foreign operations and therefore mitigate the negative association between repatriation taxes and investors' valuation of cash holdings.

To test the effect of segment disclosure, I partition firms into *discloser* and *non-discloser* groups. Following Hope and Thomas (2008), if a firm discloses two or more non-domestic geographic segments, I code the firm as a “discloser.” If the firm does not report geographic segments or aggregates all foreign subsidiaries into one foreign segment, I code the firm as a “non-discloser.”²⁶ Note that the meanings of “discloser” and “non-discloser” are different under SFAS 14 and SFAS 131 (adopted December 1997). Under SFAS 14, multinational firms were required to disclose earnings by geographic area. Under SFAS 131, firms do not have to disclose geographic earnings if their operating segments are not based on geographic areas. Therefore, under SFAS 14, firms did not have much discretion on the number of foreign segments reported, unless they changed their business structure. For my discloser versus non-discloser partition to work, I use only sample years after SFAS 131 is adopted (fiscal years starting on or after December 15, 1997). The discloser vs. non-discloser partition captures segment disclosure quality because firms are not required to report their segments by geographical area. Hope and Thomas (2008) use the same partition and find that non-disclosing firms indeed engage in more empire building activities overseas.

²⁶ I require a firm to disclose two or more foreign segments to be classified as a “discloser”, because GAAP already requires firms to report domestic versus foreign earnings. If the firm discloses only one foreign segment, then this does not add incremental information.

I estimate Eq. (2) separately for discloser and non-discloser groups, and I expect repatriation taxes to have a larger impact on value of cash for non-disclosing firms. Results are reported in Table 6. For *RepCost 1*, the coefficient on $\Delta Cash * RepCost$ is negative and significant for both groups, but the magnitude of the discount is significantly larger for the non-discloser group (-0.313 versus -0.128, p-value=0.083). For *RepCost 2*, the negative effect of repatriation costs on the value of cash holds only for the non-discloser group. Again, for the non-discloser group, the magnitude of the effect of repatriation costs (-0.313 and -0.183) is much larger than in the overall sample (-0.080 and -0.060 in Table 2). To sum up, the negative effect of repatriation taxes on investors' valuation of cash holdings is more pronounced when firms withhold detailed foreign segment disclosures, consistent with the monitoring role of disclosure.

Overall, evidence in this section is consistent with H2a and H2b that repatriation taxes negatively affect the value of cash holdings because tax-induced foreign cash is subject to agency problems.

4.5.2 Internal Financing Friction: Domestic Debt Capacity

Firms with ample domestic debt capacity can issue domestic debt at a relatively low cost, so they can easily counter balance any domestic cash deficiencies, and repatriation taxes are less relevant. H2c predicts that the effect of repatriation costs on the value of cash holdings is mitigated for these firms.

I use the S&P domestic long-term issuer credit rating to capture a firm's ability to raise domestic debt (Faulkender and Petersen 2006). If a firm does not have any ratings, or has a rating that is below investment grade (BB+ or lower), I code it as *constrained*. If a firm has an investment grade long-term rating, I code it as *unconstrained*. Then, I estimate Eq. (2) separately for both constrained and unconstrained firms. Table 7 presents the results. The negative effect of

repatriation taxes on the value of cash holdings holds only for constrained firms, consistent with my hypothesis that these firms rely more on foreign funds and therefore repatriation taxes have a larger negative impact on them. For relatively unconstrained firms, because they can counter balance any domestic cash deficiencies through external financing, repatriation taxes are not relevant for them.

4.5.3 Passive Investment in Financial Assets

In this section, I test the passive investment hypothesis (H2d). The opportunity cost of investing in financial assets could be high because returns from these investments are usually lower than a firm's cost of capital. Following Bryant-Kutcher et al. (2008), I use *excess* cash holdings to proxy for tax-motivated reinvestment in financial assets.

To estimate a firm's "excess" cash holdings, I follow Bates et al. (2009). First, I regress firms' cash holdings on a set of previously documented economic determinants. I estimate the following equation by industry and year. I require each industry-year group to have at least 15 observations.

$$Cash_{i,t} = \beta_0 + \beta_1Leverage_{i,t} + \beta_2IndVolCashFlow_{i,t} + \beta_3MTB_{i,t} + \beta_4Size_{i,t} + \beta_5Div_{i,t} + \beta_6Capex_{i,t} + \beta_7Acquisition_{i,t} + \beta_8CashFlow_{i,t} + \beta_9RD_{i,t} + \varepsilon_{i,t} \quad (4)$$

The residual from the first-stage regression (untabulated) is the "excess" cash holdings that cannot be explained by observable economic determinants.²⁷ Next, I partition firm-years into *high* and *low* excess cash holdings groups, and estimate Eq (2) for each group. *High* and *low* are defined relative to industry-year median. Regression results are presented in Table 8. The negative effect of repatriation taxes on the value of cash holdings is concentrated in the high excess cash sample. A pooled sample t-test indicates that the coefficient on $\Delta Cash * RepCost$ is significantly different

²⁷ The coefficients from the first-stage regression are largely consistent with prior studies, and the model has good explanatory power (adjusted R-squared 0.375).

across high and low excess cash groups. Overall, Table 8 is consistent with the passive investment hypothesis.

4.6 Supplemental Analyses

The American Jobs Creation Act of 2004 (AJCA 2004) is a tax holiday that substantially reduces the tax costs of repatriation. Firms receive an 85% dividends received deduction if foreign earnings are repatriated during fiscal 2004 and/or 2005. I conduct two additional analyses using the AJCA 2004 setting.

First, AJCA 2004 acts as an exogenous shock that reduces repatriation costs for a cross section of firms.²⁸ According to H1, on average, the value of cash should increase during AJCA 2004 because repatriation costs decrease. The intuition is that firms can bring cash home at a much lower cost and use it to fund (previously unfundable) domestic projects or to give it back to shareholders through a special dividend or share repurchase. I expect that the value of cash holdings will increase more for firms previously facing higher tax costs of repatriation because these firms are more likely to be affected by the Act. Table 9 shows that the value of cash holdings increase more for high repatriation cost firms in response to the tax holiday, relative to low repatriation cost firms. Results in Table 9 provides additional evidence in support my main results and also suggests that repatriation taxes have a causal effect on investors' valuation of cash holdings.

Second, AJCA 2004 is the first tax holiday that substantially reduces the tax costs of repatriation. Therefore, firms and investors both update their belief on whether another tax holiday might recur in the future. Clausing (2005) points out, "With the implementation of this break, the

²⁸ It could be that firms with large overseas profits lobby for tax holidays like AJCA 2004. Therefore, the Act may not be completely exogenous.

U.S. government has also raised the probability of similar tax breaks in the future. This change in expectations will likely increase the incentive for multinational firms to invest in low-tax countries and to shift profits to such destinations.” Hence, one would expect that after AJCA 2004, firm’s repatriation behavior, as well as the market’s pricing of trapped cash, might change accordingly. On one hand, despite that the AJCA 2004 is a one-time tax break, it sets a precedent and increases the uncertainty that similar tax breaks will be granted in the future. Bloom et al. (2007) show that with partial irreversibility higher uncertainty reduces the responsiveness of investment to demand shocks. Therefore, because real investments are partially irreversible, firms might be cautionary and hold more cash overseas after AJCA 2004. Anticipating this, shareholders will price high repatriation cost firms’ cash more negatively. On the other hand, when the perceived probability of another tax break is higher, the expected tax burden is lower, so shareholders might assign a higher value to cash holdings. Therefore, as a sensitivity check, I partition my main sample into two periods to see if the effect of repatriation taxes on the value of cash holdings differs pre and post-AJCA (excluding AJCA years).

I estimate Eq. (2) in sub-periods before (fiscal year ending before 2003) and after AJCA 2004 (fiscal year starting in or after 2006). Results are presented in Table 10. The coefficient on $\Delta Cash * RepCost$ is negative for both pre- and post-AJCA years for both repatriation cost measures. However, a pooled sample t-test suggests that the coefficients are not significantly different between pre- and post-AJCA years. I also exclude financial crisis years (fiscal years 2008, 2009, and 2010), and the results are qualitatively similar. Therefore, there is insufficient evidence to conclude that the effect of repatriation taxes on the value of cash holdings differs after AJCA 2004.

