U.S. WORLDWIDE TAXATION AND DOMESTIC MERGERS AND ACQUISITIONS

Jeremiah Harris* and William O'Brien**

September 29, 2017

Abstract

This study shows that domestic mergers and acquisitions (M&A) are inhibited by the U.S.'s worldwide tax policy on foreign-earned income. Double Irish structures, a complex web of subsidiaries that reduce foreign taxes and therefore increase potential repatriation taxes, are associated with lower levels of domestic M&A by U.S. firms. These results do not reflect a continuation of prior trends or declines in worldwide acquisitiveness. We exploit several useful properties of our Double Irish variable; it enables a variety of endogeneity-mitigating tests, eliminates a confounding effect present in another common repatriation cost measure, and helps us detect increases in a complex, tax-circumventing acquisition technique.

JEL Classifications: F23; G34; G38; H21; H26;
Keywords: Acquisitions, Repatriation, Taxes

* Kent State University, P.O. Box 5190, Kent, Ohio 44242. Tel: 330-672-1097. E-mail: jharri97@kent.edu
** Corresponding Author. The University of Illinois at Chicago, 601 S. Morgan St., Chicago, IL 60607. Tel: 312-996-4552. E-mail: obrienw@uic.edu.

Acknowledgements: We thank Josh Austin, Andriy Bodnaruk, Matthew D. Cain, Robert Chirinko, David Denis, Mara Faccio, Zhaozhao He, Greg Kadlec, Michelle Lowry, Melissa Martin, Steve McKeon, Sébastien Michenaud, Tu Nguyen, Leslie Robinson, Jason Sturgess, Erin Towery, Tim Trombley, Alminas Zaldokas, and seminar participants at DePaul University, Kent State University, the University of Illinois at Chicago, the 2016 Eastern Finance Association Annual Meeting, the 2016 Financial Management Association Annual Meeting, the 2016 Midwest Finance Association Annual Meeting, and the 2016 SFS Finance Cavalcade Meeting for their helpful discussions and valuable suggestions on this draft or related working papers. Further comments are welcome. All errors are attributable to the authors.

Authors' declaration:

We have no conflicts of interest to disclose.

Jeremiah Harris and William O'Brien

U.S. WORLDWIDE TAXATION AND DOMESTIC MERGERS AND ACQUISITIONS

September 29, 2017

Abstract

This study shows that domestic mergers and acquisitions (M&A) are inhibited by the U.S.'s worldwide tax policy on foreign-earned income. Double Irish structures, a complex web of subsidiaries that reduce foreign taxes and therefore increase potential repatriation taxes, are associated with lower levels of domestic M&A by U.S. firms. These results do not reflect a continuation of prior trends or declines in worldwide acquisitiveness. We exploit several useful properties of our Double Irish variable; it enables a variety of endogeneity-mitigating tests, eliminates a confounding effect present in another common repatriation cost measure, and helps us detect increases in a complex, tax-circumventing acquisition technique.

JEL Classifications: F23; G34; G38; H21; H26;

Keywords: Acquisitions, Repatriation, Taxes

Apple CEO Tim Cook…[said] that he wouldn't bring over Apple's overseas funds "until there's a fair rate," meaning, of course, a "fair" tax rate…[C]ompanies like Google and Microsoft are said to be following a similar strategy. Phillips Erb, Kelly, "Apple CEO Says Company Won't Bring Home Money Parked Overseas Until Tax Rates Are 'Fair,'", *Forbes*, August 2016.

1. Introduction

In this paper, we investigate whether the United States (U.S.) market for mergers and acquisitions (M&A), an important potential source of value creation for U.S. firms, is impeded by tax policy on domestic firms' foreign earnings.[1] As suggested by our epigraph, many U.S. CEOs believe that M&A and other domestic uses of firm resources are impeded by the U.S.'s tax policy on overseas income, and that a reform of this policy would "stimulate growth" (Belvedere (2014)), "enable growth," "spur investment" (Kazin (2017)), and increase investment specifically in domestic M&A (Lovelace Jr. (2016)). The U.S. currently follows a "worldwide" tax policy that "taxes the foreign-source income of U.S.-based multinationals when it is repatriated…with a credit for foreign income taxes they [have] paid."[2] Since U.S. multinational corporations (MNCs) can postpone paying these repatriation taxes until the foreign income is used for certain domestic purposes, Foley, Hartzell, Titman, and Twite (2007), among others, suggest that this dynamic "traps" MNC cash overseas, with as much as $2.5 trillion "trapped" in this fashion (Cox (2016)).[3] A number of distortionary effects have been linked to this trapped

[1] Cai, Song, and Walkling (2011) and Wang (2017) document how acquiring shareholders gain, on average, from domestic M&A. Haleblian, Devers, McNamara, Carpenter, and Davison (2009) provide a literature review of many studies outlining M&A benefits to target shareholders. Jensen (1986), Scharfstein (1988), and Rossi and Volpin (2004) provide evidence for M&A as a solution to agency problems. McConnell and Martin (1991) and Agarwal and Walkling (1994) provide evidence of the disciplinary effect of M&A. Finally, Maksimovic and Phillips (2001) and Devos, Kadapakkam, and Krishnamurthy (2009) document efficient resource reallocation from M&A.

[2] Source: Urban-Brookings Tax Policy Center.

[3] Per Section 956 of the Internal Revenue Code, transactions such as domestic acquisitions, dividends, repurchases, or business expenditures funded by these earnings would be considered repatriations and trigger taxation. Although foreign income can be deposited in U.S. bank accounts and invested in financial assets such as treasuries and unrelated U.S. stocks without paying these repatriation taxes, we follow other studies (such as Bird, Edwards, and

cash and the potential cost of its repatriation.[4] For example, in a study relevant to our research question, Bird, Edwards, and Shevlin (forthcoming) show evidence that foreign firms acquire U.S. MNCs to "unlock" trapped cash, leading any benefits from these deals to flow to foreign (rather than U.S.) acquirers.

Despite these critiques and a well-documented negative relationship between taxes and corporate investment in other contexts,[5] there has been little to no evidence linking worldwide tax policies to lower-than-predicted domestic M&A levels. For example, in studies of different research questions than ours, Hanlon, Lester, and Verdi (2015) and Martin, Rabier, and Zur (2015) find no negative relationship between widely-accepted repatriation cost proxies and domestic M&A.[6] Additionally, while the removal of worldwide tax policies in some regions has increased *cross-border* M&A (Feld, Ruf, Scheuering, Schreiber, and Voget (2013)), there is no evidence that this change generated additional *domestic* M&A in those regions (Arena and Kutner (2015)).

Our study's main innovation is a unique experimental design that examines a specific repatriation tax-increasing event: the establishment of a "Double Irish" structure, a complex system of foreign subsidiaries that allows MNCs to classify a portion of pre-tax foreign profits as patent royalties and divert them to a tax haven.[7] This structure is specifically designed to take advantage of a host of international laws, including an Irish tax exemption on patent royalties, treaties that remove taxation on profit transfers between certain European countries, a U.S. rule

---

Shevlin (forthcoming), Blouin, Krull, and Robinson (2016), and Hanlon, Lester, and Verdi (2015)) and refer more generally to this income as "overseas" cash or earnings.

[4] These distortions include altered domestic investment sensitivities to domestic cash flows and investment opportunities (Blouin *et al.* (2016) and Harford, Wang, and Zhang (2017)) and an increase in domestic borrowing as an alternative to repatriation (Graham, Hanlon, and Shevlin (2010)). In recent congressional testimony, Hanlon (2016) summarizes these and other distortions from U.S. tax policy.

[5] For recent examples of this negative relationship, see Djankov, Gasner, McLeish, Ramahlo, and Shleifer (2010), Doidge and Dyck (2015), Lester (2016), Mukherjee, Sigh, and Žaldokas (forthcoming), and Romer and Romer (2010).

[6] More specifically, Hanlon *et al*. show no relationship between repatriation costs and various measures of domestic investment, while Martin *et al*. show a positive relationship between repatriation costs and domestic M&A. We discuss the differences in our research questions and variables in more detail in Sections 3 and 6 of the paper.

[7] While Ireland has moved recently to reform its tax laws, this will not affect existing Double Irish users until 2020 (Schechner (2014)).

that allows some foreign subsidiaries to be treated as disregarded entities, and a law that allows certain Irish companies to be treated as "non-residents." Anecdotal evidence suggests that Double Irish establishment is a legal, tax-reducing action for U.S. MNCs; Forest Laboratories' tax savings from international operations doubled after Double Irish establishment, while Google saved more than $3.1 billion over three years (Drucker (2010b,c)).

The tax savings from Double Irish (DI) structures effectively *increase* potential repatriation costs. For example, if a U.S. MNC pays a 25% tax on foreign earnings, the U.S. worldwide tax policy (assuming a 35% U.S. tax rate) implies an additional 35% - 25% = 10% tax rate imposed upon repatriation. If a DI structure further lowers taxes paid on foreign income by *x%*, the resulting potential repatriation tax rate would rise to 10% + *x%*. Based on this hypothesized effect, our key proxy for high potential repatriation costs is an indicator equal to one when the subsidiaries necessary for a DI structure are present. This procedure accurately classifies known DI-using firms, and our DI variable is positively related to proxies for trapped cash and repatriation costs.

Our paper's main finding is that an increase in repatriation tax costs, as proxied by DI establishment, is associated with lower-than-predicted levels of both domestic M&A deal volume and spending in our 1994-2013 sample of U.S. firms. These declines do not appear to be a continuation of trends preceding DI establishment. Foreign M&A levels appear unaffected by DI establishment, suggesting that these domestic results do not reflect changes in a firm's overall (worldwide) acquisitiveness. Evidence of these declines is robust to a variety of empirical tests, including negative binomial and OLS tests that use firm-level demeaning or firm fixed effects along with other industry, time, and firm-level controls, univariate tests of a propensity-score-matched (PSM) sample of DI users and closely-matched non-users, and bivariate probit and two-stage instrumental variable (IV) tests that use a plausibly excludable variable (foreign income in high-patent firms in the year before the passage of a key DI law) to mitigate bias related to selection and omitted variables.

Our next tests add a widely-used proxy for tax-induced foreign cash, *REPAT* (the U.S. corporate tax rate times foreign earnings, minus the actual foreign taxes paid, all scaled by

assets), first used in Foley *et al*. (2007) and later used in M&A regressions by Hanlon *et al.* (2015) and Martin *et al.* (2015). In contrast to DI's negative association with domestic acquisition levels, *REPAT* is *positively* associated with domestic M&A in our sample period. These *REPAT* results counter-intuitively suggest that higher repatriation tax costs lead to *greater* domestic investment.

We offer a potential explanation for these contrasting results: a confounding effect in *REPAT*, not shared by our DI variable, which limits its ability to detect any declines in domestic M&A related to repatriation tax avoidance. By examining the construction of *REPAT* in detail, we demonstrate how both tax actions (such as declines in foreign taxes resulting from DI establishment) and growth actions (such as an increase in pre-tax foreign earnings) affect the value of *REPAT*. We also posit that MNCs choosing to "acquire growth" in foreign markets will take similar actions in domestic markets, consistent with the positive correlation between foreign and domestic M&A observed in our sample. Since foreign M&A correlates positively with pre-tax foreign earnings, this causes an (indirect) positive correlation between growth in foreign pre-tax earnings (reflected in *REPAT*) and domestic M&A, confounding *REPAT*'s ability to detect our hypothesized negative association with domestic M&A.

Based on this confounding effect, we posit that our DI proxy has a greater likelihood than *REPAT* of detecting any negative effects of repatriation tax increases on domestic M&A. This claim is based on our assumption that DI structure use is a tax action with no obvious ex ante correlation with foreign M&A (unlike *REPAT*). We test this assumption by regressing our DI proxy and *REPAT* on *foreign* M&A; consistent with our assumption, we find a positive and significant coefficient only on *REPAT*. We also find that this positive and significant *REPAT* coefficient disappears in a "horse race" regression where a direct proxy for foreign growth actions (pre-tax foreign income) is included, while the coefficient of our DI proxy remains insignificant and largely unchanged. This again suggests that *REPAT* is affected, at least in part, by (pre-tax) foreign growth actions that may cloud our inferences but do not appear to affect our DI proxy.

Our paper's final tests examine whether our proposed *channel* for the relationship between DI establishment and domestic M&A levels (repatriation tax avoidance leading to lower domestic acquisitions) is consistent with the behavior of DI-using MNCs in other circumstances. Since DI users possess a relatively sophisticated knowledge of international tax laws, we investigate whether DI-using firms exploit this knowledge and increase their use of domestic M&As where these taxes can be circumvented. More specifically, we examine a recent phenomenon where firms accompany acquisitions with other intra-company transactions in order to meet the IRS's definition of a "corporate reorganization," which avoids triggering repatriation taxes on trapped cash used in the deal (Domingo (2011), Lowder (2011), Martin *et al*. (2015), and Willens (2011)). We refer to these deals as pseudo-reorganization acquisitions (PRAs hereafter).

If potential repatriation costs affect the domestic acquisition decisions of DI users, we would expect these firms to pursue more PRAs, and pursue them with targets that are less likely to invite investor or regulatory scrutiny (such as acquisitions of private companies where deal value is below a materiality threshold and not disclosed at announcement). Consistent with this prediction, we find that DI use is associated with higher levels of these types of domestic deals. We also find lower-than-expected levels, on average, in a proxy for trapped cash accompanying these "lower visibility" deals for DI users with high repatriation costs. This is the expected outcome if trapped cash were used in these deals. We do not find an association between our trapped cash proxy and our main sample of more highly visible domestic M&A deals. This is important for two reasons: 1) it mitigates the possibility that some omitted factor is spuriously generating the negative association between trapped cash proxies and lower visibility acquisitions, and 2) it implies a reluctance to use trapped cash and pay repatriation taxes to fund "normal" domestic acquisitions. While the economic magnitude of these potential PRAs is small compared to the overall decline in acquisition spending, these results provide additional pieces of evidence suggesting that DI users' domestic M&A decisions are sensitive to repatriation taxes.

Our study contributes to literatures on tax laws and their impact on investment in several ways. First, we focus on a specific repatriation-tax-altering firm action (the establishment and

use of Double Irish structures) that is not yet examined in this literature. Second, we find novel and robust evidence of a negative link between repatriation tax costs and U.S. firms' M&A levels, and our empirical tests mitigate the possibility that many non-causal stories can explain these results. Our findings complement and extend a robust literature on economic distortions related to the U.S.'s worldwide tax policy (Albertus (2016), Bird *et al.* (forthcoming), Blouin *et al.* (2015), Edwards *et al.* (2016), Graham *et al.* (2010), Hanlon *et al.* (2015), Hanlon (2016), and Harford *et al.* (2017)). Third, we examine different *types* of acquisitions, including lower visibility deals usually excluded from M&A studies (Netter, Stegemoller, and Wintoki (2011)), in order to present evidence consistent with both lower levels in *overall* domestic deal spending and higher levels of deals that appear to circumvent repatriation taxes (PRAs). This latter result is consistent with the conclusions in Martin *et al*. (2015), and we extend their study by demonstrating that low visibility acquisitions are the likely venue for these PRAs. Finally, our evidence is consistent with Slemrod's (1992) predictions about individual responses to tax increases and Lester's (2016) application of these predictions to a corporate setting; our results suggest that firms respond to an increase in potential repatriation taxes by both changing real activities (lowering their overall levels of domestic M&A) and re-characterizing certain acquisitions as "corporate reorganizations" (PRAs).

2. Technical Background on Tax Avoidance Techniques

2.1 Description of the "Double Irish" Structure and its Use

Figure 1 provides a pictorial representation of the steps involved in the establishment and use of a DI structure, and we walk through these steps in greater detail below. To create a DI structure, firms begin by establishing an Irish subsidiary (step 1). In step 2, the firm's intellectual property (IP), or patents, are either developed directly in Ireland (Darby and Lemaster (2007)) or transferred early in their life to this subsidiary (Royse (2013)). The subjectivity inherent in valuing new patents under U.S. tax and accounting laws allows the IP to be more easily valued at low, firm-friendly levels, generating low transfer pricing charges and low U.S. taxes when the IP

is sold or licensed to this Irish subsidiary (Blair-Stanek (2015)). The firm then creates a *second* Irish subsidiary, wholly owned by the first Irish subsidiary (step 3), and an additional Dutch or Luxembourgian subsidiary (step 4). The first Irish subsidiary licenses the IP to this newly-created second Irish subsidiary (step 5). Profits from foreign sales generated by this second Irish subsidiary are sent to the first Irish subsidiary as "patent royalties", reducing taxable income from those sales (step 6). The Dutch or Luxembourgian subsidiary is used in this transfer process; due to tax treaties between Ireland and these countries, if money is transferred from the second Irish subsidiary to this subsidiary (rather than directly to the first Irish subsidiary), no withholding taxes are levied by the Irish government.

(INSERT FIGURE 1 ABOUT HERE)

One crucial component of a DI structure is the ability for U.S. firms to use what is known as a "check-the-box" election for their two Irish subsidiaries. This election allows the two Irish subsidiaries (the second of which is owned by the first Irish subsidiary) to be treated as a single entity for U.S. taxation purposes while still being treated as separate entities by non-U.S. tax authorities. This allows profit transfers between the two subsidiaries to avoid U.S. taxation, while allowing the first Irish subsidiary to be treated as a "non-resident" under Irish tax law. More specifically, Darby and Lemaster (2007) note that this first Irish subsidiary is treated "for Irish tax purposes as a non-resident if that company (1) 'controls' an Irish company that conducts an active business in Ireland and (2) is 'controlled' by one or more residents of a country with which Ireland has a double taxation treaty." The first condition is met because the first Irish subsidiary owns the second Irish subsidiary, and the second condition is met because the U.S. parent owns the first subsidiary. With both conditions met, tax residency under Irish tax law is based on the location of the company's management; by placing the actual management of the first Irish subsidiary in a different tax haven country (such as Bermuda or the Cayman Islands), the first subsidiary is classified as a "dual resident" and exempt from corporate taxation by the Irish government.

In summary, the "check-the-box" feature provides two crucial components that dramatically increase the effectiveness of the DI tax shelter: 1) it allows profit transfers between

the two Irish subsidiaries to be ignored by the IRS, and 2) it allows the first Irish subsidiary to have "dual resident" status and avoid Irish corporate taxation. The regulation that clarified the legality of "check-the-box" elections was passed in 1997 (Darby and Lemaster (2007)). While some firms may have classified subsidiaries in a similar fashion prior to the 1997 law, the passage of the law provided the previously used methods with much greater certainty and much less complexity (Ring (2002)). We will revisit this regulation later in section 5.4.

Importantly, this structure reflects a more effective technique for reducing taxes on foreign income than a single tax haven-based subsidiary (Lowder (2011)). The reaction of tax experts to recent court rulings (Taylor (2016)) and the planned 2020 phase-out of the laws enabling Double Irish structures (Schechner (2014)) suggest that DI structure use (prior to this phase-out) is legal.

2.2 Pseudo-Reorganization Acquisitions (PRAs)

A number of articles and studies document how firms pair acquisitions with specific intra-company transactions to allow the deal to fall under the IRS's definition of a corporate reorganization (Domingo (2011), Lowder (2011), Martin *et al*. (2015), and Willens (2011)). These transactions (PRAs) allow trapped cash to finance domestic deals *without* repatriation tax costs. While these techniques may be legal, the IRS has suggested that these methods circumvent the intention of U.S. repatriation tax policy (Maruca (2013)), and efforts to combat these techniques have continued through at least 2014 (Rubinger and Kruler (2014)). PRAs are difficult to detect; they are not specific to one particular method of payment[8], and to our knowledge, PRA use has only been highlighted by researchers and the press (rather than by PRA-using firms).

There are three types of known PRAs, and their names refer to numbered items in the IRS Revenue Code pertaining to corporate reorganization laws. In the "Killer B" (named after IRS Section 368(a)(1)(B)), an acquiring firm's foreign subsidiary trades cash with the parent

[8] For example, one suggested PRA (Merck's acquisition of Schering-Plough acquisition) used a mixture of cash and stock, while another (Lilly's acquisition of IMClone) was financed with 100% cash (Drucker (2010a)).

company for stock, and uses this stock to finance the deal. Another technique called the "Deadly D" involves the acquiring firm purchasing a target with cash and then having one of the acquirer's offshore subsidiaries assume control of the target by transferring cash equal to the purchase price to the parent. Finally, under "Outbound F" reorganizations, the acquiring firm purchases a target with stock and the target issues a note payable to the acquirer equal to the purchase price. The acquirer then establishes a foreign subsidiary, transfers control of the target to this foreign subsidiary, merges an existing foreign subsidiary (with trapped cash) into this subsidiary, and pays off the note (tax-free) with the trapped cash.[9]

Notably, other methods of avoiding taxes on foreign income have provoked swift responses from lawmakers and investors after high-profile examples of their use. For example, on May 29, 2007, IBM proposed a $12.5 billion share repurchase designed to return overseas cash directly to shareholders, without paying U.S. taxes, by initiating the repurchase program through a foreign subsidiary. Two days later, the IRS issued Notice 2007-48, preventing firms from continuing this practice (Johnston (2007)). Illinois Tool Works (ITW) used a series of loan transactions between its wholly owned subsidiaries to repatriate a $357M loan, tax-free, as a "return of basis"; the IRS has challenged this tax-free repatriation in court (Rubinger and Lepree (2014)). Recent high-profile attempts to use tax inversions (where a U.S. firm relocates its headquarters to a foreign country) to avoid taxes have met with substantial pushback from regulators, politicians, and consumers (McKinnon and Paletta (2014), Rubin and Katz (2014)). Finally, O'Donovan, Wagner, and Zeume (2017) show that when information about secret offshore tax-avoidance vehicles is disclosed to the public, the market capitalization of firms using these vehicles declines significantly, consistent with anticipated regulatory pushback or fines.

The above anecdotes illustrate the typical regulatory response when tax avoidance techniques are uncovered. A positive association between the visibility of corporate actions and subsequent regulatory responses to those actions is also documented in Miller (2006) and Dyck,

[9] Further descriptions of these loophole techniques are found in Lowder (2011) and Martin *et al*. (2015).

Volchkova, and Zingales (2008). To the extent that firms use PRA transactions, we posit that the acquisitions will be concentrated in deals that are "less visible" to investors and regulators. (We discuss this assumption in more detail in the next section.)

3. Hypothesis Development

In this section, we develop testable predictions about the effect of an increase in repatriation taxes on domestic investment (specifically domestic M&A) for U.S. MNCs. Our first hypothesis outlines how potential repatriation taxes would be an important consideration in the domestic M&A decisions of companies. More precisely, we hypothesize that the inability of high trapped cash firms to costlessly repatriate their foreign earnings will affect their domestic acquisition choices. (Notably, Hasan, Hoi, Wu, and Zang (2014) show that borrowing costs are higher for tax avoiding firms; if domestic acquisitions were entirely funded by such borrowing rather than with repatriated funds, this would generate predictions similar to those outlined below.)

Increases in potential repatriation costs could affect firms' domestic acquisition decisions in at least two ways. The first scenario is when a potential deal has a very small but positive net present value without repatriation costs. Repatriation taxes could turn this value-creating acquisition into a value-destroying one, and as these repatriation taxes increase, managers are therefore more likely to reject acquisition opportunities that are only *marginally* value-creating (without the taxes). The second scenario, which matches the thinking espoused by the CEOs quoted in our introduction, occurs when firm managers choose not to repatriate earnings to fund domestic acquisitions due to the possibility of future legislation reducing repatriation taxes. (In our online appendix, we formally model how an increase in repatriation taxes increases the value of the "option to wait" to repatriate earnings for domestic acquisitions.) The negative relationship between repatriation costs and domestic acquisition likelihood outlined in both of these scenarios leads to our first testable hypothesis:

H1: An increase in potential repatriation tax costs for U.S. firms will result in lower levels of domestic acquisitions for those firms.

