

The Paradoxical Impact of Corporate Inversions on US Tax Revenue

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Abstract

Do corporate inversions cost the US Treasury billions of dollars in tax revenue, justifying legislative responses and even strong-arming corporations from moving their tax domicile abroad? We show that corporate inversions not only do not appear to reduce, but, paradoxically, are even likely to increase tax collections by the US Treasury.

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1. Introduction

Corporate inversions have recently attracted considerable attention from Congress, the US Treasury, and even President Obama who referred to them as “unpatriotic.”¹ At the heart of the controversy is the US taxation of foreign-sourced income combined with the highest corporate tax rate in the world.

Corporations have been avoiding paying taxes on foreign-sourced income by not repatriating them, leading by some estimates to \$2 trillion in cash “permanently” invested abroad, which will be taxed in the US upon repatriation.² Of course, while avoiding paying US taxes on those moneys, holding them abroad reduces corporations’ flexibility. In recent papers, Hanlon et al. (2015) and Edwards et al. (2015) document that such foreign cash holdings increased US firms’ propensity to make foreign acquisitions.

Other than repatriating and paying US taxes on unrepatriated foreign-sourced income (for our sample firms, net of foreign-tax credits, at an average 13.98 percent rate) corporations can gain financial flexibility by moving their tax domicile abroad, commonly referred to as a corporate inversion – a reorganization by which a domestic firm changes its tax-domicile from the United States to a foreign country. In this paper, we analyze the tax benefits accruing to corporations and their shareholders from inversions and estimate the resulting consequences to the US Treasury’s revenue.

The US tax system creates two incentives for inversions. First, the US corporate tax rates are the highest in the world. Second, the effect of high US corporate tax rates are exacerbated because the US taxes worldwide (as opposed to only US-sourced) income.

Following an inversion, a corporation is still required to pay US corporate taxes on US-sourced income, but is no longer required to pay US taxes on foreign-sourced income. In addition, during our sample

¹ President’s Obama weekly radio and internet address for the week of July 26, 2014.

² Casselman and Lahart, 2011. Davidoff, 2011.

period, firms were able to avoid paying US taxes on foreign-sourced income earned prior to the inversion that had not been repatriated. Finally, once domiciled abroad, a corporation can engage in shifting income from its US subsidiary to its new tax-domicile where it is taxed at a lower rate. Such income stripping can be achieved (i) by transferring intangible assets to its new (low) tax-domicile and leasing them back to the US subsidiary or (ii) by changing the capital structure of the US subsidiary to include more debt, which is tax deductible.

Naturally, the US Congress is concerned about the loss of revenue to the US treasury that may result from such inversions. “The Joint Committee on Taxation estimates that House legislation to stop corporate inversions would save the U.S. tax base nearly \$34 billion over 10 years.”³ Similarly, Rep. Levin (a ranking member of the Ways and Means Committee) stated that “Corporate inversions are a growing problem, costing the U.S. tax base billions of dollars and undermining vital domestic investments, ... This egregious practice requires immediate action. This legislation would stop American companies from avoiding U.S. taxes simply by purchasing a smaller foreign company.”⁴

In addition, to the loss of tax revenue, inversions are viewed as “unfair,” particularly because they can be achieved without physically moving the US operations. “Corporate inversions are costing the U.S. billions of dollars in lost tax revenue and putting an increasing burden on American taxpayers, who cannot just move their addresses overseas to avoid taxes.”⁵ Finally, the view that inversions are unfair seems also to be shared by the population at large: “When asked if respondents approved of companies seeking lower tax rates by becoming a subsidiary of a foreign company, more than two-thirds said they

³ Ways and Means Committee: <http://democrats.waysandmeans.house.gov/issue/corporate-inversions>.

⁴ Ways and Means Committee. <http://democrats.waysandmeans.house.gov/press-release/house-democrats-introduce-legislation-tighten-restrictions-corporate-tax-inversions>.

⁵ Rep. Sander Levin: <http://democrats.waysandmeans.house.gov/press-release/rep-levin-sen-levin-applaud-treasury-action-inversions>.

disapproved. The majority of Democrats, Independents, and Republicans disapprove of tax inversions, polling at 86, 80, and 69 percent respectively.”⁶

But are inversions really reducing the tax revenue to the US Treasury? Paradoxically, we find that inversions not only do not result in lower revenue to the US Treasury, but actually may result in an increase in tax collections. The reason for this surprising result is twofold.

First, corporations were successfully avoiding paying taxes on foreign-sourced income by not repatriating foreign sourced income and likely waiting for a so called “tax holiday.” For example, Apple CEO Tim Cook testified that Apple would not repatriate unless the resulting tax were reduced to a “single digit” level.⁷ Upon inverting, our sample firms repatriate foreign-sourced income and increase dividends – which, of course, is likely to result in an increase in additional income taxes collected by the US Treasury (assuming that repatriation would not occur at current tax rates or in the short-term). Thus, for the US Treasury, a “bird in the hand is worth two in the bush.”

Second, our sample firms do not appear to engage in additional earnings stripping following an inversion. Indeed, we find that in the three years following an inversion, our sample firms pay about the same US income taxes as they did before the inversion and their US income tax rate actually increases marginally.

Finally, we “validate” these results by investigating investors’ reaction to inversions. Our results indicate that approximately two thirds of the synergies created by the inversions are related to un-repatriated prior foreign earnings, expected future foreign-sourced earnings, and associated publicity. Importantly, the synergies are not correlated to our proxies for earnings stripping. Thus, investors’ response to inversions is consistent with our analysis of the corporate tax consequences: repatriation of past foreign-sourced income, avoidance of US taxation of future foreign sourced income, and no expectations of earnings stripping. Thus, our main conclusion is that despite the alarming statements made by Congress,

⁶ Morning Consult. <http://morningconsult.com/polls/pol-tax-inversions/>

⁷ See: <http://www.gpo.gov/fdsys/pkg/CHRG-113shrg81657/pdf/CHRG-113shrg81657.pdf>

inversions are “much ado about nothing.” They may make for good political capital, however, there is no evidence that they are a threat to the US Treasury.

The remainder of this paper proceeds as follows: Section 2 covers the institutional background. The benefits and costs of inversions are described in section 3. Section 4 reviews the history of inversions and related regulation. The types of inversions and their consequences are described in section 5. Section 6 provides the sample. Section 7 analyzes the effects of inversion on tax revenues. Section 8 analyzes the sources of tax benefits and costs as perceived by the market. Section 9 concludes.

2. Institutional Background

In this section, we discuss the incentives to invert created by US corporate taxation and the different strategies used by corporations in response.

A) Tax System

Worldwide taxation – as opposed to territorial taxation – is a system whereby the income of domestic firms is taxed irrespective whether it is earned (referred to as “sourced” in the Internal Revenue Code, IRC) domestically or abroad. In contrast, territorial tax systems only tax domestically-sourced income at the domestic rate and impose little or no tax on foreign-sourced income.

Most industrial nations have a territorial tax system. Of the G7, the US is the only country with worldwide taxation.⁸ Out of the 37 member countries of the OECD, only 8 use worldwide taxation: United States, Chile, Greece, Ireland, Israel, Korea, Mexico, and Poland.⁹ In addition to having a world-

⁸ The G7 is composed of the United States, Canada, France, Germany, Italy, Japan, and the United Kingdom.

⁹ Of the OECD countries with a territorial tax system, Belgium, France, Germany, Italy, Japan, Slovenia, Switzerland exempt 95 percent of foreign sourced income from domestic taxation; Norway exempts 97 percent; Australia, Austria, Canada, Czech Republic, Denmark, Estonia, Finland, Hungary, Iceland, Luxemburg, Netherlands, New Zealand, Portugal, Slovak Republic, Spain, Sweden, Turkey, United Kingdom exempt 100 percent.

wide tax system, the US has also the highest statutory corporate tax rate among the OECD countries (and indeed it is the highest corporate tax rate in the world).¹⁰

Table 1 summarizes the tax rates for the 37 OECD countries and by tax system. The average statutory tax rate of OECD countries, including sub-national tax rates, is 25.3%, with a minimum of 12.5% in Ireland (which incidentally also has a world-wide tax system), and a maximum of 39.1% in the US.¹¹

As a result of its world-wide tax system, the US taxes both domestic and foreign-sourced income. Taxes on the foreign-sourced income are collected only when it is repatriated (as opposed to when it is earned). However, US-domiciled corporations must generate a tax expense as though their foreign-sourced income is repatriated when it is earned, unless it is permanently invested abroad. Thus, a temporary tax difference is created. Upon repatriation, US-domiciled corporations are granted a foreign tax credit for taxes paid abroad on their foreign-sourced income.¹² Thus, US-domiciled corporations must pay the difference between the US tax (i.e., 35%) and the tax paid abroad when foreign-sourced income is repatriated.¹³ In contrast, for foreign corporations, the US taxes only US-sourced income. Once a US corporation inverts, it becomes a foreign corporation and the US a worldwide system essentially reverts to a territorial system.

B) Changing Tax-Domiciles

US-domiciled corporations can become foreign-domiciled by either directly leaving the US through a reorganization or by combining with a corporation domiciled abroad through a merger or an acquisition. Both means of becoming foreign-domiciled are defined as inversions by the Internal Revenue Code (IRC).

¹⁰ As reported by the Small Business & Entrepreneurship Council: <http://www.sbecouncil.org/2013/06/25/america-lags-in-tax-system-reform-u-s-corporate-rate-is-the-highest/>

¹¹ Organization for Economic Co-operation and Development Tax Policy Analysis 2014.

¹² While the foreign tax credit is capped to the lesser of the US and the foreign tax rate, the cap is rarely bound by the US tax rate as the US corporate tax is the highest in the world. Thus, generally, the corporation will pay taxes to the US treasury beyond the taxes paid abroad on the foreign-sourced income.

¹³ I.R.C. § 951 – 965.

Leaving directly requires the firm to have a substantial business presence in the new foreign country of domicile. Over the last 10 years, the IRC has defined substantial business presence in four different ways.¹⁴ Thus, there is significant ambiguity in what is and will be sufficient to qualify as substantial business presence.

A US firm can also change tax-domiciles through a merger or an acquisition, by combining with a foreign-domiciled partner. Such an inversion can be achieved with either a foreign-domiciled corporation being acquired by (or merging with) a US-domiciled corporation (thus creating a presence abroad) or by the US-domiciled corporation being acquired by (or merging with) a foreign-domiciled corporation.

Regardless of whether the domestic firm is the acquirer or the target, the transaction can be structured such that the shares of the domestic corporation remain the shares of the post-inversion conglomerate and continue to be traded on a US exchange.¹⁵

3. Benefits and Costs of Inversions

A) Tax Benefits of Inversions

There are three primary benefits of inversions. Two of these benefits come from reducing taxes on foreign-sourced income and one benefit comes from the ability to strip earnings from the US to the new country of domicile.

The three potential benefits are (1) inversions may allow US-domiciled firms to avoid paying US tax on previously earned, but not yet repatriated foreign-sourced income; (2) inversions allow US-domiciled

¹⁴ As described in section 4, History of Inversions and Regulations, the definition of substantial business presence has changed significantly over time. In 2004, substantial business presence was not properly defined in the American Jobs Act. In 2006, substantial business presence was redefined with a “facts and circumstances test” and supplemented with a safe harbor provision. The facts and circumstances test just allows for each transaction all of the facts and circumstances surrounding the transaction to be considered in determining whether a substantial business presence exists. The safe harbor provision applied to transactions that result in a corporation with 10% or more of employees in number and compensation, 10% or more of income derived, and 10% or more of assets located in the new country of domicile. In 2009, the safe harbor provision was removed. In 2012, the definition of substantial business presence was redefined with a bright-line rule requiring the resulting corporation to have 25% or more of employees in number and compensation, 25% or more of income derived, and 25% or more of assets located in the new country of domicile.

