Centre for
Economic
and Financial
Research
at
New Economic
School

September 2014

Investor Valuations of Japan's Adoption of a Territorial Tax Regime: Quantifying the Direct and Competitive Effects of International Tax Reform

Sebastien Bradley
Estelle Dauchy
Makoto Hasegawa

Working Paper No 201

CEFIR / NES Working Paper series

Investor Valuations of Japan's Adoption of a Territorial Tax Regime: Quantifying the Direct and Competitive Effects of International Tax Reform*

Sebastien Bradley† Estelle Dauchy‡ Makoto Hasegawa§

September 2014

Keywords: International tax reform, Japanese dividend exemption, territorial taxation, multinational tax avoidance, tax competition, event study
JEL: H25, H32, F23, K34, H26

Abstract

Despite an extensive literature on the normative implications of different international tax regimes and an empirical literature addressing individual specific predictions, there exists little evidence encompassing the broad range of effects of taxing corporations' foreign-source income on a worldwide or territorial basis. This paper takes a more comprehensive quantitative approach by examining stock market reactions surrounding three events over the course of which Japan's 2009 adoption of a dividend exemption system was developed into proposed law. Using an event study methodology which leverages individual firm characteristics and accounts for contemporaneous financial market developments, we find that Japanese firms with less foreign exposure and fewer opportunities for tax avoidance experienced relatively larger abnormal returns, while differences in firms' foreign and domestic effective tax rates accounted for an aggregate capitalization effect of ¥4.1 trillion. We attribute these gains to a combination of enhanced opportunities for international expansion among smaller domestic firms, direct tax savings on official estimates of existing undistributed foreign earnings, and general cultural biases against tax planning in an environment of largely unchanged anti-abuse provisions.

*We are grateful to Alexey Khazanov, Anton Radice, and Alfiya Sagitova for excellent research assistance, and we thank Rosanne Altshuler, Sebastian Bause, Dhammika Dharmapala, Peter Egger, Jim Hines, Kevin Markle, Peter Merrill, Tom Neubig, Leslie Robinson, Joanna Wu, and conference participants at the International Institute of Public Finance, International Tax Policy Forum, National Tax Association, International Tax Policy Forum/American Enterprise Institute, and the European Institute for Advanced Studies in Management for their helpful comments.

†sbradley@drexel.edu; LeBow College of Business, Drexel University, 1023 Gerri C. LeBow Hall, 3220 Market St., Philadelphia, PA 19104, U.S.A.

‡edauchy@nes.ru: Corresponding Author; New Economic School, Novaya ul. 100, Skolkovo Village, Moscow 143025, Russia.

§m-hasegawa@grips.ac.jp; National Graduate Institute for Policy Studies, 7-22-1 Roppongi, Minato-ku, Tokyo 106-8677, Japan

Spillover effects in the U.S. and German markets (through tax competition or firm competitiveness) appear insignificant.

1 Introduction

As firms' operations have expanded their global reach, corporate taxation has become inextricably tied to the taxation of multinational firms' foreign earnings. Correspondingly, discussions over corporate tax reform have been dominated by consideration of international tax issues, tax avoidance, and tax competition, with much debate focusing specifically on the choice over worldwide (residence-based) versus territorial (source-based) taxation. In this global environment, corporate tax reform in one country is likely to have implications beyond the boundaries of the home country by affecting firm competitiveness and the prospects for reform elsewhere in the world. Despite an extensive body of normative literature in this area,[1] however, little is known as to the practical importance of any such tax competition effects on foreign corporations, nor much even as to the more primitive question regarding the magnitude of any domestic effects from significant changes in the tax treatment of multinational firms.

The purpose of this paper is to quantify these domestic and foreign effects empirically in the context of one of the most important recent instances of international tax reform: namely, Japan's 2009 adoption of a territorial tax regime exempting Japanese corporations' foreign earnings from domestic taxation.[2] Broadly speaking, such changes in tax regime ought to influence domestic as well as foreign corporations' spatial and intertemporal investment and repatriation decisions through their direct effects on the tax cost of dividend repatriation over the short- and longer-term (and thus, the after-tax return on foreign direct investment and reported earnings) as well as by affecting firms'

[1] For a description of optimal international tax systems, including the implications of international taxation for capital export, import, and ownership neutrality, see e.g. Musgrave (1969), Desai and Hines (2003), or Devereux (2008).

[2] All together, ten OECD countries have adopted territorial tax systems since 2000 (Dittmer, 2012), namely: Iceland (2003), the Czech Republic, Norway, and Slovakia (2004), Estonia and Turkey (2005), Poland (2007), Japan, New Zealand, and the United Kingdom (2009). This leaves only seven remaining OECD countries with worldwide tax systems in place: Chile, Greece, Ireland, Israel, Korea, Mexico, and the U.S. Brys et al. (2011) provide a brief introduction to recent such international tax reforms, the net effect of which has been that the U.S.'s share of real GDP among OECD countries with worldwide tax systems increased from 56.4 to 78.2 percent between 2005 and 2010.

ability to compete effectively in a global market and by indirectly influencing the outlook for reform elsewhere around the globe through tax competition.[3] With these clearly in mind, the Japanese government's primary objectives in adopting a territorial tax system were to encourage repatriations of accumulated foreign earnings, reduce tax compliance costs, and to strengthen the ability of Japanese firms to compete effectively in international markets, the benefits of which were hoped would eventually be felt domestically through reinvested earnings and higher tax revenue.

Consistent with the most direct of these anticipated incentives, Egger et al. (2012) and Hasegawa and Kiyota (2013) document the existence of an immediate dividend repatriation reaction among U.K. and Japanese multinationals to the corresponding reforms in each of these countries, respectively. However, longer-term dynamic effects may be even more important than these domestic short-term consequences of dividend exemption, with resulting consequences for firms' short-term and long-term after-tax profitability. In the absence of financial market frictions, forward-looking investors ought to have immediately incorporated the combination of all such effects into their valuation of firm share prices as soon as new information related to Japan's adoption of the permanent dividend exemption became known. Our approach is thus to apply an event study methodology to evaluate changes in stock market valuations around multiple event dates related to Japan's transition from a worldwide to territorial tax system for the largest 25 percent of publicly-listed Japanese, U.S., and German domestic and multinational corporations (MNCs), exploiting information with regards to foreign subsidiary location and other key firm characteristics to obtain more precise estimates of the net present value gains resulting from the adoption of a territorial tax regime, while simultaneously attempting

[3]Toder (2014) indicates that the timing of the Japanese reform was heavily affected by near-simultaneous passage of a similar law in the United Kingdom: "the United Kingdom's adoption of its territorial system when it did may have been a tipping point, because Japanese policymakers always follow what is happening in other countries. They periodically send study groups out from the government [...] These groups return to Japan, they draw up their comparison tables, and then consider what other countries are doing and why. They typically look at the United States, the United Kingdom, France, Germany, and a few other jurisdictions." (pp. 23-24).

to disentangle changes in firm valuation due to underlying short-term, direct tax savings effects on undistributed earnings from longer-term effects on tax avoidance, firm competitiveness, and tax competition.[4]

Although direct effects of the Japanese reform ought to have no bearing on firms in other countries (i.e. through changes in effective tax rates), we nevertheless anticipate that investors should be attentive to these latter two effects in other markets, the U.S. naturally being the country most likely to be indirectly impacted. Indeed, Japan and the U.K.'s adoptions of territorial tax systems have been carefully watched as potential harbingers of consequences for the U.S. if it were to follow suit, with particular attention being paid to the effect of the reform on multinational tax avoidance and investment activity.[5] In contrast, we should not expect the Japanese tax reform to have a significant impact on firms already subject to territorial taxation except through changes in relative firm competitiveness. We consequently include a sample of German firms in our analysis to serve essentially as a benchmark against which to measure investor valuations of current and future tax savings both in Japan and—indirectly—the U.S.[6]

Examining nine potential event dates related to the initial proposal, discussion, and eventual adoption of the Japanese dividend exemption system, we ultimately focus on three dates associated with the outcomes of Cabinet meeting discussions on the grounds that these ought to have proven most informative and decisive given the structured nature

[4]For additional applications of event study methods to quantifying the perceived benefits of tax avoidance, see Desai and Dharmapala (2007), Hanlon and Slemrod (2009), or Bradley (2013). Sakurada and Nakanishi (2011) also examine investor reactions to news of the Japanese dividend exemption, albeit for only a single event date and a small selected sample of large Japanese MNCs.

[5]Debate over adoption of a territorial tax system has been a regular fixture of tax policy discussions in the U.S. Historically more widely endorsed among Republican policymakers, territorial taxation appears to have gained some degree of support among both political parties in recent years. As recently as December 2010, for example, adoption of a territorial regime figured prominently among the set of proposals laid forth by President Obama's bipartisan National Commission on Fiscal Responsibility and Reform (i.e. the Simpson-Bowles Commission). The issue likewise figures prominently in House Ways and Means Committee Chairman Dave Camp's (R-Michigan) tax reform proposal of 2014 and was favored by Mitt Romney throughout his 2012 presidential campaign.

[6]Germany's territorial tax regime was first adopted in 1920, the details of which have changed over time. Current law (in place since 2001) features a 95% dividend exemption similar to the system adopted in Japan in 2009, albeit with a lower corporate tax rate (i.e. 30.2% since 2008 versus 40.69% in Japan during this time period).

of Japan's annual tax reform process,[7] thereby ruling out several other events that were coincidentally marked by major developments in the ongoing financial crisis. We find that each of these Cabinet meeting events are associated with significant cumulative abnormal stock returns (CARs) among Japanese firms across a variety of empirical specifications, whereas U.S. and German firms do not appear to be impacted, at least in any consistent or statistically-discernible manner.

Predictably, abnormal returns cumulated over the sequence of these three events support the view that Japanese MNCs facing lower effective tax rates on their foreign operations would stand to benefit disproportionately from the reform. Hence, a 10 percentage point increase in our measure of the repatriation tax savings rate is associated with a 0.9 percent increase in market capitalization as of the last Cabinet meeting prior to the law's enactment. On an aggregate basis, this effect translates to a roughly ¥4.1 trillion increase in market capitalization of Japanese MNCs, an amount strikingly similar to predictions based on a simple application of the average tax savings rate in our sample to estimates by the Ministry of the Economy, Trade, and Industry (METI) at the time of the reform, which pointed to ¥17 trillion (roughly 3.4 percent of GDP) in undistributed profits of first- and second-tier subsidiaries as of the end of fiscal year 2006, with growth of another ¥2-3 trillion per year.[8]

Overall, however, the largest beneficiaries of the reform among Japanese firms as a group appear to have been *domestic* firms, with net gains in firm valuation amounting to just over 3 percent of market capitalization, suggesting substantial benefits from reduced tax compliance costs and enhanced competitiveness in relation to opportunities for inter-

[7]According to Japanese tax practitioners, there should have been no remaining doubts beyond the final January 2009 Cabinet meeting with respect to both passage of the proposal into law two months later and the details of the new policy: "The draft legislation is delivered to the Cabinet in January for review and approval. The final legislation is completed in February. It's delivered to the National Diet usually during late February. And, in March, it is virtually always passed to go into effect as of April 1." (Toder, 2014; p. 25)

[8]By comparison, U.S. multinationals repatriated a total of $362 billion (about 2.9 percent of 2006 U.S. GDP) under the terms of the American Job Creation Act's temporary 85 percent dividends received deduction over the period 2004-2006, most of which occurred in 2005 (Redmiles, 2008).

national expansion. Meanwhile, Japanese multinationals with at least one subsidiary located in a tax haven jurisdiction or multinationals operating in more intangible-intensive industries tended to be unaffected or even fare worse than other MNCs, suggesting that future tax avoidance opportunities and strategic income reallocation were largely ignored by investors once pre-reform foreign effective rates were taken into account. Although this latter finding is surprising from the point of view of actors where such tax minimization concerns are common and even expected of firms (as in the U.S.), this may be much less surprising for Japanese firms, which are widely perceived as dutiful taxpayers with little interest in tax planning.[9] Moreover, the absence of restrictions on related-party borrowing combined with the application of anti-avoidance rules involving "Specified Foreign Subsidiaries" (i.e. firms located in low-tax countries) both before and after the reform may have rendered the dividend exemption system largely irrelevant for more sophisticated firms with pre-established tax mitigation strategies, while simultaneously tending to favor firms confronting weaker liquidity constraints.

The remainder of the paper is organized as follows: Part 2 describes the details of the Japanese tax reform, including our choice of event dates leading up to its implementation, and characterizes its corresponding implications for Japanese and U.S. MNCs; Part 3 explains the event study methodology and associated econometric complications; Part 4 summarizes the sources and principal characteristics of the merged parent- and subsidiary-level data and describes the construction of various measures of foreign activity, effective tax rates, and intangible intensity; Part 5 presents the primary results of our analysis along with a set of robustness checks, and Part 6 concludes.

[9]See, for example, Toder (2014, p. 24) or Takashima (2009) which argue that (i) many Japanese corporations lack a full awareness of the importance of international tax and accounting strategies and thus tend to bear extra tax costs that they could otherwise avoid, (ii) Japanese companies tend to assume that taxes are unavoidable and are to be paid to the government as a matter of loyalty or patriotism while U.S. and European companies regard taxes as costs that they should manage and reduce, and (iii) Japanese corporations lack sufficient human resources for tax planning.

2 Japan's Dividend Exemption System

2.1 Tax Reform

Prior to April 2009, Japan employed a worldwide tax system to tax Japanese corporations' foreign-source income upon repatriation while allowing tax credits for corporate income taxes paid by Japanese-owned subsidiaries in foreign jurisdictions and other related taxes paid to foreign governments, including withholding taxes on dividend, royalty, and interest payments between foreign subsidiaries and their Japanese parents. Beginning in early 2008, the Japanese government became increasingly concerned that this system of worldwide taxation was inducing firms to accumulate excessive undistributed foreign earnings to avoid Japanese taxation. A subcommittee on international taxation at the METI—convened to study the possibility of a dividend exemption system—expressed some concern about the increased incentives for multinational tax avoidance and income reallocation that a territorial regime would provide but ultimately concluded that such a system could achieve revenue neutrality, with the subcommittee instead emphasizing positive aspects of a dividend exemption system, including the elimination of distortions related to the timing of profit repatriations, the stimulation of dividend remittances and domestic investment, and simplification of the international tax system as it pertained to existing multinationals and smaller firms intent on expanding overseas to remain competitive.

The Japanese government thus proceeded to adopt a dividend exemption system whereby 95 percent of dividends remitted by foreign affiliates to their Japanese parent firms on or after April 1, 2009 would be exempt from domestic taxation. Under this system, the remaining 5 percent of non-exempt dividends are regarded as expenses incurred by parent firms for earning foreign income and are added to the calculation of Japanese taxable income.[10] Moreover, in order to qualify for dividend exemption, a parent firm

[10]Expenses corresponding to these five percent of repatriated dividends are assumed to be deducted from the taxable incomes of parent firms at the time of investment, and thus, would not be exempted

must have held at least 25 percent of the shares of its affiliate for at least six months as of the dividend declaration date, and while dividend exemption would reduce Japanese corporate tax liabilities on all repatriated dividends, foreign tax credits no longer apply to withholding taxes imposed by host countries.[11]

Before 2009, the Japanese foreign tax credit system utilized an "overall limitation" rather than a foreign tax credit limitation on each item of income (e.g. dividends, royalty, or interest income) or country. This allowed taxpayers to engage in "cross-crediting" or "mixing/blending" by applying excess credits generated in a high tax country against excess limitations generated in a low tax country. Controlled foreign corporation (CFC) regulations and other anti-avoidance rules were slightly modified under the 2009 reform to make the treatment of foreign dividends paid by CFCs consistent with the dividend exemption provisions.[12] Under CFC rules, the pre-tax income of CFCs is added to the taxable income of their parent firms and is immediately taxed by the Japanese government. Notably, as the term "dividend" exemption implies, the Japanese tax reform only exempts foreign income in the form of paid dividends and does not apply to other types of foreign source income, including royalties, interest payments, income earned by foreign branches, and capital gains, though foreign taxes imposed on these types of income

upon repatriation under the new exemption system. An important change under the reform is that foreign tax credits no longer apply to the remaining 5 percent of taxable foreign dividends. For this reason, the tax reform may increase the tax obligations of certain firms that were previously able to offset these taxes with excess tax credits from other sources.

[11]For more details about the reform, see e.g., PricewaterhouseCoopers (2009), Deloitte, or http://japantax.org/?p=590.

[12]CFCs in Japan are called "Specified Foreign Subsidiaries" (SFSs) formed in certain low-taxed foreign territories specified by the Ministry of Finance. The tax treatment of SFSs in Japan is described by the Tax Haven Counter Measure Laws ("THCML"), which are comparable to the U.S.'s Subpart F and U.K. CFC rules. By definition, a company is treated as an SFS if 50 percent or more of the total number of issued shares or 50 percent or more of the voting shares of the company is held by corporations resident in Japan, and faces an effective tax rate of 25 percent or less (reduced to 20 percent under the 2010 tax reform). The CFC rules apply on an entity basis. A company that would otherwise be treated as an SFS is exempted from the application of the CFC rules if the companies satisfy several conditions to prove that it owns a fixed plant or office and engages in real business activities. Also, excess foreign tax credits from income subject to either foreign corporate taxation or foreign withholding taxation of dividends, royalty or rents, could be used to offset residual Japanese taxes from any of these sources. For example, excess foreign tax credits from non-SFS income could be used to offset SFS income for purposes of calculating the overall limitation.

continue to be creditable under Japan's direct foreign tax credit system.

2.2 Event Dates

As with most policy reforms, adoption of the Japanese dividend exemption arose over the course of many months out of a series of discussions, debates, proposals, and pronouncements. Table 1 summarizes the key developments leading to the 2009 reform suggested by Sakurada and Nakanishi (2011) and corroborated by our reading of Japanese media reports, giving us an initial set of nine candidate event dates upon which to base our analysis of stock market reactions. Detailed descriptions of these events are provided in Appendix A, beginning with METI Minister Akira Amari's May 9, 2008 announcement that he had instructed his ministry to examine the possibility of switching from a foreign tax credit system to a foreign income exemption system and ending with the March 27, 2009 passage into law of the resulting reform.