While two other recent studies conduct tests of the association between trapped cash proxies and domestic acquisitions (Hanlon *et al*., 2015, and Martin *et al.*, 2015), our study differs from those in three important ways. First, neither of these studies predict or test the negative relationship we posit in H1; Hanlon *et al*.'s main hypothesis concerns the association between trapped cash and foreign investment of that cash (with domestic investment included as a "placebo test" where positive results are not expected), while Martin *et al*.'s hypothesis predicts an *increase* in domestic M&A due to repatriation-tax-mitigating properties in certain domestic acquisitions (which we address in our next hypothesis). Second, our study uses a new variable, the establishment and subsequent use of a DI subsidiary structure to proxy for an increase in potential repatriation tax costs. Third, our first hypothesis concerns *tax avoidance behavior* (the establishment of a DI structure) to proxy for an increase in potential repatriation costs, while Hanlon *et al.* hypothesizes more generally about tax-induced foreign cash (or "trapped cash") rather than a particular tax avoidance behavior. We revisit these differences between studies later in Section 6.3.

Importantly, we should not expect lower levels of *foreign* acquisitions after an increase in repatriation costs. If a firm is faced with foreign and domestic acquisition opportunities of identical (positive) value in a repatriation-tax-free environment, the firm would rank those projects identically. However, when faced with a repatriation tax charge that lowers the overall value of domestic deal, we would expect the firm to now prefer the foreign deal.

The dynamic described in the previous paragraph might create a positive association between foreign acquisitions and repatriation costs and trapped cash proxies in certain contexts, and this association is indeed observed by Hanlon *et al.* (2015) and Martin *et al.* (2015). (Edwards *et al.* (2016) also document how the profitability of foreign acquisitions is negatively related to trapped cash proxies). In other contexts, foreign acquisition volume might remain *unchanged* after an increase in repatriation costs. For example, if an MNC faces substantial

potential repatriation costs from their current overseas businesses *prior* to an additional increase in repatriation costs, foreign investments will have looked comparably more attractive than domestic investments for some time. To put this another way, if repatriation costs are already an economically significant consideration for firm investments, an increase in these costs is likely to negatively impact domestic acquisitions (relative to the firm's past levels) but may not significantly alter their valuation of foreign acquisition opportunities and their subsequent foreign investment (relative to the firm's past levels). To the extent that DI-using firms bear significant potential repatriation costs prior to DI establishment, we might expect no change (rather than an increase) in foreign acquisitions after firms establish these structures.

Our first hypothesis proposes a specific channel for how DI use should associate negatively with domestic acquisitions: a desire to avoid repatriation taxes, and a resulting reluctance to use trapped cash to fund domestic investment. To further test the validity of this proposed channel, our second hypothesis outlines how sensitivity to repatriation taxes should affect DI users in a different context: trapped-cash-funded domestic investments where these taxes can be avoided (PRA transactions). While the use of PRAs is likely to come with planning, compliance, reputational, and financial reporting costs, PRAs provide benefits by helping firms avoid any future taxes on trapped cash. In certain circumstances, PRAs may be a preferable alternative for MNCs than leaving cash abroad; leaving pre-tax cash unrepatriated may subject it to unfavorable tax law changes, such as the recently proposed one-time tax on trapped cash (Mason and Drawbaugh (2015)), and the cost of such a tax is likely to increase as the estimated repatriation cost of that trapped cash increases. To the extent that this PRA benefit exceeds the potential costs outlined above, a well-designed PRA could create more value than a non-PRA deal for that firm, even in cases where the deal could be funded with domestic, repatriation-tax-free sources of cash. (Our online appendix provides more formal modeling of this idea.)

We assume that DI-using firms are "tax sophisticated" and therefore aware of tax-free PRA techniques.[10] To the extent that repatriation costs affect the domestic M&A decisions of DI users, we would expect PRA volume to react to a repatriation tax increase in the following way:

> *H2: An increase in potential repatriation tax costs for U.S. firms will result in higher levels of PRAs.*

While we cannot directly observe whether a given M&A transaction is a PRA, we can proxy for likely PRA deals by combining two empirical tests. First, following the logic outlined in Section 2.2, we assume that a deal's visibility to outside investors and regulators is positively related to the cost (and negatively related to the value) of structuring that deal as a PRA. If firms pursue PRAs only if they create value for shareholders, PRAs should be concentrated in deals that have *low visibility* to outsiders. We therefore test whether *lower visibility* domestic acquisitions increase when repatriation taxes increase. Second, we test whether such lower visibility deals are accompanied by lower-than-expected levels of trapped cash reserves (the expected outcome of a repatriation-tax-free PRA funded with trapped cash). In contrast, Hypothesis 1 explicitly suggests that higher visibility domestic acquisitions will *not* be funded with (and are *not* negatively associated with) trapped cash.

Although these two hypotheses have opposite predictions, we can use different deals within the M&A universe to test both. For Hypothesis 1, we use domestic acquisitions with deal value equal to or greater than 1% of acquirer firm value and $1M.[11] We hypothesize that deal visibility (and any corresponding PRA costs) are sufficiently high for these acquisitions that the effect posited in Hypothesis 1 will dominate. We further assume that deals that do not meet this threshold have sufficiently low visibility and PRA costs that the effect posited in Hypothesis 2 will dominate. (For brevity and clarity, the term "acquisitions" refers to deals used in tests of

[10] Meade and Li (2015) define "tax sophistication" as "a firm characteristic reflecting both an acute awareness of tax issues and a willingness to invest in aggressive tax minimization actions where such actions are expected to provide a return superior to that of other investments."

[11] This criterion mirrors a similar rule used to construct acquisition samples in Harford, Humphery-Jenner, and Powell (2012), Masulis, Wang, and Xie (2007), and Moeller, Schlingemann, and Stulz (2004, 2007).

Hypothesis 1 from this point forward unless it is preceded by another descriptive phrase, such as "lower visibility.")

We critically examine several key assumptions that underlie our testable hypotheses (the association of DI structures with repatriation tax increases, DI users bearing significant potential repatriation costs prior to DI establishment, DI-using firms being aware of PRAs and other repatriation tax loopholes, and private acquisitions with undisclosed deal values having lower visibility to investors and regulators) in the next section of the paper.

4. Data and Variable Construction

4.1 Construction of the Double Irish Proxy and Other Repatriation Tax Cost Proxies

We construct a dataset of U.S. firm subsidiaries by country in each year using publicly available 10-K filings. Firms are required to report major subsidiaries and their locations in Exhibit 21 (or 21.1) in their 10-Ks. We use a Python script to download each Compustat-listed firm's Exhibit 21 from the 10-K text files in the SEC's EDGAR database for each fiscal year and we search through the text for any mention of Irish, Dutch, or Luxembourgian subsidiaries using both automated and manual techniques. If a company does not provide Exhibit 21, we assume the firm does not have any significant foreign subsidiaries. The EDGAR 10-K data is available in machine-readable format from 1993 to the present.

Using this information, we identify firms likely to have a DI structure in a particular year. More specifically, we create an indicator variable, *DoubleIrish*, equal to one for each firm-year observation starting with the first year when the firm reports at least two subsidiaries incorporated in Ireland and one in the Netherlands or Luxembourg (and zero otherwise). Although many MNCs establish foreign subsidiaries in the normal course of their business, the specific subsidiary requirements of the DI structure make it likely that firms with this unique combination of subsidiaries are using this technique for its tax benefits. For example, Desai, Foley, and Hines (2006) list Hong Kong, Singapore, and Ireland as examples of tax haven countries; since these countries also have substantial populations and business communities, it might be difficult to systematically determine whether a *single* subsidiary in these countries was

established for tax avoidance or local business interests (or both). We suggest that the presence of *two* Irish subsidiaries, plus a third subsidiary in either the Netherlands or Luxembourg, is much less likely to result solely from local business interests.

One important caveat is that firms may be able to avoid disclosing subsidiaries under certain circumstances; according to Item 601(b)(21)(ii) of Regulation S-K, a firm is allowed to not report names of subsidiaries that, in aggregate, do not constitute a significant subsidiary. This "selective disclosure" might introduce noise into our proxy; for example, Gramlich and Whiteaker-Poe (2013) document that the majority of subsidiaries once listed by Google and Oracle disappeared from subsequent Exhibit 21s, even though two-thirds of the subsidiaries are still active (using public company registry data). Dyreng, Hoopes, and Wilde (forthcoming) also suggest that some UK firms strategically avoid subsidiary disclosure, especially subsidiaries in tax haven countries. In order to account for this potential measurement error, we assume that once a firm is identified as a DI user in our sample, that classification continues in all future years even if the necessary subsidiaries are no longer listed in their 10-K. In robustness tests, we also use a more "naïve" classification procedure that simply uses each year's Exhibit 21 information.[12]

To examine the validity of our classification procedure, we search for popular press mentions of firms using DI structures to see if our procedure correctly identifies these firms as DI users. This complete list of alleged DI users we found is as follows: Abbott, Adobe Systems, Amazon, Apple, Boston Scientific, eBay, Facebook, Forest Laboratories, Google (Alphabet), Microsoft, Novell, Pfizer, Twitter and Yahoo.[13] Our procedure classifies every one of these firms as DI users for a portion of our sample. We also find that *DoubleIrish* = 1 for other "tax sophisticated" firms, such as the acquirers in all three confirmed PRA users we found (Eli Lilly,

[12] We can illustrate the difference between our main classification and naïve classification procedures using Microsoft as an example. In 2007, both our main and naïve procedures classify Microsoft as a DI-using firm (*DoubleIrish* = 1). However, in 2008, previously listed Netherlands subsidiaries disappear from Microsoft's Exhibit 21, so our naïve classification procedure would classify Microsoft firm-years from 2008-2011 as *DoubleIrish* = 0 (a new Luxembourgian subsidiary is listed in Microsoft's 2012 10-K). In contrast, the procedure used for the majority of our tests would continue to classify those firm-years as *DoubleIrish* = 1.

[13] Sources: Bergin and Consiglio (2014), Drucker (2014), Keena and Carswell (2013), Martin (2012), Smyth (2013), Sullivan (2013), Worstall (2013).

Johnson & Johnson, and Merck) and the firms that attempted a non-M&A repatriation tax avoidance technique (IBM and Illinois Tool Works) in the years the PRA or technique took place.[14] Notably, our procedure also classifies all of the firms whose executives are cited in our introduction as tax reform advocates (Apple, Caterpillar, Cisco, Google, IBM, and Microsoft) as DI users in part of our sample.[15]

We also create two additional variables that are commonly used to proxy for repatriation taxes and trapped cash. The first is the estimated tax rate associated with repatriation (*REPAT*), defined by Foley *et al.* (2007) as foreign pre-tax income ("pifo" in Compustat) * 0.35, minus taxes on foreign income ("txfo"), all scaled by total assets ("at"), and set to zero when either "pifo" or "txfo" are missing. The second additional proxy (used in our paper's final test) is a firm's offshore permanently reinvested earnings, which is hand-collected from firm's 10-K filings and from *Audit Analytics* for the 2000 – 2013 period.[16] Following Martin *et al.* (2015), we define *PRE* as permanently reinvested earnings scaled by total assets. One important caveat is that "permanently reinvested earnings" is not synonymous with pre-tax foreign cash; it is instead an accounting designation used by the firm to disclose the amount of unrepatriated earnings that will be left overseas indefinitely (which will affect accruals for deferred taxes on these earnings). Blouin *et al*. (2015) show that less than half of permanently reinvested earnings consists of cash or cash equivalents. With this caveat in mind, we follow other studies and use *PRE* as a proxy for trapped cash (Edwards *et al.* (2016), Harford *et al.* (2017), Martin *et al*. (2015)).[17]

[14] Sources for PRA deals from Eli Lilly, Johnson & Johnson, and Merck: Drucker (2010a) and Willens (2012). Sources for IBM and ITW tax avoidance techniques: Johnston (2007) and Rubinger and Lepree (2014).

[15] While Apple is considered to be a pioneer of Double Irish structure use (Duhigg and Kocieniewski (2012)), a 2016 ruling by the European Commission suggests that Apple may have more recently used a "Single Irish" (rather than a Double Irish) structure to achieve the same effects of a Double Irish structure (Taylor (2016)). Our results and inferences remain essentially unchanged if Apple is dropped entirely from our sample.

[16] The authors thank Andriy Bodnaruk for providing us with this hand-collected data *PRE* data.

[17] In unreported statistics, we find that the mean (median) of *PRE* is $1.7B ($209M) during the year before DI establishment, consistent with our Section 3 assumption that these firms faced significant repatriation costs prior to establishment.

4.2 Dependent Variables, Control Variables, and Summary Statistics

Our study includes all U.S. firms with accounting data in Compustat for 1993-2012 (matched with acquisition activity for 1994-2013). The sample begins in 1993 to coincide with the first year machine-readable subsidiary information is available from the SEC's EDGAR database. Following Hanlon *et al*. (2015) and Martin *et al*. (2015), we remove financials, real estate companies, and utilities from the set of all Compustat firms. We exclude the years 2004-2005 in all tests to control for any confounding effects from the AJCA "tax holiday", which allowed firms with trapped cash to pay a greatly reduced repatriation tax rate in the twelve months following the act's passage.[18] Other studies (Dharmapala, Foley, and Forbes (2011) and Faulkender and Petersen (2012)) focus the specific effect of the AJCA on domestic investment.

The data for mergers and acquisitions is from the Thomson Reuters Securities Data Companies (SDC) Platinum merger database. To be included in our acquisition sample, the acquiring firm must own less than 50% before the merger and 100% after (e.g., a "change of control" acquisition), and to be considered a *domestic* acquisition, both the target and the target's ultimate parent must be located in the U.S. Our main acquisition variable (*N_dom)* is equal to the number of domestic deals in a given firm-year with disclosed deal values equal to at least $1 million and 1% of the acquiring firm's market value 30 days prior to the merger announcement (as in Harford, Humphery-Jenner, and Powell (2012), Masulis, Wang, and Xie (2007), and Moeller, Schlingemann, and Stulz (2004, 2007)). We use this acquisition sample in tests of Hypothesis 1. For each firm-year we also measure the natural log of one plus the total value of these domestic acquisitions (*lnTV_dom*) and an indicator for any acquisitions (*ind_dom*) in that year. For robustness, we also examine the count of acquisitions where deal value is at least $10 million or $50 million (*N_10m* and *N_50m*, respectively).

For tests of Hypothesis 2, we classify the remaining SDC-listed acquisitions with undisclosed deal values or values below the 1%/$1M threshold as lower visibility acquisitions (*N_lower*). To validate the assumption behind this classification, we empirically examine how

[18] Source: Department of the Treasury, Office of Public Affairs, "FACT SHEET: Guidance on Repatriation of Foreign Earnings Under the American Jobs Creation Act", January 13, 2005.

the stock trading volume of acquiring firms fluctuates at the time of the deal announcement for *N_dom* and *N_lower*. We follow Chae (2005) and calculate the acquiring firm's abnormal turnover during the 21-day period [-10, +10] surrounding the deal announcement as each day's Log Turnover (the log of daily trading volume scaled by shares outstanding) minus the average of Log Turnover over the [-40, -11] day period before the announcement. In Figure 2, we plot the results of these abnormal trading volume estimations and the corresponding 95% confidence interval for all acquisition announcements by type (Figure 2a) and deal announcements that do not coincide with an earnings announcement during the [-10, +10] day period (Figure 2b) to reduce any volume effects resulting from these announcements (rather than the deal announcement). In both figures, there is a noticeable spike in trading related to our main sample of deals (*N_dom*) starting on day zero and a much smaller spike for *N_lower*. We also perform two tailed t-tests for differences in average turnover between the two samples on days -10, -5, 0, +5, and +10 relative to deal announcement. In Figure 2a, the difference between the lines at day – 5 is insignificantly different from zero, while it is statistically significant but economically small at day –5 in Figure 2b. In contrast, the *N_dom* sample has greater average turnover than the *N_lower* sample at a very high level of statistical certainty on days 0, +5, and +10 in both figures. These results suggest that the deals we characterize as less visible indeed generate a more muted response from investors upon announcement.

(INSERT FIGURE 2 ABOUT HERE)

Within this sample of lower visibility acquisitions, we create a subsample of deals that we assume will have the *lowest* visibility to investors and regulators: acquisitions of private targets where deal value is undisclosed (*N_lowest*). This assumption is motivated by several facts. First, private targets are not subject to the same deal-related SEC disclosure requirements as public targets. For example, if the target is not registered under the Securities Exchange Act of 1934, the bidding firm is not required to comply with the SEC disclosure provisions regarding tender offer rules (Stebbins and Wolff (2014)). Additionally, while acquirers funding a deal with stock typically file an S-4 Registration Statement with the SEC, private target deals can be structured as a private placement, eliminating the S-4 requirement (Bell (2016)). We therefore

assume that private target acquisitions generate fewer disclosures than public target acquisitions. Finally, classifying deals with undisclosed values as "lower visibility" is consistent with Netter *et al.* (2011), who find that observations missing deal value in SDC are typically missing public disclosures of deal value in any form (or deal announcements of any kind in many cases).

Following Hanlon *et al*. (2015), we include the following one-year lagged controls for potential acquirers in our analysis: sales growth (*sales_growth*), net working capital to assets (*nwc_assets*), debt to assets ratio (*debt_assets*), market to book ratio (*mtb*), price/earnings ratio (*price_earnings*), size (log total assets, *lnassets*), and the cash to assets ratio (*cash_assets*). (We additionally include variables for lagged domestic and foreign sales in robustness tests.) We further include return on assets winsorized at 0 (*roa*) and a net loss indicator (*netloss*) equal to one for negative ROA values. To control for recent trends in firm-level acquisition activity, we include past acquisition variables measured over the previous three years for each dependent variable of interest. To control for the relationship between corporate innovation and acquisitions (Bena and Li (2014), Phillips and Zhdanov (2013)), we use CRSP–matched patent information from the United States Patent and Trademark Office (taken from Kogan, Papanikolaou, Seru, and Stoffman (2012)).[19] Our final control variable is foreign pre-tax income scaled by total worldwide sales (*pct_foreign_income*).[20] All non-indicator variables are winsorized at the 1st and 99th percentiles of their distribution each year, and detailed variable definitions are available in the appendix at the end of this manuscript.

Table 1, Panel A reports summary statistics on our full panel of firm-year observations. This sample includes 66,859 firm years; on average, firms complete 0.165 large and 0.228 lower visibility domestic acquisitions each year. We also find that 4.4% of the firm-years have *DoubleIrish* = 1. Although this is a small fraction of our overall firm-year observations, DI users tend to be much larger than other firms and make up more than 45% of U.S. firm market

[19] Any firm-years not included in the patent database are set equal to zero. To smooth the annual variability in patents applications, we use the count of patents in the preceding five years. We extrapolate patent data beyond 2009 (the last full year in the database) by using five-year patent counts in 2009 for our last four sample years.

[20] *pct_foreign_income* uses sales as a scaling factor to avoid difficulties in interpreting the variable when total worldwide income is negative. We set *pct_foreign_income* = 0 if foreign income data (pifo) is missing in Compustat.

capitalization in the last year of our sample. We also divide the sample into two groups based on the *DoubleIrish* indicator and test the differences in the key variables for these groups. The two groups are significantly different (P-values < 0.001) along every dimension with the exception of *debt_assets*, which suggests that controlling for these differences in our tests will be important.

(INSERT TABLE 1 ABOUT HERE)

In Table 1, Panel B, we present a correlation matrix that includes most of our key independent variables. The correlation between *DoubleIrish* and *REPAT* is positive (0.212); to the extent that *REPAT* captures some element of a firm's true repatriation costs, this suggests that DI structures are associated with higher repatriation costs. (Interestingly, *REPAT* and *pct_foreign_income* correlate much more highly (0.627) than *DoubleIrish* and *pct_foreign_income* (0.214); we revisit the reasons for these differing correlations in Section 6 of the paper.) In the next subsection, we take more formal steps to test whether DI establishment is in fact associated with higher potential repatriation tax costs.

4.3 The Association Between Double Irish Structures and Repatriation Tax Costs

In Figure 3a, we plot the average of the estimated three-year repatriation tax rate, defined as .35 minus the firm's cash tax rate on foreign income (calculated using taxes paid divided by book pre-tax income), averaged over the current and trailing two years. The solid line on the graph represents the mean of this three-year average rate for DI-using firms relative to the year of DI establishment ("year 0"). Inclusion in this graph is conditional on the availability of at least three years of data both before and after DI establishment. The dashed line represents the average of the composite estimated repatriation tax rate for non-DI, MNC firms (equally weighted) in the same periods as the DI users represented by the solid line. (MNCs are defined similar to Hanlon *et al.* (2015) as U.S. firms with foreign income, taxes, or subsidiaries.) The dotted lines represent the average of each line's values for the periods [year -5, year -1] and [year 1, year 5]. As expected, DI-using firms on average experience an increase in the estimated repatriation tax rate after DI establishment, and this rate appears higher, on average, than the rate for of all other firms in those same post-DI-establishment years.

Besides this increase in DI users' potential repatriation costs, several other features of Figure 3a merit further discussion. First, the estimated repatriation tax rate for DI firms is actually *lower* prior to DI establishment for those DI firms. Second, there appears to be a large spike in the DI firm rate in the year *prior* to DI establishment. Third, the difference between DI and non-DI firm rate collapses in year +5. These difficult-to-explain features raise an important question: do they suggest shortcomings in our hypothesized association between DI structures and repatriation taxes or our DI proxy itself, or do they indicate noisiness specific to the tax cost proxy we use?

To investigate this question, in Figure 3b we generate plots that use the three-year average of .35 minus the foreign *book tax expense rate* (instead of the rate of foreign taxes paid). Book tax rates include tax accruals that might smooth out tax rate trends by including known tax expenses that have not yet been paid. Using these book tax rates eliminates most of the differences in pre-DI tax rates between the two groups and also removes the year +5 dip in DI firm rates. However, the large tax rate increase in year -1 remains, suggesting that DI establishment might be the final step of a one or two-year tax-reduction initiative from these firms. Importantly for our tests, the increase in DI users' repatriation tax rates occurs very close to the period of DI establishment, and the rates continue at a higher level (about double that of the pre-DI period, on average) in the years following establishment

(INSERT FIGURE 3 ABOUT HERE)

Figure 3c plots *REPAT* relative to DI establishment for these same groups. The effect of DI establishment is even more clear in this graph; *REPAT* levels increase at a similar, slow rate for both groups through year 0, then the DI users experience a large spike in year +1 *REPAT* levels and a subsequent rapid increase in *REPAT*. (In Online Appendix Table A.2, we examine the relationship between *DoubleIrish* and *REPAT* in multivariate tests and find a similarly positive relationship in a variety of specifications.) However, *REPAT* will increase with both foreign tax-reducing actions and foreign growth actions that increase pre-tax income (as we discuss in more detail in Section 6). To separate these effects, Figure 3d plots *pre-tax* foreign income (scaled by assets), which should capture foreign growth actions *without* the effect of any

tax actions. Although we find (in unreported statistics) that asset-scaled pre-tax income increases from year 0 to year +1 by 23.7%, the growth rate from year -1 to year 0 is similar (15.6%), suggesting that some of the post-DI increase might reflect trends not related to DI establishment. In contrast, the percentage change in *REPAT* for those same periods in Figure 3c increases from 2.4% (from year -1 to year +0) to 39.5% (from year 0 to year 1). These differences in 3c and 3d suggest that a substantial portion of the *REPAT* increase is due to reductions in foreign taxes that accompany DI establishment. Overall, Figures 3a-3d and the results in Appendix Table A.2 strongly suggest that Double Irish establishment is associated with an increase in repatriation costs.[21]

5. Tests of Hypothesis 1: Repatriation Taxes and Domestic M&A

5.1 Univariate Examination of Double Irish Establishment and M&A Investment

We begin our investigation of Hypothesis 1 with a visual examination of domestic and foreign acquisition volume around the establishment of DI structures in order to provide some basic insights prior to our multivariate tests. For example, a graph of acquisition volume before and after DI establishment can help us see whether post-DI acquisition volume represents a change from previous levels or whether it is simply the continuation of pre-DI trends. It also allows us to examine changes in domestic acquisition trends alongside *foreign* acquisition trends, which should *not* decline due to a repatriation tax increase.