¹⁵ Beginning in September 2014, to maintain the historically US nature of the Dow Index, the Dow Jones company excludes firms from the Dow Index that do business in the US, but are incorporated overseas. Demos, Telis: "Dow Index Overseers Make It Official: U.S. Firms Only." Wall Street Journal, 24 Sept. 2014. Web.

corporations to avoid paying US taxes on future foreign-sourced income; and (3) once domiciled abroad, corporations can transfer US-sourced income to a foreign domicile (typically referred to as earnings stripping) where it is taxed at a lower rate.

Unlike the first two potential benefits, corporations are able to conduct earnings stripping without an inversion. However, without an inversion, the benefit from the earnings stripping is trapped abroad. When paired with an inversion, the benefit of the earnings stripping can be invested abroad or returned to shareholders.

Earnings stripping can be achieved by transferring intangible assets such as patents, trademarks, or brand names abroad and then leasing them back to the US subsidiary. As a result, US-sourced income, which continues to be taxed in the US at the US tax rate decreases and foreign income, which is subject to the lower foreign tax rates, increases.

Income can also be stripped by shifting the domestic subsidiary's capital from equity (which is not tax-deductible) to debt (which is tax deductible). Typically, such a change is accompanied with a reduction in the debt (or a defeasance) of the foreign parent, thus avoiding an increase in the leverage of the overall conglomerate. This can be achieved either through a direct loan between the foreign parent and domestic subsidiary or by using a third party to facilitate the transaction. As a result, such changes in capital structure shift income from the domestic subsidiary that is taxed at the high US tax rate to the foreign parent which is taxed at the lower foreign tax rate.¹⁶

B) Costs of Inversions

There are six primary costs of inversions: (1) possible loss of domestic net operating losses (NOLs) and tax credits; (2) possible taxation of domestic shareholders; (3) adverse effect on the taxation of executive

¹⁶ Such changes in the domestic subsidiary's capital structure can be also done through a third party, thus avoiding the "appearance" of a tax-motivated transaction. For example, the domestic subsidiary can borrow from a financial intermediary, while the foreign parent reduces its leverage. As a result, the overall leverage is maintained without the domestic subsidiary directly borrowing from the foreign parent.

compensation; (4) changes in corporate laws; (5) possible removal from index; and (6) negative publicity and the associated political costs.

Under section 7874 of the IRC, the post-merger firm becomes an expatriated entity if shareholders of the domestic corporation receive between 60 percent and 80 percent of the ownership of the post-merger firm and it has no substantial business presence in the new country of domicile. Section 7874 specifies that any domestic taxes on gains resulting from the transfer of controlled foreign corporations, assets, licensing agreements, etc. from the expatriated entity to the foreign parent cannot be offset using net operating losses (NOLs) or tax credits.

Section 367(a) of the IRC requires shareholders of the domestic firm to recognize gains when the domestic corporation changes its domicile to a foreign country, and the shareholders of the domestic corporation will own greater than 50% of the resulting corporation. Shareholders must recognize the gain regardless if the domestic firm is the acquirer or target. The transaction is treated as though the shareholders of the domestic firm are selling their shares and rebuying shares in the new merged firm. Thus, the domestic firm shareholders pay capital gains tax on the difference between the market price of the share of the new merged firm and their tax basis in the share of the domestic firm.¹⁷

Section 4985 of the IRC requires executive officers and board members of domestic corporations to pay capital gains tax on any compensation tied to the stock price that occurs in the twelve months centered on a completion of an inversion when an expatriated entity results. However, generally the firms “gross-up” the pay of the individuals to cover the additional taxes owed due to section 4985.¹⁸ As a result, the additional tax costs resulting from section 4985 are, generally, born by the firm and not by the executives.

¹⁷ Some transactions have been structured to avoid the effect of section 367(a) tax for shareholders of the domestic corporation. For example, in the merger of Burger King and Tim Hortons, section 367(a) tax was partially avoided by providing Burger King shareholders with the option of receiving shares in an Ontario limited partnership. That inversion was not taxable, with the partnership shares converting to ordinary shares after one year. “Whopper of a Tax Dodge: How Burger King’s Inversion Could Shortchange America.” Americans for Tax Fairness. December 2014.

¹⁸ “In Deal to Cut Corporate Taxes, Shareholders Pay the Price.” *DealBook In Deal to Cut Corporate Taxes Shareholders Pay the Price Comments*. New York Times, 8 July 2014.

In addition, the new foreign country of domicile may have different corporate laws and corporate governance requirements than the US. For instance, the Netherlands has bound shareholder votes on executive pay since 2004.¹⁹

Following an inversion, a corporation may face index removal. Beginning in September 2014, to maintain the historically US nature of the Dow Index, the Dow Jones company excludes firms from the Dow Index that do business in the US, but are incorporated overseas.²⁰

Lastly, companies often face negative publicity for completing an inversion. Inversions have been deemed “unpatriotic” and have resulted in negative comments in the popular press.²¹ Moreover, Members of Congress have threatened to pass legislation that precludes inverting firms from doing business with the Federal government or any of its affiliated agencies.²² For example, in August 2014, Walgreens halted plans to invert to Switzerland through a merger with Alliance Boots. Walgreens noted that “the company [also] was mindful of the ongoing public reaction to a potential inversion and Walgreen’s unique role as an iconic American consumer retail company with a major portion of its revenues derived from government-funded reimbursement programs.”²³

4. History of Inversions and Regulations

The earliest known corporate inversion in the US was completed in 1983 when McDermott International changed domiciles from the US to Panama. In that inversion, McDermott merged into a Panamanian subsidiary resulting in a change of domicile. This transaction was taxable to McDermott’s shareholders.

¹⁹ Chasan, Emily. "Say-on-Pay Rules Expand Globally." *The CFO Report RSS*. Wall Street Journal, 5 Mar. 2013. Web.

²⁰ Demos, Telis: "Dow Index Overseers Make It Official: U.S. Firms Only." Wall Street Journal, 24 Sept. 2014. Web.

²¹ In July 2014, President Obama declared inversions as “unpatriotic”.

²² “No Federal Contracts for Corporate Deserts Act of 2014” (S.2704 and H.R.5278) and “No Federal Contracts for Corporate Deserts Act of 2015” (S.975 and H.R.1809) proposed a prevention of inverted firms from receiving a contract from any executive agency.

²³ Goldstein, Steve. "From the Horse’s Mouth — Why Walgreen Didn’t Invert." *Capitol Report*. Wall Street Journal, 6 Aug. 2014. Web.

However, many of the McDermott shareholders had losses in the stock and, thus, for many McDermott shareholders, the inversion may not have resulted in taxable gains.²⁴

In 1984, in response to McDermott's inversion, section 1248(i) of the IRC was enacted. Section 1248(i) requires the firm to recognize gains as if the consideration had been issued to the domestic corporation and then liquidated to shareholders. Since McDermott's inversion occurred before this update to regulation, McDermott did not pay a dividend tax on the cash the foreign subsidiary used as consideration in the transaction.

The first inversion resembling those seen today was the Helen of Troy transaction in 1994 when Helen of Troy changed domiciles to Bermuda. The inversion was completed by Helen of Troy merging into a US subsidiary of a Bermuda corporation wholly owned by Helen of Troy. This inversion was tax-free for Helen of Troy shareholders.²⁵

In response to the Helen of Troy inversion, section 367(a) of the IRC was amended to make all transfers of US securities to a foreign corporation taxable to US citizens if the US transferors own, in aggregate, at least 50%, in vote or value, of the resulting foreign firm. Despite these regulations, there was a boom of inversions following the Helen of Troy inversion until around 2002, when Congress increased its attempts to block inversions.²⁶

In 2004, the American Jobs Act was signed into legislation and with it sections 7874, 4985, and 965 of the IRC.²⁷ Section 7874 has three conditions which, if all are met, require the resulting foreign corporation to be treated as a domestic corporation of tax purposes: 1) The foreign corporation acquires substantially all of the assets of the US Corporation; 2) The shareholders of the domestic corporation hold 80% or more, by vote or value, of the stock in the resulting corporation; 3) the resulting corporation does

²⁴ Tillinghast, David. "Recent Developments in International Mergers, Acquisitions and Restructurings." *Taxes*. December 1994.

²⁵ Helen of Troy Ltd. Prospectus/Proxy Statement. January 1994.

²⁶ New York State Bar Association. "Tax Section Report on Outbound Inversion Transactions." July 2002.

²⁷ American Jobs Creation Act of 2004. Pub.L. 108-357.

not have substantial business presence in the foreign country of incorporation. Substantial business presence was not properly defined, however. Section 4985 requires executive officers and board members of domestic corporations to pay capital gains tax on any compensation tied to the stock price that occurs in the six months prior and the six months after an inversion is completed when an expatriated entity results.

Section 965 of the IRC instituted a one-year tax holiday. The tax holiday created a 85% dividend received deduction resulting in a 5.25% effective tax rate on repatriated funds. The tax holiday was limited on the greater of \$500,000,000 or the amount permanently reinvested abroad. In addition, only extraordinary dividends would qualify and the eligible dividend is reduced by any increase in debt. Extraordinary dividends are defined as dividends greater than the average dividend paid. As part of the requirements, the full amount of the dividend had to be invested in the US in accordance with a domestic reinvestment plan. The dividend could not be used to increase executive compensation or as payment to shareholders through dividends, capital return, or redemption of stock. There is extensive literature examining who repatriated funds during the tax holiday and the effects of the tax holiday. One of the found effects of the tax holiday was an increase in the amount of funds being permanently reinvested abroad post-tax holiday.²⁸

In 2006, substantial business presence was defined with a “facts and circumstance test.” A fact and circumstance test just notes that for each transaction, all of the facts and circumstances surrounding the transaction will be considered in determining whether the resulting firm has substantial business presence in the new country of domicile. In particular, the following factors will be considered: number of employees, pay of employees, property, sales, historical presence, management activities in the new country of domicile, and the strategic importance of the new country of domicile.²⁹ In addition, a safe harbor was included. The safe harbor applied to inversion transactions that resulted in a firm with 10% or

²⁸ An analytical paper by De Waegenaere and Sansing (2008) demonstrated that increasing the probability of a future tax holiday leads to more funds being permanently reinvested abroad, thus, deferring repatriation taxes. Brennan (2010) find a dramatic increase in the rate of funds being permanently reinvested abroad (and, thus, not repatriated) following the tax holiday.

²⁹ 2006-2 C.B. 1-7.

more of its employees in number and compensation, 10% or more of its income derived, and 10% or more of the assets located in the new country of domicile.

In 2009, the safe harbor provision was dropped from the definition of substantial business presence. However, in 2012, substantial business presence was reintroduced with a bright-line rule stating that the requirement of a substantial business presence was met if after the inversion the firm had 25% or more of its employees in number and compensation, 25% or more of its income derived, and 25% or more of the assets located in the new country of domicile.

In June 2014, the Way and Means Committee met to discuss tax inversions. The Congressional Research Services provided a list of 76 inversions.³⁰ The original source of this document appears to be a Fordham University MBA thesis.³¹ Surprisingly, our review of that list shows that it included duplicate transactions, corporations who did not complete inversions, and corporation which do not exist, reducing the original count to 46 inversions.

In September 2014, the Treasury department released Notice 2014-52. The notice makes it harder for the domestic companies to receive less than 60% or 80% of the shares in the resulting corporation by not allowing for pre-inversion special dividends. The notice also prohibits tax avoidance for hopscotch loans. These are loans between the resulting foreign corporation and the foreign subsidiary of the domestic corporation, which has now become a subsidiary. These loans are now taxed as dividends from the foreign subsidiary to the domestic subsidiary. In addition, the notice prevents the new foreign parent from gaining a controlling interest in the foreign subsidiary of the domestic subsidiary, allowing the foreign parent to access the cash of the foreign subsidiary without repatriating the earnings. Lastly, the notice prevents “spinversions,” where a US corporation moves assets into a newly formed foreign subsidiary and then only the foreign subsidiary is spun/split/sold-off in an inversion.

