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Abstract

In 2009, the United Kingdom switched from a worldwide taxation system to a territorial system which exempts all foreign-earned active income from taxation. This reform fundamentally changes the dividend tax imposed on UK multinationals in many low-tax countries. In this paper I use data on multinational affiliates located in 27 European countries and employ the difference-in-differences approach to assess the causal effect of dividend exemption on real investment by UK-owned multinational affiliates. I find that UK's switch to dividend exemption has increased outbound investment by UK multinationals by around 15.7 percentage points in countries with a lower corporate tax rate than the UK. The observed increase, though temporary in nature, represents an addition in aggregate investment, as there is no evidence on a concurrent decrease in investment by UK multinationals in high-tax countries or in the UK.

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I Introduction

Between the two major systems of international taxation, the territorial system is gaining its popularity over the worldwide system. The number of current OECD member countries with territorial tax system has doubled since 2000. As of 2014, 28 of the 34 OECD member countries have adopted territorial tax system. Several major developed economies, including New Zealand, Norway, Japan and the UK, have all switched to the territoriality system in the past decade. The United States, among a very small number of countries with a worldwide system, is also in the process of reviewing its international taxation system, with many independent advisory board, working group, and federal agency recommending that the U.S. pivot toward a territorial system.[1,2]

The key difference between the two tax systems lies in the home-country taxation of foreign-earned income. Under the territorial system, active business income earned abroad is largely exempt from home country tax. Domestic and outbound investment by UK multinationals is therefore taxed at the same effective rate regardless of the country of origin. In comparison, the worldwide system taxes profit repatriated to the home country in the form of dividends with a credit for foreign taxes paid up to the limit of the home country liability. Under the worldwide system, investments are treated the same for tax purposes in the home country regardless of the destination. The two tax system have distinct impact on tax revenues of home government and on the real business activities of multinational corporations.

In 2009, the UK fundamentally changed its international taxation regime by switching from the worldwide tax system to territoriality. This reform allows me to direct identify the effect of territoriality on outbound investment of UK multinationals, exploiting differential changes in the dividend tax rates across destination countries in the EU-27 as identifying variation. There are two key factors that determine whether UK's switch to the dividend exemption system would have any impact on dividend repatriation and investment: (1) the level of corporate tax rate in the host country relative to that in the UK, and (2) the marginal source of finance faced by UK-owned multinational affiliates. Theoretically, the introduction of dividend exemption should decrease the tax burden on dividend repatriation in countries

[1] These include the President's Advisory Panel on Federal Tax Reform (2005), the President's Advisory Board (2010), Council on Jobs and Competitiveness (2012), Commission on Fiscal Responsibility and Reform (2010), the President's Export Council (2010), the President's Council of Advisors on Science and Technology (2011), Board (2010), Council on Jobs and Competitiveness (2012), Commission on Fiscal Responsibility and Reform (2010), Joint Committee on Taxation (2005), U.S. Department of the Treasury, Office of Tax Policy (2007), and the House Committee on Ways and Means (2011).

[2] China, as the world's second largest economy, also employs a worldwide system to tax corporation income.

where the corporate tax rate is lower than the UK rate, but should have no impact on the tax burden on dividend repatriation in countries where the corporate tax rate is higher than the UK rate. To illustrate the role of finance, I present a simple model which shows that a reduction in dividend taxes paid by the UK parent firm will increase investment by foreign affiliates in the low-tax countries, while the timing of the increase will depend on whether the marginal investment is financed by new equity or retained earnings. Pragmatically, if UK multinationals invest strategically in both low and high tax countries to minimize their overall foreign tax liability through tax planning, one may expect the introduction of dividend exemption to have significant impact on multinational investment in both low and high tax countries.

I use the Amadeus database provided by Bureau van Dijk as the primary source for affiliate-level data. This micro-level database provides information on the financial and operating characteristics of multinationals in European countries between 2005 and 2011. The data provides information on ownership structure and allows me to identify affiliates with a multinational parent firm in each of the EU-27 countries. I distinguish between low and high tax countries using the Oxford Centre for Business Taxation Tax Database. I examine the causal effect of dividend exemption on investment by UK-owned affiliates, separately in low and high tax countries, with a difference-in-difference estimation approach and non-UK multinational affiliates as the control group.

I find evidence that UK's switch to the exemption system had a significant and positive effect on investment by UK affiliates after 2009 in the low-tax countries. This finding is robust to controlling for a wide range of non-tax factors including firm-specific investment opportunities, time-varying host country and home country characteristics, as well as unobserved affiliate heterogeneity, unobserved parent firm heterogeneity, and aggregate macroeconomic shocks that are common to all multinational affiliates in the same host country. Qualitatively, the introduction of dividend exemption increased investment by UK affiliates by 15.7 percentage points in the low tax countries, for an average decrease of 9 percentage points in the dividend taxes on repatriated profits. Given that decrease in the dividend tax rates might be overestimated due to deferral or onshore pooling of excess credit, this estimate represents a lower bound on the true investment response to dividend taxation in the low-tax countries.

There is considerable heterogenous effects of dividend exemption on investments by UK multinational affiliates. The observed investment increase is mainly driven by "financially constrained" firms, which are more likely to rely on newly injected capital from the parent company for investment. The investment increase is concentrated in large multinational group measured by total number of related companies and total assets, suggesting that the

observed investment increase is mainly driven by affiliates in larger, more liquid company group. UK multinationals increased their investment immediately after the introduction of the territorial system, while a close look into the timing of the response suggests that the increase is quick but largely temporary in nature.

Nevertheless, the investment increase represents an increase in aggregate investment. Using the same DD approach, I find no significant investment response by UK affiliates in the high-tax countries or in the UK following UK's switch to the territorial system. The evidence suggests that there is an increase in total investment rather than that the UK multinationals relocated some of their overseas activities from high-tax to low-tax countries to take advantage of increased after-tax profitability.

This paper provides new evidence on the debate about the impact of dividend taxation on business investment between the "old view" (Harberger, 1962, 1966; Feldstein, 1970; Poterba and Summers, 1984) and the "new view" (Auerbach, 1979; Bradford, 1981; King, 1977; Hartman, 1985). Under the traditional, or "old view" of dividend taxation in which marginal investments are funded out of new equity or risky debt, dividend taxes distorts investment by increasing the cost of capital, with potentially adverse welfare consequences. Under the "new view" of dividend taxation in which marginal investment are funded out of retained earnings and riskless debt, dividend taxes do not distort investment decisions as the tax affects the cost of capital and the post-tax marginal return to investment by the same portion. Empirical evidence from recent studies including Becker, Jacob and Jacob (2013), Yagan (2015), and Alstadsæter, Jacob and Michaely (2015) is also mixed. This paper focus on one specific, permanent reform that changes the dividend taxes on overseas profit, and carefully analyses how firms response.[3]

The paper proceeds as follows. The next section describes the policy background on the UK's change from the worldwide to territorial system. Section III provides a simple conceptual framework to understand how investment undertaken by UK-owned affiliates in the foreign markets would respond to the dividend exemption. Section IV describes the data that I use for empirical analysis. Section V discusses the empirical strategy and specification. Section VI presents empirical results on the effect of dividend exemption on UK outbound investment in the low tax countries. Section VII presents empirical evidence on increase in total outbound investment by UK multinationals by analyzing investment in the high-tax countries and in the UK. Section VIII briefly concludes.

[3]More literature on (1) the effect of international tax policy on financial and real behaviour responses of multinationals and (2) spillover effect of fiscal policy on other countries to be added...

II Policy Background

A UK's Switch to the Exemption System in 2009

I briefly summarize the tax treatment of foreign earnings of UK-headquartered multinationals in the pre- and post-2009 regime. Until 2008, the UK operated under a worldwide system of corporate income taxation. Total earnings of UK-incorporated companies, including those from activities domestic and abroad, are liable to corporation tax in the UK. Foreign profits are taxed in the form of dividends upon repatriation, but are entitled to a credit for corporate taxes paid in the foreign jurisdictions. For example, if a UK firm has an investment in Ireland, it will pay Irish tax at the rate of 12.5%. When the Irish subsidiary remits profit as a dividend to its UK parent, the profit is then liable to a UK tax of 28% but net of the Irish tax paid, i.e. a dividend tax rate of 15.5%.[4]

The foreign tax credit is limited to the amount of corporation tax that would be owed if the profits were earned in the UK, and therefore there is no additional tax on repatriated dividends from subsidiaries in a country where the statutory corporate tax rate is higher than the UK rate. For example, if a UK firm has an investment in France, it will pay French tax at the rate of 35%, which is higher than the UK rate. When the French subsidiary remits profit to its UK parent, the profit is no longer liable to any additional UK tax. In general, the additional UK tax on each pound of repatriated dividend ($\tau_{UK,div}$) is the difference between the statutory tax rate in the source country (τ_j) and the UK rate (τ_{UK}):

$$\tau_{UK,div} = \begin{cases} \tau_{UK} - \tau_j & \text{if } \tau_j \leq \tau_{UK}, \\ 0 & \text{if } \tau_j > \tau_{UK}. \end{cases}$$

Under the worldwide system, the UK parent faces the same post-tax return irrespective of the investment location, and can allocate investment efficiently across countries of different corporate tax rates (Richman, 1963). On the other hand, firms based in high-tax countries would face a competitive disadvantage relative to firms based in low-tax countries, when competing in low-tax jurisdictions. In light of such consideration,[5] the Treasury and HMRC issued a discussion document in June 2007, proposing for the UK to move from a worldwide tax system to an exemption system. The Finance Bill 2009 then introduced the exemption system, which became effective on July 1, 2009 and exempts most foreign dividends from UK

[4] The corporate tax rate of 28 percent was the main rate on corporate taxable profit above £1.5 million between financial years 2008 and 2010. The main rate was reduced to 26 percent in 2011, 24 percent in 2012, and 20 percent in 2015.

[5] The stated policy objective of this reform is "*to enhance the competitiveness and attractiveness of the UK as a location for multinational business (Great Britain: Parliament: House of Lords: Select Committee on Economic Affairs, 2009).*"

taxation.[6] Foreign-earned profits remitted to a UK parent company are no longer liable for UK corporation tax and are only taxed in host countries. As a result, this reform introduced differential changes on the tax burden on repatriated dividends, depending on whether the host country has a low or high statutory corporate tax rate comparing to the UK. Specifically, the reform decreased the tax rate on dividends remitted from a low-tax country from τ_{UK} to τ_j but did not directly change the tax rate on dividends remitted from a high-tax country:

$$Decrease in \tau_{UK,div} = \begin{cases} \tau_{UK} - \tau_j & \text{if } \tau_j \leq \tau_{UK}, \\ 0 & \text{if } \tau_j > \tau_{UK}. \end{cases}$$

The differential tax rate, $\tau_{UK} - \tau_j$, represents the maximum tax savings on every pound of dividend repatriated from a low-tax country j following the introduction of dividends exemption. This is because under the pre-2009 worldwide system, the UK allowed for on-shore pooling of foreign tax credit when UK parent companies received dividends from multiple countries. A parent firm whose foreign tax payments are less than foreign tax credit limit, where the foreign tax credit limit is calculated as the total foreign taxable income time the UK corporate tax rate is in an excess limit position. A parent company whose foreign tax payment is more than the foreign tax credit is in an excess credit position. For companies in the latter group, they can use excess credits—the difference between the foreign tax payments and the foreign tax credit limit—to reduce the UK tax obligations on foreign source income. The amount of the excess credits that can be offset against any remaining UK tax was restricted to be up to 45 percent of the dividends, and can be either carried back for three years or carried forward.