Figure 4 plots the mean acquisition volume and value of the 149 sample firms that establish DI structures and have at least three years of data available both before and after DI establishment (following a similar criterion used in Figure 3). The year of DI establishment is once again referred to as "year 0," and we plot deal volume from five years before DI

[21] For the sake of robustness, we also examine the relationship between *DoubleIrish* and firms' own estimates of their repatriation tax costs. More specifically, we use a hand-collected sample (taken from 10-K filings) of firms' permanently reinvested earnings and the estimated repatriation tax costs if those earnings were repatriated to create an additional estimate of repatriation tax costs (thanks to Andriy Bodnaruk for providing the estimated tax data). This sample consists of 740 firm-years during the years 2000-2012, with 226 of those firm-years classified as DI users according to our methodology. In a univariate test, available from the authors upon request, we find that this repatriation cost estimate is significantly higher (t-stat = 3.54) in DI-using firms than non-DI-using firms.

establishment to five years after establishment. The solid line plots the average number of domestic acquisitions in each year (relative to DI establishment) for these firms, while the dashed line presents the average number of similar foreign acquisitions in each year for these firms. As in Figure 3, we include dotted lines that report the average deal statistics over two five-year periods ([year -5, year -1] and [year 1, year 5]) for each type of acquisition (foreign or domestic).

(INSERT FIGURE 4 ABOUT HERE)

In Figure 4a, which examines average deal volume, we clearly observe a decline in domestic acquisitions following DI establishment for these firms, from just under 0.4 deals per year to just over 0.2. Given these averages and the direction of the trend prior to DI establishment (increasing deals in both years -1 and 0), this decline does not appear to be the result of pre-DI trends. In contrast, foreign acquisitions are similar in pre- and post-DI periods. These results are consistent with repatriation-cost-increasing DI structures dampening domestic investment while leaving foreign investment levels basically unchanged. In Figure 4b, we examine acquirer spending with very similar results; spending on domestic deals noticeably declines (from an average of $127.2M per year before establishment to $75.5M per year after establishment) while spending on foreign deals remains similar. In an online appendix plot (Figure A.1), we obtain similar results to Figure 4b if we include spending on *all* foreign and domestic deals (rather than only deals that clear the 1%/$1M threshold). All of these figures are consistent with a noticeable effect of DI establishment on domestic (but not foreign) acquisitiveness.

In the next subsection, we use a multivariate approach to more explicitly control for industry, time, and firm-specific factors that may affect our ability to detect an association between deal volume and DI establishment.

5.2 Multivariate Specifications using DoubleIrish

In this section, we formally test our first hypothesis by examining the effect of a repatriation tax-increasing event (use of a DI structure) on domestic acquisitions:

$$N\_Dom_{i,t} = f(\alpha + \beta_1 DoubleIrish_{i,t} + \gamma \boldsymbol{X}_{i,t} + \varepsilon_{i,t}) \quad (1)$$

Our first test of equation (1) uses a negative binomial specification, with all variables standardized to have a mean of zero and a standard deviation of one (as in Hanlon *et al.* (2015) and Martin *et al.* (2015)). Negative binomial specifications are ideal when using count data as a dependent variable in a panel setting (Cameron and Trivedi (2005)). However, negative binomial methods may not control for all stable covariates when numerous fixed effects are included (Allison and Waterman (2002)). Additionally, multiple fixed effects in non-linear models (such as negative binomial models) bias standard errors downward (Greene (2004)). We address these concerns in two different ways. First, since our DI indicator varies over time for each firm, we demean all independent variables at the firm level (before standardization) in the negative binomial tests rather than using firm fixed effects. Next, to address these concerns and the concern that inconsistent estimates will result from demeaning (Gormley and Matsa (2014)), we also estimate equation (1) using an OLS regression with firm fixed effects. Each type of specification includes industry-year fixed effects, and standard errors are clustered at the firm level in each specification.

(INSERT TABLE 2 ABOUT HERE)

Table 2 presents the results of these regressions. Consistent with our first hypothesis, our first two specifications show that DI use is associated with a decrease in *N_dom* in both negative binomial (specification (1)) and OLS (specification (2)) tests at the 1% level of significance. The marginal effects reported in these specifications suggest that adoption of a DI structure results in an average decrease in domestic deal volume between 36.3% and 41.2% (using the marginal effects of -0.060 and -0.068 in specifications (1) and (2) compared to the *N_dom* mean of 0.165 from Table 1, Panel A). The next specification examines whether DI structures are also associated with a decline in *dollars* spent on domestic deals. Specification (3) uses firm fixed effects OLS regressions of our deal value variable (*lnTV_dom*) and we continue to find a

significant and negative coefficient for *DoubleIrish*.[22] Our results are robust to two alternative minimum deal value thresholds for sample inclusion ($10M in specification (4) and $50M in specification (5)).

For the sake of robustness, in the Online Appendix we repeat the first three specifications in Table 2 using negative binomial and fixed effect OLS regressions with different empirical choices; Table A.3 focuses on deal volume while Table A.4 focuses on acquisition value. First, in both tables we restrict our sample to only MNCs rather than the full sample of U.S. firms in order to more directly compare our results with Hanlon *et al*. Second, in both tables we exclude a longer sample of tax holiday-adjacent years (2004-2008) to mitigate the possibility that repatriated cash during the AJCA period of 2004-2005 could affect our results in subsequent years. Third, in both tables we include domestic and foreign sales, scaled by assets, when that data is available from Compustat Segments (following Hanlon *et al.* (2015)), and total sales (when segment data is unavailable) scaled by assets as additional controls.[23] Fourth, in both tables we use a "naïve" classification procedure where *DoubleIrish* is only equal to one if the necessary subsidiaries appear in a particular year's 10-K filing (rather than our current method, which takes the possibility of hiding subsidiary information into account). Fifth, in Table A.3 we perform an OLS regression of our domestic acquisition indicator variable (*ind_dom*) on *DoubleIrish* in order to better interpret our earlier results. If those results are attributable to a very small number of DI-using firms with extraordinary decreases in domestic M&A volume, the coefficient of *DoubleIrish* would lose significance when regressed on *ind_dom*. However, if the M&A trends are more broadly shared by many DI-using firms, the coefficient of *DoubleIrish* should remain significant and negative. Finally, in Table A.4 we create an alternative dependent variable that includes *all* deal value from change-of-control domestic deals (rather than only

[22] Our deal value tests are OLS rather than tobit specifications due to the inability of tobit specifications to allow for numerous fixed effects without biasing standard errors downward (Greene (2004)). For robustness, in an unreported test we scale domestic deal value by firm assets and obtain similar results in this test and later tests of deal value.

[23] If segment data on sales is missing, the domestic and foreign sales variables are set to zero. If segment data on sales is available, total sales is set to zero. As in Harford *et al.* (2017), in all tests using *Compustat Segment* data we exclude firm-year observations where the sum of the segment data for a particular variable differs from the total *Compustat* value of that variable by greater than 1%.

deals that clear the 1%/ $1M threshold). Our results are robust to these alternative specifications; the coefficient of *DoubleIrish* is negative in all fourteen specifications and statistically significant at the 10% level or greater in thirteen of fourteen cases.

5.3 Propensity Score Matching

In this section, we exploit the binary nature of our DI proxy and create a reduced sample of firm pairs that are similar along many dimensions *except* for DI use. To create this closely-matched paired-firm sample, we utilize propensity score matching (Heckman, Ichimura, and Todd (1997, 1998)). More specifically, we estimate a probit selection equation using our control variables to predict the probability of DI structure establishment and use in each sample year. Following Leuven and Sianesi (2003), we implement the necessary steps to identify the five "nearest neighbor" matches, with replacement, for each DI firm. Since one of our key matching variables is a firm's past acquisitions, our treatment sample consists of DI-using firms that established their structures within the five years prior to the observation year; in this way, we avoid matching control firms with treatment firms whose domestic acquisitions (and the resulting past acquisition control variable) have already been altered by DI establishment for some time. We also require an exact match on both year and firm industry (2-digit SIC) in our tests.

(INSERT TABLE 3 ABOUT HERE)

Panel A of Table 3 presents univariate comparisons of *N_dom* for our treatment and control firms. The first row provides evidence that *N_dom* is significantly smaller by -0.045/0.260 = -17.1% in the sample of firms with a DI structure. To examine whether the smaller amount of these deals is associated with fewer dollars spent on these deals, in Panel B we compare *lnTV_dom* for each sample. Consistent with Table 2's results, *lnTV_dom* is significantly lower for DI-using firms.

Although our PSM-generated samples are not perfectly matched across all firm characteristics, the PSM procedure generally reduces or completely mitigates differences in DI-

using and non-DI-using firms (other than DI structures themselves).[24] Notably, the treatment and control samples are insignificantly different from one another for both *lnpatents* and *pct_foreign_income* in both panels, suggesting that these firm pairs are closely matched in terms of intellectual property development and foreign profit levels. In other words, while these firms presumably share the *ability* to profitably use DI structures, they still differ in terms of DI use.

5.4 Tests for Selection and Omitted Variables

In this section, we address the possibility that selection issues or an omitted variable correlated with both domestic acquisition volume *and* DI use could explain our earlier results. To properly control for endogeneity related to selection and omitted variables, we must identify a variable correlated with a firm's incentive to establish and use DI structures but *not* correlated with current year domestic acquisition volume. Our choice of variable follows from two elements necessary for the effective use of a DI structure: foreign income and IP/patents. More specifically, a DI structure reduces taxes on foreign earnings, and this tax reduction is enabled by Irish tax laws allowing IP-related "patent royalties" to be transferred between subsidiaries without taxation.

One concern is that some firms might alter their business strategy over time by increasing their fraction of foreign sales and/or developing more IP, and these strategic changes might correlate with both domestic acquisition volume and DI structure use. We attempt to mitigate this concern by using patent and foreign income information from 1996, the year before the "check-the-box" election clarified the legality of DI structures and before the use of these structures was widely known. We create a time-invariant variable called *DI_likely*, which is equal to a firm's *pct_foreign_income* in the year 1996 if the firm is in the top quartile of patent

[24] To test whether our significant Panel A results can be attributed to the imperfect match on past acquisitions, in an unreported test we match within industry only on *past_N_3yr_dom* and the two other characteristics with the most significant differences in the treatment and control samples (*lag_lnassets* and *lag_cash_assets*). Under these conditions, *past_N_3yr_dom* is insignificantly different between the DI-using and non-DI-using samples (t-stat = -1.10) while *N_dom* is significantly lower in the DI-using sample (t-stat = -2.45).

volume in 1996, and equal to zero otherwise. If a sample firm is not present in Compustat in 1996, it is excluded from tests using this variable.

Table 4 presents two different types of tests for the relevant sample years for this variable (1997-2013). We begin by using a bivariate probit specification (Heckman (1978)), which is effective when the treatment probability is close to zero (Nichols (2011)), as is the case with *DoubleIrish*. The bivariate probit model simultaneously estimates two probit specifications with correlated disturbances in a similar fashion to a seemingly unrelated regression model (Greene (2012)). In specification (1), we estimate the relationship between *DI_likely* and the probability of adopting a DI structure. In specification (2), we estimate the relationship between an indicator for domestic acquisitions in a given year (*ind_dom*) and *DoubleIrish*. The results show that that *DI_likely* is highly correlated with DI use, and that the predicted value of *DoubleIrish* is negatively and significantly correlated with large domestic deal volume.

(INSERT TABLE 4 ABOUT HERE)

Next, we estimate a standard two-stage least squares (2SLS) regression using *DI_likely* as an instrumental variable (IV). Since *DoubleIrish* is a binary variable, we follow Adams, Almeida, and Ferreira (2009) and Fahlenbrach (2009) and begin by running a probit regression of *DoubleIrish* on *DI_likely* and control variables. The estimated value of *DoubleIrish* from this probit regression is used, along with our controls, to predict realized *DoubleIrish* values in the first stage of our 2SLS procedure. The second stage is an OLS regression of *N_dom* on the predicted value of *DoubleIrish* from the first stage.[25] We find very similar results to the bivariate probit tests using this procedure; *DI_likely* is significant and positive in the probit test (specification (3)) while the predicted value of *DoubleIrish* is negatively and significantly related to *N_dom* in the second stage OLS results (specification (4)). All four specifications include our standard control variables and industry-year fixed effects.

[25] Wooldridge (2002) shows that the standard errors and test statistics are asymptotically valid using this procedure; if fitted estimates of *DoubleIrish* from a probit specification were used directly in the second stage (instead of the three step probit-OLS-OLS process we use), the estimates from the second stage would be inconsistent.

These results are only informative to the extent that *DI_likely* satisfies the exclusion restriction (this is a well-known feature of two-stage IV models, and Han and Vytlacil (2016) discuss the exclusion restriction in the context of the bivariate probit model). More specifically, *DI_likely* is useful in our tests only if the percentage of a firm's income from foreign sources (multiplied by our patent volume indicator) in 1996 is uncorrelated with domestic acquisition volume *except* through its correlation with the likelihood of adopting a DI structure. While we cannot test for the validity of the exclusion restriction directly, we believe this is a reasonable assumption. For example, the exclusion restriction would be violated if either of the two components of the excluded variable (patent use and foreign income) are correlated with domestic acquisitiveness by themselves (or correlated with a factor that correlates with domestic acquisitiveness). However, in the even numbered specifications in Table 4, the lagged values of *pct_foreign_income* and *lnpatents* are not significantly related to domestic acquisition volume. There is also no clear economic explanation for why our variable, measured in the year before the legality of DI structures was clarified, would have a negative association with domestic acquisition volume many years in the future *except* through its effect on DI establishment and use.

6. Comparing *DoubleIrish* and *REPAT*

6.1 Tests of Domestic Acquisition Volume Using DoubleIrish and REPAT

In order to compare *DoubleIrish* with another commonly used repatriation tax cost proxy, in Table 5 we repeat Table 2's tests using both *DoubleIrish* and *REPAT* in negative binomial tests (in the first two specifications in both panels) and OLS tests (in the last two specifications in both panels).[26] In Panel A, specifications (1) and (3), each variable is included separately, while the two variables are interacted in specifications (2) and (4). Interestingly, in specifications (1) and (3), *DoubleIrish* remains negatively related to material domestic deal volume, but *REPAT* is *positively* related to the volume of these deals. In specifications (2) and (4), the

[26] For space reasons, we suppress the coefficients and statistical significance for certain control variables in many of our remaining tables. Those results are available from the authors upon request.

inclusion of the interaction term *DoubleIrish* * *REPAT* removes significance from the uninteracted *REPAT* term, suggesting that *REPAT* is positively related to deal volume specifically in DI-using firms.

(INSERT TABLE 5 ABOUT HERE)

In Online Appendix Table A.5, we provide two additional robustness tests for these Panel A results. First, to mitigate the possibility that the high correlation between *REPAT* and *pct_foreign_income* (discussed in Section 4.2) is generating spurious results in our *N_dom* regressions, we exclude *pct_foreign_income* and the coefficients on *DoubleIrish* and *REPAT* remain similarly signed and statistically significant (although the significance on *REPAT* is stronger if foreign income is excluded from these *N_dom* tests). Second, Hope, Ma, and Thomas (2013) discuss how some firms may have strategically omitted disclosures about income in foreign markets from 1998-2003 in order to mask tax avoidance actions. To test whether strategic omissions of foreign income data are biasing our results using *REPAT*, we also re-run the Panel B tests excluding any observation where *pct_foreign_income* is missing or equal to zero. Using this reduced sample in specifications (5)-(8), our results and inferences remain essentially unchanged.

6.2 Discussion of DoubleIrish, REPAT, and Their Ability to Identify our Hypothesized Effects

To better understand why *DoubleIrish* and *REPAT* produce such different results in our domestic acquisition tests, in this subsection we revisit and further discuss the construction of each variable. As discussed in Section 4, *DoubleIrish* accurately proxies for a specific tax action taken by firms that reduces foreign taxes (Figures 3a and 3b) and consequently increases potential repatriation taxes. While we cannot rule out the possibility that other, non-tax factors lead to *DoubleIrish's* negative correlation with domestic M&A, the nature of such factors (if they exist) is not obvious, and our earlier tests in Tables 2-4 explicitly attempt to mitigate any effects from any such observable or unobservable factors.

While *REPAT* is also affected by changes in foreign taxes, this is not the sole factor affecting its value. Following Foley *et al*. (2007), Hanlon *et al*. (2015), and Martin *et al*. (2015),

we define *REPAT* as (pre-tax foreign income * .35) – (foreign taxes paid), all scaled by total firm assets. If we instead write the second parenthetical term in the numerator as (pre-tax foreign income * T_f), we can express the definition of *REPAT* value in the following equivalent way:

$$REPAT = \frac{pre\text{-}tax\ foreign\ income*(.35-T_f)}{total\ assets}. \quad (2)$$

With this definition in mind, we categorize changes to the numerator variables in equation (2) into two groups. First, firm managers may take actions to explicitly reduce the tax rate on foreign income (via a DI structure or some other method), which would decrease T_f and increase *REPAT*; we categorize these as *tax actions*. Second, managers may decide to grow the firm's foreign operations (thus growing pre-tax foreign income), which would also increase *REPAT*, even when holding T_f constant; we categorize these as *growth actions*.[27]

Why is the potential effect of growth actions on *REPAT* important for our study? Suppose that a U.S. MNC exhausts most of its opportunities for organic growth and chooses instead to "acquire growth" (Levine (2017)) and optimally capitalize on exogenous productivity shocks (Wang (2017)) by pursuing M&A opportunities in both foreign and domestic markets.[28] This would create a positive correlation between foreign M&A volume and domestic M&A volume. (Consistent with this idea, in an unreported test we find that the correlation between total domestic and foreign change-of-control acquisitions is 0.272 in MNC observations.) If *foreign* M&A growth actions correlate positively with a firm's *domestic* M&A growth actions, and such foreign M&A actions also increase *REPAT*, this could create a positive association between *REPAT* and domestic deals. Since we are primarily interested in whether a repatriation tax cost increase (a "tax action") is *negatively* associated with domestic M&A, growth actions reflected in *REPAT* may offset any negative association between tax-related increases in *REPAT* and domestic deals, confounding our ability to identify our hypothesized effect.

[27] While these two categories reflect "actions" by firm managers, *REPAT* can also shift for more passive reasons. For example, Chow, Hoopes, and Maydew (2017) study a variety of tax holidays in foreign countries; if a company already has international operations in one of these countries, their foreign tax rate may decrease without any active change in international operations by firm managers.

[28] Other factors that might conceivably correlate with an increase in acquisitive behavior in both foreign and domestic markets include CEO overconfidence (Malmendier and Tate (2008)), technological shocks (Harford (2005)), and a desire to obtain innovation while avoiding an "R&D race" with smaller firms (Phillips and Zhdanov (2013)), all of which have been linked to M&A.

One additional issue merits further discussion: should we observe an increase in *REPAT* (which includes a scaling factor that would reflect changes in firm size) even if a firm's growth actions affect both foreign *and* domestic markets? Two factors suggest that *REPAT* should, in fact, increase in these circumstances. First, foreign M&A is likely to be funded with "trapped cash" (as in Hanlon *et al.* (2015)). Unlike stock-funded M&A, new-debt-funded M&A, or organic (non-M&A) growth, the total assets of the acquirer would remain unchanged in an all-cash M&A transaction, since the cash spent on the deal exactly matches the new assets added from the target. In this case, the numerator of *REPAT* (proportional to pre-tax foreign income) would grow faster than the scaling factor (total assets) in the denominator, even if a firm's M&A growth actions are allocated in the same proportion (in terms of foreign and domestic markets) as their existing business. Second, since trapped cash incurs no additional taxes if invested in foreign operations, it is reasonable to think that an MNC might pursue a proportion of foreign deals (relative to total deals) that is greater than the proportion of foreign business in their current operations, leading again to an increase in *REPAT*. (Numerical illustrations of these examples and their effect on *REPAT* are presented in Online Appendix Exhibit A.)

In the next subsection, we continue to explore whether foreign growth actions are likely to introduce confounding effects into *REPAT* (or *DoubleIrish*) that diminishes its ability to serve as a useful proxy for tests of our first hypothesis.

6.3 Tests of Foreign Acquisition Volume Using DoubleIrish and REPAT

Our claim that growth actions confound the ability of *REPAT* to proxy for tax avoidance in our domestic M&A tests relies on two distinct associations: a positive correlation between growth actions and foreign M&A, and a positive correlation between foreign and domestic M&A. While the positive coefficient on *REPAT* in Table 5, Panel A is consistent with this idea, it is possible that another factor (besides a growth actions story) might better explain this result. To further test the validity of this growth actions story, in Table 5, Panel B we test the first association suggested by the story (a positive correlation between growth actions and foreign M&A) by regressing *N_frn_all* (the volume of all foreign change-of-control acquisitions by U.S.

firms) on *DoubleIrish* and *REPAT* in our sample of MNC firm-year observations. If *REPAT* were more affected by growth actions that correlate with foreign M&A than *DoubleIrish*, we would expect *REPAT* to correlate more positively with foreign M&A volume than *DoubleIrish*. This is exactly the result shown in specifications (1) and (3); the coefficient on *REPAT* is positive and significant, while the coefficient on *DoubleIrish* is insignificantly different from zero.

These two specifications purposefully omit a control variable, scaled pre-tax foreign income levels (*pct_foreign_income*), which is used in all previous tests. This pre-tax variable directly proxies for foreign growth actions, and unlike *REPAT*, by definition it contains no information about tax actions. To test whether the growth action and/or tax action portions of *REPAT* are causing the association with foreign M&A, in specifications (2) and (4) we reintroduce *pct_foreign_income* as a control. If *REPAT*'s correlation with foreign M&A is primarily driven by growth actions, this "horse race" regression between *REPAT* and *pct_foreign_income* would result in a positive coefficient on the variable that represents growth actions with less noise from other factors (*pct_foreign_income*). As shown in specifications (2) and (4), this is precisely what happens, while the significance levels on *DoubleIrish* and the remaining variables (omitted for space but available upon request) remain basically unchanged.

Notably, we fail to find any evidence in either Panel B specification that *DoubleIrish* is correlated with this particular type of growth action (foreign M&A). We cannot and do not claim that *DoubleIrish* is *entirely* unrelated to growth actions; for example, Figure 3d suggests a positive correlation between *DoubleIrish* and pre-tax foreign income. However, the evidence presented here (both in how *REPAT* is defined and the results in Table 5) strongly suggests a greater limitation in *REPAT*'s ability to effectively isolate the effect of U.S. tax policy on domestic acquisitions. These results, along with the unchanged foreign M&A trends observed in DI-using firms in Figure 4, suggest that *DoubleIrish* is not correlated enough with foreign acquisitiveness to affect our tests in this manner.[29] This difference in the two variables'

[29] One remaining noteworthy Table 5 result is Panel A's finding that *REPAT* is significant *only* when interacted with *DoubleIrish* in specifications (2) and (4). While this result seems counterintuitive, it is consistent with the post-DI characteristics shown in Figure 3. Since DI structures represent a current "best-practice" in foreign tax avoidance,

correlation with non-tax-related foreign growth highlights why *DoubleIrish* is crucial for our empirical methodology.

