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By

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Abstract

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This dissertation looks at the taxation of U.S. multinational firms and specifically at the taxation of dividend payments from foreign affiliates to their U.S. parent companies. The United States has an increasingly unusual tax system compared to other countries in that repatriating income earned abroad generally has tax consequences. This dissertation examines how taxes on intrafirm dividend payments affect multinational firm's intrafirm dividend policies and what effect firms' dividend payments have on their domestic investment.

I first look at the previous literature on the taxation of intrafirm dividend payments. Hartman (1985) is one of the major theoretical papers on intrafirm dividend taxation. In the Hartman model, with the assumptions that repatriation taxes are constant and unavoidable, repatriation taxes do not affect intrafirm dividend payments. However, all empirical evidence points to the fact that dividend payments do respond to the dividend tax rate. I discuss the research that has tried to reconcile the theory with the empirical evidence by investigating ways in which firms avoid dividend taxes and whether firms respond to temporary changes in the tax rate more than the permanent tax level. I also discuss research that looks at the effects of a tax holiday on intrafirm dividends in 2005 that was meant to encourage firms to remit their foreign earnings and increase their U.S. investment. Research suggests that the repatriations induced by the tax holiday were used to increase distributions to shareholders and were not used to expand domestic operations.

The next chapter examines how intrafirm dividend payments respond to a particular component of the tax rate – that caused by fluctuations in the exchange rate between the currency of the foreign affiliate and the U.S. dollar. Since this component of the tax rate changes over time, it allows me to test if firms attempt to time their dividend payments to take advantage of temporary swings in the repatriation tax rate. I find that firms respond to this temporary component of the tax rate more than they do to the tax rate as a whole. I also find that the response to the exchange-rate component of the tax rate is concentrated among firms with the most resources to devote to tax planning and those firms with the most flexibility in timing their dividend payments. The dividend payments of large firms, firms with tax haven affiliates, and financially unconstrained firms are sensitive to the exchange-rate component of the repatriation tax rate while small firms, firms that do not own tax haven affiliates, and financially constrained firms are not. Therefore, I find evidence that

certain, more sophisticated types of firms time their dividend payments to minimize their tax bill, but not all firms appear to engage in this tax timing behavior.

The final chapter investigates how firms' domestic investment responds to exogenous changes in firms' incentives to repatriate. The link between the availability of internal funds and investment has long been noted, and changes in the amount of foreign earnings firms repatriate may change the amount of financing available for domestic investment. This chapter looks particularly at whether there is a difference between financially constrained and unconstrained firms in the response of their domestic investment to repatriations, since the investment of financially constrained firms is generally assumed to be more sensitive to internal funds than that of financially unconstrained firms. I find suggestive evidence that the domestic investment of financially constrained firms responds to repatriations while the domestic investment of unconstrained firms does not, although the responses are not precisely estimated.

This dissertation sheds some light on multinational firms' responses to repatriation taxes and what effect repatriations have on firms' domestic operations, and it highlights that multinational firms exhibit a range of behaviors that depend on their size and financial constraints. Since repatriation payments from large firms make up a large portion of total repatriations, total repatriations and any financial and investment outcomes influenced by repatriation taxes will be most affected by what large firms do. However, when thinking about how tax policy affects individual firms' behavior, it is necessary to consider multinational firms' heterogenous responses.

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Chapter 1

Introduction

This past spring, the taxation of multinational firms briefly came to the forefront of our national discussion – an unusual occurrence for a rather esoteric topic. In March, the New York Times reported that General Electric (G.E.) did not pay any U.S. federal income taxes in 2010 despite worldwide profits of $14.2 billion.[1] With the U.S. in a prolonged economic slump and a precarious fiscal position, G.E.'s aggressive approach to tax minimization aroused indignation in some quarters and also ignited a debate on the efficiency of the U.S. corporate tax system.

When looked at in broad outlines, the U.S. appears to have one of the more burdensome corporate tax systems in the world. At 35 percent, the U.S. has one of the highest statutory corporate tax rates in the world, and it is also one of the few countries that taxes corporations on income earned abroad. Despite the seemingly burdensome tax system, however, firms appear to be able to avoid paying much U.S. corporate tax. According to the OECD, the U.S. collected only 1.8% of GDP in corporate tax revenue in 2008 compared with an OECD-wide average of 3.5%, and as illustrated by the G.E. story, many companies have effective U.S. tax rates that are much lower than the 35% statutory rate.

One factor that contributes to such low effective tax rates is multinational firms' foreign operations. Desai (2003) discusses the discrepancy between firms' worldwide book earnings and their U.S. taxable earnings and notes that the increasing importance of firms' foreign operations has led to an increasing divergence between book and taxable income. Since firms can defer U.S. taxes on foreign earnings until they are repatriated to the U.S., multinational firms' worldwide book income does not have a one-to-one correspondence to their U.S. taxable earnings. Foreign operations also create opportunities, such as transfer pricing, to shelter income from U.S. taxation which may be less costly and less transparent than purely domestic tax shelters. These tax shelters allow firms to shift income out of the U.S., and they can then defer U.S. taxation as long as they retain the earnings abroad.

This dissertation studies how the U.S. taxes foreign-source income and what effect that tax system has on firm behavior. It particularly focuses on firms' decisions to remit their foreign-source income by making dividend payments from foreign affiliates to U.S. parent companies. Since foreign markets have been and continue to be a large source of profits for U.S.-based firms, multinational firms' decisions to repatriate foreign earnings is an important

[1] http://www.nytimes.com/2011/03/25/business/economy/25tax.html?pagewanted=all

part of their financial decision-making. In 2010, U.S. firms had foreign earnings of over $400 billion dollars (an increase of over 300% from a decade ago) and remitted over $100 billion in dividend payments. Given the large sums of money involved, it is important to understand how the U.S. tax system affects firms' repatriation policies and what effect that movement (or non-movement) of funds has on the operations of firms. Since multinational firms have access to sophisticated accounting and finance techniques, it is an open question how much multinationals are able to make use of those techniques to obviate the need to pay dividends in order to make foreign earnings available to the parent company.

This dissertation examines two issues. The first question is how much repatriation taxes affect firms' intrafirm dividend payments and to what extent firms try to minimize their repatriation tax exposure. In Chapter 3, I look at whether firms time their intrafirm dividend payments to take advantage of unusually low or high repatriation tax rates. I isolate a particular transitory component of the repatriation tax rate – the part of the repatriation tax rate that fluctuates when the currency of a foreign affiliate moves against the U.S. dollar – and measure whether the response of firms' dividend payments to that component is greater than their response to the tax rate as a whole. I find that the certain types of firms' dividend payments of have a large response to this transitory component, and thus those firms appear that they are timing their dividend payments to minimize their repatriation taxes. Large firms, firms that own tax haven affiliates, and financially unconstrained firms all are sensitive to the exchange-rate component of the tax rate. While this makes sense in that these are the firms with the most resources to devote to planning, it is also interesting because these are the firms that would be expected to use accounting and financial wizardry to find low-cost ways around paying intrafirm dividend payments. The fact that they respond to fluctuations in the dividend tax rate implies that there are not entirely costless ways to avoid making dividend payments.

The second question this dissertation investigates is how repatriated funds are used. Besides the past spring, one of the more recent periods of attention on multinational taxation was during the tax holiday on repatriated earnings that occurred under the American Jobs Creation Act of 2004. The firms that lobbied for this law argued that high repatriation taxes prevented them from returning their foreign earnings to the U.S. and that a tax holiday would allow them to repatriate their foreign earnings and use them to finance domestic investment projects. Over $362 billion was repatriated under the auspices of the tax holiday. Despite the law's name, research shows that firms did not use their repatriations for domestic investment or hiring and instead used their repatriations to finance share repurchases.

However, only a small set of firms took advantage of the tax holiday and therefore the uses of the tax holiday repatriations might not be a good indication for the how repatriations are used by all multinationals. In Chapter 4, I look at how multinational firms' domestic investment responds to repatriations outside the AJCA tax holiday period. I measure the effect on domestic investment of a change in repatriations caused by an exogenous change in the incentives to repatriate, and I find suggestive evidence that an increase in repatriations increases the domestic investment of financially constrained firms but that it has a lesser effect on the investment of financially unconstrained firms. This fits with previous research that finds the investment of financially constrained firms is more sensitive to the availability of internal funds, and it is evidence that firms' repatriation policies can have real effects on firms' operations. The investment of multinational firms with limited access to the external

capital market may depend on where firms allocate their internal funds and thus also on the (dis)incentives provided by the tax system to repatriate.

Chapter 2

Literature Review

2.1 Introduction

The taxation of multinational firms has received increasing attention from academic researchers in the past few decades as multinational firms have played a progressively larger role in the U.S. and world economy. As the economy globalizes and firms expand into foreign markets, how foreign-source earnings are taxed and how that tax affects firm decision-making has become an increasingly important topic and has gained more academic attention.

Research into the taxation of multinational firms' foreign-source income also became more common as better data became available. Empirical work on this topic in the 1970s and 1980s had to mostly make do with data on repatriated foreign income aggregated by source country, which removed much of the variation in repatriation tax rates that firms faced. In the 1990s and 2000s, researchers have been able to make use of IRS tax return microdata and data from surveys of multinational firms conducted by the Bureau of Economic Analysis. The passage of the American Jobs Creation Act (AJCA) of 2004, which gave multinational firms a tax holiday on their repatriated earnings, has also increased interest in this topic in recent years.

This chapter provides a brief overview of the relevant tax law relating to intrafirm dividend payments in Section 2.2. Section 2.3 discusses theoretical models of firms' response to dividend taxation, and Section 2.4 discusses empirical findings. Section 2.5 reviews the literature that specifically studies firms' response to the American Jobs Creation Act tax holiday.

2.2 U.S. Taxation of Dividends

The United States has a residential tax system, which means that firms based in the U.S. are taxed on their worldwide income. They must pay taxes on both their profits earned within the U.S. and also on their foreign earnings. It is one of the few countries left which taxes foreign income. Most countries only tax the profits earned within their borders either because they have explicitly territorial tax systems – where the the government only taxes income earned within the country – or because foreign income is *de facto* untaxed due to tax treaties and a generous granting of tax credits.

Firms in the U.S., however, are not taxed immediately on their foreign income. An important aspect of the U.S. tax system is deferral. Firms are allowed to defer tax payment on their foreign earnings until they remit them to the U.S. Firms also earn tax credits for foreign taxes paid on foreign earnings. Their tax bill on their foreign income, then, is equal to their U.S. tax liability on their remitted earnings minus whatever foreign taxes they have already paid on those earnings.

The following is a simple, one-period example of how taxes on repatriated earnings are computed. In Chapter 3, I discuss how repatriation taxes are calculated when foreign earnings are not repatriated in full every year. When a multinational firm pays a dividend from a foreign affiliate in a country with corporate tax rate τ to a parent firm facing the U.S. corporate tax rate of τ_{US}, it faces of dividend tax of $\tau^d = \frac{(\tau_{US}-\tau)}{(1-\tau)}$. Since dividends are distributed after foreign tax has been collected, the dividend is 'grossed up' by the foreign tax rate (hence, the $1-\tau$ in the denominator), and then the firm owes the difference between the U.S. and foreign tax rates, $\tau_{US}-\tau$. For example, if a foreign subsidiary faces a foreign tax rate of 20% and pays a dividend to its parent firm of \$100, then the parent would owe a dividend tax of $\frac{(0.35-0.20)}{(1-0.20)} * 100 = \$18.75$. Since the after-foreign-tax dividend is \$100, the IRS calculates that the before-tax income was $\frac{\$100}{0.80} = \$125$. The U.S. then taxes the firm at the U.S. corporate tax rate of 35% on \$125 worth of income, but credits the firm with having paid \$25 worth of foreign tax.

If a firm repatriates from only one subsidiary, then the tax credit is limited to the U.S. tax liability. Thus, if the foreign tax rate was greater than 35% percent, the firm would have zero U.S. tax liability, but it would not receive a refund of the greater foreign taxes paid. When a parent pays dividends from multiple subsidiaries, worldwide averaging of credits is allowed – excess tax credits earned on dividends from a high-tax subsidiary may be applied to earnings repatriated from a low-tax subsidiary. Firms are also allowed to carry their credits forward for ten years and backward for one year and apply them to taxable foreign income in any of those years. Cross-crediting, however, is not allowed indiscriminately. U.S. tax law divides income into nine baskets, and excess tax credits can only be applied to dividends paid from the same type of income from which the tax credit originated. Foreign taxes paid on manufacturing income, for example, cannot be used as credits for financial services income.

International tax law is quite complicated and there is obviously much that I have not discussed and that is outside the scope of this paper. Since they are relevant to the literature discussed in this chapter, I will mention just a few more complications relating to the taxation of foreign income. Not all types of income are subject to deferral. Passive income is taxed immediately whether or not it is repatriated. Passive income is income earned from passively holding assets as opposed to active income that is earned from the conduct of business. Also, branches, which are foreign affiliates that are not separately incorporated abroad, cannot defer U.S. taxation. All branch income is taxed as it is earned. Finally, since foreign income is normally earned in a currency other than U.S. dollars, repatriation taxation necessarily involves foreign currency translation issues. This issue is the focus of Chapter 3 and will be discussed in much greater detail there.

2.3 Theoretical Models

Given that paying dividends to a U.S. parent firm often results in a tax liability, it would seem likely that taxes would play a role in forming firms' dividend policies. However, there is some theoretical ambiguity in the part taxes play. Hartman (1985) developed a model where repatriation taxes did not affect the timing or amount of repatriations. This model was closely related to the "trapped equity" or "new view" of dividend payments to shareholders developed by King (1977), Auerbach (1979), and Bradford (1981). In Hartman's two-period model, the only options for foreign earnings in the first period are to reinvest them in the affiliate (with return r^*) or remit them as a dividend to the parent (to earn return r_{US}). The model assumes that dividend taxes are constant across time and the affiliate must remit all its earnings in the second period. Given these constraints, Hartman finds that the repatriation tax rate does not influence the dividend decision. In the Hartman model, if the affiliate retains its earnings for reinvestment in the first period and waits to pay out dividends until the second period, the parent receives $(1 + r^*(1 - \tau))\frac{1-\tau_{US}}{1-\tau}$ for every dollar invested – the net return on foreign equity decreased by the dividend tax. If the affiliate repatriates in the first period and the parent uses the (taxed) dividend to invest in the U.S., the parent gets a return of $\frac{1-\tau_{US}}{1-\tau}(1 + r_{US}(1 - \tau_{US}))$ – the net return on U.S. equity decreased by the dividend tax. Since paying repatriation taxes in one period or another is inevitable, only the rate of return in the foreign country versus the home country matters in determining the timing of the dividend decision and how much to invest abroad.

However, this result of the insignificance of repatriation taxes only holds for mature affiliates, which use retained earnings as their marginal source of investment funds, and does not necessarily hold for immature affiliates. For immature affiliates, which may rely on the parent for their investment funds, parents may be better off by providing less equity at the beginning of an affiliate's life than they would in the absence of repatriation taxes. In this way, the affiliate can use its own earnings for future investment and put off the "trapped equity" state during which dividend taxes are inevitable.

The Hartman model, however, does not reflect the entirety of options available to affiliates. Affiliates of multinational companies have other possible uses of their earnings than reinvestment or repatriation. Altshuler and Grubert (2002) model a number of strategies firms might use to avoid repatriation taxes when they have a wider range of options. For example, retaining earnings abroad and investing them in passive assets could lead to a greater after-tax profit than either reinvesting in the affiliate or remitting earnings to the parent. Even though firms cannot defer U.S. taxes on passive foreign earnings, they are able to defer taxes on the principle and so may end up with a better return than would be gotten by shrinking the principle by returning it to the U.S. and paying the repatriation tax. This would be an especially attractive strategy if the parent firm is able to borrow against the assets held abroad – then, foreign earnings would make funds available for domestic investment without the firm having to pay taxable dividends. When a firm has multiple affiliates, more strategies open up that allow companies to escape or reduce dividend taxation. For example, an affiliate in a low-foreign-tax country can use its earnings to invest in a related affiliate in a high-foreign-tax country. The high-tax affiliate can then pay out all its earnings to the parent each year without triggering any repatriation taxes and the low-tax affiliate can use its income to continually reinfuse equity into the high-tax affiliate. Alternatively,

a high-tax affiliate could invest in a related low-tax affiliate. The low-tax affiliate can then pay dividends to the high-tax affiliate, which can in turn pay dividends to the parent that are credited with the blended tax rate of the two affiliates.

Firms can also use other means to repatriate earnings from affiliates, such as interest payments and royalties. Thus, firms could consider the tax price of dividends compared to other the tax price of other repatriation vehicles when making its repatriation decision. Grubert (1998) presents a model of a firm where firms can decide between repatriating in the form of dividends, interest, and royalty payments. The firm's decision depends on the relative tax prices of these repatriation vehicles.

2.4 Empirical Findings

Theoretically, then, there has been some debate on whether multinationals' dividend policies should respond to taxation, but most empirical work has found a relationship between dividends and dividend taxes, with repatriation rates decreasing as the dividend tax-price increases. Using tax return data of U.S. multinationals in 1984, Hines and Hubbard (1990) find that a one-percent decrease in the U.S. tax rate (which would lead to a decreased repatriation tax rate) would result in four-percent increase in dividends relative to foreign affiliate assets. Altshuler and Newlon (1993) use tax return data from 1986 and also study the effect of taxation on dividend payments. They expand on Hines and Hubbard by calculating a dividend tax price that factors in the tax code of the foreign affiliate's country. For example, some countries may charge a withholding tax on dividends or have different tax rates for distributed and undistributed corporate profits. Altshuler and Newlon find an even larger effect of taxes on dividend payments than Hines and Hubbard.

Desai, Foley, and Hines (2001) use panel data from the BEA's Annual (Benchmark) Survey of U.S. Direct Investment Abroad from 1982 to 1997. Without tax return data, they do not have perfect information on the repatriation tax rates firms face, but they have the benefit of having affiliates in their sample which are not subject to dividend taxation. They compare how the repatriations of incorporated subsidiaries, which can defer U.S. taxation, compare to the repatriations of branches, which cannot. The use the median foreign tax rate paid by affiliates in each country to proxy for the repatriation tax rate the affiliates face. They find that the tax rate has a significant effect on subsidiary repatriations but an insignificant effect on that of branches. They conclude a one-percent higher foreign tax rate (which leads to lower repatriation tax rate) leads to one-percent increase in dividend payments.

Desai, Foley, and Hines (2007) repeat their previous analysis extending the BEA panel to 2002 and also find a tax effect on dividend payments. In this paper, Desai, Foley, and Hines use as comparison groups both branches and also indirectly-owned affiliates – affiliates that the U.S. parent company owns through tiers of other affiliates. Since indirectly owned affiliates are unlikely to pay dividends directly to the U.S. parent, their repatriation policies should not be affected by U.S. repatriation taxes.

Even this evidence, though, could be consistent with the Hartman "trapped equity" model if the dividend responses measured by the econometricians are capturing responses to temporary changes in dividend tax prices. According to Hartman's model, repatriations

should not respond to the permanent level of taxes, but they could respond to temporary tax changes that make paying dividends more or less costly in one period compared to another. Altshuler, Newlon, and Randolph (1995) investigate if temporary dividend tax changes result in larger dividend responses than differences in permanent tax levels. They create a panel dataset, using four years of tax return data from the 1980s, and attempt to decompose the tax price of repatriations into permanent and temporary components. They instrument for the permanent dividend tax price using the average tax price faced by affiliates in a country (rather than the affiliate-specific tax price) and the dividend withholding tax rate of the country the affiliate is located in. They calculate the temporary tax component as the difference between the measured tax rate and the instrumented permanent tax rate.[1] Their paper finds support for the Hartman model; in their empirical work, temporary increases in dividend taxes are associated with lower dividend payments, but permanent tax levels do not have an effect significantly different than zero.

In addition to the constancy of repatriation taxes, the other assumption that drives the Hartman model prediction of the irrelevance of repatriation taxes is that repatriation taxes are unavoidable. I next discuss papers that test whether this assumption holds – whether, in fact, firms eventually repatriate all their foreign income and there is no way to do so without incurring repatriation taxes. Both Altshuler and Grubert (2002) and Grubert (1998) test their models discussed in Section 2.3 that lay out options for firms to avoid dividend taxes. Altshuler and Grubert (2002), using 1996 tax return data, find support that firms use some of the alternatives they discuss. They find that subsidiaries facing higher dividend tax rates hold more passive assets and that it appears that foreign affiliates invest their earnings in each other in order to avoid making dividend payments to the parent that trigger taxes.