CHAPTER 5: Conclusion

I investigate how the tax costs of repatriation affect investors' valuation of U.S. multinationals' cash holdings. I find that investors place a discount on cash holdings when they anticipate that firms cannot access those cash holdings without incurring additional tax costs, consistent with repatriation taxes lead to inefficient cash retention and usage. The effect of repatriation taxes on investors' valuation of cash holdings is not uniform across all firms. I find that the negative effect of repatriation taxes on the value of cash holdings is more pronounced for firms with entrenched managers and for firms with aggregated geographic segment disclosure. These findings are consistent with the agency cost of free cash flow story; that is, better disclosure and governance reduce the risk of foreign cash being misused. In addition, I find that the negative effect of repatriation tax costs holds only for firms with limited domestic debt capacity, consistent with repatriation taxes increasing financing costs when foreign funds are the marginal capital source for domestic investments. Lastly, consistent with investors discounting tax-motivated investments in low-return financial assets, the negative effect is more pronounced for firms with high excess cash holdings.

My study has implications for policymakers who seek to evaluate the costs and benefits of the current tax system. As firms locate operations and shift profits overseas, policymakers are concerned about the loss of tax revenue and job opportunities. My findings suggest that shareholders' welfare is also affected because firms sacrifice efficiency along other dimensions (e.g. cash retention and usage, investment and financing decisions) in order to achieve tax efficiency. In other words, the benefit of U.S. tax deferral does not come without cost. Because I rely on investor valuation to infer how cash is retained and used, a caveat of my study is that I do not directly examine firms' real investment and financing behavior. Hanlon et al. (2015) and

Edwards et al. (2015) are two good examples that look at firms' foreign acquisition activities and I believe that more research can be done in this area.

My findings are also relevant for financial statement analysis and for liquidity analysis in particular. Most companies disclose only total cash and key financial ratios, such as the current ratio and quick ratio, are calculated without distinguishing foreign cash from domestic cash. I find that tax-induced foreign cash is valued lower than other cash, and repatriation taxes create a barrier to internal capital flow. Therefore, foreign cash should have different valuation and liquidity implications than domestic cash. Analyzing financial statements using total cash alone might lead to an overstatement of liquidity because it overlooks repatriation taxes. Mandating geographic cash disclosure will aid financial statement users in more accurately analyzing multinationals' cash and liquidity positions.

Repatriation taxes create inefficiencies, and federal tax reform is needed for U.S. multinationals. However, this does not mean that a tax break such as the AJCA 2004 could address the problem. Granting multinational firms a tax break would be unfair to firms that do business only in the U.S. In addition, if they anticipated a future tax break, firms would only have more incentives to locate operations and retain cash overseas. To make sure that firms do not act opportunistically, permanently eliminating repatriation taxes might be a solution. There could be different ways to eliminate repatriation taxes, for example, by moving to a territorial system or dropping the deferral rule. However, my study does not suggest which of these is a better solution, and an answer to this question is left for future research.

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Table 1
Sample Selection and Descriptive Statistics

Panel A: Sample Selection – Compustat Sample

Data Restrictions	# firm-years
All multinational firms from Compustat, fiscal year ≥ 1985	46,847
Remove firm-years that include a change of fiscal year-end	46,498
Remove firms that are not incorporated in the U.S. [fic="USA"]	40,947
Remove utilities and financial firms	38,570
Remove firms with missing SICs	38,443
Firm-years for which I can calculate size and book-to-market matched abnormal return	30,793
Firm-years with data necessary to compute firm-level repatriation tax measures (using RepCost1)	30,316
Firm-years with data necessary to compute firm-level repatriation tax measures (using RepCost2)	30,793

Panel B: Descriptive Statistics – Compustat Sample

Variable	N	Mean	p25	Median	p75	Std Dev
Repatriation cost measures						
<i>RepCost 1</i>	30,314	0.241	0.000	0.000	0.198	0.554
<i>RepCost 2</i>	30,791	0.301	0.000	0.000	0.290	0.646
Variables used in the value of cash regression						
<i>Abnormal return</i> ($r_{i,t} - R_{i,t}^B$)	30,791	-0.029	-0.380	-0.096	0.204	0.687
$\Delta Cash$	30,745	0.011	-0.023	0.003	0.038	0.122
<i>Lagged_Cash</i>	30,771	0.168	0.039	0.097	0.213	0.218
$\Delta Earn$	30,761	0.021	-0.027	0.007	0.038	0.262
ΔNA	30,745	0.024	-0.038	0.033	0.123	0.415
$\Delta R\&D$	30,774	0.000	0.000	0.000	0.004	0.024
$\Delta Interest$	30,761	0.000	-0.002	0.000	0.003	0.023
ΔDiv	30,691	0.000	0.000	0.000	0.001	0.009
<i>Lev</i>	30,618	0.214	0.031	0.156	0.327	0.214
<i>Net Financing</i>	30,774	-0.002	-0.059	-0.012	0.029	0.205

All variables used in the value of cash regression, except for *Abnormal_ret* and *Lev*, are deflated by market value of equity in year t-1. Detailed variable definitions are presented in Appendix A. All continuous variables are winsorized at 1% and 99%.

Table 2
Repatriation Tax Costs and the value of Cash Holdings

$$AR_{i,t} = \beta_0 + \beta_1 RepCost_{i,t-1} + \beta_2 RepCost_{i,t-1} * \Delta Cash_{i,t} + \beta_3 \Delta Cash_{i,t} + \sum \beta_k Control_{k,i,t} + Year\ FE + Industry\ FE + \varepsilon_{i,t}$$

<i>Dependent variable: abnormal return over a fiscal year</i>					
	Pred.	[1]	[2]	[3]	[4]
<i>RepCost1</i>	?	0.001 [0.26]	0.007 [0.78]		
<i>ΔCash*RepCost1</i>	-	-0.080*** [-3.15]	-0.213** [-2.57]		
<i>RepCost2</i>	?			0.003 [1.01]	0.013* [1.74]
<i>ΔCash*RepCost2</i>	-			-0.060** [-2.19]	-0.143** [-2.09]
<i>ΔCash</i>	+	1.780*** [11.34]	1.785*** [11.41]	1.803*** [11.70]	1.798*** [9.61]
<i>ΔEarn</i>	+	0.393*** [9.97]	0.393*** [9.95]	0.391*** [10.09]	0.392*** [10.07]
<i>ΔNA</i>	+	0.234*** [12.08]	0.233*** [12.03]	0.232*** [11.45]	0.231*** [10.03]
<i>ΔR&D</i>	+	-0.322 [-0.75]	-0.326 [-0.76]	-0.310 [-0.74]	-0.312 [-0.57]
<i>ΔInterest</i>	-	-1.017** [-2.76]	-1.017** [-2.76]	-0.959** [-2.44]	-0.959** [-2.28]
<i>ΔDiv</i>	+	1.324*** [3.25]	1.317*** [3.24]	1.398*** [3.55]	1.387*** [2.85]
<i>Lagged_Cash</i>	+	0.361*** [4.35]	0.361*** [4.35]	0.366*** [4.19]	0.367*** [4.61]
<i>Lev</i>	-	-0.528*** [-10.28]	-0.527*** [-10.28]	-0.523*** [-10.10]	-0.524*** [-9.14]
<i>Net Financing</i>	?	-0.182*** [-2.98]	-0.182*** [-2.98]	-0.189*** [-2.85]	-0.189*** [-2.83]
<i>ΔCash*Lagged_Cash</i>	-	-0.297*** [-4.12]	-0.299*** [-4.20]	-0.399*** [-4.72]	-0.396*** -4.59
<i>ΔCash*Lev</i>	-	-1.429*** [-4.97]	-1.425*** [-4.95]	-1.350*** [-4.29]	-1.348*** -3.29
Number of observations		30,090	30,090	30,559	30,559
Adjusted R-squared		0.219	0.219	0.219	0.219
Standard error clustered by calendar year		Yes	Yes	Yes	Yes

Detailed variable definitions are presented in Appendix A. Because repatriation cost is bounded below by zero, its distribution is right skewed. To account for the lack of normality in this variable, In Columns (1) and (3), I rank firms into quintiles by industry and year. Firm-years with *Repatriation Cost* = 0 are assigned to quintile 1, and the remaining firm-years are assigned to four equal-sized quintiles (quintiles 2-5). In Columns (2) and (4), I code *RepCost* as 0 if repatriation tax cost is zero, and as 1 if repatriation tax cost is greater than zero. All explanatory variables, except for *Leverage*, are deflated by market value of equity in t-1. t-statistics are reported in brackets. *, **, and *** indicate significance (two-tailed) at the 10%, 5%, and 1% level, respectively. Standard errors are clustered by year to account for cross-sectional dependence in stock returns. Year and industry fixed effects are included.