Importantly, while Hanlon *et al.* (2015) also regress *REPAT* on domestic M&A volume, the potential for growth factors to affect *REPAT* in domestic M&A tests is more of a concern with our specific research question. Hanlon *et al.* "investigate whether the tax-induced overseas cash holdings are associated with overseas investment," and the domestic M&A regressions "use the firm as its own control" to examine whether their results are specific to foreign (rather than *all*) acquisitions, as the authors predict. Put differently, their study specifically concerns the effects of trapped cash rather than the effects of *tax avoidance behavior*. The managerial actions that lead to increases in *REPAT* and trapped cash should not affect their hypothesis, as the cash remains similarly "locked out" whether it increases due to tax actions or growth actions. (Consistent with this focus on the use trapped cash, Hanlon *et al.* use a sample of all-cash acquisitions for their tests.) In another study using regressions of domestic M&A on *REPAT*, Martin *et al*. (2015) investigate whether "MNCs facing higher repatriation tax costs are more likely to engage in tax avoidance strategies involving domestic acquisitions." While the confounding effect we outline in *REPAT* could potentially generate a false positive in their study, we find evidence that supports their hypothesis and conclusions using *DoubleIrish*. We outline these tests in the next section of the paper.

7. Tests of Hypothesis 2: Repatriation Taxes and PRAs

7.1 Tests for Lower Visibility Acquisition Volume in Double Irish-using Firms

In this section, we examine whether our repatriation tax-increasing event (DI use) increases the volume of deals with characteristics consistent with tax-avoiding PRAs. If U.S. firm acquisition decisions are sensitive to repatriation tax concerns, we would expect an increase

---

the estimated repatriation taxes increase around DI establishment but flatten out afterwards (Figure 3b). Since there are likely no further tax actions available to these firms, the upward trend in *REPAT* observed after DI establishment is attributable, at least in part, to growth actions; in untabulated results from Figure 3, the average annual growth in pre-tax foreign income from year +1 to year +5 in Figure 3d (9.7%) is about two-thirds the size of the rate of growth in *REPAT* in Figure 3c over the same period (15.6%).

in PRAs. In Table 6, we repeat the negative binomial, OLS, PSM, bivariate probit, and two-stage IV tests found in Tables 2, 3, and 4 with two new dependent variables: lower visibility (*N_lower*) and lowest visibility (*N_lowest*) acquisitions. We hypothesize that if firms attempt to avoid repatriation taxes through PRAs, these attempts will likely be concentrated in these samples of acquisitions, since they are less likely to attract investor and regulator attention.

(INSERT TABLE 6 ABOUT HERE)

Panel A repeats Table 2's negative binomial and OLS tests using *N_lower* (the first three specifications) and *N_lowest* (the last three specifications) as the dependent variables. The results of these regressions show that *DoubleIrish* is positively related to these lower visibility deals, with stronger and more significant results in the *N_lowest* tests. Using the marginal effects of 0.058 and 0.088 in specifications (4) and (5) compared with the *N_lowest* mean of 0.136 from Table 1, the adoption of DI structures results in between 42.6% to 64.7% higher levels of lowest visibility deals.

In specifications (3) and (6) of Panel A, we include a new variable, *lnissuance* (the natural log of one plus the value of debt or equity issued during the current year, obtained from the SDC Global New Issues database). We use *lnissuance* to test whether new sources of domestic cash accompany DI-using firms' increased deals, which would be more consistent with firms using new domestic funding for investment to avoid repatriation costs (as in Graham *et al.* (2010)) than PRAs. If this were the case, we would expect the interactions of *DoubleIrish* and *lnissuance* to be positive and significant and the uninteracted *DoubleIrish* indicators to lose significance. While *lnissuance* is positive and significant by itself, the coefficients of the interaction terms are either insignificant or negative, with *DoubleIrish* remaining positive and significant in each case. This mitigates the concern that our results are primarily driven by proceeds from domestic financing.

In Panel B, we repeat our propensity score matching tests for *N_lowest*. Our matching procedure shows that DI-using firms have a 0.051/0.294 = 14.8% greater number of lowest visibility acquisitions than their matched, non-DI-using peers. In Panel C, tests for selection and omitted variable effects that mirror Table 4's tests and show a positive relationship between DI

establishment and *N_lowest* using both a bivariate probit framework (specifications (1) and (2)) and a 2SLS IV framework (specifications (3) and (4)). As in Table 4, the lagged values of *pct_foreign_income* and *lnpatents* (omitted for space) are not significantly related to acquisition volume by themselves. These results reduce concerns that the positive relationship between *DoubleIrish* and *N_lowest* is due to observable differences in DI-using and non-DI-using firms or endogeneity concerns related to selection or omitted variables.[30]

7.2 Tests of Changes in a Proxy for Trapped Cash

In this section, we examine whether changes in a proxy for trapped cash accompanying lower visibility acquisitions from DI-using firms are consistent with the predicted effects of PRAs. More specifically, we use difference-in-difference tests to examine how a proxy for trapped cash (permanently reinvested earnings, or *PRE*) changes contemporaneously with different types of acquisitions. Although Blouin *et al.* (2014) raise important issues with the use of *PRE* as a proxy for trapped cash, we follow previous studies (Edwards *et al.* (2016), Harford *et al.* (2017), Martin *et al.* (2015)) and proxy for trapped cash using this measure. Our tests use all of the sample years (2000-2013, excluding the AJCA-affected years) where we have data on changes in *PRE* (*ΔPRE*).

In Table 7, we perform OLS regressions of *ΔPRE* on *DoubleIrish*, *REPAT*, domestic acquisitions, interactions between these variables, control variables, and industry-year fixed effects. (Since our dependent variable of interest is a change variable, we exclude firm fixed effects.) Each specification in Table 7 uses either acquisition counts *N_dom* and *N_lowest* (in specifications (1)-(3)) or acquisition indicators *ind_dom* and *ind_lowest* (in specifications (4)-(6)). In specifications (1) and (4), we interact *DoubleIrish* with each of the domestic acquisition variables, while in specifications (2) and (5), we interact *REPAT* with the domestic acquisition variables. In each case, the interactions with these repatriation tax proxies and the lowest visibility acquisition variable produce no significant results.

[30] In unreported tests, we find similarly signed but statistically insignificant results in Panels B and C of Table 6 when using *N_lower* in place of *N_lowest*.

(INSERT TABLE 7 HERE)

In specifications (3) and (6), we examine whether *DoubleIrish* has greater power to find evidence consistent with loophole use when used *in conjunction* with *REPAT*. To the extent that *REPAT* and *DoubleIrish* contain unique and complementary information about potential repatriation taxes, we would expect a test that interacts both of these variables with domestic acquisitions to produce more significant results.[31] The results in specifications (3) and (6) are consistent with this idea, as the coefficients on *DoubleIrish * REPAT * N_lowest* (or *ind_lowest*) are negative and significant.

While these results are not definitive proof of PRA deals from repatriation tax-sensitive firms, they are consistent with the expected *effect* of PRA deals (a lower-than-expected level of trapped cash, proxied here by *ΔPRE*). Interestingly, the interactions of *DoubleIrish* with variables representing our main sample of M&A deals (*N_dom* and *ind_dom*) in specifications (3) and (6) are insignificant. Not only is this result consistent with DI-using firms' reluctance to pay repatriation taxes fund large domestic deals with trapped cash (which would instead result in a negative *ΔPRE*), it also provides a falsification test of sorts for the *N_lowest* and *ind_lowest* results. More specifically, the heterogeneous results with the different types of acquisitions suggests that the negative correlation between *ΔPRE* and low visibility deal triple interaction is not caused by some omitted factor that correlates with *ΔPRE* and *all* types of domestic acquisitions.

7.3 Comparison of economic magnitudes of main test results and PRA test results

In this section, we examine the aggregate economic magnitude of our findings to determine whether the two phenomena related to repatriation tax increases documented by our study (a decrease in domestic acquisitions and an increase in PRA) suggest a net investment or a net disinvestment in domestic M&A in total. We begin by quantifying (in dollar terms) our two

[31] In Table 7, we observe a strong positive correlation between *ΔPRE* and *REPAT*. To the extent that *REPAT* correlates positively with domestic acquisitiveness (as discussed in Section 6), this should work *against* our prediction of finding *PRE* declines associated with lower visibility domestic deals.

key findings: the decrease in financially material, highly visible acquisitions (above the 1%/$1M deal value threshold) and increase in lower visibility acquisitions for DI-using firms. Figure 4b provides some context for the former quantity; if we extrapolate the approximately $51.7M per year drop in deal spending after DI establishment to the 2,915 firm-year observations where *DoubleIrish* = 1 (found in Table 1, Panel A), this suggests that $51.7M * 2,915 = $150.7B of deal value is "missing" due to repatriation tax increases generated by DI structures. For the sake of conservatism, we also use the PSM results (Table 3), where the magnitudes of the domestic deal effects are lower than in Figure 4 and Table 2, to estimate dollar impacts. In Table 3, Panel A, N_dom is lower by -0.045 acquisitions per year for DI-using firms when compared with closely matched non-DI-using firms. Using the average value of a DI-using firm's deal, calculated using Table 1, Panel A figures (TV_dom/N_dom = $98.785 / 0.217 = $455M), the total impact across all observations in our sample is -0.045 * $455M * 2,915 = -$60B.

Estimating the economic magnitude of the increase in "lowest visibility" deals (where deal value is undisclosed) is less straightforward. While FASB's Statement of Financial Accounting Concepts No. 2 gives firms some flexibility in defining when shareholder-relevant information such as deal values should be disclosed, the American Institute of Certified Public Accountants (AICPA) suggests that common thresholds, benchmarked to firm characteristics, are used in practice.[32] Different estimates for these thresholds include 15% of fixed assets (Moloney, Titera, and Hill (2014)), 5-10% of pre-tax income, or 1-1.5% of assets or sales (Brody, Lowe, and Pany (2003)). Using reported and unreported DI-using firm statistics, we estimate the "upper bound" for acquisition materiality under each of these guidelines and find that the 1.5% asset threshold produces the largest figure: .015 * $9.541B = $143M per deal. Using the 0.051 higher level of *N_lowest* in DI-using firms in Table 6, Panel B, the upper bound of the value of these deals is estimated to be 0.051 * 2,915 firm-years * $143M = $21B. The actual figure is likely to be lower, since our estimate assumes that all "lowest visibility deals" have values exactly at the upper bound of the materiality threshold, but calculating the upper bound allows us to fully

[32] Source: AICPA's Statement on Auditing Standards (SAS) No. 122, AU-C sec. 320.10.A6, http://www.aicpa.org/Research/Standards/AuditAttest/DownloadableDocuments/AU-C-00320.pdf

examine whether the economic magnitude of M&A declines from DI users is meaningfully offset by PRAs.

The economic significance of the decline in large deals (between $60B and $151B) appears to far outweigh the significance of the potential upper bound of the increase in low visibility deals ($21B). Importantly, these estimates are also based *only* on the use of DI structures; foreign income earned in the 33,000-plus non-DI MNC firm-years in our sample are presumably affected by repatriation costs as well.[33] This suggests that the *total* impact of the U.S.'s foreign income tax policy on investment in acquisitions is likely to be much larger than these estimates.

8. Conclusion

Our study uses a repatriation tax-increasing event, the establishment and use of a DI structure, to document an association between the U.S.'s worldwide tax policy and reduced spending on domestic acquisitions. While these results are offset by higher levels of lower visibility deals (likely driven by a tax-avoiding repatriation technique), this phenomenon is economically small when compared with the magnitude of our main findings. Our results mitigate the possibility than many non-causal stories can explain these results.

One remaining mystery associated with our findings is why the 2004 repatriation tax holiday spurred little to no additional investment other than share repurchases (Dharmapala *et al.* (2011), Faulkender and Petersen (2012)). However, this outcome may make sense if the reduced AJCA tax holiday repatriation rate of 5.25% was still valued less by most MNCs than the "option to wait" for more permanent tax reforms. To the extent that this is true, the tax holiday should have generated additional domestic investment only among firms whose typical financing costs were already greater than 5.25%. This is broadly consistent with Faulkender and Petersen (2012), which shows an increase in investment *only* from financially constrained firms during the AJCA.

[33] MNCs account for 36,066 of our firm-year observations, 2,915 of which have *DoubleIrish* = 1.

Our results suggest several future areas of study. Since employment levels in merged firms often decline following the deal due to the elimination of redundant functions, it is not clear whether acquisition impacts from the worldwide tax policy would be enough to spur legislative changes from politicians sensitive to labor issues. However, a domestic acquisition may be preferable (in terms of employment) to the collapse of the firm or an acquisition from a foreign buyer (Bird *et al.* (forthcoming)) which might move jobs overseas. Additionally, given the lack of robust evidence of investment "rebound" after worldwide tax code changes (Arena and Kutner (2015)), it is unclear if (and how) recent proposals for both a tax holiday and a change to a territorial tax system (Davis and Rappeport (2017)) would affect U.S. investment in the market for corporate control. However, our study suggests that domestic acquisition levels (and shareholder value) have been directly and negatively impacted by U.S. tax policy; if even a fraction of the $2.5T trapped cash reserve can be freed for domestic investment through a carefully designed tax reform, it could greatly benefit the U.S. economy.

REFERENCES

Adams, Renee, Heitor Almeida, and Daniel Ferreira, 2009, Understanding the relationship between founder–CEOs and firm performance, *Journal of Empirical Finance* 16, 136-150.

Agrawal, A. and Ralph A. Walkling, 1994, Executive careers and compensation surrounding takeover bids, *Journal of Finance* 49, 985-1014.

Albertus, James F., 2016, The Real Effects of U.S. Tax Arbitrage by Foreign Multinational Firms, Carnegie Mellon University Working Paper.

Allison, Paul D. and Richard Waterman, 2002, Fixed effects negative binomial regression models, *Sociological Methodology* 32, 247-265.

Arena, Matteo P. and George W. Kutner, 2015, Territorial Tax System Reform and Corporate Financial Policies, *Review of Financial Studies* 28, 2250-2280.

Auerbach, Alan. J. and Kevin Hassett, 1992, Tax policy and business fixed investment in the United States, *Journal of Public Economics* 47, 141-170.

Bell, Jeffrey Esq., 2016, The Acquisition of Control of a United States Public Company, Morrison Forrester Working Paper.

Belvedere, Matthew J., "CEOs to Obama: Tax reform, not an inversion Band-Aid", *CNBC.com*, July 24, 2014.

Bena, Jan, and Kai L, 2014, Corporate innovations and mergers and acquisitions, *Journal of Finance* 69, 1923-1960.

Bergin, Tom and Consiglio, Valentina, "Yahoo shifts Europe tax base to Ireland from Switzerland", *reuters.com*, February 7, 2014.

Bird, Andrew, Alexander Edwards, and Terry J. Shevlin, Does U.S. Foreign Earnings Lockout Advantage Foreign Acquirers?, forthcoming in the *Journal of Accounting and Economics*.

Blair-Stanek, Andrew, 2015, Intellectual Property Law Solutions to Tax Avoidance, *UCLA Law Review* 62, 2-73.

Blouin, Jennifer, Linda Krull, and Leslie Robinson, 2016, The location, composition, and investment implications of permanently reinvested earnings, University of Pennsylvania Working Paper.

Bradley, Michael, Anand Desai, and E. Han Kim, 1988, Synergistic Gains from Corporate Acquisitions and their Division Between the Stockholders of Target and Acquiring Firms, *Journal of Financial Economics* 21, 3-40.

Brody, Richard G., D. Jordan Lowe, and Kurt Pany, 2003, Could 51 million be immaterial when Enron reports income of 105 million?, *Accounting Horizons* 17, 153-160.

Cai, Jie, Moon H. Song, and Ralph A. Walkling, 2011, Anticipation, acquisitions, and bidder returns: Industry shocks and the transfer of information across rivals, *Review of Financial Studies* 24, 2242-2285.

Cameron, A., Trivedi, P., 2005. Microeconometrics: methods and applications. Stata Press, College Station, Texas.

Chae, Joon, 2005, Trading Volume, Information Asymmetry, and Timing Information, *Journal of Finance* 60, 413-442.

Chow, Travis, Jeffrey L. Hoopes, and Edward L. Maydew, 2017, U.S. Firms on Foreign (Tax) Holidays, University of North Carolina Working Paper.

Cox, Jeff, "US companies are hoarding $2.5 trillion in cash overseas", *CNBC.com*, September 20, 2016.

Darby, Joseph B. III and Kelsey Lemaster, 2007, Double Irish More than Doubles the Tax Savings, *Practical US/International Tax Strategies* 11, 2-16.

Davis, Julie Hirschfeld and Alan Rappeport, "White House Proposes Slashing Tax Rates, Significantly Aiding Wealthy", *New York Times*, April 26, 2017.

Desai, Mihir A., C. Fritz Foley, and James R. Hines Jr., 2006, The demand for tax haven operations, *Journal of Financial Economics* 90, 513-531.

Devos, Erik, Palani-Rajan Kadapakkam, and Srinivasan Krishnamurthy. 2009, How do mergers create value? A comparison of taxes, market power, and efficiency improvements as explanations for synergies, *Review of Financial Studies*, 22, 1179–1211.

Dharmapala, Dhammika, C. Fritz Foley, and Kristen Forbes, 2011, Watch what I do, not what I say: the unintended consequences of the Homeland Investment Act, *Journal of Finance* 66, 753-788.

Djankov, Simeon, Tim Ganser, Caralee McLiesh, Rita Ramalho, and Andrei Shleifer, 2010, The effect of corporate taxes on investment and entrepreneurship, *American Economic Journal: Macroeconomics* 2, 31-64.

Doidge, Craig, and Alexander Dyck, 2015, Taxes and corporate policies: Evidence from a quasi natural experiment, *Journal of Finance* 70, 45-89.

Domingo, Maria, "IRS Impedes the Attack of the Killer B's", *LexisNexis Legal Newsroom: Tax Law*, June 13, 2011.

Drucker, Jesse, "Dodging Repatriation Tax Lets U.S. Companies Bring Home Cash", *Bloomberg Business*, December 29, 2010 (a).

Drucker, Jesse, "Google 2.4% Rate Shows How $60 Billion Lost to Tax Loopholes", *Bloomberg Business*, October 21, 2010 (b).

Drucker, Jesse, "U.S. Companies Dodge $60 Billion in Taxes With Global Odyssey", *Bloomberg Business*, May 13, 2010 (c).

Drucker, Jesse, "Double Irish's Slow Death Leaves Google Executives Calm", *Bloomberg News*, October 14, 2014.

Duhigg, Charles and David Kocieniewski, 2012, "How Apple Sidesteps Billions in Taxes", *The New York Times*, April 2012

Dyck, Alexander, Natalya Volchkova, and Luigi Zingales, 2008, The Corporate Governance Role of the Media: Evidence from Russia, *Journal of Finance* 63, 1093-1135.

Dyreng, Scott D., Jeffrey L. Hoopes, and Jaron H. Wilde, Public pressure and corporate tax behavior, forthcoming in the *Journal of Accounting Research*.

Edwards, Alexander, Todd Kravet, and Ryan Wilson, 2016, Trapped Cash and the Profitability of Foreign Acquisitions, *Contemporary Accounting Research* 33, 33-77.

Fahlenbrach, Rudiger, 2009, Founder-CEOs, Investment Decisions, and Stock Market Performance, *Journal of Financial and Quantitative Analysis* 44, 439-466.

Faulkender, Michael W. and Mitchell A. Petersen, 2012, Investment and Capital Constraints: Repatriations Under the American Jobs Creation Act, *Review of Financial Studies* 25, 3351-3388.

Feld, Lars P., Martin Ruf, Uwe Scheuering, Ulrich Schreiber, and Johannes Voget, 2013, Effects of territorial and worldwide corporation tax systems on outbound M&As, *Freiburg Discussion Papers on Constitutional Economics*.

Foley, C. Fritz, Jay C. Hartzell, Sheridan Titman, and Garry Twite, 2007, Why do firms hold so much cash? A tax-based explanation, *Journal of Financial Economics* 86, 579-607.

Gormley, Todd A., and David A. Matsa, 2014, Common errors: How to (and not to) control for unobserved heterogeneity, *Review of Financial Studies* 27, 617-661.

Graham, John R., Michelle Hanlon, and Terry J. Shevlin, 2010. Barriers to Mobility: The Lockout Effect of U.S. Taxation of Worldwide Corporate Profits, *National Tax Journal* 63, 1111-1144.

Gramlich, Jeffrey, and Janie Whiteaker-Poe, 2013, Disappearing subsidiaries: The cases of Google and Oracle, Washington State University Working Paper.

Greene, William, 2012, Econometric Analysis, Prentice Hall, Upper Saddle River, NJ.

Greene, William, 2004, The Behavior of the Fixed effects Estimator in Nonlinear Models, *Econometrics Journal* 7, 98-119.

Haleblian, Jerayr, Cynthia E. Devers, Gerry McNamara, Mason A. Carpenter, and Robert B. Davison, 2009, Taking Stock of What We Know About Mergers and Acquisitions: A Review and Research Agenda, *Journal of Management* 35, 469-502,

Han, Sukjin, and Edward J Vytlacil, 2016, Identification in a generalization of bivariate probit models with dummy endogenous regressors, University of Texas at Austin Working Paper.

Hanlon, Michelle (Howard W. Johnson Professor, MIT Sloan School of Management), Testimony before the United States House Committee on Ways and Means, February 24, 2016.

Hanlon, Michelle, Rebecca Lester, and Rodrigo Verdi, 2015, The Effect of Repatriation Tax Costs on U.S. Multinational Investment, *Journal of Financial Economics* 116, 179-196.

Harford, Jarrad, 2005. What drives merger waves?, *Journal of Financial Economics* 77, 529-560.

Harford, Jarrad, Mark Humphery-Jenner, and Ronan Powell, 2012, The sources of value destruction in acquisitions by entrenched managers, *Journal of Financial Economics* 106, 247-261.

Harford, Jarrad, Cong Wang, and Kuo Zhang, 2017, Foreign Cash: Taxes, Internal Capital Markets and Agency Problems, *Review of Financial Studies* 30, 1490-1538.

Hasan, Iftekhar, Chun Keung Stan Hoi, Qiang Wu, and Hao Zhang, 2014, Beauty is in the eye of the beholder: The effect of corporate tax avoidance on the cost of bank loans, *Journal of Financial Economics* 113, 109-130.

Heckman, James J. 1978, Dummy Endogenous Variables in a Simultaneous Equation System, Econometrica 46, 931-959.

Heckman, James, Hidehiko Ichimura, and Petra Todd, 1997, Matching as an Econometric Evaluation Estimator: Evidence from Evaluating a Job Training Programme, *Review of Economic Studies* 64, 605-654.

Heckman, James, Hidehiko Ichimura, and Petra Todd, 1998, Matching as an Econometric Evaluation Estimator, *Review of Economic Studies* 65, 261-294.

Hope, Ole-Kristian, Mark Shuai Ma, and Wayne B. Thomas, 2013, Tax avoidance and geographic earnings disclosure, *Journal of Accounting and Economics* 56, 170-189.

Houston, J. F., C. M. James, and M. D. Ryngaert. 2001, Where Do Merger Gains Come From? Bank Mergers from the Perspective of Insiders and Outsiders, *Journal of Financial Economics* 60, 285–331.

Jensen, M. C. 1986. Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review* 76, 323-329.

Johnston, David Cay, "I.R.S. Moves to Close Tax Shelter Shortly After I.B.M. Uses It to Save $1.6 Billion", *The New York Times*, June 7, 2007.

Kasin, Matthew, "IBM CEO Rometty Says a Lower Tax Rate, Territorial Tax System Will Enable Growth", *foxbusiness.com*, April 30, 2017.

Keena, Colm and Carswell, Simon, "Irish Boston Scientific company paid effective tax rate of 4% in 2011", Irish Times, May 31, 2013.