While all nine candidate events should have enhanced the likelihood of enactment of a dividend exemption system, it is likely that investors would have shown stronger reactions to certain events than others given the variation in the amount of new information revealed on each occasion along with the perceived authoritativeness of its source.[13] Indeed, somewhat unique to the Japanese political process is the fact that once set in motion, steps leading to tax reform follow a relatively well-defined sequence as part of Japan's annual tax policy review. We thus expect the Japanese government's first public announcement on May 9, 2008 of its intent to seriously consider the adoption of a territorial tax regime to constitute an especially important event in terms of its informational content, authority, and surprise. Notwithstanding the ruling Liberal Democratic Party's lack of majority control over the Upper House from 2007 to 2009,[14] we expect investors

[13]The absence of events which would have *reduced* the probability of adoption of a territorial tax system does not necessarily imply strictly positive reactions, of course. Certain events may have been viewed in a neutral or even negative manner relative to previous expectations as more concrete details such as those pertaining to CFC rules or foreign tax credits emerged.

[14]Because of this situation, referred to as the "twisted" Diet, the passage of the bill for the tax reform

in Japan more generally to be particularly attentive to the results of Cabinet meetings, whose proposed tax reforms are virtually always enacted (Toder, 2014) and hence likely to be viewed as decisive. Beyond May 9, these include the events of June 27, 2008 and January 23, 2009. From a purely informational perspective, we might also expect the release of details of an August 2008 interim report by the METI to have substantially reduced investor uncertainty regarding the provisions of the proposed reform, though not necessarily in an unambiguously positive (or negative) manner.

Section 5.1 presents evidence of market reactions for all nine candidate events consistent with these conjectures about the greater perceived importance of events related to Japanese Cabinet meetings. Consequently, we ultimately emphasize the May 9 and June 27, 2008 and January 23, 2009 events in our core analyses, though results for all dates are available upon request.

3 Event Study Methodology

3.1 Standard Market Model Approach

In order to evaluate the magnitude of the expected change in firm after-tax profitability in response to the release of potentially-unanticipated news pertaining to the Japanese tax reform as a function of MNC characteristics, we adopt a variant of the standard market model event study approach popularized by Ball and Brown (1968) and Fama et al. (1969) using a dummy variable procedure first proposed by Gibbons (1980) to allow for single-step estimation of cumulative abnormal returns and associated firm characteristic interactions.[15]

Under the standard market model approach, ordinary stock returns r_{it} for listing i in period t are modeled as a function of the average return on an appropriately-chosen

of 2008 was delayed from April 1, 2008 to April 30, for example.

[15]See MacKinlay (1997), Binder (1998), or Corrado (2011) for reviews of differing event study methodologies and associated statistical issues.

market portfolio, R_t:

$$r_{it} = \alpha_i + \beta_i R_t + \epsilon_{it} \tag{1}$$

where r and R are each computed net of the risk-free rate on one-month U.S. Treasury bills. Event-induced abnormal stock returns (AR) over event period E are then calculated as the out-of-sample prediction errors obtained by applying the parameters $\widehat{\alpha}_i$ and $\widehat{\beta}_i$ estimated from Equation (1) over a pre-event historical estimation period of length $T, t = -T, -T+1, ...-1$ to contemporaneous stock prices and market returns, such that:

$$\begin{aligned} \widehat{AR}_{it}^{E} &= r_{it} - \widehat{r}_{it} \\ &= r_{it} - (\widehat{\alpha}_i + \widehat{\beta}_i R_t), \forall t = T_0^E, ...T_1^E \end{aligned} \tag{2}$$

In order to allow for pre-event information leakage or gradual post-event information dissemination, the duration of the event window, $T_1^E - T_0^E$, is typically greater than a single period, with the resulting statistic of interest being the cumulative abnormal return (CAR):

$$\widehat{CAR}_{it}^{E} = \sum_{s=T_0^E}^{t} \widehat{AR}_{is}^{E} \tag{3}$$

Several adjustments have been proposed for the calculation of the corresponding standard errors and test statistics to account for potential intertemporal autocorrelation, event-induced return volatility, and cross-sectional correlation of abnormal returns inherent to a study of investor reactions involving clustered events (i.e. affecting multiple firms simultaneously). In the results that follow, we begin by presenting broad evidence of abnormal stock returns around key event dates, emphasizing those that are largely robust to the application of several parametric and non-parametric test statistic corrections designed to address some or all of these econometric concerns, including the Patell

(1976) test, the Boehmer, Musumeci, and Poulsen (1991), or BMP, test, the Corrado and Zivney (1992) non-parametric rank test, plus cross-sectionally-adjusted versions of each of these tests developed by Kolari and Pynnönen (2010). Nevertheless, even the most sophisticated of econometric corrections for ARs and CARs obtained under the standard market model are inappropriate for evaluating the source of these abnormal returns in relation to firm characteristics.

3.2 Single-Step Approach

A better suited methodology for estimating possible such relationships in a single step instead consists of estimating Equation (1) with the inclusion of a sequence of event dummy variables D_s for each date s in the event window following the procedure outlined in Salinger (1992) and Binder (1998):

$$r_{it} = \alpha_i + \beta_i \tilde{\mathbf{R}}_\mathbf{t} + \sum_{s=T_0^E}^{T_1^E} \left(\gamma_s D_s + \tilde{\delta}_\mathbf{s} \tilde{\mathbf{X}}_\mathbf{i} \cdot D_s \right) + \epsilon_{it} \tag{4}$$

$$\forall i = 1, ...N; \ \forall t = -T, -T+1, ... -1; T_0^E, ...T_1^E$$

Firm-specific average returns α_i and market co-movement β_i over the historical estimation period carry over from the standard model, while $\tilde{\mathbf{X}}_\mathbf{i}$ represents a vector of time-invariant pre-reform firm characteristics which are allowed to affect stock market valuations through their interaction with the event date indicators. With D_s set to 1 on date s and 0 otherwise, date s abnormal returns are estimated directly as $AR_{is} = \gamma_s + \tilde{\delta}_\mathbf{s} \tilde{\mathbf{X}}_\mathbf{i}$. Taken one step further, CARs can be readily recovered as shown in Salinger (1992) by redefining the event dummies such that D_s equals 1 on date s, -1 on date $s+1$, and 0 otherwise.[16] This approach—which most closely resembles the procedure followed by

[16]To see this, consider the simplest case with a 2-period event window ($T_1 - T_0 = 2$). Equation (4) may thus be rewritten (suppressing the idiosyncratic error term for brevity) as $r_{it} = \alpha_i + \beta_i \tilde{\mathbf{R}}_\mathbf{t} + AR_{i1} \cdot W_1 + AR_{i2} \cdot W_2$, with $W_s = 1$ on date s and 0 otherwise. By definition of cumulative abnormal returns, $CAR_1 = AR_1$ and $AR_s = CAR_s - CAR_{s-1}$ for all subsequent dates in the event window, such that this

Auerbach and Hassett (2005) to evaluate the impact of the U.S. dividend tax cut of 2003 —represents the core econometric technique employed in our analysis and has the important virtue of facilitating the estimation of average CARs in a single step, including their interactions with key firm characteristics. Furthermore, CAR standard errors estimated in this manner are robust to intertemporal autocorrelation across event window stock returns, thereby eliminating one of the primary econometric concerns associated with most event studies.[17]

Given the nature of the question under consideration—wherein events in the Japanese market are believed to have potential repercussions in the U.S. market and where markets are moreover globally-integrated—$\tilde{\mathbf{R}}$ includes separate measures of Japanese as well as U.S. and German market returns, thereby requiring that we estimate four fixed effects per firm (i.e. a single α_i plus three β_i's) in our analysis. This introduces computational limitations which require that we use a selected sample of firms, as we describe in the next section. Consistent with a majority of event studies focused on these three countries, we use the daily return on the Frankfurt Stock Exchange (CDAX), the overall daily value-weighted market return on all NYSE, NASDAQ, and AMEX stocks, and the daily return on the TSE Tokyo Stock Price Index (TOPIX) to capture market movements in Germany, the U.S., and Japan, respectively (Corrado and Truong, 2008). Due to

last expression can be transformed into a function of CARs only:

$$\begin{aligned} r_{it} &= \alpha_i + \beta_i \tilde{\mathbf{R}}_{\mathbf{t}} + CAR_{i1} \cdot W_1 + (CAR_{i2} - CAR_{i1}) \cdot W_2 \\ &= \alpha_i + \beta_i \tilde{\mathbf{R}}_{\mathbf{t}} + CAR_{i1} \cdot (W_1 - W_2) + CAR_{i2} \cdot W_2. \end{aligned}$$

Specifying $D_1 \equiv W_1 - W_2$ and $D_2 \equiv W_2$ completes the desired transformation.

[17] Smith et al. (1986) estimate Equation (4) as a system of equations in order to address potential cross-sectional correlation among firm ARs. Lack of contemporaneous (daily) variation in firm characteristics precludes our ability to employ such a technique, which would moreover be constrained by limits on the number of cross-equation restrictions that may be imposed in order to recover average CARs for a large sample of publicly-traded firms. The most popular approach to addressing cross-sectional correlation in the event study literature—estimation of aggregate portfolios of stock returns (Kolari and Pynnönen, 2010)—assumes away the possibility of heterogenous policy effects and is consequently equally uninteresting for our purposes. Our panel estimation approach can instead by viewed as a hybrid of these techniques, whereby conditioning on firm characteristics may be viewed as yielding a set of flexibly-defined portfolios and should as such largely mitigate—if not eliminate—concerns associated with cross-sectional correlation.

differences in market trading hours for the TSE and the U.S. and Frankfurt exchanges, we allow U.S. and German market returns on date t to influence calendar date $t+1$ stock prices listed on the TSE.[18] Conversely, the fact that U.S. and German markets open after the close of the Japanese markets recommends using date t market data to identify the impact of events surrounding the Japanese dividend exemption on valuations of U.S. and German shares. Stock market holidays in either the Japanese, U.S., or German markets are recorded as zero-return dates from the perspective of each of the other countries.

4 Data

4.1 Stock Returns

Stock market capitalization data on Japanese, U.S., and German publicly-listed companies are drawn from Thomson Reuters Datastream and cover all stocks listed on the Tokyo Stock Exchange (TSE), New York Stock Exchange (NYSE), NASDAQ, American Stock Exchange (AMEX), and the Frankfurt Stock Exchange. Listings which did not exist over the entire period 2007-2009 are dropped, as are listings for which market capitalization information remained unchanged for more than 20 consecutive trading days, thereby yielding an initial set of 2795 Japanese listings, 2975 U.S. listings, and 585 German listings. Daily stock returns are computed as the percent change in gross market capitalization from the prior trading day, net of the risk-free rate on one-month U.S.

[18] Historically, an additional econometric concern in event studies has been the issue of non-synchronous trading, whereby the timing of realized market returns and individual stock returns differ. Scholes and Williams (1977) show, for example, that this can yield biased and inconsistent estimates of the degree of co-movement with the market, with the direction of the bias depending on the relative frequency of trading. An extension of this is unavoidable in the present context. Brown and Warner (1985) present evidence that this does not preclude valid inference in the case of the basic market model.

Treasury bills.[19,20] Index data for the Japanese TOPIX and German CDAX are likewise drawn from Datastream, while returns on a value-weighted portfolio of all NYSE, NASDAQ, and AMEX stocks are obtained from Kenneth French.

4.2 Firm Characteristics

Stock return data are subsequently merged by SEDOL identification number with financial statement data from Bureau van Dijk's Orbis database of publicly-listed Japanese, U.S., and German global ultimate owners (i.e. MNC parents) and all of their majority-owned foreign subsidiaries. In addition to financial items on balance sheet and profit-and-loss statements, the data contain information on industrial classification and country of location. We link publicly-listed companies' financial statements to those of their domestic and foreign subsidiaries, based on their global ultimate owner information.[21] Restricting global ultimate owners to being located in Japan, the U.S., or Germany and linking all subsidiaries to these parents based on identification numbers and location over the period 2005-2009, we are able to identify 3,588 publicly-listed Japanese corporations (1,311 MNCs and 2,277 domestic firms), 11,035 publicly-listed U.S. corporations (3,638 MNCs and 7,397 domestic firms), and 999 German corporations (462 MNCs and 537 domestic firms) matched to 44,474 Japanese subsidiaries, 186,968 U.S. subsidiaries, and 29,353 German subsidiaries, respectively. As described in details Appendix C we exclude

[19]Datastream does not provide information on ex-dividend returns. Returns based on changes in market capitalization may therefore be influenced by dividend payouts. For this reason (among others) outlying stock market returns and corresponding abnormal return estimates derived from the standard market model are winsorized to the 1^{st} and 99^{th} percentile values from their respective daily distributions. Preliminary results suggest only modest sensitivity to the choice of cutoff or outright exclusion of outlying return observations.

[20]Treasury bill rates are courtesy of Kenneth French and interpolated on U.S. stock market holidays for the purposes of stripping out risk-free returns for Japanese and German listings.

[21]Bureau van Dijk's ownership database is linked to Orbis by default for the latest fiscal year (2012 or 2013, depending on firms). Orbis defines an ultimate owner of a subsidiary by tracing the ownership path of shareholders with a minimum 50 percent ownership stake and searching for the shareholder with the highest ownership percentage that has no further shareholders with more than 50 percent ownership. To identify as many foreign subsidiaries as possible, we also use information from foreign subsidiaries owned with a minimum 25 percent ownership percentage, to little effect. In practice, a majority of foreign subsidiaries of Japanese, U.S., and German MNCs are wholly-owned.

many firms due to imprecisions on financial statements or ownership links information, as well as public firms that are not self-owned, government contractors, and companies in the financial and real estate sectors (NAICS codes 52 and 53).[22] Due to computational limitations associated with the single-step estimation of multiple firm-specific market co-movement parameters, however, we ultimately utilize only the largest twenty-five percent of firms (based on market capitalization as of January 4, 2008) within each nationality and MNC status pair for which we have all necessary data. Our core estimation sample hence consists of 462 Japanese firms (261 domestic, and 201 multinational), 450 U.S. firms (122 domestic and 328 multinational), and 47 German firms (8 domestic and 39 multinational).[23]

Using a combination of income statement and balance sheet data, we construct multiple variables capturing firms' characteristics that we consider to be the main drivers of the variation in abnormal returns across firms surrounding the events associated with the Japanese tax reform.[24] One of the most primitive implications of dividend exemption is that adopting such a system should seemingly favor firms with existing foreign operations and profits relative to those without. Despite the simple intuition, this may be misguided, however, if international taxation influences firms' decisions to establish foreign subsidiaries, and indeed, this was reportedly one of the many motives for the Japanese reform. This is hence an empirical question, which we address by constructing a simple binary indicator of MNC status (I_MNC_i) on the basis of whether firm i has at least a single matched foreign subsidiary in the Orbis database. All remaining firms

[22]Finance and real estate firms are omitted from our analysis because of their distinct tax treatment and special sensitivity to market events over the 2008-2009 period.

[23]This last sample of German firms is potentially disconcertingly small, but preserving additional smaller firms for Germany alone would produce a skewed distribution of firm sizes across countries for the full sample. Moreover, as shown in table 3, German firms are similar to both Japanese and U.S. firms along several financial characteristics. We further compared German, US, and Japan firms's financials in our final samples to public data provided by Capital IQ and Bloomberg (see http://people.stern.nyu.edu/adamodar) and find that our selected top quartile firms have similar characteristics as the top quartile firms for the whole distribution. As shown in a later sensitivity test of our core results, even the full sample of German firms is likely to suffer from remaining small-sample concerns, at least among domestic firms.

[24]See Appendix B for a detailed description of the construction of firms' characteristics.

are categorized as domestic-only, with measures of foreign activity coded as zeros where appropriate.

Among multinationals, a natural theoretical implication of the adoption of a territorial tax regime is that the benefits of the reform should reflect the rate of tax savings on repatriated earnings. Potential tax savings per dollar of earnings remitted following the reform, TS_i, are hence defined as the difference between pre-reform domestic and foreign effective tax rates (ETRs) measured at the level of the parent firm, with average foreign ETRs ($AETR\_FOR_i$) computed as the ratio of total tax payments to total taxable income among foreign subsidiaries of parent i, averaged over the three-year pre-reform period 2005-2007 to smooth over tax and income realizations and control for endogeneity. Domestic average ETRs ($AETR\_DOM$) are calculated analogously as the ratio of total domestic tax payments to total domestic taxable income. As most MNCs file their financial statements on a consolidated basis, domestic tax payments and taxable income are recovered from the difference between worldwide and foreign taxes and taxable income (including the parent).[25] [,26]

Beyond the short-term tax savings reflected in TS for firms with previously trapped foreign earnings, the nature of the relationship between long-term tax savings flowing from the Japanese dividend exemption and the pre-reform availability of tax minimizing strategies is theoretically ambiguous. Intuitively, MNCs that were able to skillfully navigate international tax rules in order to achieve low effective foreign tax rates (i.e., high TS) and high after-tax rates of return under a worldwide system might see relatively little additional benefit from a reduction in taxes on foreign-source income. On the other hand, conditional on ETRs achieved prior to reform, greater ability to reduce

[25] About 8 percent of Japanese and German public firms and 2 percent of U.S. public firms in our sample report on an unconsolidated basis. See Appendix B for details.

[26] Results involving various alternative measures of foreign tax rates produce qualitatively-similar results and are available from the authors upon request. See Appendix B for a description of our various proxies for TS, each measure aiming to avoid particular concerns associated with reform-induced endogeneity of firms' AETRs, measurement error, or a lack of detailed coverage of minority-owned subsidiaries.

future foreign tax obligations through strategic income reallocation might render a dividend exemption system even more valuable by increasing the reward from shifting profits toward low-tax foreign jurisdictions. While most MNCs located in both low and high-tax countries are able to use various legal tax minimizing strategies, these strategies are often more accessible to intangible intensive firms, such as firms in the chemical, pharmaceutical, or software industries, because of the nature of the underlying assets involved in production (Gravelle, 2013). In particular, transactions involving intangible assets present special problems for the application and enforcement of transfer pricing rules due to the non-existence of comparable goods. Therefore, the uniqueness of intangible assets makes it difficult to assess appropriate arm's-length transaction prices. Altshuler and Grubert (2003) find along these lines that about half of the difference in profitability between high- and low-tax countries is due to transfers of intellectual property.[27] Intangible intensive firms are also more likely to creatively use cross-crediting rules between income sources (e.g., dividends or royalty income) and countries (e.g., high- and low-tax countries). One important type of income that is considered foreign-source income and can be shielded from taxes in high-tax countries is royalty income from active businesses because royalties are generally deductible from income.[28] We attempt to capture the differential availability of all such related tax minimization strategies and resulting gains from tax reform with a measure of intangible intensity, $INTAN_j$, defined at the 2-digit industry level for firms located in Japan, the United States, and Germany.[29]

[27]Redmiles (2008) and Gravelle and Marples (2011) report that approximately one half of earnings repatriated under the American Jobs Creation Act of 2004's temporary tax holiday originated in the pharmaceutical and other high technology sectors and were repatriated from predominantly low-tax countries or tax havens.