Grubert (1998) finds the relative tax costs of different types of repatriation vehicles matter. He finds that high dividend tax costs are associated with lower dividends, but he also finds evidence consistent with the fact high dividend taxes lead to greater use of another repatriation vehicle. He does not find that higher dividend taxes increase retained earnings. Instead, he concludes that taxes do not have an effect on the decision of the amount of earnings to repatriate; they only have an effect on how (dividends, royalties, or interest payments) to do so.

However, in contradiction to Grubert (1998), there is some evidence that firms do not substitute entirely away from dividends into other repatriation vehicles and that high dividend taxes can lead to higher retained earnings. As just mentioned, Altshuler and Grubert (2002) find that affiliates facing high repatriation taxes have more passive assets than low-repatriation-tax affiliates. In a similar vein, Foley et al. (2007) find that affiliates with higher repatriation taxes have larger cash holdings than those with lower tax penalties for paying dividends to the parent, and find that firms with overall higher repatriation tax burdens have overall higher cash balances and particularly hold more cash abroad. The large increase in dividends during the repatriation tax holiday of the American Jobs Creation Act also indicates that repatriation taxes have influenced some firms to retain a large amount of earnings abroad.

[1] A dividend withholding tax is a tax that companies must pay when making dividend payments to to foreign payees – in this case, a tax that foreign affiliates must pay when making dividend payments to their owners in a different country.

Finally, one last empirical paper worth mentioning is one that does not quite fit into the previous frameworks. Rather than focusing solely on the monetary tax costs of repatriations, Blouin, Krull, and Robinson (2011) look at how the financial reporting requirements of dividend taxes affect firms' dividend policies. As discussed in Section 2.2, firms may defer taxation on their foreign income as long as they retain it abroad. However, although a firm can defer making a tax payment, it still must report on its financial statements the domestic tax liability incurred on the foreign income when the income in earned unless it designates those foreign earnings as permanently reinvested earnings (PRE).

Permanently reinvested income is an accounting concept. Firms can designate foreign income as permanently reinvested if they plan to retain the income abroad indefinitely. If foreign income is designated as PRE, a firm does not have to recognize the U.S. tax liability on the income in its financial reporting when the income is earned. If foreign earnings are not designated as PRE, a firm has to report on its income statement the U.S. tax liability associated with them in the year they are earned even if that tax liability is deferred because the firm has not yet repatriated the earnings.

Therefore, although the monetary tax cost of a dividend payment is the same whether or not a firm has previously designated foreign earnings as PRE, the financial reporting consequences will differ. Since the expected repatriation taxes on income not designated as PRE were reported on the firm's income statement the year the income was earned, firms do not have to report the tax cost again when they actually repatriate the income. However, since no tax was previously reported for earnings designated as PRE, repatriation taxes must be reported on a firm's income statement when the earnings are repatriated, thus lowering the firm's reported profits. Blouin, Krull, and Robinson (2011) investigate whether the financial reporting aspect of dividend taxation affects dividend payments and find that the financial reporting consequences appear to influence firms' repatriation decisions. They find that firms with a high percentage of their foreign earnings designated as PRE are more sensitive to the tax cost of making a dividend payment than firms that have not designated foreign income as PRE. They also find that high-PRE firms are particularly sensitive to the tax cost when making dividend payments in the fourth quarter, which is when firms may make the most effort to manage what their year-end financial statements will look like.

Overall, the bulk of the literature comes clearly to the conclusion that dividend taxation influences intrafirm dividend policy. The Hartman model's assumption of constant, inevitable repatriation taxes does not hold in the real world and so neither does its prediction of the irrelevance of dividend taxation to dividend payments. Since firms can choose to retain their earnings abroad and do not a face a constant tax rate on their repatriations, high dividend tax rates discourage dividend payments.

2.5 American Jobs Creation Act

The tax holiday on repatriations contained in the American Jobs Creation Act, which was passed into law in 2004, was the impetus of many new studies on multinational firms' repatriations. Multinational firms brought over $350 billion back under the AJCA, which was multiple times the amount repatriated in preceding years, and defied some predictions (notably of the Joint Committee on Taxation) that tax holiday would have a much smaller

effect. The large amount of repatriations remitted during the tax holiday sparked new interest in how firms respond to repatriation taxes and sparked interest in what use such a sizable infusion of funds would be put to.

The AJCA gave multinational firms a one-year tax reduction of 85 percent on dividend payments received from their foreign affiliates. Firms could choose to take advantage of the tax holiday in either 2004, 2005, or 2006, and most of the repatriations that came back under the auspices of the AJCA were brought back in 2005. To qualify for the tax holiday, dividends had to be paid in cash and they had to be "extraordinary," which was defined as greater than the firm's average dividend payment over the past five years, excluding the highest and lowest years. Another restriction on the amount repatriated was that a firm could repatriate the maximum of: (1) $500 million dollars, (2) the amount of foreign income marked as permanently reinvested earnings (PRE) on the firm's financial statements, and (3) the tax liability attributed to earnings designated as PRE divided by 0.35, the U.S. corporate tax rate. The third option was included in case firms report in their financial statements the amount of tax attributable to permanently reinvested earnings but not the earnings themselves.[2]

The intent of the tax holiday was to encourage firms to repatriate foreign earnings retained abroad and use those funds for domestic investment and hiring. Multinational corporations had lobbied for the Act arguing that high repatriation taxes prevented them from repatriating their foreign earnings, and that a tax holiday would allow them to remit funds held abroad and use them to finance domestic investment. In order to qualify for the tax holiday, firms had have a CEO- and board-of-directors-approved plan that showed how they would spend their repatriated funds on such approved uses as domestic hiring and training, capital investment, R&D, and paying down debt. Firms were explicitly prohibited from using the repatriations for certain purposes, such as executive compensation, shareholder dividend payments, and share repurchases. However, given the fungibility of money, there were not rigorous enough rules in place to ensure that the repatriations were used for their intended purposes. There was nothing that forced firms to use their repatriations for incremental domestic hiring or investment. Thus, firms could legally use repatriated funds for their already planned investment or hiring and then use the money that otherwise would have been spent on investment or hiring for other, technically forbidden purposes.

The AJCA tax holiday induced a large spike in repatriations, but the repatriations came from a small subset of multinational firms. Redmiles (2008) documents that 843 corporations took advantage of the tax holiday and that they were generally large firms with average assets of over $24 billion. Pharmaceutical and medical manufacturing firms accounted for one-third of the qualifying dividend payments, and computer and electronic equipment manufacturing accounted for almost 20 percent of the dividends repatriated during the tax holiday period.

Rather quickly after the Act went into effect, it was clear that it was not going to have its eponymous effect of job creation. In 2005 and 2006, the Wall Street Journal ran a number of articles documenting that repatriating firms were announcing layoffs and engaging in large-scale stock buybacks, and the New York Times published editorials chastising Congress for

[2]As discussed in Section 2.4, firms do not report repatriation taxes attributable to PRE as a line item on their income statement and so they do not affect reported profits. However, firms usually report the amount of permanently reinvested earnings or the tax liability attributable to permanently reinvested earnings in a footnote in their financial statements.

such bad policy-making. Academic research soon followed that confirmed that the AJCA did not significantly increase domestic investment or employment, but it was strongly associated with increased share repurchases.

Blouin and Krull (2009) investigated the investment opportunities of firms that repatriated during the tax holiday and the use to which they put their repatriations. They theorized that the firms that could best take advantage of the AJCA were firms that did not have good investment opportunities either at home or abroad. If firms had profitable domestic investment opportunities that needed financing, they would have repatriated before the tax holiday, and firms with profitable investment opportunities abroad would want to retain their foreign earnings abroad for investment overseas. Using data from Compustat as well as repatriations data they collected from SEC 10-K and 10-Q filings, they find empirical support for their theory. Firms that repatriated had worse investment opportunities than non-repatriating firms, where investment opportunities are measured as positive changes in the return on assets and market-to-book ratio in the years leading up to the tax holiday. Since they use Compustat data on consolidated firms, they cannot distinguish between investment opportunities at home and abroad.

Blouin and Krull also examined the effect of the AJCA on shareholder distributions. They find that firms that repatriated under the AJCA increased shareholder distributions, particularly in the form of share repurchases rather than dividend payments to shareholders. Increasing share repurchases rather than dividend payments makes sense for firms repatriating under the AJCA, since share repurchases are more likely to be regarded as a one-off action than dividend payments and the increase in repatriations due to the tax holiday was a temporary phenomenon.

Dharmapala, Foley, and Forbes (2010) also investigated what effect the tax holiday had on firms' share repurchases. Although the change in the tax rate under the AJCA was exogenous to the firm, the decision to repatriate during it was still an choice endogenous to the firm. Therefore, to control for variables that might be correlated with the choice to repatriate and also what the firm did with the repatriations (e.g., share repurchases or investment), Dharmapala, Foley, and Forbes instrument for tax holiday repatriations. They use two instruments, a dummy variable that equals one when a firm owns an affiliate located in a tax haven or organized as a holding company and a dummy variable that equals one when a firm has a foreign tax rate that is below the median in their dataset, that capture the characteristics of firms that were most likely to take advantage of the holiday. Owning tax haven or holding company affiliates as well as having a low average foreign tax rate are firm characteristics associated with holding funds abroad and with facing a high repatriation tax rate – characteristics which in turn made the AJCA tax holiday very attractive.

As Blouin and Krull do, Dharmapala, Foley, and Forbes (2010) find that share repurchases increased for firms that repatriated under the AJCA. Since Dharmapala, Foley, and Forbes use data from the BEA that allows them to look separately at firms' foreign and domestic operations, they also look into what domestic uses the AJCA repatriations were put to. However, they do not find that the AJCA repatriations led to increased domestic capital investment, R&D expenditure, or employment, which was the Act's intent.

Dharmapala, Foley, and Forbes (2010), along with Baghai (2010), also examine how the quality of corporate governance affected firms' behavior during the tax holiday. Both these papers found that, in contrast to well-governed firms, poorly-governed firms did not use

their repatriations to increase shareholder payouts. This is evidence that poorly governed firms, since they did not return their repatriations to shareholders, may have kept the cash infusion to spend on managers' pet projects or perks. Baghai (2010) finds that weakly-governed firms' stock prices decreased after the Senate passed the AJCA, which implies that shareholders of weakly-governed firms may have suspected that the repatriations would not be efficiently used. Neither Dharmapala, Foley, and Forbes nor Baghai find that either well- or poorly-governed firms increased investment with AJCA repatriations, but Baghai finds that well-governed firms actually decreased firm-wide investment after repatriating.

Dharmapala, Foley, and Forbes (2010) also use the tax holiday to test for the extent of financial constraints among U.S. multinationals. The assumption behind the AJCA was that multinational firms had domestic financial constraints that prevented them from undertaking profitable domestic projects but that they had holdings of funds abroad which could be used to finance the domestic projects if they were brought back to the U.S. Dharmapala, Foley, and Forbes (2010) use a number of measures of financial constraints to test if the effect of the AJCA on domestic investment or employment was different for financially constrained firms than firms without financial constraints. However, just as they find for the entire sample, they do not find that the domestic investment or employment of financially constrained firms responded to AJCA repatriations. They also do not find that firms that specifically lobbied for the AJCA used repatriations to increase their investment. In addition, Dharmapala, Foley, and Forbes find that equity injections from the parent to foreign affiliates increased during the 2005 tax holiday. These may have been engaging in "round tripping" – injecting equity into foreign affiliates so that the affiliates would be have enough free cash to pay dividends during the tax holiday. This is yet more evidence that most of the firms taking advantage of the AJCA were not financially constrained, since financially constrained firms would not have had the funds to inject equity into their foreign affiliates.

Faulkender and Petersen (2009) also examine how financially constrained firms acted under the AJCA, and contrary to Dharmapala, Foley, and Forbes (2010), they find that financially constrained firms used repatriations for investment. Part of the discrepancy between Dharmapala, Foley, and Forbes (2010) and Faulkender and Petersen (2009) may be due to the difference in the measures of repatriations the two papers use. Both Dharampala, Foley, and Forbes and Faulkender and Petersen instrument for repatriations made under the AJCA using firm characteristics associated with retaining income abroad. However, Dharampala, Foley, and Forbes then use the predicted value of repatriations to measure the response of domestic investment, and Faulkender and Petersen use the residual from the first-stage regression. Dharampala, Foley, and Forbes use an instrumented value of repatriations because they believe actual repatriations may be correlated with the firm's investment plans and they want to measure the effect of an exogenous change in the incentives to repatriate on investment. Faulkender and Petersen put both the predicted value of repatriations and its residual into the second-stage regression because they want to compare repatriations' effect on investment for firms with the same probability of repatriating. By estimating the coefficient on the residual, they want capture to what extent firms time their dividend payments to provide financing for domestic investment projects – if the residual is positively correlated with investment, they interpret that as firms increasing their repatriations above what their pre-AJCA characteristics would predict because they need domestic financing. The two papers, therefore, are attempting to answer two different questions. Dharampala,

Foley, and Forbes test whether an increase in repatriations due to an exogenous change in the incentives to repatriate is used by the firm to increase investment, while Faulkender and Petersen approach the question as a matter of dividend timing – as whether firms decided on their AJCA repatriations based on their domestic investment needs.

Overall, the American Jobs Creation Act provides evidence that repatriation taxes have a significant effect on at least some firms' repatriation behavior and that these firms may be retaining much of their foreign earnings abroad to avoid paying high repatriation taxes. However, it is also clear that the firms taking advantage of the tax holiday did not need their foreign earnings to expand their domestic investment and hiring, and the Act ended up being a windfall to corporate shareholders. As both Blouin and Krull (2009) and Dharmapala, Foley, and Forbes (2010) point out, the tax holiday still may have had a positive effect on the U.S. economy since corporate shareholders may have used their windfall on consumption and investment spending.

While the results of the tax holiday imply that repatriations do not affect domestic investment, due to the small subset of firms that took advantage of the tax holiday, it is hard to extrapolate those results to the wider universe of multinational firms. In Chapter 4, I look at how a broader sample of firms uses repatriations outside the AJCA period.

Chapter 3

Do Firms Time their Intrafirm Dividend Payments to Minimize Taxes? Evidence From Exchange Rate Based Tax Changes[1]

Abstract

Repatriating income earned abroad generally has tax consequences for U.S. firms. In this paper, I test if multinational firms attempt to time their repatriations to take advantage of temporarily low tax rates or avoid temporarily high tax rates. I test whether the intrafirm dividend payments of multinational firms respond differently to the total repatriation tax rate than they do to a transitory component of the tax rate, measured by the part of the repatriation tax rate that fluctuates as the exchange rate between the currency of a foreign affiliate and the U.S. dollar fluctuates. I find that dividend payments' response to this transitory component of the tax rate is significantly greater than than the response to the repatriation tax rate as a whole, and I find that this response is driven by certain types of firms – large firms, firms with tax haven operations, and firms with bond ratings show a larger dividend response to the exchange-rate component of the tax rate than small firms, firms without affiliates in tax havens, and firms lacking bond ratings. These firms likely have more resources to devote to tax planning and face less immediate need to return foreign earnings to the U.S.

3.1 Introduction

Determining when and how much foreign income to repatriate is an important part of multinational firms' financial decision-making. In 2010, U.S. firms had earnings of over $400 billion

[1]The statistical analysis of firm-level data on U.S. multinational companies was conducted at the Bureau of Economic Analysis, U.S. Department of Commerce, under arrangements that maintain legal confidentiality requirements. The views expressed are those of the author and do not reflect official positions of the U.S. Department of Commerce.

dollars abroad and repatriated about $100 billion. Given that repatriating income earned abroad generally has tax consequences for U.S. firms, an important question in the literature on the taxation of multinational corporations is how U.S. repatriation taxes influence firms' decisions to repatriate foreign-source income. This paper studies how the currency translation provisions of repatriation tax law affect the repatriation taxes faced by firms and to what extent firms respond to repatriation tax changes caused by exchange rate fluctuations between the U.S. dollar and the currency of foreign earnings.

Past literature has examined both theoretically and empirically how repatriation taxes affect dividend payments. In Hartman's (1985) model of intrafirm dividend payments, repatriation taxes do not have an effect on repatriations if the taxes are constant and unavoidable. However, much empirical work has found that dividend payments do respond to the tax cost, and there has been an effort to reconcile the theoretical and empirical findings. One way to do so is to remove the assumption that repatriation taxes are constant and investigate if firms respond to changes in repatriation tax rates. The large response to the AJCA tax holiday discussed in the previous showed that firms' certainly respond to an extremely large reduction in the tax rate. However, there is less evidence that firms respond to the more modest fluctuations in tax rates they normally face.

In this chapter, I identify a particular temporary component of the repatriation tax rate – the component of the repatriation tax rate caused by the fluctuation of the currency of a foreign affiliate against the U.S. dollar – and measure its effect on dividend payments as compared to the effect of the total tax rate. When a foreign affiliate pays a dividend to a U.S. parent company, the dividend is translated into U.S. dollars at the current exchange rate, but the foreign taxes credited to the dividend are translated at the exchange rate(s) in effect when they were paid. Therefore, when the currency of the foreign affiliate is stronger relative to the dollar than it was when past foreign taxes were paid, the repatriation tax rate is higher than it would otherwise be since the foreign tax credit is translated into dollars at a lower exchange rate than the dividend. Conversely, if the current exchange rate is low relative to past exchange rates, then the firm will face a lower repatriation tax since the foreign tax credits will be worth more in dollars relative to the dividend payment. I find that firms do respond more to the exchange-rate component of the repatriation tax rate than to the overall tax rate, although this response is concentrated among certain types of firms, particularly large firms, firms with tax haven operations, and firms with long-term bond ratings. Thus, while it appears that timing issues are important to some firms – those firms with the most resources to devote to tax planning and those firms with the most flexibility in timing their payments – not all firms engage in repatriation tax timing, at least in response to tax rate movements caused by exchange rates. Since repatriations from large firms make up a large portion of total repatriations, however, their behavior has a disproportionate effect on total repatriations coming into the U.S.

This paper adds to the literature on how repatriation behavior responds to temporary changes in repatriation tax rates, and it also examines an aspect of repatriation taxation, the effect of foreign currency translation issues, that has not received much attention. The response of repatriation behavior to dividend taxation is important because it is a measure of how much dividend taxes affect firms' financial and operating decisions. One reason that some forecasters predicted a small response to the AJCA tax holiday was the assumption that repatriation taxes did not greatly influence firms' repatriation patterns because multinational

firms had enough sophisticated accounting and financial tools at their disposal to move funds where they wanted and avoid taxation even without the tax holiday. However, the response to the AJCA tax holiday and the response I find to the exchange-rate component of the repatriation tax rate show multinational firms do react to tax incentives. U.S. multinationals have not found costless ways around the repatriation tax system altogether and so they take advantage of temporarily low tax rates when possible. (Both the response to the exchange-rate component of the tax rate and the AJCA were concentrated among large firms (see Redmiles 2008), which are presumably the firms that have the resources to completely avoid repatriation taxation if it were possible.)

Section 3.2 provides background on U.S. tax law and the taxation of intrafirm dividend payments. Section 3.3 reviews the literature. Section 3.4 shows formally how repatriation taxes fluctuate with the exchange rate and the incentive that firms have to respond to the exchange-rate component of the repatriation tax rate. The empirical strategy and data are described in Sections 3.5 and 3.6. Section 3.7 present the results. Section 3.8 concludes.

3.2 U.S. Taxation of Dividends

Under the United States' residential tax system, U.S. firms are taxed on their worldwide income; they owe taxes not only on their profits earned within the U.S. but also on foreign earnings. In the U.S., however, firms are not taxed immediately on their foreign income. Under the credit and deferral system, taxes are not owed until foreign earnings are repatriated to the U.S., and to avoid double taxation of earnings, firms earn credits for foreign taxes paid. Firms only owe taxes to the U.S. government to the extent that U.S. tax liability exceeds the foreign taxes already paid on remitted earnings.

Chapter 2 gave a simple example of how repatriation taxes are calculated. Here, I go into more detail. In order to compute the repatriation tax on a dividend payment from a foreign affiliate, it is necessary to compute the amount of foreign taxes credited to the dividend. The Tax Reform Act of 1986 amended the computation of the foreign tax credit, and for all dividends paid after 1986, the foreign tax credit (FTC) is calculated as:

$$\text{FTC} = \text{Post-1986 Foreign Income Taxes} \times \frac{\text{Dividend}}{\text{Post-1986 Undistributed Earnings}} \tag{3.1}$$

For foreign tax credit calculation purposes, earnings from an affiliate's post-1986 years are pooled together, and the foreign taxes paid on those earnings accumulate in a separate pool. As opposed to the last-in-first-out system that existed prior to 1987, when dividends were assumed to be paid out of an affiliate's most recently earned income and credited with the most recently paid taxes, dividends are now assumed to be paid out of an affiliate's entire post-1986 undistributed earnings with no extra weight given to recently earned income or taxes.[2] By pooling earnings (and taxes) from multiple years together, affiliates have less of

[2]However, it is the case that, since earning and taxes are in nominal terms, recent income and taxes may make up a greater proportion of post-1986 earnings and taxes than they would if earnings and taxes were adjusted for inflation.

an incentive to bunch tax payments into a year they plan to make a dividend payment than they did before 1986.