Kogan, Leonid, Dimitris Papanikolaou, Amit Seru, and Noah Stoffman, 2017, Technological Innovation, Resource Allocation, and Growth, *Quarterly Journal of Economics* 132, 665-712.

Lester, Rebecca, 2016, Made in the U.S.A.? A Study of Firm Responses to Domestic Production Incentives, Stanford University Working Paper.

Levine, Oliver, Acquiring growth, forthcoming in the *Journal of Financial Economics*.

Leuven, Edwin and Barbara Sianesi, 2003, "PSMATCH2: Stata module to perform full Mahalanobis and propensity score matching, common support graphing, and covariate imbalance testing", http://ideas.repec.org/c/boc/bocode/s432001.html, version 4.0.6.

Lovelace Jr., Berkeley, "Bringing Cisco's cash back to the US would cause a rush of dividends, buybacks and M&A, CEO says", *CNBC.com*, December 7, 2016.

Lowder, J. Bryan, "The Double Irish and the Dutch Sandwich", *Slate*, April 14, 2011.

Maksimovic, V. and Gordon Phillips, 2001, The Market for Corporate Assets: Who Engages in Mergers and Asset Sales and Are There Efficiency Gains?, *Journal of Finance* 56, 2019–65.

Malmendier, Ulrike, and Geoffrey Tate, 2008, Who makes acquisitions? CEO overconfidence and the market's reaction, *Journal of Financial Economics* 89, 20-43.

Martin, K. J., and John J. McConnell, 1991, Corporate performance, corporate takeovers, and management turnover, *Journal of Finance* 46, 671-687.

Martin, Peter, "Tax Office wary of 'Double Irish Dutch Sandwich' ploy", *Sydney Morning Herald*, November 22, 2012.

Martin, Xiumin, Maryjane Rabier, and Emanuel Zur, 2015, Dodging Repatriation Tax: Evidence from the Domestic Mergers and Acquisitions Market, Washington University working paper.

Maruca, Samuel M. (Director, Transfer Pricing Operations, Internal Revenue Service), U.S. Senate Hearing on the Shifting of Profits Offshore by U.S. Multinational Corporations, May 21, 2013.

Mason, Jeff and Kevin Drawbaugh, "Obama targets foreign profits with tax proposal, Republicans skeptical", *Reuters Business News*, February 1, 2015.

Masulis, Ronald W., Cong Wang, and Fei Xie, 2007, Corporate governance and acquirer returns, *Journal of Finance* 62, 1851-1889.

McKinnon, John D. and Damian Paletta, "Obama Administration Issues New Rules to Combat Tax Inversions", *Wall Street Journal*, September 22, 2014.

Meade, Janet A. and Shihong Li, 2015, Strategic Corporate Tax Lobbying, *Journal of the American Taxation Association* 37, 23-48.

Miller, Gregory S., 2006, The Press as a Watchdog for Accounting Fraud, *Journal of Accounting Research* 44, 1001-1033.

Moeller, Sara B., Frederik P. Schlingemann, and Rene M. Stulz, 2004, Firm size and the gains from acquisitions, *Journal of Financial Economics* 73, 201-228.

Moeller, Sara B., Frederik P. Schlingemann, and René M. Stulz, 2007, How do diversity of opinion and information asymmetry affect acquirer returns?, *Review of Financial Studies* 20, 2047-2078.

Moloney, Jim, Mike Titera, and Kevin Hill, 2014, What's the Big Deal? Why Some Seemingly Material Acquisition Agreements Might Never See The Light of Day, *Deal Lawyers* 8, 1-4.

Mukherjee, Abhiroop, Manpreet Singh, and Alminas Zaldokas, Do Corporate Taxes Hinder Innovation?, forthcoming at the *Journal of Financial Economics*.

Netter, Jeffry, Mike Stegemoller, and M. Babajide Wintoki, 2011, Implications of Data Screens on Merger and Acquisition Analysis: A Large Sample Study of Mergers and Acquisitions from 1992 to 2009, *Review of Financial Studies* 24, 1-42.

Nichols, Austin, 2011, Causal inference for binary regression with observational data, presented at Stata Conference Chicago 2011. www.stata.com/meeting/chicago11/materials/chi11_nichols.pdf

O'Donovan, James, Hannes Wagner, and Stefan Zeume, 2017, The Value of Offshore Secrets – Evidence from the Panama Papers, INSEAD Working Paper.

Phillips, Gordon M. and Alexei Zhdanov, 2013, R&D and the Incentives from Merger and Acquisition Activity, *Review of Financial Studies* 26, 34-78.

Ring, Diane M., 2002, One Nation Among Many: Policy Implications of Cross-Border Tax Arbitrage, *Boston College Law Review* 44, 79-175.

Romer, Christina D., and David H. Romer, 2010, The macroeconomic effects of tax changes: estimates based on a new measure of fiscal shocks, *American Economic Review* 100, 763-801.

Rossi, Stefano and Paolo F. Volpin, 2004, Cross-country determinants of mergers and acquisitions, *Journal of Financial Economics* 74, 277-304.

Royse Law Blog, "Double Irish Tax Sandwich", *Royse Law Blog* (www.royselawblog.com), November 1, 2013.

Rubin, Richard and Ian Katz, "Crackdown Targets Inversions Designed to Limit U.S. Taxes", www.bloomberg.com, September 22, 2014.

Rubinger, Jeffrey R. and Nadia E. Kruler, 2014, Notice 2014-32 Takes Further Sting Out of "Killer B" Transactions, *Journal of Taxation* 121, 78-82.

Rubinger, Jeffrey R. and Summer Ayers Lepree (Bilzin Sumberg Baena Price & Axelrod LLP), "Return of Basis" Repatriation Strategy Tested in Tax Court", *Bilzin Sumberg's Taxes Without Borders*, September 24, 2014.

Scharfstein, David. 1988. The disciplinary role of takeovers. The Review of Economic Studies, 55(2), 185–199.

Schechner, Sam, "Ireland to Close 'Double Irish' Tax Loophole", *Wall Street Journal*, October 14, 2014.

Smyth, Jamie, "Adobe shows its creativity with Ireland tax base", *Financial Times*, September 12, 2013.

Slemrod, Joel, 1992, Do taxes matter? Evidence from the 1980s. *American Economic Review* 82, 250-256.

Stebbins, Ann Beth and Kenneth M. Wolff (Skadden, Arps, Slate, Meagher & Flom LLP), 2014, The International Comparative Legal Guide to: Mergers & Acquisitions 2014, p. 332.

Stock, James H., and Motohiro Yogo, 2005, Testing for Weak Instruments in Linear IV Regression, in Donald W. K. Andrews and James H. Stock eds.: *Identification and Inference for Econometric Models: Essays in Honor of Thomas Rothenberg* (Cambridge University Press) 80-108.

Sullivan, Martin, "Questions About Pfizer's Taxes", LexisNexis Legal Newsroom: Tax Law, June 25, 2013.

Taylor, Cliff, "Apple's Irish company structure key to EU tax finding", *Irish Times*, September 2, 2016.

Wang, Wenyu, Bid Anticipation, Information Revelation, and Merger Gains, forthcoming in the *Journal of Financial Economics*.

Willens, Robert, "IRS Moves to Curtail Tax-Free Repatriation of Foreign Earnings", *Tax Notes,* August 20, 2012.

Wooldridge, Jeffrey M., 2002, Econometric Analysis of Cross Section and Panel Data, The MIT Press, Cambridge, MA.

Worstall, Tim, “Of Course Twitter Is Using The Double Irish With A Dutch Sandwich, They'd Be Mad Not To”, *Forbes*, October 19, 2013.

Appendix
Variable Names and Definitions for Tables 1-7
(Indicator variables in italics)

VARIABLE	Definition
ΔPRE	Change in permanently reinvested earnings (PRE). Calculated as (PRE (t) - PRE(t-1))/(Total Assets (t-1)) where *t* represents the acquisition year.
DI_likely	The firm's *pct_foreign_income* in the year 1996 if the firm is in the top quartile of patent volume in 1996, and equal to zero otherwise.
DoubleIrish	Indicator equals one for each year starting with the first year when an acquiring firm is identified as having at least two Irish subsidiaries and a subsidiary in either the Netherlands or Luxembourg according to Exhibit 21 and zero otherwise.
ind_dom	Indicator equals one if the number of domestic acquisitions (*N_dom*) is greater than zero in the year by the acquiring firm and zero otherwise.
ind_lowest	Indicator equals one if the number of lowest visibility domestic acquisitions (*N_lowest*) is greater than zero in the year by the acquiring firm and zero otherwise.
lag_assets	Total assets lagged one year.
lag_cash_assets	Ratio of cash and cash equivalents to total assets lagged one year.
lag_debt_assets	Ratio of short-term and long-term debt to total assets lagged one year.
lag_lnassets	Natural log of total assets lagged one year.
lag_mtb	Market-to-Book ratio lagged one year.
lag_netloss	Indicator equals one if the firm reports a negative ROA for the fiscal year (and zero otherwise).
lag_nwc_assets	Ratio of net working capital to total assets lagged one year.
lag_pct_foreign_income	Percent foreign income scaled by sales lagged one year.
lag_price_earnings	Price to earnings ratio lagged one year.
lag_roa	Return on assets (ROA) lagged one year. If the value is negative, the observation is set equal to zero and the net loss indicator equals one.
lag_sales_growth	Percent growth in sales from year t-2 to year t-1.
lnissuance	Natural log of one plus total debt and equity issuance in the year of the acquisition.
lnpatents	Natural log of the number of patent in the previous 5 years according to the data provided by Kogan, Papanikolaou, Seru, and Stoffman (2012). All observations after 2009 are coded to 2009 levels.
lnTV_dom	Natural log of one plus the total transaction value for domestic acquisitions (*N_dom*) completed in the year by the acquiring firm.
N_10m	Count of number of domestic acquisitions completed in the year by the acquiring firm where the transaction value is at least $10m.
N_50m	Count of number of domestic acquisitions completed in the year by the acquiring firm where the transaction value is at least $50m.
N_dom	Count of the number of domestic acquisitions completed in the year by the acquiring firm. Acquisitions are considered if the transaction value is at least $1 million and the transaction value represents at least 1% of the acquiring firm's market value.
N_frn_all	Count of the number of foreign acquisitions completed in the year by the acquiring firm.

VARIABLE	Definition
N_lower	Count of number of lower visibility domestic acquisitions completed in the year by the acquiring firm. Acquisitions are considered lower visibility if they do not meet the 1% or $1 million thresholds.
N_lowest	Count of number of low visibility domestic acquisitions completed in the year by the acquiring firm. Acquisitions are considered lowest visibility if the target is a private firm without dollar value disclosed.
past_3yr_lowest_ind	Indicator equals one if *past_N_3yr_lowest* > 0 and zero otherwise.
past_lnTV_3yr_dom	Natural log of one plus the total transaction value for domestic acquisitions (*N_dom*) completed by the acquiring in the previous three years.
past_N_3yr_10m	The count of total domestic acquisitions where the transaction value is at least $10m (*N_10m*) completed by the acquiring in the previous three years.
past_N_3yr_50m	The count of total domestic acquisitions where the transaction value is at least $50m (*N_50m*) completed by the acquiring in the previous three years.
past_N_3yr_dom	The count of total domestic acquisitions (*N_dom*) completed by the acquiring in the previous three years.
past_N_3yr_dom_ind	Indicator equals one if *past_N_3yr_dom* > 0 and zero otherwise.
past_N_3yr_xbor	The count of total foreign acquisitions (*N_frn_all*) completed by the acquiring in the previous three years.
past_N_3yr_lower	The count of total lower visibility domestic acquisitions (*N_lower*) completed by the acquiring in the previous three years.
past_N_3yr_lowest	The count of total lowest visibility domestic acquisitions (*N_lowest*) completed by the acquiring in the previous three years.
Pre-Tax Foreign Income	Ratio of pre-tax foreign income to total firm assets (for Figure 3d).
REPAT	Measures the incremental U.S. tax due on repatriation of cash from foreign subsidiaries in year t-1. Calculated by multiplying foreign earnings by the statutory U.S. tax rate of 35% and then subtracting foreign taxes paid. Scaled by total assets.
Repat Rate (Cash)	The three-year estimated repatriation tax rate, defined as .35 minus the firm's effective tax rate (calculated using taxes paid divided by book pre-tax income, *txfo/pifo*) averaged over the current and trailing two years (for Figure 3a).
Repat Rate (Book)	The three-year estimated repatriation tax rate, defined as .35 minus the firm's effective tax rate (calculated using book tax expenses divided by book pre-tax income, (*txfo+txdfo)/pifo*)) averaged over the current and trailing two years (for Figure 3b).
TV_dom	Total transaction value for domestic acquisitions (*N_dom*) completed in the year by the acquiring firm.

Table 1
Summary Statistics

Table 1 presents firm characteristics for all firm-year observations in Compustat during our 1993-2012 sample period. Information on the number and transaction value of acquisitions is from SDC Global acquisition database for the 1994-2013 sample period and patent information is from the Kogan *et al.* (2012) patent database for the years 1988-2009. Accounting information is presented for the year before the acquisition takes place. All non-indicator variables are winsorized by year at the 1st and 99th percentiles. Panel A presents overall averages in columns 1-3 and average firm characteristics for non-Double Irish-using firms (*DoubleIrish* = 0) and Double Irish-using firms (*DoubleIrish* =1) in columns 4-9. Differences (Double Irish - non-Double Irish) and P-values are provided in columns 10, and 11. Panel B presents the correlations between our main control variables. Section 4 and the Appendix provide more information about variable and sample construction.

Panel A: Overall Summaries and Univariate Group Summaries

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
		Full Sample			DoubleIrish = 1			DoubleIrish = 0			
VARIABLES	N	Mean	Sd	N	Mean	Sd	N	Mean	Sd	(5) -(8)	P-value
DoubleIrish	66,859	0.044	0.20								
N_dom	66,859	0.165	0.450	2,915	0.217	0.485	63,944	0.162	0.448	0.055	<0.001
past_N_3yr_dom	66,859	0.543	0.985	2,915	0.777	1.059	63,944	0.532	0.981	0.245	<0.001
lnTV_dom	66,859	0.543	1.508	2,915	1.043	2.263	63,944	0.520	1.461	0.522	<0.001
past_lnTV_3yr_dom	66,859	1.341	2.198	2,915	2.873	3.232	63,944	1.271	2.112	1.602	<0.001
N_10m	66,859	0.145	0.430	2,915	0.320	0.603	63,944	0.137	0.419	0.183	<0.001
past_N_3yr_10m	66,859	0.459	0.958	2,915	1.150	1.451	63,944	0.428	0.917	0.722	<0.001
N_50m	66,859	0.079	0.305	2,915	0.244	0.516	63,944	0.072	0.289	0.172	<0.001
past_N_3yr_50m	66,859	0.238	0.638	2,915	0.837	1.133	63,944	0.211	0.592	0.627	<0.001
N_lower	66,859	0.228	0.695	2,915	0.705	1.220	63,944	0.207	0.653	0.499	<0.001
past_N_3yr_lower	66,859	0.768	1.835	2,915	2.275	3.191	63,944	0.699	1.718	1.577	<0.001
N_lowest	66,859	0.136	0.504	2,915	0.439	0.893	63,944	0.122	0.474	0.317	<0.001
past_N_3yr_lowest	66,859	0.457	1.328	2,915	1.373	2.234	63,944	0.416	1.256	0.957	<0.001
ind_dom	66,859	0.135	0.342	2,915	0.185	0.388	63,944	0.133	0.340	0.052	<0.001
past_N_3yr_dom_ind	66,859	0.325	0.469	2,915	0.469	0.499	63,944	0.319	0.466	0.150	<0.001
ind_lowest	66,859	0.090	0.286	2,915	0.256	0.436	63,944	0.082	0.275	0.174	<0.001
past_3yr_lowest_ind	66,859	0.202	0.402	2,915	0.469	0.499	63,944	0.190	0.392	0.279	<0.001
N_frn_all	66,859	0.132	0.447	2,915	0.565	0.894	63,944	0.112	0.404	0.453	<0.001
past_N_3yr_frn_all	66,859	0.408	1.037	2,915	1.843	2.136	63,944	0.343	0.905	1.501	<0.001
TV_dom	66,859	26.815	142.807	2,915	98.785	300.939	63,944	23.534	130.190	75.250	<0.001
lag_sales_growth	66,859	0.224	0.697	2,915	0.098	0.292	63,944	0.230	0.709	-0.131	<0.001
lag_nwc_assets	66,859	0.076	0.203	2,915	0.028	0.129	63,944	0.078	0.205	-0.050	<0.001
lag_debt_assets	66,859	0.218	0.219	2,915	0.222	0.175	63,944	0.218	0.220	0.005	0.256
lag_mtb	66,859	2.862	4.125	2,915	3.478	4.170	63,944	2.834	4.120	0.644	<0.001
lag_price_earnings	66,859	12.590	48.738	2,915	16.169	46.227	63,944	12.427	48.843	3.742	<0.001

lag_lnassets	66,859	5.261	2.040	2,915	8.246	1.441	63,944	5.125	1.958	3.121	<0.001
lag_assets	66,859	1,544.25	5,163.26	2,915	9,541.42	14,092.40	63,944	1,179.688	3,971.87	8,361.73	<0.001
lag_pct_foreign_income	66,859	0.007	0.035	2,915	0.042	0.059	63,944	0.006	0.032	0.036	<0.001
lag_cash_assets	66,859	0.189	0.218	2,915	0.159	0.152	63,944	0.191	0.221	-0.032	<0.001
lag_roa	66,859	0.047	0.057	2,915	0.062	0.055	63,944	0.046	0.057	0.016	<0.001
lag_netloss	66,859	0.370	0.483	2,915	0.189	0.392	63,944	0.379	0.485	-0.190	<0.001
lnpatents	66,859	0.923	1.530	2,915	3.013	2.453	63,944	0.828	1.401	2.185	<0.001
REPAT	66,859	0.001	0.004	2,915	0.005	0.008	63,944	0.001	0.003	0.004	<0.001
lnissuance	66,859	1.004	2.123	2,915	2.450	3.174	63,944	0.938	2.038	1.512	<0.001
ΔPRE	7,416	0.019	0.044	1,648	0.026	0.048	5,768	0.017	0.043	0.009	<0.001
DI_likely	29,586	0.005	0.017	1,965	0.024	0.035	27,621	0.003	0.014	0.021	<0.001

Panel B: Correlation Table

	VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1)	DoubleIrish	1												
(2)	REPAT	0.212	1											
(3)	lag_sales_growth	-0.039	-0.026	1										
(4)	lag_nwc_assets	-0.051	0.005	-0.072	1									
(5)	lag_debt_assets	0.004	-0.063	-0.014	-0.204	1								
(6)	lag_mtb	0.032	0.034	0.130	-0.110	-0.101	1							
(7)	lag_price_earnings	0.016	0.035	0.011	0.072	-0.044	0.040	1						
(8)	lag_lnassets	0.312	0.208	-0.069	-0.035	0.190	-0.042	0.090	1					
(9)	lag_pct_foreign_income	0.214	0.627	-0.015	0.031	-0.046	0.045	0.071	0.262	1				
(10)	lag_cash_assets	-0.030	0.047	0.104	-0.258	-0.402	0.174	-0.040	-0.242	-0.025	1			
(11)	lag_roa	0.058	0.191	0.000	0.168	-0.220	0.135	0.134	0.147	0.232	0.027	1		
(12)	lag_netloss	-0.080	-0.137	0.038	-0.277	0.104	0.015	-0.464	-0.324	-0.242	0.204	-0.621	1	
(13)	lnpatents	0.292	0.248	-0.067	0.002	-0.073	0.062	0.019	0.345	0.242	0.109	0.081	-0.058	1

Table 2
Repatriation Tax Costs and Domestic Acquisitions

Table 2 presents the results of tests of the relationship between domestic (U.S.) acquisitions and Double Irish-using firms using all U.S. firm-years from 1994-2013. The key independent variable is *DoubleIrish*, which equals one if at least two Irish subsidiaries and a subsidiary in either the Netherlands or Luxembourg are present in a firm's Exhibit 21 10-K filings in the current or any prior years. The main dependent variables are constructed using acquisitions where the transaction value is at least $1 million and the transaction value represents at least 1% of the acquiring firm's market value (with the exception of specifications (4) and (5)). In specification (1), we present results using a negative binomial regression (demeaned at the firm level with industry-year fixed effects), while specification (2) uses an OLS regression (with firm and industry-year fixed effects) on the number of domestic (U.S) acquisitions. Specification (3) is an OLS specification similar to specification (2), where the dependent variable is the natural log of one plus the total value of domestic acquisitions. Specifications (4) and (5) are negative binominal regressions similar to specification (1), where the dependent variable is the number of acquisitions where disclosed deal value is at least $10 million (4) and at least $50 million (5). All variables in the negative binominal regressions are demeaned at the firm level and standardized to have a mean of zero and a standard deviation of one, such that the coefficient measures the effect on the dependent variable given a one-standard-deviation change in each of the demeaned independent variables (as in Hanlon *et al.* (2015) and Martin *et al.* (2015)). The estimated marginal effects (dy/dx) for *DoubleIrish* are shown in the last row. Robust z-statistics (t-statistics for OLS regressions), clustered at the firm level, are shown in parentheses below the estimated coefficients. ***, ** and * indicate significance of the coefficients at the 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
VARIABLES	N_dom	N_dom	lnTV_dom	N_10m	N_50m
DoubleIrish	-0.040***	-0.068***	-0.239**	-0.049***	-0.047**
	(-2.95)	(-2.66)	(-2.50)	(-3.24)	(-2.17)
lag_sales_growth	0.051***	0.017***	0.034***	0.043***	0.031**
	(5.52)	(4.82)	(3.44)	(4.51)	(2.57)
lag_nwc_assets	0.055***	0.071***	0.092*	0.027**	0.014
	(4.60)	(3.82)	(1.65)	(2.25)	(1.03)
lag_debt_assets	-0.082***	-0.102***	-0.364***	-0.103***	-0.107***
	(-6.20)	(-5.17)	(-5.92)	(-7.54)	(-6.25)
lag_mtb	0.050***	0.002***	0.010***	0.067***	0.071***
	(4.99)	(4.16)	(4.54)	(6.56)	(5.21)
lag_price_earnings	-0.013	0.000	0.000	0.008	0.032**
	(-1.05)	(0.01)	(0.67)	(0.67)	(2.13)
lag_lnassets	-0.081***	-0.029***	-0.005	0.000	0.105***
	(-4.84)	(-5.22)	(-0.28)	(0.00)	(4.54)
lag_pct_foreign_income	0.024**	0.114	0.598**	0.036***	0.058***
	(2.11)	(1.60)	(2.13)	(2.85)	(3.32)
lag_cash_assets	0.120***	0.198***	0.539***	0.097***	0.073***
	(10.94)	(9.27)	(8.39)	(8.66)	(5.19)

lag_roa	0.025**	0.150***	0.800***	0.047***	0.059***
	(2.18)	(2.68)	(4.22)	(3.78)	(3.68)
lag_netloss	-0.163***	-0.065***	-0.177***	-0.124***	-0.098***
	(-10.75)	(-8.72)	(-7.36)	(-7.99)	(-5.04)
lnpatents	-0.015	-0.006	-0.023	-0.005	-0.010
	(-1.12)	(-1.24)	(-1.33)	(-0.37)	(-0.52)
past_N_3yr_dom	-0.138***	-0.037***			
	(-8.18)	(-7.86)			
past_lnTV_3yr_dom			-0.055***		
			(-9.26)		
past_N_3yr_10m_dom				-0.078***	
				(-4.68)	
past_N_3yr_50m_dom					-0.183***
					(-6.38)
Observations	66,859	66,859	66,859	66,859	66,859
SIC-Year Controls	Fixed	Fixed	Fixed	Fixed	Fixed
Firm Controls	Demeaned	Fixed	Fixed	Demeaned	Demeaned
Cluster	Firm	Firm	Firm	Firm	Firm
R-squared/Pseudo R-Squared	0.042	0.296	0.283	0.036	0.049
Estimation Method	NegBin	OLS	OLS	NegBin	NegBin
DoubleIrish dy/dx	-0.060***	-0.068***	-0.239**	-0.064***	-0.034**

Table 3
Univariate PSM Tests of Domestic Acquisitions and Repatriation Tax Costs

Table 3 presents firm characteristics for a sample of Double Irish-using firms (*DoubleIris*h = 1) and closely matched non-Double Irish-using firms (*DoubleIrish* = 0) from 1994-2013. The matching firms are the five nearest-neighbor matches (with replacement) as determined by a probit regression of *DoubleIrish* on the characteristics listed below using propensity score matching and requiring an exact match on year and 2-Digit SIC code. We limit the sample to include only Double Irish-using firms in the first five years after the establishment of their Double Irish structure. Our main variables of interest consider the number or total value of domestic control acquisitions completed with a transaction value of at least $1 million and representing at least 1% of the acquiring firm's market value by each firm for a given year. In Panel A, the main variable of interest is the number of acquisitions (*N_do*m), and in Panel B the main variable of interest is the natural log of one plus the total value of domestic acquisitions (*lnTV_dom*). Summary statistics for the matched and treatment samples, as well as differences and significance (P-values and t-stats) are reported.