³⁰ "New CRS Data: 47 Corporate Inversions in Last Decade." *Ways and Means Committee*. 7 July 2014. Web.

³¹ “Mergers of Equals. Getting Caught in the Section 7874 Corporate Inversion Web – Change the Rules or Change the Game” (Marsha Henry 2013).

5. Types of Inversions and Tax Consequences

There are five types of inversions: substantial business presence with control, substantial business presence without control, expatriated entity, inversion without consequences with control, and inversion without consequences and control. Table 2 summarizes the types of inversions and the potential consequences of each. When the popular press discusses inversions, they are generally referring to inversions where the domestic corporation maintains control (the domestic corporation shareholders result in owning 50% or more of the final corporation). Inversions can occur as the result of four primary transactions: a foreign firm acquiring a domestic firm or a domestic part of a firm; a domestic firm acquiring a foreign firm or a foreign part of a firm; a domestic firm reorganizing and merging into a wholly-owned foreign subsidiary; a domestic firm spinning or splitting-off a foreign subsidiary.

An inversion can be achieved without the domestic firm having to give up any control if the resulting corporation achieves a significant business presence in the new country of domicile. For transactions occurring after June 6, 2012, there is a bright-line rule for determining significant business presence: the resulting corporation must have 25% or more of its employees in number and compensation, 25% or more of its income derived, and 25% or more of the assets located in the new country of domicile.

Substantial business presence with control inversions are generally achieved through a reorganization, merger, acquisition, or spinning/splitting-off a subsidiary. In reorganization, the domestic firm merges with and into a foreign subsidiary, resulting in a foreign corporation owned by the same shareholders as the initial domestic firm or shareholders of the domestic firm own greater than 50% of the resulting firm. A domestic corporation could acquire a foreign corporation, such that after the transaction, the resulting firm has a substantial business presence in the foreign country and shareholders of the domestic firm own greater than 50% of the resulting firm. A foreign corporation can acquire a domestic corporation, maintain a substantial business presence in the new country of domicile, and shareholders of the domestic firm own greater than 50% of the resulting firm. In addition, an inversion with substantial business presence can be achieved by a domestic corporation spinning or splitting-off a foreign subsidiary with

significant business presence in a foreign country and shareholders of the domestic firm own greater than 50% of the resulting firm, domiciling the now separated subsidiary in the foreign country, with the remainder of the domestic company remaining domiciled in the US. Substantial business presence with control inversions, generally, result in a step-up in the tax basis for the shareholders of the domestic corporation since the shareholders of the domestic firm face section 367(a) taxes.

Inversions with substantial business presence without control are generally achieved through a reorganization, merger, acquisition, or spinning/splitting-off a subsidiary. In reorganization, the domestic firm merges with and into a foreign subsidiary, resulting in a foreign corporation and shareholders of the domestic firm own less than 50% of the resulting firm. A domestic corporation could acquire a foreign corporation, such that after the transaction, the resulting firm has a substantial business presence in the foreign country and shareholders of the domestic firm own less than 50% of the resulting firm. A foreign corporation can acquire a domestic corporation, maintain a substantial business presence in the new country of domicile, and shareholders of the domestic firm own less than 50% of the resulting firm. In addition, an inversion with substantial business presence without control can be achieved by a domestic corporation spinning or splitting-off a foreign subsidiary with significant business presence in a foreign country and shareholders of the domestic firm own less than 50% of the resulting firm, domiciling the now separated subsidiary in the foreign country, with the remainder of the domestic company remaining domiciled in the US.

Inversions with consequences are achieved when a transaction results in a corporation with no substantial business presence in the new country of domicile and the domestic corporation shareholders own between 60% and 80% of the resulting corporation. The resulting corporation is considered an expatriated entity. The expatriated entity is domiciled in a foreign country for US tax purposes. However, the expatriated entity is not able to use NOLs or tax credits to offset the gains to the domestic firm from the transfer of asset, stock, licenses, etc. associated with the inversion. There is, generally, a step-up in the tax basis for shareholders of the domestic firm since the shareholders of the domestic firm face section 367(a) taxes.

Inversions with consequences are achieved by a foreign corporation acquiring a domestic corporation such that the target shareholders receive between 60% and 80% of the shares and the resulting corporation has no substantial business presence in the foreign country. Inversions with consequences can also be achieved by a domestic corporation acquiring a foreign corporation such that the acquiring shareholders will continue to own between 60% and 80% of the resulting corporation and the resulting corporation has no substantial business presence in the foreign country.

Inversions without consequences with control are achieved when the resulting corporation has no substantial business presence in the new country of domicile and shareholders of the domestic corporation own between 50% and 60% of the resulting corporation. This results in a corporation with foreign-domicile for US tax purposes. In addition, there is, generally, only a step-up in the tax basis for the shareholders of the domestic corporation since the shareholders of the domestic firm face section 367(a) taxes. Inversions without consequences with control are achieved by a foreign corporation acquiring a domestic corporation such that the target shareholders receive between 50% and 60% of the shares and the resulting corporation has no substantial business presence in the new country. Inversions without consequences with control can also be achieved by a domestic corporation acquiring a foreign corporation such that the acquiring shareholders will continue to own between 50% and 60% of the resulting corporation and the resulting corporation has no substantial business presence in the foreign country of tax domicile.

Inversions without consequences and control are achieved when the resulting corporation has no substantial business presence in the new country of domicile and shareholders of the domestic corporation own less than 50% of the resulting corporation. This results in a corporation with foreign-domicile for US tax purposes. Inversions without consequences or control are achieved by a foreign corporation acquiring a domestic corporation such that the target shareholders receive less than 50% of the shares and the resulting corporation has no substantial business presence in the new country. Inversions without consequences and control can also be achieved by a domestic corporation acquiring a foreign corporation

such that the acquiring shareholders will continue to own less than 50% of the resulting corporation and the resulting corporation has no substantial business presence in the foreign country of tax domicile.

6. Sample

The spin/split-offs and the mergers and acquisitions were gathered from CapitalIQ and SDC. All transactions in CapitalIQ and SDC with announcements post January 1, 2004 involving a domestic firm traded on a major US exchange and foreign firm traded on a major US exchange were manually checked to see if they resulted in a firm with incorporation abroad. We include only inversions announced after January 1, 2004 due to the implementation of section 7874 of the Internal Revenue Code with the American Jobs Act of 2004. This section of the code, as previously described in the paper, largely impacted the types of inversions allowed. Thus, inversions before and after the implementation of section 7874 may be significantly different.

Reorganizations were collected from EdgarPro using a search for “section 7874.” All firms referencing “section 7874” in their financial statements were manually checked to see if reorganization resulted in a re-incorporation abroad. The inversions were then matched with CRSP and Compustat to get the necessary stock and financial information. This resulted in a final sample of 122 inversions.

We summarize our sample in Table 3. Our total sample consists of 132 inversions. However, when we require post-inversion data, our sample reduces to 104 inversions. With 123 inversions (99 when post-inversion data are required), M&A transactions are the most frequent form of means to achieve an inversion, followed by 5 (4) reorganizations and 4 (1) spin/split-offs.

In terms of inversion types, the sample consists of 114 (95) inversions without consequences, 8 (4) inversions with consequences, and 10 (5) inversions with substantial business presence.³²

³² Recall that inversions without consequences occur when shareholders of the US-domiciled corporation own less than 60% of the resulting foreign-domiciled corporation. Inversions with consequences occur when shareholder of the US-domiciled corporation own between 60% and 80% of the resulting foreign-domiciled corporation. Inversions with substantial business presence result when the resulting corporation is deemed to have a substantial business

7. Effects on Tax Revenues

A) Hypothesis

Exploring the effects of inversion on tax revenues requires examining both changes in taxes collected directly from the firm and from the shareholders of the firm. We can directly analyze changes in both the dollar value and the rate paid by our sample firms to the US Treasury. If the US Treasury experiences a large decrease in revenue due to inversions, we expect a decrease in the domestic taxes paid and possibly even a decrease in the domestic effective tax rate are expected following an inversion.

However, shareholders of inverting firms may face taxes on dividends and stock repurchases (if the foreign sourced-income is repatriated post-inversion and distributed to shareholders) and capital gains taxes resulting from the appreciation in stock price due to the inversion. Both the increase in dividends/repurchases and the capital gains may in fact increase the taxes collected by the US Treasury.³³

B) Results

To allow comparison between the pre- and the post-inversion periods, we compute pro-forma variables for a consolidated pre-inversion firm that includes, in the case of a merger or acquisition, both the target and the acquirer. The variables are computed using up to a three year average depending on data availability. For the pre-inversion period, the average is computed using data from the year before the inversion announcement up to three years before the inversion announcement. For the post-inversion period, the average is computed using data from the year after inversion close up to three years after

presence in the new country of domicile. Control occurs when the domestic corporation shareholders result in owning greater than 50% of the resulting corporation.

³³ Dividends issued by corporations to foreign shareholders are often subject to withholding tax depending on the tax laws of the foreign corporation. In the US, shareholders receive a foreign tax credit for these withholding taxes paid. Thus, the tax collected by the US Treasury is the difference between the US tax on the dividends and the foreign withholding tax. Thus, if the foreign withholding tax is less than the US tax, the US treasury will still collect tax revenue from the dividends. The US tax varies between 0% and 39.6% for ordinary dividends and between 0% and 20% for qualified dividends. The following are the withholding taxes for the countries in the sample: Australia 30%, Bermuda 0%, Canada 25%, Cayman Islands 0%, Denmark 27%, Finland 30%, France 30%, Germany 26.375%, Ireland 20%, Israel 25%, Italy 26%, Japan 20.42%, Luxembourg 15%, Netherlands 15%, Norway 25%, Puerto Rico 20%, Singapore 0%, South Africa 15%, Spain 20%, Sweden 30%, and U.K. 0%. Since we do not know the individual tax rates of shareholders, we are not able to compute the amount of tax revenue collected by the US Treasury. (S&P Dow Jones Indices. "Withholding Tax Rates." April 1, 2015.)(Deloitte. "Withholding Tax Rates 2015." 2015.)

inversion close. As we show in Table 4, on a consolidated basis, our firms total tax expense in the pre-inversion period is \$769.40 million (median \$291.58 million), and the post inversion tax expense is \$752.25 million (\$258.07 million), and neither the decrease in the mean (-\$17.15 million) nor the decrease in the median (-\$33.51 million) are statistically significant at conventional levels ($t = -0.33$ and $Z = -0.07$, respectively). However, we observe that the total effective tax rate drops from 34.26 percent to 25.07 percent (median from 26.65 percent to 20.52 percent) and while the change in the mean is not statistically significant at conventional levels, the drop in the median is ($t = -1.24$ and $Z = -4.20$, respectively).

Turning to cash taxes paid, we find an insignificant increase in cash taxes paid and an insignificant decrease in the effective cash tax rate as seen in rows 3 and 4.

Next, we investigate dividends and stock repurchases. The average dividend expense prior to the inversion is \$939.68 million (median \$186.95 million). In contrast, the mean and median dividend expense in the post-inversion period are \$1,223.33 million and \$379.34 million, respectively. The increases in the mean and median are statistically significant ($t = 6.27$ and $Z = 6.42$, respectively). As can be seen in rows 6 and 7, the increase in dividends is due to increases in regular dividends not special dividends. The changes in both mean (\$549.90 million) and median (\$67.33 million) stock repurchases increase significantly ($t = 1.99$ and $Z = 2.01$) following inversions.