As Equation 1 shows, each time a dividend is paid, it is credited with foreign taxes from the foreign tax pool in proportion to the size of the dividend relative to the earnings pool. After a dividend payment, the earnings pool is reduced by that dividend payment, and the pool of post-1986 foreign income taxes is reduced by any taxes credited to the dividend payment.

Once the foreign tax credit is calculated, the repatriation tax owed is the U.S. tax liability on the dividend less the foreign tax credit. Since dividends are distributed after foreign tax has been collected, the dividend is grossed up by the foreign tax credit in order to determine U.S. tax liability. Thus, the formula for repatriation taxes (RT) can be written as $RT = \tau_{US}(D + FTC) - FTC$, where τ_{US} is the U.S. corporate income tax rate, D is the dividend payment, and FTC is the foreign tax credit.

If the foreign tax credit is greater than the U.S. tax liability on the dividend, the dividend payment would trigger no repatriation tax, but nor would the firm receive a refund of the greater foreign taxes paid. However, when a parent has multiple subsidiaries, worldwide averaging of credits is allowed – excess tax credits earned on dividends from a high-foreign-tax subsidiary may be applied to earnings repatriated from a low-foreign-tax subsidiary. Excess tax credits can also be carried backwards or forwards (with certain time limitations) and applied to foreign earnings repatriated in other years.

Because foreign affiliates of U.S. firms mostly operate in foreign currencies, it is necessary to translate dividend payments and foreign taxes paid into U.S. dollars to calculate U.S. repatriation taxes. For the foreign tax credit formula in Equation 1, the ratio of the dividend to undistributed earnings is computed when both are in foreign currency units. Foreign income taxes are translated into dollars at the exchange rate in effect when foreign taxes were paid. Thus, the pool of past foreign tax payments does not change in dollar terms as a foreign currency fluctuates against the dollar. To calculate the repatriation tax on a dividend, it is necessary to convert the dividend into dollars, and this is done at the exchange rate in effect when the dividend is paid. Since the dollar value of the dividend payment will fluctuate with the current exchange rate while a portion of the foreign tax credit will not, the repatriation tax rate will also vary as the exchange rate moves. Section 3.4 explores more formally how repatriation taxes react to exchange rate movements.

3.3 Related Literature

Since the previous chapter gave an extensive overview of the literature on intrafirm dividend payments, here I will give a briefer summary of the work most related to question addressed in this chapter. Hartman (1985) developed one of the standard theoretical models of intrafirm dividend payments; in his model, repatriation taxes do not affect the timing or amount of repatriations. This model is closely related to the "trapped equity" or "new view" of dividend payments to shareholders developed by King (1977), Auerbach (1979), and Bradford (1981). In Hartman's model, the major assumptions are that dividend taxes are constant across time and that the affiliate must eventually remit all its foreign earnings as a dividend to the parent. If these two assumptions hold, then the repatriation tax does not influence the

dividend decision, since paying repatriation taxes in one period or another is inevitable. Only the rate of return in the foreign country versus the home country matters in determining the timing of the dividend decision. Firms will invest their foreign income wherever the rate of return is highest.[3]

Most empirical work, however, has found a relationship between dividend payments and dividend taxes, with repatriation rates decreasing as the dividend tax-price increases. Using tax return data of U.S. multinationals from the 1980s, Hines and Hubbard (1990) and Altshuler and Newlon (1993) find the firms' dividend behavior responds to the tax cost. Desai, Foley, and Hines (2001 and 2007) use panel data from the BEA's Survey of U.S. Direct Investment Abroad – the same dataset used in this paper – and also find a tax effect.

This evidence could be consistent with the Hartman model if the dividend responses measured in these empirical papers are capturing responses to the cost of dividend payments relative to other repatriation vehicles or to temporary changes in dividend tax prices. The Hartman model does not incorporate there being means other than dividend payments of returning funds from the affiliate to the parent company or that repatriation taxes may change from one period to the next, but either of these would negate the assumption of the Hartman model that repatriation taxes are both inevitable and constant.

Past literature has investigated these possible explanations for the response of dividend payments to dividend taxes. One strand of the literature has focused on what repatriation vehicles firms have access to other than dividend payments. Grubert (1998) presents a model where the decision between paying dividends, interest, and royalty payments depends on their tax prices relative to each other. Altshuler and Grubert (2002) lay out a number of strategies a multinational firm might use to avoid repatriation taxes but still make funds available to other parts of the firm when it has a wider and more realistic range of options than simply making a dividend payment directly from an affiliate to the parent company. Both papers find empirical evidence that firms use means other than dividend payments to "un-trap" foreign earnings when dividend taxes are high relative to those on other repatriation vehicles.

This paper is most related to Altshuler, Newlon, and Randolph (1995), which relaxes the Hartman model's assumption of the constancy of repatriation taxes. Altshuler, Newlon, and Randolph test if temporary repatriation tax changes result in larger dividend responses than differences in permanent tax levels. They create a panel dataset, using four years of tax return data from the 1980s, and attempt to decompose the tax price of repatriations into permanent and temporary components. They instrument for the permanent tax price of a foreign affiliate using the average tax price of affiliates in the same country and the dividend withholding tax rate; the current tax price minus the permanent tax price is taken to be the temporary component of the tax price. Their paper finds that firms do time dividend payments to take advantage of fluctuations in the tax price; temporarily higher dividend taxes are associated with lower dividend payments, but permanent tax prices are not found to have an effect significantly different than zero.

This paper builds on Altshuler, Newlon, and Randolph's work but takes a different ap-

[3] As discussed in the previous chapter, this result of the insignificance of repatriation taxes only holds for mature affiliates. High repatriation taxes may induce parents to underinvest in new affiliates so that the affiliate can use its own earnings for future investment and put off the "trapped equity" state during which dividend taxes are inevitable.

proach. In this paper, I isolate a specific temporary component of the dividend tax price instead of proxying for the permanent tax rate. Using the mean country tax price as an instrument for the permanent tax price has some drawbacks. As I show in this paper, due to exchange rate movements, the repatriation tax prices faced by all affiliates in a given country may (temporarily) move up and down together; thus, the mean country tax price is not only correlated with the permanent tax price, but it is also correlated with a temporary component of the tax rate. In addition, Desai, Foley, and Hines (2001) use the median country tax rate to test the effect of repatriation taxes and find a significant effect on dividend payments, thus providing some contradictory evidence to Altshuler, Newlon, and Randolph's finding that the mean country tax rate does not affect dividend payments. Still, I find support in my analysis for Altshuler, Newlon, and Randolph's finding that response of repatriations to a temporary component of the repatriation tax rate is strong.

There is not a large literature on the effect of exchange rates on repatriation taxes, which is the temporary component of the tax rate that I make use of in this paper. Wahl (1987 and 1989) wrote two papers soon after the Tax Reform Act of 1986 came into effect. These papers argue that, since the currency exchange provisions of TRA86 cause the repatriation tax rate to fluctuate with the exchange rate, these provisions create tax incentives for repatriation where economic incentives do not exist, although they do not test this hypothesis. Dodonova and Khoroshilov (2007) present a theoretical model that takes into account the exchange rate provisions of the foreign tax credit system. To my knowledge, no prior paper has empirically tested if the foreign currency translation laws have an effect on dividend payments.

3.4 The Credited Foreign Tax Rate, Repatriation Tax Rate and After-Tax Dividend

As discussed in Section 3.2, the foreign currency translation provisions of the foreign tax credit lead the foreign tax rate credited to a dividend (and hence the repatriation tax rate) to vary with the exchange rate. This section will look more formally at how the credited foreign tax rate and repatriation tax rate vary as the exchange rate changes. In the analysis presented in this section, it is important to note that I assume that a negative repatriation tax rate is possible if an affiliate's foreign tax credit exceeds its U.S. tax liability. I assume that firms have a large enough U.S. tax liability from repatriations from other affiliates that they will be able to use any increase in foreign tax credits. This means that firms will respond favorably to a negative repatriation tax rate.

Let ϵ_s be the exchange rate at time s between the U.S. dollar and the functional currency of a foreign affiliate of a U.S. firm; an increase in ϵ_s is an appreciation of the foreign currency relative to the dollar. I_s is the affiliate's before-foreign-tax income, denominated in foreign currency, that was earned at time s and has not yet been repatriated. τ_s is the foreign income tax rate at time s applied to income I_s. I assume that the affiliate pays a dividend of one foreign currency unit at time t, and so it pulls with it a proportional amount of taxes from its post-1986 tax pool. Assuming that the affiliate pays out a different amount of its undistributed earnings would not change the results, as the repatriation tax rate does not vary with the size of the dividend. Thus, the dividend payment in dollars is ϵ_t, since the dividend payment is translated at the current exchange rate, and the foreign

tax credit in dollars, as defined in Equation 1, is $\sum_{s=1}^{t} \epsilon_s \tau_s I_s \times \frac{1}{\sum_{s=1}^{t}(1-\tau_s)I_s}$ – foreign taxes are translated at the exchange rate in effect when they were paid and the second term, the fraction of accumulated earnings being paid as a dividend, is computed in the foreign currency. The initial period, $s = 1$, is the first year after 1986 from which the affiliate has undistributed earnings; this would depend both on the affiliate's birth year and the affiliate's past repatriation behavior.

The foreign tax rate credited to a dividend at time t is:

$$\begin{aligned} \tau_t^* &= \frac{FTC}{D + FTC} \\ &= \frac{\sum_{s=1}^{t} \epsilon_s \tau_s I_s}{\epsilon_t \sum_{s=1}^{t}(1-\tau_s)I_s + \sum_{s=1}^{t} \epsilon_s \tau_s I_s} \end{aligned} \tag{3.2}$$

This differs from the average foreign tax rate faced by the affiliate over the same time period:

$$\bar{\tau}_t = \frac{\sum_{s=1}^{t} \tau_s I_s}{\sum_{s=1}^{t} I_s} \tag{3.3}$$

Setting Equation 3.2 equal to Equation 3.3, we find that the credited foreign tax rate only equals the average foreign tax rate when the exchange rate at year t equals the average exchange rate weighted by the taxes in the post-1986 tax pool (that is, if $\epsilon_t = \frac{\sum_{s=1}^{t} \epsilon_s \tau_s I_s}{\sum_{s=1}^{t} \tau_s I_s}$). What causes the divergence of the credited foreign tax rate from the average foreign tax rate is the difference between the exchange rate at which the dividend is translated and the exchange rate(s) at which the foreign tax credit is translated. When the current exchange rate is greater than the average exchange rate of the post-1986 tax pool, the credited foreign tax rate is lower than the average tax rate because the dividend is translated into dollars at a more appreciated rate than the foreign tax credit. As the foreign currency strengthens against the dollar, the credited foreign tax rate decreases, and as the foreign currency weakens, the credited foreign tax rate increases.

Just as exchange rate fluctuations affect the value of the credited foreign tax rate, they also influence the repatriation tax rate. The repatriation tax rate on a dividend is $\tau_t^d = \frac{RT}{D} = \frac{\tau_{US}(D+FTC)-FTC}{D}$. After substituting in for D and FTC and simplifying, we obtain:

$$\tau_t^d = \tau_{US} - \frac{(1-\tau_{US})\sum_{s=1}^{t} \epsilon_s \tau_s I_s}{\epsilon_t \sum_{s=1}^{t}(1-\tau_s)I_s} \tag{3.4}$$

We can divide the repatriation tax rate into two components: one component ($\tau^{d,tax}$) that captures the effect of the affiliate's foreign tax payments – and is what the repatriation tax would be if the credited foreign tax rate were equal to the average foreign tax rate (Equation 3.3) – and a second component ($\tau^{d,ex}$), which is the portion of the repatriation tax rate driven by the difference between the exchange rate at which the dividend is translated and

the tax-pool-weighted exchange rate. The current repatriation tax rate is equal to the sum of:

$$\begin{aligned} \tau_t^d &= \tau_t^{d,tax} + \tau_t^{d,ex} \\ &= \left(\tau_{US} - \frac{(1-\tau_{US})\sum_{s=1}^{t}\tau_s I_s}{\sum_{s=1}^{t}(1-\tau_s)I_s}\right) + \left(\frac{(1-\tau_{US})\sum_{s=1}^{t}(\epsilon_t-\epsilon_s)\tau_s I_s}{\epsilon_t\sum_{s=1}^{t}(1-\tau_s)I_s}\right) \end{aligned} \tag{3.5}$$

By looking at Equation 3.5, we see that $\tau^{d,ex}$ is positive when $\sum_{s=1}^{t}\epsilon_t\tau_s I_s > \sum_{s=1}^{t}\epsilon_s\tau_s I_s$, which is equivalent to the current exchange rate being greater than the average exchange rate in the foreign tax pool; $\tau^{d,ex}$ is negative when the current exchange rate is less than the tax-pool weighted exchange rate. The greater the difference between the two exchange rates, the greater the magnitude of $\tau^{d,ex}$. However, while all affiliates in a country will experience the same exchange rate fluctuations, the exchange-rate component of the repatriation tax rate will differ by affiliate. We can note that $\tau^{d,ex}$ is only different from zero when there is a stock of past years' taxes in the post-1986 tax pool – otherwise, $\sum_{s=1}^{t}(\epsilon_t-\epsilon_s)\tau_s I_s$ is equal to zero. Since affiliates' past incomes, taxes, and dividend payments will differ from each other, $\tau^{d,ex}$ will not be the same for every affiliate in a country.

To give an illustrative example of how the repatriation tax rate fluctuates with the exchange rate, Figure 1 shows how the average repatriation tax rate (τ^d) and the average exchange-rate component of the tax rate ($\tau^{d,ex}$) evolve over time for affiliates in Japan as the dollar-yen exchange rate changes. As can be seen from the graph, the average repatriation tax rate, driven by the exchange-rate component, fluctuates as the exchange rate fluctuates. Note that the average total repatriation tax rate (τ^d) is negative in the case of the Japanese affiliates in the sample. This is because Japan has a higher statutory tax rate than that of the U.S. and so most Japanese affiliates will have a credited foreign tax rate that is greater than the U.S. tax rate. Thus, when U.S. parents repatriate income from Japanese affiliates they will earn excess foreign tax credits they can apply to other repatriated income.

The next subsection explores the incentives firms have to respond to these tax rate fluctuations.

After-Tax Dividend

The repatriation tax rate that firms face is important because it affects the value of the after-repatriation-tax dividend they receive. The after-tax dollar value of a one-foreign-currency-unit dividend payment is:

$$\begin{aligned} ATD_t &= D_t(1-\tau_t^d) \\ &= \epsilon_t\left(1-\tau_{US}+\frac{(1-\tau_{US})\sum_{s=1}^{t}\epsilon_s\tau_s I_s}{\epsilon_t\sum_{s=1}^{t}(1-\tau_s)I_s}\right) \\ &= (1-\tau_{US})\left(\epsilon_t+\frac{\sum_{s=1}^{t}\epsilon_s\tau_s I_s}{\sum_{s=1}^{t}(1-\tau_s)I_s}\right) \end{aligned} \tag{3.6}$$

The exchange rate between the foreign currency and the U.S. dollar has two, opposing effects on the after-tax dividend. The stronger the foreign currency is relative to the dollar,

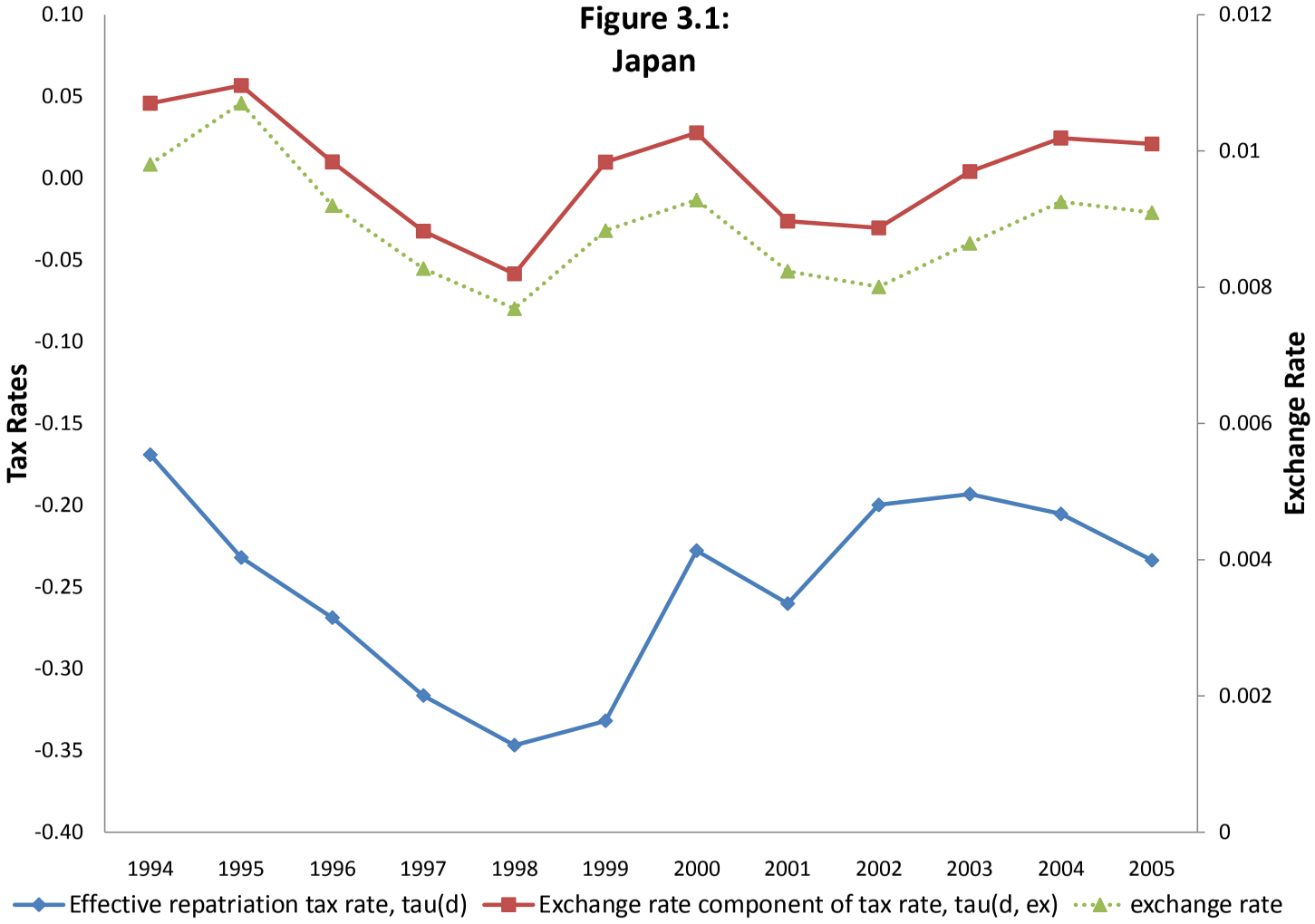


Figure 3.1:
Japan
Tax Rates
Exchange Rate
0.10
0.05
0.00
-0.05
-0.10
-0.15
-0.20
-0.25
-0.30
-0.35
-0.40
0.012
0.01
0.008
0.006
0.004
0.002
0
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
Effective repatriation tax rate, tau(d)
Exchange rate component of tax rate, tau(d, ex)
exchange rate

the higher the repatriation tax rate since the exchange-rate component of the repatriation tax rate, $\tau^{d,ex}$, rises. However, this increase in the tax rate is more than offset by the increase in the dollar value of the before-tax dividend. Therefore, the dollar value of the after-tax dividend increases as the foreign currency appreciates against the dollar: $\frac{\partial ATD_t}{\partial \epsilon_t} = (1-\tau_{US})\left(1+\frac{\tau_t I_t}{\sum_{s=1}^{t}(1-\tau_s)I_s}\right) > 0$.