Table 3
Repatriation Tax Costs and the value of Cash Holdings:
Conditional on the Actual Level of Foreign Cash Holdings

Panel A: Determinants of foreign cash disclosure – probit model

	Spec. 1	Spec. 2	Marginal Effects
	<u>Coefficient</u>	<u>Coefficient</u>	[using Spec. 2]
<i>Intercept</i>	-2.73*** [-50.40]	-2.57*** [-60.93]	
<i>SEC Comment on t-1 10-K</i>	0.93*** [8.70]	0.94*** [8.73]	18.43%
<i>RepCost1</i>	0.12*** [8.46]	0.29*** [9.49]	5.35%
<i>Size</i>	0.09*** [12.14]	0.07** [2.23]	1.31%
<i>Big 4</i>	0.01 [0.37]	0.13*** [3.31]	2.41%
<i>Foreign Earnings Fraction</i>	0.00 [-0.15]	0.36*** [11.62]	6.71%
Number of observations	25,289	25,289	
Pseudo R-squared	0.1718	0.1886	
Year dummies	Yes	Yes	

The probit model is estimated using all firm-year observations in the Compustat final sample (30,316 obs). The dependent variable is whether the firm discloses its foreign cash holdings in year t. *SEC Comment on t-1 10-K* is coded as 1 if the firm receives a foreign cash related comment letter for fiscal year t-1's 10-K, and 0 otherwise. *RepCost1* is a measure of repatriation tax costs defined in Appendix A. *Size* is the natural log of total assets in period t. *Big4* is coded 1 if the firm is audited by big four accounting firms and 0 otherwise. *Foreign earnings fraction* is calculated as $pifo/(pifo+pidom)$. In Spec. 2, *RepCost1*, *Size*, and *Foreign Earnings Fraction* are coded as binary variables based on pooled sample median.

Panel B: Correct for Self-selection

$$r_{i,t} - R_{i,t}^B = \beta_0 + \beta_1 RepCost_{i,t-1} + \beta_2 RepCost_{i,t-1} * \Delta Cash_{i,t} + \beta_3 \Delta Cash_{i,t} + \sum \beta_k Control_{k,i,t} + Year\ FE + Industry\ FE + \varepsilon_{i,t}$$

<i>Dependent variable: abnormal return over a fiscal year</i>					
	Pred.	Low Foreign Cash	High Foreign Cash	Low Foreign Cash	High Foreign Cash
<i>RepCost1</i>	?	-0.019** [-2.43]	-0.010 [-1.31]	-0.026*** [-4.32]	-0.011** [-2.28]
<i>ΔCash*RepCost1 (β₂)</i>	-	0.126 [1.27]	-0.261*** [-3.81]	0.113 [1.24]	-0.194** [-2.47]
<i>ΔCash</i>	+	1.579*** [5.02]	2.614*** [3.84]	1.456*** [5.32]	2.294*** [3.18]
<i>Mills</i>	?	0.021 [0.41]	0.032 [0.92]	-0.093* [-2.07]	0.009 [0.14]
<i>ΔEarn</i>	+	0.303** [2.22]	0.396** [3.01]	0.403*** [3.74]	0.431*** [3.05]
<i>ΔNA</i>	+	0.513*** [5.90]	0.453*** [4.45]	0.567*** [7.66]	0.461*** [4.96]
<i>ΔR&D</i>	+	1.907 [1.17]	0.100 [0.12]	2.723* [2.03]	0.516 [0.65]
<i>ΔInterest</i>	-	-3.284*** [-3.16]	-0.905 [-0.55]	-2.694** [-2.15]	-0.979 [-0.60]
<i>ΔDiv</i>	+	1.832* [1.85]	0.549 [0.94]	2.064* [1.87]	0.727 [1.19]
<i>lagged_Cash</i>	+	0.315** [2.31]	0.348*** [6.25]	0.271* [2.06]	0.316*** [5.49]
<i>Lev</i>	-	-0.339*** [-3.89]	-0.427*** [-3.48]	-0.318*** [-3.83]	-0.358*** [-3.51]
<i>Net Financing</i>	?	-0.476*** [-3.10]	-0.849*** [-7.01]	-0.556*** [-4.81]	-0.810*** [-7.26]
<i>ΔCash*lagged_Cash</i>	-	-0.125 [-0.62]	-0.697 [-1.09]	0.015 [0.08]	-0.457 [-0.73]
<i>ΔCash*Lev</i>	-	0.476 [0.99]	-1.422 [-1.48]	0.475 [1.02]	-1.566 [-1.75]
Test equality of β ₂ across samples		p-value=0.047**		p-value=0.0745*	
VIF on Mills' ratio		1.15		13.47	
n obs		1,034	1,073	1,034	1,073
Pseudo R-squared		0.236	0.246	0.316	0.334
Standard error clustered by year		Yes	Yes	Yes	Yes
Year fixed effects		No	No	Yes	Yes
Industry fixed effects		Yes	Yes	Yes	Yes

Detailed variable definitions are presented in Appendix A. t-statistics are reported in parentheses. *, **, and *** indicate significance (two-tailed) at the 10%, 5%, and 1% level, respectively. Standard errors are clustered by year to account for cross-sectional dependence in stock returns. Year and industry fixed effects are included.

Table 4
Valuation of Tax-induced Foreign Cash Holdings

$$r_{i,t} - R_{i,t}^B = \beta_0 + \beta_1 \Delta TIFC_{i,t} + \beta_2 \Delta CIFC_{i,t} + \beta_3 \Delta Cash_{i,t} + \sum \beta_k Control_{k,i,t} + Year\ FE + Industry\ FE + \varepsilon_{i,t}$$

<i>Dependent variable: abnormal return over a fiscal year</i>		
	Pred.	Coefficient estimates
$\Delta TIFC (\beta_1)$	+	0.736*** [5.47]
$\Delta CIFC (\beta_2)$	+	3.514*** [11.53]
$\Delta Cash (\beta_3)$	+	1.107*** [9.24]
$\Delta Earn$	+	0.227*** [7.44]
ΔNA	+	0.205*** [12.92]
$\Delta R\&D$	+	-1.202** [-2.75]
$\Delta Interest$	-	-0.054 [-0.20]
ΔDiv	+	3.311*** [7.03]
$lagged_Cash$	+	0.198*** [3.02]
Lev	-	-0.531*** [-11.07]
$Net\ Financing$	?	-0.023 [-0.46]
$\Delta Cash * lagged_Cash$	-	-0.093 [-1.19]
$\Delta Cash * Lev$	-	-1.039*** [-3.63]
$\beta_1 = \beta_3?$		p-value=0.0596*
$\beta_1 = \beta_2?$		p-value<0.0001***
$\beta_2 = \beta_3?$		p-value<0.0001***
n obs		28,860
Adj R-squared		0.300
Standard error clustered by year		Yes

Detailed variable definitions are presented in Appendix A. t-statistics are reported in parentheses. *, **, and *** indicate significance (two-tailed) at the 10%, 5%, and 1% level, two-tailed, respectively. Standard errors are clustered by year to account for cross-sectional dependence in stock returns. $\Delta TIFC$ is annual change in tax-induced foreign cash holdings scaled by lagged market value of equity. $\Delta CIFC$ is annual change in controls-induced foreign cash holdings scaled by lagged market value of equity. I rank repatriation cost by year and industry into quintiles, and firms with zero repatriation cost are forced into quintile 1. The *Low Repatriation Cost* group includes firms in quintile 2, and the *High Repatriation Cost* group includes firms in quintile 5.