Finally, we analyze sources and uses of cash. We find a significant increase in operating cash flows (mean \$2,834.37 million and median \$1,262.02 million). While financing cash flows are unchanged, cash flows from investments decrease by -\$1,860.67 million (median -\$545.76 million), while the mean is not statistically significant, the median is ($p = 0.01$). Thus, the picture that emerges is that the domestic tax revenue does not decrease, and that the overall dividends increase. In turn, these preliminary results suggest that the US Treasury does not suffer a decrease in revenue, and in fact may benefit from the additional income taxes that result from the dividend payments and even from the capital gains accruing to US shareholders. We investigate this effect next.

In Table 5, we first compare the price of the US pre-inversion firm to the stock value and cash represented by that share following the inversion. On a per transaction basis, the US firms realize an average of \$566.83 million (median \$416.35 million) in capital gains.

Finally, we investigate the effect of the increases in dividends resulting from the repatriation of foreign profits held abroad that follows the inversions. For the purpose of this analysis, we focus on 36 inversions where the shareholders of the US domiciled corporation remained shareholders of the resulting foreign-domiciled corporation. Prior to the inversion, the mean (median) dividend to the original shareholders of the US firm was \$26.69 million (\$0.00). Following the inversion, the dividend to the original shareholders of the US firm increased to \$60.30 million (median \$6.50 million), that is increased by an average \$33.61 million (median \$6.50 million), with both the mean and median increases statistically significant at conventional levels (p values of 0.01 and 0.00, respectively). This increase in dividend to the original shareholders of the US firm is from regular dividends as opposed to special dividends. In addition, stock repurchases are insignificant.

In summary, following the inversions, we find increases in dividends, which likely resulted in increases in future taxable income in addition to the considerable increases in taxable income resulting from the inversion transactions, suggesting that the revenues to the US Treasury likely increased considerably from the inversions. Next, we investigate whether investors' reactions to the inversions are consistent with our main result that the main benefit of inversions is the ability to repatriate past and future foreign-sourced income.

8. Investors' Response to the Inversion Announcements

A) Hypothesis

Given the results described in the previous section, we expect the benefits created by inversions to be related to un-repatriated cash and expected future foreign sourced income, but not to proxies of earnings stripping. We test this hypothesis by regressing the change in total shareholder wealth (that is both the

benefits to the acquirers and the targets) on un-repatriated cash, future foreign sourced income, and proxies for earnings stripping. We focus on total synergies (as opposed to increases in shareholder wealth to acquirer or the target shareholders) for two reasons. First, nine of our inversions are not M&A transactions (they are reorganizations and spin-offs), and hence the distinction between target and acquirer is not meaning full. Also, even in an M&A inversion, the US firm could be the target or the acquirer. Second (and more importantly), the split of the synergies between target and acquiring firms are irrelevant to our research question.

B) Model

Positive (negative) synergies occur in a transaction when the result of the transaction is worth more (less) than inputs into the transaction. Generally, synergies are perceived to be positive, but investors do sometimes view the synergies in M&A transactions as negative (for our sample, approximately two third of the synergies are positive). Synergies have three primary components: revenue synergies, cost synergies, and tax benefits/costs. Positive (negative) revenue synergies occur when the two companies combined create greater (fewer) revenues than the companies do separately. Examples of positive revenue synergies are cross selling and entry into new markets. Negative revenue synergies could include a decrease in quality. Positive (negative) cost synergies occur when the companies are (not) able to eliminate expenses when combined that cannot (can) be eliminated when the companies are separate. Positive cost synergies can include reduction of redundant employees, elimination of additional offices or departments, and reduction in overhead. Examples of negative cost synergies are changes in employee contracts and changes in supplier/customer contracts. Tax benefits/costs can occur when the marginal tax rate of the combined companies differs from that of each separate company. Based on these components of synergies, $S = S_R + S_C + T$ where S_R is the net revenue synergy, S_C is the net cost synergy, and T is the net tax benefit of the transaction.

Tax benefits/costs result when the marginal tax rate of the combined companies differs from that of each separate company. Tax benefits are a driver in inversion transactions. In the case of inversions, tax

benefits occur from three sources, as discussed in the benefits section: the ability to avoid taxes on non-repatriated foreign-sourced income, the ability to avoid domestic taxation on future foreign-sourced income, and the ability of the foreign parent to strip earnings from the US subsidiary, thus avoiding domestic taxation on domestic income (earnings stripping).

In the case of inversions, tax costs to the firm result from four sources: the potential loss of NOLs and tax credits, the gross-up of executive contracts to cover section 4985 taxes, the costs of changes in country corporate law (could be positive or negative), and the costs of negative publicity from moving overseas. Thus, $T = (B_P + B_F + B_E) - (C_N + C_G + C_L + C_A)$ where B_P is the dollar value of the benefit attributable to the ability to access non-repatriated foreign income without domestic taxation, B_F is the dollar value of benefit due to avoidance of domestic taxes on future foreign income, B_E is the dollar value of the benefit attributable to earnings stripping, C_N is the cost of the loss of NOLs and tax credits, C_G is the gross-up of executive contracts to cover section 4985 taxes, C_L is the costs of the changes in applicable corporate law, and C_A is the cost of negative publicity from moving overseas. Therefore, the dollar value of synergies is $S = S_R + S_C + [(B_P + B_F + B_E) - (C_N + C_G + C_L + C_A)]$.

C) Hypotheses

Using the models developed above, the factors which influence the market's expectation of synergies can be measured. Using proxies for each benefit and cost, the market's expectation of synergies will be regressed on the various benefits and costs of an inversion. It is expected that the proxies for the three benefits of an inversion will increase the expected synergies as the benefit increases. It is also expected that the proxies for the costs of an inversion will result in a decrease in the expected synergies as the costs increase.

To test the model described above, the measured synergies are regressed on the components of the tax benefits and tax costs. The resulting regression is:

$$S = \alpha + \beta_1 \Delta T_F C_{F,N} + \beta_2 \Delta T_F I_F + \beta_3 E_1 + \beta_4 E_C + \beta_5 T_D NOL + \beta_6 N_A \text{ with country fixed effect.}$$

The alpha will represent the revenue and costs synergies. β_1 , the coefficient on the benefit of the unrepatriated foreign sourced income, should be equal to 1. β_2 , the coefficient on the benefit of the domestic tax avoidance on future foreign income, represents 1 divided by the discount rate minus the growth rate of foreign income. β_3 , the coefficient on the benefits of earnings stripping associated with intangibles, represents the average of domestic earnings stripped to the new foreign parent by firms with high intangibles owned by the US firm. β_4 , the coefficient on the benefits of earnings stripping associated with changes to the domestic capital structure, represents the average of domestic earnings stripped to the new foreign parent by firms with domestic subsidiaries with large capacity to increase interest expense. β_5 , the coefficient on the costs of the inability to use NOLs to offset gains from the inversion, will represent the portion of NOLs the market expects the US firm to lose in the transaction. β_6 , the coefficient on the costs of the publicity, represents the per article benefits/costs of transaction publicity. The coefficients on the country fixed effects represent the costs of changing from the corporate laws of the United States to the new foreign country of domicile. It is expected that β_1 will equal 1, β_2 , β_3 , and β_4 will be positive, and β_5 and β_6 will be negative.

D) Results

We report the dependent and independent variables used in the regression analysis in Table 6. For our regression sample of 132 inversions, the mean (median) total synergy is \$1,313.62 million (\$216.10 million). These synergies are measured as the total change in shareholder wealth in the period from minus 30 days prior to the first announcement to one day after the first announcement. To correct for cross-sectional differences in the probability of completion, we gross up the synergies to reflect the expected value of the synergies when the completion of the inversion were 100 percent. (See Appendix for a description of our method.) However, our results are qualitatively unchanged when we use the changes in the market capitalizations unadjusted for the probability of completion.

The average unrepatriated cash is \$90.15 million (median \$0.00 million). In the year preceding the announcement, our sample firms' mean foreign income was \$225.81 million (median \$0.00 million). Our

sample firms have \$218.18 million in NOLs (median \$0.50 million) and the mean combined market capitalization of the firms involved (one firm in the case of reorganizations and spin-offs and two firms in the case of M&A transactions) is \$37,001.62 million (median \$17,177.21 million). Finally, the mean difference in the statutory tax rate between the US and the new host country is 13.83 percent (median 11.87 percent) and we find an average of 116.73 news articles (median 69.5) discussing the inversions in the seven day period from one day before the announcement to five days following the announcement. We include this variable because we expected that news articles may be indicative of publicity that adversely will affect shareholders' reactions to the announcements.

We report results of the following regression:

$$S = \alpha + \beta_1 \Delta T_F C_{F,N} + \beta_2 \Delta T_F I_F + \beta_3 E_I + \beta_4 E_C + \beta_5 T_D NOL + \beta_6 N_A \text{ with country fixed effect}$$

in Table 7.

Column 1 reports the results with country fixed effects and column 2 report the same results without country fixed effects. In columns 3 and 4, we replicate the same regressions but include total market capitalization as an additional control variable.

Because the results are qualitatively similar across the four specifications, we focus our discussion on the results reported in column 1 (inclusive of country fixed effects), but note when the other specifications differ.

The proxies for un-repatriated foreign sourced income, future foreign income, and publicity are highly statistically significant and positive, meaning the market believes that the ability for the firm to reduce tax on un-repatriated foreign-sourced income, future foreign income, and the benefits of publicity are the most significant sources of tax benefits. The average revenue and cost synergies are negative with economic, but not statistical significance. This is likely the result of the revenue and cost synergies being correlated with the components of the tax costs and benefits. Neither the coefficients of the proxies for savings from earnings stripping nor the coefficient on the potential loss of NOLs are statistically

significant at conventional levels. Importantly, our conclusions are unchanged when we add the market capitalization to control for size in columns three and four as does excluding country fixed effects as shown in columns two and four of Table 7. Finally, our intercept is negative and marginally (at best) significant, implying that all the benefits accruing to shareholders in inversions come from repatriation of foreign cash and tax avoidance on future foreign-sourced and not from revenue or cost synergies.

Our results remain qualitatively unchanged when we perform sensitivity analyzes (untabulated), including using three-year averages for the independent variables (to reduce errors in variables) and alternate proxies for earnings stripping (e.g., dummy variables when both the foreign cash and the foreign income are zero).

9. Conclusion

We show that the inversions do not reduce taxes collected by the US Treasury, contrary to the strongly held assertions by Congress. In fact, the most likely outcome is that inversions actually increase taxes to the US Treasury, in the form of taxable and possibly tax deferred capital gains and increases in post-inversion cash dividends. Further, both our analysis of the firm specific variables and our analysis of investors' stock price reaction are consistent in implying that repatriation of past and future foreign sourced income without paying the incremental US tax and not earnings stripping are the main sources of the observed increase in shareholder wealth. Thus, our seemingly paradoxical conclusion is that to maximize tax collections by the US Treasury, Congress should encourage, and certainly not discourage, inversions.

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Appendix: Measurement

1. Synergies³⁴

A) By Form of Inversion

Synergies are measured based on the form of the inversion. Below, the measurement of synergies for inversions completed through mergers & acquisitions, restructurings, and spin/split-offs are described.

i. Measuring Synergies in Mergers & Acquisitions

“The whole is greater than the sum of its parts” (Aristotle). In mergers and acquisitions, the value of the acquirer and the target together is worth more than the value of the acquirer and target separately, otherwise, the acquisition should never have occurred. The differences in value between the acquirer and target on their own and the value of the combined corporation are referred to as synergies. Thus, $S = V_M - [V_{A,N} + V_{T,N}]$, such that $V_M = V_{A,M} + V_{T,M}$. Thus, $S = [V_{A,M} + V_{T,M}] - [V_{A,N} + V_{T,N}]$. Where S is the dollar value of synergies achieved through the transaction, V_M is the value of the combined firm after the transaction, $V_{A,M}$ is the value of the acquirer after the transaction, $V_{T,M}$ is the value of the target after the transaction, $V_{A,N}$ is the value of the acquirer if no transaction is completed, and $V_{T,N}$ is the value of the target if no transaction is completed.

