

The Effects of the Taxation of Dividends on the Allocation of Foreign Portfolio Investment around the World

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Abstract

We use a new bilateral international tax database to investigate the association between foreign equity portfolio holdings and dividend tax policies around the world. We find evidence that relatively favorable tax policies on dividend income earned by foreign investors are associated with larger foreign equity portfolio holdings. This effect is stronger for countries that have higher dividend payouts. We also find that investors allocate less of their foreign equity portfolios to countries with imputation systems that do not extend the benefits of imputation to foreign investors. This result is consistent with the European Court of Justice's recent rulings that imputation systems discriminate against foreign investors. The results are robust to a series of tests including controls for alternative explanations such as agency conflicts.

Do investors consider the taxation of dividends when determining the location of their investments in their foreign equity portfolios? Prior research addressing the effects of tax policies on the location of foreign equity investment focuses on foreign direct investment (FDI), which is defined as an investment large enough to provide some control over the entity.¹ This historical focus on FDI is understandable given the small percentage of foreign portfolio investment (FPI) that comprised total foreign equity investment in the past. However, as the world's capital markets become more integrated and countries fight to attract capital to their securities markets, tax policies become a mechanism by which countries' create incentives and barriers to this growing type of foreign capital.² In this paper, we use a novel bilateral tax dataset to examine the extent to which foreign (source) and home (residence) countries' tax policies on dividend income affect FPI.

Understanding how tax policies affect FPI is important because previous research argues that FPI affects factors that improve the recipient (source) country's economic growth.³ One of these factors is the development of the recipient country's capital market. A stronger capital market improves economic growth by creating more market liquidity and efficiency and a better allocation of resources. Foreign portfolio investors contribute to a stronger capital market by demanding more transparency, regulatory protection and governance as ways to mitigate the information asymmetries surrounding the source country's capital market. In addition, foreign investors bring innovations in institutions, services, securities and technology that further develop a source country's capital market. Finally, the participation of foreign investors may also strengthen the source country's capital market by encouraging its domestic investors to have

¹ See Cummins and Hubbard (1995) for an example of empirical research on the effects of taxation on FDI. Morisset and Pirnia (2002) provide a review of research investigating the effect of taxes on FDI. Auerbach (2005) reviews the incidence of corporate tax, including some international issues.

² Graetz and Grinberg (2003) and Dharmapala (2009) discuss issues surrounding the taxation of international portfolio income and report that U.S. outbound foreign portfolio investment grew 21.1% annually from 1986–2001. In most years since 1990, the market value of U.S. FPI has been larger than U.S. FDI.

³ See Errunza (2001) for an insightful review. More recent research by Ferreira and Matos (2008) provides evidence that a 10% increase in foreign institutional ownership is associated with 3% increase in firm valuation relative to the average firm.

more confidence and participation in their local capital market.⁴ Another factor potentially affected by FPI that improves the recipient country's economic growth is a lower cost of capital. Not only will lower information asymmetries from a stronger capital market decrease the recipient country's cost of capital, but some argue that opening a country's capital market to FPI will lead to a lower cost of capital if benefits to diversification exist.

More recently the potential costs of FPI to recipient countries' economies have become more conspicuous. The perceived costs of FPI evolve from concerns over a decrease in the stability of the local capital markets. Those concerned about FPI suggest that instability may arise for three related reasons: stronger co-movements between markets, contagious bear markets, and less persistent foreign investment flows. While constituents worry that FPI can exit more quickly and exacerbate the effects of a crisis, consistent evidence supporting an association between FPI and market instability is not yet evident (Karolyi and Stultz (2002), Karolyi (2003)).⁵

Regulatory bodies, such as the European Court of Justice (ECJ), should also have an interest in the effect of tax policies on FPI. Over the last five years, the ECJ has enforced nondiscriminatory tax systems for dividend income within the European Union (EU) through several decisions that rule imputation tax credits issued by member countries are incompatible with the EU treaty.⁶ These rulings assume that FPI is sensitive to member countries' tax policies on dividends with little empirical evidence to support the claim. While the EU is dealing with tax inequities on dividend income from FPI, the reforms proposed in the U.S. on international tax policy largely ignore the growing importance of FPI as a source of global capital. Instead, the policies still focus on issues relevant to FDI such as 1) territorial versus worldwide tax systems, 2) the repeal of deferral and 3) abuses with cross-crediting and transfer pricing.⁷ However as the global capital markets continue to integrate, U.S. policymakers will need to pay more attention to the effect of taxes on FPI (Graetz and Grinberg (2003), Desai and Dharmapala, (2009a, 2009c)).⁸

While the literature on FDI is extensive and suggests that tax policies do matter in the allocation decision, it is not clear that these results extend to FPI. First, Desai and Dharmapala (2009b) provide evidence that national tax policies, specifically foreign corporate tax rates, affect the location of U.S. FDI and U.S. FPI differently. Second, the decision maker is fundamentally different for the two sources of foreign capital. The decision on where to allocate FDI is made by a company's management team while the same decision for FPI is most likely made by individuals or their investment advisors. These decision makers face different nontax factors that could limit the influence of tax policies on their international asset allocation decision. Lastly, FPI may be more sensitive to national tax policies than FDI because foreign portfolio investors'

⁴ See Evans (2002) for a discussion of the benefits of FPI.