Nonetheless, due to the expected future path of the dollar value of the after-tax dividend, the incentive exists for firms to respond to the exchange-rate component of the repatriation tax rate even though it is working in opposition to the exchange rate's effect on the before-tax dividend. Under the assumption that the exchange rate follows a random walk, the exchange-rate component of the repatriation tax rate will be expected to decrease in magnitude over time while the before-tax dividend will be expected not to change.[4] To see this, I compare the after-tax value of a dividend paid in period t to the expected after-tax value of a dividend paid in period $t+1$. The expected value of a one-foreign-currency-unit dividend in period $t+1$ is:

$$\begin{aligned} E[ATD_{t+1}] &= E\left[(1-\tau_{US})\left(\epsilon_{t+1}+\frac{\sum_{s=1}^{t+1}\epsilon_s\tau_s I_s}{\sum_{s=1}^{t+1}(1-\tau_s)I_s}\right)\right] \\ &= (1-\tau_{US})\left(E[\epsilon_{t+1}]+E\left[\frac{\sum_{s=1}^{t+1}\epsilon_s\tau_s I_s}{\sum_{s=1}^{t+1}(1-\tau_s)I_s}\right]\right) \end{aligned} \tag{3.7}$$

Comparing Equation 3.8 to Equation 3.7 shows that the value of the a current dividend payment relative to a future dividend payment will depend on the expected change in the exchange rate and the expectations of the next period's taxes and income. In order to focus on the effects of the exchange rate, I assume that future income is known with certainty and is independent of the future exchange rate and that the firm faces a constant foreign tax rate τ. This implies that $\tau^{d,tax}$, the portion of the repatriation tax rate driven by the foreign tax rate, is unchanging from year t to $t+1$ and that all changes in the repatriation tax rate are due to changes in $\tau^{d,ex}$. I also assume that $E[\epsilon_{t+1}] = \epsilon_t$, that is, that the exchange rate follows a random walk. Under these assumptions, the dollar value of a dividend payment at time t and the expected value of a dividend payment at time $t+1$ are:

$$ATD_t = (1-\tau_{US})\left(\epsilon_t+\frac{\tau\sum_{s=1}^{t}\epsilon_s I_s}{(1-\tau)\sum_{s=1}^{t}I_s}\right) \tag{3.8}$$

$$\begin{aligned} E[ATD_{t+1}] &= (1-\tau_{US})\left(E[\epsilon_{t+1}]+E\left[\frac{\tau\sum_{s=1}^{t+1}\epsilon_s I_s}{(1-\tau)\sum_{s=1}^{t+1}I_s}\right]\right) \\ &= (1-\tau_{US})\left(\epsilon_t+\frac{\tau\epsilon_t I_{t+1}+\tau\sum_{s=1}^{t}\epsilon_s I_s}{(1-\tau)\sum_{s=1}^{t+1}I_s}\right) \end{aligned} \tag{3.9}$$

[4] Meese and Rogoff (1983) and Cheung et al. (2005) find that a random walk model fits exchange rate movements as well as structural models. I exclude countries with extremely high, persistent inflation – which have currencies that may be expected to continually depreciate against the dollar – from my empirical analysis.

Since the exchange rate is not expected to change – and hence the dollar value of the before-tax dividend payment is expected to remain the same – the dollar value of the foreign tax credit (the second term in parentheses in Equations 3.8 and 3.9) will determine the difference between value of the current period's dividend payment and a future dividend payment. The expected value of an after-tax dividend payment at time $t+1$ will be larger than a dividend in year t when:

$$\begin{aligned} E[ATD_{t+1}] &> ATD_t \\ \frac{\tau\epsilon_t I_{t+1} + \tau\sum_{s=1}^{t}\epsilon_s I_s}{(1-\tau)\sum_{s=1}^{t+1} I_s} &> \frac{\tau\sum_{s=1}^{t}\epsilon_s I_s}{(1-\tau)\sum_{s=1}^{t} I_s} \\ \frac{\epsilon_t I_{t+1} + \sum_{s=1}^{t}\epsilon_s I_s}{\sum_{s=1}^{t+1} I_s} &> \frac{\sum_{s=1}^{t}\epsilon_s I_s}{\sum_{s=1}^{t} I_s} \\ \epsilon_t &> \frac{\sum_{s=1}^{t}\epsilon_s I_s}{\sum_{s=1}^{t} I_s} \quad \text{if } I_{t+1} > 0 \end{aligned} \tag{3.10}$$

Equation 3.10 shows that the next period's after-tax dividend is expected to be greater than the current after-tax dividend if the next period's expected average exchange rate (weighted by the affiliate's post-1986 earnings, which is the same as the tax-weighted average exchange rate since the tax rate is assumed to be constant) is greater than the average exchange rate in the current period. If I_{t+1} is greater than zero, then the last line of Equation 3.10 follows: the next period's expected average exchange rate will be greater than the current period's average exchange rate when the expected exchange rate in time $t+1$, ϵ_t, is greater than the current average exchange rate.

This is the same condition under which $\tau_t^{d,ex}$ is positive. Thus, when $\tau_t^{d,ex}$ is positive (i.e., the exchange-rate component of the the tax rate increases the repatriation tax rate an affiliate faces), an affiliate is better off waiting to repatriate since the after-tax dividend is expected to be higher in the next period ($E[ATD_{t+1}] > ATD_t$). When the current exchange rate is less than the average tax-pool exchange rate and $\tau_t^{d,ex}$ is negative, then the affiliate is better off repatriating in the current period since the after-tax dividend is expected to be lower in future periods. Since the exchange-rate component of the repatriation tax rate is driven by the difference between the exchange rate at which the dividend is translated and the exchange rate at which foreign taxes are translated, the exchange-rate component will decrease in magnitude as more taxes are added to the tax pool at the current exchange rate. Positive values of $\tau_t^{d,ex}$ and negative values of $\tau_t^{d,ex}$ are both expected to move towards zero as time goes by. Since the value of $\tau_t^{d,ex}$ is expected to be temporary, firms can avoid repatriation taxes pushed higher by a positive exchange-rate component by waiting to repatriate and can take advantage of negative values of $\tau_t^{d,ex}$ by paying a dividend in the current period.

3.5 Empirical Strategy

I measure the response of a foreign affiliate's dividend payment (normalized by the assets of the affiliate) to the components of an affiliate's repatriation tax rate:

$$\frac{D_{i,j,t}}{A_{i,j,t}} = \beta_0 + \beta_1 \frac{D_{i,j,t-1}}{A_{i,j,t-1}} + \beta_2 \tau^d_{i,j,t} + \beta_3 \tau^{d,ex}_{i,j,t} + X\gamma + u_{i,j,t} \quad (3.11)$$

$D_{i,j,t}$ is the dividend payment by firm i's foreign affiliate j in year t to its U.S. parent company, and $A_{i,j,t}$ measures the affiliate's assets. As defined in Section 3.4, $\tau^d_{i,j,t}$ is the repatriation tax rate a dividend payment would incur if affiliate j paid a dividend in period t, and $\tau^{d,ex}_{i,j,t}$ is the component of the repatriation tax rate caused by exchange rate fluctuations. I also include a set of control variables X discussed below.

I estimate Equation 3.11 using a censored regression estimator since the dividend payout ratio $\left(\frac{D}{A}\right)$ is censored at zero – negative dividend payments are not possible and about 80 percent of the affiliate observations in my sample do not pay a dividend. I use the trimmed least squares estimator proposed by Honoré (1992), which provides unbiased estimates for censored regressions with fixed effects.

The expected sign of the coefficient on the repatriation tax rate τ^d is negative. Although I am controlling for the transitory component of the tax rate caused by exchange rate fluctuations, τ^d contains all other components firm regard as temporary and its coefficient will also measure the response of affiliates' dividend payments to the permanent tax rate.

My hypothesis is that the coefficient on the exchange-rate component of the repatriation tax rate will be negative if firms are timing their dividend payments to minimize their repatriation taxes. As $\tau^{d,ex}$ is a temporary component of the repatriation tax rate that firms face, it should engender a greater response in firms' dividend behavior than the current tax rate, which includes both the temporary and permanent components of the tax rate. The sum of the coefficients β_2 and β_3 will provide the total effect of $\tau^{d,ex}$ on the dividend payout ratio.

The lagged dividend payment is included since Desai, Foley, and Hines (2001 and 2007) have shown that dividend payments are persistent and that the lagged dividend is a significant predictor of the current dividend payment. As control variables, I also include the net income of an affiliate normalized by its assets, the age of the affiliate, and industry dummy variables. I expect the coefficient on net income to be positive, as the larger the net income of an affiliate, the greater is its ability to pay dividends. I also expect the coefficient on age to be positive as it has been documented in past literature that older affiliates pay larger dividends on average than more newly established affiliates. The correlation between age and dividend size fits with the Hartman model: parents may underinvest in newer affiliates, so that the affiliates can reinvest their earnings at first and avoid paying dividends and dividend taxes until later in their life-cycle. It is especially important to control for the age of affiliates because the value of $\tau^{d,ex}$ is likely to be correlated with age since older affiliates are likely to have larger stocks of post-1986 taxes than newer affiliates.

Fixed effects are included in some specifications: I use both country-by-year and parent fixed effects. I use country-by-year fixed effects because swings in exchange rates could likely be correlated with changes in the economic environment that may influence dividend payments entirely separately from any repatriation tax effects. For example, large depreciations may be associated with financial upheaval and firms may want to repatriate their earnings from these countries regardless of any repatriation tax consequences. Secondly, a change in the exchange rate will cause the dollar value of a foreign-currency dividend to fluctuate.

While I show in Section 3.4 that swings in the dollar value of dividends should not necessarily affect firms' repatriations decisions, using country-by-year fixed effects further controls for this. I also include parent-firm fixed effects in some specifications in order to control for firm-wide repatriation decisions.[5]

Finally, I divide the sample into groups which may be expected to have different levels of responsiveness to repatriation tax rates. In order to investigate whether certain types of companies respond more to the exchange-rate component of the tax rate, I group foreign affiliates by the three criteria: the size of the firm the affiliate belongs to, whether the parent firm has an affiliate in a tax haven country, and the bond rating of the parent firm. As seen in the response to the AJCA, larger firms took more advantage of the tax reduction offered by the AJCA and much of the earnings repatriated were held in tax haven affiliates. These firms have both the resources to devote to tax planning and also perhaps flexibility in timing their repatriations – they likely have better access to capital markets on average and find it less costly to time their repatriation payments for tax minimization purposes than firms which are more reliant on internal funds.

3.6 Data

The data on foreign affiliates of U.S. firms comes from two surveys conducted by the Bureau of Economic Analysis. As a result of confidentiality assurances and penalties for noncompliance, the BEA believes that coverage of these surveys is close to complete and levels of accuracy are high. The BEA requires a survey to be filled out for each foreign affiliate that exceeds a certain threshold in terms of assets, sales, or net income. These thresholds vary by year.[6]

The first survey is the Annual (Benchmark) Survey of U.S. Direct Investment Abroad. This survey, which has been conducted every year since 1982, collects financial and operating information for both the parent companies and foreign affiliates of U.S. multinationals. The second survey, the Quarterly Balance of Payments Survey of U.S. Direct Investment Abroad, is concerned more closely with financial flows between foreign affiliates and their U.S. parent companies and has been conducted quarterly since 1994.

Both surveys contain information on dividend payments by foreign affiliates. The Survey of U.S. Direct Investment Abroad contains data on dividend payments made by a foreign affiliate to any of its owners. The Quarterly Balance of Payments Survey of U.S. Direct Investment Abroad contains data on dividend payments made directly to a U.S. parent company. As dividend payments made directly to a U.S. parent company are going to have immediate U.S. repatriation tax consequences, I use the data from the latter survey as the dependent variable in my empirical work. However, I use the total dividend payments when calculating affiliates' post-1986 undistributed earnings, since dividend payments to any owners are considered to decrease the earnings pool.

[5] I also estimated regressions with parent-by-year fixed effects and find similar estimates as when parent fixed effects are included.

[6] The affiliate reporting threshold for 1994 was $3 million, for 1995-1998 was $20 million, for 1999 was $7 million, for 2000-2003 was $30 million, for 2004 was $10 million, and for 2005 was $40 million. Benchmark surveys, which have the most complete coverage, were conducted in 1994, 1999, and 2004; therefore, the reporting thresholds for these three years are relatively low.

From the BEA's Annual Survey of U.S. Direct Investment Abroad, in addition to dividend payments, I also collect data on foreign affiliates' net income, assets, foreign tax payments, industry, age, functional currency, and country of operation. I use the data on dividend payments, net income, and foreign tax payments to calculate each affiliate's repatriation tax rate and the exchange-rate component of the repatriation tax rate using Equations 3.4 and 3.5 in Section 3.4. The value of τ_{US} used to compute the repatriation tax rates is 35%, the statutory corporate tax rate in the U.S. since 1993. Since, in order to calculate an affiliate's repatriation tax rate in a given year, I need an affiliate's dividend, income, and foreign tax payment history from 1987 up to the given year, I impute these values for some affiliates that drop out of and then reappear in the sample.

The data on exchange rates comes from the Global Financial Database. I measure the yearly exchange rate by averaging the daily exchange rates over the calendar year.

My dataset includes affiliates operating abroad in the years from 1994 to 2005, but my analysis is restricted to the years 1995-2003. I drop the years 2004 and 2005 as those were the years of the American Jobs Creation Act tax holiday and affiliates may have faced lower repatriation tax rates than the tax rates I compute, and observations in 1994 drop out of my analysis because lagged dividend payments are not available for them.

I also exclude affiliates which are subject to different tax laws than those described in Section 3.2. I exclude affiliates that are classified as financial firms (which includes holding companies) or which have a parent in the financial industry. Firms in the financial industry have more varied methods than non-financial firms to move funds around, and there are different tax laws that apply to financial transactions. I also restrict my sample to affiliates that are incorporated abroad; I drop unincorporated affiliates since their foreign earnings are not subject to tax deferral. Finally, I exclude from my dataset affiliates in countries which have currencies classified as hyperinflationary by the IRS because affiliates with hyperinflationary currencies must follow different currency translation rules than other affiliates. As defined by the IRS, a currency is hyperinflationary in the current year if it has had a cumulative compounded rate of inflation of at least 100% over the previous three years as measured by the consumer price indices in the IMF's International Financial Statistics.

My sample contains 39,170 observations at the affiliate-year level. These affiliates are spread across 39 countries. These affiliates had an average repatriation tax rate of 6.2% with a standard deviation of 27%. The average exchange-rate component of the repatriation tax rate is -1.6% with a standard deviation of 4.3%.

3.7 Results

3.7.1 All Firms

I first present results of the regression in Equation 3.11 excluding the exchange-rate component of the repatriation tax rate. In Table 3.1, Column 1 shows the estimation results without country-by-year or parent fixed effects. [Note: All tables are at the end of the chapter.] As expected, the coefficients on the lagged dividend payment, the affiliate's net income, and the age of the affiliate are all positive and significant. The repatriation tax rate has a negative, significant coefficient. The inclusion of country-year fixed effects does not greatly

affect the estimated coefficients, although the coefficient on the repatriation tax is of greater magnitude once country-year fixed effects are added, perhaps because the country-year fixed effects absorb some of the permanent component, such as the country's statutory tax rate, of the repatriation tax rate. The coefficient on the repatriation tax rate decreases in value with the inclusion of parent fixed effects, which may be due to overall parent repatriation patterns; firms which expect to repatriate much of their earnings may not attempt to minimize their foreign tax payments as much as firms which expect to retain their foreign earnings abroad.

The coefficients reported in the table measure the unobserved (uncensored) dividend payout ratio changes with respect to changes in the regressors. To calculate the effect on the observed (censored) dividend ratio, it is necessary to adjust the coefficients to account for the probability that the payout ratio is greater than zero. Given the adjustment, an increase in the repatriation tax rate by 1 percent is associated with a decrease in the dividend payout ratio of 0.01 percent. The mean dividend payout ratio in the sample is about 0.022 (that is, on average, foreign affiliates pay out 2.2% of their assets as dividends to U.S. parent companies per year), and so an increase in the tax rate by one percent implies a decrease in the dividend payout ratio equal to about one-half percent of the mean, and an increase in the repatriation tax rate of one standard deviation of 0.27 would decrease the payout ratio by about 12 percent of the mean.

In Columns 4 through 6, the exchange-rate component of the repatriation tax rate ($\tau^{d,ex}$) is included as a regressor as well as the total repatriation tax rate (τ^{d}). With the inclusion of $\tau^{d,ex}$, the current repatriation tax rate still has a negative effect on dividend payments, but the exchange-rate component of the tax rate has a positive, though indistinguishable from zero, coefficient. Adding country-year and parent fixed effects causes the coefficient to become negative, but it is still not significant. Thus, the exchange-rate component of the tax rate is not estimated to have a negative effect on the dividend payout ratio separate from the effect of the overall tax rate.

Columns 7-9 contain estimates when the exchange-rate component of an affiliate's repatriation tax rate is normalized by the standard deviation of the repatriation tax rate of the affiliate, σ_{τ^d} (as measured during the years the affiliate is in the sample). The variance of the repatriation tax rate an affiliate faces over time varies greatly among affiliates; some affiliates face fairly constant repatriation tax rates during the sample period, while others' tax rates fluctuate quite a bit. An affiliate which has a highly variable repatriation tax rate may be less likely to respond to the same absolute value of $\tau^{d,ex}$ than an affiliate for which the value of $\tau^{d,ex}$ represents a greater proportion of its average yearly tax rate variation, since there is a larger probability for the first affiliate of an even greater tax change in the next year.[7]

The average value of the repatriation tax rate's standard deviation within an affiliate is 0.28, with a median value of 0.08. If the coefficient on $\frac{\tau^{d,ex}}{\sigma_{\tau^d}}$ in Column 7 is divided by the

[7] In addition to dividing $\tau^{d,ex}$ by the standard deviation of the repatriation tax rate of the affiliate, I also tested dividing it by one other measure. For each affiliate, I regressed the repatriation tax rate I calculate using Equation 3.4 on the repatriation tax rate that would be if the credited foreign tax rate were equal to the median foreign tax rate paid by all affiliates in that country that year. I then calculate the standard deviation of the error term. Changes in the statutory foreign tax rate could cause the standard deviation of τ^d to be large even if τ^d is not very volatile – if, for example, τ^d were steadily increasing each year – and controlling for the median country tax rate helps correct for any trend that τ^d is experiencing. Using this alternate measure of the standard deviation of τ^d does not qualitatively change the results.

average standard deviation of 0.28, the estimated effect of a change in the exchange-rate component of the tax rate is -0.031 [= -0.00856/0.28], and the estimated effect is -0.107 when evaluated at σ_{τ^d}=0.08. This means that a one-percent change in the exchange-rate component of the repatriation tax rate is associated with a change in the dividend payout ratio that is more than fifty percent greater than a one-percent change in the overall tax rate at σ_{τ^d}=0.28, and a change that is almost three times as great when σ_{τ^d}=0.08. Thus, it appears that, if the exchange-rate component of the tax rate causes a large enough change in the tax rate, firms will adjust their dividend payments in response.

3.7.2 By Size of Company

I next separate foreign affiliates into groups depending on the size of the consolidated company they belong to. I divide by asset size because larger companies have more resources to devote to tax planning and, due to their larger size, may reap more benefits from any given amount of tax planning. They also likely have better access to capital markets on average and find it less costly to time their repatriation payments for tax minimization purposes than firms which are more reliant on internal funds. For each year, I rank the parent companies of affiliates in the sample by asset holdings. Foreign affiliates in the small-asset group are part of companies that fall in the bottom ninety percent of my sample in a given year, and affiliates are classified as part of large-asset companies if the company has assets in the top ten percent. Because companies with larger assets have a greater number of affiliates on average, this does not lead to a ninety-ten split of affiliates. About 68 percent of affiliates are in the small-asset group and 32 percent are in the large-asset group.[8]

Table 3.2 shows the estimates of Equation 3.11 when the sample is divided into foreign affiliates belonging to large and small companies. The response to the overall tax rate does not differ significantly between affiliates of large and small firms. However, there is a difference in the response to the exchange-rate component of the tax rate. This is particularly pronounced when comparing the coefficients on $\frac{\tau^{d,ex}}{\sigma_{\tau^d}}$. The dividend payments of large firms show a much greater response to the exchange-rate component of the tax rate than the dividend payments of smaller firms.

3.7.3 By Tax Haven Operations

In my second division of companies, I groups firms by ownership of an affiliate in a tax haven. I use tax haven operations as one measure of a firm's tax planning activities. Firms which set up an affiliate in a tax haven jurisdiction are firms which have taken steps to minimize their tax burden and should be among the firms which are most sensitive to changes in tax rates. I classify countries as tax havens based on a report published by the OECD in 2009. I include as tax havens jurisdictions which have not committed to the internationally agreed tax standard or have committed to the internationally agreed tax standard but have not yet

[8]The decision on where to draw the line between large and small companies is obviously somewhat arbitrary, but in order to make sure the "large" group of companies did not have too much variation in company size, it seemed necessary to set the dividing line higher than the median asset level. The distribution of assets is quite skewed, and of the companies in my sample, the top ten percent of companies own about 68 percent of the total assets in each year.

substantially implemented it. However, I do not classify as tax havens larger countries, such as Switzerland and Austria, that may attract a substantial number of companies for reasons other than financial and tax planning.