The eligible excess credits generated by dividends from high-tax countries can shield, to some extent, other overseas dividends from low-tax countries from any residual UK tax. This feature of the pre-2009 credit system suggests that the tax consequences of outbound investment should depend on the individual circumstances of each MNC. For example, some MNCs may be able to set up their operations to avoid paying taxes by ways of deferral repatriation of foreign profits or onshore credit pooling.[7] With either approach some UK companies might have effectively been taxed as if under the territorial system, and their outbound investment might not change in response to the tax reform. In fact, the amount of tax revenue collected on repatriated dividends consisted a very small share of corporation tax revenue. The Treasury has estimated a figure of £650 million as the revenue impact

[6] Except where the receipt is similar to interest or distributions paid in respect of certain securities.

[7] Unlike the U.S. worldwide system, the Financial Act 2000 and 2001 disallowed offshore pooling of foreign tax credit. UK multinationals could no longer avoid repatriation taxes by way of indirect ownership of foreign affliate, either through holding comapnies or through affiliate in tax havens that do not impose repatriation taxes.

during a three-year period from 2009-10 to 2011-12. The total UK corporation tax receipts is £103,715 million over the same period, implying that on average, the foregone tax revenue as a result of switching to the territorial system is less than one percent of total corporation taxes.[8]

B Aggregate Evidence

Figure 1 provides some aggregate evidence on the effect of dividend exemption by presenting time series of net UK outbound investment (Panel A) and the associated net earnings (Panel B) in other EU-27 countries during 2003-2012.[9] Net direct investment flows abroad by UK companies includes acquisitions/disposals of equity capital, reinvestment of earnings, and inter-company debt. Net earnings from direct outbound investment include earnings of outbound investment arising from both equity and debt. To identify the direct effect of dividend exemption on dividend repatriation and investment in low-tax countries, each panel shows a breakdown of the time series in the low-tax and high-tax countries.

Panel A shows some distinctive patterns of UK outward investment by country groups. In particular, UK outbound investment in high-tax countries is much more volatile. It peaked in 2007, started to decrease drastically until 2009, and recovered slightly since 2010. This trend is mainly driven by the recent economic crisis. UK outbound investment in low-tax countries, by exerting a steady decrease between 2006 and 2010, is relatively more stable and decreased to a less extent in 2009 relative to that in high-tax countries. Interestingly, the two investment series moved in different directions immediately after the introduction of exemption system in the years of 2009-2011. However, it is clear that aggregate investment trends track closely with the business cycle and masks the effect of tax reform in the time series, highlighting the importance of using micro-level data to identify the causal effect of dividend exemption on investment.

There is a clearer effect of dividend exemption on net earnings of UK outbound investment as shown in Panel B. Net earnings on UK outbound investment in both groups increased from 2004 to 2008 and started to diverge in 2009. There is an immediate drop in net earnings from

[8] In relation to passive income, the controlled foreign companies (CFCs), effective between 2001-02 and 2009-10, restricted the ability of UK-based groups to retain profits overseas without paying a full UK tax charge. Specifically, the retained profits of subsidiaries that are located in countries where the corporation tax is less than three quarters of the rate applicable in the UK can be apportioned back to the UK and taxed as income of the parent. UK parent companies were also liable to UK taxes on interest or royalties income from foreign subsidiaries, with a credit for any withholding taxes paid abroad.

[9] Sources: Office for National Statistics, UK Balance of Payment 2012, available at *http://www.ons.gov.uk/ons/rel/fdi/foreign-direct-investment/2012-sb/stb-fdi-2012.html.* A negative value indicates a net disinvestment abroad, or a decrease in the amount due to the UK. Statistics in Figure 1 do not include those from UK offshore.

high-tax countries in 2009 and 2010, while the net earnings from low-tax countries continued to increase in 2009, peaked in 2010 and started to decrease again afterwards. In the two years following the introduction of the exemption system, there is an evident increase in net earnings from UK outbound investment in the low-tax countries relative to the high-tax countries. The changes in repatriated profit present evidence on which view of dividend taxation is most relevant for understanding the impact of dividend taxes on welfare. Under the old or agency view, a tax cut would cause an increase in dividend payouts.

III Conceptual Framework

I consider in a simple two-period model the effect of dividend taxation on firm investment, based on Bond, Devereux and Klemm (2005) and Chetty and Saez (2010). At the beginning of period 0, a UK affiliate in the foreign market has an initial level of cash holdings of C. In period 0 it invests an amount of I, which can be financed out of retained earnings, or by receiving new capital injection of $E \geq 0$ from the parent company. At the end of period 0, the foreign affiliate pays to its UK parent a dividend in the amount of $D = C+E-I$. In period 1, the foreign affiliate produces output and earns revenue with the production function $f(I, E)$, where $f(\cdot)$ is strictly concave, strictly increasing, continuous and continuously differentiable. Note that the positive dependence of this production function on the level of new capital reflects possible "control benefits" of subjecting the investment decision to scrutiny and monitoring from the parent company, rather than relying on internal finance. At the end of period 1, the affiliate repatriates the entire net wealth to the UK parent company by paying a dividend. A tax rate of t_d^0 and t_d^1 is levied on dividend payments in period 0 and 1, respectively. [10]

The foreign affiliate chooses I and E to maximize the present value of net distributions, given by:

$$V = (1 - t_d^0)(C + E - I) - E + (1 - t_d^1)\beta f(I, E),$$

where β is the parent company's discount factor, $\beta = \frac{1}{1+r} < 1$, and r is the risk-free interest rate between the two periods, subject to the non-negativity constraints on dividend payments and new share issues. The foreign affiliate thus maximizes:

$$V = (1 - t_d^0)(C + E - I) - E + \lambda^D(C + E - I) + \lambda^E E + (1 - t_d^1)\beta f(I, E),$$

where λ^D and λ^E are shadow values associated with the non-negativity constraints. The

[10] To focus on the implication of dividend taxation for dividend payments and new share issues, I assume the firm issues no debt.

first-order conditions for investment and new equity issues are:

$$f_I = (1+r)\left[\frac{1-t_d^0}{1-t_d^1} + \frac{\lambda^D}{1-t_d^1}\right],$$

and

$$f_E = (1+r)\left[\frac{1-(1-t_d^0)-(\lambda^D+\lambda^E)}{1-t_d^1}\right].$$

There are two financial regimes in this model, and the optimal strategy of finance depends on the level of initial cash flow C relative to the firm-specific investment opportunities. As is well known from the tax literature on international direct investment, new equity is never a tax-preferred way of financing if dividends trigger a tax on distributions. The foreign affiliate will never choose to repatriate dividends ($D > 0$) and make equity transfers from the UK parent ($E > 0$) simultaneously. Doing so results in an unnecessary tax payment to the home country government of t_d in period 0 and leaves the UK parent with only $£(1-t_d)$ to invest abroad. It is more tax efficient for the foreign to retain the initial earnings and avoid a tax on dividends. Assume for now a constant t_d between the two periods, i.e. $t_d^0 = t_d^1 = t_d$.

Regime 1: Financed by New Equity

When the marginal investment is financed by issuing new shares, this implies that the dividend payments are zero, i.e. $D = 0$ so that $\lambda^D > 0$, and $E > 0$ so that $\lambda^E = 0$. This occurs when the initial cash flow C is so low relative to investment opportunities that, if the firm issues the optimal level of new shares suggested by the optimal condition, it cannot finance the optimal level of investment and pay positive dividends in the current period. In this case the first-order conditions are

$$f_I = (1+r)\left[1 + \frac{\lambda^D}{1-t_d}\right], \tag{1}$$

and

$$f_E = (1+r)\left[\frac{1-\lambda^D}{1-t_d} - 1\right]. \tag{2}$$

In this case, the foreign affiliate invests all the cash it has: $I = C+E$ and finance the marginal investment with new equity. Implicit differentiating of equation (1) and (2) suggests that $\partial f_I/\partial(1-t_d) < 0$ and $\partial f_E/\partial(1-t_d) < 0$. A decrease in dividend taxation implies for firms in this financial regime a decrease in the marginal benefit of investment, which requires an increase in the level of investment. A decrease in the dividend tax also implies a decrease in the marginal benefit of issuing new shares, which requires an increase in the level of new shares issued. In addition, if the cross-derivative $f_{I,E}$ is strictly positive, the increase in new shares issued implies further increase in investment. The firm is financially constrained in

this regime, as a windfall increase in cash flow would reduce the shadow value of internal funds λ^D, thus reducing new share issues and increasing invesmtent.

These results are from the standard "old view" models that when marginal investments are financed by funds from outside investors, proceeds from these investments are returned to investors and face the dividend tax rate. Thus the dividend tax distorts investment decisions, with potentially adverse welfare consequences. Conversely, reduction in the dividend tax, as in the case of the 2009 dividend exemption in the UK, will potentially increase both investment and new share issues by UK multinational affiliates in the low-tax countries .

Regime 2: Financed by Retained Earnings

In the second regime, the initial cash flow C is sufficiently high relative to investment opportunities,and the marginal investment is financed out of retained earnings C. This implies that $D > 0$ so that $\lambda^D = 0$, and $E = 0$ so that $\lambda^E > 0$. The first-order condition (1) thus becomes

$$f_I = (1 + r)\,, \tag{3}$$

implying that the cost of capital and the optimal level of investment does not depend on the dividend tax t_d. This is because provided the tax rate on dividends is constant, a dividend tax lowers both the cost of investment and the return on the investment in the same way, and thus has no effect on the cost of capital. In this case, neither investment nor dividends payments depend on the dividend tax paid by the parent company. This is similar to the "new view" of dividend taxation, which is developed by King (1974), Auerbach (1979) and Hartman (1985). Comparing Equation 3 with 1 confirms that standard pecking order in which external finance is not less expensive than internal finance, suggesting that UK multinationals should finance their investment first by exhausting the internal funds before turning to requiring new capital injection from the parent company.

The above results hold with a constant dividend tax. The irrelevance result of dividend taxation for marginal investments relying on internal finance no longer applies when there is some change in the rate of dividend tax, or there is expectation of such changes. Suppose that the parent firm anticipates in period 0 that the rate of dividend tax will decrease in the next period so that $t_d^0 > t_d^1$. In this case, the first-order condition that determines the optimal level of investment for firms in the second financial regime becomes

$$f_I = \left(\frac{1 - t_d^0}{1 - t_d^1}\right)(1 + r)\,. \tag{4}$$

Equation (4) suggests that when the dividend tax rate in period 0 is higher relative to its level in the next period, the marginal productivity of investment in period 0 for the cash-rich firm is lower than $(1 + r)$. This result implies that the optimal investment level

in period 0 would be higher than the level determined by equation (3) in the absence of anticipating any tax change, even when the marginal source of finance for new investment is retained earnings. The intuition is that anticipating a dividend tax decrease in the next period, dividend payouts in period 1 becomes more attractive than dividend payouts in period 0. In consequence, the affiliate delays the dividend payout to period 1 and uses the retained earnings savings to increased its investment in period 0. In the following sections, I empirically examine the responsiveness of investment by UK multinational affiliates to the introduction of the dividend exemption regime.

IV Data

The primary dataset for empirical analysis is an unbalanced panel of 131,614 multinational affiliates in one of the EU-27 countries for the years 2005 to 2011. It is constructed by using unconsolidated financial statement of multinational subsidiaries in the commercial Amadeus database, which is provided by Bureau van Dijk. The Amadeus database includes approximately 8 million public and private companies in 38 European countries. It combines data from over 35 specialist regional information providers and provides information on financial statement and basic ownership structure for medium and large-sized European companies. A company is defined as a multinational affiliate if it has an ultimate parent company owning at least 50% of its shares and is located in a different country from the parent company. The ultimate parent company in the dataset locate in one of 158 countries.