[28]This is also true for R&D current expenses, although R&D activities also benefit from additional tax incentives, the most common of which are tax credits. See Chen and Dauchy (2013a) for a detailed list of tax subsidies for R&D in 34 OECD countries over time, and a summary index of the tax benefit by industry and country.

[29]Intangible intensity is based on investment and stocks of intangible and physical asset for 19 two-digit industries, excluding finance and real estate. Although we experiment with various measures of intangible intensity based on subsidiary- or parent-level industry classification, and on investments or stocks, we ultimately employ parent-level investment measures in our preferred analyses. See Appendix D for a description of various proxies for intangible intensity.

Along similar lines, we take ownership of at least a single subsidiary in a tax haven jurisdiction as a simple proxy for tax sophistication and thus as measure of potential gains arising through new opportunities for tax avoidance under a territorial regime. On the one hand, locating a subsidiary in a tax haven increases the benefit from territorial reform because it facilitates funneling of highly-taxed foreign profits through low-tax subsidiaries, as repatriations are no longer taxable. On the other hand, if a MNCs' ownership of a tax-haven subsidiary serves as an indicator of existing (i.e. pre-reform) access to tax minimization strategies, adoption of a dividend exemption system might prove largely unnecessary among these tax savvier firms. We use existing lists of tax haven jurisdictions based on Hines (2010) and Gravelle (2013) to create another binary indicator to distinguish MNCs with tax haven operations from those without (I_HAVEN_i). It is noteworthy that our proxies for the tax savings potential defined above as TS_i also likely capture to some extent the tax aggressiveness (or minimization) of multinationals. Our empirical approach evaluates the specific contribution of these measures of tax minimization.

Finally, we also wish to consider the role of liquidity constraints in light of the frequently-heard argument that repatriation taxes inhibit cash constrained firms from exploiting their foreign-source income for purposes of reinvestment. This argument served to motivate a temporary relaxation of U.S. rules with respect to related-party borrowing in the midst of the financial crisis and was likewise among the many arguments made in the context of the Japanese tax reform (Tajika et al., 2012).[30] We construct a measure of pre-reform liquidity constraints (LQ_i) based on the average ratio of domestic cash flows to assets, or cash flow "intensity," with larger values denoting less constrained firms.

Beyond the market return terms that are needed to produce reliable estimates of "normal" share price movements and the firm characteristics described above whose vari-

[30]This is despite the fact that Japan has not historically restricted parent corporations from borrowing from their foreign subsidiaries without triggering a repatriation tax on "deemed" dividends, contrary to the United States' use of I.R.C. §956.

ability may influence abnormal returns in a relatively direct manner, we also construct a handful of additional variables based on the geographic and sectoral distribution of consolidated assets within MNC groups. Despite our outright exclusion of *parent* firms in the financial and real estate sectors (i.e. NAICS codes 52 and 53, or FIRE) to avoid the worst of the confounding effects due to the financial crisis, we are reluctant to omit individual subsidiaries within multinational groups (e.g. leasing or finance affiliates) on similar grounds. We consequently define ξ^{FIRE} as measuring the share of total foreign assets attributable to subsidiaries operating in the FIRE sector in order to account for subsidiaries' direct exposure to the collapse of the global financial sector while simultaneously reflecting variation in possible tax avoidance opportunities involving financial operations. Similarly, we also define ζ^{JP}, ζ^{US}, and ζ^{DE} as the share of a parent firm's consolidated worldwide assets held in Japan, the U.S., and Germany, respectively (e.g. such that $\zeta^{JP} = 100$ percent for a domestic Japanese firm), in order to account for variation in the extent of firms' foreign exposure and possible direct bilateral competition across markets.

Each of the above variables are described in Table 2.[31] Table 3 provides summary statistics of the key variables used in our empirical specifications for each country of residence and multinational status, among top quartile firms. Notably, approximately 90 percent of German and U.S. firms own at least one subsidiary in a tax haven ($I\_HAVEN = 1$) whereas fewer than 60 percent of Japanese firms hold tax haven subsidiaries. Because of the high domestic effective tax rates in Japan, averaging 39.8 percent, Japanese multinationals on average face relatively large potential tax savings per dollar of repatriated earnings from the reform, larger than for either the U.S. or Germany (i.e. $TS = 0.215$ versus 0.176 and 0.148, respectively).[32,33] Not surprisingly, MNCs are

[31] See appendix for details.

[32] Although Germany's statutory corporate tax rate was reduced by about 10 percentage points to 29.6 percent in 2009 (KPMG's "Corporate and Indirect Tax Survey"), our AETR measure is constructed from financial statement information in 2005-2007. http://www.kpmg.com/Global/en/services/Tax/tax-tools-and-resources/Pages/corporate-tax-rates-table.aspx.

[33] Our average measure of $AETR$s within domestic or multinational groups is very close to that found

significantly larger than their domestic counterparts.

Other notable features of our final sample include that—contrary to German and U.S. MNCs which are generally less likely to be liquidity constrained than domestic firms—Japanese MNCs and domestic firms seem to face similar levels of cash flow intensity and are less cash constrained than their U.S. or German counterparts. MNCs are generally more intangible intensive than domestic firms, this latter difference being largest among U.S. firms.

5 Results

5.1 Market Model Returns

Before turning to the detailed analysis of the impact of particular firm characteristics on investor valuations of the Japanese dividend exemption, we calculate average abnormal returns (AARs) by firm nationality and multinational status as the mean cross-sectional prediction errors derived from estimation of the standard market model (Section 3.1) including market portfolio returns drawn from the Japanese, U.S., and German exchanges over the last 250 trading days ending 20 days before the first May 9, 2008 event. AARs arrayed by country and firm type for our full firm sample are presented for all nine candidate events in Figure 1 (left column) alongside their corresponding average CARs (ACARs; right column), computed as the running sum of AARs within five-day event windows centered around each event date. Tests of statistical significance follow Kolari and Pynnönen's (2010) "adjusted BMP" methodology and combine corrections for intertemporal correlation (Patell, 1976), event-induced returns volatility (Boehmer et al., 1991), and cross-sectional correlation within firm grouping to avoid invalid inference given our particular event study setting.[34] Results featuring less conservative test statis-

by Markle and Shakelford (2012) who use Orbis data to compare average effective tax rates faced by MNCs and domestic firms in several OECD countries from 2005 through 2009.

[34] According to Corrado and Truong (2008), further reason for caution in interpreting estimated ARs and CARs arises in contexts where security returns are distributed non-normally. The BMP T-test

tics such as the commonly-used Patell (1976) test increase the prevalence of abnormal returns deemed statistically-significant, including nearly all estimated ARs, thereby providing little information by which to evaluate the relative importance of different events. Non-parametric rank test results following Corrado and Zivney (1992) (with and without Kolari and Pynnönen's (2010) proposed adjustment), in contrast, are closest to those from the adjusted BMP test.[35]

Perhaps the most notable feature of the results shown in Figure 1 is the fact that most events do not appear to have induced significant investor reactions in the Japanese (JP) market, at least within basic firm groupings. Focusing on estimated ACARs (rightmost plots) to capture stock market participants' evolving reactions over a sequence of multiple trading days, only the May 9, October 1, and December 19, 2008 events (sub-figures i, iv, and vii, respectively) are characterized by any statistically significant responses, such that the remaining events do not appear to have been construed as providing extraordinary new information regarding the prospects for Japanese tax reform in the aggregate. Of the statistically significant Japanese market reactions—including additional scattered significant AARs on December 12, 2008 and March 27, 2009—these generally appear larger in magnitude among domestic firms than MNCs, which lends some credence to the idea that one of the objectives of the Japanese tax reform was to facilitate expansion of smaller domestic firms into overseas markets (Toder, 2014).

Differences in AARs and ACARs across Japanese, German (DE), and U.S. (US) markets in turn provide more compelling evidence of event-induced reactions, since by design, German returns are intended to account primarily for global financial market conditions and be unaffected by the Japanese reform except through perceived effects on firm competitiveness, while U.S. returns ought to additionally incorporate anticipated effects due to tax competition. It is therefore noteworthy that the statistically-significant 1-2 per-

(Boehmer et al., 1991) without adjustment, for example, is found to reject the true null too often when applied to market model returns from the AMEX, NASDAQ, and Asia-Pacific stock exchanges (Corrado, 2011).

[35]Results from each of these additional parametric and non-parametric tests are available upon request.

cent CARs observed in the Japanese market surrounding the first event (i) are unmet by comparable reactions in either German or U.S. markets, such that the observed effects in Japan are more credibly attributable to the METI announcement—itself evidently either ignored or perceived as unimportant for U.S. and German firm profitability. In contrast, significant negative CARs in the Japanese market surrounding the Prime Minister's and Ministry of Finance's October 1 and December 19, 2008 respective dividend exemption endorsements (iv and vii) exhibit similar trends to those seen in the U.S. and Germany, though abnormal returns in the latter country are considerably greater in magnitude.

These similarities in investor reactions across markets and high degree of statistical precision of certain German or U.S. AAR estimates point to the existence of common shocks as a serious concern, even while level differences in the *magnitude* of abnormal returns may still indicate potentially-offsetting event responses. Disentangling these event-induced reactions from coincident market developments for which the market model cannot fully account represents the central challenge in this analysis and thus the primary motive for examining abnormal returns in relation to specific firm attributes beyond whether or not firms simply have foreign operations. Indeed, a majority of our nine candidate events fall within one trading day of extraordinary developments related to the U.S.-led global financial crisis and auto-sector bailout, the latter having had potentially widely divergent impacts across our sets of U.S., Japanese, and German firms.[36] Aggregate CAR estimates for the October 1, November 28, December 12, December 19, and March 27 events are thus virtually certain to be affected by confounding market events.[37]

[36]The German auto industry in particular stands apart in terms of its dominance of the U.S. luxury vehicle segment, its continued reliance on non-U.S. production, and its disproportionate representation among the set of largest German firms by market capitalization included in our estimation sample.

[37]For a (truncated) timeline of the financial crisis, see e.g., http://www.washingtonpost.com/wp-srv/business/economy-watch/timeline/. The United States' $700 billion Troubled Assets Relief Program (TARP) passed the U.S. Senate on October 1, 2008 in the midst of considerable policy and financial market uncertainty after an earlier version was rejected on September 29, and the final version was enacted on October 3 as part of the Emergency Economic Stability Act of 2008 (Bajaj and Grynbaum, 2008). November 28, 2008 was marked by the United Kingdom's first bank nationalization while the next trading day produced the news that the U.S. had officially entered into recession. December 12 and December 19, 2008 were associated with a series of alternating breakthroughs and failures in discussions between the U.S. administration and Congress with respect to the U.S. auto bailout, the

Coincidentally, this leaves only the three Cabinet meeting-related events and the August 2008 METI report date as being relatively uncontaminated by specific events due to the financial crisis[38]—precisely those dates which knowledge of the Japanese tax reform process suggests ought to have proven decisive for adoption of the dividend exemption system. We consequently proceed by concentrating our main analysis on the CAR effects of firm characteristics which ought to have been specifically associated with anticipated effects of the dividend exemption system surrounding the May 9, June 27, August 18, and January 23 events while striving to control for firms' remaining financial sector exposure.[39] We return to consideration of auto sector-specific concerns in later robustness checks.

5.2 Modulating Effects of Firm Characteristics

As described in Section 4.2, we examine the impact of the following key firm characteristics on firm CARs: (a) an indicator for tax haven subsidiary ownership, I_HAVEN; (b) the potential tax savings rate on repatriated foreign earnings, TS; (c) intangible intensity, $INTAN$; and (d) cash flow intensity, LQ. Applying the single-step dummy variable approach described in Section 3.2, each of these attributes are allowed to have differential impacts by country and multinational status of the parent firm, where applicable, as well

terms of which were finally agreed upon on December 19 (Dombey, 2008). On March 30, 2009, the first trading day after enactment of the Japanese reform, the U.S. Administration reported that General Motors and Chrysler had failed to meet their viability conditions, thereby pushing both automakers toward bankruptcy and Chrysler into an alliance with Fiat (Stolberg and Vlasic, 2009).

[38]Economic news was nevertheless broadly negative over this entire time period, as captured in the Bank of Japan's worsening GDP growth outlook, reported in the *Nihon Keizai Shimbun* on August 19, 2008 and January 23, 2009. Even if these reports surprised investors, however, their effects should likely have been distributed fairly uniformly without producing differential ARs as a function of firm characteristics. Toyota Motor Company's worst sales and earnings forecast in nine years, released on May 9, 2008 (*Nihon Keizai Shimbun*), is more concerning as a surprise announcement from the largest firm in Japan's vital auto industry. Robustness checks involving the exclusion of all auto-related manufacturing industries imply only a very slim reduction in the differential between aggregate CAR effects for domestic versus multinational firms surrounding the May 9 event (not shown), whereas the introduction of controls for auto industry-specific portfolio returns tend to imply the opposite (Section 5.4), suggesting at most a limited impact of the Toyota announcement.

[39]All results for the full set of events are available upon request. Consistent with the foregoing discussion, CARs surrounding these other dates show little significant association with firm attributes.

as by the share of consolidated worldwide assets held in Japan, the U.S., and Germany (ζ^{JP}, ζ^{US}, and ζ^{DE}, respectively) to account for variation in the extent of firms' foreign exposure and possible direct bilateral competition across markets. Estimation of equation (4) thus incorporates multiple layers of interactions whose effects on day-three ACARs for the events of May 9, June 27, August 18, and January 23 are summarized in Tables 4-7, with specifications (1)-(4) for each date consisting of simple combinations of characteristics (a)-(d).[40] Due to the large number of underlying interactions, we only report aggregated average marginal effect estimates for our key firm characteristics as well as overall day-three ACARs.[41]

Average marginal effects of tax haven subsidiary ownership on day-3 ACARs are shown as specification (1) in Tables 4-7 and stem from estimation of equation (4) using a vector of firm covariates $\tilde{\mathbf{X}}$ defined as

$$\begin{aligned}\tilde{\mathbf{X}} = {} & \xi^{FIRE} + \left\{I\_DE, I\_US, I\_JP\right\} + \left\{I\_DE, I\_US, I\_JP\right\} \times I\_MNC \\ & + \left\{I\_DE, I\_US, I\_JP\right\} \times I\_MNC \times \left[I\_HAVEN + \zeta^{DE} + \zeta^{US} + \zeta^{JP}\right] \\ & + \left\{I\_DE, I\_US, I\_JP\right\} \times I\_MNC \times I\_HAVEN \times \left[\zeta^{DE} + \zeta^{US} + \zeta^{JP}\right]\end{aligned} \tag{5}$$

with $\left\{I\_DE, I\_US, I\_JP\right\}$ representing a set of binary indicators for parent firm nationality. Specification (2) follows a similar form of interactions, substituting TS for I_HAVEN as a more precise measure of potential gains from dividend exemption, where TS should implicitly reflect the application of firms' existing tax mitigation strategies, including the use of tax havens, to firms' fundamental operating results and tax liabilities.

[40] As illustrated in the five-day event windows in Figure 1, a majority of statistically-significant abnormal returns occurred within plus or minus one day of their respective event dates. As a result, we focus hereinafter on three-day event windows, as in Hanlon and Slemrod (2009). Allowing longer five-day events windows does not qualitatively alter our main results (not shown) despite the increased computational burden.

[41] By design, these last figures are equivalent to ACAR estimates obtained from estimation of the standard market model for identical firm groups, albeit with standard errors from the single-step approach that account for intertemporal correlation and cross-group correlation directly. In contrast to the preliminary results presented in Figure 1, out of computational necessity, our single-step estimates apply exclusively to the top quartile of domestic and multinational firms by market capitalization.

Specifications (3) and (4) add a full set of interactions of specification (2) with $INTAN$ or LQ, such that intangible intensity or liquidity constraints are allowed to affect firms' CARs both directly and through the tax savings channel, thereby allowing, for example, investors to attribute larger gains to firms with higher relative cash flow out of which to finance future dividends or to firms with relatively lower costs of income reallocation.

A first point to emerge from Tables 4-7 is that even after accounting for key firm characteristics, Japanese MNCs experienced significantly worse day-three ACARs surrounding each of the three Cabinet meeting dates than their domestic counterparts, something which was not directly testable in the unconditional analysis of market model abnormal returns of the previous section. Moreover, among Japanese MNCs, more sophisticated or tax aggressive firms (i.e. those with at least one tax haven subsidiary) performed relatively worst of all (specification (1)). Thus, whereas domestic Japanese firms saw their market capitalization increase by an average of 1.8 percent relative to what would have been anticipated based on general stock market performance surrounding the May 9 METI announcement (Table 4), Japanese MNCs as a group experienced imprecisely-estimated near-zero ACARs (0.1 percent), with part of this reduction toward zero being driven by tax haven subsidiary ownership, as reflected in the estimated $\partial r/\partial I\_HAVEN$ of -0.3 percent. Comparable results, albeit featuring smaller differential effects between domestic and multinational firms, similarly characterize the June 27 (Table 5) and January 23 (Table 7) event dates.

Measured in this manner, tax sophistication on the part of Japanese firms consequently does not appear to have been perceived by investors as creating exceptional value for firms under a territorial regime. Anecdotally, Japanese corporate culture is believed to be responsible for weak tax planning, such that the 2009 tax reform could be viewed as merely enabling Japanese firms to compete on equal footing with their more tax-savvy international competitors (Toder (2014), p. 24).[42] Coupled with the reform's

[42]Tax practitioners frequently point out, for example, that the Japanese tax system does not restrict parent firms from borrowing from foreign subsidiaries, contrary to the United States' treatment of

anticipated reduction in compliance burdens and facilitation of foreign expansion, it appears reasonable for domestic and "non-haven" MNCs to attract larger abnormal returns, whereas MNCs which already had more complex tax avoidance strategies in place prior to May 9, 2008 might not have been expected to see much change in future tax obligations. In contrast, among U.S. firms, more sophisticated MNCs fared significantly better around the May 9 event than their domestic counterparts or than those MNCs without a single tax haven subsidiary (admittedly, just under 10 percent of the sample), consistent with the notion that more effective tax planning on the part of U.S. MNCs might insulate such firms from enhanced Japanese competition while simultaneously yielding larger tax savings from an eventual territorial regime whose likelihood of adoption could be expected to increase in a world of heightened tax competition. German firm results should be interpreted cautiously given the small sample involved, especially within firm subgroups, and it is consequently difficult in the aggregate to reject a null hypothesis of zero abnormal returns for all but the June 27 event date. Even there, however, the magnitudes of the estimated ACARs by multinational status and tax haven subsidiary ownership would rather suggest the occurrence of a significant common shock, and it remains plausible that German stock market investors attributed no significance to Japan's tax reform.