The market value of the target and acquirer can be calculated using the share price and the number of outstanding shares. Thus, $V_{A,M} = P_{A,M}N_A$, $V_{T,M} = P_{T,M}N_T$, $V_{A,N} = P_{A,N}N_A$, and $V_{T,N} = P_{T,N}N_T$ where $P_{A,M}$ is the per share price of the acquirer after the transaction, $P_{T,M}$ is the per share price of the target after the transaction, $P_{A,N}$ is the per share price of the acquirer if no transaction is completed, $P_{T,N}$ is the per share price of the target if no transaction is completed, N_A is the number of outstanding acquirer shares, and N_T is the number of outstanding target shares. Therefore, synergies are equal to $S = [P_{A,M}N_A + P_{T,M}N_T] - [P_{A,N}N_A + P_{T,N}N_T]$.

³⁴ Synergies are measured in a manner similar to the model developed by Larker & Lys (1987).

On the day of transaction announcement, using merger arbitrage formulas, the post announcement price of the target and acquirer equate to $P_{A,D} = \pi P_{A,M} + (1 - \pi)P_{A,N}$, $P_{T,D} = \pi P_{T,M} + (1 - \pi)P_{T,N}$, and $P_{T,M} = C + EP_{A,M}$ where $P_{A,D}$ is the per share price of the acquirer at the transaction announcement, $P_{T,D}$ is the per share price of the target at the transaction announcement, π is the probability the transaction is completed, C is the per share cash consideration given to target shareholders, and E is the stock

consideration conversion rate. Therefore, $\pi = \frac{E(P_{A,D}-P_{A,N})-(P_{T,D}-P_{T,N})}{P_{T,N}-(C+EP_{A,N})}$, $P_{A,M} = \frac{P_{A,D}-P_{A,N}(1-\pi)}{\pi}$ and

$$P_{T,M} = C + EP_{A,M}. \text{ Thus, } S = \left[\frac{P_{A,D}(C-P_{T,N})-P_{A,N}(C-P_{T,D})}{EP_{A,N}-EP_{A,D}+P_{T,D}-P_{T,N}} N_A + \left(C + E \frac{P_{A,D}(C-P_{T,N})-P_{A,N}(C-P_{T,D})}{EP_{A,N}-EP_{A,D}+P_{T,D}-P_{T,N}} \right) N_T \right] - [P_{A,N}N_A + P_{A,N}N_T].$$

ii. Measuring Synergies in Restructurings

In inversions completed through restructurings, the domestic parent corporation merges with a foreign subsidiary with the foreign subsidiary surviving as the new parent corporation. There are no changes to the asset or liability structure of the firm. Thus, there are no revenue synergies or cost synergies, only tax synergies are present. In addition, any change in value of the firm is attributable solely to synergies. Thus, $S = V_M - V_N$ where S represents the dollar value of synergies, V_M represents the value of the firm with restructuring and V_N represents the value of the firm without restructuring.

The market value of the firm can be calculated using share price and the number of shares outstanding. Thus, $V_M = P_M N$ and $V_N = P_N N$ where P_M is the per share price with restructuring, P_N is the per share price without restructuring, and N is the number of outstanding shares of the firm. Therefore total synergies are $S = (P_M - P_N)N$.

On the day of restructuring announcement, the post announcement price of the firm equates to $P_D = \pi P_M + (1 - \pi)P_N$ where P_D is the post announcement price of the firm and π is the probability of the restructuring completing. Assuming the probability of restructuring is 100% once announced, then $P_D = P_M$. Thus, $S = (P_D - P_N)N$.

iii. Measuring Synergies in Spin/Split-offs

In inversions completed through a spin or split-off, the domestic parent corporation divests a foreign subsidiary with the foreign subsidiary domiciling in a foreign country. In divestures, the value of the divesting company and the divested firm are worth more separate, then together. The difference in the value between the divesting company and the divested firm together and the value of them separate is referred to as synergies. Thus, $S = (V_{A,M} + V_{T,M}) - V_{A+T,N}$ where S represents the dollar value of synergies, $V_{A,M}$ represents the value of the divesting firm with the spin or split-off, $V_{T,M}$ represents the value of the divested firm with the spin or split-off, and $V_{A+T,N}$ represents the value of the firm without divesting.

The market value of the divesting company and the divested firm can be calculated using the share price and the number of outstanding shares. Thus, $V_{A,M} = P_{A,M}N_A$, $V_{T,M} = P_{T,M}N_T$, and $V_{A+T,N} = P_{A+T,N}N_A$ where $P_{A,M}$ is the per share price of the divesting firm with the spin or split-off, $P_{T,M}$ is the per share price of the divested firm, $P_{A+T,N}$ is the per share price of the firm without divesting, N_A is the number of shares outstanding of the firm without divesting and the number of shares of the divesting firm, and N_T is the number of shares of the divested firm outstanding. Therefore, synergies are $S = \left[\left(P_{A,M} + P_{T,M} \frac{N_T}{N_A} \right) - P_{A+T,N} \right] N_A$.

On the day of restructuring announcement, the post announcement price of the firm equates to $P_{A+T,D} = \pi(P_{A,M} + P_{T,M} \frac{N_T}{N_A}) + (1 - \pi)P_{A+T,N}$ where $P_{A+T,D}$ is the post announcement price of the undivested firm and π is the probability of the spin or split-off completing. Assuming the probability of spin or split-off is 100% once announced, then $P_{A+T,D} = P_{A,M} + P_{T,M} \frac{N_T}{N_A}$. Thus, $S = (P_{A+T,D} - P_{A+T,N})N_A$.

B) Measurement

Share price and outstanding shares were collected from CRSP. Merger consideration was collected from CapitalIQ. The closing price the first trading day after announcement was used to capture the price after

announcement. If the closing price the first trading day after announcement was not available, the second trading day after announcement was used, and so on until the third day after announcement. We use the closing price 30 days before announcement to measure the share price absent the inversion.³⁵ If the closing price 30 days prior to announcement was not available, the closing price 31 days prior to announcement was used, and so on until 33 days prior to announcement.

2. Effects on Tax Revenues

A) Sample Firms

There are three sample firm designations: pre-inversion US firm, consolidated pre-inversion firm, and the post-inversion firm. The sample firm designations are defined below based on the form of the inversion.

i. Pre-Inversion US Firm

Restructurings

For restructurings, the pre-inversion US firm is the original US-domiciled corporation that existed prior to the inversion.

Spin/Split-offs

For spin/split-offs, the pre-inversion US firm is the whole of the original US-domiciled corporation that existed prior to the corporation dividing into a US-component and a foreign-component.

Mergers and Acquisitions

For mergers and acquisitions, the pre-inversion US firm is either the target or the acquirer before the inversion occurs. If the target before the transaction was a US-domiciled corporation and the acquirer was a foreign-domiciled corporation, then the pre-inversion US firm is the target. If the target before the inversion was a foreign-domiciled corporation and the acquirer was a US-domiciled corporation, then the pre-inversion US firm is the acquirer.

³⁵ If upon further examination there unrelated significant events occurred between 30 days prior to announcement and announcement, then the price 15 days before announcement was used instead. This does not significantly alter the results.

ii. Consolidated Pre-Inversion Firm

Restructurings

For restructurings, the consolidated pre-inversion firm is the original US-domiciled corporation that existed prior to the inversion. Thus, for restructurings, the consolidated pre-inversion firm is the same as the pre-inversion US firm.

Spin/Split-offs

For spin/split-offs, the consolidated pre-inversion firm is the whole of the original US-domiciled corporation that existed prior to the corporation dividing into a US-component and a foreign-component. Thus, for spin/split-offs, the consolidated pre-inversion firm is the same as the pre-inversion US firm.

Mergers and Acquisitions

For mergers and acquisitions, the consolidated pre-inversion firm is the combined target and acquirer before the inversion occurs. Thus, for mergers and acquisitions, the consolidated pre-inversion firm is the combination of the pre-inversion US firm and the pre-inversion foreign firm.

iii. Post-Inversion Firm

Restructurings

For restructurings, the post-inversion firm is the foreign-domiciled corporation that is created due to the inversion. After the inversion, there is a single foreign-domiciled corporation which replaces the US-domiciled corporation that existed prior to the inversion.

Spin/Split-offs

For spin/split-offs, the post-inversion firm is the combination of the US firm that is created in the transaction and the foreign firm that is created in the transaction. After the inversion, there is both a foreign-domiciled firm and a US-domiciled firm which replace the US-domiciled corporation that existed prior to the transaction.

Mergers and Acquisitions

For mergers and acquisitions, the post-inversion firm is the resulting foreign-domiciled firm created in the transaction. After the inversion, for mergers and acquisitions, there is a foreign-domiciled firm which results from the combination of the acquirer and target.

B) Variables

i. 3 Year Average

All of the variables used to analyze the change in firm tax revenues are computed as averages over a maximum of three years. When data is available for three years, a three year average is used. If data is only available for two of the three years, then a two year average is used. If data is only available for one of the years, then only that year of data is used. When calculating the variables for pre-inversion US firms, pre-inversion foreign firm, or consolidated pre-inversion firms, the average is taken over a maximum of three years prior to transaction announcement. When calculating the variables for post-inversion firms, the average is taken over a maximum of three years after transaction close.

ii. Total Tax

Total tax is measured as the tax expense (txt) as reported in Compustat. This is calculated as an average over a maximum of three years as described above.

iii. Total Effective Tax Rate

The total effective tax rate is measured as total tax expense (txt) over pre-tax income (pi) as reported in Compustat. The total effective tax rate is calculated for each year and then averaged as described above.

iv. Foreign Tax

Foreign tax is measured as foreign tax expense (txfo) as reported in Compustat. When foreign tax expense is missing, foreign tax expense is assumed to be zero. Foreign tax is calculated as a maximum of a three year average as described above.

v. Foreign Effective Tax Rate

The foreign effective tax rate is measured as foreign tax expense (txfo) over foreign pre-tax income (pifo) as reported in Compustat. When foreign tax expense is missing, it is assumed to be zero. In addition, when foreign pre-tax income is missing, it is assumed to be zero. The foreign effective tax rate is calculated for each year and then averaged as described above.

vi. Domestic Tax

Domestic tax is measured as the difference between tax expense (txt) and foreign tax expense (txfo) as reported in Compustat. When foreign tax expense is missing, domestic tax expense is assumed to be tax expense (txt). The domestic effective tax rate is calculated for each year and then averaged as described above.

vii. Domestic Effective Tax Rate

The domestic effective tax rate is measured as domestic tax expense over domestic pre-tax income. Domestic tax expense is calculated as the difference between tax expense (txt) and foreign tax expense (txfo). When foreign tax expense is missing, domestic tax expense is assumed to be tax expense (txt). Domestic pre-tax income is measured as the difference between pre-tax income (pi) and foreign pre-tax income (pifo). When foreign pre-tax income is missing, domestic pre-tax income is assumed to be pre-tax income (pi). The total effective tax rate is calculated for each year and then averaged as described above.

viii. Cash Tax Paid

Cash tax paid is measured as the tax paid (txpd) as reported in Compustat. Cash tax paid is averaged as described above.

ix. Cash Effective Tax Rate

The cash effective tax rate is calculated as tax paid (txpd) over pre-tax income (pi) as reported in Compustat. The cash effective tax rate is calculated for each year and then averaged as described above.

x. Foreign Cash

Foreign cash is measured using a two-step estimation process described below. Foreign cash is then averaged as described above.