As the results in Table 3.3 show, tax haven status has a large effect on whether firms respond to the portion of the tax rate caused by exchange rate movements. The coefficient on $\frac{\tau^{d,ex}}{\sigma_{\tau^d}}$ is negative and significant when estimated on the subsample of affiliates of companies that own affiliates in tax havens and is positive and insignificant for the subsample of affiliates of firms which are not also operating in tax haven countries. The coefficient on $\tau^{d,ex}$ is also negative and significant at the 10 percent significance level when parent fixed effects are included in the sample of affiliates of firms with tax haven operation, while it is positive in the regressions estimated on affiliates of firms without tax haven operations.

3.7.4 By Bond Rating

In order to test directly whether access to capital markets has an effect on the extent firms time their dividend payments based on tax rates, I also divide the sample by whether the parent company has a long-term bond rating issued by Standard & Poor's. Presumably one of the reasons that a firm may repatriate is that it needs funds for domestic purposes. Firms with greater credit market access should be better able to time their repatriations to take advantage of low tax rates, while firms which find it more costly to access external funds might need to give tax considerations a lower priority and domestic funding needs a higher one. I divide the sample into companies with bond ratings and those without. I use Standard & Poor's long-term credit rating from Compustat, which I match with the parent firms in the BEA dataset through their IRS-assigned Employer Identification Number (EIN). Not all firms in the BEA sample have a match in Compustat, and I group those firms that do not have a Compustat match into the no bond rating group under the assumption they do not have a bond rating.[9]

Table 3.4 presents the results for the two bond-rating groups. Firms with bond ratings show a more negative dividend response to both $\tau^{d,ex}$ and $\frac{\tau^{d,ex}}{\sigma_{\tau^d}}$ than affiliates of firms without bond ratings. The dividend response to the total repatriation tax rate, τ^d, is about the same magnitude and statistically significant across the two groups. Thus, there is evidence that firms with poor bond ratings do not attempt to tax time their dividend payments in regards to the fluctuations caused by exchange rates, although it appears that they do respond to the overall tax rate.

3.7.5 By Parent Loss

As a robustness check, I also divide affiliates by the loss status of the parent company since the tax consequences of repatriation differ if a company is in a worldwide loss. If a U.S. firm has negative net income, it does not owe taxes to the U.S. and it earns net operating loss deductions (NOLDs) which it can carry forward for up to 20 years and back for two years

[9] I have also only used those firms for which there is a match in the Compustat database. The results are very similar. In addition, dividing firms up firms by whether they have an investment-grade bond rating (vs. a speculative or no bond rating) also leads to similar results.

and apply against the positive income the firm earns (or has earned) within that time frame. If a parent firm repatriates foreign income in a year when it has negative net income, then this repatriated foreign income decreases the amount of the domestic loss a firm can claim and any foreign tax credits that the foreign income brings with it can be carried forward for ten years or backward for one year (this was changed from five and two years, respectively, in 2004) and be applied to foreign income repatriated in those years.

A NOLD may be more valuable than a foreign tax credit both because it has a longer carryforward period and because foreign tax credits can only be applied to foreign income and not to domestic income. By repatriating foreign income in a loss year, companies forgo net operating loss deductions equal to the taxes they do not pay on the foreign income due to the loss position plus the foreign tax credits the dividends brings. (See Power and Silverstein (2007) for a comprehensive discussion of the attractiveness of NOLDs relative to FTCs.)

Because firms do not necessarily gain by repatriating foreign income that brings with it high foreign tax credits when the parent firm is in a loss, I do not necessarily expect the see the same relationship between the dividend payout ratio and the repatriation tax rate when the firm has an overall loss. Table 3.5 presents some mixed evidence in favor of this hypothesis. The overall repatriation tax rate has a negative effect of about the same magnitude on repatriations in the both the sample of firms with positive net income and firms in a loss, although the coefficients on τ^d are more statistically significant when estimated on the sample of affiliates of firms with positive net income than on the sample in a loss state. The coefficients on $\frac{\tau^{d,ex}}{\sigma_{\tau^d}}$ are more negative and statistically significant in the sample with positive income than negative income.

Therefore, there is some evidence that firms with positive income respond more to the repatriation tax rate than firms in a loss, although it is not conclusive. One issue may be that my measure of net income is the firm's response on the BEA survey, which may differ from the net income reported on the firm's tax return. It could also be that not all firms find NOLDs more attractive than FTCs.

3.7.6 Instrumental Variables

As described in Section 3.4, the value of $\tau^{d,ex}$ depends on an affiliate's past dividend payments, which may be correlated with the current dividend payment. In order to correct for the bias this may cause, I instrument $\tau^{d,ex}$ with the value of $\tau^{d,ex}$ an affiliate would face if, given its past history of income and taxes, it had made a steady stream of past dividend payments. I set this stream of dividend payments equal to 2.2 percent of the affiliate's assets in each year, which is the average dividend payout ratio in the sample. As discussed above, there is positive correlation between past dividend payments and the current dividend payment, and affiliates with higher dividend payments will have smaller absolute values of $\tau^{d,ex}$ than those affiliates with a past history of lower dividend payments, since affiliates with high past dividend payments will have a smaller stock of past taxes that have not yet been used as credits. Assuming that the true relationship between the exchange-rate component of the tax rate and the dividend payout ratio is a negative one, this would lead to a larger (in magnitude) estimated coefficient on $\tau^{d,ex}$ for those affiliates which have a positive value of $\tau^{d,ex}$; for those affiliates with a negative value of $\tau^{d,ex}$, the estimated coefficient on $\tau^{d,ex}$ is smaller in magnitude than the true effect. Since there are more affiliates with a negative

value of $\tau^{d,ex}$ than a positive value in the sample, then I suspect that the non-IV estimated coefficient is biased in a positive direction.

I use Newey's two-step minimum chi-squared estimator as the instrumental variables estimator. Since there is not an easily implementable way to use instrumental variables for a censored regression with fixed effects, I present here only specifications without fixed effects. Because τ^{d} is the sum of $\tau^{d,ex}$ and $\tau^{d,tax}$, I substitute $\tau^{d,tax}$ for τ^{d} as a exogenous regressor. This means that the coefficient on $\tau^{d,ex}$ now measures the total effect of $\tau^{d,ex}$ on the dividend payout ratio. In order to more easily compare the IV estimates with the non-IV estimates, I present non-IV estimates with $\tau^{d,tax}$ as a regressor along with the IV estimates. Because Honoré's trimmed least squares estimator used in my prior estimations is meant for estimating fixed-effect models, I compare the IV estimates with non-IV Tobit estimates without any fixed effects.

Tables 3.6 and 3.7 contain the estimates when $\tau^{d,ex}$ is instrumented for using its smoothed version. The coefficients on $\tau^{d,ex}$ in the instrumented regressions are more negative and more significant than when $\tau^{d,ex}$ is not instrumented. While the coefficient on $\tau^{d,ex}$ is often positive, although not significantly positive, in the uninstrumented regressions, it has a negative point estimate in almost all of the instrumented regressions, and it is significantly negative in the expected samples – the entire sample, the sample of affiliates of large companies, the sample of affiliates of companies with bond ratings, and the sample of affiliates of companies with tax haven operations. However, in only one sample – the sample of affiliates of firms with tax haven operations – is the coefficient on $\tau^{d,ex}$ statistically significantly more negative than the coefficient on $\tau^{d,tax}$. Thus, only for the sample of affiliates of firms with tax haven operations does level of the exchange rate component of the tax rate have a statistically significant additional effect on repatriations separate from the overall repatriation tax rate level.

In Tables 3.8 and 3.9, the results are presented of the IV estimates when $\frac{\tau^{d,ex}}{\sigma_{\tau^d}}$ (rather than $\tau^{d,ex}$) is included as an endogenous variable. The coefficients on $\frac{\tau^{d,ex}}{\sigma_{\tau^d}}$ are more negative when $\frac{\tau^{d,ex}}{\sigma_{\tau^d}}$ is instrumented for using $\frac{\tau^{d,ex}}{\sigma_{\tau^d}}$ calculated using smooth dividend payments than in the uninstrumented regressions. Therefore, it does appear that the correlation between past and present dividend payments causes an upward bias in the estimated coefficient on the exchange-rate component of the tax rate.

3.7.7 Quantile Regressions

As a final robustness check, this section contains estimates using the three-step censored quantile regression (CQR) estimator proposed by Chernozhukov and Hong (2003). This approach is useful both because it places few restrictive assumptions on the error term and also because it allows differentiation among affiliates with varying dividend payout ratios. Given that payout ratios range from 0 to close to 50 percent of assets, it may be expected that there would be a heterogeneous response to repatriation tax rates.

The three-step CQR technique of Chernozhukov and Hong is attractive because it is easily implementable. In the first step, I estimate a model of the probability of the dependent variable (the dividend payout ratio, in this case) not being censored. For this estimation, I use a logit model with the same dependent variables described above in Section 3.5 except that a dummy variable for whether the affiliate paid a dividend in the last period is substituted

for lagged payout ratio. I then select a subsample, denoted $J(c)$, such that the estimated probability of being uncensored is greater than $1-q+c$ where c is a trimming constant and q is the quantile. Following Chernozhukov and Hong, I choose c such $\#J(c)/\#J(0) = 90\%$ – that is, I set c such that 10% of the observations that would be chosen if c were equal to 0 are thrown away. The purpose of the first step is to select a subset of observations (not necessarily the largest subset) for which the true propensity score of being uncensored is greater than $1-q$.

In the second step, I obtain the standard quantile regression estimates using the sample $J(c)$ selected in the first step. I then select the observations where the predicted values of the dividend payout ratio from the quantile regressions are greater than the censoring value (zero) plus a very small positive number.

In step three, I re-estimate the quantile regression using the sample selected in the second step to obtain the final estimates for $\beta(q)$.

Tables 3.10 and 3.11 present the results for the censored quantile regressions for the 90th, 95th, and 99th quantiles. Since $\frac{\tau^{d,ex}}{\sigma_{\tau^d}}$ has been shown to have a more significant effect on dividends than $\tau^{d,ex}$, I here only present the results using $\frac{\tau^{d,ex}}{\sigma_{\tau^d}}$ as an explanatory variable. We can see that, generally, the responsiveness of the dividend payout ratio to both the exchange-rate portion of the repatriation tax rate and the total repatriation tax rate is greater in the higher quantiles and that affiliates of larger firms, firms with tax haven affiliates, and firms with bond ratings have larger responses to the exchange-rate component of the repatriation tax rate than affiliates of firms without these characteristics. Figures 3.2-3.4 graph the point estimates and two-standard-deviation confidence intervals of the coefficients on $\frac{\tau^{d,ex}}{\sigma_{\tau^d}}$ for large firms, firms with tax haven affiliates, and firms with bond ratings. The figures illustrate the higher responsiveness to $\frac{\tau^{d,ex}}{\sigma_{\tau^d}}$ of affiliates with conditionally higher dividend payout ratios.

3.8 Conclusion

I find that dividend payments of multinational firms respond to repatriation tax rates and, for certain types of firms, respond more to a transitory component of the repatriation tax rate caused by exchange rate fluctuations than to the total repatriation tax rate. As would be expected if firms need to balance the benefits from tax minimization against the need for domestic funds, dividend payments of larger firms, firms with tax haven operations, and firms with bond ratings show a greater response to the exchange-rate component of the repatriation tax than smaller firms without tax haven operations and firms lacking bond ratings.

The varied responses to repatriation tax changes that I measure fits the pattern of responses to the AJCA tax holiday. Only a small percentage of U.S. multinational firms responded to the AJCA tax holiday, and they were mostly fairly large firms. While this is partly due to provisions in the AJCA that made it easier for large firms to take advantage of the tax holiday than small firms, it is also probable that large firms devote more resources to tax planning than smaller firms. While it is not surprising that firms differ in the extent they engage in tax-minimizing behavior, it is interesting to distinguish among different firms' responses to the same tax incentives. Since repatriation payments from large

Figure 3.2:
Large Firms

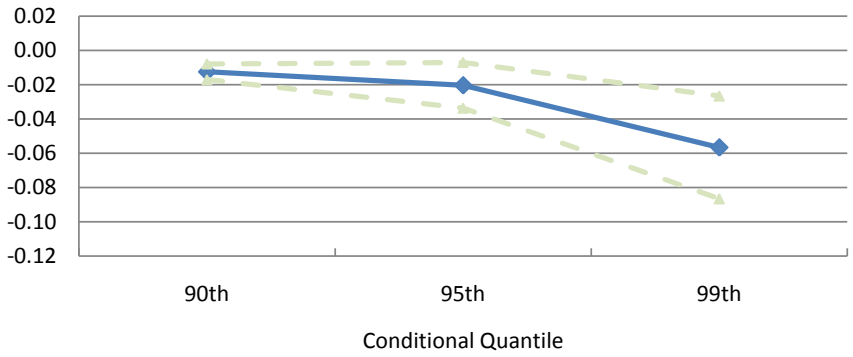


Figure 3.3:
Firms with Tax Havens

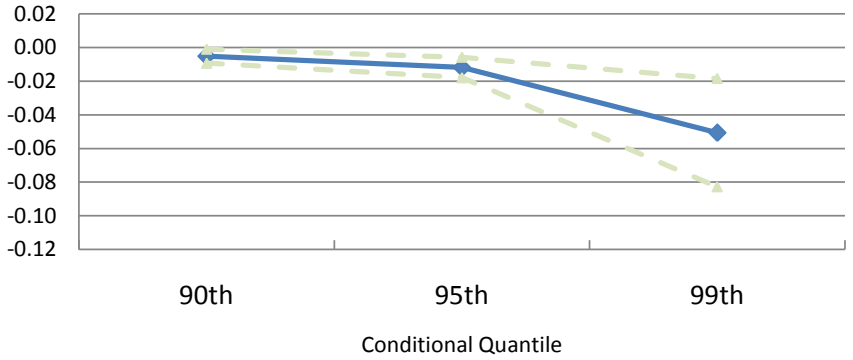
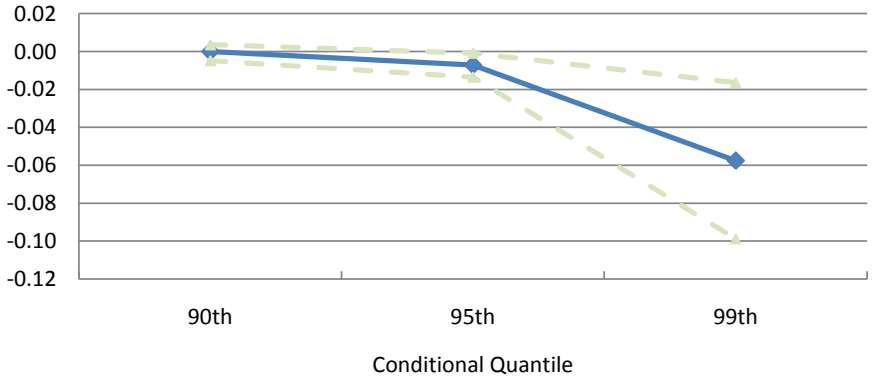


Figure 3.4:
Firms with S&P Bond Ratings



firms make up a large portion of total repatriations, total repatriations (and any financial or investment outcomes influenced by repatriation taxes) will be most affected by what large firms do. However, when thinking about how tax policy affects individual firms' behavior, it is necessary to look at a full range of firms, some of which may be less sophisticated with respect to tax planning than the largest U.S. multinationals.

This paper also sheds some light on the effects of the foreign currency translation provisions of repatriation tax law. The fluctuations in repatriation tax rates caused by exchange rate fluctuations have a significant effect on foreign affiliates' dividend payments for certain types of firms. While the exchange-rate component of the tax rate is normally not large compared to the total tax rate, it can provide deviations in the repatriation tax rate that some firms may find worthwhile to take advantage of.

Table 3.1: Affiliates of All Firms

Dependent Variable: Dividend Payout Ratio	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Lagged payout ratio	1.005***	0.990***	0.688***	1.006***	0.989***	0.688***	1.003***	0.986***	0.685***
	(0.0460)	(0.0256)	(0.0373)	(0.0460)	(0.0257)	(0.0372)	(0.0457)	(0.0258)	(0.0369)
Tax rate	-0.0613***	-0.0779***	-0.0404***	-0.0618***	-0.0775***	-0.0401***	-0.0588***	-0.0748***	-0.0370***
	(0.00713)	(0.0101)	(0.00873)	(0.00777)	(0.0115)	(0.00967)	(0.00713)	(0.0105)	(0.00907)
Exchange rate component of tax rate				0.00845	-0.00719	-0.00420			
				(0.0673)	(0.0844)	(0.0559)			
Exchange rate component of tax rate/std dev							-0.00856	-0.0124*	-0.00994*
							(0.00737)	(0.00678)	(0.00530)
Net income/assets	0.517***	0.507***	0.411***	0.517***	0.507***	0.411***	0.518***	0.508***	0.412***
	(0.0413)	(0.0265)	(0.0319)	(0.0413)	(0.0264)	(0.0319)	(0.0411)	(0.0265)	(0.0320)
Affiliate age/100	0.448***	0.434***	0.263***	0.449***	0.433***	0.263***	0.437***	0.419***	0.243***
	(0.0600)	(0.0536)	(0.0630)	(0.0609)	(0.0533)	(0.0615)	(0.0657)	(0.0538)	(0.0609)
Industry Dummies?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects?	Yes	No	No	Yes	No	No	Yes	No	No
Country-Year Fixed Effects?	No	Yes	No	No	Yes	No	No	Yes	No
Parent Fixed Effects?	No	No	Yes	No	No	Yes	No	No	Yes
Estimation Method	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS
Observations	39,170	39,170	39,170	39,170	39,170	39,170	39,170	39,170	39,170

Standard errors are in parentheses.

*** denotes 1% significance level; ** denotes 5% significance level; * denotes 10% significance level.

Table 3.2: By Size of Firm

Dependent Variable: Dividend Payout Ratio	Affiliates of Large Firms						Affiliates of Small Firms					
Lagged payout ratio	0.886***	0.894***	0.608***	0.884***	0.892***	0.607***	1.052***	1.036***	0.727***	1.050***	1.034***	0.724***
	(0.0517)	(0.0431)	(0.0844)	(0.0510)	(0.0433)	(0.0852)	(0.0456)	(0.0299)	(0.0325)	(0.0446)	(0.0300)	(0.0320)
Tax rate	-0.0613***	-0.0720***	-0.0381**	-0.0601***	-0.0761***	-0.0390***	-0.0658***	-0.0807***	-0.0409***	-0.0611***	-0.0747***	-0.0355***
	(0.0167)	(0.0192)	(0.0152)	(0.0141)	(0.0178)	(0.0150)	(0.00938)	(0.0144)	(0.0127)	(0.00955)	(0.0128)	(0.0116)
Exchange rate component of tax rate	-0.0831	-0.200	-0.111				0.0699	0.102	0.0478			
	(0.0951)	(0.131)	(0.0851)				(0.0726)	(0.108)	(0.0640)			
Exchange rate component of tax rate/std dev				-0.0261**	-0.0384***	-0.0229***				-0.000503	0.000140	-0.00474
				(0.0112)	(0.0126)	(0.00868)				(0.00843)	(0.00815)	(0.00599)
Net income/assets	0.547***	0.552***	0.469***	0.549***	0.553***	0.470***	0.495***	0.479***	0.378***	0.496***	0.480***	0.379***
	(0.0399)	(0.0380)	(0.0442)	(0.0400)	(0.0381)	(0.0449)	(0.0561)	(0.0349)	(0.0435)	(0.0563)	(0.0349)	(0.0436)
Affiliate age/100	0.419***	0.396***	0.333***	0.395***	0.376***	0.313***	0.494***	0.485***	0.214***	0.488***	0.477***	0.195***
	(0.0978)	(0.0748)	(0.118)	(0.0997)	(0.0752)	(0.117)	(0.0626)	(0.0666)	(0.0636)	(0.0702)	(0.0671)	(0.0632)
Industry Dummies?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects?	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No
Country-Year Fixed Effects?	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No
Parent Fixed Effects?	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Estimation Method	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS
Observations	12,368	12,368	12,368	12,368	12,368	12,368	26,802	26,802	26,802	26,802	26,802	26,802

Standard errors are in parentheses.