The main analysis sample contains all multinational affiliates if the company: (a) reports non-missing, non-zero turnover and total asset values,or (b) is not a financial company with main productive assets that are typically not tangible capital. I further discard any financial statement that contains missing industry or unspecified ultimate parent location. Table 1 shows the country distribution of multinational affiliates in the main analysis sample.

The main accounting variables are flows of investment, sales, cash flow, and earnings before interest and tax (EBIT).[11] Investment spending (I_t) is computed as changes in fixed capital assets based on the net book values of tangible and intangible fixed assets plus depreciation, i.e. $K_{t+1} - K_t + depreciation$, where K_t denotes book value of the fixed asset in year t. Gross investment rate, $Investment_t$, is defined as the ratio between current-year gross investment spending and beginning-of-year net fixed capital asset. Similarly, net investment rate, $Investment\_Net_t$, is defined as the ratio between current-year net investment spending and beginning-of-year net fixed capital asset. Sales refers to operating

[11] Unfortunately, there is no information on dividend payment in the affiliate-level financial statement which would allow for a direct test of the effect of dividend exemption on dividend repatriation.

revenue and profit margin is calculated as earnings before interest and tax (EBIT) divided by sales. All ratio variables are winsorized at top and bottom 0.01 percentile to minimize the influence of outliers. Table 2 contains summary statistics for the main variables.

A limitation of the Amadeus data, however, is that information on the ownership structure refers to the last reported date, which is year 2011 for most observations in the sample. I assume that the parent-affiliate ownership structure for 2011 applies to the earlier years and there may be potential misclassification of parent-subsidiary-connections due to change of ownership structure over the sample period.[12] Suppose that UK's moving to an exemption system increases the competitiveness of UK parent company in the international market. As a result they acquire more foreign subsidiaries in low tax jurisdictions.[13] By including these newly acquired subsidiaries in the analysis, the estimation results will capture the overall investment response to moving to the exemption system after allowing for endogenous investment changes at the extensive margin via merge and acquisition.

I merge data on the statutory corporate tax rate at the affiliate location provided by Oxford Centre for Business Taxation Tax Database.[14] This is a measure of total statutory tax rate by capturing the sum of all statutory tax rates (including top corporate tax rate at federal level, any surcharge levied, and any local corporate tax rate and taking into account the deductions available) levied at the corporate profit in a given country in a given year. Subsidiaries in the main sample face a statutory corporate tax rate that ranges from 0.10 to 0.404 with a mean of 0.285. The theoretical consideration predicts that UK's switch to an exemption system would bear different implications on UK outbound investment in low- versus high-tax countries. Accordingly, I define an indicator variable *low tax* which takes on value 1 if a country sets its corporate tax rate consistently below the UK rate in 2005-2011 and 0 otherwise. Low-tax countries defined in this way are depicted in dark blue in Figure 2, including: Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, Hungary, Ireland, Lithuania, Latvia, Poland, Romania, Sweden, Slovenia, and Slovakia.

I further merge data on host country characteristics including GDP per capita, population and unemployment rate to capture the aggregate market size and demand characteristics, and measures of governance quality and financial stability in the host countries. I also include home-country characteristics to capture marcoeconomic conditions at the parent location. These variables include the growth rate of GDP per capital, and WDI indicators

[12] This caveat is acknowledged in previous studies exploring the ownership structure in the AMADEUS data. See, e.g. Budd, Konings and Slaughter (2005), Dischinger and Riedel (2011) and Dharmapala and Riedel (2013).

[13] Feld et al. (2005) estimates that the abolishment of repatriation taxes in the UK in 2009 has increased the number of acquisitions abroad by Bristish firms by 3.9%.

[14] Available at: http://www.sbs.ox.ac.uk/ideas-impact/tax/publications/data

on governance quality and financial institution stability.[15]

V Empirical Strategy and Specification

This section describes the empirical strategy designed to identify the causal effect of dividend exemption on investment by UK-owned multinational affiliates. Specifically, I exploit plausibly exogenous time-series variation in the relative cost of equity financing following UK's switch to the exemption system. If dividend exemption has decreased the tax burden of equity financing faced by UK affiliates in low-tax countries, we would expect an increase in investment by UK-owned affiliates after 2009 if new equity is the main marginal source of finance. To explicitly control for variation in investment by UK-owned affiliates due to non-tax factors, I use a control group which consists non-UK multinational affiliates in the same host country and hence are exposed to aggregate shocks similar to those experienced by UK-owned affiliates. Formally, I examine investment by UK-owned affiliates in the standard difference-in-difference (DD) specification:

$$INVESTMENT_{ikt} = a_i + d_t + \beta_{DE} DE_t + \beta_{\mathbf{x}} \mathbf{x}_{ikt} + \beta_{\mathbf{z}} \mathbf{z}_{kt} + \varepsilon_{ikt}, \tag{5}$$

where i indexes firms, k indexes host countries, and t indexes time. The dependent variable $INVESTMENT_{ikt}$ denotes gross investment scaled by book value of fixed capital asset in (end of) year $t-1$. The key variable of interest, DE_t, is an indicator equal to one for UK-owned affiliates starting in 2009, and zero otherwise. The coefficient β_{DE} represents the difference-in-difference estimate of the effect of dividend exemption on investment by UK-owned affiliates. Following the theoretical discussions in Section C, I expect β_{DE} to be positive and significant if a non-trivial amount of UK affiliates finance their marginal investment by new equity.

A set of firm fixed effects (a_i) is included to control for unobserved firm heterogeneity as well as unobserved time-invariant characteristics of the parent. As discussions in Section B suggest, the tax consequence of dividend exemption on investment abroad depends critically on the ability of the UK parent to defer or minimize the overall taxes on dividend repatriation. Presumably, UK affiliates with a parent company that begin in excess credit status under the worldwide system would be less affected by the shift to the credit system than those beginning in excess limit. Therefore it is important to control for the initial tax status of the

[15] Subsidiary-level country data is collected from the European Statistical Office (Eurostat), available at http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/. Parent-level country data is collected from the World Development Indicators Database, available at http://data.worldbank.org/data-catalog/world-development-indicators.

parent company through firm fixed effects. The firm fixed effects subsumes host-country fixed effects (given that affiliates do not change their location), which controls for time-invariant differences across host countries that may affect location choice of multinationals, which include, for example, perceived average quality of governance during the sample period, common language and/or former colonial ties, and geographical distance between the home and host country. I further include a full set of time dummies (d_t) to capture the effect of aggregate marcoeconomic shocks, including the effect of the great recession, that are common to all multinational affiliates in the same host country. $\mathbf{x}_{ikt}$ denotes a possible empty vector of firm-level controls, and ε_{ikt} is a white noise term.

For robustness I include statutory corporate tax rate at source to control for the confounding effects of concurrent tax reforms in the host countries. In most specifications I include a full set of industry by year interactions and country by year interactions to control for industry and country specific macro-economic factors that may affect private investment and would otherwise be captured by the DD estimates. In addition, I control for a set of time-varying country characteristics ($\mathbf{z}_{kt}$) for both host and parent countries, including GDP per capita, population size, unemployment rate, and indices of governance quality and financial institution stability to capture the effect of time-varying market size and demand characteristics on investment.

I employ two alternative approaches to address the concern that UK and control affiliates may not be identical in terms of observable characteristics, and that these differences can explain different trends in investment over time. First, I directly control for a set of variables that may capture firm-level investment opportunities ($\mathbf{x}_{ikt}$), which include lagged output, cash flow scaled by lagged asset, lagged profit margin as a measure of profitability, and one-period lagged growth rate of output. Alternatively, I implement a matching DD strategy (Heckman, Ichimura and Todd (1997)). To this end, I replicate the DD tests on a subsample of matched firms based on pre-reform characteristics. The key assumption underlying the DD technique is that investment trends in both the treated and control groups would be the same in the absence of dividend exemption. I examine any differences in the trends before the legislation in the next section.

VI Investment Responses in Low-Tax Countries

A Graphical Evidence

Figure 3 shows the average investment by UK affiliates and non-UK affiliates around the dividend exemption reform in low tax countries (Panel A) and in high tax countries (Panels B),

which reveal some distinct patterns in the two panels. In low tax countries, real investment (relative to its 2006 level) of UK affiliates decreased at a slower rate than that of non-UK affiliates, but the difference between the two groups was quite small in the pre-exemption period of 2006-2008. Both groups continued to decrease their investment until 2009, and started to increase their investment after the financial crisis. Comparing to their non-UK peers, UK affiliates decreased their investment to a less extent after 2009, suggesting that dividend exemption had a positive effect on investment of UK affiliates in low-tax countries.

In high tax countries, while investment of UK affiliates decreased more quickly than that of non-UK affiliates, changes in investment were quite similar in the years around 2009. Comparing to the widening gap of investment between the treated and control groups in the low tax countries, the difference is much more stable in the high tax countries.

There are two threats to identification. The first is that contemporaneous changes that are unrelated to the tax reform, which could have differential impacts on UK and non-UK affiliates. For example, UK affiliates might be more resilient to the financial crisis comparing to their non-UK peers, which could explain the smaller decline in their investment and highlights the importance of controlling for time-invariant affiliate and parent company characteristics in the regression analysis. Moreover, concurrent tax reforms in other countries are likely to confound the effect of dividend exemption that is of primary interest in this paper. For example, Japan also switched to a credit system in 2009. Given a statutory corporate tax rate of 38% in Japan, this implies that outbound equity-financed investment of Japanese affiliates are likely to increase in the sample, and will cause a downward bias in the effect of dividend exemption. To summarize, the aggregate evidence presented in Figure 3 provides suggestive evidence on the effect of dividend taxation on UK outbound investment. In the following section, I use regression analysis to control for a large set of confounding factors and provide conclusive evidence of a link between dividend taxation and outbound investment by UK multinationals.

B Baseline results

Table 3 presents regression results from the difference-in-difference estimation of equation (5), focusing on multinational affiliates operating in the EU-27 countries with a lower corporate tax rate compared to the UK. All regressions include a full set of firm fixed effects and year fixed effects. Heteroscedasticity-robust standard errors that are clustered at the firm level are show in brackets below the coefficient estimates.

Following the difference-in-difference specification in equation (5), Column 1 regresses investment on the DE_t variable, which is the interaction between a UK affiliate indicator

and an indicator for the year being 2009 onwards following the dividend exemption. The coefficient estimate for DE_t is positive and statistically significant, suggesting that the introduction of territorial system has systematically increased investment undertaken by UK-owned affiliates in the low-tax countries, relative to investment by affiliates with a non-UK parent company. The empirical evidence that UK-owned affiliates in the low-tax countries significantly increased their investment following UK's switch to the exemption system is consistent with the theoretical prediction if a non-trivial portion of their marginal investment is financed by new equity. To assess the robustness of this finding, column 2 includes additional controls that capture firm-specific investment opportunities, which include one-period lagged turnover, cash flow scaled by lagged asset, lagged profit margin, and growth rate of lagged turnover. To control for the fact that the sector composition for UK-owned affiliates may be different from non UK-owned multinationals, column 3 adds industry by time fixed effects to control for time-varying shocks to each industry at the 1-digit NACE level. The basic result remains unchanged.

To control for potential confounding effects of concurrent host-country tax reforms on investment, column 4 includes host-country statutory tax rate on corporate income. In addition, column 4 includes host-country GDP per capita, population size, unemployment rate, and indicators of governance quality and financial institution stability to control for the impact of market condition that would otherwise be captured by the DE_t coefficient estimate. To examine the robustness of the results to differential country-specific shocks, column 5 further includes a full set of country by year interactions to control for all country specific macro-economic factors that may affect private investment. Our empirical estimates do not appear to be sensitive to the inclusion of this rich set of control variables.