Table 5
Testing H2a: Firms Partitioned Based on the Entrenchment Index

$$r_{i,t} - R_{i,t}^B = \beta_0 + \beta_1 \text{RepatriationCost}_{i,t-1} + \beta_2 \text{RepatriationCost}_{i,t-1} * \Delta \text{Cash}_{i,t} + \beta_3 \Delta \text{Cash}_{i,t} \\ + \sum \beta_k \text{Control}_{k,i,t} + \text{Year FE} + \text{Industry FE} + \varepsilon_{i,t}$$

<i>Dependent variable: abnormal return over a fiscal year</i>					
	Pred.	Strong gov	Weak gov	Strong gov	Weak gov
<i>RepCost1</i>	?	-0.001 [-0.29]	-0.006* [-1.96]		
<i>ΔCash*RepCost1</i>	-	-0.033 [-0.48]	-0.279*** [-3.86]		
<i>RepCost2</i>	?			0.002 [0.44]	-0.002 [-0.45]
<i>ΔCash*RepCost2</i>	-			-0.012 [-0.19]	-0.204** [-2.71]
<i>ΔCash</i>	+	2.104*** [7.86]	2.380*** [7.74]	2.069*** [7.71]	2.319*** [7.41]
<i>ΔEarn</i>	+	0.437*** [5.43]	0.334*** [6.61]	0.440*** [5.40]	0.325*** [6.37]
<i>ΔNA</i>	+	0.305*** [6.02]	0.284*** [6.91]	0.301*** [5.75]	0.282*** [6.79]
<i>ΔR&D</i>	+	-0.374 [-0.56]	-1.106* [-2.02]	-0.364 [-0.54]	-1.096* [-1.96]
<i>ΔInterest</i>	-	-0.921 [-0.96]	-0.231 [-0.29]	-0.919 [-0.95]	-0.206 [-0.26]
<i>ΔDiv</i>	+	0.549 [0.63]	0.953 [1.24]	0.487 [0.57]	0.963 [1.25]
<i>lagged_Cash</i>	+	0.501*** [5.34]	0.391*** [4.64]	0.502*** [5.27]	0.393*** [4.69]
<i>Lev</i>	-	-0.515*** [-7.27]	-0.534*** [-9.72]	-0.513*** [-7.36]	-0.528*** [-9.46]
<i>Net Financing</i>	?	-0.401*** [-4.37]	-0.285*** [-2.93]	-0.400*** [-4.36]	-0.288*** [-3.01]
<i>ΔCash*lagged_Cash</i>	-	0.023 [0.06]	-0.466** [-2.29]	0.018 [0.05]	-0.461** [-2.23]
<i>ΔCash*Lev</i>	-	-2.081*** [-3.23]	-2.729*** [-5.60]	-2.052*** [-3.03]	-2.609*** [-5.54]
Test equality of β_2 across samples		p-value=0.0045***		p-value=0.0073***	
n obs		7,575	7,243	7,602	7,257
Adj R-squared		0.2234	0.2388	0.2223	0.2356
Standard error clustered by year		Yes	Yes	Yes	Yes

In this test, I partition firm-years based on the Bebchuk et al. (2009) Entrenchment Index (E-Index). The E-Index is based on corporate governance data published by the Investor Responsibility Research Center (IRRC). IRRC published six volumes in 1990, 1993, 1995, 1998, 1999 and 2002. Following Bebchuk et al. (2009), I assume that the firms' governance provisions as reported in a given IRRC volume were in place during the period immediately following the publication of the volume until the publication of the subsequent volume. For example, if the E-Index based on the 1999 volume is 2, then I assume the index is 2 for 2000 and 2001. Firm-years with *above* (below) industry-year (Fama French 48 Industry classification) median E-Indexes are classified as *bad* (good) governance firms. Detailed variable definitions are presented in Appendix A. t-statistics are reported in parentheses. *, **, and *** indicate significance (two-tailed) at

the 10%, 5%, and 1% level, respectively. Standard errors are clustered by year to account for cross-sectional dependence in stock returns. Year and industry fixed effects are included.

Table 6
Testing H2b: Firms Partitioned Based on Geographic Segment Disclosure

$$r_{i,t} - R_{i,t}^B = \beta_0 + \beta_1 \text{RepatriationCost}_{i,t-1} + \beta_2 \text{RepatriationCost}_{i,t-1} * \Delta \text{Cash}_{i,t} + \beta_3 \Delta \text{Cash}_{i,t} \\ + \sum \beta_k \text{Control}_{k,i,t} + \text{Year FE} + \text{Industry FE} + \varepsilon_{i,t}$$

<i>Dependent variable: abnormal return over a fiscal year</i>					
	Pred.	Non-discloser	Discloser	Non-discloser	Discloser
<i>RepCost1</i>	?	-0.001 [-0.14]	-0.002 [-0.47]		
<i>ΔCash*RepCost1</i>	-	-0.313*** [-4.28]	-0.128** [-2.80]		
<i>RepCost2</i>	?			0.001 [0.09]	0.003 [0.80]
<i>ΔCash*RepCost2</i>	-			-0.183* [-2.00]	-0.087 [-1.60]
<i>ΔCash</i>	+	2.097*** [7.33]	2.420*** [9.50]	2.027*** [6.40]	2.450*** [9.96]
<i>ΔEarn</i>	+	0.351*** [4.72]	0.352*** [4.26]	0.351*** [4.46]	0.337*** [4.28]
<i>ΔNA</i>	+	0.300*** [5.39]	0.265*** [6.05]	0.294*** [5.43]	0.268*** [6.18]
<i>ΔR&D</i>	+	-0.661 [-0.48]	-1.573*** [-3.06]	-0.353 [-0.24]	-1.672*** [-3.24]
<i>ΔInterest</i>	-	-1.567* [-1.79]	-1.627* [-2.00]	-1.488 [-1.66]	-1.306 [-1.39]
<i>ΔDiv</i>	+	1.254 [1.52]	0.658 [0.78]	1.630** [2.38]	0.716 [0.85]
<i>lagged_Cash</i>	+	0.455** [2.55]	0.417*** [4.00]	0.477** [2.36]	0.424*** [4.11]
<i>Lev</i>	-	-0.406*** [-5.60]	-0.593*** [-6.19]	-0.414*** [-6.19]	-0.578*** [-5.90]
<i>Net Financing</i>	?	-0.385** [-2.66]	-0.349*** [-3.68]	-0.380** [-2.61]	-0.383*** [-3.58]
<i>ΔCash*lagged_Cash</i>	-	0.057 [0.25]	-0.629*** [-3.03]	-0.305 [-1.52]	-0.691*** [-3.38]
<i>ΔCash*Lev</i>	-	-1.606*** [-3.26]	-1.825*** [-3.79]	-1.024* [-1.88]	-1.787*** [-3.78]
Test equality of β_2 across samples		p-value=0.083*		p-value=0.327	
n obs		4,573	11,477	4,675	11,698
Adj R-squared		0.2133	0.248	0.2082	0.246
Standard error clustered by year		yes	yes	yes	yes

Only firm-years starting on or after December 15, 1997 are included in this test. Following Hope and Thomas (2008), if a firm discloses two or more non-domestic geographic segments under SFAS 131, I code it as a “discloser”. If the firm does not report geographic segments or aggregate all foreign subsidiaries into one foreign segment, I code it as a “non-discloser.” Detailed variable definitions are presented in Appendix A. t-statistics are reported in parentheses. *, **, and *** indicate significance (two-tailed) at the 10%, 5%, and 1% level, respectively. Standard errors are clustered by year to account for cross-sectional dependence in stock returns. Year and industry fixed effects are included.

Table 7
Testing H2c: Firms Partitioned Based on Domestic Borrowing Capacity

$$r_{i,t} - R_{i,t}^B = \beta_0 + \beta_1 \text{RepatriationCost}_{i,t-1} + \beta_2 \text{RepatriationCost}_{i,t-1} * \Delta \text{Cash}_{i,t} + \beta_3 \Delta \text{Cash}_{i,t} \\ + \sum \beta_k \text{Control}_{k,i,t} + \text{Year FE} + \text{Industry FE} + \varepsilon_{i,t}$$