Naturally, MNC status and ownership of tax haven subsidiaries remain relatively coarse measures of international exposure and tax aggressiveness. Specifications (2)-(5) hence allow a more nuanced examination of investor reactions through the introduction of continuous measures of TS, $INTAN$, and LQ. Considered in isolation, the rate of anticipated tax savings resulting from the elimination of domestic tax on repatriated foreign earnings (counterfactually-so, in the case of Germany) is associated with substantial positive effects on day-three CARs among Japanese MNCs across all four events, with the largest such contributions arising around the June 27 and January 23 Cabi-

"deemed" dividends under I.R.C. §956. In spite of this, instances of Japanese corporations availing themselves of this tax avoidance opportunity are unheard of.

net meetings. The interpretation of $\partial r/\partial TS$ for this first date under specification (2) is therefore that a 10 percentage point increase in the repatriation tax savings rate would have been associated with abnormal gains of 0.48 percent of market capitalization (equal to ¥5.9 billion or $56 million for the average Japanese MNC in our sample). Intriguingly, statistically-significant tax savings effects around these same two dates among German firms appear on the basis of the underlying model coefficient estimates to be largely attributable to significant differences in counterfactual tax savings rates in relation to ζ^{JP}, the proportion of German firms' consolidated assets held by Japanese subsidiaries.[43]

Focusing on future tax avoidance and the role of liquidity constraints through the introduction of controls for industry-level intangible intensity and firm-level cash flow intensity yields a reduction in magnitude and statistical precision of the January 23 tax savings effect among Japanese MNCs in favor of robust positive effects on June 27 (Table 5, specifications (3) and (4)) and a significant positive tax savings effect on May 9 (Table 4, specification (4)). Meanwhile, to the extent that intangible intensity itself has any direct influence on ACARs—holding constant the existing distribution of tax savings rates—the results of specification (3) reveal that if anything, greater income shifting ability was perceived by investors as having almost universally negative (or at best, positive and insignificant) implications for future firm profitability across all four events, regardless of nationality or MNC status. Indeed, the near-uniformity of the negative $\partial r/\partial INTAN$ effects of intangible intensity raises the possibility that once variation in foreign effective tax rates have been accounted for through TS, remaining variation in intangible intensity may serve primarily to capture industry effects, with more intangible intensive firms potentially being in industries more severely affected by the financial crisis. If so, it may still be meaningful to draw comparisons between the magnitudes of

[43]As previously shown in Table 3, Japanese subsidiaries hold an extremely small 0.03 percent (on average) of German firms' worldwide assets as measured using Orbis data. This presents a further challenge and caution for interpreting the magnitudes of estimated German effects due to the apparent influence of these few firms with small Japanese operations (where size measured in this way might itself reflect the effects of the Japanese tax system).

estimated ACAR effects between Japan, Germany, and the U.S. under the assumption of common global market developments, in which case the more positive point estimates among Japanese firms for the first two events could suggest a slight *relative* tendency toward positive valuation of tax avoidance capabilities around these events, albeit not in a statistically-precise manner.

Beyond its heterogenous impact on firms facing different current and future tax savings, the Japanese dividend exemption may have also favored more financially constrained firms, including those facing more serious cash constraints in the midst of the financial crisis. Indeed, many investors view the adoption of a permanent foreign dividend exemption in the United States as an efficient way to alleviate liquidity constraints facing U.S. firms by facilitating access to cash out of which to fund long term operations.[44] This view, however, is largely premised on the notion that parent corporations cannot access foreign cash without triggering a significant repatriation tax, which may be appropriate for the U.S. as a result of the application of I.R.C. §956 to the treatment of deemed dividends, but Japanese MNCs prior to the reform faced no such obstacle. As such, it is perhaps less surprising that our measure of liquidity constraints, LQ, for which larger values denote firms with greater relative cash flow, is shown to have been associated with significant positive abnormal returns among Japanese MNCs at the time that the government's intention to consider a dividend exemption system was first reported by the METI. All else held constant, a one standard deviation increase in Japanese MNC cash flow intensity of 0.45 points would have thereby raised the average firm's market capitalization by $(0.45)(1.92) = 0.87$ percent relative to the overall market. By comparison, the tax savings effect among Japanese MNCs surrounding the May 9 event would imply a $(0.18)(3.08) = 0.55$ percent ACAR in relation to a one standard deviation increase in

[44] See, for example, "Promote Dividend Repatriation," by Joseph M. Calianno and Fred F. Murray, *Tax Analysts*, 2009. http://www.taxanalysts.com/www/freefiles.nsf/Files/CALIANNOandMURRAY-8.pdf/$file/CALIANNOandMURRAY-8.pdf. The U.S. government implicitly recognized this argument by temporarily relaxing restrictions on U.S. parent borrowing from foreign subsidiaries at the peak of the financial crisis.

TS.

Contrary to the conventional view—perhaps tainted by the United States' dominant perspective on international taxation issues in the context of the financial crisis—investors' initial perception of the benefits from adoption of a dividend exemption regime for Japanese firms was thus that this might prove more advantageous for those firms with relatively greater cash flow. Subsequent events tended to reverse this result as firms with relatively *lower* cash flow (measured prior to the financial crisis) experienced more positive abnormal returns, though in a manner not unique to Japan. Taken in isolation, these negative abnormal returns attributable to the partial effect of LQ for Japanese MNCs on the last three of our events are consistent with investors tempering their expectations with respect to the perceived advantages of increased cash flow as additional details of the proposed reform became known and as the financial crisis worsened. Similar contemporaneous effects either in Germany or the U.S. cast a measure of doubt on this interpretation, however, such that the May 9 results emerge as all the more distinct from global market events.[45]

5.3 Cumulated Event Returns

Given the incremental nature of the sequence of events leading up to adoption of Japan's dividend exemption system and the possibility of swings in investor valuations as new information became available, a natural extension of the foregoing discussion is to consider the sum of stock market reactions across multiple events. As evidenced by the results of Tables 4-7, the August 18 event (Table 6) revealed virtually no discernible market

[45]Once again, evidence of statistically-significant reactions in the German market, including a substantial positive tax savings effect surrounding the May 9 event under specification (4), tend to suggest the occurrence of potential confounding events, as these effects are difficult to reconcile with a strict effect of firm competition. Given the small sample of German MNCs involved, individual firm performance may be highly influential, as is largely confirmed by the application of robust regression or quantile regression methods (discussed below). As in other specifications, German CAR effects appear to be very sensitive to the share of consolidated assets held by Japanese subsidiaries, thereby amplifying the corresponding average marginal effects, and the joint effects of TS and LQ for German MNCs around the May 9 event appear to be largely offsetting.

response, and we consequently focus exclusively on the Cabinet meeting-related events for this exercise, treating each three-day event *window* in this sequence as part of a single contiguous event period.[46] We thus adapt the single-step approach in a manner similar to Auerbach and Hassett (2005) to redefine the event dummies in equation (4) such that $D1 = 1$ for all days within the three-day event window around May 9, $D2 = 1$ for all three days in the June 27 event window, etc.. As such, $D1$ and its associated interactions identifies the AAR for the May 9 event *averaged* across all three days in the first event window, while $D2$ and $D3$ capture the cumulated sum of average AARs incurred across the first two and three events, respectively.

Table 8 reports the resulting average AARs cumulated across the three Cabinet meeting dates for the basic tax haven and tax savings specifications previously shown for individual days as specifications (1) and (2) in Tables 4-7. By design, the May 9 results in the first column of the table closely replicate the results shown in Table 4, albeit expressed as an average effect spread over three days rather than the sum of three daily effects measured each with some statistical imprecision. Thus, for example, the three-day average AAR (i.e. $\partial r/\partial D1$) of 0.59 for Japanese domestic firms is approximately one third of the day-three ACAR for Japanese domestic firms of 1.80 discussed previously. The more substantive component of this analysis therefore lies in the subsequent accumulation of AARs and importantly, the degree of statistical precision surrounding these cumulated effects. Despite finding statistically-significant negative ACARs among Japanese MNCs around January 23 (Table 7), for instance, taken in conjunction with investor reactions from the previous two events, the net result over the course of all three Cabinet meeting

[46]This approach assumes a full realization of investor expectations over the course of the nine days defined by the May 9, June 27, and January 23 events, without allowing for offsetting investor reactions on excluded dates. This assumption is broadly validated in the results of a comparable analysis applied to the full sequence of nine event dates (not shown). We remain reluctant to place too much weight on dates that were so clearly impacted by major global market developments in the context of the financial crisis, and though we cannot fully exclude the occurrence of even more gradual dissemination of information beyond the dates considered, this nevertheless provides some assurance that incorporating the set of most likely additional events to our analysis does not change the overall estimated impact of the reform through the January 23 event.

dates is not statistically distinguishable from zero. Over the same time period, Japanese domestic firms experienced a significant positive average cumulated AAR of 1.02 (equivalent to a 3.1 percent three days ACAR), virtually identical to that for U.S. domestic firms despite an earlier positive reaction only in Japan. Conversely, stronger abnormal returns among U.S. MNCs at the time of the May 9 METI announcement became no longer distinguishable from zero over the course of subsequent events (and hence more comparable to the effects on Japanese firm valuations). German firms, meanwhile, experienced uniformly negative and worsening results overall.

For those firm characteristics more closely associated with specific impacts of the tax reform on firm after-tax profitability, I_HAVEN and TS, their partial effects on cumulated average AARs across countries bring added clarity to overall investor responses. As shown in the upper portion of Table 8, ownership of at least a single tax haven subsidiary ultimately contributed to reductions in MNC market capitalization across all three countries, the result being that—contrary to the immediate May 9 reaction—more tax sophisticated Japanese MNCs may have ultimately been perceived as facing disproportionately *smaller* losses over this time period than their German or U.S. counterparts. Net of the German or U.S. effects (presumably due to a combination of non-reform related global market developments, effects on international competitiveness, and spillovers to prospects for U.S. reform), Japanese MNCs with tax haven operations may have eventually been viewed by investors as benefiting by comparison insofar as they might better exploit new tax avoidance opportunities rendered more explicit as details of the reform's proposed anti-avoidance measures became known.

Further underlying these cumulated AAR results by multinational status and tax haven ownership was a pronounced strengthening of the estimated tax savings effect among Japanese MNCs, without which their stock market performance would have been substantially lower. Estimates of $\partial r/\partial TS$ imply that a 10 percentage point increase in the tax savings rate (e.g. through a comparable reduction in average effective foreign

tax rates) was associated by investors with AARs cumulated across all three Cabinet meeting dates and averaged across three days of 0.31 percent, for the equivalent of a final 0.92 percent ACAR as of the last day in the January 23 event window.[47] Applied to the complete distribution of TS among Japanese MNCs (i.e. with a mean tax savings rate of 0.215) and weighted by average market capitalization at each event date, this would translate to an aggregate gain in market capitalization attributable to the sequence of tax savings effects of ¥4.1 trillion in the group of largest Japanese MNCs in our sample. Assuming a similar average tax savings rate of 21.5 percent across all Japanese MNCs, this is just slightly in excess of predicted tax savings on the repatriation of ¥17 trillion in undistributed earnings held by first- and second-tier foreign subsidiaries of Japanese firms as of the end of fiscal 2006, as reported in the METI's report (2008).[48]

5.4 Robustness Checks

In spite of our emphasis on event dates which ought to have proven decisive based on the Japanese tax reform process while simultaneously not being explicitly associated with major developments related to the financial crisis, conditions in the global financial markets during this general time period nevertheless remain a challenge for an event study analysis predicated on the ability to accurately predict normal stock returns based on previous historical market comovement. This, in conjunction with our sample selection criteria which are required for computational tractability raise a natural concern that the results of our core analyses are unduly influenced by these factors. Accordingly, Table 9 presents a comparison of our benchmark tax haven and tax savings results for the first

[47] $(3.076)(0.1)(3) = (0.10)\left[(0.356)(3) + (1.958 - 0.356)(3) + (3.076 - 1.958)(3)\right] = 0.92$.

[48] Both measures of estimated tax savings, whether based on investor reactions or back-of-the-envelope calculations, are likely understated either because of our inability to incorporate the universe of Japanese MNCs, or in the case of the latter, because of the omission of lower-tier subsidiaries' undistributed earnings and the lack of more up-to-date information. Furthermore, even with better information, the back-of-the-envelope calculation necessarily ignores tax savings on anticipated *future* earnings altogether. Due to missing information in Orbis, we cannot verify the amount of foreign undistributed earnings held by firms in our sample. However, the largest 25 percent of Japanese MNCs do hold 85 percent of total assets in our full sample, and it is reasonable to expect that their undistributed foreign earnings would likewise constitute a disproportionate share of the total given our selection criteria.

May 9 event with a series of robustness checks intended to dispel the most serious of these concerns as well as concerns related to the general susceptibility of the German abnormal return estimates to small-sample issues and overly-influential observations.

Results involving the full sample of all German, U.S., and Japanese firms for which we have sufficient stock market and financial statement data to perform the core analyses are presented in the second column and yield—not entirely unexpectedly—CAR estimates for Germany and the U.S. that are generally driven toward zero relative to those obtained using the top-quartile sample only. For Japan, in contrast, the introduction of the larger firm sample mostly accentuates abnormal return patterns, the most notable of these effects being the pronounced increase in magnitude of estimated day-three ACARs among the set of Japanese MNCs without tax haven operations. Indeed, in the full sample, these less tax sophisticated and likely smaller MNCs appear to have been viewed by investors in a nearly identical manner as their domestic counterparts, perhaps reaping similar gains from their enhanced prospects for foreign expansion. As a consequence, Japanese MNCs as a group are seen to experience significantly greater ACARs in the full sample, with a portion of this effect more clearly attributable to the rate of tax savings on repatriated earnings than in the benchmark results.

Despite our explicit winsorizing of firms' stock market returns above and below the 1^{st} and 99^{th} percentiles of the returns distribution, individual observations may nevertheless exert undue influence on our estimated results (e.g. German MNCs with Japanese subsidiaries; auto manufacturers, etc.). The robust regression results presented in the third column of Table 9 take an alternate approach to mitigating the effects of potential outliers within the top-quartile sample in which regression residuals are iteratively applied to re-weighting observations so as to put proportionately less weight on points further from the fitted regression line. As shown, this methodology yields very similar results as ordinary least squares in the benchmark specifications, the only noteworthy difference being an increase in the magnitude and precision of day-three ACARs among

U.S. domestic firms. Overall, this suggests that outliers are unlikely to be responsible for the more pronounced investor reactions identified in our core results, contrary to what might have been the case.

Focusing on the remaining possible confounding effects of the global financial crisis and developments related to the U.S. auto sector bailout, we consider as a final robustness check the introduction of returns on two additional stock market indices as additional determinants of normal stock returns. Beyond the exclusion of financial and real estate sector parent firms and controls for the proportion of subsidiary assets attributable to these sectors already present in our core analyses, the final column of Table 9 thus depicts results based on an augmented market model consisting of five market return portfolios: the Japanese, U.S., and German market return measures used previously, plus returns on the Dow Jones U.S. Automobile and Parts Index and World Financial Index.[49] Firms whose share price movements are closely tied to developments in these sectors ought to be predicted with greater accuracy by leveraging information from these additional sectoral indices, thereby reducing the portion of actual stock returns estimated to constitute abnormal returns. In fact, Japanese and U.S. ACARs appear almost entirely unaffected, regardless of multinational status, ownership of tax haven subsidiaries, or TS. German firm ACARs appear somewhat more sensitive to these additional market controls—not unexpected given the dominance of auto sector firms in the German sample—without nevertheless presenting a radically altered view of overall investor reactions.

Taken together, each of these specifications tend to emphasize rather than attenuate the differential impacts of the tax reform in Japan relative to those in the U.S. or Germany, consistent with the view that investor reactions in the latter markets serve as valuable counterfactuals against which to contrast the Japanese results. By the same token, the general attenuation of ACARs among German or U.S. firms across specification tests suggests that evidence of any significant reactions in these countries should be

[49]Indices for the U.S. auto industry (DJUSAT) and the financial industry (Dow Jones Global Financial Index) are obtained from Global Financial Data (available at https://www.globalfinancialdata.com).

more cautiously viewed as an artifact of global financial market conditions rather than real responses to the Japanese tax reform.

6 Conclusion

Tax competition and tax base erosion has become a major concern among OECD countries in recent years as countries have increasingly turned to tax policy as a way to incentivize economic activity. Moreover, countries with worldwide tax regimes have seen a considerable expansion of firms' unrepatriated earnings over time, in part due to the increasingly intangible nature of worldwide business income, and increased global coverage of MNC operations. Out of this environment, ten OECD countries have adopted territorial tax regimes since 2000, the most prominent of these having occurred in 2009 in Japan, the U.K., and New Zealand. Our analysis of stock market valuations of Japan's 2009 tax reform hence has broad implications both for Japan and for remaining worldwide tax regimes—primarily the U.S.—where territorial taxation has been repeatedly proposed as an option for tax reform, as well as for other nations having recently implemented similar reforms.

Starting from a preliminary set of nine potential event dates related to the eventual adoption of Japan's dividend exemption system, we ultimately focus our analysis on three Cabinet meeting dates which we argue should have been viewed as speaking most authoritatively with respect to the substance of the reform given the nature of Japan's streamlined annual tax policy review process. This choice is largely corroborated by an initial examination of abnormal returns in the Japanese market relative to the U.S. and German markets based on standard event study methods and has the added coincidental virtue of avoiding event dates which simultaneously involved major developments in the global financial crisis. As we show, each of these three events are associated with significant market reactions in Japan, which on an aggregate basis tended to favor domestic

firms relative to multinationals, especially the conceivably more tax-sophisticated MNCs with foreign operations located in one or more tax haven jurisdictions. The largest such effect thus implies an ACAR of 1.8 percent among Japanese domestic firms immediately surrounding the first May 9, 2008 event, when the METI first announced its commitment to seriously examine ways to implement an exemption system.