Foreign cash is estimated in a fashion similar to that of Thakor (2013). The amount of foreign cash held must be estimated since disclosure is voluntary and many firms choose to not disclose. Calculating foreign cash held requires two steps. First, the following regression is computed for each domestic firm using up to ten years, depending on data availability, of annual Compustat data prior to announcement:

$$\frac{Cash}{Net\ Assets} = \beta_0 + \beta_1 \frac{R\&D}{Total\ Assets} + \beta_2 \frac{CapEx}{Total\ Assets} + \beta_3 Leverage + \beta_4 std(CF) + \beta_5 Dividend + \beta_6 \ln(Total\ Assets) + \beta_7 \frac{BV\ of\ Equity}{MV\ of\ Equity} + \beta_8 \frac{Domestic\ Income}{Total\ Assets} + \beta_9 \frac{Foreign\ Income}{Total\ Assets} + \beta_{10} TaxBurden + \varepsilon.$$

The dependent variable, $\frac{Cash}{Net\ Assets}$, is measured as the cash (ch) of the firm dividend by the total asstes minus the cash (at – ch). $\frac{R\&D}{Total\ Assets}$ is measured as research and development expense (xrd) divided by total assets (at). If research and development expense is missing, then $\frac{R\&D}{Total\ Assets}$ equals 0. $\frac{CapEx}{Total\ Assets}$ is measured as capital expenditure (capx) divided by total assets (at). When capital expenditure is missing, then $\frac{CapEx}{Total\ Assets}$ is set to 0.

Leverage is measured as total debt (dt) divided by total debt plus the market value of equity (dt + mkvalt).

If total debt is missing then leverage equals 0. CF is measured as operating income before depreciation (oibdp) divided by total assets (at). If operating income before depreciation is missing, then CF is measured as total operating income plus depreciation expense (opiti + xdp) divided by total assets (at).

The standard deviation of CF is then measured over the ten years prior to announcement where available.

Dividend is a dummy variable that is 0 unless total dividends (dvt) is greater than 0, then dividend is 1.

Total assets is total assets (at). $\frac{BV\ of\ Equity}{MV\ of\ Equity}$ is measured as total equity (teq) divided by the market value

of equity (mkvalt). If total equity is missing, then $\frac{BV\ of\ Equity}{MV\ of\ Equity}$ is measured as total assets minus total

liabilities (at – lt) divided by the market value of equity (mkvalt). $\frac{\text{Domestic Income}}{\text{Total Assets}}$ is measured as pretax domestic income (pidom) divided by total assets (at). If pretax domestic income is missing, then $\frac{\text{Domestic Income}}{\text{Total Assets}}$ is measured as pretax income minus pretax foreign income (pi – pifo) divided by total assets (at). If pretax domestic income and pretax foreign income are missing, then $\frac{\text{Domestic Income}}{\text{Total Assets}}$ is measured as pretax income (pi) divided by total assets (at). $\frac{\text{Foreign Income}}{\text{Total Assets}}$ is measured as pretax foreign income (pifo) divided by total assets (at). If pretax foreign income is missing, then $\frac{\text{Foreign Income}}{\text{Total Assets}}$ equals 0. Tax burden is measured as 35% times the pretax foreign income minus foreign income taxes (35% * pifo - txfo) divided by total assets (at). In foreign income taxes are missing, then the tax burden is measured as 35% times the pretax foreign income (35% * pifo) divided by total assets (at). If the pretax foreign income is missing, then the tax burden equals 0.

Then, using the same measures as above for total assets, $\frac{\text{Foreign Income}}{\text{Total Assets}}$, and tax burden, foreign cash held is estimated by:

$$\text{Foreign Cash} = \text{Total Assets} \left[\beta_9 \frac{\text{Foreign Income}}{\text{Total Assets}} + \beta_{10} \text{TaxBurden} \right] \text{ for each year.}$$

xi. Dividend

Dividend is measured as the total dividends (dvt) as reported in Compustat. Dividends are averaged as described above.

xii. Operating Cash Flows

Operating cash flows are measured as the operating cash flows (oancf) as reported in Compustat.

Operating cash flows are averaged as described above.

xiii. Financing Cash Flows

Financing cash flows are measured as the financing cash flows (fincf) reported in Compustat. Financing cash flows are averaged as described above.

xiv. Investing Cash Flows

Investing cash flows are measured as the investing cash flows (invcf) reported in Compustat. Investing cash flows are averaged as described above.

xv. Stock value per share of US firm

Pre-Inversion US Firm

For pre-inversion US firms, the stock value per share of US firm is measured as the closing stock price of the pre-inversion US firm 30 days before transaction announcement as reported in CRSP. If the closing price 30 days before announcement was unavailable, then the closing price 31 days prior to announcement is used, and so on until 33 days prior to announcement. For restructuring and spin/split-offs, as described above, the pre-inversion US firm is the original US-domiciled firm. For mergers and acquisition, the pre-inversion US firm is either the target or the acquirer. If the target before the transaction was a US domiciled corporation and the acquirer was a foreign-domiciled corporation, then the pre-inversion US firm is the target. If the target before the inversion was a foreign-domiciled corporation and the acquirer was a US-domiciled corporation, then the pre-inversion US firm is the acquirer.

Post-Inversion Firm

For restructurings, the stock value per share of US firm in the post-inversion time period is measured as the closing stock price of the post-inversion firm 1 day after announcement as reported in CRSP. If the closing price 1 day after announcement is not available, the closing price 2 days after announcement is used, and so on until 3 days after announcement.

For spin/split-off, the inversion results in both a foreign-domiciled corporation and a domestic-domiciled corporation, which are owned by the shareholders of the original pre-inversion US-domiciled corporation. Thus, the stock value per share of US firm in the post-inversion time period is measured as the closing stock price of the post-inversion US-domiciled firm 1 day after announcement as reported in CRSP plus

the closing price of the post-inversion foreign-domiciled firm 1 day after announcement as reported in CRSP. If the closing price 1 day after announcement is not available, the closing price 2 days after announcement is used, and so on until 3 days after announcement.

For mergers and acquisitions, the inversion results in a single corporation owned by the shareholders of the acquirer in the case of an all cash acquisition or owned by both the shareholders of the acquirer and target in the case of mixed or all stock consideration. Thus, in measuring the stock value per share of US firm, only the stock value owned by the shareholders of the US firm should be considered. To calculate this, the post-merger price of the acquirer needs to be calculated as described in the section describing the measurement of synergies. If the pre-inversion US firm is the acquirer, then the stock value per share of US firm is the post-merger price of the acquirer. If the pre-inversion US firm is the target, then the stock value per share of US firm is the per share cash consideration plus the stock consideration conversion rate times the calculated post-merger price of the acquirer.

xvi. Stock Value for Shareholders of US Firm

The stock value for shareholders of the US firm is the stock price per share of the US firm, as calculated above, times the number of outstanding shares of the US domiciled corporation 30 days prior to transaction announcement as reported in CRSP.

xvii. Dividend per Share of US Firm

Pre-Inversion US Firm

For pre-inversion US firms, the dividend per share of US firm is measured as the dividend expense (dvt) as reported in Compustat divided by the number of outstanding shares 30 days prior to transaction announcement as reported in CRSP. If dividend expense is missing, then dividend expense is assumed to be zero. Dividend expense is averaged as described above.

Post-Inversion Firm

For restructurings, the dividend per share of US firm in the post-inversion time period is measured as the dividend expense (dvt) as reported in Compustat divided by the number of outstanding shares of the pre-inversion US firm 30 days prior to transaction announcement as reported in CRSP.

For spin/split-off, the inversion results in both a foreign-domiciled corporation and a domestic-domiciled corporation, which are owned by the shareholders of the original pre-inversion US-domiciled corporation. Thus, the dividend per share of US firm in the post-inversion time period is measured as the dividend expense (dvt) as reported in Compustat of the US-domiciled corporation plus the dividend expense (dvt) as reported in Compustat of the foreign-domiciled corporation divided by the number of outstanding shares of the pre-inversion US firm 30 days prior to transaction announcement as reported in CRSP.

For mergers and acquisitions, the inversion results in a single corporation owned by both the shareholders of the acquirer and target. Thus, in measuring the dividend per share of US firm, only the dividends received by the shareholders of the US firm should be considered. If the pre-inversion US firm is the acquirer, then the dividend per share of US firm is measured as the dividend expense (dvt) as reported in Compustat for the post-inversion firm divided by the number of outstanding shares of the post-inversion firm. If the pre-inversion US firm is the target, then the dividend per share of US firm is measured as the dividend expense (dvt) as reported in Compustat for the post-inversion firm divided by the number of outstanding shares of the post-inversion firm times the stock consideration conversion rate.

xviii. Dividend for Shareholders of US Firm

The dividend for shareholders of the US firm is the dividend per share of the US firm, as calculated above, times the number of outstanding shares of the US domiciled corporation 30 days prior to transaction announcement as reported in CRSP.

3. Sources of Tax Benefits and Costs

A) Quantifying the Tax Benefit

As discussed in the last section, tax benefits are derived from three components: the ability to avoid taxes on non-repatriated foreign-sourced income, the avoidance of domestic taxes on future foreign income, and earnings stripping. The benefit arising from the ability to access non-repatriated foreign income is valued as the dollar savings that arise from the avoidance of the US's worldwide taxation of foreign income. Thus, $B_P = \Delta T_F C_{F,N}$ where ΔT_F is the difference between the marginal US tax rate and the foreign tax rate (this is the effective tax rate on the repatriation) and $C_{F,N}$ is dollar value of the non-repatriated foreign cash held by the US firm in the transaction.

A change in tax rate occurs for foreign income generated by the US firm because that income will no longer face the worldwide taxation policy of the US. The foreign income will now face the taxation policy of the new country of domicile. The benefit arising from the avoidance of domestic taxes on future income is valued as the dollar savings from the difference in taxes owed on foreign income between the foreign country of domicile and the US for the length of the firm's life. Thus, $B_F = \sum_{n=1}^{\infty} \frac{\Delta T_F I_{F,n}}{(1+r)^n} = \frac{\Delta T_F I_F}{r-g_F}$ where I_F is the foreign income of the US firm, r is the discount rate of the firm, and g_F is the growth rate of the foreign income of the US firm.

The tax benefit arising from earnings stripping is valued as the tax savings from the percent of domestic income of the US firm that can be moved to the foreign parent and taxed at the lower foreign tax rate.

Thus, $B_E = B_{E,I} + B_{E,C}$ where $B_{E,I}$ is the tax benefit from earnings stripping associated with intangibles and $B_{E,C}$ is the tax benefit from earnings stripping associated with changes in the capital structure. Then,

$B_{E,I} = \frac{\Delta T_F I_{S,I}}{r-g_{S,I}}$ and $B_{E,C} = \frac{\Delta T_F I_{S,C}}{r-g_{S,C}}$ where I_S is the income of the US firm that is stripped to the foreign

parent, r is the discount rate of the firm, and g_S is the growth rate of the income of the US firm being

stripped to the foreign parent. Therefore, the net tax benefits are equivalent to $T = \left(\Delta T_F C_{F,N} + \frac{\Delta T_F I_F}{r-g_F} + \right.$

$\frac{\Delta T_F I_{S,I}}{r-g_{S,I}} + \frac{\Delta T_F I_{S,C}}{r-g_{S,C}}) - (C_N + C_G + C_L + C_A)$ and total synergies are equivalent to $S = S_R + S_C +$

$$\left[\left(\Delta T_F C_{F,N} + \frac{\Delta T_F I_F}{r-g_F} + \frac{\Delta T_F I_{S,I}}{r-g_{S,I}} + \frac{\Delta T_F I_{S,C}}{r-g_{S,C}} \right) - (C_N + C_G + C_L + C_A) \right].$$

B) Quantifying the Tax Costs

As discussed, tax costs are derived from four components: the potential loss of NOLs and tax credits, the gross-up of executive compensation to cover section 4985 taxes, the costs of changes in country corporate law (could be positive or negative), and the costs of negative publicity from moving overseas. The tax cost arising from the potential loss of NOLs and tax credits is valued as the extra dollar costs of taxes as a result of NOL and tax credit losses. Thus, $C_T = T_D q NOL$ where T_D is the marginal tax rate of domestic income for the US firm in the transaction, q is portion of NOLs that are lost as a result of the inversion and NOL is dollar value of the NOLs held by the US firm in the transaction.