Time-invariant parent company characteristics and time-invariant home country characteristics are already controlled for with affiliate fixed effects (which subsume parent country fixed effects and parent company fixed effects, given that affiliates do not change their location or switch owners). However, UK-owned firms may be exposed to country-specific shocks at home which may systematically affect outbound investment by all UK affiliates abroad. To control for these effects column 6 adds additional time-variant marcoeconomic characteristics of the home country including GDP growth rate, GDP per capita and indicators on governance quality and financial stability. This leaves the qualitative results essentially unchanged. Finally, column 7 replaces the DE_t variable with its interaction with the decrease in dividend taxes in each of the low-tax countries to capture the magnitude of the tax reform. The coefficient estimate of the post-reform tax differential is around 1.59 and highly significant, suggesting that for every one percentage point decrease in the dividend tax, the investment by UK-owned affiliates in low-tax countries increases by 1.59 percentage points.

C Robustness Checks

In this section, I assess whether the findings are robust to a number of alternative specifications and alternative samples. First, columns 1-4 of Table 4 uses the same specification, control variables, and scaling underlying column 6 of Table 3, except that in column 1 the standard errors are clustered by host-home country pair. This is to address the common concern with tax reform studies that they understate the standard errors by assuming independence across firms within each tax jurisdiction (Bertrand, Duflo and Mullainathan, 2004). Column 2 excludes firms in the control group that are owned by parent companies in countries with the worldwide system. To the extent that investment decisions by these firms may also be influenced by tax planning consideration under the worldwide system, they may be less comparable to firms under the exemption system. To control for confounding effects of the eurozone crisis on investment, column 3 adds an interaction term between an indicator that takes value of 1 for host countries in the eurozone and the post-2009 indicator. To ensure that the identified tax effect is not entirely driven by firm entries and exits, column 4 uses a balanced sample that include firms that are established before 2005 and survived through 2010. The resulting DE_t coefficient estimates from the four regressions are statistically indistinguishable from the estimate reported in Table 3 column 6.

Alternatively, Column 5 implements a matching DD strategy (Heckman, Ichimura and Todd (1997)) to address the concern that UK and control affiliates may not be identical in terms of observable characteristics, and that these differences can explain different trends in investment over time. Specifically, I replicate the DD analysis on a subsample of matched firms based on pre-reform firm-level characteristics in terms of turnover, turnover growth, operating profits, and number of employees. The DD analysis further controls time-varying industry shocks and host-country marcoeconomic conditions. The resulting estimate has a wider confidence interval given the smaller number of observations but remains positive and significant at the 10 percent level.

Finally, Table 4 column 6 uses gross investment rate winsorized at 97.5 percentile as the dependent variable, and column 1-2 in the lower Panel use net investment rate winsorized at 99 and 97.5 percentile as the dependent variable, respectively. The estimated effect of the tax reform remains positive and significant, and is not significantly different from the estimate from the preferred specification in Table 3 column 6.

D The Effect of Dividend Exemption on Other Outcomes

Columns 3-6 in Panel B of Table 4 examines the effect of dividend exemption on other outcome variables including wage rate, employment, labor productivity, and profitability.

Wage rate is the only variable that shows a significant change to the tax reform, conditioning on the increase in investment. As there is no significant change in variables that measuring productivity or profitability, the increase in wage rate could be interpreted as evidence on rent sharing. In circumstances where dividend taxes are effectively paid by the foreign affiliates, dividend exemption represents an increase in after-tax profit, which is in turn shared between the firm and workers.

E Heterogeneous Analysis

To investigate the potential heterogeneity in investment responses by UK-owned subsidiaries, I use several proxies for ex ante financial constraints–firm size, liquid asset position and profitability–to test for a difference in investment responses between constrained and unconstrained firms. If the financing of foreign affiliates represents an important consideration for investment decisions, then we should expect a consistent, systematic difference in investment responses for groups of firms based on these proxies. The proxies are defined based on the pre-2009 average firm-level characteristics, excluding firms that recently entered or did not survive throughout 2010. I divide firms in the main sample along each indicator into each of the deciles. I then estimate the effect of tax reform by including ten interaction terms between the DE_t and each of the ten decile dummy indicators:

$$INVESTMENT_{ikt} = a_i + d_t + \sum_{j=1}^{10} \beta_{DE,Decile_j} DE_t \times \mathbf{I}\{i \in Decile_j\} + \beta_{\mathbf{x}} \mathbf{x}_{ikt} + \beta_{\mathbf{z}} \mathbf{z}_{kt} + \varepsilon_{ikt}, \quad (6)$$

where $\mathbf{I}\{i \in Decile_j\}$ is the jth decile indicator defined above, and all other variables are as previously defined. The coefficient $\beta_{DE,Decilej}$ represents the quantity of interest: the effect of the 2009 dividends exemption on investment by UK-owned affiliates relative to non UK-owned affiliates in the jth decile of the distribution based on each of the ex ante financial constraints indicators.

Panels A-B of Figure 4 report the coefficient estimates β_{DE} and 95% confidence interval across deciles of pre-2009 firm size and total asset. It is clear that only large UK-owned affiliates in upper decile of the turnover distribution significantly increased their investment in response to the 2009 reform. A similar pattern is shown in panel B which examines heterogenous investment responses based on the distribution of total asset. Following theoretical discussions in Section III, only investment by firms relying on newly injected equity from the parent company would respond to the introduction of territorial system. In other words, empirical evidence consistent with the theoretical prediction would be a higher sensitivity of investment in the cash-poor sample. Panels C of Figure 4 reports the results based on

the distribution of free cash flow. The investment increase is predominately concentrated in the lower decile of the cash flow distribution, suggesting that dividend exemption primarily increased outbound investment by relatively cash-poor UK affiliates in the low-tax countries.

Panel D of Figure 4 reports the results based on the distribution of profitability. The investment increase is mainly in firms in the middle distribution of profitability including the 4-6th and 8th deciles. The results suggest that firms with extremely low profitability did not increase their investment in response to the tax reform, neither did extremely profitable firms which are more likely to rely on retained earnings to finance their investment.

According to the theoretical discussion in section III, increase in investment by UK-owned affiliates should be mainly driven by new capital injected from the parent company. Evidence consistent with this hypothesis would be a more prominent investment response for firms in larger and more liquid multinational company groups.[16] Panel E reports the results based on the distribution of the company group size– the number of related companies in the same company group–and the results suggest a higher sensitivity of investment in larger multinational group measured by the number of affiliates. Finally, panel F reports the results based on the distribution of the company group asset. The measure is constructed by summing up the total asset of all affiliates with the same parent company in the main sample. Since Amadeus only include European affiliates, the group asset variable is a noisy measure of the worldwide company group asset. The results are roughly consistent that there is a higher sensitivity of investment in large multinationals measured by the total asset of the company group.

F Separating the Anticipation Effect

Consultation on the UK's moving to an exemption system were launched in late 2007, but the Treasury and HMRC did not release the draft legislation until more than a year later in February 2009. At the time of its release, HMRC emphasized that the draft legislation was at an earlier stage of development than normal and significant changes should be anticipated. Nor was there any date specified as to when the new legislation would take effect. The Financial Bill 2009, which became effective on April 3, 2009, formally introduced the exemption system which took effect on July 1, 2009. It is a 100% exemption rule for most dividends payable on or after 1 July 2009, including profits accumulated before the introduction of the new legistlation.

Despite a narrow three-month window between the announcement and implementation of the exemption system, UK multinationals may nevertheless have anticipated in 2008 the

[16] In theory, the parent company can either inject equity with internal funds, or raise equity from external capital market.

coming reduction in dividend taxation and strategically adjusted their outbound investment. Depending on the marginal source of finance, investment of UK-owned affiliates would respond in opposite directions anticipating dividend exemption. If new equity injected from the UK parent is the marginal source of finance, a forward-looking profit maximizing UK-owned affiliate would delay some investment spending in low-tax countries in anticipation of a dividend tax cut until after the implementation of the policy. In this case, there may be a temporary decrease in investment by UK affiliates in the low tax countries in 2008 and then an overshoot in investment in 2009, and the difference-in-difference coefficient estimate could reflect strategically timing of investment spending rather than a genuine increase in investment spending as a result of the tax reform.

For UK affiliates that rely on internal finance for investment, equation (4) shows that the cost of capital would become cheaper in 2008 given a coming reduction in dividend taxes. In this case, a forward-looking profit maximizing UK-owned affiliate would increase some investment spending in the low-tax countries in 2008, driving a temporary increase in investment in 2008 prior to the tax reform. To identify the potentially different effect of anticipation on investment, I include in equation (5) another interaction term between a $Year_{2008}$ dummy and an indicator for an UK-owned affiliate:

$$INVESTMENT_{ikt} = a_i + d_t + \beta_{2008} Year_{2008} \cdot UK \text{ Affiliate}_i + \beta_1 DE_t + \beta_{\mathbf{x}} \mathbf{x}_{ikt} + \beta_{\mathbf{z}} \mathbf{z}_{kt} + \varepsilon_{ikt},$$

where all other variables are as previously defined. The β_{2008} coefficient captures any differential between investment by UK and non-UK affiliates in 2008, relative to the 2006 base-year level.

Table 5 summarizes the estimation results in low-tax countries. Regressions in columns 1 use gross investment as the dependent variable and follow the most comprehensive specification which includes additional controls at firm, host country and home country levels. The coefficient estimate of β_{2008} is statistically insignificant while the DE_t coefficient remains positive and highly significant. An insignificant coefficient estimate of β_{2008} suggests the lack of evidence that UK affiliates strategically adjusted their investment prior to the implementation of dividend exemption.

Timing uncertainty associated with the dividend exemption reform might explain the lack of any anticipation effects. There are two components of reform proposed in the 2007 consultation: exemption of foreign-sourced income and a new Controlled Foreign Companies (CFC) regime. By 2008, however, implementation of the proposal was already "in jeopardy". This is due to HMRC's requirement that the dividend proposals must be "tax neutral", which required targeted measures to restrict the tax deductibility of interest and to use the CFC

regime to generate additional tax revenues by including certain capital gains and income from intellectual property (IP). As a result, the proposed CFC regime has attracted wide criticism particularly from IP-rich companies and has led to a number of UK headquartered multinationals (such as Shire Pharmaceuticals and United Business Media) announcing their intention to relocate to a more tax friendly jurisdiction, such as Ireland. In view of these criticisms and a potentially significant number of companies seeking to leave the UK, HMRC announced that it would postpone the new CFC regime and instead, tighten up the existing rules. It intended to move forward with the dividend exemption but only if suitable measures to protect UK tax revenues could be found. It was therefore unclear in 2008, in retrospect, the exact time when the dividend exemption would come into effect.

To further examine how quickly outbound investment reacted to dividend exemption, regressions in column 2 include two additional interaction terms between a post 2010/2011 year dummy and an indicator for an UK-owned affiliate, respectively. Coefficient on each interaction term would capture the differential change between investment by UK and non-UK affiliates following the corresponding year, relative to the 2006 base year level. The estimate coefficient of DE_t remains positive and highly significant, while neither of the other two coefficient estimates is significant. The results suggest that the overall investment response of UK multinationals is immediate and largely temporary in nature. Column 3 and 4 in Table 5 repeat the analysis using net investment as the dependent variable, and the results remain qualitatively the same.

Finally, I conduct simply placebo tests to see whether the investment by UK-owned affiliates increased in 2007 or 2008 prior to the tax reform, by replacing the DE_t variable with an interaction term between a post 2007/2008 dummy and an indicator for an UK-owned affiliate, respectively. Figure 5 summarizes the coefficient estimates of the interaction terms along with those from columns 1-2 in Table 5. None of the coefficient estimates are significantly different from zero, except the one for the DE_t variable. The results are assuring that the identified effect of the 2009 tax reform is not a simple continuation of pre-reform increase in the outbound investment of UK multinationals, and that the investment response to the 2009 tax reform is large but temporary in nature.