Panel A: PSM Sample Comparison for Number of Domestic Acquisitions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Treatment, DoubleIrish = 1			Matched, DoubleIrish = 0					
VARIABLES	N	Mean	Sd	N	Mean	Sd	(2) - (5)	P-value	T-stat
N_dom	1,502	0.215	0.487	4,915	0.260	0.540	-0.045	0.017	-2.380
lag_sales_growth	1,502	0.134	0.361	4,915	0.127	0.398	0.006	0.645	0.460
lag_nwc_assets	1,502	0.032	0.136	4,915	0.036	0.141	-0.004	0.464	-0.730
lag_debt_assets	1,502	0.224	0.191	4,915	0.208	0.184	0.016	0.020	2.320
lag_mtb	1,502	3.493	4.378	4,915	3.698	4.610	-0.206	0.210	-1.260
lag_price_earnings	1,502	17.249	51.949	4,915	18.333	54.965	-1.084	0.579	-0.560
lag_lnassets	1,502	7.803	1.324	4,915	7.558	1.439	0.245	0.000	4.850
lag_pct_foreign_income	1,502	0.030	0.051	4,915	0.030	0.050	0.000	0.967	0.040
lag_cash_assets	1,502	0.161	0.163	4,915	0.182	0.193	-0.021	0.001	-3.300
lag_roa	1,502	0.058	0.054	4,915	0.058	0.056	0.000	0.813	-0.240
lag_netloss	1,502	0.223	0.416	4,915	0.229	0.420	-0.006	0.713	-0.370
lnpatents	1,502	2.524	2.266	4,915	2.607	2.247	-0.084	0.311	-1.010
past_N_3yr_dom	1,502	0.818	1.095	4,915	0.907	1.244	-0.090	0.036	-2.090

Panel B: PSM Sample Comparison for Total Value of Domestic Acquisitions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Treatment, DoubleIrish = 1			Matched, DoubleIrish = 0					
VARIABLES	N	Mean	Sd	N	Mean	Sd	(2) - (5)	P-value	T-stat
lnTV_dom	1,502	0.965	2.128	4,864	1.123	2.271	-0.158	0.049	-1.970
lag_sales_growth	1,502	0.133	0.361	4,864	0.132	0.420	0.001	0.918	0.100
lag_nwc_assets	1,502	0.032	0.136	4,864	0.035	0.143	-0.003	0.539	-0.620
lag_debt_assets	1,502	0.224	0.191	4,864	0.211	0.187	0.013	0.053	1.930
lag_mtb	1,502	3.484	4.378	4,864	3.680	4.703	-0.196	0.238	-1.180
lag_price_earnings	1,502	17.216	51.953	4,864	17.819	55.877	-0.603	0.760	-0.310
lag_lnassets	1,502	7.803	1.323	4,864	7.568	1.432	0.235	0.000	4.680
lag_pct_foreign_income	1,502	0.030	0.051	4,864	0.030	0.050	0.000	0.989	-0.010
lag_cash_assets	1,502	0.160	0.163	4,864	0.179	0.192	-0.019	0.004	-2.880
lag_roa	1,502	0.058	0.054	4,864	0.058	0.056	0.000	0.838	-0.200
lag_netloss	1,502	0.224	0.417	4,864	0.231	0.421	-0.007	0.654	-0.450
lnpatents	1,502	2.508	2.261	4,864	2.591	2.258	-0.083	0.314	-1.010
past_lnTV_3yr_dom	1,502	2.757	3.054	4,864	2.831	3.057	-0.073	0.511	-0.660

Table 4
Repatriation Tax Costs, Domestic Acquisitions, and Tests for Selection and Omitted Variable Effects

Table 4 presents the results of two pairs of regression specifications using U.S. firm-years from 1997-2013 for firms with *Compustat* data available in 1996. As the excluded variable or instrumental variable in each pair of regressions, we use *DI_likely*, which is equal to a firm's *pct_foreign_income* in the year 1996 if the firm is in the top quartile of patent volume in 1996, and equal to zero otherwise. Specifications (1) and (2) report the results of the estimation of a bivariate probit model, using a probit regression of *DoubleIrish* on *DI_likely* in specification (1) and a probit regression of *ind_Dom* on *DoubleIrish* in specification (2). Specifications (3) and (4) follow Wooldridge (2002) and report the estimates from a standard two-stage least-squares instrumental variable (IV) regression where the predicted probability of establishing a DI structure, obtained from a probit regression of *DI_likely* on *DoubleIrish* (specification (3)), is used as the instrument for DI in a standard 2SLS procedure on *N_dom* (the second stage is reported in specification (4)). All specifications include industry-year fixed effects. Robust z-statistics (t-statistics for OLS regressions), clustered at the firm level, are shown in parentheses below the estimated coefficients. ***, ** and * indicate significance of the coefficients at the 1%, 5% and 10% levels, respectively.

VARIABLES	(1) DoubleIrish	(2) ind_dom	(3) DoubleIrish	(4) N_dom
DI_likely	4.590**		4.553**	
	(2.06)		(2.03)	
DoubleIrish		-0.205*		-0.071**
		(-1.71)		(-2.05)
lag_sales_growth	-0.183***	0.068***	-0.178***	0.016***
	(-2.78)	(3.75)	(-2.74)	(2.79)
lag_nwc_assets	-0.037	0.089	-0.052	0.007
	(-0.11)	(1.19)	(-0.16)	(0.39)
lag_debt_assets	-0.151	-0.089	-0.153	-0.018
	(-0.62)	(-1.34)	(-0.62)	(-1.05)
lag_mtb	0.010	0.005*	0.009	0.001
	(1.50)	(1.80)	(1.36)	(1.10)
lag_price_earnings	-0.000	-0.000	-0.000	0.000
	(-0.57)	(-0.17)	(-0.61)	(0.83)
lag_lnassets	0.498***	0.103***	0.498***	0.024***
	(12.90)	(11.18)	(12.81)	(9.51)
lag_pct_foreign_income	2.504***	-0.439	2.534***	-0.029
	(3.06)	(-1.31)	(3.11)	(-0.32)
lag_cash_assets	-0.055	0.334***	-0.039	0.080***
	(-0.20)	(4.57)	(-0.14)	(4.38)
lag_roa	-1.317*	0.661***	-1.325*	0.137**
	(-1.86)	(2.87)	(-1.87)	(2.05)
lag_netloss	-0.004	-0.212***	-0.008	-0.044***
	(-0.05)	(-5.99)	(-0.10)	(-4.63)
lnpatents	0.012	-0.008	0.013	-0.001
	(0.41)	(-0.85)	(0.42)	(-0.21)
past_3yr_dom_ind	0.075	0.466***		
	(1.30)	(19.55)		
past_N_3yr_dom			0.024	0.084***
			(0.81)	(17.36)
Observations	29,586	29,586	22,008	22,008
SIC-Year Controls	Fixed	Fixed	Fixed	Fixed
Cluster	Firm	Firm	Firm	Firm

Table 5
Tests Comparing Proxies for Repatriation Tax Costs

Table 5 presents the results of tests of the relationship between domestic (U.S.) and foreign acquisitions and Double Irish-using firms using all U.S. firm-years from 1994-2013. The key independent variables are *DoubleIrish* (as defined in Table 2), and *REPAT*, which is calculated by multiplying foreign earnings by the statutory U.S. tax rate of 35% and then subtracting foreign taxes paid and then scaling the result by total assets. In Panel A, the main dependent variables are domestic acquisitions (*N_dom*) as in Table 2 and any foreign acquisition (*N_frn_all*) where majority control is obtained by the acquirer in Panel B. The two panels present results using negative binomial regressions (specifications (1)-(2)) and OLS regressions (specifications (3)-(4)) using the demeaning, standardization, and fixed effects used in Table 2. The estimated marginal effects (dy/dx) for *DoubleIrish* are shown in the last row. Robust z-statistics (t-statistics for OLS regressions), clustered at the firm level, are shown in parentheses below the estimated coefficients. ***, ** and * indicate significance of the coefficients at the 1%, 5% and 10% levels, respectively.

Panel A: Tests Using *REPAT* on Domestic Acquisitions

	(1)	(2)	(3)	(4)
VARIABLES	N_dom	N_dom	N_dom	N_dom
DoubleIrish	-0.041***	-0.065***	-0.069***	-0.107***
	(-3.00)	(-4.42)	(-2.71)	(-3.89)
REPAT	0.023*	-0.003	1.444*	-0.101
	(1.86)	(-0.24)	(1.85)	(-0.13)
DoubleIrish*REPAT		0.063***		8.464***
		(5.24)		(4.33)
lag_pct_foreign_income	0.01	0.01	0.026	0.019
	(0.75)	(0.73)	(0.32)	(0.24)
Observations	66,859	66,859	66,859	66,859
SIC-Year Controls	Fixed	Fixed	Fixed	Fixed
Firm Controls	Demeaned	Demeaned	Fixed	Fixed
Cluster	Firm	Firm	Firm	Firm
R-Squared/Pseudo R-squared	0.042	0.042	0.296	0.296
Estimation Method	NegBin	NegBin	OLS	OLS
DoubleIrish dy/dx	-0.061***	-0.097***	-0.069***	-0.107***

Variables omitted for space: *lag_sales_growth, lag_nwc_assets, lag_debt_assets, lag_mtb, lag_price_earnings, lag_lnassets, lag_cash_assets, lag_roa, lag_netloss, lnpatents, N_past_3yr_dom.*

Panel B: Tests using *REPAT* on Foreign Acquisitions

	(1)	(2)	(3)	(4)
VARIABLES	N_frn_all	N_frn_all	N_frn_all	N_frn_all
DoubleIrish	-0.017	-0.018	-0.033	-0.034
	(-1.05)	(-1.10)	(-0.83)	(-0.87)
REPAT	0.029**	-0.001	1.981**	0.283
	(2.02)	(-0.08)	(2.01)	(0.25)
lag_pct_foreign_income		0.060***		0.377***
		(3.26)		(3.06)
Observations	36,066	36,066	36,066	36,066
SIC-Year Controls	Fixed	Fixed	Fixed	Fixed
Firm Controls	Demeaned	Demeaned	Fixed	Fixed
Cluster	Firm	Firm	Firm	Firm
R-Squared/Pseudo R-squared	.028	.028	0.386	0.387
Estimation Method	NegBin	NegBin	OLS	OLS
DoubleIrish dy/dx	-0.025	-0.027	-0.033	-0.034

Variables omitted for space: *lag_sales_growth, lag_nwc_assets, lag_debt_assets, lag_mtb, lag_price_earnings, lag_lnassets, lag_cash_assets, lag_roa, lag_netloss, lnpatents, N_past_3yr_frn_all.*

Table 6
Repatriation Tax Costs and Domestic Acquisitions That Are Less Visible to Regulators and Investors

Table 6 presents the results of tests of the relationship between domestic (U.S.) acquisitions and Double Irish-using firms using all U.S. firm-years from 1994-2013. The key independent variable is *DoubleIrish*, which equals one if at least two Irish subsidiaries and a subsidiary in either the Netherlands or Luxembourg are present in a firm's Exhibit 21 10-K filings in the current or any prior years. In Panel A, the dependent variables are *N_lower*, the number of domestic control acquisitions that do not meet the $1m/1% threshold used to construct *N_dom* in Tables 2-4, and *N_lowest*, the number of domestic acquisitions where the target firm is privately held and no information is disclosed about deal value. In Panels B and C, the dependent variable is *N_lowest*. Panel A uses negative binomial and OLS regressions with the fixed effects and specifications used previously in Table 2. Specifications (3) and (6) replicates specifications (1) and (4), with the addition of the natural log of total debt and equity issuance during the year of the acquisition (*lnissuance*) and an interaction of this variable with *DoubleIrish*. The estimated marginal effects (dy/dx) for *DoubleIrish* are shown in the last row. Panel B replicates the propensity score matching tests of Table 3, with the matching criteria now including the past three-year total of lowest visibility acquisitions (past_N_3yr_lowest). Panel C replicates the bivariate probit and two-stage least-squares instrumental variable tests of Table 4. Robust z-statistics (t-statistics for OLS regressions), clustered at the firm level, are shown in parentheses below the estimated coefficients in Panels A and C (***, ** and * indicate significance of the coefficients at the 1%, 5% and 10% levels, respectively), while P-values and t-stats are reported for characteristic differences in Panel B. The control variables listed at the bottom of Panels A and C are included in all specifications but the results are suppressed for space.

Panel A: Multivariate tests of Repatriation Tax Costs and PRAs

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	N_lower	N_lower	N_lower	N_lowest	N_lowest	N_lowest
DoubleIrish	0.027**	0.070	0.032***	0.047***	0.088**	0.051***
	(2.51)	(1.52)	(2.80)	(3.21)	(2.47)	(3.20)
lnissuance			0.114***			0.120***
			(11.32)			(9.07)
DoubleIrish*lnissuance			-0.009			-0.006
			(-1.07)			(-0.54)
Observations	66,859	66,859	66,859	66,859	66,859	66,859
SIC-Year Controls	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
Firm Controls	Demeaned	Fixed	Demeaned	Demeaned	Fixed	Demeaned
Cluster	Firm	Firm	Firm	Firm	Firm	Firm
R-Squared/Pseudo R-squared	0.0203	0.441	0.022	0.028	0.397	0.029
Estimation Method	NegBin	OLS	NegBin	NegBin	OLS	NegBin
DoubleIrish dy/dx	0.057**	0.070	0.067***	0.058***	0.088**	0.063***

Variables omitted for space: *lag_sales_growth, lag_nwc_assets, lag_debt_assets, lag_mtb, lag_price_earnings, lag_lnassets, lag_pct_foreign_income, lag_cash_assets, lag_roa, lag_netloss, lnpatents, past_3yr_lower* (specifications (1)-(3)), and *past_3yr_lowest* (specifications (4)-(6)).

Panel B: PSM Sample Comparison of Lowest Visibility Domestic Acquisition Volume

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Treatment, DoubleIrish = 1			Matched, DoubleIrish = 0					
VARIABLES	N	Mean	Sd	N	Mean	Sd	(2) - (5)	P-value	T-stat
N_lowest	1,473	0.346	0.782	4,849	0.294	0.708	0.051	0.062	1.860
lag_sales_growth	1,473	0.133	0.363	4,849	0.129	0.411	0.004	0.773	0.290
lag_nwc_assets	1,473	0.033	0.136	4,849	0.038	0.143	-0.005	0.355	-0.930
lag_debt_assets	1,473	0.224	0.193	4,849	0.213	0.185	0.011	0.129	1.520
lag_mtb	1,473	3.469	4.390	4,849	3.626	4.456	-0.157	0.334	-0.970
lag_price_earnings	1,473	17.281	52.196	4,849	16.734	55.400	0.547	0.783	0.280
lag_lnassets	1,473	7.769	1.310	4,849	7.542	1.447	0.228	0.000	4.470
lag_pct_foreign_income	1,473	0.030	0.051	4,849	0.030	0.048	0.000	0.984	-0.020
lag_cash_assets	1,473	0.162	0.163	4,849	0.178	0.193	-0.016	0.013	-2.490
lag_roa	1,473	0.058	0.054	4,849	0.057	0.055	0.001	0.754	0.310
lag_netloss	1,473	0.227	0.419	4,849	0.241	0.428	-0.014	0.371	-0.900
lnpatents	1,473	2.492	2.249	4,849	2.614	2.255	-0.122	0.141	-1.470
past_N_3yr_lowest	1,473	1.037	1.848	4,849	1.059	1.940	-0.022	0.756	-0.310

Panel C: Repatriation Tax Costs, Lowest Visibility Domestic Acquisitions, and Tests for Selection and Omitted Variable Effects

	(1)	(2)	(3)	(4)
VARIABLES	DoubleIrish	ind_lowest	DoubleIrish	N_lowest
DI_likely	4.434**		4.535**	
	(2.03)		(2.02)	
DoubleIrish		0.685***		0.437***
		(5.09)		(5.70)
Observations	29,586	29,586	22,008	22,008
SIC-Year Controls	Fixed	Fixed	Fixed	Fixed
Cluster	Firm	Firm	Firm	Firm
R-Squared/Pseudo R-Squared			0.423	0.275

Variables omitted for space: *lag_sales_growth, lag_nwc_assets, lag_debt_assets, lag_mtb, lag_price_earnings, lag_lnassets, lag_pct_foreign_income, lag_cash_assets, lag_roa, lag_netloss, lnpatents, past_3yr_lowest_ind* (specifications (1)-(2)), and *past_3yr_lowest* (specifications (3)-(4)).

Table 7
Repatriation Tax Costs, Domestic Acquisitions, and Changes in Permanently Invested Earnings

Table 7 presents results of OLS regressions of the relationship between changes in permanently reinvested earnings (ΔPRE), *DoubleIrish*, *REPAT*, and domestic acquisitions. *PRE* data is hand collected from firm's 10-K filings and from Audit Analytics for the 2000-2013 period (excluding 2004-2005) where *ΔPRE* is not equal to zero. Industry-year fixed effects are included in all regressions. Specifications (1) – (3) use counts (*x = N; N_dom and N_lowest*) while specifications (4) – (6) use indicators (*x = ind; ind_dom and ind_lowest*) for acquisition counts. Specifications (1) and (4), include double interactions of *DoubleIrish* with both types of acquisitions. Specifications (2) and (5) include double interactions of *REPAT* with both types of acquisitions. Specifications (3) and (6) include all previous interactions, along with an interaction between *DoubleIrish* and *REPAT* and triple interactions between *DoubleIrish*, *REPAT*, both types of acquisitions. The control variables listed at the bottom of the table are included in all specifications but the results are suppressed for space. Robust t-statistics, clustered at the firm level, are shown in parentheses below the estimated coefficients. ***, ** and * indicate significance of the coefficients at the 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Acquisition counts (N_dom and N_lowest)			Acquisition indicators (ind_dom and ind_lowest)		
VARIABLES	ΔPRE	ΔPRE	ΔPRE	ΔPRE	ΔPRE	ΔPRE
DoubleIrish	0.001	0.002	-0.001	0.001	0.002	-0.001
	(0.39)	(1.57)	(-0.56)	(0.53)	(1.60)	(-0.46)
REPAT	1.153***	1.142***	1.077***	1.156***	1.144***	1.077***
	(6.98)	(6.20)	(5.31)	(7.02)	(6.19)	(5.28)
DoubleIrish*REPAT			0.300			0.332
			(1.06)			(1.22)
x_dom	-0.002*	-0.001	-0.001	-0.003**	-0.002	-0.002
	(-1.89)	(-1.05)	(-0.99)	(-2.14)	(-1.18)	(-1.32)
DoubleIrish* x_dom	0.005**		0.002	0.008***		0.003
	(2.47)		(0.64)	(2.66)		(0.86)
x_dom*REPAT		0.124	-0.236		0.214	-0.229
		(0.67)	(-1.03)		(0.90)	(-0.86)
DoubleIrish*x_dom*REPAT			0.551			0.708
			(1.41)			(1.47)
x_Lowest	-0.001*	-0.001	-0.002***	-0.002	-0.001	-0.003*
	(-1.83)	(-0.87)	(-2.78)	(-1.19)	(-0.87)	(-1.71)
DoubleIrish* x_lowest	0.002		0.004***	0.000		0.005
	(1.64)		(3.15)	(0.06)		(1.47)
x_lowest*REPAT		0.009	0.244		-0.077	0.273
		(0.12)	(1.46)		(-0.37)	(0.90)
DoubleIrish* x_lowest*REPAT			-0.443**			-0.804*
			(-2.34)			(-1.95)
Observations	7,414	7,414	7,414	7,414	7,414	7,414
SIC-Year Controls	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
Cluster	Firm	Firm	Firm	Firm	Firm	Firm
R-Squared	0.216	0.215	0.217	0.216	0.215	0.217

Variables omitted for space: *lag_sales_growth, lag_nwc_assets, lag_debt_assets, lag_mtb, lag_price_earnings, lag_lnassets, lag_pct_foreign_income, lag_cash_assets,*

Figure 1

Overview of "Double Irish" Structure and its Use

Step 1: Establish an Irish subsidiary and manage it from a different tax haven country.

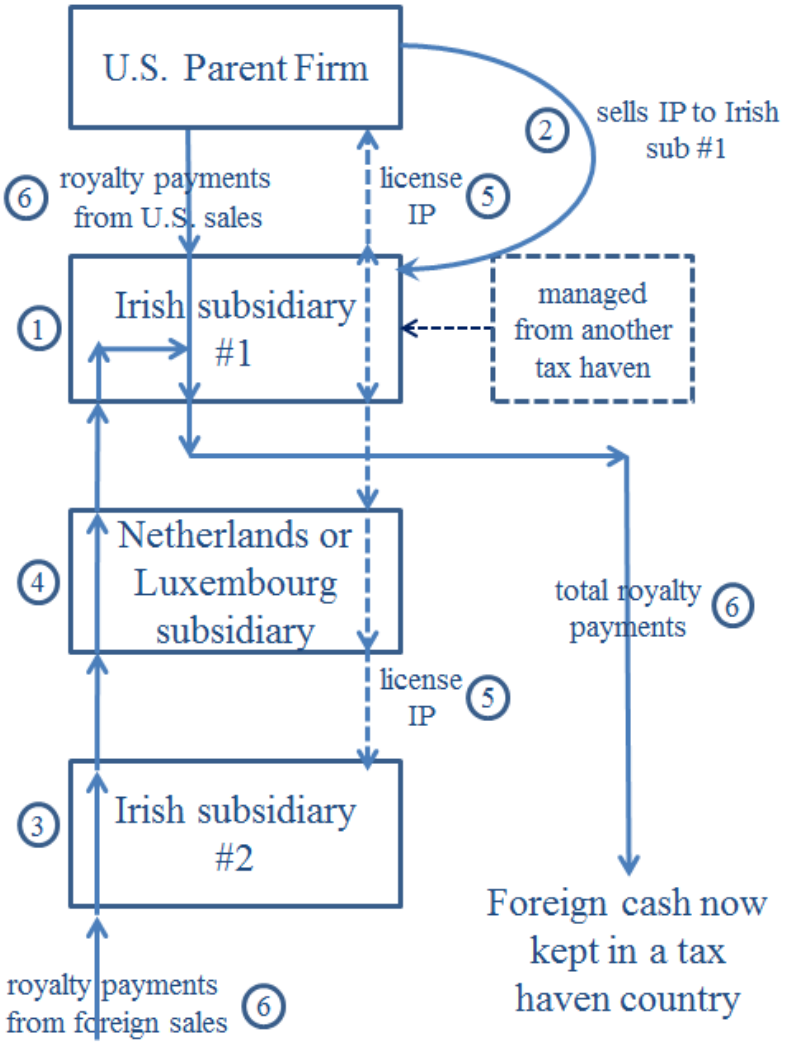
Step 2: Sell **new patents/IP** to Irish subsidiary (or co-create IP with Irish subsidiary).