*** denotes 1% significance level; ** denotes 5% significance level; * denotes 10% significance level.

Table 3.3: By Tax Haven Operations

Dependent Variable: Dividend Payout Ratio	Affiliates of Firms with Tax Haven Operations						Affiliates of Firms without Tax Haven Operations					
Lagged payout ratio	0.960***	0.945***	0.712***	1.018***	0.939***	0.708***	1.060***	1.036***	0.632***	1.061***	1.034***	0.632***
	(0.0512)	(0.0308)	(0.0445)	(0.0230)	(0.0311)	(0.0443)	(0.0517)	(0.0412)	(0.0476)	(0.0524)	(0.0413)	(0.0478)
Tax rate	-0.0556***	-0.0638***	-0.0280**	-0.0598***	-0.0662***	-0.0298***	-0.0728***	-0.0926***	-0.0548***	-0.0635***	-0.0831***	-0.0435***
	(0.0106)	(0.0152)	(0.0122)	(0.00654)	(0.0143)	(0.0115)	(0.0183)	(0.0173)	(0.0164)	(0.0143)	(0.0148)	(0.0153)
Exchange rate component of tax rate	-0.105	-0.136	-0.107*				0.201*	0.183	0.184**			
	(0.0826)	(0.0949)	(0.0629)				(0.118)	(0.142)	(0.0937)			
Exchange rate component of tax rate/std dev				-0.0152***	-0.0240***	-0.0201***				0.00890	0.00155	0.00552
				(0.00413)	(0.00784)	(0.00699)				(0.00815)	(0.0118)	(0.00707)
Net income/assets	0.477***	0.486***	0.371***	0.281***	0.487***	0.373***	0.575***	0.554***	0.487***	0.576***	0.556***	0.489***
	(0.0469)	(0.0322)	(0.0415)	(0.0166)	(0.0322)	(0.0415)	(0.0496)	(0.0471)	(0.0606)	(0.0505)	(0.0475)	(0.0609)
Affiliate age/100	0.415***	0.365***	0.249***	0.513***	0.352***	0.230***	0.485***	0.500***	0.353***	0.481***	0.487***	0.337***
	(0.0402)	(0.0622)	(0.0755)	(0.0366)	(0.0618)	(0.0763)	(0.105)	(0.0859)	(0.0859)	(0.110)	(0.0866)	(0.0848)
Industry Dummies?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects?	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No
Country-Year Fixed Effects?	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No
Parent Fixed Effects?	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Estimation Method	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS
Observations	19,628	19,628	19,628	19,628	19,628	19,628	19,542	19,542	19,542	19,542	19,542	19,542

Standard errors are in parentheses.

*** denotes 1% significance level; ** denotes 5% significance level; * denotes 10% significance level.

Table 3.4: By Bond Ratings

Dependent Variable: Dividend Payout Ratio	Affiliates of Firms with S&P Long-Term Bond Ratings						Affiliates of Firms without S&P Long-Term Bond Ratings					
Lagged payout ratio	0.987***	0.977***	0.696***	0.981***	0.972***	0.690***	1.023***	0.998***	0.657***	1.025***	0.999***	0.658***
	(0.0529)	(0.0312)	(0.0519)	(0.0535)	(0.0319)	(0.0510)	(0.0387)	(0.0330)	(0.0451)	(0.0381)	(0.0326)	(0.0451)
Tax rate	-0.0559***	-0.0657***	-0.0416***	-0.0546***	-0.0671***	-0.0391***	-0.0747***	-0.106***	-0.0368**	-0.0673***	-0.0941***	-0.0322**
	(0.0111)	(0.0125)	(0.0120)	(0.0106)	(0.0114)	(0.0110)	(0.0125)	(0.0206)	(0.0156)	(0.0103)	(0.0182)	(0.0157)
Exchange rate component of tax rate	-0.0641	-0.139	-0.0483				0.189**	0.287*	0.0869			
	(0.0729)	(0.0944)	(0.0690)				(0.0814)	(0.157)	(0.0884)			
Exchange rate component of tax rate/std dev				-0.0203**	-0.0280***	-0.0186**				0.0128	0.0137	0.00459
				(0.00838)	(0.00814)	(0.00743)				(0.00928)	(0.0129)	(0.00658)
Net income/assets	0.520***	0.517***	0.409***	0.522***	0.519***	0.410***	0.520***	0.498***	0.427***	0.521***	0.499***	0.427***
	(0.0488)	(0.0339)	(0.0398)	(0.0486)	(0.0340)	(0.0399)	(0.0510)	(0.0429)	(0.0488)	(0.0513)	(0.0428)	(0.0488)
Affiliate age/100	0.403***	0.370***	0.243***	0.384***	0.352***	0.219***	0.559***	0.571***	0.355***	0.562***	0.565***	0.352***
	(0.0716)	(0.0609)	(0.0768)	(0.0758)	(0.0611)	(0.0762)	(0.108)	(0.0991)	(0.0979)	(0.114)	(0.101)	(0.0979)
Industry Dummies?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects?	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No
Country-Year Fixed Effects?	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No
Parent Fixed Effects?	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Estimation Method	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS
Observations	24,293	24,293	24,293	24,293	24,293	24,293	14,833	14,833	14,833	14,833	14,833	14,833

Standard errors are in parentheses.

*** denotes 1% significance level; ** denotes 5% significance level; * denotes 10% significance level.

Table 3.5: By Parent Loss

Dependent Variable: Dividend Payout Ratio	Affiliates of Firms with Positive Net Income						Affiliates of Firms with Negative Net Income					
Lagged payout ratio	0.971***	0.955***	0.667***	0.968***	0.951***	0.665***	1.275***	1.228***	0.788***	1.277***	1.235***	0.783***
	(0.0469)	(0.0271)	(0.0377)	(0.0468)	(0.0273)	(0.0376)	(0.0958)	(0.0840)	(0.0910)	(0.0948)	(0.0873)	(0.0908)
Tax rate	-0.0618***	-0.0772***	-0.0400***	-0.0575***	-0.0726***	-0.0370***	-0.0491*	-0.0807**	-0.0367	-0.0575*	-0.0901***	-0.0330
	(0.00898)	(0.0116)	(0.00978)	(0.00794)	(0.0107)	(0.00938)	(0.0272)	(0.0318)	(0.0297)	(0.0338)	(0.0330)	(0.0297)
Exchange rate component of tax rate	0.0213	0.0184	-0.0101				-0.131	-0.193	0.0324			
	(0.0693)	(0.0857)	(0.0556)				(0.161)	(0.233)	(0.195)			
Exchange rate component of tax rate/std dev				-0.00971	-0.0138*	-0.0109**				0.00154	0.00108	-0.00617
				(0.00815)	(0.00728)	(0.00555)				(0.0119)	(0.0185)	(0.0135)
Net income/assets	0.517***	0.508***	0.424***	0.517***	0.509***	0.424***	0.496***	0.501***	0.296**	0.492***	0.496***	0.301***
	(0.0381)	(0.0262)	(0.0313)	(0.0380)	(0.0263)	(0.0315)	(0.155)	(0.122)	(0.117)	(0.155)	(0.119)	(0.115)
Affiliate age/100	0.450***	0.433***	0.279***	0.437***	0.417***	0.259***	0.457***	0.425***	0.316	0.471***	0.446***	0.294
	(0.0652)	(0.0537)	(0.0637)	(0.0693)	(0.0540)	(0.0628)	(0.116)	(0.165)	(0.195)	(0.124)	(0.168)	(0.190)
Industry Dummies?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects?	Yes	No	No	Yes	Yes	No	Yes	Yes	No	Yes	No	No
Country-Year Fixed Effects?	No	Yes	No	No	No	Yes	No	No	Yes	No	Yes	No
Parent Fixed Effects?	No	No	Yes	No	No	No	No	No	No	No	No	Yes
Estimation Method	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS	Trimmed LS
Observations	32,995	32,995	32,995	32,995	32,995	32,995	6,175	6,175	6,175	6,175	6,175	6,175

Standard errors are in parentheses.

*** denotes 1% significance level; ** denotes 5% significance level; * denotes 10% significance level.

Table 3.6: Instrumental Variables
(Exchange Rate Component of the Tax Rate)

Dependent Variable: Dividend Payout Ratio	All Affiliates		Affiliates of Large Firms		Affiliates of Small Firms	
Lagged payout ratio	1.091***	1.092***	0.938***	0.939***	1.170***	1.171***
	(0.0177)	(0.0164)	(0.0295)	(0.0263)	(0.0219)	(0.0209)
Non-Exchange Rate component of tax rate	-0.0717***	-0.0665***	-0.0772***	-0.0727***	-0.0711***	-0.0664***
	(0.00549)	(0.00621)	(0.00886)	(0.00987)	(0.00695)	(0.00797)
Exchange rate component of tax rate	0.0176	-0.0885**	-0.0498	-0.155**	0.0453	-0.0468
	(0.0326)	(0.0402)	(0.0536)	(0.0657)	(0.0410)	(0.0510)
Net income/assets	0.287***	0.288***	0.301***	0.302***	0.277***	0.278***
	(0.0130)	(0.0109)	(0.0219)	(0.0176)	(0.0160)	(0.0139)
Affiliate age/100	0.527***	0.508***	0.542***	0.524***	0.519***	0.503***
	(0.0267)	(0.0271)	(0.0425)	(0.0428)	(0.0344)	(0.0350)
Industry Dummies?	Yes	Yes	Yes	Yes	Yes	Yes
Other Fixed Effects?	No	No	No	No	No	No
Estimation method	Tobit	IV Tobit	Tobit	IV Tobit	Tobit	IV Tobit
Observations	39,170	39,170	12,368	12,368	26,802	26,802

Robust standard errors are in parentheses.
*** denotes 1% significance level; ** denotes 5% significance level; * denotes 10% significance level.

Table 3.7: Instrumental Variables
(Exchange Rate Component of the Tax Rate)

Dependent Variable: Dividend Payout Ratio	Affiliates of Firms with Tax Haven Operations		Affiliates of Firms without Tax Haven Operations		Affiliates of Firms with Bond Ratings		Affiliates of Firms without Bond Ratings	
Lagged payout ratio	0.980***	1.026***	1.177***	1.179***	1.040***	1.041***	1.179***	1.181***
	(0.0231)	(0.0206)	(0.0278)	(0.0268)	(0.0222)	(0.0200)	(0.0291)	(0.0286)
Tax rate	-0.0738***	-0.0641***	-0.0784***	-0.0745***	-0.0677***	-0.0626***	-0.0801***	-0.0756***
	(0.00699)	(0.00782)	(0.00893)	(0.0102)	(0.00658)	(0.00753)	(0.00990)	(0.0110)
Exchange rate component of tax rate	0.00665	-0.184***	0.186***	0.112	-0.00677	-0.106**	0.0817	-0.0159
	(0.0408)	(0.0492)	(0.0564)	(0.0696)	(0.0387)	(0.0476)	(0.0592)	(0.0748)
Net income/assets	0.300***	0.281***	0.292***	0.293***	0.288***	0.289***	0.287***	0.288***
	(0.0176)	(0.0137)	(0.0207)	(0.0179)	(0.0165)	(0.0135)	(0.0213)	(0.0186)
Affiliate age/100	0.542***	0.461***	0.519***	0.507***	0.521***	0.504***	0.536***	0.519***
	(0.0334)	(0.0344)	(0.0433)	(0.0444)	(0.0317)	(0.0323)	(0.0491)	(0.0497)
Industry Dummies?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fixed Effects?	No	No	No	No	No	No	No	No
Estimation method	Tobit	IV Tobit	Tobit	IV Tobit	Tobit	IV Tobit	Tobit	IV Tobit
Observations	19,628	19,628	19,542	19,542	24,293	24,293	14,833	14,833

Robust standard errors are in parentheses.
*** denotes 1% significance level; ** denotes 5% significance level; * denotes 10% significance level.

Table 3.8: Instrumental Variables
(Exchange Rate Component of the Tax Rate/Standard Deviation)

Dependent Variable: Dividend Payout Ratio	All Affiliates		Affiliates of Large Firms		Affiliates of Small Firms	
Lagged payout ratio	1.086***	1.083***	0.933***	0.933***	1.160***	1.159***
	(0.0178)	(0.0163)	(0.0296)	(0.0262)	(0.0222)	(0.0208)
Tax rate	-0.0603***	-0.0613***	-0.0737***	-0.0718***	-0.0606***	-0.0580***
	(0.00512)	(0.00604)	(0.00876)	(0.00965)	(0.00686)	(0.00775)
Exchange rate component of tax rate/std dev	0.287***	-0.0262***	-0.0176***	-0.0335***	-0.0111***	-0.0232***
	(0.0130)	(0.00379)	(0.00578)	(0.00685)	(0.00390)	(0.00460)
Net income/assets	0.587***	0.286***	0.304***	0.304***	0.275***	0.274***
	(0.0286)	(0.0109)	(0.0218)	(0.0175)	(0.0161)	(0.0139)
Affiliate age/100	0.0146	0.546***	0.538***	0.512***	0.603***	0.576***
	(0.0233)	(0.0284)	(0.0444)	(0.0438)	(0.0381)	(0.0373)
Industry Dummies?	Yes	Yes	Yes	Yes	Yes	Yes
Other Fixed Effects?	No	No	No	No	No	No
Estimation Method	Tobit	IV Tobit	Tobit	IV Tobit	Tobit	IV Tobit
Observations	39,170	39,170	12,368	12,368	26,802	26,802

Robust standard errors are in parentheses.

*** denotes 1% significance level; ** denotes 5% significance level; * denotes 10% significance level.

Table 3.9: Instrumental Variables
(Exchange Rate Component of the Tax Rate/Standard Deviation)

Dependent Variable: Dividend Payout Ratio	Affiliates of Firms with Tax Haven Operations		Affiliates of Firms without Tax Haven Operations		Affiliates of Firms with Bond Ratings		Affiliates of Firms without Bond Ratings	
Lagged payout ratio	1.018***	1.016***	1.168***	1.169***	1.037***	1.036***	1.179***	1.180***
	(0.0231)	(0.0205)	(0.0280)	(0.0267)	(0.0221)	(0.0199)	(0.0291)	(0.0286)
Tax rate	-0.0660***	-0.0641***	-0.0629***	-0.0607***	-0.0670***	-0.0653***	-0.0768***	-0.0749***
	(0.00681)	(0.00761)	(0.00880)	(0.00988)	(0.00645)	(0.00727)	(0.00980)	(0.0107)
Exchange rate component of tax rate/std dev	-0.0193***	-0.0353***	-0.00322	-0.0119*	-0.0130***	-0.0231***	-0.00617	-0.0144**
	(0.00408)	(0.00491)	(0.00521)	(0.00607)	(0.00375)	(0.00428)	(0.00510)	(0.00590)
Net income/assets	0.281***	0.281***	0.288***	0.287***	0.289***	0.288***	0.288***	0.288***
	(0.0167)	(0.0137)	(0.0208)	(0.0179)	(0.0165)	(0.0135)	(0.0213)	(0.0186)
Affiliate age/100	0.514***	0.484***	0.590***	0.572***	0.499***	0.476***	0.512***	0.490***
	(0.0366)	(0.0358)	(0.0474)	(0.0467)	(0.0318)	(0.0324)	(0.0494)	(0.0499)
Industry Dummies?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other Fixed Effects?	No	No	No	No	No	No	No	No
Estimation Method	Tobit	IV Tobit	Tobit	IV Tobit	Tobit	IV Tobit	Tobit	IV Tobit
Observations	19,628	19,628	19,542	19,542	24,293	24,294	14,833	14,833

Robust standard errors are in parentheses.

*** denotes 1% significance level; ** denotes 5% significance level; * denotes 10% significance level.

Table 3.10: Censored Quantile Regressions

Dependent Variable: Dividend Payout Ratio	All Affiliates			Affiliates of Large Firms			Affiliates of Small Firms		
	q=0.9	q=0.95	q=0.99	q=0.9	q=0.95	q=0.99	q=0.9	q=0.95	q=0.99
Lagged payout ratio	0.884***	1.004***	0.771***	0.974***	0.909***	0.643***	0.869***	1.067***	0.803***
	(0.0191)	(0.0289)	(0.0523)	(0.0282)	(0.0530)	(0.0764)	(0.0155)	(0.0416)	(0.0723)
Tax rate	-3.80e-05	-0.0214***	-0.0423	-0.0134**	-0.0195***	-0.0773	0.00819	-0.0121***	-0.0180
	(0.0165)	(0.00306)	(0.0263)	(0.00563)	(0.00492)	(0.0553)	(0.0166)	(0.00308)	(0.0305)
Exchange rate component of tax rate/std dev	-0.00297	-0.00292	-0.0148	-0.0124***	-0.0203***	-0.0566***	0.00153	0.00787**	-0.00220
	(0.00652)	(0.00399)	(0.0162)	(0.00229)	(0.00666)	(0.0150)	(0.00664)	(0.00349)	(0.0179)
Net income/assets	0.196***	0.442***	0.514***	0.329***	0.549***	0.477***	0.209***	0.304***	0.473***
	(0.0344)	(0.0228)	(0.0205)	(0.0397)	(0.0364)	(0.0353)	(0.0320)	(0.0326)	(0.0218)
Affiliate age/100	0.0454	0.156***	0.350***	0.106***	0.0917***	0.462**	0.0169	0.143***	0.292**
	(0.0404)	(0.0156)	(0.118)	(0.0134)	(0.0224)	(0.187)	(0.0803)	(0.0274)	(0.149)
Industry Dummies?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other Fixed Effects?	No	No	No	No	No	No	No	No	No
Estimation Method	3-step CQR	3-step CQR	3-step CQR	3-step CQR	3-step CQR	3-step CQR	3-step CQR	3-step CQR	3-step CQR
Observations	39,170	39,170	39,170	12,368	12,368	12,368	26,802	26,802	26,802

Bootstrapped standard errors are in parentheses.

*** denotes 1% significance level; ** denotes 5% significance level; * denotes 10% significance level.

Table 3.11: Censored Quantile Regressions

Dependent Variable: Dividend Payout Ratio	Affiliates of Firms with Tax Haven Operations			Affiliates of Firms without Tax Haven Operations			Affiliates of Firms with Bond Ratings			Affiliates of Firms without Bond Ratings		
	q=0.9	q=0.95	q=0.99	q=0.9	q=0.95	q=0.99	q=0.9	q=0.95	q=0.99	q=0.9	q=0.95	q=0.99
Lagged payout ratio	1.045***	1.016***	0.701***	0.871***	1.065***	0.885***	1.061***	1.010***	0.805***	0.889***	1.035***	0.745***
	(0.0332)	(0.0291)	(0.0468)	(0.0199)	(0.0575)	(0.136)	(0.0233)	(0.0369)	(0.0802)	(0.0245)	(0.0583)	(0.120)
Tax rate	-0.0156***	-0.0320***	-0.0989***	0.000284	-0.00119	-0.0256	-0.0342***	-0.0237***	-0.0448	0.00105	-0.00159	-0.0530*
	(0.00334)	(0.00381)	(0.0313)	(0.0250)	(0.00450)	(0.0251)	(0.00440)	(0.00464)	(0.0504)	(0.0175)	(0.00295)	(0.0284)
Exchange rate component of tax	-0.00512**	-0.0118***	-0.0506***	0.00414	0.0103***	0.0231	-0.000590	-0.00715**	-0.0576***	0.00715	0.0116**	0.0443***
	(0.00208)	(0.00303)	(0.0161)	(0.00709)	(0.00380)	(0.0215)	(0.00210)	(0.00315)	(0.0206)	(0.00801)	(0.00471)	(0.0118)
Net income/assets	0.244***	0.483***	0.478***	0.128***	0.247***	0.532***	0.239***	0.491***	0.528***	0.150***	0.267***	0.492***
	(0.0321)	(0.0242)	(0.0243)	(0.0404)	(0.0292)	(0.0199)	(0.0341)	(0.0274)	(0.0255)	(0.0391)	(0.0389)	(0.0279)
Affiliate age/100	0.0929***	0.143***	0.427***	0.0639	0.162***	0.309**	0.113***	0.171***	0.165	0.0932	0.147***	0.582***
	(0.0113)	(0.0227)	(0.113)	(0.0921)	(0.0327)	(0.142)	(0.0115)	(0.0232)	(0.178)	(0.112)	(0.0339)	(0.177)
Industry Dummies?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other Fixed Effects?	No	No	No	No	No	No	No	No	No	No	No	No
Estimation Method	3-step CQR	3-step CQR	3-step CQR	3-step CQR	3-step CQR	3-step CQR	3-step CQR	3-step CQR	3-step CQR	3-step CQR	3-step CQR	3-step CQR
Observations	19,628	19,628	19,628	19,542	19,542	19,542	24,293	24,293	24,294	14,833	14,833	14,833

Bootstrapped standard errors are in parentheses.