VII Reallocation or Increase in Total Investment?

Changes in investment by UK multinationals in the low-tax countries could represent a generic increase in investment due to reduced cost of capital and hence an increase in aggregate investment by UK multinationals. Alternatively, the observed investment increase could reflect a reallocation of investment from high-tax to low-tax countries while the aggregate

invesmtent by UK multinationals remains unchanged. This concern is particularly relevant around the time of the Great Recession, when many companies are resource constrained with limited investment capacity. To test these two competing hypothesis, I analyze investment responses in high-tax countries as well as in the UK.

A Outbound Investment Responses in High-Tax Countries

Table 6 presents the difference-in-difference estimation results based on equation (5), focusing on multinational affiliates operating in the EU-27 high-tax countries. Similar to Table 3, all regressions include a full set of subsidiary and year fixed effects. Each column follows the same specification in Table 3. Heteroscedasticity-robust standard errors clustered at the firm level.

Column 1 in Table 6 suggests that the introduction of dividend exemption has a somewhat negative effect on investment by UK-owned affiliates in high-tax countries, which could be suggestive that UK multinationals invested strategically in high-tax countries in order to utilize cross crediting to minimize their foreign tax liability. However the negative effect becomes statistically insignificant once controlling for other non-tax firm-level determinants of investment in column 2, and remains as statistically insignicant in columns 3-7 that control for additional industry, host and home country characteristics. Since introduction of the territorial system did not directly change the tax treatment of dividend repatriation in the high-tax countries, the lack of investment response in high-tax countries suggests limited shifting of overseas activities from high-tax to low-tax countries following the tax reform.

B The Effect of Dividends Exemption on Home Investment

To analyze the investment response of UK-owned multinational affiliates at home, I use a similar DD strategy with two alternative control groups: (1) non-UK multinational affiliates operating in the UK, and (2) UK affiliates that are part of a domestic company group.[17] Figure 1 panel B shows that following UK's switch to the exemption system, there was some considerable increase in the net earnings of outbound direct investment in the low-tax EU-27 countries. Egger et al. (2012) confirms with micro-level data that dividend exemption induced firms to pay out significantly more dividends and estimates that the average UK-owned affiliate paid out about US$ 2.15 million more dividends immediately after the reform than the counterfactual affiliate in the absence of the reform.

[17] I identify stand-alone firms and domestic company group with all subsidiaries in the UK from ownership information on all UK companies in FAME.

Table 7 summarizes the regression results using non-UK multinational affiliates/domestic firms as the control group in panel A and B, respectively.[18] Columns 1-4 follow the same regression specification as in Table 3, while columns 5-6 attempt to identify the presence of any anticipation effects in 2008. In Panel A, the coefficient estimate of DE_t is mostly negative and insignificant, suggesting that there is no differential investment response by UK-owned affiliates relative to foreign affiliates in non-UK MNEs. In Panel B, the coefficient estimate of DE_t is statistically insignificant across all specifications, suggesting that there is no differential investment response by UK-owned affiliates relative to affiliates in domestic company groups. Regression results in both panels provide suggestive evidence that the exemption system did not systematically affect domestic investment by UK affiliates. Conceptually, there is no reason why we would expect such investment change at home, as the tax reform did not change the user cost of capital in the UK. This finding is consistent with Dharmapala, Foley and Forbes (2011), which shows that repatriation following a 2004 tax holiday introduced by the Homeland Investment Act (HIA) did not increase domestic investment in the United States.[19] The lack of investment response at home provides further supportive evidence that increase in outbound investment in low-tax countries does not crowd out domestic investment.

C Interpretation of Economic Magnitude

In economic terms, a one-standard-deviation increase in the dividends tax differential is associated with a relative increase of approximately 6.9 percentage points in investment by UK-owned affiliates. These results are robust to controlling for other factors that influence firm investment behavior, such as free cash flow, growth opportunities, parent-level characteristics. Decrease in the dividend tax rates might be overestimated due to deferral or onshore pooling of excess credit, and if so this estimate represents a lower bound on the true impact of dividend taxation on investment. To provide a rough estimate on the extent of investment changes by UK multinationals in the low-tax countries, I group the low-tax countries in the sample according to their dividend taxes into low, medium, and high tax differential countries. Intuitively, countries with the largest tax differential are more affected

[18] The graphical evidence is presented in Figure in the Appendix.

[19] Two major differences are worth noting. First, the HIA provides U.S. multinationals with a one-time deduction of 85 percent of dividends repatriated by their foreign affiliates. In contrary, UK's dividend exemption is permanent. Second, under the HIA, the 85 percent exemption applies only to "extraordinary dividends", which are defined as dividend payments exceeding average repatriations over a five-year period ending before July 1, 2003, excluding the highest and lowest years. Thus the exemption is limited to extraordinary dividends over and above the average level of dividends remitted. The UK's exemption applies to most dividends as discussed in Section B. The exemption permitted under the new system in the UK is different in nature and more generous than the exemption under the HIA in the United States.

by the UK's switch to the territorial system. For each of the country group, I replace the actual tax differential with an interaction between the DE_t variable and the group indicator. The estimated coefficient of the interaction term captures the overall change in investment by UK multinationals after the tax reform. I then plot the estimated coefficient on the post-2009 tax differential term against the actual change in investment in Figure . The predicted investment change as a result of the tax reform is in general smaller than the actual investment change, but the two estimates lie reasonably close to the 45 degree line, suggesting the predicted investment change accounts for a large portion of actual investment changes in the low tax countries after 2009.

To gauge the quantitative impact of the 2009 tax reform on investment in low-tax countries, I use the estimated coefficient of tax differential from Table 3 3 column 7 to estimate the firm-level and country-level increase in investment. First, given that the average fixed asset across low-tax countries is around €9.9 million, the estimated investment coefficient suggests that the average UK-owned affiliate in low-tax countries increased its investment by around €0.6 million. Second, I sum all the investment increase in each country to estimate the increase in aggregate investment, which is shown in Figure 7. Ireland, Czech Republic and Poland see the largest increase in their investment as a result of the tax reform, and in aggregate the predicted investment increase is around €1.3 billion in the low-tax countries as a result of UK's switch to territoriality.

VIII Conclusion

In 2009, the United Kingdom switched from a worldwide taxation system to a territorial system which exempts all foreign-earned active income from taxation. In this paper I document robust empirical evidence that dividend exemption increased outbound investment by UK multinationals by around 15.7 percentage points in countries with a lower corporate tax rate than the UK. The observed investment increase is quick and temporary, and represents an addition in aggregate investment–there is no evidence on a concurrent decrease in investment by UK multinationals in high-tax countries or in the UK. There is considerable heterogeneous investment responses among UK multinational affiliates, which could be further uncovered by analysis at the parent and company group level.

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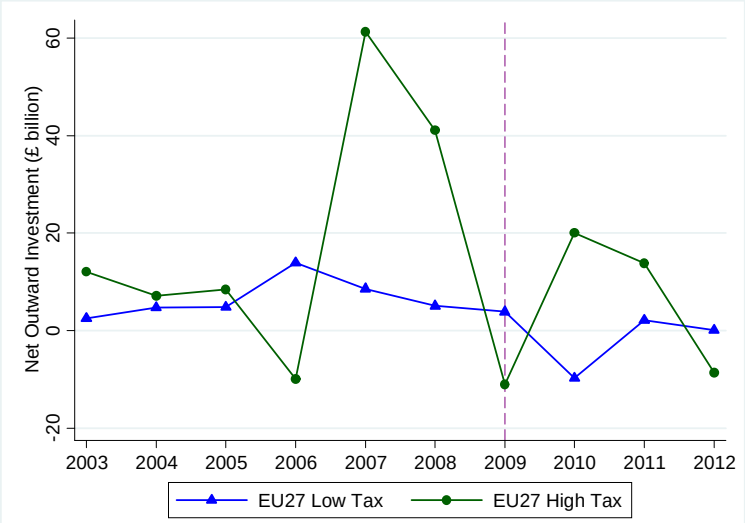
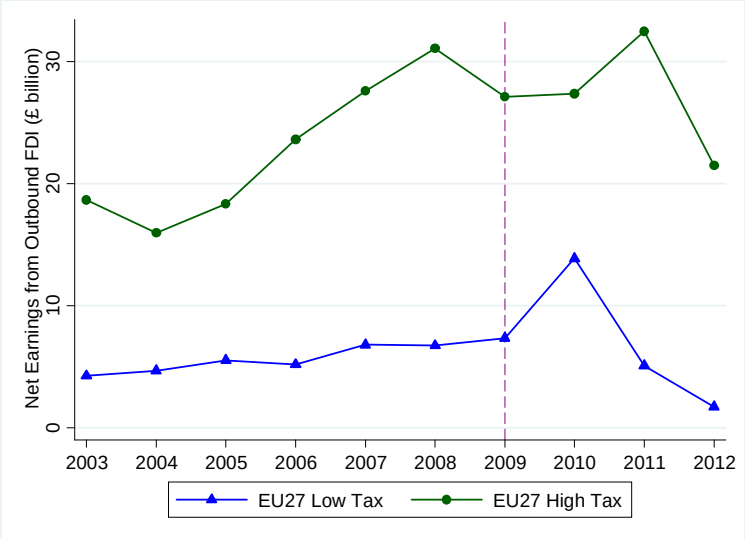
Figure 1. AGGREGATE EVIDENCE FROM EU27

A. Net UK Outbound Investment

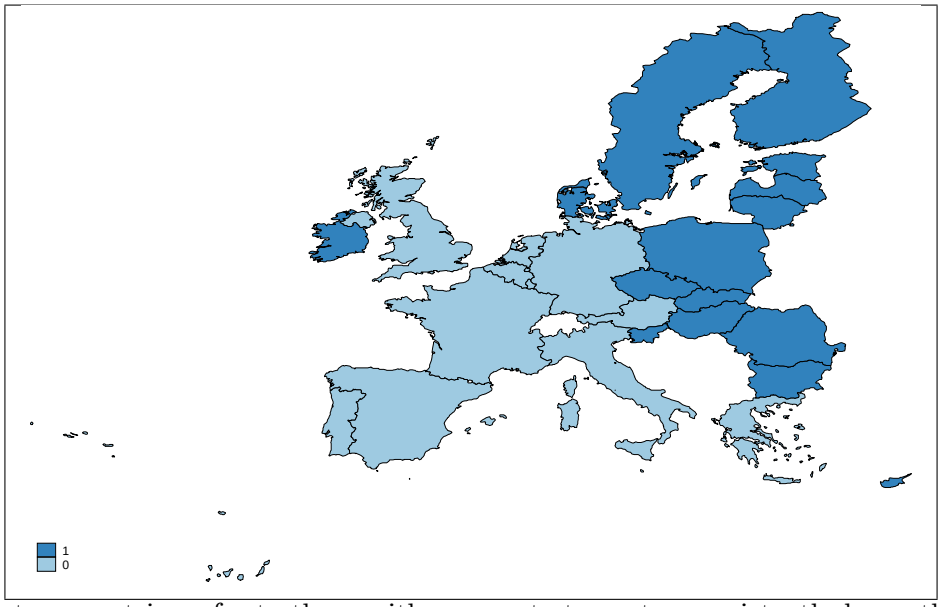


B. Net Earnings from Outbound FDI



Notes: Net foreign direct investment flows abroad by main country, 2003 to 2012. Sources: Office of National Statistics, available at http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-329603.