Dependent variable: abnormal return over a fiscal year

	Pred.	U.S. unconstrained	U.S. constrained	U.S. unconstrained	U.S. constrained
<i>RepCost1</i>	?	-0.003 [-0.82]	-0.001 [-0.15]		
<i>ΔCash*RepCost1 (β₂)</i>	-	-0.009 [-0.16]	-0.094*** [-3.48]		
<i>RepCost2</i>	?			-0.003 [-0.94]	0.003 [0.81]
<i>ΔCash*RepCost2 (β₂)</i>	-			0.020 [0.41]	-0.073** [-2.38]
<i>ΔCash</i>	+	1.396*** [5.68]	1.865*** [11.47]	1.320*** [5.90]	1.892*** [11.66]
<i>ΔEarn</i>	+	0.491*** [12.50]	0.390*** [9.29]	0.472*** [11.31]	0.386*** [9.36]
<i>ΔNA</i>	+	0.142*** [4.04]	0.237*** [11.87]	0.152*** [4.49]	0.234*** [11.10]
<i>ΔR&D</i>	+	0.811 [1.38]	-0.379 [-0.85]	0.829 [1.44]	-0.375 [-0.86]
<i>ΔInterest</i>	-	-0.816 [-1.36]	-1.210*** [-3.17]	-1.118* [-1.95]	-1.136** [-2.75]
<i>ΔDiv</i>	+	0.984 [0.88]	1.480*** [3.88]	1.109 [1.03]	1.553*** [4.30]
<i>lagged_Cash</i>	+	0.398*** [4.52]	0.387*** [4.38]	0.383*** [4.49]	0.395*** [4.23]
<i>Lev</i>	-	-0.531*** [-10.33]	-0.524*** [-9.32]	-0.523*** [-10.24]	-0.518*** [-9.14]
<i>Net Financing</i>	?	-0.212*** [-4.29]	-0.175** [-2.59]	-0.219*** [-4.28]	-0.184** [-2.51]
<i>ΔCash*lagged_Cash</i>	-	-0.033 [-0.12]	-0.324*** [-4.10]	-0.098 [-0.34]	-0.435*** [-4.93]
<i>ΔCash*Lev</i>	-	-1.757*** [-2.89]	-1.453*** [-4.66]	-1.680*** [-2.85]	-1.352*** [-3.95]
Test equality of β ₂ across samples		p-value=0.1232		p-value=0.1301	
n obs		6,744	21,577	6,789	21,960
Adj R-squared		0.2369	0.2288	0.2346	0.2283
Standard error clustered by year		Yes	Yes	Yes	Yes

I use Compustat S&P domestic long-term issuer rating to measure a firm's ability to raise domestic debt (Faulkender and Petersen 2006). If a firm has above investment grade S&P domestic long (short) issuer credit rating, then I code it as *unconstrained*. If there is no available rating or the rating is below investment grade, then the firm is *constrained*. Detailed variable definitions are presented in Appendix A. t-statistics are reported in parentheses. *, **, and *** indicate significance (two-tailed) at the 10%, 5%, and 1% level, respectively. Standard errors are clustered by year to account for cross-sectional dependence in stock returns. Year and industry fixed effects are included.

Table 8
Testing H2d: Firms Partitioned Based on Investment in Financial Assets

$$r_{i,t} - R_{i,t}^B = \beta_0 + \beta_1 RepCost_{i,t-1} + \beta_2 RepCost_{i,t-1} * \Delta Cash_{i,t} + \beta_3 \Delta Cash_{i,t} + \sum \beta_k Control_{k,i,t} + Year\ FE + Industry\ FE + \varepsilon_{i,t}$$

Dependent variable: abnormal return over a fiscal year

	Pred.	<i>Low excess cash</i>	<i>High excess cash</i>	<i>Low excess cash</i>	<i>High excess cash</i>
<i>RepCost1</i>	?	-0.002 [-0.61]	0.009* [2.04]		
<i>ΔCash*RepCost1</i>	-	0.072 [1.19]	-0.166*** [-4.20]		
<i>RepCost2</i>	?			0.001 [0.16]	0.009** [2.15]
<i>ΔCash*RepCost2</i>	-			0.038 [0.78]	-0.126*** [-3.18]
<i>ΔCash</i>	+	1.479*** [6.89]	1.945*** [10.21]	1.593*** [6.66]	1.936*** [10.18]
<i>ΔEarn</i>	+	0.362*** [7.79]	0.431*** [9.48]	0.346*** [7.52]	0.439*** [9.56]
<i>ΔNA</i>	+	0.239*** [9.94]	0.210*** [7.88]	0.241*** [10.43]	0.208*** [7.52]
<i>ΔR&D</i>	+	-0.483 [-0.87]	-0.247 [-0.50]	-0.594 [-1.05]	-0.113 [-0.22]
<i>ΔInterest</i>	-	-0.558 [-1.54]	-1.181** [-2.48]	-0.408 [-1.04]	-1.226** [-2.66]
<i>ΔDiv</i>	+	1.783*** [3.85]	1.421** [2.66]	1.850*** [4.48]	1.605*** [2.93]
<i>lagged_Cash</i>	+	0.547*** [4.21]	0.396*** [4.78]	0.560*** [4.02]	0.400*** [4.60]
<i>Lev</i>	-	-0.653*** [-13.66]	-0.499*** [-8.02]	-0.643*** [-13.27]	-0.503*** [-8.40]
<i>Net Financing</i>	?	-0.372*** [-4.44]	-0.044 [-1.06]	-0.385*** [-3.99]	-0.046 [-1.10]
<i>ΔCash*lagged_Cash</i>	-	-0.150 [-0.69]	-0.347*** [-3.70]	-0.360* [-1.94]	-0.443*** [-3.87]
<i>ΔCash*Lev</i>	-	-0.612 [-1.35]	-1.672*** [-4.90]	-0.592 [-1.42]	-1.523*** [-3.79]
Test equality of β_2 across samples		p-value=0.0071***		p-value=0.0167 **	
n obs		12,464	13,100	12,671	13,309
Adj R-squared		0.2349	0.2411	0.2359	0.2400
Standard error clustered by year		Yes	Yes	Yes	Yes

I first estimate Eq. (4) by industry and year to get an estimate of excess cash holdings (untabulated). The low (high) excess cash sample includes firm-years with excess cash below (above) industry-year median. Detailed variable definitions are presented in Appendix A. t-statistics are reported in parentheses. *, **, and *** indicate significance (two-tailed) at the 10%, 5%, and 1% level, respectively. Standard errors are clustered by year to account for cross-sectional dependence in stock returns. Year and industry fixed effects are included.

Table 9
Difference-in-differences Analysis around AJCA 2004

$$r_{i,t} - R_{i,t}^B = \beta_0 + \beta_1 \text{Holiday} * \Delta \text{Cash} * \text{Treatment} + \beta_2 \Delta \text{Cash} * \text{Treatment} + \beta_3 \text{Holiday} + \beta_4 \text{Holiday} * \text{Treatment} + \beta_5 \text{Holiday} * \Delta \text{Cash} + \beta_6 \text{Treatment} + \beta_7 \Delta \text{Cash} + \sum \beta_k \text{Controls} + \varepsilon_{i,t}$$

<i>Dependent variable: abnormal return over a fiscal year</i>			
	Pred.	RepCost 1	RepCost 2
<i>Holiday*ΔCash*Treatment</i>	+	1.075**	0.744***
		[2.30]	[3.21]
<i>ΔCash*Treatment</i>	?	-0.414	-0.235
		[-1.15]	[-1.35]
<i>Holiday</i>	?	-0.037	-0.022
		[-0.35]	[-0.40]
<i>Holiday* Treatment</i>	?	-0.042	-0.070**
		[-0.63]	[-2.07]
<i>Holiday*ΔCash</i>	?	-1.436**	-0.647
		[-2.21]	[-1.15]
<i>Treatment</i>	?	0.022	0.029
		[1.06]	[1.37]
<i>ΔCash</i>	+	2.496***	2.202***
		[4.91]	[4.56]
<i>Controls</i>		Yes	Yes
n obs		3,066	3,583
Adj R-squared		0.1846	0.1928
Standard error clustered by year		Yes	Yes
Year fixed effects		Yes	Yes
Industry fixed effects		Yes	Yes

For the difference-in-differences analysis, I use data up to fiscal 2005. I define *Holiday* = 1 for fiscal years 2003, 2004, and 2005, and *Holiday* = 0 for fiscal years 1985 to 2002. The treatment group includes firms with high repatriation costs (quintile 5), and the control group includes firms with low repatriation costs (quintile 2). Detailed variable definitions are presented in Appendix A. Coefficient estimates on control variables are omitted for brevity. t-statistics are reported in brackets. *, **, and *** indicate significance (two-tailed) at the 10%, 5%, and 1% level, respectively. Standard errors are clustered by year to account for cross-sectional dependence in stock returns. Year and industry fixed effects are included.