The gross-up of executive compensation to cover the costs of the section 4985 taxes is valued as the dollar value of the gross-up. Thus, $C_G = G$ where G is the gross-up of the executive compensation due to section 4985 taxes.

The costs of changes in the country corporate law are valued as the cost of change in country corporate law by country. Thus, $C_L = \sum_{m=1}^v L_m$ where L_m is the cost of the change in corporate law for new country of domicile number m if the new country of domicile is m and else 0 and v is the number of different countries.

The costs of negative publicity are valued as the cost of a negative article times the number of articles available on Factiva in the week following announcement of the transaction. Thus, $C_A = N_A A_C$ where N_A is the number of articles in the week following the announcement of the transaction and A_C is the cost of each article. Therefore, the total tax synergies are equivalent to $T = \left(\Delta T_F C_{F,N} + \frac{\Delta T_F I_F}{r-g_F} + \frac{\Delta T_F I_{S,I}}{r-g_{S,I}} +$

$\frac{\Delta T_{FIS,C}}{r-g_{S,C}}) - (T_D qNOL + G + \sum_{m=1}^v L_m + N_A A_C)$ and total synergies are equivalent to $S = S_R + S_C +$

$$\left[\left(\Delta T_F C_{F,N} + \frac{\Delta T_{FIF}}{r-g_F} + \frac{\Delta T_{FIS,I}}{r-g_{S,I}} + \frac{\Delta T_{FIS,C}}{r-g_{S,C}} \right) - (T_D qNOL + G + \sum_{m=1}^v L_m + N_A A_C) \right].$$

C) Modeling Inversions through Restructurings

Inversions completed through a restructuring can occur in inversions with substantial business presence.

i. Inversion with Substantial Business Presence

An inversion with substantial business presence completed through a restructuring results in synergies

being modeled as $S = \left(\Delta T_F C_{F,N} + \frac{\Delta T_{FIF}}{r-g_F} + \frac{\Delta T_{FIS,I}}{r-g_{S,I}} + \frac{\Delta T_{FIS,C}}{r-g_{S,C}} \right) - (\sum_{m=1}^v L_m + N_A A_C)$. Inversions

completed through a restructuring face no revenue or cost synergies. However, the transactions still produce tax benefits and costs. Inversions with substantial business presence generate tax benefits resulting from avoidance of domestic tax on un-repatriated foreign sourced income, avoidance of domestic tax on future foreign income, and earnings stripping. Inversions with substantial business presence only produce tax costs resulting from change in country corporate law and negative press.

D) Modeling Inversions with Spin/Split-Offs

Inversions completed through a spin or split-off can occur in inversions with substantial business presence.

i. Inversion with Substantial Business Presence

An inversion with substantial business presence completed through a spin or split-off results in synergies

being modeled as $S = S_R + S_C + \left[\left(\Delta T_F C_{F,N} + \frac{\Delta T_{FIF}}{r-g_F} + \frac{\Delta T_{FIS,I}}{r-g_{S,I}} + \frac{\Delta T_{FIS,C}}{r-g_{S,C}} \right) - (\sum_{m=1}^v L_m + N_A A_C) \right]$.

Inversions completed through a spin/split-off may produce revenue or cost synergies. In addition, the transactions may create tax benefits and costs. Inversions with substantial business presence generate tax benefits resulting from avoidance of domestic tax on un-repatriated foreign sourced income, avoidance of

domestic tax on future foreign income, and earnings stripping. Inversions with substantial business presence only produce tax costs resulting from change in country corporate law and negative press.

E) Modeling Inversions through Mergers/Acquisitions

Inversions completed through a merger or acquisition can occur in all types of inversions: inversions with substantial business presence, inversions with consequences, and inversions without consequences. All inversions completed through a merger or acquisition face revenue and cost synergies. However, the tax benefits and costs can vary based on the type of inversion completed.

i. Inversion with Substantial Business Presence

An inversion with substantial business presence completed through a merger or acquisition results in

synergies being modeled as $S = S_R + S_C + \left[\left(\Delta T_F C_{F,N} + \frac{\Delta T_F I_F}{r-g_F} + \frac{\Delta T_F I_{S,I}}{r-g_{S,I}} + \frac{\Delta T_F I_{S,C}}{r-g_{S,C}} \right) - \left(\sum_{m=1}^v L_m + N_{A,C} \right) \right]$. Inversions with substantial business presence face tax benefits resulting from avoidance of

domestic tax on un-repatriated foreign sourced income, avoidance of domestic tax on future foreign income, and earnings stripping. Inversions with substantial business presence only face tax costs resulting from change in country corporate law and negative press.

ii. Inversion with Consequences

An inversion with consequences results in synergies being modeled as $S = S_R + S_C + \left[\left(\Delta T_F C_{F,N} + \frac{\Delta T_F I_F}{r-g_F} + \frac{\Delta T_F I_{S,I}}{r-g_{S,I}} + \frac{\Delta T_F I_{S,C}}{r-g_{S,C}} \right) - (T_D qNOL + G + \sum_{m=1}^v L_m + N_{A,C}) \right]$. Expatriated entities produce tax

benefits resulting from avoidance of domestic tax on un-repatriated foreign sourced income, avoidance of domestic tax on future foreign income, and earnings stripping. Expatriated entities face tax costs resulting from the potential inability to use NOLs, the gross-up of executive pay to account for additional tax, change in country corporate law, and negative press.

iii. Inversion without Consequences

An inversion without consequences results in synergies being modeled as $S = S_R + S_C + \left[\left(\Delta T_F C_{F,N} + \frac{\Delta T_{FIF}}{r-g_F} + \frac{\Delta T_{FIS,I}}{r-g_{S,I}} + \frac{\Delta T_{FIS,C}}{r-g_{S,C}} \right) - (\sum_{m=1}^v L_m + N_A A_C) \right]$. Inversions without consequences face tax benefits resulting from avoidance of domestic tax on un-repatriated foreign sourced income, avoidance of domestic tax on future foreign income, and earnings stripping. Inversions without consequences produce tax costs resulting from the change in country corporate law and negative press.

F) Variable Measurement

i. Change in Tax Rate on Foreign Income

The change in tax rate on foreign income is calculated as the difference between the corporate income tax rate of the new country of incorporation and the US corporate tax rate. The corporate tax rate used is the average corporate income tax rate faced by corporations at both the federal and sub-federal level in the year of transaction announcement³⁶.

ii. Un-repatriated foreign cash

The tax benefit from un-repatriated foreign sourced income is measured, as described above, as the change in tax rate times the amount of un-repatriated foreign sourced income. Un-repatriated foreign cash is measured for the pre-inversion US firm. Since firms do not have to disclose un-repatriated foreign sourced income, an estimation for foreign cash held is used as a proxy. The estimation of foreign cash held is described above in the description for the foreign cash variable.

iii. Future Foreign Income

The tax benefits from avoiding domestic taxation on future foreign income is estimated by multiplying the change in tax rate on foreign income, as measured above, and the past foreign income as a proxy for

³⁶ "Deloitte Tax Guide and Highlights." Web. <https://dits.deloitte.com/#TaxGuides>; "Worldwide Tax Summaries – Corporate Taxes." Web. <http://www.pwc.com/gx/en/tax/corporate-tax/worldwide-tax-summaries/downloads.jhtml>; "KPMG Corporate Tax Rate Tables." Web. <http://www.kpmg.com/global/en/services/tax/tax-tools-and-resources/pages/corporate-tax-rates-table.aspx>

future foreign income. Foreign income is measured as pre-tax foreign income (pifo) as reported in Compustat. When pre-tax foreign income is missing, it was assumed to be zero. Foreign income is averaged as described above. The tax benefits of future foreign income are estimated for the pre-inversion US firm.

iv. Earnings Stripping

The tax benefits from earnings stripping are proxied for by the ability of the firm to strip earnings from the domestic firm. The ability of the domestic firm's earnings to be stripped is divided into two groups: the ability of the domestic firm's earnings to be stripped using intangibles and the ability of the domestic firm's earnings to be stripped using changes to the capital structure. The ability of the domestic firm to strip earnings using intangibles is measured as a dummy which is equal to one when the research and development expense (xrd) plus the advertising expense (xad), as reported in Compustat, are greater than the average expense in the sample.

The ability of the domestic firm to strip earnings using changes in the capital structure is measured using a dummy variable. The variable is set equal to one when the additional interest expense possible is greater than the sample average. The additional interest expense possible is calculated as total assets divided by total liabilities minus one ($at/lt - 1$) times interest expense (xint) as reported in Compustat.

v. Consequences

For inversions with consequences, the tax costs from the inability to use NOLs and tax credits to offset gains created by the transfer of assets, stock, contracts, etc. from the domestic firm to the foreign parent as part of the inversion are measured by multiplying the domestic tax rate and the reported net loss carryforwards of the domestic firm. The domestic corporate tax rate used is the average corporate income tax rate faced by corporations at both the federal and sub-federal level in the year of announcement. The net loss carryforwards from the year prior to announcement are used. Net operating losses are measured

as the net loss carryforwards (tlcf), as reported in Compustat, from the year prior to announcement for the domestic firm. If the net loss carryforward is missing, then net operating losses equal 0.

vi. New Country of Domicile

The new country of domicile is manually collected for accuracy from financial statements after the transaction is completed. Dummy variables for each country are used to measure the differences in law and culture. The new country of domicile is a series of dummy variables for the different countries of incorporation.

vii. Publicity

Publicity is measured as the number of articles regarding the transaction. The number of articles is collected by searching Factiva for unique articles mentioning all relevant firms from one day prior to announcement till five days post announcement. Thus, the number of articles over a seven day period is measured.

Table 1: Corporate Tax Rates for OECD Countries

This table summarizes the average combined national and sub-national corporate tax rates for OECD countries. In addition, this table provides summary corporate tax rates by tax system for OECD countries. This information was obtained from the OECD Tax Database.

	Minimum (%)		Average (%)	Maximum (%)		N
Overall	12.5	Ireland	25.3	39.1	USA	37
Territorial Taxation	17.0	Slovenia	25.5	37.0	Japan	29
Worldwide Taxation	12.5	Ireland	24.7	39.1	USA	8

Table 2: Consequences of Inversions

This table summarizes the consequences of inversions based on the type of inversion and the resulting ownership of the shareholders of the domestic firm.

Type of Inversion	Percent Owned by Domestic Firm Shareholders	Tax Consequences
Inversion with Substantial Business Presence	0% - 100%	N/A
Inversion with Consequences	60% - 80%	Potential loss of domestic NOLs and tax credits and shareholders of domestic firm face capital gains tax
Inversion without Consequences	50% - 60%	Shareholders of domestic firm face capital gains tax
Inversion without Consequences	0% - 50%	N/A

Table 3: Data Sample by Types and Forms of Inversions

This table summarizes the data sample by the four types of inversions and the three forms by which an inversion can be achieved.

Type of Inversion	Can be Achieved Through:			Total
	M&A	Reorganization	Spin/Split-Off	
Inversion with Substantial Business Presence	1	5	4	10
	0	4	1	5
Inversion with Consequences	8			8
	4			4
Inversion without Consequences	114			114
	95			95
Total	123	5	4	132
	99	4	1	104

Table 4: Change in Firm Tax Revenues

This table provides a comparison of the tax, tax rates, dividend, income, foreign cash, and cash flows of the combined pre-inversion firm with the post-inversion firm.