*** denotes 1% significance level; ** denotes 5% significance level; * denotes 10% significance level.

Chapter 4

Multinational Firms' Repatriations and Domestic Investment[1]

Abstract

This paper investigates whether multinational firms' domestic investment responds to changes in the amount of funds they repatriate from their foreign subsidiaries, and particularly whether financially constrained firms show a greater change in domestic investment in response to repatriations than less financially constrained firms. I find suggestive evidence that a change in repatriations caused by exogenous changes in the incentives to repatriate leads to greater changes in domestic investment for financially constrained than financially unconstrained firms, although due to imprecise estimates it is impossible to draw strict conclusions. The difference in the domestic investment response between financially constrained and unconstrained firms fits with the theory that financially constrained firms are more reliant on internal funds for investment financing than unconstrained firms.

4.1 Introduction

In the previous chapter, I find evidence of heterogeneous responses of firms' repatriation behavior to a specific component of the repatriation tax rate depending on such firm characteristics as size, ownership of a tax haven affiliate, and financial constraints. In this chapter, I investigate if the use to which firms put repatriations also differs depending on the firm's characteristics. If, for example, a firm adjusts its repatriations due to a change in the repatriation tax rate it faces, does this change in the amount of domestic funds available affect the firm's behavior? I am particularly interested in the relationship between repatriations and multinational firms' domestic investment in the wake of the American Jobs Creation Act of 2004, which gave U.S. multinationals a one-time tax reduction on their repatriated foreign earnings, and current lobbying efforts to enact a similar tax holiday. Supporters of another

[1]The statistical analysis of firm-level data on U.S. multinational companies was conducted at the Bureau of Economic Analysis, U.S. Department of Commerce, under arrangements that maintain legal confidentiality requirements. The views expressed are those of the author and do not reflect official positions of the U.S. Department of Commerce.

tax holiday argue that firms will invest their foreign earnings in the U.S. and expand their U.S. payroll, although their is little evidence that this resulted under the AJCA tax holiday. However, the firms which took advantage of the AJCA tax holiday were not a representative sample of all U.S.-based multinationals, and there were certain provisions of the AJCA that made it more attractive for firms which were unlikely to need foreign funds for domestic investment purposes. This paper looks at whether repatriations of foreign earnings affected domestic investment outside of the AJCA period.

There are two parallel questions regarding how repatriations and domestic investment interact, since both repatriations and investment can be seen as causing the other. The first question is how firms' domestic investment responds to a change in repatriations caused by an exogenous change in the incentives to repatriate, such as the increase that occurred under the AJCA. This is a question of how multinational firms' domestic investment responds to a certain type of internal funds – dividends paid from income earned abroad. The second question is whether investment plans affect firms' repatriation decisions. That is, do firms time their dividend payments in order to meet their domestic and foreign investment financing needs by increasing dividends to finance domestic projects and decreasing dividends when the firm wants to invest more abroad? This question relates closely to the Hartman model, discussed in the other chapters of this dissertation, which finds that firms should make their dividend payment decisions based on the relative rates of return in the home country and abroad.

Although they are both interesting questions, this paper attempts to answer the first question: do firms change their domestic investment when their repatriations change, thus changing the amount of internal funds available to the domestic part of the firm? The link between the availability of internal funds and firms' investment has long been noted. This link may exist because external financing is generally more expensive than internal financing due to such factors as transaction costs, principal-agent problems between firm managers and outside investors (e.g., Jensen and Meckling (1976)), or information asymmetries between the two groups (e.g., Myers and Majluf (1984)).

While all firms may face a wedge between the costs of internal and external capital, some firms find external capital especially costly to access. These financially constrained firms may be more reliant on internal capital to finance their investment than firms which face less difficulty in going to the external capital market. Fazzari, Hubbard, and Petersen (1988) were the first to test and find that financially constrained firms' investment was more sensitive to internally generated cash flow than financially unconstrained firms. There has been some controversy over the link between financial constraints and reliance on internal funds for investment since changes in internal funds may be correlated with omitted variables such as investment opportunities. Kaplan and Zingales (1997 and 2000) have been particularly critical of the causal link between financial constraints and cash flow-investment sensitivity. However, papers such as Lamont (1997) and Rauh (2006) use changes in internal funds that are more arguably exogenous than simple cash flow and find that investment responds to these changes.

In this paper, I examine whether the relationship between firms' repatriations of their foreign earnings and their domestic investment depends on whether firms are financially constrained. Financially constrained firms' domestic investment may be more sensitive to their repatriations than firms which can raise external capital more cheaply. Since firms which are

less financially constrained should be able to get close to their optimal domestic investment by raising external capital, changes in repatriations should not affect their domestic investment very much. However, for firms which find it harder to raise external capital and are far away from their optimal investment point, domestic investment may depend how much of their foreign earnings are repatriated.

Much of the literature that has looked at domestic uses of foreign repatriations has focused on what was done with the funds repatriated during the American Jobs Creation Act tax holiday. The AJCA gave multinational firms a one-year tax reduction of 85 percent on dividend payments from foreign affiliates to the parent company. There were, however, certain restrictions on what dividend payments could qualify for the tax holiday. These restrictions, which are detailed in Chapter 2, made the tax holiday most beneficial to those firms that had built up large holdings of foreign earnings abroad and had not recently made large dividend payments.

Although the American Jobs Creation Act was originally called the Homeland Investment Act, there is little evidence of either increased domestic hiring or capital investment by the firms that repatriated during the tax holiday and much evidence that the firms paid out a large portion of the repatriated funds to their shareholders. Blouin and Krull (2009) found an increase in stock repurchases associated with repatriations made under the AJCA. Baghai (2010) found an increase in shareholder payouts (dividend payments and share repurchases combined) and a decrease in firm-wide investment for well-governed firms. Dharampala, Foley, and Forbes (2010) also found a significant increase in stock repurchases, and they did not find that the AJCA tax holiday had a significant effect on U.S. investment, R&D, or employment. Dharampala, Foley, and Forbes also look specifically at financially constrained firms, but they do not find that even these firms used AJCA repatriations to increase their domestic investment or hiring. Bucking the trend, Faulkender and Petersen (2009) find that financially constrained firms' repatriations under the AJCA were correlated with their domestic investment. However, as discussed in Chapter 2, Faulkender and Petersen's econometric specification is a better test for whether firms chose the amount to repatriate under the AJCA based on their investment plans than for whether their investment was affected by their repatriations.

Given the provisions of the American Jobs Creation Act, it is not particularly surprising that there was such a large response in share repurchases and not much in domestic investment or employment. The assumption behind the AJCA tax holiday, for it have the effect that policymakers hoped, was that firms had domestic financial constraints that prohibited them from undertaking profitable investment projects in the U.S. while at the same time having funds abroad that could be used to fund these projects. However, since the firms which were most able to take advantage of the AJCA were those firms that built up large holdings of foreign earnings abroad and had not made large repatriations recently, they most likely did not have profitable domestic investment projects in need of financing or they could have previously repatriated foreign earnings to finance them.

Because the AJCA tax holiday was most attractive to a subset of multinational firms and was a temporary measure, what firms did with AJCA repatriations does not necessarily give much insight into the typical uses of repatriated foreign earnings. However, there has not been much research on how repatriations affect domestic investment separately from the AJCA tax holiday. In this paper, I examine the relationship between domestic investment

and repatriations in the years leading up to the tax holiday, and I test whether financially constrained firms respond to changes in repatriations differently than financially unconstrained firms. In addition, to the best of my knowledge, all papers studying the response to the AJCA only looked at firms with publicly available financial statements and left out privately held companies, which are smaller and (probably) more financially constrained on average. The dataset used in this paper includes private companies and so looks at a wider sample of firms than those in the AJCA studies.

The rest of this chapter is organized as follows. Sections 4.2 and 4.3 describe the empirical strategy and data used to test the relationship between domestic investment and repatriations of foreign earnings. Section 4.4 presents the results, and Section 4.5 concludes.

4.2 Empirical Strategy

I want to test whether domestic investment changes as repatriated foreign income changes, and whether the relationship differs by type of firm. I use a regression with some of the usual controls for investment, and I also include foreign repatriations to test the relationship between repatriations and domestic investment. The empirical specification I use is:

$$\begin{aligned}\frac{PPE_{i,US,t}}{A_{i,US,t-1}} &= \beta_0 + \beta_1 \frac{\sum_j D_{i,j,t}}{A_{i,US,t-1}} + \beta_2 q_{i,US,t-1} + \beta_3 \frac{NI_{i,US,t-1}}{A_{i,US,t-1}} + \\ &\quad \beta_4 \frac{Liab_{i,US,t-1}}{A_{i,US,t-1}} + \lambda_i + \delta_t + u_{i,US,t} \qquad (4.1)\end{aligned}$$

The dependent variable $\frac{PPE_{i,US,t}}{A_{i,US,t-1}}$ is investment in plant, property, and equipment by firm i in the US in year t normalized by the lagged assets of the parent firm. $D_{i,j,t}$ are dividend payments from firm i's foreign subsidiary j in year t. $\sum_j D_{i,j,t}$ is equal to total dividend payments received by firm i from all its foreign subsidiaries j in year t. I test whether β_1, the coefficient on repatriations, varies by the type of firm. As discussed above, my hypothesis is that financially constrained firms are more likely to use repatriated foreign income for domestic investment than firms without financial constraints.

As a control, I include $q_{i,US,t-1}$, the median Tobin's q in year t-1 for the industry of the parent firm. I do not have Tobin's q for each firm because the BEA dataset does not include the market value of the firm and not every firm in the BEA dataset is also in Compustat. Instead, I calculate the median Tobin's q for each 3-digit ISI industry from firms in Compustat, and I match each firm in the BEA dataset with its 3-digit ISI industry's median Tobin's q.[2] If a firm reports sales in more than one industry, I calculate the average Tobin's q weighted by the sales in each industry. I expect β_2, the coefficient on lagged Tobin's q, to be positive.

[2]ISI (International Surveys Industry) is a BEA-specific industry classification system. The 3-digit industries that I use are similar in scope to 3-digit Standard Industrial Classification (SIC) industries. Tobin's q is calculated as the ratio of the sum of the market value of common stock outstanding, the liquidating value of preferred stock, long-term debt, and current liabilities less current assets to the book value of assets. This approximation of Tobin's q is from Chung and Pruitt (1994).

Other control variables that I include are the parent firm's net income in year t-1, $NI_{i,US,t-1}$, and the parent firm's liabilities in year t-1, $Liab_{i,US,t-1}$, both scaled by the parent firm's assets in year r t-1. I expect β_3, the coefficient on the profitability of the parent firm, to be positive, and I expect β_4, the coefficient on lagged leverage, to be negative because firms with larger debt obligations might not have the funds to take on new investment projects.

I also include year and firm fixed effects. The year fixed effects absorb any overall shocks or trends to investment, and the firm fixed effects absorb any firm-specific investment and repatriation patterns. With the inclusion of firm fixed effects, I am testing if changes in repatriations by individual firms are correlated with changes in their domestic investment rather than if repatriation of foreign earnings is correlated with domestic investment across firms.

There are a number of endogeneity issues with an OLS regression of investment on repatriations. The first is that repatriations of foreign earnings may be correlated with firms' investment opportunities. Repatriations tend to increase as foreign profits increase because firms have more funds out of which to pay dividends. Since the foreign and domestic operations of multinational firms are often involved in producing and selling the same products, high foreign profits may also be a sign of positive firm-wide investment opportunities. Therefore, repatriations and domestic investment may move together without repatriations being used to finance domestic investment. A second problem with regressing investment on repatriations is that, as mentioned above, firms may time their repatriations to fund domestic investment. Therefore, an OLS regression may pick up that dividends and investment have a positive relationship because firms increase dividends when they need financing for domestic investment, but it does not distinguish that relationship from what the effect on domestic investment would be of a change in dividend payments that is not caused by firms' investment plans. To estimate that effect, it is necessary to instrument dividend payments with variables uncorrelated with the timing effect.

In order to investigate a causal link going from foreign dividend payments to domestic investment, I use as instruments the repatriation tax rate and the age of the foreign affiliate, two of the explanatory variables that I use in Chapter 3 to predict a foreign affiliate's dividend payout ratio. The dividend payout ratio, $\frac{D_{i,j,t}}{A_{i,j,t}}$, is the ratio of an affiliate's dividend payment to its assets. However, because I now want to predict total subsidiary dividend payments relative to domestic assets and not subsidiary-specific payout ratios, it is necessary to eliminate affiliate assets from the denominator. If I multiply through by affiliate assets $A_{i,j,t}$, I obtain: $D_{i,j,t} = \alpha_0 + \alpha_1 A_{i,j,t} + \alpha_2(\tau^d_{i,j,t} \times A_{i,j,t}) + \alpha_3(age_{i,j,t} \times A_{i,j,t}) + \epsilon_{i,j,t}$.

Using variables, such as the assets, repatriation tax rate, and age of an affiliate, that are affiliate-specific as instruments for firm-wide repatriations adds some complication to the normal two-stage least squares procedure. It is necessary to predict dividends at the foreign affiliate level and then aggregate those predicted values to get a firm-wide value to use in the second-stage regression.

In Equation 4.1, I would like to instrument for $\frac{\sum_j D_{i,,j,t}}{A_{i,US,t-1}}$. To do this, I need to scale the first-stage regression by $A_{i,US,t-1}$.[3] Using current-year assets and the affiliate's repatriation

[3]I have also estimated a model where all the variables are measured in levels and neither the first or second stage is scaled by U.S. assets. However, some firms are much larger than others, and the estimates of the unscaled regressions are driven by the large firms. Therefore, I present the scaled model here so that

tax rate and age interacted with its assets as instruments, the first stage is:

$$\begin{aligned}\frac{D_{i,j,t}}{A_{i,US,t-1}} &= \alpha_0 + \alpha_1 \frac{A_{i,j,t}}{A_{i,US,t-1}} + \alpha_2 \frac{(\tau^d_{i,j,t} \times A_{i,j,t})}{A_{i,US,t-1}} + \alpha_3 \frac{(age_{i,j,t} \times A_{i,j,t})}{A_{i,US,t-1}} + \alpha_4 q_{i,US,t-1} + \\ & \alpha_5 \frac{NI_{i,US,t-1}}{A_{i,US,t-1}} + \alpha_6 \frac{Liab_{i,US,t-1}}{A_{i,US,t-1}} + \lambda_i + \delta_t + \epsilon_{i,j,t}\end{aligned}$$

where the first three variables are instruments and the rest are the exogenous variables from the second-stage.

I then calculate predicted affiliate dividends scaled by lagged domestic assets $\left(\frac{\hat{D_{i,j,t}}}{A_{i,US,t-1}}\right)$, sum the predicted value over all the affiliates of each firm in a given year, $\sum_j \frac{\hat{D_{i,j,t}}}{A_{i,US,t-1}}$, and use that sum as the instrumented value in the second-stage regression:

$$\frac{PPE_{i,US,t}}{A_{i,US,t-1}} = \beta_0 + \beta_1 \sum_j \frac{\hat{D_{i,,j,t}}}{A_{i,US,t-1}} + \beta_2 q_{i,US,t-1} + \beta_3 \frac{NI_{i,US,t-1}}{A_{i,US,t-1}} + \beta_4 \frac{Liab_{i,US,t-1}}{A_{i,US,t-1}} + \lambda_i + \delta_t + u_{i,US,t}$$

One problem with the above instruments is that affiliate assets may not be exogenous to domestic investment, especially when firm fixed effects are included. Due to the firm fixed effects, the identification of the relationship between domestic investment and dividends in the second stage comes from changes in investment and changes in dividends over time within a firm. Since a firm's foreign and domestic investment are likely correlated, changes in foreign assets may be correlated with changes in domestic investment. In order correct for this, I try three different sets of instruments: (1) the instruments discussed above, (2) the instruments discussed above with lagged affiliate assets substituted for current-year assets, and (3) the affiliate's repatriation tax rate and age without including assets.

4.3 Data

As in Chapter 3, I use data from two surveys of U.S.-based multinational firms conducted by the Bureau of Economic Analysis. As a result of confidentiality assurances and penalties for noncompliance, the BEA believes that coverage of these surveys is close to complete and levels of accuracy are high. The BEA requires a survey to be filled out for each foreign affiliate that exceeds a certain threshold in terms of assets, sales, or net income. These thresholds vary by year.[4] The U.S.-based parent firm must also fill out a survey for itself.

The first survey is the Annual (Benchmark) Survey of U.S. Direct Investment Abroad. This survey, which has been conducted every year since 1982, collects financial and operating information for both the parent companies and foreign affiliates of U.S. multinationals. The

each firm is more equally weighted.

[4]The affiliate reporting threshold for 1994 was $3 million, for 1995-1998 was $20 million, for 1999 was $7 million, for 2000-2003 was $30 million, for 2004 was $10 million, and for 2005 was $40 million. Benchmark surveys, which have the most complete coverage, were conducted in 1994, 1999, and 2004; therefore, the reporting thresholds for these three years are relatively low.

second survey, the Quarterly Balance of Payments Survey of U.S. Direct Investment Abroad, is concerned more closely with financial flows between foreign affiliates and their U.S. parent companies and has been conducted quarterly since 1994.

I collect data on dividend payments made to U.S. parent companies from their foreign affiliates from the Quarterly Balance of Payments Survey of U.S. Direct Investment Abroad. From the BEA's Annual Survey of U.S. Direct Investment Abroad, I collect data on parent firms' industry, assets, capital investment, net income, sales, and liabilities. I also collect the same data for the multinational firms' foreign affiliates.

I use Compustat for data on firms' long-term S&P bond ratings and dividend payments to shareholders, which I use to measure financial constraints, as well as the data necessary to calculate firms' Tobin's q. I match Compustat data with the BEA data set using firms' IRS-assigned Employer Identification Numbers (EINs).

The time period of the sample I use extends from 1994 to 2003. It begins in 1994 because that is the first year of the Quarterly Balance of Payments Survey, and it ends in 2003 to avoid picking up the effects of the American Jobs Creation Act on repatriations. Given the huge response of some firms' dividend payments to the AJCA, I do not want the years of the AJCA tax holiday to drive my results.

4.4 Results

4.4.1 OLS

Table 4.1 presents the OLS estimation of Equation 4.1. To see what difference firm fixed effects make, Column 1 shows the estimates without firm fixed effects and Column 2 includes them. It is interesting to see that without firm fixed effects, the coefficient on repatriations is negative. Thus, it appears that, all else equal, firms that repatriate more foreign earnings invest less domestically. The coefficients on Tobin's q and net income and have the expected positive signs, while the coefficient on leverage has the expected negative sign. In Column 2, when firm fixed effects are included, repatriations and investment take on a positive relationship. Within a firm, higher foreign dividend payments are associated with more domestic investment.

In Columns 1 and 2, the sample extends from 1994 through 2003. It stops at 2003 because of the AJCA tax holiday which was passed into law in October 2004. However, discussion of a possible tax holiday began well before it was passed, and bills with early versions of the eventual tax holiday were introduced before 2004. The Homeland Investment Act, which contained the first version of the tax holiday, was introduced as a standalone bill in the House of Representatives in February 2003. Firms may have anticipated the tax holiday before its passage into law in 2004, and this could bias my results if firms adjusted their repatriation or investment behavior in expectation of the tax holiday. Therefore, since a bill including the tax holiday was first introduced in early 2003, Column 3 presents the results when data from the years 2002 and 2003 are excluded from the sample. The estimated coefficient on dividends is very close to that in Column 2, so it does not appear as if behavior caused by the expectation of the AJCA is driving the results.

Financial Constraints

As discussed above, firms with financial constraints may be more likely to use repatriated foreign earnings for domestic investment than firms that are not financially constrained, since firms without easy access to the external capital market may be more reliant on internally generated funds. Here, I test that hypothesis using three measures of firms' financial constraints: (1) not having a long-term S&P bond rating, (2) having a speculative-grade long-term S&P bond rating *or* no long-term bond rating, and (3) not paying a dividend to shareholders in the previous year. All data on bond ratings and shareholder dividend payments is taken from Compustat. I assume that firms in the BEA dataset and with no match in the Compustat bond file do not have a bond rating. However, for the shareholder dividend measure of financial constraints, I use only firms which have a match in Compustat since it is impossible to say what sort of payouts to owners firms not in Compustat have.