We interpret this effect in conjunction with the absence of any significant net impact on Japanese MNC valuations or comparable significant reactions in the U.S. or German markets as implying that the possibility of adopting a territorial regime was initially perceived as being disproportionately valuable for firms that might previously have been deterred from expanding overseas due to international tax compliance issues and lack of competitiveness under the worldwide regime, consistent with one of the motives for the reform. By extension, more tax savvy Japanese MNCs might reasonably have been anticipated to benefit disproportionately *less* from the long-term tax savings and incentives for tax avoidance afforded under a dividend exemption system given their previously-established tax minimization strategies.

The differential impact of the reform across firm types may also reveal differences in anticipated benefits as a function of other tax system details that our data do not allow us to observe directly, such as changes in the ability of MNCs to use cross-crediting for foreign tax credit purposes, or the strictness of anti-avoidance rules. Firms that would no longer be able to use foreign tax credits to reduce foreign taxes on unqualified sources of income, such as royalty and interest receipts, might consequently have seen increases in tax obligations. Furthermore, in contrast to the U.S. treatment of "deemed" repatriations under I.R.C. §956, the absence of restrictions on Japanese parent corporations' ability to borrow from foreign subsidiaries without triggering domestic taxation either before or after the reform suggests that even moderately-sophisticated Japanese MNCs might have easily avoided taxes on foreign-source income under Japan's worldwide regime, thereby making the reform largely irrelevant for tax avoidance purposes. These features of the

Japanese tax system and anecdotal evidence of Japanese corporations' tax morale may also explain our findings that intangible intensity of parent firms had no significant impact (if not a negative one) on Japanese MNCs' stock returns surrounding each of the Cabinet meeting dates, or that the reform tended to favor *less* liquidity constrained firms, at least initially.

Despite largely insignificant and negative ACAR estimates for Japanese MNCs as a group, these mask important underlying heterogeneity. Offsetting what would have otherwise been even weaker MNC returns, we thus also find a significant positive impact on Japanese MNC ACARs of the tax savings rate on repatriated foreign earnings, the magnitude of which over the course of the three events corresponds approximately to the amount of savings attributable to the repatriation of all first- and second-tier subsidiaries' undistributed earnings according to the best available estimates at the time of these events for earnings held through the end of fiscal 2006. The largest single-event gains accruing to firms' anticipated tax savings were thus realized at the time of the Cabinet's official endorsement of a policy reform aimed at encouraging the repatriation of foreign earnings on June 27 and amounted to the equivalent of a 0.4 - 0.5 percent increase in market capitalization for every 10 percentage point increase in the tax savings rate. Cumulated across the sequence of Cabinet meeting events, the total effect of the same increase in the tax savings rate was associated with 0.9 percent increase in market capitalization, representing the equivalent of ¥4.1 trillion spread over our sample of the largest 201 Japanese MNCs. A simple back-of-the-envelope calculation of the savings resulting from the elimination of repatriation taxes on undistributed earnings of ¥17 trillion at the average tax savings rate of 21.5 percent observed in our sample should have implied instantaneous gains of ¥3.7 trillion. As discussed in Section 5.3, these figures are not directly comparable, and both likely underestimate the savings accruing to the universe of Japanese MNCs on *all* undistributed earnings.[50] It is conceivable that investors

[50]Offsetting the underestimate of the latter back-of-the-envelope figure is the yen's 24 percent nominal appreciation against a trade-weighted basket of foreign currencies over the period 2006-2009, thereby

had already heavily discounted repatriation taxes on undistributed earnings prior to any discussions of the reform (e.g. because of the availability of alternatives to dividend repatriation or because of undistributed earnings being bound up in long-term investments plans), but it is otherwise striking that investors did not impute even larger gains to the tax savings rate on all retained *and future* earnings. For this reason as well, it does not appear that investors perceived new opportunities for tax avoidance to significantly impact firms' future after-tax profitability.

In comparison to Japanese market reactions, our analysis of U.S. and German abnormal returns surrounding the same sequence of events yield no discernible patterns of consistent responses which could be tied to perceived effects of firm competitiveness or international tax competition. This is not unanticipated in the German market given the country's long-running territorial tax regime (and hence the justification for including German returns to draw attention to possible contemporaneous global market events) but somewhat more so in the U.S. where corporate tax policy discussions have frequently turned to reducing the burden of international taxation. Policy discussions in the U.S. were heavily dominated during this time period by crafting responses to the financial crisis, however, and even media reports in the U.S. of the Japanese or U.K. tax reforms were relatively rare. This is indicative in and of itself of the probable importance of direct spillovers onto U.S. firms, suggesting that these may be immeasurably small.

As in all event studies, especially those involving "clustered" events, a natural concern involves the occurrence of confounding market developments, and indeed, results involving several of our excluded dates appear to confirm the existence of major effects of this type. In addition to our exclusion of these dates from our analysis, our exclusion of financial sector and real estate sector parent firms and controls for subsidiary exposure to these same industries, and our leveraging of data on specific firm attributes to avoid the most severe such sources of concern, we perform a final series of robustness

diminishing the yen-denominated value of foreign earnings as measured for fiscal 2006.

checks intended specifically to address remaining sample and outlier issues or a lack of industry-specific predictive ability. Each of these tests confirm or even accentuate the importance of Japanese market reactions while mitigating potentially-spurious reactions in Germany and the U.S.

These findings collectively confirm the importance of the most direct source of gains from adoption of a territorial tax regime—namely, the tax savings on immediate repatriations—while highlighting the perceived benefits among aspiring entrants into foreign markets of reductions in tax compliance costs and enhanced competitiveness in foreign markets. Notably missing are any results to suggest important anticipated gains from an acceleration of income reallocation and tax avoidance. From a Japanese perspective, this should provide policymakers with a degree of satisfaction, knowing that their own policy objectives were largely matched by investors' expectations of how firms would behave under a territorial regime. Attempts to extend these findings to other countries having recently enacted or contemplated similar reforms ought to take careful account of possible differences in cultural attitudes toward tax compliance and general tax morale but should nevertheless prove highly instructive for evaluating the likely costs and benefits of switching to a territorial tax system.

References

Almeida, Heitor and Murillo Campello (2007) "Financial constraints, asset tangibility, and corporate investment," *Review of Financial Studies*, Vol. 20, No. 5, pp. 1429–60.

Altshuler, Rosanne and Harry Grubert (2003) "Repatriation Taxes, Repatriation Strategies, and Multinational Financial Policy," *Journal of Public Economics*, Vol. 87, pp. 73–107.

Auerbach, Alan J. and Kevin A. Hassett (2005) "The 2003 Dividend Tax Cuts and the Value of the Firm: An Event Study," *NBER Working Paper*, No. 11449, June.

Bajaj, Vikas and Michael M. Grynbaum (2008) "For Stocks, Worst Single-Day Drop in Two Decades," *New York Times*, September 29.

Ball, Ray and Philip Brown (1968) "An Empirical Evaluation of Accounting Income Numbers," *Journal of Accounting Research*, Vol. 6, No. 2, pp. 159–178.

Binder, John J. (1998) "The Event Study Methodology Since 1969," *Review of Quantitative Finance and Accounting*, Vol. 11, pp. 111–137.

Boehmer, Ekkehart, Jim Musumeci, and Annette B. Poulsen (1991) "Event-study Methodology Under Conditions of Event-Induced Variance," *Journal of Financial Economics*, Vol. 30, No. 2, pp. 253–272.

Bradley, Sebastien (2013) "Investor Responses to Dividends Received Deductions: Rewarding Multinational Tax Avoidance?", November.

Brown, Stephen J. and Jerold B. Warner (1985) "Using Daily Stock Returns: The Case of Event Studies," *Journal of Financial Economics*, Vol. 14, pp. 3–31.

Brys, B., S. Mathews, and J. Owens (2011) "Tax Reform Trends in OECD Countries," *OECD Taxation Working Papers*, No. 1.

Chen, Sophia and Estelle P. Dauchy (2013a) "International R&D sourcing and knowledge spillover: Evidence from OECD countries," *New Economic School, Working Paper*.

——— (2013b) "The tax-adjusted q model of corporate investment after accounting for intangible assets: Theory and evidence from the US in 1998-2006," *New Economic School, Working Paper*.

Corrado, Charles J. (2011) "Event Studies: A Methodology Review," *Accounting and Finance*, Vol. 51, pp. 207–234.

Corrado, Charles J. and C. Truong (2008) "Conducting Event Studies with Asia-Pacific Security Market Data," *Pacific-Basin Finance Journal*, Vol. 16, pp. 493–521.

Corrado, Charles J. and Terry L. Zivney (1992) "The Specification and Power of the Sign Test in Event Study Hypothesis Tests Using Daily Stock Returns," *The Journal of Financial and Quantitative Analysis*, Vol. 27, No. 3, pp. 465–478, September.

Dauchy, Estelle P. (2013) "The efficiency cost of asset taxation in the U.S. after accounting for intangible assets," *New Economic School, Working Paper*.

Deloitte"World Tax Advisor-Foreign Dividend Exemption in 2009 Japanese Tax Reform," *Deloitte Touche Tohmatsu*, No. 46.

Desai, Mihir A. and Dhammika Dharmapala (2007) "Corporate Tax Avoidance and Firm Value," *NBER Working Paper*, No. 11241.

Desai, Mihir A. and James R. Jr. Hines (2003) "Evaluating International Tax Reform," *National Tax Journal*, Vol. 56, pp. 487–502.

Devereux, Michael P. (2008) "Taxation of Outbound Direct Investment: Economic Principles and Tax Policy Considerations," *Oxford Review of Economic Policy*, Vol. 24, No. 4.

Dittmer, P. (2012) "A Global Perspective on Territorial Taxation,"Technical report, The Tax Foundation.

Dombey, Daniel (2008) "Bush Unveils $17.4bn Carmaker Rescue," *Financial Times*, December 19.

Edgerton, Jesse (2010) "Investment incentives and corporate tax asymmetries," *Journal of Public Economics*, Vol. 94, No. 11-12, pp. 936–52.

Egger, Peter, Valeria Merlo, Martin Ruf, and Georg Wamser (2012) "Consequences of the New UK Tax Exemption System: Evidence from Micro-level Data," *CESifo Working Paper*, No. 3942, September.

Fama, Eugene F., Lawrence Fisher, Michael C. Jensen, and Richard Roll (1969) "The Adjustment of Stock Prices to New Information," *International Economic Review*, Vol. 10, No. 1, pp. 1–21.

Fazzari, Steven M. and Bruce C. Peterson (1993) "Working capital and fixed investment: New evidence on financing constraints," *The RAND Journal of Economics*, Vol. 44, No. 3, pp. 328–42.

Gibbons, M. (1980) "Econometric Models for Testing a Class of Financial Models: An Application of the Nonlinear Multivariate Regression Model." Unpublished Manuscript, University of Chicago.

Gravelle, Jane (2013) "Tax havens: International tax avoidance and evasion," January.

Gravelle, Jane and Donald J. Marples (2011) "Tax cuts on repatriation earnings as economic stimulus: An econometric analysis," December 20.

Hanlon, Michelle and Joel Slemrod (2009) "What Does Tax Aggressiveness Signal? Evidence from Stock Price Reactions to News About Tax Shelter Involvement," *Journal of Public Economics*, Vol. 93, pp. 126–141.

Hasegawa, Makoto and Kozo Kiyota (2013) "The Effect of Moving to a Territorial Tax System on Profit Repatriations: Evidence from Japan," July.

Hines, James R. Jr. (2010) "Treasure Islands," *Journal of Economic Perspectives*, Vol. 24, No. 2, pp. 103–126, Fall.

Kaplan, Steven N. and Luigi Zingales (1997) "Do investment-cash flow sensitivities provide useful measures of financing constraints?" *Quarterly Journal of Economics*, Vol. 112, No. 1, pp. 169–215.

Kolari, James W. and Seppo Pynnönen (2010) "Event Study Testing with Cross-sectional Correlation of Abnormal Returns," *Review of Financial Studies*, Vol. 23, No. 11, pp. 3996–4025.

MacKinlay, A. Craig (1997) "Event Studies in Economics and Finance," *Journal of Economic Literature*, Vol. 35, pp. 13–39, March.

Markle, Kevin S. and Douglas A. Shakelford (2012) "Cross-Country Comparison of Corporate Income Taxes," *National Tax Journal*, Vol. 65, No. 3, p. 493528, September.

Ministry of Economy, Trade and Industry of Japan (2008) "Repatriations of Foreign Profits by Japanese Enterprises: Toward the introduction of a dividend exemption regime (In Japanese: Wagakuni Kigyo no Kaigairieki no Kanryu nitsuite)." http://www.rieti.go.jp/en/columns/a01_0387.html#note2.

Miyagawa, Tsutomu and Shoichi Hisa (2013) "Estimates of intangible investment by industry and productivity growth in Japan," *Japanese Economic Review*, Vol. 64, No. 1, pp. 42–72, March.

Moyen, Nathalie (2004) "Investment-cash flow sensitivities: Constrained versus unconstrained firms," *The Journal of Finance*, Vol. 59, No. 5, pp. 2061–92.

Musgrave, Peggy B. (1969) *United States Taxation of Foreign Investment Income: Issues and Arguments*, Cambridge, MA: Harvard Law School.

Nihon Keizai Shimbun (2008a) "Toyota Decreases in Sales and Profit for the First Time in 9 Years (In Japanese: Toyota 9 Nen buri Genshu Geneki)," Morning Edition, May 9 (In Japanese).

——— (2008b) "Exempt Foreign Corporate Profit from Taxation (In Japanese: Kigyo no Kaigai Rieki Hikazei ni)," Morning Edition, August 17 (In Japanese).

——— (2008c) "Downgrade the Diagnosis of the Economic Condition to Economic Stagnation (In Japanese: Keiki Teitai ni Kaho Shusei)," Evening Edition, August 19 (In Japanese).

——— (2009) "Negative Economic Growth for the Second Consecutive Year (In Japanese: Ninen Renzoku Mainasu Seicho)," Morning Edition, January 23 (In Japanese).

Patell, James M. (1976) "Corporate Forecasts of Earnings Per Share and Stock Price Behavior: Empirical Test," *Journal of Accounting Research*, Vol. 14, No. 2, pp. 246–276.

PricewaterhouseCoopers (2009) "Outline of 2009 Tax Reform," *Japan Tax Update*, No. 46, May. http://www.pwc.com/jp/ja/taxnews/pdf/Outline_of_2009_Tax_Reform_E.pdf.

Redmiles, Melissa (2008) "The One-Time Received Dividend Deduction," *Statistics of Income Bulletin*, pp. 102–114, Spring.

Sakurada, Joe and Yoshiyuki Nakanishi (2011) "The Stock Market Reaction to the Announcement Regarding Japan's Foreign Dividend Exemption (translated)."

Salinger, Michael (1992) "Standard Errors in Event Studies," *The Journal of Financial and Quantitative Analysis*, Vol. 27, No. 1, pp. 39–53.

Scholes, Myron and Joseph Williams (1977) "Estimating Betas from Nonsynchronous Data," *Journal of Financial Economics*, Vol. 5, No. 3, pp. 309–327.

Smith, Rodney T., Michael Bradley, and Greg Jarrell (1986) "Studying Firm-Specific Effects of Regulation with Stock Market Data: An Application to Oil Price Regulation," *The RAND Journal of Economics*, Vol. 17, No. 4, pp. 467–489.

Stolberg, Sheryl Gay and Bill Vlasic (2009) "U.S. Lays Down Terms for Auto Bailout," *New York Times*, March 30.

Tajika, Eiji, Masaki Hotei, and Shibata Keiko (2012) "The Effect of Japan's Tax Reform 2009 on Dividend Repatriations by Japanese Multinationals: An Analysis with a Focus on the Cash Demand of Parent Companies (2009 Nendo Zeisei Kaisei ga Genchi Hojin no Haito Sokin ni Oyoboshita Koka)," *Policy Research Institute, Ministry of Finance, PRI Discussion Paper Series (In Japanese)*, No. No.12A-16.

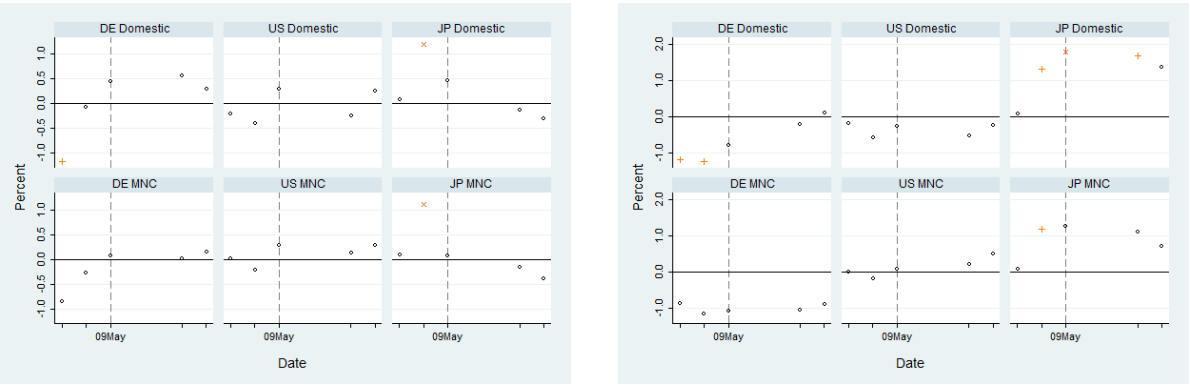
Takashima, Kennichi (2009) "The Basics of International Tax and Accounting Strategies: The Importance of International Tax and Accounting Strategies for Business Operation (In Japanese: Kokusai Zeimu Senryaku no Kiso: Keiei Senryaku niokeru Kokusai Zeimu no Juyousei)." http://www.kpmg.com/Jp/ja/knowledge/article/tax/Documents/200907_2.pdf.

Toder, Eric (2014) "Review of the Conference on What the United States Can Learn from the Experience of Countries with Territorial Tax Systems," June 18.