Figure 2. EU-27 CORPORATE TAX LEVEL

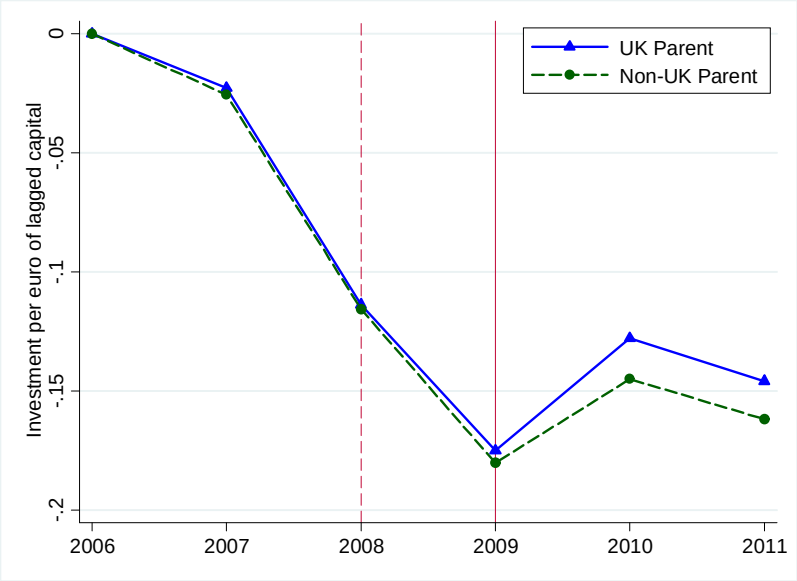


Notes: Low-tax countries refer to those with corporate tax rates consistently lower than the UK tax rate during 2005-2011. They are depicted in dark blue and include Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, Hungary, Ireland, Lithuania, Latvia, Poland, Romania, Sweden, Slovenia, and Slovakia. High-tax countries refer to the rest of EU-27 countries and are depicted in light blue. The corporate tax rates for each country are:

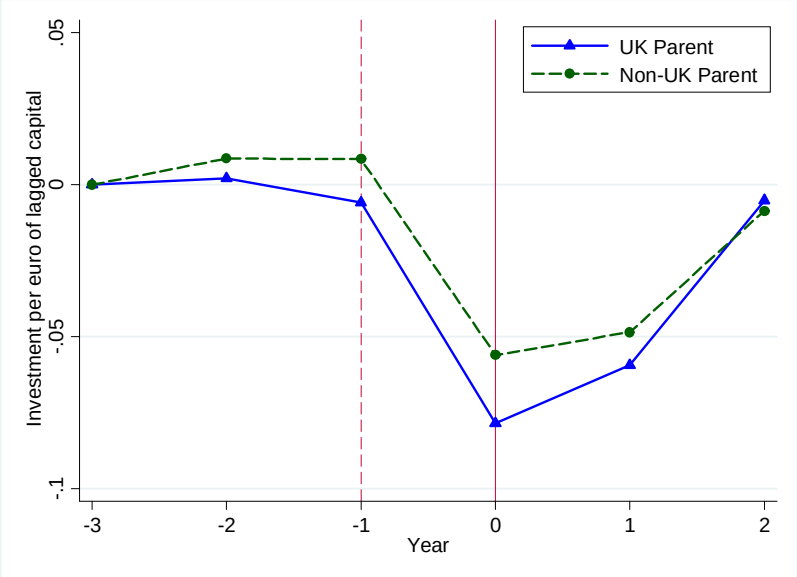
Country	2005	2011	Country	2005	2011
Low-Tax:			**UK**	30	28
Cyprus	10	10	**High-Tax:**		
Ireland	12.5	12.5	Portugal	29	29
Bulgaria	15	10	Austria	30	25
Latvia	15	15	Luxemburg	30.38	28.8
Romania	16	16	Netherlands	31.5	25
Hungary	17.52	21	Greece	32	24
Poland	19	19	Belgium	33.99	33.99
Slovakia	19	19	France	34.93	34.93
Estonia	24	21	Malta	35	35
Slovenia	25	25	Italy	37.25	31.29
Finland	26	26	Germany	39.6	30.95
Czech Republic	26	19	Spain	40.37	35.25
Denmark	28	25			
Sweden	28	25			

Figure 3. GRAPHICAL EVIDENCE

A. Gross Investment Rate in Low-Tax Countries

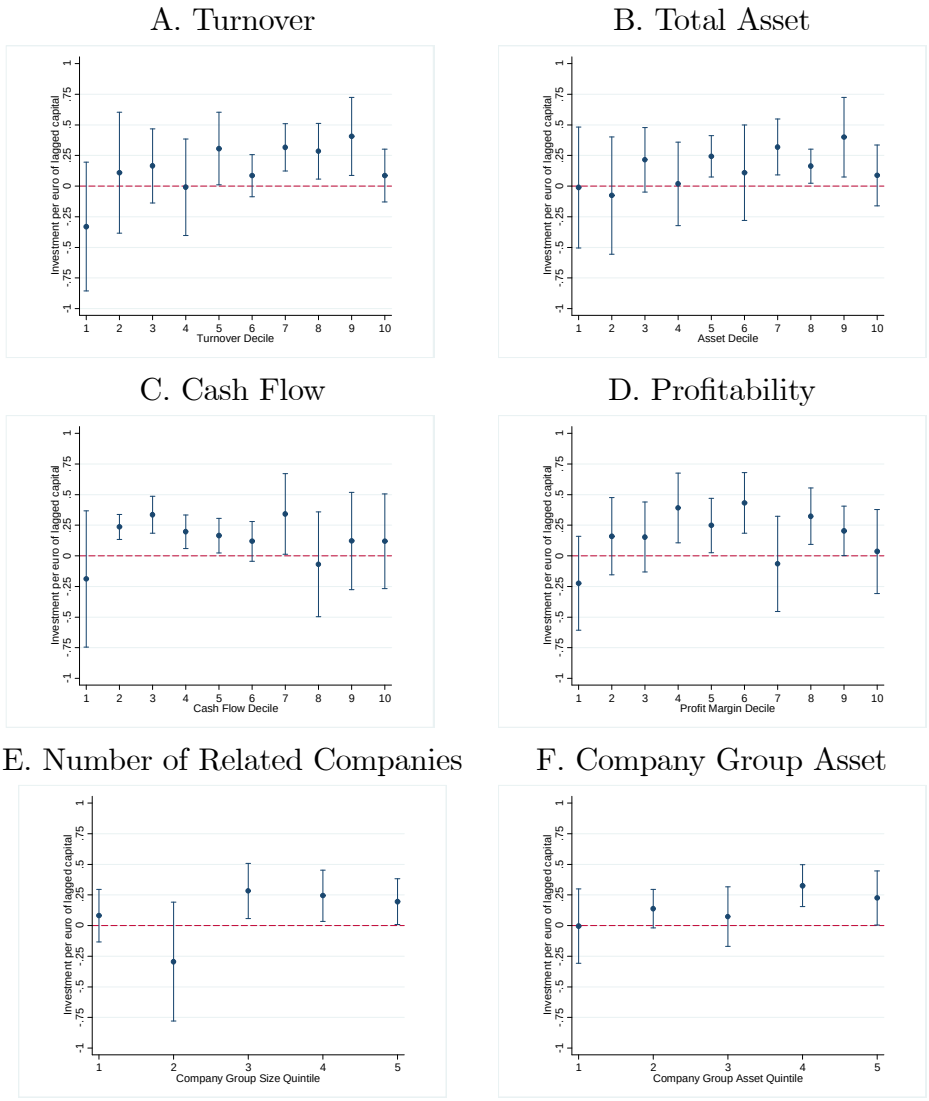


B. Gross Investment Rate in High-Tax Countries



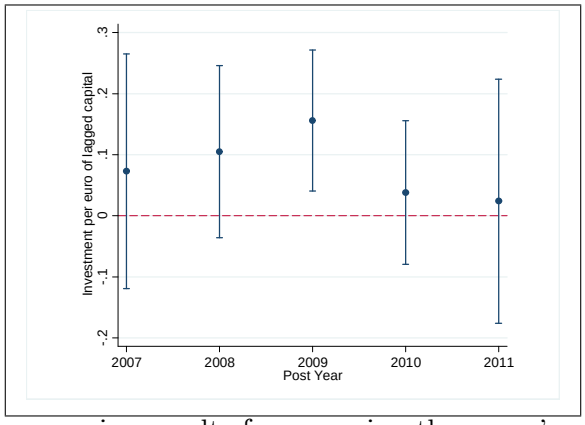
Notes: Panel A plots the median investment rate in 2006-2011 for UK affiliates and non-UK affiliates in low-tax countries. Panel B plots the median investment rate in 2006-2011 for UK affiliates and non-UK affiliates in high-tax countries. The solid vertical line depicts the year when the exemption system became effective, and the dashed vertical line depicts the year when the policy reform was announced.

Figure 4. HETEROGENEOUS INVESTMENT RESPONSES IN LOW-TAX COUNTRIES



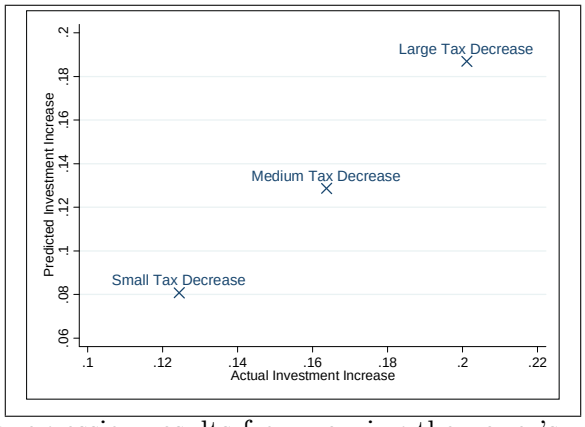
Notes: This figure reports regression results by dividing the main sample into deciles of ex ante financial constraints indicator including firm size, total asset, cash flow (as a fraction of lagged fixed asset), and profitability. The estimation equation continues to use the DD approach and includes ten interaction terms between the DE_t and each of the ten decile dummy indicators. All other variables are as previously defined. Each panels reports the ten coefficient estimates $\beta_{DE,Decile_j}$ and the corresponding 95th confidence interval.