Table 4.2 presents the results when the sample is divided up by the three measures of financial constraints. Firms with bond ratings have a smaller, less precisely estimated coefficient on dividends than firms without bond ratings. Dividing firms into samples with investment-grade and speculative-grade bond ratings, we see that the same pattern holds. In Columns 5 and 6, a similar pattern also holds when dividing firms up by whether they pay dividends to shareholders. However, due to the large standard errors, it is not possible to statistically discriminate between financially constrained and unconstrained firms.

4.4.2 Instrumental Variables

As discussed above, the OLS regressions shown in Table 4.1 and 4.2 cannot establish a causal relationship between repatriations and domestic investment. In order to test if an increase in repatriations leads to an increase in domestic investment, I instrument repatriations with variables that are not otherwise correlated with domestic investment.

Current Assets and Current Assets Interacted with the Repatriation Tax Rate and Age as Instruments

Table 4.3 shows the first-stage regressions when current affiliate assets and current affiliate assets interacted with the affiliate's repatriation tax rate and age are used as instruments. As expected, the repatriation tax rate has a negative effect on dividend payments and the assets and age of the affiliate have a positive effect. It should be noted that the first stage is stronger for financially unconstrained firms than financially constrained firms based on the F-statistics of the instruments and R-squareds of the regressions. The first stage is particularly weaker for firms that did not make a dividend payment to shareholders. This pattern exists for all three sets of instruments used.

In the second-stage results presented in Table 4.4, the estimated relationship between repatriations and domestic investment is much stronger than that estimated with OLS. While the point estimates on repatriations are higher for firms with financial constraints than firms without financial constraints, the standard errors are large enough that one cannot distinguish between the two groups except for shareholder-dividend paying and nonpaying firms. However, the coefficient estimated on the sample of non-shareholder dividend paying

firms is particularly large, which is may be because the weak first stage leads to inconsistent second-stage estimates.

Given that the estimated coefficients on dividends are greater than one for all samples, these results do not seem very credible. Coefficients larger than one imply that a change in repatriations causes domestic investment to change by more than the change in repatriations. In addition, since the OLS estimates were all below 0.13 and it seems that most of the bias in the OLS estimates would be in a positive direction, it is surprising that the IV estimates are so much larger than the OLS estimates.

Lagged Assets and Lagged Assets Interacted with the Repatriation Tax Rate and Age as Instruments

As discussed in Section 4.2, one reason the estimates are so large in Table 4.4 may be that current-year foreign assets are correlated with domestic investment and that may lead to inconsistency in the IV estimates. In Table 4.5, lagged affiliate assets are substituted for current affiliate assets in the first-stage regression, and Table 4.6 shows the second-stage results. Using lagged assets rather than current-year assets results in smaller estimated coefficients on dividends, although they are still quite large. This may be because lagged affiliate assets may also be correlated domestic investment if foreign and domestic growth are correlated, since growth in one year could be correlated with growth in the next year. However, the large size of the IV estimates persists even when twice-lagged assets are used (results not shown), and so it is not clear that the large estimates are entirely due to inconsistency caused by the relationship between foreign affiliate asset size and domestic investment. Nonetheless, because the IV estimates when affiliate assets are used as an instrument are so large, I next examine the results when assets are not included as an instrument.

Repatriation Tax Rate and Age as Instruments

Tables 4.7 and 4.8 present the first and second-stage results when the repatriation tax rate and age of an affiliate are used as instruments and affiliate assets are not included. In this case, the estimated second-stage coefficients on repatriations are much lower than when assets are used as an instrument. For all firms and financially constrained firms, the point estimates on repatriations are higher than the OLS estimates but the estimates are lower (and negative) for less constrained firms. However, the standard errors are so large that one cannot distinguish between the estimated coefficients on financially constrained and unconstrained firms. Again, since it seems that the OLS estimates should be biased upwards relative to the true effect of the causal effect of repatriations on domestic investment, it is surprising that the estimated coefficient on dividends for the samples of financially constrained firms is higher than the OLS estimates, although the high standard errors make it impossible to distinguish the OLS estimates from the IV estimates. While it is interesting that the pattern between financially constrained and unconstrained firms persists, the imprecision of the estimates makes it impossible to state that there is a causal relationship between repatriations and domestic investment. Although affiliate repatriation tax rates and ages appear to be strong instruments for repatriations, a problem might be that there is not enough variation in repatriations due to tax rates and age from year to year in order to

precisely estimate repatriations' effect on domestic investment.

4.5 Conclusion

Finance theory has long told us that there may be a wedge between the cost of internal and external funds and that this wedge may affect firms' investment decisions. Multinational firms have another complication in that different parts of the firm cannot easily access all of the firm's internal funds and therefore investment in different countries may depend not only on the firm's overall financial position but also the amount of the firm's internal funds located in the country. This chapter investigated whether the domestic investment of multinational firms responds to changes in the amount of internal funds repatriated from foreign affiliates to the domestic parent company. Since the U.S. tax system provides incentives to retain earnings abroad, it would be important for policymakers to know if those incentives resulting in a lack of investment financing in the U.S.

I find suggestive evidence that the domestic investment of financially constrained firms responds to changes in repatriations more than the domestic investment of financially unconstrained firms and that financially constrained firms use repatriations for domestic investment. While more research certainly need to be done on this topic, this implies that U.S. policymakers may want to consider the effect of the U.S. tax system on repatriations and investment. A tax holiday like the American Jobs Creation Act, that is targeted at certain firms, has already been shown not to be an effective way to increase domestic investment, but a more comprehensive overhaul could lead to more efficient investment decisions.

Table 4.1: OLS

Dependent Variable: Domestic Investment / Lagged US Assets	All Firms, 1994-2003	All Firms, 1994-2003	All Firms, 1994-2001
	(1)	(2)	(3)
Total Dividends / Lagged US Assets	-0.0494	0.0941**	0.0923**
	(0.0426)	(0.0435)	(0.0463)
Tobin's q	0.00004	0.00005	0.00375**
	(0.000105)	(0.00006)	(0.00185)
Domestic Income / Lagged US Assets	0.0590***	0.0582***	0.0550***
	(0.00718)	(0.00669)	(0.00781)
Domestic Liabilities / Lagged US Assets	-0.00949***	0.00149	0.00478
	(0.00309)	(0.00413)	(0.00468)
Constant	0.0610***	0.0549***	0.0492***
	(0.00254)	(0.00272)	(0.00365)
Year Fixed Effects?	Yes	Yes	Yes
Firm Fixed Effects?	No	Yes	Yes
Estimation Method	OLS	OLS	OLS
Observations	9,030	9,030	7,291
R-squared	0.047	0.069	0.026

Robust standard errors clustered by firm are in parentheses.
*** denotes 1% significance level
** denotes 5% significance level
* denotes 10% significance level

Table 4.2: OLS, by Financial Constraints

Dependent Variable: Domestic Investment / Lagged US Assets	Firms with No Bond Rating	Firms with Bond Rating	Firms with Speculative-Grade or No Bond Rating	Firms with Investment-Grade Bond Rating	Non-Shareholder Dividend Paying Firms	Shareholder Dividend Paying Firms
	(1)	(2)	(3)	(4)	(5)	(6)
Total Dividends / Lagged US Assets	0.120**	0.0640	0.105*	0.0610	0.124	0.0324
	(0.0602)	(0.0605)	(0.0570)	(0.0655)	(0.117)	(0.0427)
Tobin's q	0.00004	0.000146*	0.00006	0.000145	0.000182	-0.00003
	-0.00007	(7.96e-05)	-0.00007	(8.91e-05)	(0.000143)	(0.000124)
Domestic Income / Lagged US Assets	0.0497***	0.0768***	0.0531***	0.0936***	0.0506***	0.0872***
	(0.00804)	(0.0121)	(0.00724)	(0.0160)	(0.0123)	(0.0121)
Domestic Liabilities / Lagged US Assets	0.000309	0.00630	0.00176	-0.00503	0.0111	0.00160
	(0.00484)	(0.00737)	(0.00467)	(0.00878)	(0.00997)	(0.00614)
Constant	0.0537***	0.0550***	0.0535***	0.0622***	0.0534***	0.0564***
	(0.00312)	(0.00518)	(0.00316)	(0.00566)	(0.00757)	(0.00370)
Year Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes
Estimation Method	OLS	OLS	OLS	OLS	OLS	OLS
Observations	5,516	3,514	6,552	2,478	1,947	3,499
R-squared	0.044	0.124	0.051	0.148	0.057	0.126

Robust standard errors clustered by firm are in parentheses.

*** denotes 1% significance level; ** denotes 5% significance level; * denotes 10% significance level.

Table 4.3: 1st-Stage Regressions (At Affiliate Level)

Instruments: Current assets and current assets interacted with tax rate and age

Dependent Variable: Affiliate Dividends / Lagged US Assets	All Firms	Firms with No Bond Rating	Firms with Bond Ratings	Firms with Speculative-Grade or No Bond Rating	Firms with Investment-Grade Bond Rating	Non-Shareholder Dividend Paying Firms	Shareholder Dividend Paying Firms
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Affiliate Assets / Lagged US Assets	0.000547	0.000228	0.00106	0.000485	0.00145	0.00123**	0.000356
	(0.000470)	(0.000634)	(0.000672)	(0.000533)	(0.000898)	(0.000558)	(0.000805)
Affiliate Assets * Repatriation Tax Rate / Lagged US Assets	-0.00450***	-0.00413***	-0.00518***	-0.00394***	-0.00616***	-0.00005	-0.00466***
	(0.000893)	(0.00118)	(0.00121)	(0.00106)	(0.00149)	(0.00132)	(0.00152)
Affiliate Assets * Affiliate Age / Lagged US Assets	0.0495***	0.0463***	0.0541***	0.0384***	0.0689***	0.00548	0.0678***
	(0.00607)	(0.00791)	(0.00899)	(0.00661)	(0.0114)	(0.00531)	(0.00981)
Tobin's q	-0.000004	-0.000004	-0.000004*	-0.000005	0.000000	-0.000006***	0.000001
	(0.000003)	(0.000004)	(0.000002)	(0.000003)	(0.000003)	(0.000001)	-0.000004
Domestic Income / Lagged US Assets	0.000354***	0.000472**	0.000218	0.000291*	0.000363**	0.000126	0.000619***
	(0.000126)	(0.000230)	(0.000151)	(0.000175)	(0.000171)	(0.000193)	(0.000201)
Liabilities/Lagged US Assets	-4.05e-05	7.72e-06	-5.03e-05	1.22e-05	-3.50e-05	-2.34e-05	-0.000132
	(7.65e-05)	(0.000114)	(9.26e-05)	(9.57e-05)	(0.000114)	(0.000136)	(0.000138)
Year Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firms Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	114,108	44,257	69,851	53,089	61,019	16,394	66,061
R-squared	0.042	0.035	0.054	0.030	0.071	0.012	0.060
F-Stat for Instruments	52.94	24.68	36.8	26.26	41.54	6.25	30.95

Robust standard errors clustered by firm are in parentheses.

*** denotes 1% significance level; ** denotes 5% significance level; * denotes 10% significance level.

Table 4.4: 2nd-Stage Regressions (At Firm Level)

Instruments: Current assets and current assets interacted with tax rate and age

Dependent Variable: Domestic Investment / Lagged US Assets	All Firms	Firms with No Bond Rating	Firms with Bond Ratings	Firms with Speculative-Grade or No Bond Rating	Firms with Investment-Grade Bond Rating	Non-Shareholder Dividend Paying Firms	Shareholder Dividend Paying Firms
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Total Dividends / Lagged US Assets	1.526***	1.827***	1.357***	1.799***	1.012***	3.927***	0.767***
	(0.267)	(0.387)	(0.366)	(0.378)	(0.348)	(1.259)	(0.268)
Tobin's q	0.00009	0.00009	0.000190**	0.000112	0.000174*	0.000317**	-0.000014
	(0.00006)	(0.00008)	(0.00009)	(0.00007)	(0.00009)	(0.000146)	(0.000131)
Domestic Income / Lagged US Assets	0.0521***	0.0425***	0.0713***	0.0480***	0.0828***	0.0457***	0.0782***
	(0.00670)	(0.00834)	(0.0116)	(0.00729)	(0.0161)	(0.0123)	(0.0124)
Domestic Liabilities / Lagged US Assets	0.00171	0.000616	0.00691	0.00156	-0.00356	0.0111	0.00239
	(0.00409)	(0.00477)	(0.00728)	(0.00464)	(0.00856)	(0.00995)	(0.00607)
Year Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Estimation Method	IV	IV	IV	IV	IV	IV	IV
Observations	9,030	5,516	3,514	6,552	2,478	1,947	3,499

Robust standard errors clustered by firm are in parentheses.

*** denotes 1% significance level; ** denotes 5% significance level; * denotes 10% significance level.

Table 4.5: 1st-Stage Regressions (At Affiliate Level)

Instruments: Lagged assets and lagged assets interacted with tax rate and age

Dependent Variable: Affiliate Dividends / Lagged US Assets	All Firms	Firms with No Bond Rating	Firms with Bond Ratings	Firms with Speculative-Grade or No Bond Rating	Firms with Investment-Grade Bond Rating	Non-Shareholder Dividend Paying Firms	Shareholder Dividend Paying Firms
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Lagged Affiliate Assets / Lagged US Assets	0.000307	-0.000283	0.00116	0.000148	0.00187	0.00152**	0.000193
	(0.000596)	(0.000785)	(0.000916)	(0.000648)	(0.00128)	(0.000633)	(0.00110)
Lagged Affiliate Assets * Tax Rate / Lagged US Assets	-0.00536***	-0.00497***	-0.00595***	-0.00464***	-0.00735***	-0.000483	-0.00575***
	(0.00101)	(0.00132)	(0.00139)	(0.00118)	(0.00174)	(0.00142)	(0.00174)
Lagged Affiliate Assets * Affiliate Age/Lagged US Assets	0.0562***	0.0551***	0.0583***	0.0446***	0.0740***	0.00395	0.0764***
	(0.00719)	(0.00926)	(0.0110)	(0.00770)	(0.0141)	(0.00555)	(0.0119)
Tobin's q	-0.0000047*	-0.000005	-0.000004	-0.0000053*	0.000001	-0.000006***	0.000002
	(0.000003)	(0.000004)	(0.000002)	(0.000003)	(0.000003)	(0.000001)	(0.000004)
Domestic Income / Lagged US Assets	0.000376***	0.000475*	0.000223	0.000294	0.000383**	0.000118	0.000640***
	(0.000133)	(0.000245)	(0.000162)	(0.000185)	(0.000179)	(0.000200)	(0.000206)
Domestic Liabilities / Lagged US Assets	-4.74e-05	8.59e-06	-6.20e-05	8.14e-06	-3.41e-05	-6.22e-05	-0.000136
	(8.26e-05)	(0.000126)	(9.51e-05)	(0.000106)	(0.000115)	(0.000151)	(0.000147)
Year Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firms Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	104,752	40,809	63,943	49,021	55,731	14,964	60,654
R-squared	0.046	0.040	0.057	0.034	0.078	0.013	0.067
F-Stat for Instruments	51.08	24.53	35.54	25.58	41.52	6.19	30.99

Robust standard errors clustered by firm are in parentheses.

*** denotes 1% significance level; ** denotes 5% significance level; * denotes 10% significance level.

Table 4.6: 2nd-Stage Regressions (At Firm Level)

Instruments: Lagged assets and lagged assets interacted with tax rate and age

Dependent Variable: Domestic Investment / Lagged US Assets	All Firms	Firms with No Bond Rating	Firms with Bond Ratings	Firms with Speculative-Grade or No Bond Rating	Firms with Investment-Grade Bond Rating	Non-Shareholder Dividend Paying Firms	Shareholder Dividend Paying Firms
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Total Dividends / Lagged US Assets	1.064***	1.307***	0.882**	1.243***	0.572*	1.203	0.421*
	(0.249)	(0.371)	(0.362)	(0.368)	(0.333)	(1.407)	(0.252)
Tobin's q	0.00008	0.00008	0.000173**	0.00010	0.000159*	0.000217	-0.00002
	(0.00006)	(0.00008)	(0.00009)	(0.00007)	(0.00009)	(0.000150)	(0.000127)
Domestic Income / Lagged US Assets	0.0546***	0.0452***	0.0742***	0.0502***	0.0887***	0.0498***	0.0830***
	(0.00673)	(0.00837)	(0.0117)	(0.00731)	(0.0164)	(0.0123)	(0.0122)
Domestic Liabilities / Lagged US Assets	0.00167	0.000525	0.00677	0.00161	-0.00409	0.0113	0.00201
	(0.00410)	(0.00482)	(0.00731)	(0.00466)	(0.00861)	(0.00998)	(0.00610)
Year Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Estimation Method	IV	IV	IV	IV	IV	IV	IV
Observations	9,030	5,516	3,514	6,552	2,478	1,947	3,499

Robust standard errors clustered by firm are in parentheses.

*** denotes 1% significance level; ** denotes 5% significance level; * denotes 10% significance level.

Table 4.7: 1st-Stage Regressions (At Affiliate Level)

Instruments: Tax rate and age

Dependent Variable: Affiliate Dividends / Lagged US Assets	All Firms	Firms with No Bond Rating	Firms with Bond Ratings	Firms with Speculative-Grade or No Bond Rating	Firms with Investment-Grade Bond Rating	Non-Shareholder Dividend Paying Firms	Shareholder Dividend Paying Firms
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Repatriation Tax Rate	-0.000138***	-0.000175***	-0.000114***	-0.000155***	-0.000123***	-2.60e-05	-0.000146***
	(2.66e-05)	(5.05e-05)	(2.91e-05)	(4.42e-05)	(3.17e-05)	(5.86e-05)	(3.42e-05)
Affiliate Age	0.00311***	0.00435***	0.00255***	0.00387***	0.00267***	0.00256***	0.00313***
	(0.000272)	(0.000564)	(0.000284)	(0.000479)	(0.000310)	(0.000501)	(0.000348)
Tobin's q	-0.0000042*	-0.000005	-0.0000033*	-0.000005*	-0.0000005*	-0.000006***	0.000001
	(0.0000025)	(0.000004)	(0.000002)	(0.000003)	(0.000003)	(0.000001)	(0.000003)
Domestic Income / Lagged US Assets	0.000406***	0.000581**	0.000254*	0.000374**	0.000418**	0.000192	0.000684***
	(0.000123)	(0.000226)	(0.000151)	(0.000170)	(0.000190)	(0.000188)	(0.000208)
Liabilities/Lagged US Assets	5.06e-06	6.82e-05	-4.64e-05	6.49e-05	-8.42e-05	1.41e-05	-0.000125
	(7.40e-05)	(0.000113)	(9.27e-05)	(9.36e-05)	(0.000116)	(0.000134)	(0.000140)
Year Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firms Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	114,108	44,257	69,851	53,089	61,019	16,394	66,061
R-squared	0.013	0.014	0.013	0.013	0.014	0.007	0.015
F-Stat for Instruments	75.28	36.09	44.96	38.68	41.95	13.55	47.98

Robust standard errors clustered by firm are in parentheses.

*** denotes 1% significance level; ** denotes 5% significance level; * denotes 10% significance level.

Table 4.8: 2nd-Stage Regressions (At Firm Level)

Instruments: Tax rate and age

Dependent Variable: Domestic Investment / Lagged US Assets	All Firms	Firms with No Bond Rating	Firms with Bond Rating	Firms with Speculative-Grade or No Bond Rating	Firms with Investment-Grade Bond Rating	Non-Shareholder Dividend Paying Firms	Shareholder Dividend Paying Firms
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Total Dividends /	0.182	0.315	-0.0987	0.154	-0.227	0.637	-0.136
Lagged US Assets	-0.187	(0.305)	(0.283)	(0.297)	(0.311)	(0.922)	(0.226)
Tobin's q	0.000051	0.000044	0.000139*	0.000063	0.000135	0.000196	-0.000034
	(0.000057)	(0.000074)	(0.000080)	(0.000065)	(0.000087)	(0.000144)	(0.000122)
Domestic Income /	0.0579***	0.0488***	0.0776***	0.0528***	0.0973***	0.0499***	0.0896***
Lagged US Assets	(0.00676)	(0.00821)	(0.0123)	(0.00737)	(0.0170)	(0.0124)	(0.0128)
Domestic Liabilities /	0.00166	0.000740	0.00615	0.00197	-0.00557	0.0112	0.00153
Lagged US Assets	(0.00413)	(0.00485)	(0.00738)	(0.00469)	(0.00877)	(0.00998)	(0.00617)
Year Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Estimation Method	IV	IV	IV	IV	IV	IV	IV
Observations	9,030	5,516	3,514	6,552	2,478	1,947	3,499

Robust standard errors clustered by firm are in parentheses.

*** denotes 1% significance level; ** denotes 5% significance level; * denotes 10% significance level.

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