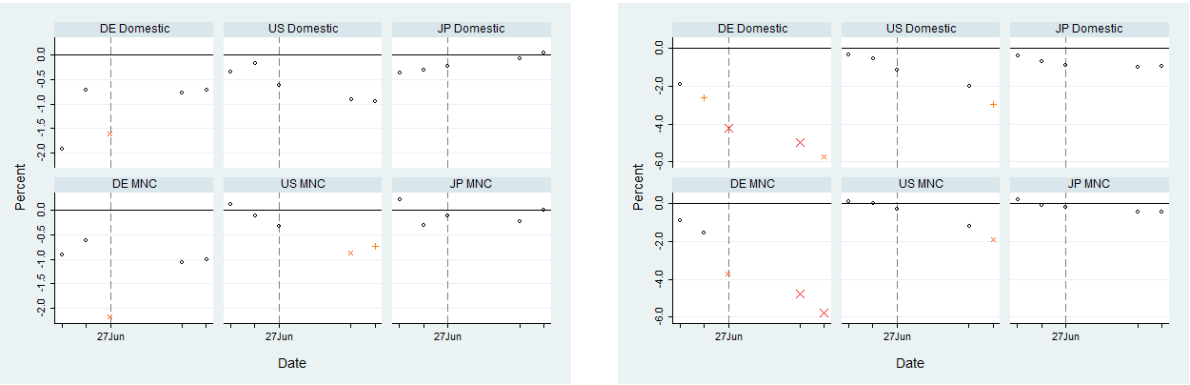
"TIMELINE: Crisis on Wall Street," http://www.washingtonpost.com/wp-srv/business/economy-watch/timeline/. Accessed: 2014-06-24.

Figure 1: Average Abnormal and Cumulative Abnormal Returns within 5-Day Event Windows by Firm Nationality and Multinational Status

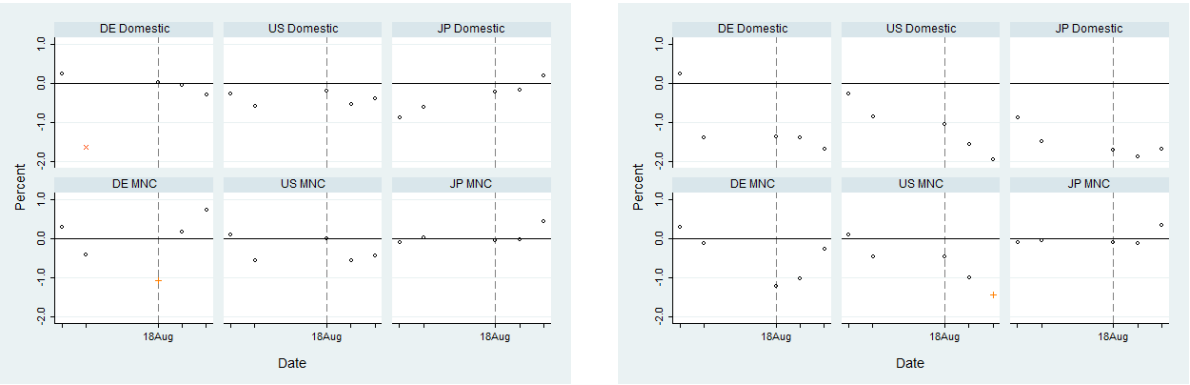
AARs **ACARs**



(i) May 9, 2008



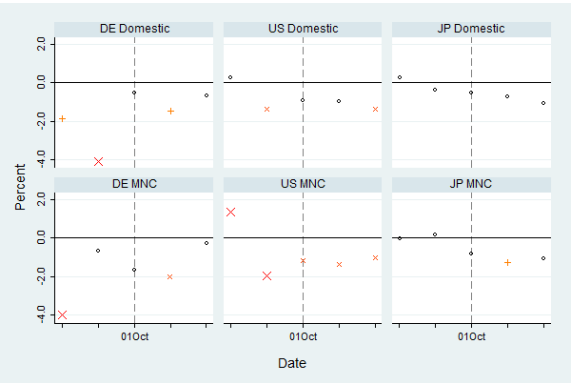
(ii) June 27, 2008

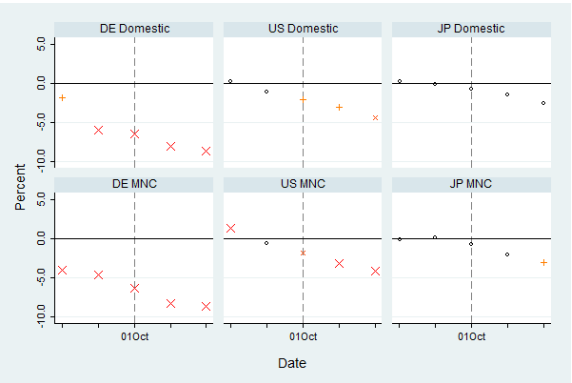


(iii) August 18, 2008

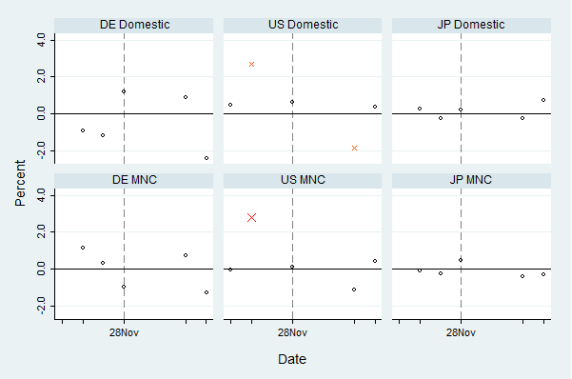
Figure 1: Average Abnormal and Cumulative Abnormal Returns within 5-Day Event Windows by Firm Nationality and Multinational Status (continued)

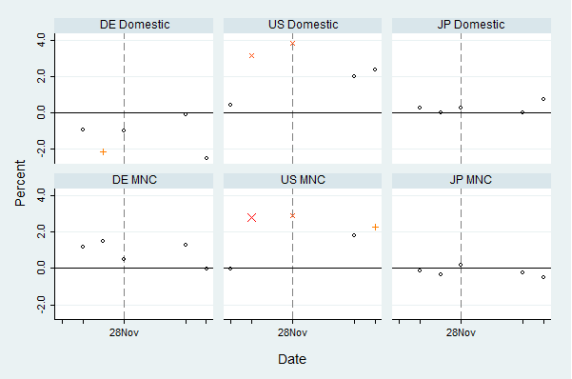
AARs **ACARs**



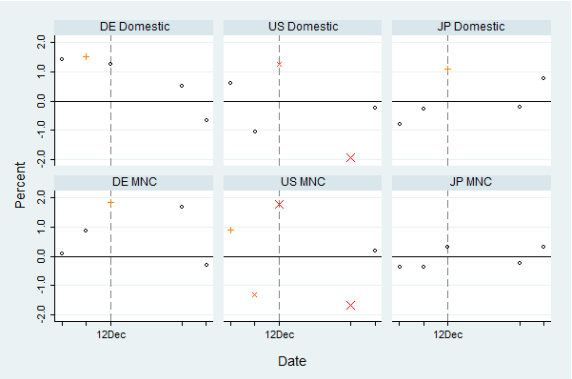


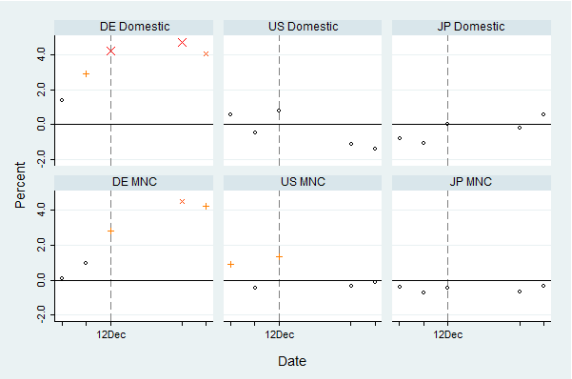
(iv) October 1, 2008





(v) November 28, 2008

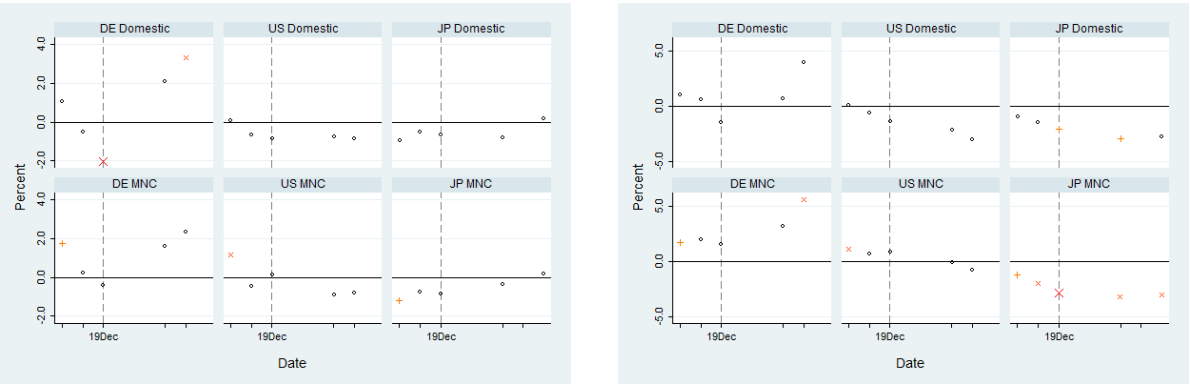




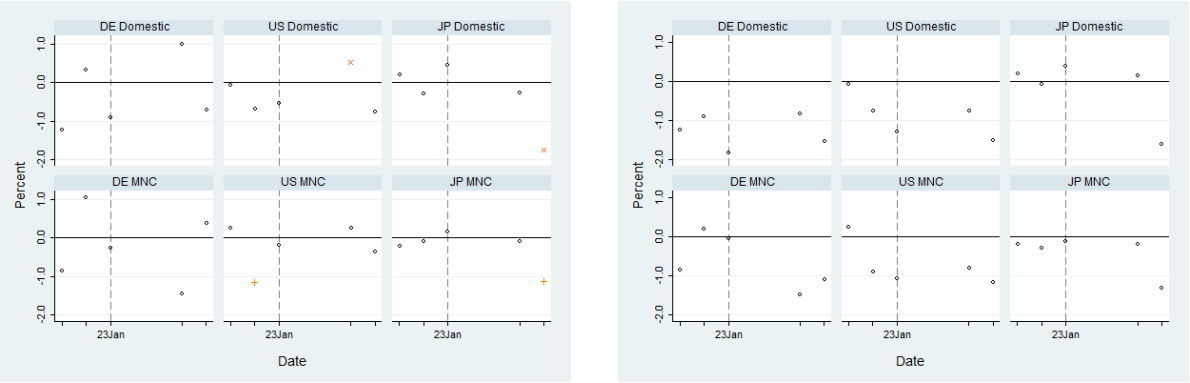
(vi) December 12, 2008

Figure 1: Average Abnormal and Cumulative Abnormal Returns within 5-Day Event Windows by Firm Nationality and Multinational Status (continued)

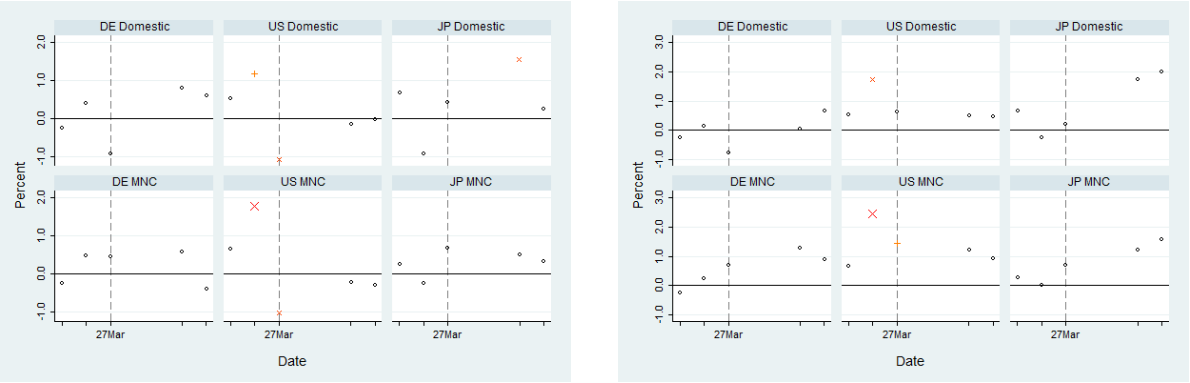
AARs **ACARs**



(vii) December 19, 2008



(viii) January 23, 2009



(ix) March 27, 2009

+, x, and X denote statistically-significant average ARs and CARs at the 10, 5, and 1 percent levels, respectively, where the corresponding test statistics are based on scaled ARs and CARs and adjusted BMP standard errors following Kolari and Pynnönen (2010).

Table 1: Timeline of Prominent Events Related to Japan's Dividend Exemption

May 9, 2008	Minister Akira Amari instructs Minister of Economy, Trade and Industry (METI) to examine implementation of a foreign income exemption system
June 27, 2008	Cabinet approves "Basic Policies for Economic and Fiscal Reform 2008," including tax reform to stimulate profit repatriation by Japanese multinational corporations (MNCs)
August 18, 2008	Nihon Keizai Shimbum gives advance details of METI's August 22 interim report, "Repatriations of Foreign Profits by Japanese Enterprises: Toward the Introduction of a Dividend Exemption Regime"
October 1, 2008	Prime Minister Aso Taro indicates support for introduction of a dividend exemption system before full House of Representatives
November 28, 2008	Government Tax Commission releases their "Policy Recommendation for Tax Revisions for Fiscal Year 2009," including a dividend exemption proposal
December 12, 2008	Liberal Democratic Party releases their "Large Package of Tax Revisions for Fiscal Year 2009," including introduction of dividend exemption
December 19, 2008	Ministry of Finance releases their endorsed version of "Large Package of Tax Revisions for Fiscal Year 2009," including introduction of dividend exemption
January 23, 2009	Cabinet approves "The Outline of Tax Revisions for Fiscal Year 2009," including dividend exemption provisions
March 27, 2009	Dividend exemption provisions are passed into law

Table 2: Description of Key Regression Variables[a]

Variable name	Description
I_k	Country dummies, $k \in \{JP, US, DE\}$.
I_MNC	Multinational status defined as 1 if MNC, or 0 otherwise.
I_HAVEN	Dummy equal to 1 if a multinational owns at least one foreign subsidiary in a tax haven.
TS	Tax savings potential, defined as the difference between domestic and foreign average effective tax rates ($AETR\_DOM - AETR_{Foreign}$).
$AETR\_FOR$	Ratio of the sum of taxes paid by all foreign subsidiaries and the sum of all foreign subsidiaries' taxable income over 2005-2007.
$AETR\_DOM$	Ratio of the sum of taxes paid by all domestic subsidiaries and the sum of all domestic subsidiaries' taxable income over 2005-2007.
$INTAN$	Intangible intensity defined at the industry level based on two-digit NAICS codes of parents. See Appendix D for details.
LQ[b]	Proxy for *domestic* liquidity constraints measured as cash flow over assets, and defined from balance sheet items as the ratio of net income plus depreciation over physical assets, averaged over 3 years (2005-2007). Censored at zero at the bottom, and winsorized at 5 percent at the top. See Appendix B.
ζ^k	Ratio of total assets located in country $k \in \{JP, US, DE\}$ and worldwide total assets over 2005-2007.
ξ^{FIRE}	Ratio of total assets of all foreign subsidiaries classified in finance or real estate (NAICS code 52 and 53) and worldwide total assets over 2005-2007.
MC	Market capitalization as of January 3, 2008 (in USD millions).

[a] See appendix for details on variables' construction and sources.
[b] A more standard approach in the finance literature is to define liquidity constraints as *cash flow intensity (CF/K)* where CF is defined as the sum of earnings before extraordinary items and depreciation, divided by the beginning-of-period net property, plant and equipment (which proxies for capital stock K). See for instance Kaplan and Zingales (1997); Fazzari and Peterson (1993); Almeida and Campello (2007); Moyen (2004). This approach was not available to us because few firms in Orbis accurately report earnings before extraordinary items.

Table 3: Summary Statistics for Japanese, U.S., and German Firms[a]

	Germany				**U.S.**				**Japan**			
	Domestic		MNC		Domestic		MNC		Domestic		MNC	
Variable[b]	Mean	SD.	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
$AETR\_DOM$	0.116	0.129	0.327	0.208	0.299	-	0.321	0.157	0.434	0.205	0.398	0.114
$AETR\_FOR$	.	.	0.228	0.182	.	0.088	0.176	0.208	.	.	0.213	0.206
TS	0	0	0.148	0.194	0	0	0.190	0.184	0	0	0.215	0.176
ζ^{jp}	0	0	0.030	0.124	0	0	0.092	0.599	100	0	94.5	8.37
ζ^{us}	0	0	0.849	3.546	100	0	83.7	22.0	0	0	0.711	5.00
ζ^{de}	100	0	66.9	25.9	0	0	1.92	5.97	0	0	0.897	2.54
ξ^{FIRE}	0	0	2.82	6.39	0	0	0.814	3.08	0	0	0.455	1.79
I_HAVEN	0	0	0.897	0.307	0	0	0.902	0.297	0	0	0.597	0.492
$INTAN$	0.159	0.106	0.168	0.083	0.223	0.222	0.468	0.195	0.356	0.147	0.383	0.115
LQ	0.095	0.095	0.482	0.502	0.289	0.399	0.628	0.572	0.323	0.547	0.397	0.454
MC	659.9	1,044.9	25,348.2	38,878.2	4,231.2	6,070.0	27,071.2	51,459.4	932.1	1,270.4	13,581.9	20,098.4
$Nsub$	19.8	25.9	251.5	247.9	25.8	41.9	158.1	194.4	11.6	14.0	111.9	125.1
N	8		39		122		328		261		201	

Sources: Financial statements variables are from Orbis and market capitalization is from Datastream. Intangible intensity is obtained from the RIETI (Japan), and from authors calculation using several sources for the U.S. and Germany (see appendix).
All variables are defined in table 2 and amounts are converted to current US$. Market capitalization (MC) is in USD millions.
[a] Summary statistics are shown for firms in the top quartile, after sample selection (see appendix for details).
[b] Asset shares are shown in percent.