Table 10
Repatriation Tax Costs and the value of Cash Holdings, pre- and post-AJCA 2004 Analysis

$$r_{i,t} - R_{i,t}^B = \beta_0 + \beta_1 \text{RepCost}_{i,t-1} + \beta_2 \text{RepCost}_{i,t-1} * \Delta \text{Cash}_{i,t} + \beta_3 \Delta \text{Cash}_{i,t} + \sum \beta_k \text{Control}_{k,i,t} + \text{Year FE} + \text{Industry FE} + \varepsilon_{i,t}$$

<i>Dependent variable: abnormal return over a fiscal year</i>					
	Pred.	Pre AJCA	Post AJCA	Pre AJCA	Post AJCA
<i>RepCost1</i>	?	0.005 [1.34]	-0.005 [-0.83]		
<i>ΔCash*RepCost1</i> (β_2)	-	-0.031 [-0.92]	-0.108** [-3.26]		
<i>RepCost2</i>	?			0.004 [0.99]	0.000 [-0.01]
<i>ΔCash*RepCost2</i> (β_2)	-			-0.050 [-1.58]	-0.048 [-1.17]
<i>ΔCash</i>	+	1.728*** [7.13]	1.670*** [9.59]	1.754*** [7.44]	1.677*** [9.65]
<i>ΔEarn</i>	+	0.327*** [6.35]	0.359*** [7.99]	0.327*** [6.36]	0.350*** [8.01]
<i>ΔNA</i>	+	0.226*** [11.22]	0.250*** [6.66]	0.225*** [11.40]	0.250*** [6.78]
<i>ΔR&D</i>	+	0.392 [1.37]	-0.165 [-0.31]	0.392 [1.40]	-0.100 [-0.29]
<i>ΔInterest</i>	-	-1.355*** [-3.41]	0.180 [0.35]	-1.349*** [-3.44]	0.368 [0.69]
<i>ΔDiv</i>	+	1.087* [1.76]	1.034** [2.75]	1.097* [1.74]	1.143** [3.18]
<i>lagged_Cash</i>	+	0.266*** [3.79]	0.374* [2.29]	0.264*** [3.76]	0.391* [2.26]
<i>Lev</i>	-	-0.604*** [-8.44]	-0.368*** [-6.14]	-0.604*** [-8.46]	-0.352*** [-5.64]
<i>Net Financing</i>	?	-0.121** [-2.45]	-0.464*** [-3.64]	-0.119** [-2.39]	-0.492** [-3.40]
<i>ΔCash*lagged_Cash</i>	-	-0.537*** [-3.43]	-0.393*** [-4.97]	-0.529*** [-3.41]	-0.555*** [-5.37]
<i>ΔCash*Lev</i>	-	-1.513*** [-4.48]	-0.316 [-0.77]	-1.530*** [-4.69]	-0.129 [-0.30]
Test equality of β_2 across samples		p-value=0.12		p-value=0.93	
n obs		16,708	10,032	16,812	10,401
Adj R-squared		0.1998	0.2508	0.1998	0.2517
Standard error clustered by year		Yes	Yes	Yes	Yes

The pre-AJCA sample includes fiscal years ending before 2003. The post-AJCA sample includes fiscal years starting after 2005. Detailed variable definitions are presented in Appendix A. t-statistics are reported in brackets. *, **, and *** indicate significance (two-tailed) at the 10%, 5%, and 1% level, respectively. Standard errors are clustered by year to account for cross-sectional dependence in stock returns. Year and industry fixed effects are included.

Appendix A: Variable Definitions

Repatriation cost measures

<i>RepCost 1</i>	Pre-tax foreign income (<i>pifo</i>) multiplied by marginal tax rate (MTR), minus current foreign income tax expense (<i>txfo</i>), scaled by total assets and multiplied by 100. MTR is the marginal tax rate after interest deductions (Blouin et al. 2010).
<i>RepCost 2</i>	Similar to <i>RepCost 1</i> , but using U.S. corporate statutory tax rate instead of marginal tax rate.

Value of cash regression

$r_{i,t} - R_{i,t}^B$	Abnormal stock return over the fiscal year. To calculate the benchmark return for firm <i>i</i> in fiscal year <i>t</i> , I assign firm <i>i</i> to a benchmark portfolio at the end of fiscal year <i>t</i> -1 using the size and book-to-market breakpoints from Ken French's website (5*5 portfolios).
$\Delta Cash_{i,t}$	Annual change in cash holdings (<i>che</i>) scaled by lagged market value of equity (<i>prcc_f*cscho</i>).
$\Delta Earn_{i,t}$	Annual change in earnings before extraordinary items (<i>ib+xint+txdi+itci</i>) scaled by lagged market value of equity (<i>prcc_f*cscho</i>). If <i>xint</i> , <i>txdi</i> or <i>itci</i> is missing and <i>ib</i> is not missing, then set <i>xint</i> , <i>txdi</i> , and <i>itci</i> to zero.
$\Delta NetAsset_{i,t}$	Annual change in net assets scaled by lagged market value of equity (<i>prcc_f*cscho</i>). Net assets is defined as total assets minus cash (<i>at-che</i>).
$\Delta R\&D_{i,t}$	Annual change in R&D expense (<i>xrd</i>) scaled by lagged market value of equity (<i>prcc_f*cscho</i>). If <i>xrd</i> is missing, set R&D expense to 0.
$\Delta Interest_{i,t}$	Annual change in interest expense (<i>xint</i>) scaled by lagged market value of equity (<i>prcc_f*cscho</i>).
$\Delta Div_{i,t}$	Annual change in common dividends (<i>dvc</i>) scaled by lagged market value of equity (<i>prcc_f*cscho</i>).
<i>Leverage_{i,t}</i>	Long-term debt plus debt in current liabilities divided by the sum of total debt and market value of equity: (<i>dltt+dlc</i>)/(<i>dltt+dlc+prcc_f*cscho</i>).
<i>NetFin_{i,t}</i>	Net external financing scaled by scaled by lagged market value of equity (<i>prcc_f*cscho</i>). Net external financing is calculated as the sum of net equity financing and net debt financing. Net equity financing is measured as the proceeds from the sale of common and preferred stock (<i>sstk</i>) less cash payments for the purchase of common and preferred stock (<i>prstk</i>) less cash payments for dividends (<i>dv</i>). Net debt financing is measured as the cash proceeds from the issuance of long-term debt (<i>dltis</i>), less cash payments for long-term debt reductions (<i>dltr</i>), less the net changes in current debt (<i>dlcch</i>) (Bradshaw et al. 2006).
$\Delta TIFC_{i,t}$	Tax-induced foreign cash holdings scaled by lagged market value of equity (<i>prcc_f*cscho</i>). Tax-induced foreign cash holdings are calculated as: $\exp(\hat{\beta}_1 * Repatriation\ Cost) - 1$. $\hat{\beta}_1$ is from a first-stage regression reported in Table B2.
$\Delta CIFC_{i,t}$	Controls-induced foreign cash holdings scaled by lagged market value of equity (<i>prcc_f*cscho</i>). Controls-induced foreign cash holdings are calculated as: $\exp(\sum \hat{\beta}_k * Controls) - 1$. $\hat{\beta}_k$ s are from a first-stage regression reported in Table B2.

Variables used in the excess cash estimation model

$Leverage_{i,t}$	Leverage: long-term debt plus debt in current liabilities divided by book assets $((dltt+dlc)/at)$.
$IndVolCashFlow_{i,t}$	Industry cash flow risk: first compute cash flow standard deviation for the previous 10 years for each firm, then take the average across the two-digit SIC industry.
$MTB_{i,t}$	Market-to-book ratio: Book value of assets (at) minus the book value of equity (ceq) plus the market value of equity ($prcc_f*csho$), divided by book value of assets (at).
$Size_{i,t}$	Firm size: logarithm of book assets (at).
$Div_{i,t}$	Dividend payout dummy: equals one in years in which a firm pays a common dividend (dvc).
$Capex_{i,t}$	Capital expenditure to assets: capital expenditures ($capx$) to book assets (at).
$Acquisition_{i,t}$	Acquisitions to assets: acquisitions/book assets (aqc/at).
$CashFlow_{i,t}$	Cash flow to assets: earnings after interest, dividends, and taxes but before depreciation divided by book assets $((oibdp-xint-txt-dvc)/at)$.
$RD_{i,t}$	R&D to sales: $xrd/sale$, set R&D to zero if it is missing.