Figure 5. INVESTMENT RESPONSES IN LOW-TAX COUNTRIES: TIMING



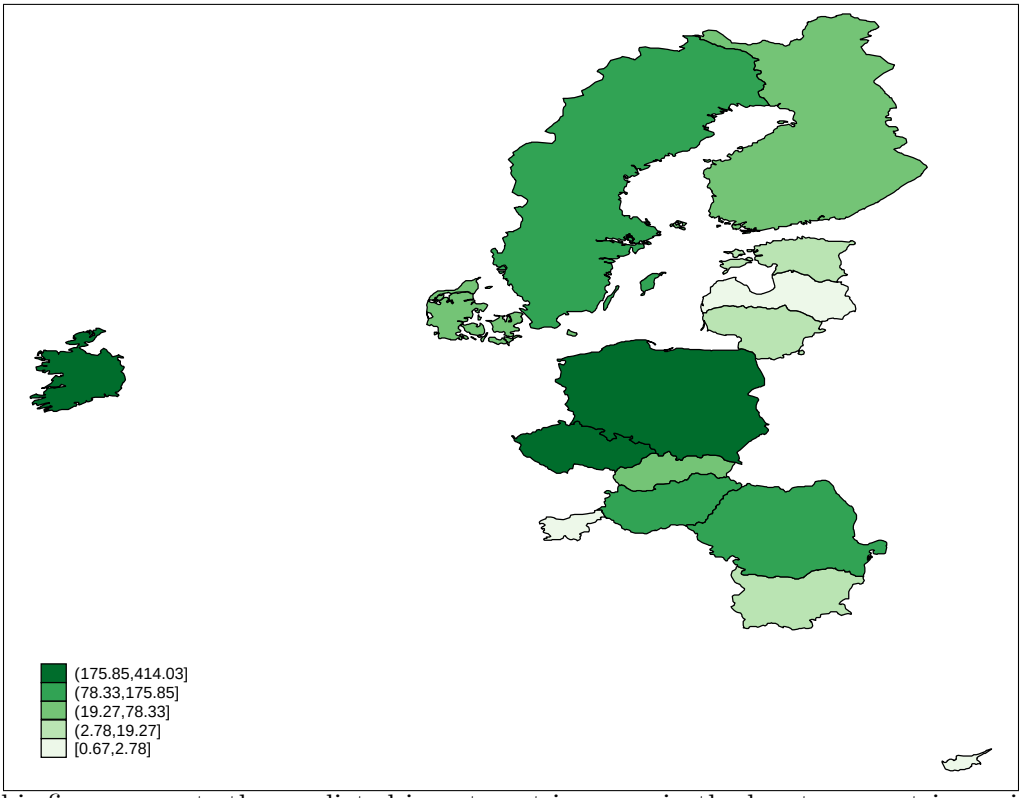
Notes: This figure reports regression results from varying the paper's main investment regression specification (underlying Table 3 column 6) in order to conduct placebo tests or to test the timing of the investment responses. For each year y between 2006 and 2011, the figure reports the coefficient estimate for the interaction term between a post year-y indicator and an indicator that takes value of 1 for UK-owned affiliates.

Figure 6. INVESTMENT RESPONSES IN LOW-TAX COUNTRIES: TIMING



Notes: This figure reports regression results from varying the paper's main investment regression specification (underlying Table 3 column 6) in order to conduct placebo tests or to test the timing of the investment responses. For each year y between 2006 and 2011, the figure reports the coefficient estimate for the interaction term between a post year-y indicator and an indicator that takes value of 1 for UK-owned affiliates.

Figure 7. PREDICTED AGGREGATE INVESTMENT INCREASES IN LOW-TAX COUNTRIES



Notes: This figure reports the predicted investment increase in the low-tax countries, using coefficient estimates in Table 3 column 7 and the actual decrease in dividend tax in each of the low-tax countries.

Table 1. COUNTRY STATISTICS

Number of Subsidiaries in	with Ultimate Parent in							
Host Country:	Total	UK	Europe	North America	Asia	Africa	South America	Oceania
Austria	3,218	128	2,527	52	117	11	7	9
Belgium	3,817	247	2,536	26	229	13	5	32
Bulgaria	1,098	35	795	21	140	6	0	2
Cyprus	15	2	6	2	0	1	0	1
Czech Republic	6,040	238	4,779	67	275	39	3	15
Germany	13,965	986	8,803	181	1,151	51	16	93
Denmark	1,183	104	790	11	46	1	0	4
Estonia	1,393	68	1,088	44	76	1	0	2
Spain	7,602	643	5,171	92	386	18	47	45
Finland	1,699	103	1,269	14	65	1	1	8
France	13,429	1,091	8,633	187	736	152	24	65
United Kingdom	41,787	24,246	7,709	592	1,566	223	25	547
Greece	1,147	83	855	10	33	17	0	9
Hungary	979	34	787	5	38	2	0	2
Ireland	1,485	294	531	27	54	3	1	15
Italy	7,367	613	4,947	81	339	22	15	55
Lithuania	635	19	535	15	21	1	0	2
Luxembourg	1,305	189	690	37	26	9	1	8
Latvia	1,043	43	802	22	99	8	0	4
Malta	67	8	46	0	3	1	0	1
Netherlands	2,453	272	1,083	34	257	12	14	18
Poland	6,820	303	5,462	36	248	11	2	22
Portugal	1,628	70	1,272	6	58	18	11	13
Romania	8,147	227	6,225	85	858	85	3	21
Sweden	1,774	125	1,301	9	59	0	1	13
Slovenia	293	10	249	1	6	2	0	2
Slovakia	1,225	25	1,037	11	31	1	2	3
Total	131,614	30,206	69,928	1,668	6,917	709	178	1,011

Notes: Countries in each row refer to the host country where the multinational affiliate locate. Countries/Regions in each column refer to the home country/region where the ultimate parent of the multinational affiliate locate.

Table 2. DESCRIPTIVE STATISTICS

Variable	Obs.	Mean	P10	Median	P90
Investment	395,771	1,273	- 41	83	2,969
Fixed Asset	590,648	15,368	6	609	17,305
Gross Investment scaled by Lagged Asset	395,771	0.21	- 4.19	0.34	0.30
Net Investment scaled by Lagged Asset	395,771	0.08	- 5.05	0.13	0.16
Firm-level controls					
Sales	634,601	52	0	6	74
Cash Flow	509,668	4,432	- 398	339	5,800
EBIT Margin	597,762	0.05	- 0.14	0.04	0.29
Sales Growth Rate	495,536	0.20	- 0.30	0.04	0.65
Country-level controls					
Population	634,601	45,361,335	8,355,260	60,182,050	64,658,856
GDP per Capita	634,601	22,811	6,911	26,638	31,000
Unemployment Rate	634,601	0.08	0.05	0.08	0.10
Corporate Tax Rate	634,601	0.28	0.19	0.30	0.36
Governance Quality Indicator	634,601	1.06	0.48	1.18	1.48
Financial Institution Stability Indicator	634,601	11.2	5.3	10.3	21.1
Parent country-level controls					
GDP growth rate (%)	624,479	1.29	- 3.82	1.80	4.01
GDP per Capita	624,708	32,828.78	23,752.86	30,963.23	43,453.36
Unemployment Rate	634,601	7.87	5.30	7.70	10.30
Governance Quality Indicator	630,949	1.20	0.67	1.25	1.64
Financial Institution Stability Indicator	625,101	13.847108	4.8564801	12.1894	25.6315

Notes: Unconsolidated values, in thousand Euros, current prices. All ratios winsorized at top and bottom 0.025 percentile. Country-level controls from the World Bank's World Development Indicators 2009. Country-level corproate tax rates collected from Oxford CBT Tax Database. CPIA transparency, accountability, and corruption in the public sector rating (1=low to 6=high). CPIA business regulatory environment rating (1=low to 6=high).

Table 3. INVESTMENT RESPONSE IN LOW-TAX COUNTRIES: BASELINE RESULTS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
DE_t	0.156***	0.112**	0.120**	0.110**	0.096*	0.157***	
	(0.059)	(0.051)	(0.051)	(0.051)	(0.052)	(0.057)	
$DE_t \times (\tau_{UK} - \tau_j)$							1.595***
							(0.578)
Year FEs	x	x	x	x	x	x	x
Affiliate FEs	x	x	x	x	x	x	x
Affiliate-Level Controls		x	x	x	x	x	x
Industry-Year Fes			x	x	x	x	x
Host Country-Level Controls				x	x	x	x
Parent Country-Level Controls					x	x	x
Host Country-Year FEs						x	x
N	102,901	74,416	74,416	74,416	74,416	73,014	73,014
Clusters (firms)	26,808	23,541	23,541	23,541	23,541	23,075	23,075
R^2	0.014	0.008	0.009	0.01	0.013	0.013	0.013

This table reports difference-in-differences estimates of the effect of the 2009 dividends exemption on investment by UK affiliates in EU-27 countries which tax corporate profit at a lower rate than the UK. All columns display the coefficient on the DE_t variable, which is the interaction between a UK affiliate indicator and an indicator for the year being 2009 onwards, from a regression of investment on this interaction, affiliate fixed effects, year fixed effects and additional controls. Investment is gross investment scaled by book value of fixed capital asset in (end of) previous year. Affilate-Level controls indicates that the regression includes lagged turnover, cash flow scaled by lagged asset, lagged profit margin, and firm age. All firm-level ratio variables are winsorized at top and bottom 0.01th percentile to remove the influence of outliers. "Host Country-Level controls" indicates that the regression includes statutory corporate tax rate, GDP per capita, population size, unemployment rate, and indicators of governance quality and financial institution stability in the host country. "Host Country-Year FEs" indicates that the regression includes two-way host country and year fixed effects. "Parent Country-Level controls" indicates that the regression includes GDP growth rate and GDP per capital, and indicators of governance quality and financial institution stabilit in the home country where the ultimate parent company is located. Heteroskedasticity-robust standard errors are clustered at firm level. ***, **, * denotes significance at 1%, 5% and 10% level, respectively.

Table 4. INVESTMENT RESPONSE IN LOW-TAX COUNTRIES: ROBUSTNESS CHECKS

A. Investment						
Dependent variable:	Investment (£per lagged capital)					
Dep. Var. winsorized at:	P99					P97.5
Panel:	Unbalanced			Balanced	Matched	Unbalanced
	(1)	(2)	(3)	(4)	(5)	(6)
DE_t	0.157***	0.157***	0.157***	0.147**	0.183*	0.069*
	(0.050)	(0.057)	(0.057)	(0.059)	(0.094)	(0.035)
N	73,014	73,014	73,014	53,641	6,457	73,014
Clusters (firms)		23,075	23,075	14,039	2,021	23,075
Clusters (country pairs)	548					
R^2	0.013	0.013	0.013	0.016	0.021	0.025

B. Net Investment and Other Outcome Variables						
Dependent variable:	Net Investment (£per lagged capital)		Compensation (£per lagged capital)	Employment	Productivity (Wage per turnover)	Profitability (EBIT per turnover)
Dep. Var. winsorized at:	P99	P97.5	P99	P99	P99	P99
	(1)	(2)	(3)	(4)	(5)	(6)
DE_t	0.141***	0.058**	15.338*	2.829	-10.687	0.007
	(0.047)	(0.029)	(8.373)	(7.130)	(21.568)	(0.017)
N	73,689	73,689	84,307	89,736	87,737	102,000
Clusters (firms)	23,286	23,286	23,379	24,842	24,204	26,595
R^2	0.017	0.032	0.04	0.001	0.003	0.001

Table 5. SEPARATING THE ANTICIPATION EFFECT

Notes: This table reports difference-in-differences estimates of the effect of the 2009 dividends exemption on UK outbound investment. Column 1-3 report results in countries which tax corporate profit at a lower rate than the UK, and Column 4-6 report results in countries which tax corporate profit at a higher rate than the UK. All columns display the coefficient on the interaction between a UK affiliate indicator and an indicator for the year 2008 when the reform was announced. Column 1-2 and 4-5 display the coefficient on the DE variable, which is the interaction between a UK affiliate indicator and an indicator for the year being 2009 onwards. Column 3 and 6 display the coefficients on the interaction terms between a UK affiliate indicator and a year indicator for 2009, 2010, and 2011, respectively.