Table 4: Day-Three ACAR Marginal Effects by Nationality and MNC Status
May 9, 2008

	Firm		(1) *Haven*		(2) *TS*		(3) *INTAN*		(4) *LQ*	
Margin	Type	Country	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
		DE[a]	2.403***	0.793	-	-	-	-	-	-
$\frac{\partial r}{\partial I\_HAVEN}$	MNC	US[a]	1.161**	0.459	-	-	-	-	-	-
		JP	-0.297	0.196	-	-	-	-	-	-
		DE	-	-	5.804	6.721	5.338	7.019	34.982***	6.025
$\frac{\partial r}{\partial TS}$	MNC	US	-	-	-0.080	0.796	0.716	1.010	0.341	0.783
		JP	-	-	0.883	1.024	0.360	1.391	3.08**	1.391
		DE	-	-	-	-	-18.496	13.754	-	-
	Domestic	US	-	-	-	-	-0.972	1.420	-	-
$\frac{\partial r}{\partial INTAN}$		JP	-	-	-	-	1.773	1.779	-	-
		DE	-	-	-	-	-10.101	14.034	-	-
	MNC	US	-	-	-	-	-1.657	1.386	-	-
		JP	-	-	-	-	-1.228	2.796	-	-
		DE	-	-	-	-	-	-	-27.99*	16.927
	Domestic	US	-	-	-	-	-	-	0.709	1.027
$\frac{\partial r}{\partial LQ}$		JP	-	-	-	-	-	-	0.091	0.498
		DE	-	-	-	-	-	-	-29.028*	15.805
	MNC	US	-	-	-	-	-	-	0.072	0.236
		JP	-	-	-	-	-	-	1.923**	0.794
Day-Three ACARs										
		DE	2.105	1.514	2.105	n.a.	2.105	2.189	2.054	1.604
	Domestic	US	0.160	0.326	0.160	0.326	0.160	0.325	0.238	0.309
$\frac{\partial r}{\partial D3}$		JP	1.803***	0.237	1.803***	0.237	1.803***	0.236	1.812***	0.238
		DE	-0.366	0.404	-0.366	1.547	-0.366	3.242	-0.392	2.781
	MNC	US	0.56***	0.139	0.56***	0.140	0.56***	0.138	0.62***	0.134
		JP	0.143	0.206	0.143	0.207	0.143	0.205	0.143	0.204
Observations			239148		239,148		239,148		234,108	

Significance levels are designated as *** p<0.01, ** p<0.05, and * p<0.1, with standard errors clustered by firm. All panel regressions include firm-specific intercepts and German (DE), U.S. (US), and Japanese (JP) market co-movement slope parameters, plus a full set of day one through three event date interaction terms ($D1$-$D3$), as defined in Section 3.2, as well as further interactions with the proportion of foreign subsidiary assets held in DE, US, and JP. Only day-three marginal effects are shown (i.e. evaluated at $D3 = 1$). Complete variable descriptions appear in Table 2.

[a] Exceptionally, $\partial r/\partial I\_HAVEN$ for the U.S. and Germany are calculated directly as the interaction coefficients from a model estimated without foreign subsidiary asset shares ζ^{JP}, ζ^{US}, and ζ^{DE} due to the fact that $\zeta^{JP} = \zeta^{US} = 0$ ($\zeta^{JP} = 0$) for all German (U.S.) MNCs without tax haven subsidiaries.

Table 5: Day-Three ACAR Marginal Effects by Nationality and MNC Status
June 27, 2008

	Firm		(1) *Haven*		(2) *TS*		(3) *INTAN*		(4) *LQ*	
Margin	Type	Country	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
		DE[a]	-1.276	1.683	-	-	-	-	-	-
$\frac{\partial r}{\partial I\_HAVEN}$	MNC	US[a]	-1.285	0.796	-	-	-	-	-	-
		JP	-0.168	0.194	-	-	-	-	-	-
		DE	-	-	9.912**	4.415	7.399	5.561	11.485	7.683
$\frac{\partial r}{\partial TS}$	MNC	US	-	-	1.154	1.233	1.741	1.332	1.751	1.351
		JP	-	-	4.801***	1.204	4.044***	1.391	5.35***	1.473
		DE	-	-	-	-	-22.427	14.241	-	-
	Domestic	US	-	-	-	-	-6.447***	1.792	-	-
$\frac{\partial r}{\partial INTAN}$		JP	-	-	-	-	-1.472	1.561	-	-
		DE	-	-	-	-	-70.765***	16.989	-	-
	MNC	US	-	-	-	-	-5.151***	1.529	-	-
		JP	-	-	-	-	2.982	3.886	-	-
		DE	-	-	-	-	-	-	21.880	18.390
	Domestic	US	-	-	-	-	-	-	-0.345	0.833
$\frac{\partial r}{\partial LQ}$		JP	-	-	-	-	-	-	-0.028	0.428
		DE	-	-	-	-	-	-	-46.733**	18.279
	MNC	US	-	-	-	-	-	-	-0.91***	0.351
		JP	-	-	-	-	-	-	-0.509	0.702
Day-Three ACARs										
		DE	-5.665***	1.667	-5.665	n.a.	-5.665**	2.266	-5.513***	1.743
	Domestic	US	0.479	0.448	0.479	0.447	0.479	0.426	0.623	0.453
$\frac{\partial r}{\partial D3}$		JP	0.54**	0.218	0.54**	0.218	0.54**	0.218	0.594***	0.217
		DE	-4.294***	0.564	-4.294**	1.742	-4.294	3.617	-4.016	2.790
	MNC	US	-0.368*	0.209	-0.368*	0.209	-0.368*	0.195	-0.319	0.208
		JP	-0.234	0.216	-0.234	0.209	-0.234	0.193	-0.234	0.201
Observations			239148		239,148		239,148		234,108	

Significance levels are designated as *** p<0.01, ** p<0.05, and * p<0.1, with standard errors clustered by firm. All panel regressions include firm-specific intercepts and German (DE), U.S. (US), and Japanese (JP) market co-movement slope parameters, plus a full set of day one through three event date interaction terms ($D1$-$D3$), as defined in Section 3.2, as well as further interactions with the proportion of foreign subsidiary assets held in DE, US, and JP. Only day-three marginal effects are shown (i.e. evaluated at $D3 = 1$). Complete variable descriptions appear in Table 2.

[a] Exceptionally, $\partial r/\partial I\_HAVEN$ for the U.S. and Germany are calculated directly as the interaction coefficients from a model estimated without foreign subsidiary asset shares ζ^{JP}, ζ^{US}, and ζ^{DE} due to the fact that $\zeta^{JP} = \zeta^{US} = 0$ ($\zeta^{JP} = 0$) for all German (U.S.) MNCs without tax haven subsidiaries.

Table 6: Day-Three ACAR Marginal Effects by Nationality and MNC Status
August 18, 2008

	Firm		(1) *Haven*		(2) *TS*		(3) *INTAN*		(4) *LQ*	
Margin	Type	Country	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
		DE[a]	0.870	1.821	-	-	-	-	-	-
$\frac{\partial r}{\partial I\_HAVEN}$	MNC	US[a]	-1.74***	0.435	-	-	-	-	-	-
		JP	-0.010	0.184	-	-	-	-	-	-
		DE	-	-	-2.976	4.140	-1.426	3.709	-13.527	8.833
$\frac{\partial r}{\partial TS}$	MNC	US	-	-	-0.438	0.949	-0.566	1.162	-1.398	1.083
		JP	-	-	1.298	1.023	1.525	1.339	-1.57	1.490
		DE	-	-	-	-	-0.414	10.848	-	-
	Domestic	US	-	-	-	-	-2.032	1.418	-	-
$\frac{\partial r}{\partial INTAN}$		JP	-	-	-	-	-1.273	1.614	-	-
		DE	-	-	-	-	-36.654**	14.565	-	-
	MNC	US	-	-	-	-	-0.655	1.487	-	-
		JP	-	-	-	-	-4.276	3.541	-	-
		DE	-	-	-	-	-	-	-23.833***	4.922
	Domestic	US	-	-	-	-	-	-	-1.699	1.101
$\frac{\partial r}{\partial LQ}$		JP	-	-	-	-	-	-	-0.220	0.454
		DE	-	-	-	-	-	-	15.882	22.783
	MNC	US	-	-	-	-	-	-	-0.59**	0.299
		JP	-	-	-	-	-	-	-3.867***	0.856
Day-Three ACARs										
		DE	1.748*	1.033	1.748	n.a.	1.748	1.726	2.226***	0.466
	Domestic	US	0.494	0.369	0.494	0.369	0.494	0.366	0.518	0.372
$\frac{\partial r}{\partial D3}$		JP	0.048	0.231	0.048	0.231	0.048	0.231	-0.016	0.233
		DE	-0.897	0.563	-0.897	1.158	-0.897	2.217	-1.077	1.108
	MNC	US	-0.237	0.163	-0.237	0.165	-0.237	0.162	-0.221	0.165
		JP	-0.234	0.166	-0.234	0.166	-0.234	0.160	-0.234	0.157
Observations			239148		239,148		239,148		234,108	

Significance levels are designated as *** p<0.01, ** p<0.05, and * p<0.1, with standard errors clustered by firm. All panel regressions include firm-specific intercepts and German (DE), U.S. (US), and Japanese (JP) market co-movement slope parameters, plus a full set of day one through three event date interaction terms ($D1$-$D3$), as defined in Section 3.2, as well as further interactions with the proportion of foreign subsidiary assets held in DE, US, and JP. Only day-three marginal effects are shown (i.e. evaluated at $D3 = 1$). Complete variable descriptions appear in Table 2.

[a] Exceptionally, $\partial r/\partial I\_HAVEN$ for the U.S. and Germany are calculated directly as the interaction coefficients from a model estimated without foreign subsidiary asset shares ζ^{JP}, ζ^{US}, and ζ^{DE} due to the fact that $\zeta^{JP} = \zeta^{US} = 0$ ($\zeta^{JP} = 0$) for all German (U.S.) MNCs without tax haven subsidiaries.

Table 7: Day-Three ACAR Marginal Effects by Nationality and MNC Status
January 23, 2009

	Firm		(1) *Haven*		(2) *TS*		(3) *INTAN*		(4) *LQ*	
Margin	Type	Country	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
$\frac{\partial r}{\partial I\_HAVEN}$	MNC	DE[a]	-3.979	2.572	-	-	-	-	-	-
		US[a]	-2.341***	0.732	-	-	-	-	-	-
		JP	-0.293	0.224	-	-	-	-	-	-
$\frac{\partial r}{\partial TS}$	MNC	DE	-	-	-20.746**	8.778	-29.099***	8.524	-64.662***	10.981
		US	-	-	1.714	1.389	2.417	1.548	-0.266	1.899
		JP	-	-	3.474**	1.479	1.261	1.959	1.76	2.413
$\frac{\partial r}{\partial INTAN}$	Domestic	DE	-	-	-	-	0.048	13.934	-	-
		US	-	-	-	-	-3.258*	1.822	-	-
		JP	-	-	-	-	-4.178*	2.235	-	-
	MNC	DE	-	-	-	-	-13.625	25.784	-	-
		US	-	-	-	-	3.331**	1.558	-	-
		JP	-	-	-	-	-8.274**	3.724	-	-
$\frac{\partial r}{\partial LQ}$	Domestic	DE	-	-	-	-	-	-	22.062	15.162
		US	-	-	-	-	-	-	0.308	0.968
		JP	-	-	-	-	-	-	0.176	0.903
	MNC	DE	-	-	-	-	-	-	5.640	27.438
		US	-	-	-	-	-	-	0.127	0.484
		JP	-	-	-	-	-	-	-1.011	1.821
Day-Three ACARs										
$\frac{\partial r}{\partial D3}$	Domestic	DE	-1.473	1.425	-1.473	n.a.	-1.473	2.218	-0.971	1.437
		US	2.498***	0.403	2.498***	0.403	2.498***	0.397	2.515***	0.413
		JP	0.714**	0.313	0.714**	0.313	0.714**	0.310	0.751**	0.315
	MNC	DE	-1.545	0.983	-1.545	1.711	-1.545	3.444	-1.985	2.789
		US	0.295	0.257	0.295	0.259	0.295	0.252	0.292	0.253
		JP	-0.621**	0.259	-0.621**	0.256	-0.621**	0.244	-0.621**	0.250
Observations			239,148		239,148		239,148		234,108	

Significance levels are designated as *** p<0.01, ** p<0.05, and * p<0.1, with standard errors clustered by firm. All panel regressions include firm-specific intercepts and German (DE), U.S. (US), and Japanese (JP) market co-movement slope parameters, plus a full set of day one through three event date interaction terms ($D1$-$D3$), as defined in Section 3.2, as well as further interactions with the proportion of foreign subsidiary assets held in DE, US, and JP. Only day-three marginal effects are shown (i.e. evaluated at $D3 = 1$). Complete variable descriptions appear in Table 2.

[a] Exceptionally, $\partial r/\partial I\_HAVEN$ for the U.S. and Germany are calculated directly as the interaction coefficients from a model estimated without foreign subsidiary asset shares ζ^{JP}, ζ^{US}, and ζ^{DE} due to the fact that $\zeta^{JP} = \zeta^{US} = 0$ ($\zeta^{JP} = 0$) for all German (U.S.) MNCs without tax haven subsidiaries.

Table 8: Cumulated Event Date AAR Effects by Nationality and MNC Status

	Firm		May 9, 2008 ($d=1$)		Jun. 27, 2008 ($d=2$)		Jan. 23, 2009 ($d=3$)	
Margin	Type	Country	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
$\frac{\partial r}{\partial I\_HAVEN}$	MNC	DE[a]	0.806***	0.266	0.397	0.472	-0.916	0.864
		US[a]	0.381**	0.155	-0.030	0.267	-0.804**	0.387
		JP	-0.105	0.066	-0.161*	0.097	-0.254*	0.136
$\frac{\partial r}{\partial TS}$	MNC	DE	1.981	2.261	5.481	3.401	-1.256	2.989
		US	-0.006	0.267	0.373	0.494	0.934	0.682
		JP	0.356	0.346	1.958***	0.542	3.076***	0.766
Three-Day Average Cumulated AARs								
$\frac{\partial r}{\partial Dd}$	Domestic	DE	0.716	0.490	-1.192**	0.534	-1.685**	0.707
		US	0.046	0.109	0.191	0.181	1.01***	0.220
		JP	0.593***	0.079	0.772***	0.106	1.017***	0.160
	MNC	DE	-0.102	0.136	-1.506***	0.237	-1.993***	0.392
		US	0.185***	0.046	0.069	0.085	0.170	0.125
		JP	0.050	0.069	-0.026	0.102	-0.236	0.146

Significance levels are designated as *** p<0.01, ** p<0.05, and * p<0.1, with standard errors clustered by firm. All panel regressions include firm-specific intercepts and German (DE), U.S. (US), and Japanese (JP) market co-movement slope parameters, plus a full set of event *window* dummy interaction terms (one per three-day event window), as well as further interactions with the proportion of foreign subsidiary assets held in DE, US, and JP. Cumulated marginal effects measure AARs averaged over each three-day event window and summed across Cabinet meeting dates. Complete variable descriptions appear in Table 2.

[a] Exceptionally, $\partial r/\partial I\_HAVEN$ for the U.S. and Germany are calculated directly as the interaction coefficients from a model estimated without foreign subsidiary asset shares ζ^{JP}, ζ^{US}, and ζ^{DE} due to the fact that $\zeta^{JP} = \zeta^{US} = 0$ ($\zeta^{JP} = 0$) for all German (U.S.) MNCs without tax haven subsidiaries.

Table 9: Robustness Checks—May 9, 2008

Margin	Firm Type	Country	Benchmark Top Quartile[a] Coeff.	S.E.	Full Sample[b] Coeff.	S.E.	Robust Regressions Coeff.	S.E.	Auto&Finance Indices[c] Coeff.	S.E.
Panel 1: Haven Specifications										
Day-Three ACARs										
		DE	2.105	1.514	0.972	0.803	1.261	1.115	2.936*	1.747
$\frac{\partial r}{\partial D3}$	Domestic	US	0.16	0.326	-0.32	0.304	0.618***	0.228	0.015	0.321
		JP[a]	1.803***	0.237	1.649***	0.13	1.671***	0.179	1.809***	0.246
		DE	-2.399***	0.391	-1.124*	0.635	-1.948	1.54	-1.857***	0.667
	Non-Haven	US	-0.485	0.418	0.022	0.289	-0.49	0.426	-0.69	0.454
$\frac{\partial r}{\partial D3}$		JP	0.402	0.247	1.51***	0.16	0.404	0.321	0.217	0.274
		DE	-0.134	0.448	0.61	0.427	0.243	0.546	0.551	0.465
	Haven	US	0.673***	0.147	0.359**	0.139	0.518***	0.141	0.392***	0.148
		JP	-0.032	0.301	0.257	0.256	0.05	0.264	-0.379	0.303
Panel 2: Tax Savings Specifications										
		DE	5.804	6.721	1.674	2.298	3.919	8.334	4.59	7.336
$\frac{\partial r}{\partial TS}$	MNC	US	-0.08	0.796	0.988	0.641	-0.101	0.757	0.008	0.822
		JP	0.883	1.024	1.1*	0.633	1.113	1.262	0.886	1.045
Day-Three ACARs										
		DE	2.105	n.a.	1.014	0.76	1.574	1.01	2.805*	1.428
	Domestic	US	0.16	0.326	-0.312	0.294	0.624***	0.221	0.119	0.309
$\frac{\partial r}{\partial D3}$		JP	1.803***	0.237	1.653***	0.13	1.669***	0.179	1.809***	0.246
		DE	-0.366	1.547	-0.169	0.389	0.057	0.505	0.331	0.389
	MNC	US	0.56***	0.14	0.253*	0.132	0.427***	0.132	0.251*	0.136
		JP	0.143	0.207	1.175***	0.137	0.21	0.204	-0.138	0.212

Significance levels are designated as *** p<0.01, ** p<0.05, and * p<0.1, with standard errors clustered by firm. All panel regressions include firm-specific intercepts and German (DE), U.S. (US), and Japanese (JP) market co-movement slope parameters, plus a full set of day one through three event date interaction terms ($D1$-$D3$), as defined in Section 3.2, as well as further interactions with the proportion of foreign subsidiary assets held in DE, US, and JP. Only day-three marginal effects are shown (i.e. evaluated at $D3 = 1$). Complete variable descriptions appear in Table 2.

[a] Benchmark specifications are those shown in models (1) and (2) in Table 4.

[b] The complete firm sample consists of 1,042 Japanese, 446 U.S., and 30 German domestic firms, and 801 Japanese, 1,310 U.S., and 153 German MNCs.

[c] Includes stock market indices for the U.S. automobile industry (DJUSAT) and the worldwide financial industry (Dow Jones Global Financial Index) obtained from Global Financial Data (available at https://www.globalfinancialdata.com).

Appendix A Event Date Details

While the possibility of switching from a worldwide tax system to some type of territorial tax system had been discussed by policymakers and industry executives on earlier occasions, the first clear indication of the government's intent to *seriously* consider such a reform came when the head of the METI, Akira Amari, announced in an interview immediately following a May 9, 2008 Cabinet meeting that he had instructed his ministry to examine the possibility of switching from a foreign tax credit system to a foreign income exemption system.