Appendix B: Estimating Tax-induced Foreign Cash Holdings

I use a hand-collected foreign cash sample (described in 3.1.2) to estimate a first stage foreign cash determinant model. Following Foley et al. (2007) and Hanlon et al. (2015), I regress a firm's disclosed foreign cash holdings on repatriation taxes and a set of control variables. This first-stage regression allows me to partition foreign cash holdings into two components: (1) tax-induced foreign cash holdings (TIFC) that are due to repatriation taxes, and (2) control-induced foreign cash holdings (CIFC) that are due to other control variables.

I estimate the following regression:

$$\log[\text{foreign cash}/\text{total assets} + 1] = \beta_0 + \beta_1 \text{RepCost}_{i,t} + \sum \gamma_k \text{Controls}_{k,i,t} + \varepsilon_{i,t} \quad (\text{B1})$$

Controls include the following variables:

- *Size*: the natural logarithm of total assets.
- *DomIncome*: pre-tax domestic income scaled by total assets.
- *DivDummy*: Dummy variable set to one if the firm pays a dividend in year t, and zero otherwise.
- *BTM*: book value of equity (*ceq*) divided by market value of equity (*prcc_f*cscho*).
- *StdOpInc*: Standard deviation of the ratio of operating income before depreciation to total assets, measured by firm over year t-9 to t. Following Bates et al. (2009), for each time series, I require at least three non-missing observations to calculate the standard deviation.
- *RD*: R&D expense scaled by total assets. If R&D expense is missing, then set it to zero.
- *Capex*: capital expenditure scaled by total assets.
- *MktLeverage*: the ratio of long- and short-term debt to the sum of long- and short-term debt and the market value of equity.

Descriptive statistics for variables used in the first-stage regression are reported in Table B1. There are several interesting observations. First, the mean repatriation costs in this sample is 0.600, more than two times larger than that of the Compustat sample. It is not surprising that firms with higher repatriation costs are scrutinized more closely and requested by the SEC to disclose their foreign cash holdings.

Second, after log transformation, the average foreign cash to total assets ratio in Hanlon et al. (2015) is about 1% (using BEA data). In my sample, using firm-disclosed foreign cash data, this ratio is about 10.4%. The large difference could be due to different sample periods. The majority of my foreign cash data are from fiscal years 2011-2013, while Hanlon et al. (2015) look at four years: 1989, 1994, 1999, and 2004 (BEA conducts its benchmark survey every five years). Foreign cash is increasing over time. Therefore, it is not surprising that in my sample, foreign cash to total assets ratio is higher.

Because the dependent variable, foreign cash scaled by total assets, is highly skewed, I log transform the dependent variable. I use $\log(y+1)$ transformation because the foreign cash to total assets ratio falls between (0, 1) and adding 1 to the ratio avoids getting large negative values.²⁹ For brevity, I report only the results using the $\log(y+1)$ transformation.

Table B2 presents results of estimating Eq. (B1). In column (1), I report results from a pooled regression. Coefficients in column (1) will be used to partition foreign cash holdings into tax-induced versus controls-induced components. Industry and year fixed effects are included to account for stable industry characteristics and time effects. Standard errors are clustered by firm to account for serial correlation in foreign cash holdings.

We see that the tax costs of repatriation have a strong and positive effect on foreign cash holdings, consistent with findings in Foley et al. (2007) and Hanlon et al. (2015). The coefficient is 3.308, which suggests that if the tax costs of repatriation (scaled by total assets) increase by 1%, foreign cash to assets ratio will increase by 3.36%. Size is not significant, probably because (1) large firms tend to hold less cash in general (the transaction cost motive suggests economies of scale in cash holdings); and (2) large firms tend to hold more foreign cash because they have the

²⁹ Results are not sensitive to transformation. I also use the Hanlon et al. (2015) transformation in which they do not add 1.

ability to move profit overseas. Because these two effects work against each other, on average size does not load. Domestic income (*DomIncome*), standard deviation of operating income (*StdOpInc*), and R&D are not significant, consistent with Hanlon et al. (2015). Dividend dummy is negative and marginally significant. It is possible that firms that hold less foreign cash have more slack to pay dividends. Book to market is negative and significant, probably because firms with more growth opportunities invest more and retain more cash overseas. Interestingly, in my sample, capital expenditure has a negative and significant effect on foreign cash holdings, while in Hanlon et al. (2015), capital expenditure (*Capex*) is either insignificant or positive. It could be that capital-intensive firms are limited in their ability to move profits overseas; therefore they hold less foreign cash.

Foley et al. (2007) find that repatriation taxes are positively associated with foreign cash holdings; however, they fail to find evidence that repatriation taxes decrease domestic cash holdings. Using firm-disclosed foreign versus domestic cash data, I re-estimate model (B1) using domestic cash holdings as the dependent variable (untabulated). In the pooled sample, I find strong evidence that repatriation taxes are negatively associated with domestic cash holdings, which suggests that domestic cash can substitute for foreign cash, but not perfectly (the coefficient on repatriation cost, $-1.052 < 3.308$). The coefficient on *RepCost*, 1.052 implies that if tax costs of repatriation increase by 1%, domestic cash to asset ratio will decrease by 1.06%.

Tax-induced foreign cash holdings

Using the estimated coefficients from first-stage regression (Table B2), I decompose foreign cash into a tax-induced (TIFC) and a controls-induced (CIFC) component. The decomposition allows a more straightforward comparison of tax-induced versus controls-induced foreign cash. In Table B3 I report the descriptive statistics of the estimated tax-induced and

controls-induced foreign cash holdings. In the foreign cash sample, the mean tax-induced foreign cash holdings scaled by total assets (*TIFC_at*) is 2.3%, while the mean controls-induced foreign cash holdings scaled by total assets (*CIFC_at*) is 7.8%. The actual foreign cash divided by total assets is 10.4%. Therefore, my decomposition is accurate and reasonable. Then I apply the coefficient estimates from Table B2 to the Compustat sample. In the Compustat sample, the mean tax-induced foreign cash (*TIFC_at*) is 1.2%, and the mean controls-induced foreign cash (*CIFC_at*) is 6.6%. The smaller ratios in the Compustat sample are expected because firms in the foreign cash sample have higher repatriation costs and more foreign cash holdings.

Table B1
Descriptive Statistics – Foreign Cash Sample

Variable	N	Mean	p25	Median	p75	Std Dev
<i>Foreign cash/total cash</i>	2,614	0.545	0.313	0.552	0.798	0.290
<i>Log(Foreign Cash/Total Assets+1)</i>	2,614	0.095	0.029	0.067	0.137	0.087
<i>Foreign Cash/Total Assets</i>	2,614	0.104	0.029	0.070	0.147	0.102
<i>Log(Domestic Cash/Total Assets+1)</i>	2,614	0.096	0.018	0.062	0.134	0.103
<i>Domestic Cash/Total Assets</i>	2,614	0.107	0.018	0.064	0.144	0.125
<i>RepCost</i>	2,544	0.600	0.000	0.201	0.810	0.903
<i>Size</i>	2,614	7.378	6.092	7.381	8.663	1.831
<i>DomIncome</i>	2,576	0.022	-0.006	0.029	0.068	0.095
<i>DivDummy</i>	2,614	0.443	0.000	0.000	1.000	0.497
<i>BTM</i>	2,588	0.490	0.265	0.437	0.682	0.461
<i>Std(OpInc)</i>	2,606	0.059	0.025	0.041	0.069	0.061
<i>R&D</i>	2,614	0.047	0.000	0.019	0.071	0.067
<i>Capex</i>	2,614	0.034	0.015	0.026	0.044	0.029
<i>MktLeverage</i>	2,570	0.160	0.011	0.111	0.231	0.179

This table reports descriptive statistics for the foreign cash sample. *Foreign cash* and *Domestic cash* amounts are collected from 10-Ks. *RepCost* is defined in Appendix A. *Size* is measured as the natural log of total assets. *DomIncome* is pre-tax domestic income (*pidom*) scaled by total assets. *DivDummy* is a dummy variable set to one if the firm pays a dividend in year t and zero otherwise. *BTM* is book value of equity divided by market value of equity. *StdOpInc* is the standard deviation of the ratio of operating income before depreciation to total assets, measured by firm over year t-9 to t. *R&D* is R&D expense scaled by total assets. *Capex* is capital expenditure scaled by total assets. *MktLeverage* is the ratio of long- and short-term debt to the sum of long- and short- term debt and the market value of equity. All continuous variables are winsorized at 1% and 99% tails.