Step 3: Irish sub #1 establishes Irish sub #2. Transactions between these subsidiaries are not taxable by the IRS if a **"check-the-box" election** is made.

Step 4: Establish a Dutch or Luxembourgian subsidiary for transfers between Irish subsidiaries (to avoid withholding tax on these transfers).

Step 5: Irish sub #1 licenses the IP back to the U.S. parent and to the Dutch/Luxembourgian subsidiary (which then licenses the IP to Irish sub #2).

Step 6: Pre-tax profits from **foreign sales** are paid to Irish subsidiaries as IP royalties. Payments are massed in Irish sub #1 (and not taxed by Irish government due to foreign control from a tax haven country).



Source: *The New York Times*, April 2012, Royse Law Blog, November 2013.

Figure 2
Abnormal Stock Turnover Around Domestic Acquisition Announcements

The following figures show abnormal turnover and 95% confidence interval bands for the acquiring firm during the 21-day period [-10, +10] surrounding the deal announcement. Abnormal turnover is calculated according to Chae (2005). Figure 2a shows all material acquisitions (i.e. acquisitions above the 1%/$1M threshold) in comparison to all lower visibility acquisitions. Figure 2b removes any acquisitions that coincide with an earnings announcement during the 21-day period. t-statistics from two-tailed tests for differences in average turnover are shown in parentheses below the x-axis for days -10, -5, 0, 5, and 10 in each figure.

Figure 2a: All Acquisitions

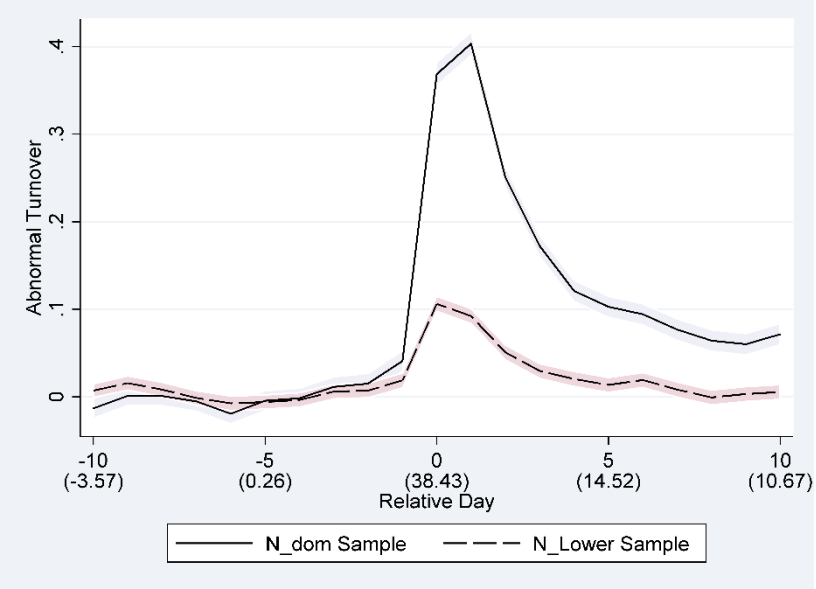


Figure 2b: All Acquisitions without Contemporaneous Earnings Announcements

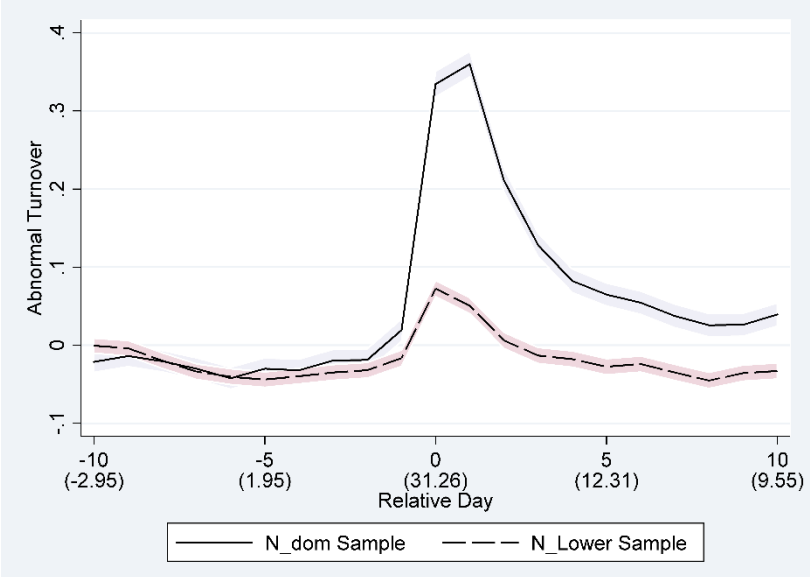


Figure 3
Double Irish Establishment and Proxies for Repatriation Tax Costs

The following figures show foreign income and tax-related measures for Double Irish-using firms (represented by solid lines) in the 11 year period [-5, +5] surrounding the establishment of their Double Irish structure. The dashed lines represent the average of the composite foreign income and tax-related measures for non-DI, MNC firms (equally weighted) in the same periods as the DI users represented by the solid line. Figure 3a plots the estimated three-year estimated repatriation cash tax rate, defined as .35 minus the firm's effective tax rate on foreign income (calculated using taxes paid divided by book pre-tax income) averaged over the current and trailing two years. Figure 3b plots the estimated three-year estimated repatriation book tax rate, which is calculated similarly to the cash tax rate in 3a with book (rather than paid) tax expenses. Figure 3c plots *REPAT*. Figure 3d plots pre-tax foreign income (scaled by total firm assets). Year 0 is the fiscal year when the firm first reports the necessary subsidiaries for a Double Irish structure. To be included, the Double Irish firm must appear in the sample for at least three years before the establishment and three years after. Pre- and Post-Double Irish averages are included for both series.

Figure 3a: Repat Rate (Cash Taxes)

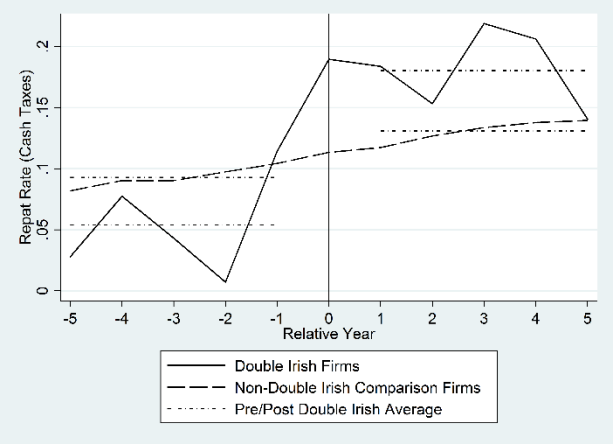


Figure 3b: Repat Rate (Book Taxes)

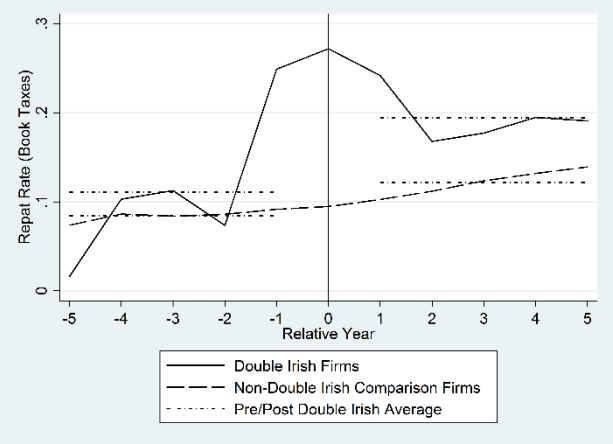


Figure 3c: *REPAT*

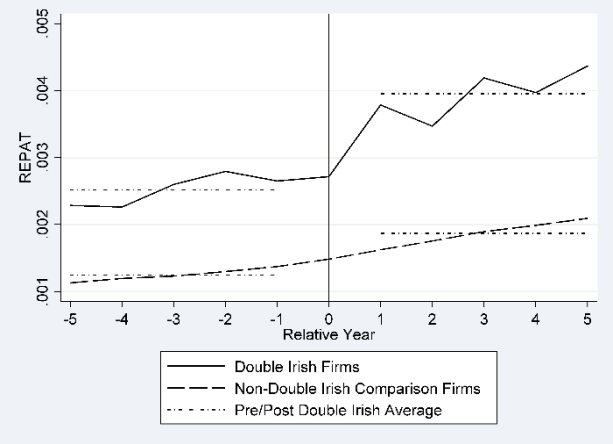


Figure 3d: Pre-Tax Foreign Income

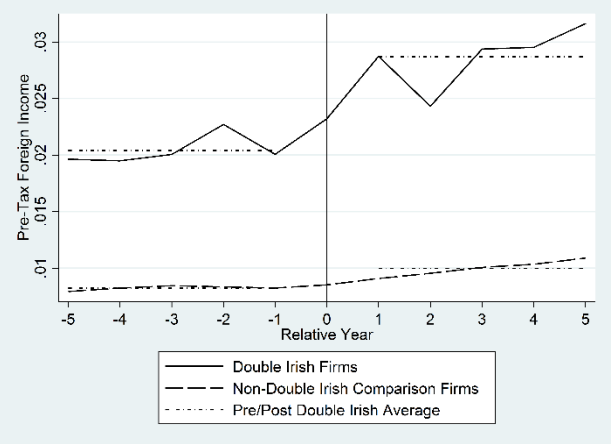


Figure 4
Double Irish Establishment and Acquisition Trends

The following figures show the number (4a) and value (4b) of domestic and foreign acquisitions above the 1%/$1M threshold for Double Irish-using firms in the 11 year period [-5, +5] surrounding the establishment of their Double Irish structure. Year 0 is the fiscal year when the firm first reports the necessary subsidiaries for a Double Irish structure. To be included, the Double Irish firm must appear in the sample for at least three years before the establishment and three years after. Pre- and Post-Double Irish averages are included for both series.

Figure 4a: Number of Acquisitions

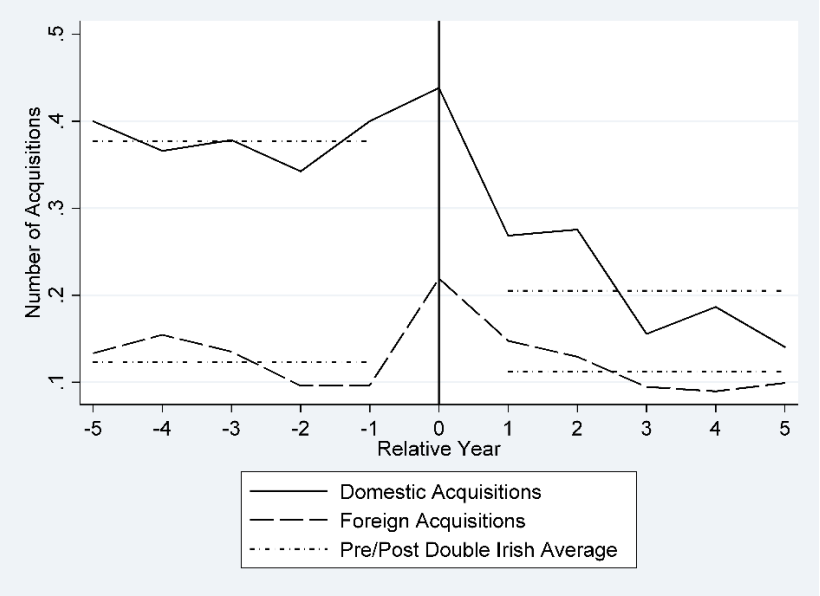
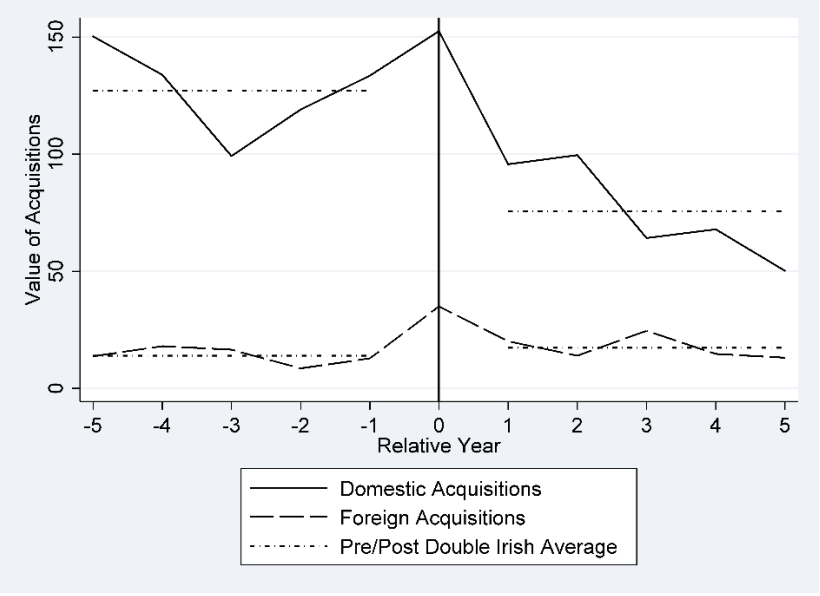


Figure 4b: Total Value of Acquisitions



U.S. WORLDWIDE TAXATION AND DOMESTIC MERGERS AND ACQUISITIONS

September 28, 2017

ONLINE APPENDIX

Formal Model Derivations for Section 3 (Hypothesis Development)

To motivate our hypotheses and subsequent empirical tests, this appendix provides a simple model of acquisition decision-making for firm managers in the context of repatriation costs. Under normal circumstances, firm managers, whom we assume are maximizing shareholder value, will pursue a proposed acquisition if its expected net present value is greater than zero. However, if the acquisition is funded with "trapped cash", the net present value will reflect both the expected value of the deal *and* the tax costs associated with repatriation. We model this dynamic below:

$$NPV = \begin{cases} V, & \text{Domestic acquisitions with no repatriation of trapped cash} \\ V - T, & \text{Domestic acquisitions funded by repatriation of trapped cash.} \end{cases} \quad (1A)$$

In these equations, V represents a potential acquisition's net present value *without* funding from trapped cash. T refers to the incremental cost of a standard repatriation of trapped cash (compared with the most likely alternative source of funding).

In our model, increases in T affect domestic acquisition decisions in two ways. First, if a potential deal has a very small but positive net present value without repatriation costs, these costs could turn this value-creating deal into a value-destroying deal (i.e. $V > 0$ and $V - T < 0$). In this case, as T increases, managers are more likely to reject a marginally value-creating deal.

The second and more complicated scenario occurs when firm managers defer the use of trapped cash as a funding source for domestic deals in the hope of a future reduction or elimination of repatriation taxes. To model this scenario, we introduce several new variables: the probability of repatriation tax elimination in the next period (p), the probability that the potential acquisition will still be available in the next period (a), and the discount rate used by the firm to equate cash flows between periods (r). A firm would forego a value-creating deal funded by repatriated cash (rather than accepting it immediately) if the following expression is true:

$$\frac{a(pV+(1-p)(V-T))}{(1+r)} > V - T. \quad (2A)$$

The left-hand side of this equation reflects the expected value of the potential value-creating acquisition funded by trapped cash one period from now. The parenthetical expression in the numerator reflects the probability of repatriation tax elimination (p) multiplied by the deal's value *without* repatriation tax costs (V), plus the probability of *no* tax law change times the deal's

value using trapped cash ((1 – *p*)(*V* – *T*)). We then multiply the probability of the deal's continued availability in one period (*a*) and discount back to the present.[1]

The values of *p*, *a*, and *r* will be ultimately unimportant for our hypotheses; we need only assume that *p* and *a* are probabilities between 0 and 1 and $r > 0$.[2] We care only about how a change in *T* will affect the estimated value of the "option to wait" modeled in equation (2A). We model this value as the left-hand side of (2A) minus the right hand side and take the first derivative with respect to *T*:

$$\frac{d}{dT}\left[\left(\frac{a(pV+(1-p)(V-T))}{(1+r)}\right)-(V-T)\right]=\frac{a}{(1+r)}(p-1)+1. \quad (3A)$$

Since the possible range of $\frac{a}{(1+r)}$ values is [0,1) and the possible range of (p - 1) values is [-1,0], the range of the product of these expressions is (-1,0], and after adding 1, the right-hand side result of equation (3A) will always be positive. Thus, an increase in *T* should result in a more valuable "option to wait", resulting a lower likelihood of deal acceptance in the present.[3]

The negative relationship between *T* and domestic acquisition likelihood outlined in both of the scenarios above are used to motivate Hypothesis 1 (*An increase in potential repatriation tax costs for U.S. firms will result in lower levels of domestic acquisitions for those firms.*)

To model how PRAs affect acquisition decision-making, we add three additional variables to our framework: *q*, the estimated probability that a one-time tax cost will be imposed on trapped cash *without* repatriation one period from now, *K*, the trapped cash that would be spent on a potential acquisition, and *C*, a function representing estimated costs associated with PRAs. We add the impact of PRAs on deal values to our previous acquisition scenarios in the following equation:

$$NPV=\begin{cases}V, & \text{Domestic acq. with no repatriation of trapped cash or PRA}\\ V-T, & \text{Domestic acq. funded by repatriation of trapped cash without PRA}\\ V+\frac{qKT}{(1+r)}-C(Z,v). & \text{Domestic PRA acq. using trapped cash}\end{cases} \quad (4A)$$

[1] For simplicity, we assume that *V* is the same in both periods and that future deal value is zero if the deal is no longer available in the next period (i.e., $a = 0$). We also ignore any impact from a one-time tax on trapped cash (such as the proposed one-time trapped cash tax referenced at the end of Section 2) in equation (2A) since it wouldn't affect the acquisition-specific valuations in that equation.

[2] If $a = 0$, there is no "option to wait" and the relationship between *T* and deal acceptance probability reverts to the first scenario outlined earlier (higher *T* implies a lower likelihood of accepting marginally value-creating deals).

[3] If we assume repatriation tax costs are reduced (rather than eliminated) when $p = 1$, the same conclusion holds. For example, if repatriation taxes would be reduced to $.5T$ instead of zero, the right-hand side of equation (3A) (after the derivative with respect to *T* of the value of the "option to wait") would instead equal $\frac{a}{(1+r)}(.5p-1)+1$, which is still greater than 0 for all allowed values of *a*, *r*, and *p*.

The second term in the bottom expression ($\frac{qKT}{(1+r)}$) reflects the estimated benefit of avoiding a future tax on trapped cash, modeled as the probability of that tax *q* multiplied by the cost of that tax for the funds that could otherwise be used for the PRA (*KT*), discounted back to the present. (For simplicity, we assume that this tax cost is equal to our earlier variable *T*.) The derivative of this term with respect to *T* is $\frac{qK}{(1+r)}$; since q is a value between zero and one and *r* and *K* are positive numbers, $\frac{qK}{(1+r)}$ is always positive and the value of a PRA therefore increases as repatriation tax costs increase.

The third term in the bottom expression of equation (4A), the cost of using a PRA ($C(Z,v)$), includes any planning, compliance, reputational, and financial reporting costs associated with the use of loopholes. *C* is a function of a vector of unobservable variables (*Z*) and *deal visibility* (*v*) to investors and regulators. We assume that the cost of PRAs increases with the visibility of the deal, reflecting the link between tax avoidance technique visibility and subsequent regulatory reform $\left(\frac{dC}{dv} > 0\right)$. Under this assumption, *v* is inversely related to the value created from the tax-avoiding element of the PRA.

Using the first and third expressions in equation (4A) above, we would expect to observe a *greater level of low visibility domestic acquisitions* if the following condition is met:

$$V + \frac{qKT}{(1+r)} - C(Z,v) > V \qquad (5A)$$

In other words, a proposed acquisition of a firm that generates a sufficiently low value of *v* (so that $\frac{qKT}{(1+r)} > C(Z,v)$) would create more value than a non-PRA deal for that firm, even in cases where the deal could be funded with domestic, repatriation-tax-free sources of cash (the right-hand side of equation (5A)). Our second hypothesis follows from this reasoning (*If the investment decisions of U.S. firms are sensitive to potential repatriation tax costs, these firms will pursue lower visibility domestic acquisitions as PRAs, with corresponding decreases in trapped cash reserves*).

Table A.1: Descriptions and Summary Statistics for Appendix Variables

This table presents firm characteristics for all firm-year observations in Compustat during our 1994-2013 sample period. Information on the number and transaction value of acquisitions is from SDC Global acquisition database for the 1994-2013 sample period and subsidiary information is available in each firm's 10-k filings. Accounting information is presented for the year before the acquisition takes place. All variables are winsorized by year at the 1st and 99th percentiles.

VARIABLES	Definition	(1) N	(2) Mean	(3) Sd
lag_dom_sales	Domestic sales from the Compustat Segments files scaled by total assets, if available, zero otherwise. Sales and total assets are lagged by one year.	66,859	0.270	0.670
lag_for_sales	Foreign sales from the Compustat Segments files scaled by total assets, if available, zero otherwise. Sales and total assets are lagged by one year.	66,859	0.017	0.096
lag_total_sales	Total sales scaled by total assets if foreign sales and domestic sales are unavailable, zero otherwise. Sales and total assets are lagged by one year.	66,859	0.899	0.843
lnTV_all	Natural log of one plus the total transaction value for all change of control domestic acquisitions (available in SDC) completed in the year by the acquiring firm.	66,859	0.596	1.559
NaïveDoubleIrish	Indicator equals one for the year if the acquiring firm has at least two Irish subsidiaries and a subsidiary in either the Netherlands or Luxembourg according to Exhibit 21 in the current year and zero otherwise.	66,859	0.032	0.176
past_lnTV_3yr_all	Natural log of one plus the total transaction value for all transfer-of-control domestic acquisitions (available in SDC) completed by the acquiring in the previous three years.	66,859	1.42	2.223

Table A.2: Tests for Validity of *DoubleIrish* as a Proxy for Higher Repatriation Tax Costs

This table presents the results of OLS tests using firm-year observations from multinational corporations (MNCs), defined as firms that report foreign income, foreign taxes, or foreign subsidiaries from 1994-2013. The key independent variable is *DoubleIrish* which equals one if at least two Irish subsidiaries and a subsidiary in either the Netherlands or Luxembourg are present in a firm's Exhibit 21 10-K filings in the current or any prior years. The dependent variable is *REPAT*, which is calculated by multiplying foreign earnings by the statutory U.S. tax rate of 35% and then subtracting foreign taxes paid and then scaling the result by total assets. Specification (1) includes year fixed-effects, specification (2) includes industry-year fixed-effects, specification (3) includes both year and firm fixed-effects, and specification (4) includes industry-year and firm fixed-effects. Robust t-statistics, clustered at the firm level, are shown in parentheses below the estimated coefficients. ***, ** and * indicate significance of the coefficients at the 1%, 5% and 10% levels, respectively.