Basic Policies for Economic and Fiscal Reform 2008 was approved in a subsequent Cabinet meeting on June 27, 2008, among its expressed objectives being to stimulate profit repatriation by Japanese MNCs so as to prevent excessive foreign profit accumulation and to limit outflows of Japanese employment and R&D investment. On August 22, 2008, the subcommittee on international taxation at the METI released their interim report, *Repatriations of Foreign Profits by Japanese Enterprises: Toward the Introduction of a Dividend Exemption Regime* which described the main characteristics of the proposed dividend exemption in greater detail than previously. The report thus highlighted four key elements of the dividend exemption that finally went into effect on April 1, 2009: (1) the dividend exemption system would permit Japanese resident corporations to deduct from taxable income a set proportion of dividends received from foreign affiliates, (2) in order to qualify for dividend exemption, a parent firm would have to have held at least 25 percent of the shares of its affiliate for at least six months, (3) exemption would apply only to foreign income in the form of paid dividends but not to other types of foreign source income, including royalties, interest payments, and income earned by foreign branches, and (4), foreign tax credits would no longer apply to withholding taxes on repatriated dividends imposed by host countries. Details of this report were published prior to their official release in Japan's leading business newspaper, the *Nihon Keizai Shimbun*, on August 17, such that we consequently use August 18, 2008 (i.e. the first business day after these details appeared in the press) as the relevant event date.

Following the release of the METI's interim report, the Cabinet, Ministry of Finance, and Liberal Democratic Party (the ruling party in the House of Representatives) each released separate tax reform plans containing the adoption of a territorial tax regime. On October 1, 2008, Prime Minister Taro Aso mentioned before the full House of Representatives that he supported the implementation of a dividend exemption system. On November 28, 2008, the Government Tax Commission released their *Policy Recommendation for Tax Revisions for Fiscal Year 2009* which proposed the introduction of a dividend exemption regime, while on December 12, 2008, the Liberal Democratic Party released their *Large Package of Tax Revisions for Fiscal Year 2009* which likewise included the introduction of dividend exemption. This last package added more detailed information on dividend exemption to the proposal by the METI, including the heretofore-unspecified proportion of dividends eligible for tax exemption (95 percent) and the treatment of foreign subsidiaries subject to the controlled foreign corporation (CFC) legislation. One week later, on December 19, 2008, the Ministry of Finance released their endorsed version of the *Large Package of Tax Revisions for Fiscal Year 2009* followed on January 23, 2009 by the Cabinet's approval of *The Outline of Tax Revisions for Fiscal Year 2009*.

Each of these last three tax reform proposals contained almost exactly the same provisions regarding dividend exemption, such that from an investor's perspective, the real substance of the latter two events would have largely been in terms of the prominence of the endorsements. At the same time, the legislative bill including the dividend exemption provisions was submitted by the Cabinet to the Diet on January 23, 2009 and finally passed into law on March 27, 2009 before coming into effect on April 1, 2009.

Appendix B Variable Definitions and Financial Data

A. 1 Effective Tax Rates

Tax savings potential, TS, is based on the difference between a firm's domestic and foreign effective tax rates. To address various data issues, we consider several possible measures of average ETRs in addition to our benchmark measure, which is defined as:

$$TS_i = AETR\_DOM_i - AETR\_FOR_i,$$

where $AETR\_FOR$ is the the sum of tax payments by foreign subsidiaries divided by the sum of foreign subsidiaries' taxable income over 2005-2007. $AETR\_DOM$ is the difference between worldwide tax payments and tax payments by all foreign subsidiaries over 2005-2007 divided by the difference between worldwide taxable income and all foreign subsidiaries' taxable income over the same period.

$$AETR\_FOR_i = \frac{\sum_{t=2005}^{2007}\sum_{k=1}^{N_{i,f}} tax_{i,k,t}}{\sum_{t=2005}^{2007}\sum_{k=1}^{N_{i,f}} pti_{i,k,t}},$$

$$AETR\_DOM_i = \frac{\sum_{t=2005}^{2007}\sum_{k=1}^{N_{i,d}}(tax^w_{i,t} - tax_{i,k,t})}{\sum_{t=2005}^{2007}\sum_{k=1}^{N_{i,d}}(pti^w_{i,t} - pti_{i,k,t})}, \quad \text{(consolidated financials), OR}$$

$$= \frac{\sum_{t=2005}^{2007}\sum_{k=1}^{N_{i,d}}(tax_{i,k,t})}{\sum_{t=2005}^{2007}\sum_{k=1}^{N_{i,d}}(pti_{i,k,t})}, \quad \text{(unconsolidated financials)}$$

$N_{i,f}$ ($N_{i,d}$) is the number of foreign (domestic) subsidiaries owned by company i, $tax^w_{i,t}$ is worldwide tax payments by multinational parent i, $tax_{i,k,t}$ are tax payments reported by a foreign or domestic subsidiary, $pti^w_{i,t}$ is i's worldwide taxable income, and $pti_{i,k,t}$ is taxable income reported by a foreign or domestic subsidiary k. Each sum of tax payments or taxable income are restricted to be non-negative, and resulting values of $AETR\_FOR_i$ and $AETR\_DOM_i$ are censored to $[0, 1]$.

To address Orbis' poor coverage of subsidiaries owned by less than 25 percent as well as misreporting by observed subsidiaries, we experiment with other measures of ETRs based on statutory tax rates. We thus define a marginal combined ETR ($METR$) based

on subsidiaries' countries of residence combined with information on corporate tax rates and withholding tax rates for each such country. A complete description of the statutory rate data sources and compilation is available from the authors upon request. Marginal ETRs are measured as follows:

$$METR\_FOR_i = \sum_{t=2005}^{2007} \sum_{c \in N_{i,f}} w_{i,c} CTR_{i,c,t},$$

$$METR\_DOM_i = CTR_{i,h},$$

where $CTR_{i,c,t}$ is country c's combined statutory tax rate in year t, $CTR_{i,h}$ is the combined statutory tax rate of the country where the parent is located ($h \in JP, US, DE$), and $w_{i,c}$ is a weight equal to the average ratio of i's foreign-based taxable income located in country c and i's total foreign-based taxable income

$$w_{i,c} = \frac{\sum_{t=2005}^{2007} \sum_{k \in N_{i,f}} pti_{i,k,t}.I\_i, k, c}{\sum_{t=2005}^{2007} \sum_{k=1}^{N_{i,f}} pti_{i,k,t}}, \quad \text{if } i \text{ is a multinational, and}$$

$$w_{i,c} = 0, \quad \text{otherwise.}$$

I_i, k, c is a dummy equal to 1 if subsidiary k is located in country c and 0 otherwise.

Foreign taxable income or tax payments of a multinational are likely to be mismeasured because they are necessarily constructed only from observed subsidiaries, rather than all subsidiaries. To address this issue, we construct a proxy for foreign ETR equal to the minimum foreign statutory tax rate faced by multinational i as follows

$$ETR_i^{min} = Min_{c \in N_{i,f}}(CTR_{i,c}).$$

Results based on alternative ETR measures do not radically alter our fundamental findings and are available upon demand.

A. 2 Liquidity Constraints

Liquidity constraints are calculated at the parent level following Fazzari and Peterson (1993), Almeida and Campello (2007), and Edgerton (2010) such that

$$LQ_i = \frac{1}{3} \frac{\sum_{t=2005}^{2007} (\text{Net income}_{i,t} + \text{Depreciation}_{i.t})}{\sum_{t=2005}^{2007} PPE_{i,t}}.$$

We use Orbis' variables "P/L for period [=Net income]", "Depreciation", and "Net Property, Plant & Equipment". Domestic net income, depreciation, and assets are recovered from the difference between worldwide amounts and all foreign subsidiaries' amounts.

There is a large degree of variation between countries in the extent to which companies are required to report negative net income, as well as outliers at the top. We censor LQ

at zero and winsorize it to 0.99 at the top.

A. 3 Asset Shares

The share of firm i's assets located in country c is defined as the average ratio of total assets held by all subsidiaries of parent i located in country c relative to the parent's consolidated worldwide assets:

$$\zeta^c = \frac{\sum_{t=2005}^{2007} \sum_{k=1}^{N_i} assets_{i,k,t}.I\_i,k,c}{\sum_{t=2005}^{2007} \sum_{k=1}^{N_i} assets_{i,k,t}}, \quad \text{if } i \text{ owns a firm in } c$$

$$\zeta^c = 0, \quad \text{otherwise.}$$

where $assets_{i,k,t}$ is subsidiary k's total assets and N_i is i's total number of subsidiaries ($N_i = N_{i,f} + N_{i,d}$).

The share of firm i's *foreign* assets held by subsidiaries in the financial sector or real estate, rental, and leasing sector (NAICS codes 52 and 53; commonly referred as FIRE) is simply defined as the average ratio of total assets of *foreign* subsidiaries classified as FIRE divided by i's worldwide assets:

$$\xi^{FIRE} = \frac{\sum_{t=2005}^{2007} \sum_{k \in N_{i,f}} assets_{i,k,t}.I\_FIRE_{i,k}}{\sum_{t=2005}^{2007} \sum_{k=1}^{N_i} assets_{i,k,t}}, \quad \text{if } i \text{ is a multinational and}$$

$$\xi^{FIRE} = 0, \quad \text{otherwise.}$$

where $I\_FIRE_{i,k}$ equals one for FIRE subsidiaries and 0 otherwise.

Appendix C Sample Selection

Detailed steps that lead us to selection of the final database of Japanese, U.S., and German publicly traded firms and their subsidiaries is described in Table C.1. We start with 1,311 MNCs and 2,277 domestic publicly-traded firms in Japan matched to 44,474 foreign and domestic subsidiaries, 3,638 MNCs and 7,397 domestic publicly-traded firms in the U.S. associated with 186,968 subsidiaries, and 999 MNCs and 537 domestic publicly-traded firms in Germany associated with 29,353 subsidiaries. From there, we first exclude companies with fewer than 5 percent of non-missing observations for several key financial variables at the subsidiary level (about 5 percent of observations)

Our desire is to identify public firms that are final owners of their domestic or multinational group since such firms must necessarily be the ones to capture the benefits of international tax reform. We thereby exclude 9 percent of Japanese firms, 3 percent of U.S. firms, and 19 percent of German firms that are not actually self-owned. We also exclude government contractors, companies in the financial and real estate sectors

Table C.1: Selection Criteria for Parent Firms

		Japan	U.S.	Germany
All observations in Orbis:				
Publicly traded	All	3,588	11,035	999
	MNCs	1,311	3,638	462
	Domestic	2,277	7,397	537
Subsidiaries	All	44,474	186,968	29,353
	Foreign	15,482	73,648	17,018
	Domestic	28,992	113,320	12,335
Exclude firms with less than 5% of non-missing observations, government contractors, and firms with no industry indicator:				
Publicly traded	All	3,572	10,547	995
	MNCs	1,309	3,576	462
	Domestic	2,263	6,971	533
Exclude if not self-owned:				
Publicly traded	All	3,248	10,185	802
	MNCs	984	2,814	271
	Domestic	2,264	7,371	531
Exclude if non-matching SEDOL or missing subsidiaries:[a]				
Publicly traded	All	2,528	4,290	340
	MNCs	913	2,064	217
	Domestic	1,615	2,226	123
Exclude finance and insurance firms and firms with missing variables of interest:				
Publicly traded	All	1,843	1,756	183
	MNCs	801	1,310	153
	Domestic	1,042	446	30

[a]Most excluded publicly traded firms at this step are dropped because they have no match with any domestic subsidiary.

(NAICS codes 52 and 53), and firms with inconsistent SEDOLs (about 1-2 percent of observations). Of the remaining sample of 3,248 Japanese firms, 10,185 U.S. firms, and 802 German firms, a further lack of accurate financial information regarding parents or subsidiaries (e.g., no SEDOL identification code to match stock market information from Datastream, no valid consolidation code, etc.) serves as justification to discard yet additional firms from the sample.

To ensure the validity of the remaining observations from the Orbis database, we perform a careful firm-by-firm examination of the top 200 companies' financial statements in Japan, the U.S. and Germany, comparing key information from individual financial statements with their database counterparts in Orbis. Several inconsistently-defined "domestic" firms based on missing subsidiary information in Orbis are consequently thrown out. In particular, since linking a firm to its foreign subsidiaries is key to our definition of MNC status and further MNC-specific variables, we delete all instances of firms that had some international exposure (e.g., non-zero foreign income) based on their actual annual statements but could not be matched to foreign subsidiaries based on Orbis data, leading to the removal of 30 percent of Japanese firms, 49 percent of U.S. firms, and 56 percent of German firms (mostly domestic firms).

The exclusion of firms with no matched domestic subsidiaries is required to perform additional robustness checks based on relative numbers of foreign and domestic subsidiaries rather than asset shares and moreover largely coincides with the exclusion of the smallest 75 percent of domestic and multinational firms that is necessitated by the computational methods used in our core analyses.

Appendix D Intangible Intensity

Intangible intensity is defined at the industry-level based on investment and stocks in intangible assets and in physical assets, averaged over three years, 2005-2007. Intangible intensity data are obtained for 107 industries in Japan from the Research Institute of Economy, Trade, and Industry (RIETI), described in detail in Miyagawa and Hisa (2013), while U.S. data are obtained at the 2-digit level from various sources listed in (Dauchy, 2013; Chen and Dauchy, 2013b).[51] Because of the lack of a measure of intangible assets at the industry level in Germany, we use information on the sale of observed intangible assets. Specifically we use the EU KLEMS database from 2005 to 2007 to construct a proxy for intangible intensity based on the share of investment in computing equipment, communications equipment, and software (in the EU KLEMS database, these variables are I_IT, ICT, and I_software).[52]

Our proxy for intangible intensity is

$$INTAN_j = \frac{\sum_{t=2005}^{2007} INT_{j,t}}{\sum_{t=2005}^{2007}(INT_{j,t} + TAN_{j,t}}), \tag{D.1}$$

[51] http://www.rieti.go.jp/en/database/. We use tables on "capital inputs", and "Investment and capital stock in intangible assets."

[52] KLEMS data can be found at www.euklems.net.

where $INTAN_j$ is the three-year average intangible intensity measure in industry j, $INT_{j,t}$ is intangible stock (respectively investment) in industry j and in year t, and $TAN_{j,t}$ is physical assets stock (respectively investment), where physical assets are national accounts assets, which include equipment and machinery, and buildings and structures. Table D.1 shows average intangible intensity in the U.S. and in Japan (based on investment). Table D.2 shows average intangible intensity in Japan and in Germany based on the more limited measure of investment obtained from reported intangibles.[53] Comparing the RIETI's comprehensive measure of intangible intensity in table D.1 and the KLEMS-based measure of intangible intensity in table D.2 for Japan, one can notice that the "limited" measure is about three times smaller than the broader measure, which is expected since the KLEMS-based measure only includes intangible assets reported in firms' financial statement. However, the ranking across industries is similar.

We match this measure to each company in our sample (both parents and foreign subsidiaries) based on their reported industry classification. Orbis data include NAICS codes but not JIP codes (Japan Industrial Productivity codes, used in Japan accounts and by the RIETI). Unfortunately, RIETI's correspondence table between JIP and ISIC codes are unusable because JIP codes do not accurately match ISIC codes found in Orbis, and we therefore match all JIP codes with NAICS codes by hand. The EU KLEMS uses NACE codes, which we also match with NAICS codes. Investment and stocks for NAICS codes 54 and 55 (respectively professional and management services) are combined because JIP codes do not differentiate between these business services.

Although we experiment with various measures of intangible intensity based on subsidiary- or parent-level industry classification, we ultimately employ only the parent-level investment-based measure in our preferred analyses for several reasons. First, our industry measures of intangible assets are based on Japanese (respectively, U.S. and German) investment and therefore may not apply to those countries in which subsidiaries operate. Second, the measure based on subsidiaries requires the use of a weighted average of each subsidiaries' intangible intensity to arrive at single parent-level figure, with weights based on financial statement data on total assets or retained earnings, and these data are frequently missing at the subsidiary level. We also experiment with measures of intangible-intensity based on stocks rather than investment flows, which are available on demand. The results based on other measures of intangible intensity do not generally change our conclusions.

[53] KLEMS data are available for a number of countries including Japan and Germany, but not the U.S.

Table D.1: Intangible Intensity in Japan and in the U.S., by Industry, Average 2006-2008 (Based on Investment)

NAICS Codes	United States (U.S.)	Japan (JP) [RIETI]	Ratio JP / U.S.	*Rank (1=lowest intensity)* United States	Japan
11	0.020	0.053	2.6	21	20
21	0.063	0.210	3.3	18	14
22	0.034	0.161	4.6	20	15
23	0.318	0.404	1.2	14	8
31	0.654	0.328	0.5	2	10
32	0.528	0.367	0.6	7	9
33	0.572	0.430	0.7	4	5
42	0.647	0.407	0.6	3	7
44	0.515	0.286	0.5	8	11
48	0.122	0.098	0.8	17	17
49	0.055	0.159	2.8	19	16
51	0.558	0.629	1.1	6	2
52	0.736	0.539	0.7	1	3
53	0.268	0.028	0.1	15	21
54	0.561	0.654	1.1	5	1
56	0.483	0.271	0.5	9	12
61	0.481	0.092	0.1	10	18
62	0.246	0.091	0.3	16	19
71	0.320	0.449	1.4	13	4
72	0.333	0.214	0.6	12	13
81	0.344	0.410	1.1	11	6

Table D.2: Intangible Intensity in Japan and Germany, by Industry, Average 2006-2008 (Based on Investment)

NAICS Codes	Japan (JP) [KLEMS]	Germany (DE) [KLEMS]	Ratio JP / DE	*Rank (1=lowest intensity)* Japan	Germany
11	0.005	0.021	2.4	21	20
21	0.042	0.061	3.4	19	19
22	0.096	0.091	1.7	14	16
23	0.077	0.144	2.8	15	10
31	0.131	0.146	2.2	10	8
32	0.186	0.120	3.0	8	13
33	0.184	0.143	3.0	9	11
42	0.232	0.253	1.6	6	4
44	0.254	0.234	1.2	5	5
48	0.107	0.069	1.4	12	17
49	0.555	0.468	0.3	2	1
51	0.452	0.284	2.2	3	3
52	0.724	0.394	1.3	1	2
53	0.009	0.003	9.2	20	21
54	0.375	0.210	3.1	4	6
56	0.067	0.098	2.7	16	15
61	0.049	0.144	0.6	18	9
62	0.127	0.130	0.7	11	12
71	0.050	0.098	4.5	17	14
72	0.102	0.162	1.3	13	7
81	0.205	0.064	6.3	7	18