Table B2
Predicting Foreign Cash Holdings

	Dependent Variable: $\log\{[foreign\ cash/total\ assets+1]\}$									
	Pooled	2013	2012	2011	2010	2009	2008	2007	2006	
<i>Intercept</i>	0.065*** [3.37]	0.071*** [3.00]	0.052*** [2.15]	0.031 [1.09]	0.082* [1.76]	0.111** [2.51]	0.034 [0.58]	0.008 [0.14]	0.114 [0.85]	
<i>RepCost</i>	3.308*** [8.89]	4.088*** [7.16]	3.875*** [6.91]	3.058*** [5.42]	2.164*** [3.15]	3.384*** [3.25]	4.913*** [4.14]	5.238*** [3.45]	4.726*** [2.55]	
<i>Size</i>	0.001 [0.53]	0.001 [0.28]	0.002 [0.72]	0.001 [0.49]	0.006* [1.81]	-0.002 [-0.32]	-0.002 [-0.24]	0.003 [0.55]	-0.015 [-0.96]	
<i>DomIncome</i>	0.001 [0.02]	-0.014 [-0.27]	-0.080* [-1.68]	0.001 [0.01]	0.182*** [2.70]	0.115 [1.14]	-0.086 [-0.83]	0.146 [0.98]	0.096 [0.35]	
<i>DivDummy</i>	-0.006 [-1.20]	-0.009 [-1.42]	0.003 [0.42]	0.005 [0.58]	-0.041*** [-3.03]	-0.008 [-0.40]	-0.003 [-0.14]	-0.016 [-0.62]	0.010 [0.15]	
<i>BTM</i>	-0.006 [-1.03]	0.002 [0.19]	0.008 [0.94]	-0.004 [-0.44]	-0.010 [-0.85]	-0.019 [-1.54]	-0.001 [-0.04]	-0.012 [-0.97]	-0.006 [-0.44]	
<i>StdOpInc</i>	0.039 [0.83]	0.052 [0.75]	0.033 [0.53]	0.055 [0.53]	0.135* [1.65]	-0.226 [-1.07]	0.007 [0.05]	0.213 [0.98]	0.009 [0.02]	
<i>RD</i>	-0.032 [-0.51]	-0.114 [-1.21]	-0.038 [-0.51]	0.001 [0.02]	0.043 [0.40]	0.154 [0.82]	0.138 [0.79]	0.076 [0.31]	0.324 [0.99]	
<i>Capex</i>	-0.166* [-1.88]	-0.176 [-1.60]	-0.149 [-1.24]	-0.004 [-0.03]	-0.649** [-2.27]	-0.501 [-1.28]	-0.309 [-0.53]	0.726 [1.29]	0.461 [0.54]	
<i>MktLeverage</i>	-0.103*** [-6.86]	-0.106*** [-4.43]	-0.100*** [-4.90]	-0.101*** [-4.44]	-0.151*** [-4.00]	-0.128** [-2.57]	-0.079* [-1.88]	-0.033 [-0.65]	0.077 [0.83]	
n obs	2,493	634	660	509	194	131	103	79	56	
R-squared	33.89%	33.20%	33.37%	35.89%	48.13%	47.31%	59.42%	67.36%	58.74%	
Std err clustered by	Firm	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Year FE	Yes	No	No	No	No	No	No	No	No	

In the pooled sample, standard errors are clustered by firm to correct for time-series dependence. *, **, and *** indicate significance (two-tailed) at the 10%, 5%, and 1% level, respectively.

Table B3
Descriptive Statistics – Predicted Foreign Cash Holdings

Variable	N	Mean	P25	Median	P75	Std Dev
Within the Foreign Cash Sample						
<i>TIFC_at</i>	2,544	0.023	0.007	0.000	0.030	0.067
<i>CIFC_at</i>	2,528	0.078	0.080	0.061	0.098	0.111
Within the Compustat Sample						
<i>TIFC_at</i>	27,540	0.012	0.000	0.000	0.011	0.025
<i>CIFC_at</i>	27,561	0.066	0.044	0.068	0.090	0.034

TIFC_at is tax-induced foreign cash holdings scaled by total assets. Tax-induced foreign cash holdings are calculated as: $\exp(\hat{\beta}_1 * RepCost) - 1$. *CIFC_at* is controls-induced foreign cash holdings scaled by total assets. Controls-induced foreign cash holdings are calculated as: $\exp(\sum \hat{\beta}_k * Controls) - 1$. $\hat{\beta}_k$ s are from a first-stage regression reported in Table B2

Appendix C: Comparing Repatriation and Reinvestment Decisions

Assume that at time 0, multinational firm *i* has after-foreign-tax income EP . Foreign tax rate is t_f , and domestic tax rate is t_d . Firm *i*'s pre-tax rate of return earned outside the U.S. on operating assets is R_f , and after-tax rate of return is $r_f = R_f \times (1 - t_f)$. Pre-domestic-tax rate of return earned within the U.S. is R_d , and after-domestic-tax rate of return earned within the U.S. is $r_d = R_d \times (1 - t_d)$. Pre-foreign-tax rate of return earned outside the U.S. on financial assets (return on the worldwide capital market) is R_p (*p* stands for “passive”), and after-tax rate of return earned outside the U.S. on financial assets is $r_p = R_p \times (1 - t_d)$.

From firm *i*'s perspective, it has three options:

Option 1:

Repatriate EP today and invest domestically for n periods. At period n , firm *i* gets:

$$\frac{EP \times (1 - t_d)}{(1 - t_f)} (1 + r_d)^n$$

Option 2:

Do not repatriate today, reinvest in foreign operating assets, and repatriate both the principal and earnings in period n . At period n , firm *i* gets:

$$\frac{EP \times (1 - t_d)}{(1 - t_f)} (1 + r_f)^n$$

Option 3:

Do not repatriate the principal (EP), but invest EP in financial assets, so earnings on financial assets $EP \times r_p$ is deemed repatriated every year (Subpart F income). Since it is costless for firm *i* to repatriate interest income, I assume that firm *i* will repatriate $EP \times r_p$ every period and invest in domestic operating assets. The payoffs of each period are as follows:

Period 0: Firm *i* generates EP .

Period 1: Firm i earns $EP \times r_p$, which is deemed repatriated; the parent firm gets:

$$EP \times r_p$$

Period 2: Firm i earns another $EP \times r_p$, which is deemed repatriated; the parent firm gets:

$$EP \times r_p$$

In addition, firm i invests the period 1 deemed repatriated amount and earns r_d

$$EP \times r_p \times (1 + r_d)$$

At the end of period 2, firm i's parent company has:

$$EP \times r_p + EP \times r_p \times (1 + r_d)$$

...

At the end of period n, firm i has:

$$EP \times r_p + EP \times r_p \times (1 + r_d) + \dots + EP \times r_p \times (1 + r_d)^{n-1}$$

which can be written as:

$$EP \times r_p \times \frac{(1 + r_d)^n - 1}{r_d}$$

Assume that firm i repatriates the principal EP at the end of period n. The total amount of cash flow firm i gets is:

$$EP \times r_p \times \frac{(1 + r_d)^n - 1}{r_d} + \frac{EP \times (1 - t_d)}{1 - t_f}$$

Therefore, a comparison among the three options boils down to:

Option 1	$(1 + r_d)^n$
Option 2	$(1 + r_f)^n$
Option 3	$R_p \times (1 - t_f) \times \frac{(1 + r_d)^n - 1}{r_d} + 1$

Option 3 dominates Option 1 if $R_p \times (1 - t_f) > r_d$. However, if $R_p \times (1 - t_f) < r_d$,

which is likely to be the case because the rate of return on passive investments is usually low, then

Option 1 dominates Option 3. Therefore, when the after-tax rate of return the firm can earn domestically is higher than the after-tax rate of return on financial assets, there is an opportunity cost to the deferral strategy. In addition, even if the firm's domestic rate of return is low, shareholders have the option of withdrawing money from the firm and invest in other more valuable projects. If we factor in shareholders' outside options, Option 3 is even less likely to dominate.

My result above is in essence consistent with that of Hines and Rice (1994) and Altshuler and Grubert (2002). More specifically, both papers find that as long as after-tax rate of return on passive investment *exceeds* the after-tax rate of return on domestic operating assets, the firm does better to reinvest its earnings abroad in passive assets than it does to repatriate the earnings. However, I argue that even though Option 3 could dominate Option 1 under certain conditions, the conditions sometimes might not be met.