A Appendix Figures

Table 6. INVESTMENT RESPONSE IN HIGH-TAX COUNTRIES

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
DE_t	-0.071*	-0.025	-0.010	-0.010	-0.009	-0.010	
	(0.040)	(0.040)	(0.040)	(0.040)	(0.040)	(0.044)	
Tax Differenial $\times$ DE_t							-0.304
							(0.751)
Year FEs	x	x	x	x	x	x	x
Affiliate FEs	x	x	x	x	x	x	x
Affiliate-Level Controls		x	x	x	x	x	x
Industry-Year Fes			x	x	x	x	x
Host Country-Level Controls				x	x	x	x
Parent Country-Level Controls					x	x	x
Host Country-Year FEs						x	x
N	176,678	130,341	130,341	130,341	130,341	128,330	128,330
Clusters (firms)	42,666	37,550	37,550	37,550	37,550	36,948	36,948
R^2	0.004	0.005	0.006	0.006	0.006	0.007	0.007

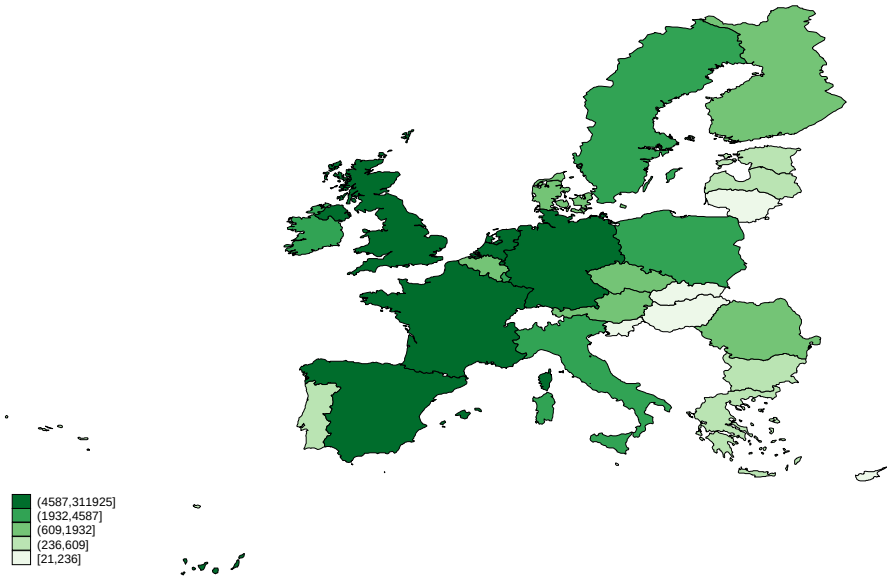
Notes: This table reports difference-in-differences estimates of the effect of the 2009 dividends exemption on investment by UK affiliates in EU-27 countries which tax corporate profit at a higher rate than the UK. All columns display the coefficient on the DE_t variable, which is the interaction between a UK affiliate indicator and an indicator for the year being 2009 onwards, from a regression of investment rate on this interaction, affiliate fixed effects, year fixed effects and additional controls. Investment rate is gross investment scaled by book value of fixed capital asset in (end of) previous year. Affilate-Level controls indicates that the regression includes lagged turnover, cash flow scaled by lagged asset, lagged profit margin, and firm age. All firm-level ratio variables are winsorized at top and bottom 0.25th percentile to remove the influence of outliers. "Host Country-Level contro" indicates that the regression includes statutory corporate tax rate, GDP per capita, population size, and unemployment rate at the host country level. "Host Country-Year FEs" indicates that the regression includes two-way host country and year fixed effects. "Parent Country-Level controls" indicates that the regression includes GDP growth rate and GDP per capital at the parent country level. Heteroskedasticity-robust standard errors are clustered at country level. ***, **, * denotes significance at 1%, 5% and 10% level, respectively.

Table 7. INVESTMENT RESPONSE IN THE UK

	(1)	(2)	(3)	(4)	(5)	(6)
A. Control Grou:	Non-UK MNE Affliates					
DE_t	-0.059	-0.038	-0.023	-0.017	-0.020	0.037
	(0.040)	(0.043)	(0.043)	(0.054)	(0.076)	(0.083)
$Year_{2008}$ * UK Parent					-0.003	-0.006
					(0.074)	(0.074)
$Post_{2010}$ * UK Parent						-0.109*
						(0.065)
$Post_{2011}$ * UK Parent						0.006
						(0.086)
N	68,679	51,474	51,474	49,863	49,863	49,863
Clusters (firms)	16,535	14,702	14,702	14,208	14,208	14,208
R^2	0.003	0.006	0.007	0.008	0.008	0.008
B. Control Group:	UK Domestic Group Affiliates					
DE_t	-0.029	0.004	-0.000	-0.000	0.010	0.058
	(0.043)	(0.046)	(0.048)	(0.048)	(0.063)	(0.073)
$Year_{2008}$ * UK Parent					0.019	0.019
					(0.072)	(0.072)
$Post_{2010}$ * UK Parent						-0.096
						(0.068)
$Post_{2011}$ * UK Parent						0.042
						(0.083)
N	38,253	27,875	27,875	27,875	27,875	27,875
Clusters (firms)	9,841	8,358	8,358	8,358	8,358	8,358
R^2	0.004	0.007	0.009	0.009	0.009	0.009

Notes: This table reports difference-in-differences estimates of the effect of the 2009 dividends exemption on investment by UK affiliates in the UK. All columns display the coefficient on the DE_t variable, which is the interaction between a UK affiliate indicator and an indicator for the year being 2009 onwards, from a regression of investment rate on this interaction, affiliate fixed effects, year fixed effects and additional controls. Panel A reports results using Non-UK multinational affiliates that operate in the UK as a control group. Panel B reports results using stand-alone firms and firms in domestic groups in the UK as a control group. All variables are defined as in Table 3. Heteroskedasticity-robust standard errors are clustered at firm level. ***, **, * denotes significance at 1%, 5% and 10% level, respectively.

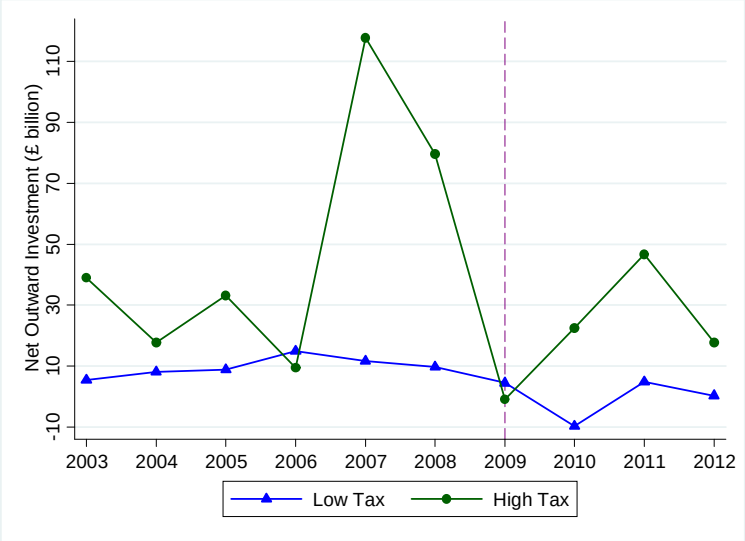
Figure A.1. SPATIAL DISTRIBUTION OF UK SUBSIDIARIES



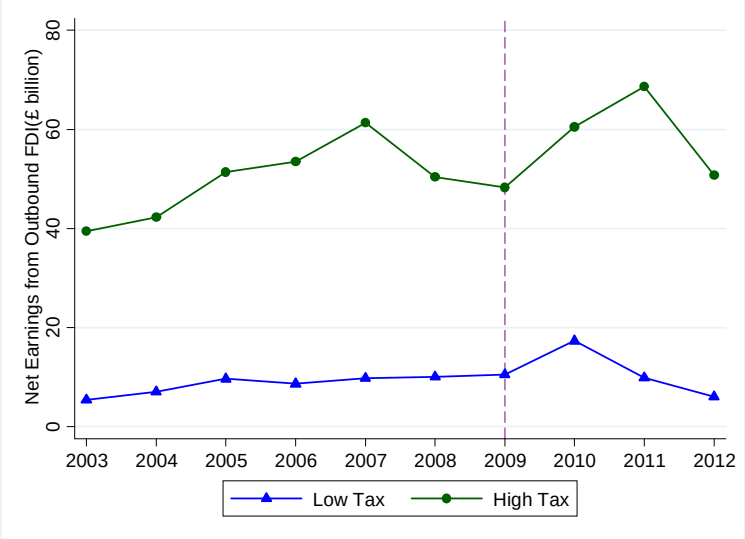
Notes: This figure shows the distribution of UK-owned affiliates in the EU-27 countries. Numbers in the square brackets refer to the five quantiles of the sample distribution.

Figure A.2. AGGREGATE EVIDENCE FROM MAJOR TRADING PARTNERS

Panel A. Net UK Outbound Investment



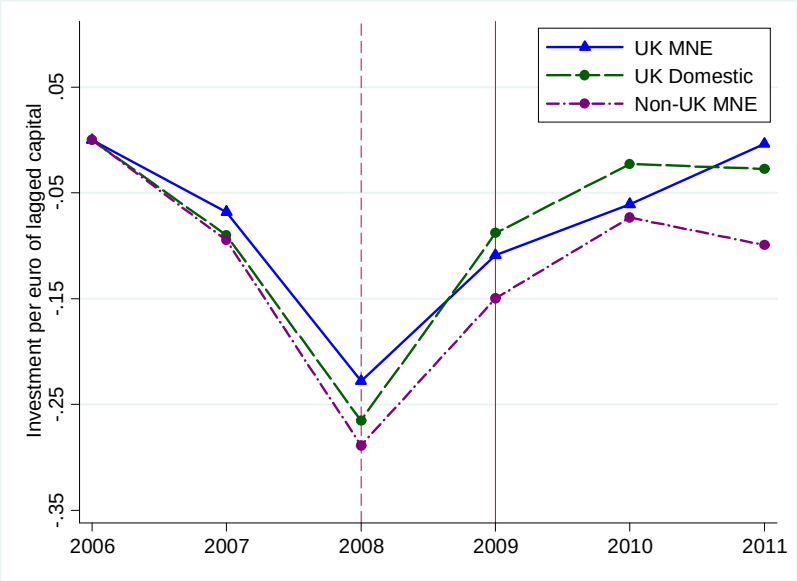
Panel B. Net Earnings from Outbound FDI



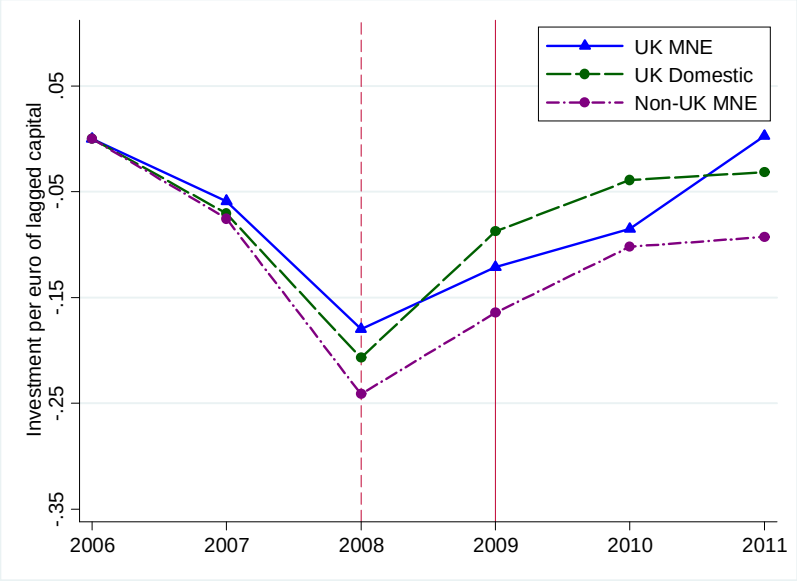
Notes: Net foreign direct investment flows abroad by main country, 2003 to 2012. Sources: Office of National Statistics, available at http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcmfor 42 out of 53 main countries which attract UK outbound investment.

Figure A.3. GRAPHICAL EVIDENCE ON INVESTMENT IN THE UK

A. Gross Investment Rate



B. Net Investment Rate



Notes: The figure plots the average gross investment rate in 2006-2011 for UK MNE affiliates, UK affiliates of domestic company group, and non-UK MNE affiliates in the UK. The solid vertical line depicts the year when the exemption system became effective, and the dashed vertical line depicts the year when the policy reform was announced.

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