	Consolidated Pre-Inversion Firm		Post-Inversion Firm		Change						N		
	Mean	Median	Mean	Median	Mean	T-Stat	P-Value	Median	Z-Stat	P-Value			
Total Tax (In millions)	769.40	291.58	752.25	258.07	-17.15	-0.33	0.74	-33.51	-0.07	0.95		104	
Total Effective Tax Rate	34.26	26.65	25.07	20.52	-9.19	-1.24	0.22	-6.13	-4.20	0.00	***	104	
Cash Tax Paid (In millions)	364.83	32.64	481.52	82.99	116.69	1.25	0.22	50.35	0.86	0.39		104	
Cash Effective Tax Rate	26.65	18.06	22.12	10.65	-4.53	-0.61	0.54	-7.41	-1.46	0.14		104	
Dividend (In millions)	939.68	186.95	1,223.33	379.34	283.65	6.27	0.00	***	192.39	6.42	0.00	***	104
Regular Dividend (In millions)	923.79	170.01	1,220.18	379.34	296.40	6.87	0.00	***	209.33	6.82	0.00	***	104
Special Dividend (In millions)	15.90	0	3.15	0	-12.75	-1.19	0.24		0	-1.07	0.28		104
Repurchases (In millions)	627.27	87.85	1,177.16	155.18	549.90	1.99	0.05	**	67.33	2.01	0.04	**	104
Operating Cash Flows (In millions)	2,834.37	1,262.02	4,433.89	1,936.45	1,599.52	1.73	0.09	*	674.43	3.53	0.00	***	99
Financing Cash Flows (In millions)	-477.12	-190.94	-126.03	-351.62	351.09	0.29	0.77		-160.68	0.34	0.73		99
Investing Cash Flows (In millions)	-1,988.23	-487.30	-3,848.91	-1,033.06	-1,860.67	-1.57	0.12		-545.76	-2.61	0.01	***	99

All variables are reported as averages over a maximum of a three year period depending on data availability. The consolidated pre-inversion firm is the original US domiciled firm that existed prior to the inversion plus either a foreign target or foreign acquirer if the inversion is completed via a merger or acquisition. All variables for the consolidated pre-inversion firm are calculated using up to three years of annual data prior to the year of transaction announcement. The post-inversion firm is the foreign domiciled firm that exists after the inversion. In the case of a spin/split-off, the post-inversion firm also includes the US domiciled corporation that continues to exist after the transaction. All variables for the post-inversion firm are calculated using up to three years of annual data after the close of the transaction. Total tax is the total tax expense in millions. The total effective tax rate is the total tax expense divided by total pre-tax income. Foreign tax is the foreign tax expense. The foreign effective tax rate is the foreign tax expense divided by foreign pre-tax income. Domestic tax is total tax expense minus foreign tax expense. The domestic effective tax rate is the domestic tax divided by total pre-tax income minus pre-tax foreign income. Cash tax paid is the cash taxes paid. The cash effective tax rate is the cash tax paid divided by pre-tax income. Dividend is the reported total dividend expense. Choice of dividend is a dummy variable equal to 1 if dividend is greater than 0 and 0 otherwise. Foreign income is the pre-tax foreign income. Domestic income is the pre-tax income minus the pre-tax foreign income. Foreign cash is an estimation of foreign cash. The estimation process is described in detail in Appendix. This is the un-repatriated foreign sourced income. Operating cash flows are the reported operating cash flows. Financing cash flows are the reported financing cash flows. Investing cash flows are the reported investing cash flows. Appendix has a detailed description of the measurement of the variables.

Table 5: Change in Taxable Income of Firm Shareholders

This table provides a comparison of the dividends and share price of the US pre-inversion firm with the post-inversion firm.

	Pre-Inversion US Firm		Post-Inversion Firm		Change							N
	Mean	Median	Mean	Median	Mean	T-Stat	P-Value	Median	Z-Stat	P-Value		
Stock Value for Shareholders of US Firm (In millions)	2,907.91	1,227.84	3,474.74	1,644.19	566.83	5.23	0.00 ***	416.35	7.37	0.00 ***	104	
Cash for Shareholders of US Firm (In millions)			2,065.98	650.64							104	
Stock for Shareholders of US Firm (In millions)			1,408.76	0							104	
For Firms Where US Shareholders Survive:												
Dividend for Shareholders of US Firm (In millions)	26.69	0	60.30	6.50	33.61	2.91	0.01 ***	6.50	3.59	0.00 ***	36	
Regular Dividend for Shareholders of US Firm (In millions)	26.69	0	60.28	6.50	33.59	2.91	0.01 ***	6.50	3.59	0.00 ***	36	
Special Dividend for Shareholders of US Firm (In millions)	0	0	0.027	0	0.027	1.00	0.32	0	1.00	0.32	36	
Stock Repurchases for Shareholders of US Firm (In millions)	65.01	11.07	67.47	2.19	2.46	0.18	0.86	-8.88	-0.07	0.94	36	

The pre-inversion US firm is the original US domiciled firm that existed prior to the inversion. All variables for the pre-inversion US firm are calculated using up to three years of annual data prior to the year of transaction announcement. The post-inversion firm is the foreign domiciled firm that exists after the inversion. In the case of a spin/split-off, the post-inversion firm also includes the US domiciled corporation that continues to exist after the transaction. All variables for the post-inversion firm are calculated using up to three years of annual data after the close of the transaction. Stock value per shareholder of US firm is the stock price of the firm combined with any cash consideration received in conjunction with the stock for shareholders of the initially US domiciled firm. Stock value for shareholder of US firm is the stock value per shareholder of US firm times the number of outstanding shares in the initially US domiciled firm. Dividend per share of US firm is the dividend owed to a shareholder of the initially US domiciled firm. Dividend for shareholders of US firm is the dividend per share of US firm times the number of outstanding shares in the initially US domiciled firm. Appendix has a detailed description of the measurement of the variables.

Table 6: Summary Statistics

This table provides summary statistics for the data sample of 122 inversions. Panel A provides the summary statistics for the overall sample. Panel B provides summary statistics by type of inversion. Panel C provides summary statistics by form of inversion.

	Mean	Standard Deviation	Median	Min	Max	N
Synergy (In millions)	1,313.62	6,377.93	216.10	-14,492.24	37,687.05	132
Synergy Positive	0.68	0.47	1	0	1	132
Foreign Cash (In millions)	90.15	678.52	0	0	7,652.50	132
Foreign Income (In millions)	225.81	1,601.04	0	-485.50	17,394.00	132
Intangibles Based Earnings Stripping	0.42	0.50	0	0	1	132
Capital Structure Based Earnings Stripping	0.42	0.50	0	0	1	132
NOL (In millions)	228.18	932.45	0.50	0	9,207.4	132
Number of Articles	116.73	176.67	69.5	0	1341	132
Difference in Tax Rate	13.83	9.93	11.87	-0.29	39.29	132
Combined Market Capital (In millions)	37,001.62	48,889.71	17,177.21	62.47	285,967.6	132

Synergy is the value created by the transaction. This is the difference in the post-transaction prices of the firms and the pre-transaction prices of the firms. The post-transaction prices of the firms are calculated based on the announcement prices, the no merger prices, and the probabilities of completion. A detailed measurement of synergies is described in Appendix. Synergy positive is a dummy variable equal to 1 when synergies are greater than 0 and equal to 0 otherwise. Foreign cash is the estimated value of foreign cash held of the pre-inversion US firm in the year prior to transaction announcement. Appendix offers a detailed description of the estimation process. Foreign income is the pre-tax foreign income of the pre-inversion US firm in the year prior to transaction announcement. Intangibles based earnings stripping is a dummy variable which equals 1 when the research and development expense plus the advertising expense of the pre-inversion US firm in the year prior to transaction announcement is greater than the sample average and zero otherwise. Capital structure based earnings stripping is a dummy variable equal to 1 when the total assets divided by total liabilities minus 1 times the interest expense (a proxy for additional interest expense possible) for the pre-inversion US firm in the year prior to transaction announcement is greater than the sample average and 0 otherwise. NOLs are the net loss carryforwards of the pre-inversion US firm in the year prior to transaction announcement. Publicity is the number of articles collected by searching Factiva for unique articles mentioning all relevant firms from one day prior to announcement till five days post announcement. The difference in the tax rate is calculated as the difference between the corporate income tax rate of the new country of domicile and the US corporate tax rate in the year of announcement. The combined market capital is the market capital of the consolidated pre-inversion firm 30 days prior to transaction announcement. A detailed description of variable measurement is provided in Appendix.

Table 7: Estimating the Effects of the Tax Benefits and Costs on Synergies

This table provides the results of regressing the measured market synergies on the components of tax benefits and costs.

	Synergies		Synergies		Synergies		Synergies	
Tax Benefits:								
Foreign Cash	9.72 (3.84) ***		9.85 (3.82) ***		9.71 (3.82) ***		9.75 (3.74) ***	
Foreign Income	10.84 (2.69) ***		11.72 (2.83) ***		10.84 (2.68) ***		11.76 (2.82) ***	
Intangibles Based Earnings Stripping	176.71 (0.21)		1,303.8 (1.62)		196.76 (0.23)		1,329.74 (1.64)	
Capital Structure Based Earnings Stripping	511.83 (0.60)		914.19 (1.15)		504.09 (0.59)		903.65 (1.13)	
Tax Costs:								
Consequences	-0.66 (-0.53)		-0.09 (-0.07)		-0.71 (-0.55)		-0.15 (-0.12)	
Index	-10,734.84 (-0.87)		-11,628.00 (-0.89)		-10,532.55 (-0.85)		-11,442.73 (-0.87)	
Publicity	10.28 (2.80) ***		10.22 (2.83) ***		10.50 (2.71) ***		10.66 (2.77) ***	
Reorganization	-1,250.00 (-0.55)		51.75 (0.02)		-1,330.52 (-0.57)		4.54 (0.00)	
Combined Market Capital					-0.00 (-0.19)		-0.00 (-0.35)	
Intercept	-2,470.09 (-0.79)		-1,369.52 (-1.94) *		-2,227.37 (-0.66)		-1,300.29 (-1.77) *	
Country Fixed Effects	Yes		No		Yes		No	
N	132		132		132		132	
Adj. R ²	0.58		0.52		0.58		0.52	

Synergy is the value created by the transaction. This is the difference in the post-transaction prices of the firms and the pre-transaction prices of the firms. The post-transaction prices of the firms are calculated based on the announcement prices, the no merger prices, and the probabilities of completion. A detailed measurement of synergies is described in Appendix. The difference in the tax rate is calculated as the difference between the corporate income tax rate of the new country of domicile and the US corporate tax rate in the year of announcement. The tax benefit of un-repatriated foreign cash is the change in the tax rate times the estimated value of foreign cash held of the pre-inversion US firm in the year prior to transaction announcement. Appendix offers a detailed description of the estimation process. The tax benefit from foreign income is the difference in the tax rate times the pre-tax foreign income of the pre-inversion US firm in the year prior to transaction announcement. Intangibles based earnings stripping is a dummy variable which equals 1 when the research and development expense plus the advertising expense of the pre-inversion US firm in the year prior to transaction announcement is greater than the sample average and zero otherwise. Capital structure based earnings stripping is a dummy variable equal to 1 when

the total assets divided by total liabilities minus 1 times the interest expense (a proxy for additional interest expense possible) for the pre-inversion US firm in the year prior to transaction announcement is greater than the sample average and 0 otherwise. The tax cost of consequences is the US corporate tax rate times the net loss carryforwards of the pre-inversion US firm in the year prior to transaction announcement. Publicity is the number of articles collected by searching Factiva for unique articles mentioning all relevant firms from one day prior to announcement till five days post announcement. Reorganization is a dummy variable for if the transaction is a reorganization. The combined market capital is the market capital of the consolidated pre-inversion firm 30 days prior to transaction announcement. A detailed description of variable measurement is provided in Appendix.