	(1) REPAT	(2) REPAT	(3) REPAT	(4) REPAT
DoubleIrish	0.001***	0.001***	0.001**	0.000*
	(4.25)	(4.11)	(2.12)	(1.66)
lag_sales_growth	0.000	0.000	-0.000	-0.000
	(0.27)	(0.24)	(-0.78)	(-0.97)
lag_nwc_assets	0.000	-0.001**	-0.000	0.000
	(0.54)	(-2.46)	(-0.47)	(0.03)
lag_debt_assets	0.000	0.000	-0.000	0.000
	(1.56)	(1.31)	(-0.09)	(0.10)
lag_mtb	-0.000**	-0.000	-0.000***	-0.000**
	(-2.07)	(-1.10)	(-3.19)	(-2.50)
lag_price_earnings	0.000***	0.000***	0.000	0.000
	(4.27)	(3.99)	(0.92)	(1.33)
lag_lnassets	-0.000***	-0.000**	-0.000**	-0.000
	(-4.62)	(-2.18)	(-2.47)	(-1.34)
lag_pct_foreign_income	0.064***	0.064***	0.062***	0.062***
	(28.01)	(28.25)	(25.17)	(25.87)
lag_cash_assets	0.002***	0.001***	-0.000	-0.000
	(6.46)	(5.05)	(-0.50)	(-0.77)
lag_roa	0.010***	0.011***	0.008***	0.009***
	(9.02)	(9.49)	(7.46)	(8.13)
lag_netloss	0.001***	0.001***	0.000***	0.000***
	(9.76)	(9.62)	(4.24)	(4.76)
lnpatents	0.000***	0.000***	0.000***	0.000***
	(5.89)	(3.11)	(5.00)	(3.72)
Observations	36,066	36,066	36,066	36,066
Year Controls	Fixed	None	Fixed	None
SIC-Year Controls	None	Fixed	None	Fixed
Firm Fixed-Effects	None	None	Fixed	Fixed
Cluster	Firm	Firm	Firm	Firm
R-squared	0.408	0.433	0.656	0.669

Table A.3: Robustness Tests Using Domestic Acquisition Volume

This table presents the results of tests of the relationship between domestic (U.S.) acquisitions and Double Irish firms using all U.S. firm-years from 1994-2013. The key independent variable is *DoubleIrish* which equals one if at least two Irish subsidiaries and a subsidiary in either the Netherlands or Luxembourg are present in a firm's Exhibit 21 10-K filings in the current or any prior years. In the odd-numbered specifications we present results using a negative binomial regression (demeaned at the firm level with industry-year fixed effects) while in the even-numbered specifications (specification (9) is the only exception) we an OLS regression (with firm and industry-year fixed effects) on either the number of domestic (U.S) acquisitions (specifications (1) – (8)) or an indicator for any domestic acquisitions (specification (9)). In Specifications (1) and (2) use a sample of multinational firms (firms that report foreign income, foreign taxes, or foreign subsidiaries), specifications (3) and (4) use the full sample with an extended AJCA exclusion period (2004-2008), specifications (5) and (6) include controls for domestic and foreign controls, when available (total sales otherwise), and specifications (7) and (8) use the naïve version of the Double Irish indicator, where *DoubleIrish* equals one if at least two Irish subsidiaries and a subsidiary in either the Netherlands or Luxembourg are present in a firm's Exhibit 21 10-K filings in the current year. All variables in the negative binominal regressions are demeaned at the firm level and standardized to have a mean of zero and a standard deviation of one, such that the coefficient measures the effect on the dependent variable given a one-standard-deviation change in each of the demeaned independent variables. Marginal effects (dy/dx) are provided in the last row for *DoubleIrish* and *NaïveDoubleIrish*. Robust z-statistics (t-statistics for OLS regressions), clustered at the firm level, are shown in parentheses below the estimated coefficients. ***, ** and * indicate significance of the coefficients at the 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Multinationals Only		Extended AJCA		Controls for Foreign/Domestic Sales		Naïve		Indicator
VARIABLES	N_dom	N_dom	N_dom	N_dom	N_dom	N_dom	N_dom	N_dom	ind_dom
DoubleIrish	-0.046***	-0.060**	-0.038**	-0.063**	-0.039***	-0.066***			-0.046**
	(-2.69)	(-2.34)	(-2.37)	(-2.16)	(-2.84)	(-2.58)			(-2.45)
NaïveDoubleIrish							-0.023*	-0.035*	
							(-1.91)	(-1.65)	
lag_dom_sales					-0.080***	-0.031***			
					(-3.91)	(-3.89)			
lag_for_sales					-0.030***	-0.076***			
					(-2.83)	(-2.82)			
lag_total_sales					-0.128***	-0.043***			
					(-6.07)	(-5.79)			
lag_sales_growth	0.050***	0.028***	0.048***	0.016***	0.051***	0.018***	0.051***	0.017***	0.009***
	(3.84)	(3.54)	(4.77)	(4.22)	(5.67)	(4.94)	(5.51)	(4.83)	(3.75)
lag_nwc_assets	0.074***	0.139***	0.051***	0.063***	0.055***	0.071***	0.055***	0.072***	0.047***
	(4.89)	(4.37)	(3.97)	(3.11)	(4.61)	(3.79)	(4.61)	(3.84)	(3.24)
lag_debt_assets	-0.078***	-0.131***	-0.085***	-0.106***	-0.084***	-0.103***	-0.082***	-0.102***	-0.083***
	(-4.96)	(-4.40)	(-5.88)	(-4.78)	(-6.31)	(-5.22)	(-6.19)	(-5.17)	(-5.78)
lag_mtb	0.039***	0.003**	0.056***	0.003***	0.052***	0.003***	0.050***	0.002***	0.002***
	(2.92)	(2.57)	(5.12)	(4.28)	(5.12)	(4.24)	(5.00)	(4.17)	(3.45)
lag_price_earnings	-0.004	0.000	-0.017	0.000	-0.013	0.000	-0.013	0.000	0.000
	(-0.29)	(-0.40)	(-1.31)	(-0.22)	(-1.04)	(0.06)	(-1.05)	-0.02	(-0.50)
lag_lnassets	-0.054**	-0.024***	-0.064***	-0.024***	-0.110***	-0.038***	-0.083***	-0.030***	-0.016***
	(-2.47)	(-2.77)	(-3.39)	(-3.90)	(-6.29)	(-6.41)	(-4.91)	(-5.28)	(-4.05)
lag_pct_foreign_income	0.029**	0.115	0.027**	0.134	0.024**	0.117	0.022**	0.1	0.092
	(2.01)	(1.51)	(2.06)	(1.58)	(2.16)	(1.64)	(1.96)	(1.41)	(1.59)

lag_cash_assets	0.134***	0.287***	0.118***	0.199***	0.102***	0.167***	0.120***	0.198***	0.152***
	(9.41)	(8.22)	(9.81)	(8.25)	(8.94)	(7.65)	(10.99)	(9.31)	(9.44)
lag_roa	0.020	0.125	0.023*	0.138**	0.038***	0.206***	0.025**	0.151***	0.167***
	(1.34)	(1.56)	(1.80)	(2.18)	(3.30)	(3.63)	(2.19)	(2.69)	(3.82)
lag_netloss	-0.149***	-0.064***	-0.166***	-0.067***	-0.162***	-0.065***	-0.163***	-0.065***	-0.050***
	(-7.86)	(-6.24)	(-9.93)	(-8.01)	(-10.72)	(-8.64)	(-10.76)	(-8.73)	(-8.76)
lnpatents	-0.026	-0.01	-0.018	-0.007	-0.012	-0.005	-0.016	-0.006	-0.004
	(-1.50)	(-1.54)	(-1.25)	(-1.26)	(-0.90)	(-1.02)	(-1.24)	(-1.35)	(-1.12)
past_N_3yr_dom	-0.129***	-0.033***	-0.189***	-0.053***	-0.142***	-0.038***	-0.137***	-0.037***	
	(-6.02)	(-5.54)	(-9.87)	(-9.93)	(-8.45)	(-8.12)	(-8.06)	(-7.77)	
past_N_3yr_dom_ind									-0.062***
									(-12.62)
Observations	36,066	36,066	57,201	57,201	66,859	66,859	66,859	66,859	66,859
SIC-Year Controls	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
Firm Controls	Demeaned	Fixed	Demeaned	Fixed	Demeaned	Fixed	Demeaned	Fixed	Fixed
Cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
R-squared/Pseudo R-Squared	0.05	0.305	0.044	0.32	0.043	0.297	0.042	0.296	0.271
Estimation Method	NegBin	OLS	NegBin	OLS	NegBin	OLS	NegBin	OLS	OLS
DoubleIrish dydx	-0.056***	-0.060**	-0.057**	-0.063**	-0.057***	-0.066***	-0.035*	-0.035*	-0.046**

Table A.4: Robustness Tests Using Domestic Acquisition Deal Value

This table presents the results of OLS tests of the relationship between domestic (U.S.) acquisitions and Double Irish firms using all U.S. firm-years from 1994-2013. The key independent variable is *DoubleIrish* which equals one if at least two Irish subsidiaries and a subsidiary in either the Netherlands or Luxembourg are present in a firm's Exhibit 21 10-K filings in the current or any prior years. The dependent variable is the natural log of one plus the total value of domestic acquisitions. The first four specifications consider only material acquisitions (deals where the transaction value is at least $1 million and the transaction value represents at least 1% of the acquiring firm's market value) and specification (5) uses all transfer-of-control domestic acquisitions where deal value is available in SDC. Specification (1) uses a sample of multinational firms (firms that report foreign income, foreign taxes, or foreign subsidiaries), specification (2) uses the full sample with an extended AJCA exclusion period (2004-2008), specification (3) includes controls for domestic and foreign controls, when available (total sales otherwise), specification (4) uses the naïve version of the Double Irish indicator, where *DoubleIrish* equals one if at least two Irish subsidiaries and a subsidiary in either the Netherlands or Luxembourg are present in a firm's Exhibit 21 10-K filings in the current year, and specification (5) uses the full sample. Robust t-statistics, clustered at the firm level, are shown in parentheses below the estimated coefficients. ***, ** and * indicate significance of the coefficients at the 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
	Multinationals Only	Extended AJCA	Controls for Foreign/Domestic Sales	Naïve	All Acquisitions
VARIABLES	lnTV_dom	lnTV_dom	lnTV_dom	lnTV_dom	lnTV_all
DoubleIrish	-0.209**	-0.200*	-0.229**		-0.187*
	(-2.12)	(-1.82)	(-2.40)		(-1.93)
NaïveDoubleIrish				-0.099	
				(-1.19)	
lag_dom_sales			-0.035		
			(-1.48)		
lag_for_sales			-0.295***		
			(-3.04)		
lag_total_sales			-0.088***		
			(-3.97)		
lag_sales_growth	0.075***	0.028***	0.035***	0.034***	0.037***
	(2.76)	(2.74)	(3.51)	(3.45)	(3.81)
lag_nwc_assets	0.285***	0.055	0.090	0.093*	0.06
	(2.66)	(0.93)	(1.63)	(1.68)	(1.06)
lag_debt_assets	-0.575***	-0.367***	-0.366***	-0.364***	-0.450***
	(-5.45)	(-5.36)	(-5.94)	(-5.91)	(-7.26)
lag_mtb	0.012***	0.011***	0.010***	0.010***	0.011***
	(3.21)	(4.81)	(4.59)	(4.56)	(5.48)
lag_price_earnings	0.000	0.000	0.000	0.000	0.000
	(0.51)	(0.61)	(0.70)	(0.68)	(1.05)
lag_lnassets	0.013	0.013	-0.021	-0.007	0.008
	(0.43)	(0.70)	(-1.14)	(-0.39)	(0.46)
lag_pct_foreign_income	0.539*	0.627*	0.627**	0.548*	0.719**
	(1.76)	(1.91)	(2.23)	(1.94)	(2.53)
lag_cash_assets	0.921***	0.525***	0.480***	0.541***	0.524***
	(7.57)	(7.21)	(7.24)	(8.44)	(8.17)

lag_roa	0.716**	0.781***	0.906***	0.804***	0.863***
	(2.46)	(3.70)	(4.72)	(4.24)	(4.45)
lag_netloss	-0.203***	-0.180***	-0.175***	-0.177***	-0.172***
	(-5.50)	(-6.78)	(-7.31)	(-7.37)	(-7.06)
lnpatents	-0.037	-0.025	-0.020	-0.025	-0.015
	(-1.55)	(-1.36)	(-1.17)	(-1.44)	(-0.88)
past_lnTV_3yr_dom	-0.060***	-0.066***	-0.056***	-0.055***	
	(-8.12)	(-9.87)	(-9.47)	(-9.24)	
past_lnTV_3yr_all					-0.043***
					(-7.20)
Observations	36,066	57,201	66,859	66,859	66,859
SIC-Year Controls	Fixed	Fixed	Fixed	Fixed	Fixed
Firm Controls	Fixed	Fixed	Fixed	Fixed	Fixed
Cluster	Firm	Firm	Firm	Firm	Firm
R-squared	0.291	0.304	0.284	0.283	0.32

Table A.5: Robustness Tests Using *DoubleIrish* and *REPAT*

This table presents the results of tests of the relationship between domestic (U.S.) acquisitions and Double Irish firms using all U.S. firm-years from 1994-2013. The key independent variable is *DoubleIrish*, which equals one if at least two Irish subsidiaries and a subsidiary in either the Netherlands or Luxembourg are present in a firm's Exhibit 21 10-K filings in the current or any prior years. In both panels, the main dependent variable considers domestic acquisitions where the transaction value is at least $1 million and the transaction value represents at least 1% of the acquiring firm's market value. In specifications (1), (2), (5), and (6) we present results using a negative binomial regression (demeaned at the firm level with industry-year fixed effects), while specifications (3), (4), (7), and (8) use an OLS regression (with firm and industry-year fixed effects) on the number of domestic (U.S) acquisitions. The regressions are similar to Table 2, panel B, except the first four regressions omit *lag_pct_foreign_income* and the remaining four regressions omit observations where foreign income is zero. All variables in the negative binominal regressions are demeaned at the firm level and standardized to have a mean of zero and a standard deviation of one, such that the coefficient measures the effect on the dependent variable given a one-standard-deviation change in each of the demeaned independent variables. Marginal effects (dy/dx) are provided in the last row for *DoubleIrish*. Robust z-statistics (t-statistics for OLS regressions), clustered at the firm level, are shown in parentheses below the estimated coefficients. ***, ** and * indicate significance of the coefficients at the 1%, 5% and 10% levels, respectively.

VARIABLES	(1) N_dom	(2) N_dom	(3) N_dom	(4) N_dom	(5) N_dom	(6) N_dom	(7) N_dom	(8) N_dom
DoubleIrish	-0.041***	-0.065***	-0.069***	-0.107***	-0.048**	-0.088***	-0.052*	-0.095***
	(-2.98)	(-4.40)	(-2.70)	(-3.88)	(-2.11)	(-3.56)	(-1.82)	(-3.03)
REPAT	0.028***	0.063***	1.564**	-0.010	0.052***	0.013	2.130**	0.536
	(2.76)	(5.25)	(2.29)	(-0.02)	(2.60)	(0.62)	(2.36)	(0.60)
DoubleIrish*REPAT		0.002		8.468***		0.098***		8.023***
		(0.19)		(4.33)		(4.71)		(3.79)
lag_pct_foreign_income					-0.008	-0.007	-0.060	-0.061
					(-0.34)	(-0.33)	(-0.61)	(-0.62)
lag_sales_growth	0.051***	0.051***	0.017***	0.017***	0.025	0.027	0.014	0.015
	(5.55)	(5.55)	(4.83)	(4.84)	(1.38)	(1.47)	(1.20)	(1.27)
lag_nwc_assets	0.055***	0.054***	0.072***	0.071***	0.060***	0.060***	0.123***	0.123***
	(4.61)	(4.58)	(3.83)	(3.80)	(2.93)	(2.96)	(2.69)	(2.70)
lag_debt_assets	-0.083***	-0.083***	-0.102***	-0.103***	-0.074***	-0.074***	-0.128***	-0.128***
	(-6.21)	(-6.25)	(-5.17)	(-5.19)	(-3.48)	(-3.50)	(-3.15)	(-3.16)
lag_mtb	0.051***	0.051***	0.003***	0.003***	0.026	0.026	0.002	0.002
	(5.03)	(5.04)	(4.18)	(4.22)	(1.40)	(1.42)	(1.22)	(1.27)
lag_price_earnings	-0.013	-0.013	-0.000	-0.000	-0.010	-0.009	-0.000	-0.000
	(-1.07)	(-1.09)	(-0.01)	(-0.02)	(-0.47)	(-0.45)	(-0.12)	(-0.13)
lag_lnassets	-0.081***	-0.080***	-0.029***	-0.029***	-0.037	-0.040	-0.017	-0.019
	(-4.81)	(-4.82)	(-5.23)	(-5.26)	(-1.22)	(-1.35)	(-1.43)	(-1.55)
lag_cash_assets	0.120***	0.120***	0.198***	0.198***	0.113***	0.113***	0.246***	0.245***
	(10.98)	(10.96)	(9.29)	(9.27)	(5.92)	(5.90)	(5.16)	(5.13)
lag_roa	0.024**	0.023**	0.144**	0.143**	0.020	0.019	0.124	0.122
	(2.08)	(2.05)	(2.57)	(2.55)	(1.05)	(1.01)	(1.22)	(1.20)

lag_netloss	-0.165***	-0.165***	-0.066***	-0.066***	-0.177***	-0.179***	-0.076***	-0.077***
	(-10.91)	(-10.95)	(-8.85)	(-8.90)	(-7.28)	(-7.36)	(-5.97)	(-6.05)
lnpatents	-0.016	-0.016	-0.006	-0.006	-0.008	-0.009	-0.003	-0.003
	(-1.20)	(-1.22)	(-1.31)	(-1.34)	(-0.35)	(-0.37)	(-0.40)	(-0.42)
past_N_3yr_dom	-0.138***	-0.140***	-0.037***	-0.037***	-0.211***	-0.213***	-0.052***	-0.053***
	(-8.18)	(-8.28)	(-7.86)	(-7.96)	(-6.53)	(-6.62)	(-6.52)	(-6.63)
Observations	66,859	66,859	66,859	66,859	22,359	22,359	22,359	22,359
SIC-Year Controls	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
Firm Controls	Demeaned	Demeaned	Fixed	Fixed	Demeaned	Demeaned	Fixed	Fixed
Cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
R-Squared/Pseudo R-squared	0.042	0.042	0.296	0.296	0.058	0.059	0.290	0.291
Estimation Method	NegBin	NegBin	OLS	OLS	NegBin	NegBin	OLS	OLS
DoubleIrish dy/dx	-0.060***	-0.096***	-0.069***	-0.107***	-0.051**	-0.094***	-0.052*	-0.095***

Figure A.1
Double Irish Establishment and Acquisition Trends

The following figures show the total value of all domestic and foreign acquisitions for Double Irish firms in the 11-year period [-5, +5] surrounding the establishment of their Double Irish structure. Relative year 0 corresponds to the fiscal year when the firm first reports the necessary subsidiaries. To be included, the Double Irish firm must appear in the sample for at least three years before the establishment and three years after. Pre- and Post-Double Irish averages are included for both series.

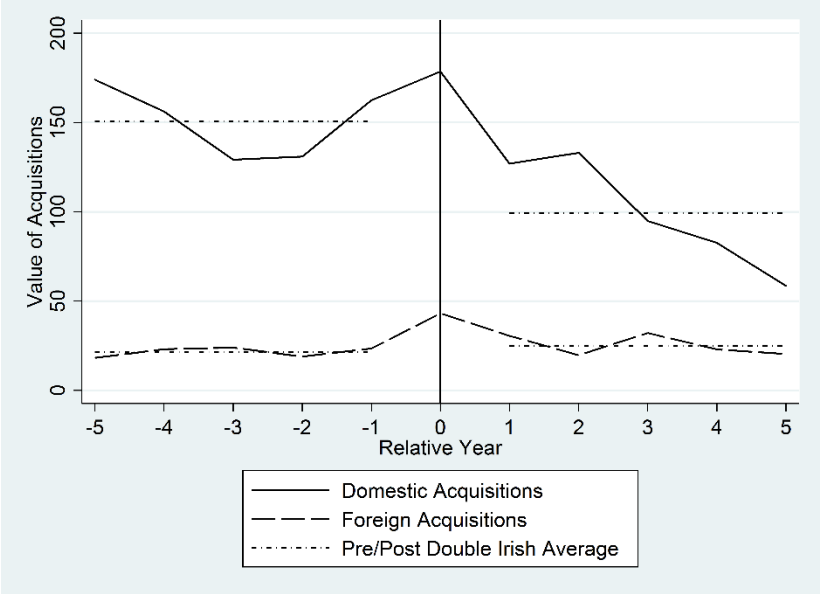


Exhibit A: The Effects of Foreign and Domestic Growth Actions on *REPAT*

REPAT calculated before and after consolidation as (Foreign Pre-Tax Income*(.35 - Foreign Tax Ratio))/(Total Assets).

Scenario 1: growth through M&A in the same proportion as the current business, with all M&A funded with stock or new debt issuance

Assets and Income Before Consolidation

	Domestic	Foreign	Total
Assets	$750	$250	$1,000
Asset Turnover %	0.8	0.8	
Sales	$600	$200	$800
Gross Margin %	0.4	0.4	
Pre-Tax Income	$240	$80	$320
Tax Rate	0.35	0.25	
NI	$156	$60	$216
REPAT	0.0080		

Assets and Income from Acquisitions

	Domestic	Foreign	Total
Assets	$75	$25	$100
Asset Turnover %	0.8	0.8	
Sales	$60	$20	$80
Gross Margin %	0.4	0.4	
Pre-Tax Income	$24	$8	$32
Tax Rate	0.35	0.25	
NI	$16	$6	$22

Consolidated Assets and Income

	Domestic	Foreign	Total
Assets	$825	$275	$1,100
Pre-Tax Income	$264	$88	$352
Tax Rate	0.35	0.25	
NI	$172	$66	$238
REPAT	0.0080		

Scenario 2: growth through M&A in the same proportion as the current business, with foreign M&A funded with pre-tax trapped cash

Assets and Income Before Consolidation

	Domestic	Foreign	Total
Assets	$750	$250	$1,000
Asset Turnover %	0.8	0.8	
Sales	$600	$200	$800
Gross Margin %	0.4	0.4	
Pre-Tax Income	$240	$80	$320
Tax Rate	0.35	0.25	
NI	$156	$60	$216
REPAT	0.0080		

Assets and Income from Acquisitions

	Domestic	Foreign	Total
Assets	$75	$25	$100
Asset Turnover %	0.8	0.8	
Sales	$60	$20	$80
Gross Margin %	0.4	0.4	
Pre-Tax Income	$24	$8	$32
Tax Rate	0.35	0.25	
NI	$16	$6	$22

Consolidated Assets and Income

	Domestic	Foreign	Total
Assets	$825	$250	$1,075
Pre-Tax Income	$264	$88	$352
Tax Rate	0.35	0.25	
NI	$172	$66	$238
REPAT	0.0082		

Scenario 3: growth through M&A, with a higher proportion of foreign investment as in the current business, with foreign M&A funded with pre-tax trapped cash

Assets and Income Before Consolidation

	Domestic	Foreign	Total
Assets	$750	$250	$1,000
Asset Turnover %	0.8	0.8	
Sales	$600	$200	$800
Gross Margin %	0.4	0.4	
Pre-Tax Income	$240	$80	$320
Tax Rate	0.35	0.25	
NI	$156	$60	$216
REPAT	0.0080		

Assets and Income from Acquisitions

	Domestic	Foreign	Total
Assets	$50	$50	$100
Asset Turnover %	0.8	0.8	
Sales	$40	$40	$80
Gross Margin %	0.4	0.4	
Pre-Tax Income	$16	$16	$32
Tax Rate	0.35	0.25	
NI	$10	$12	$22

Consolidated Assets and Income

	Domestic	Foreign	Total
Assets	$800	$250	$1,050
Pre-Tax Income	$256	$96	$352
Tax Rate	0.35	0.25	
NI	$166	$72	$238
REPAT	0.0091		