⁵ For example, leaders in the European Union proposed a tax on short-term financial transactions (i.e. Tobin tax) in 2008 after the current financial crisis.

⁶ See Graetz and Warren (2007) for a thorough discussion of the rulings of the ECJ related to dividend taxation.

⁷ For example, both the 2010 and 2011 budgets proposed by the Obama administration include international tax reforms related to FDI.

⁸ While understanding the effect of capital gains tax policies on FPI could also be interesting, we focus on dividend tax policies in this study because there is more variation in bilateral tax policies affecting dividends. Most countries do not tax capital gains earned by foreign investors, so there is little variation across source countries. The investors in FPI, who are residents of countries with worldwide taxation (our entire sample), will also see no variation in the capital gains tax policies imposed by the residence country. For an investor, capital gains from every foreign equity portfolio investment will be subject to the same capital gains tax rate of the residence country. As a result, an investor pays the same capital gains tax to the source country (i.e. zero) and to residence country (i.e. capital gains rate) on her foreign investments no matter in what foreign country she invests.

have smaller, more liquid investments. The smaller positions allow foreign investors to react faster to significant events as well as prevent them from negating national tax policies by negotiating customized tax incentives with foreign governments common with FDI.

There are several reasons why national tax policies on dividend income may not affect FPI. One reason tax policies may not matter is that portfolio investors can potentially structure their investments to avoid taxes through derivatives and tax shelters.⁹ Secondly, a foreign country's non-tax characteristics may outweigh the effects of its tax policies. Thirdly, a home country's tax policies may leave its residents indifferent to the foreign portfolio allocation decision (French and Poterba (1991)). A fourth possible reason is that capital appreciation is the source of return for foreign investors making capital gains the relevant tax rate. Finally, if equity prices capitalize foreign investors' dividend taxes such that the after-tax returns are equivalent then the foreign investors would be indifferent. Thus, the question of whether national tax policies affect the allocation of FPI is an empirical one.

Our research on the relation between countries' FPI and tax policies is related to several streams of literature that investigate foreign ownership of firms. First, Dahlquist and Robertsson (2001) examine the firm characteristics associated with the foreign ownership of Swedish firms while Ferreira and Matos (2008) examine the firm and country characteristics associated with the foreign institutional ownership of a more global sample. Because both studies examine total foreign ownership, they cannot examine the effect of national tax policies, which are bilateral, on foreign investors. Our study is most closely related to Chan et al. (2005), which also exploit an international bilateral sample.¹⁰ Their firm-level analysis uses mutual fund holdings to examine the effect of firm and country characteristics, including default withholding tax rates, on home and foreign bias. Our country-level analysis uses all foreign portfolio investment to examine the effect of actual withholding rates established by treaties and other relevant tax policies on FPI while controlling for country characteristics.

We add to this literature by focusing on the relation between national tax policies and FPI while controlling for other national factors shown to be associated with FPI. Some studies that examine various measures of FPI control for national tax policies by including countries' withholding tax rates on dividend income, but this control does not capture the effect of an investor's domestic tax policy on the choice between domestic and foreign investments, the effect of the an investor's domestic tax policy on foreign income or the effect of a foreign country's integration of corporate and shareholder taxes (i.e. imputation systems).

The second related strand of literature focuses on examining firms' payout policies as a function of agency costs, signaling and taxes in an international setting. While our purpose is not to explain firms' payout decision, we control for country-level dividend payout because research (Ferreira et al. 2010) finds a firm's foreign ownership is associated with its payout policy.¹¹ We also control for country level agency conflicts as an alternative explanation (La Porta et al. 2000)

⁹ See Staff Report of Permanent Subcommittee on Investigations (2008) for report on the ways investors dodge dividend income.

¹⁰ Chan et al. 2005 examine home bias and foreign bias. Home bias reflects the preference to invest domestically instead of abroad. Foreign bias addresses overweighting or underweighting foreign investments. We examine foreign bias in this study.

¹¹ Substantial literature exists on the association between payout policy and taxes using domestic research settings. However, the research using international settings either does not address national tax policies (Denis and Osobov 2008; Brockman and Unlu 2009) or studies tax policies relevant to domestic owners, not foreign owners (La Porta et al. 2000, Dahlquist et al 2009, Bartram et al. 2010, Ferreira et al. 2010). To our knowledge there is no evidence of the relation between national tax policies that affect *foreign* owners and firms' payout policies in an international

To examine if foreign and home countries' tax policies on dividend income affect FPI, we gather a comprehensive database of tax characteristics that could affect the after-tax dividends investors receive from equity investments in home and foreign countries.¹² These factors include tax rates on corporate and dividend income, withholding tax rates on dividend income, and systems used to tax corporate and foreign income. We combine the worldwide tax information with the FPI holdings data provided by the Coordinated Portfolio Investment Survey (CPIS) of the International Monetary Fund (IMF) and control variables from various sources.

We find consistent evidence that as the after-tax dividend received from \$1 of foreign corporate earnings increases, the larger the foreign portfolio investment in the country. We also find that this result is stronger for foreign countries with higher dividend payout ratios. When we examine imputations systems, we find evidence that investors allocate less of their foreign portfolio investments to countries that use dividend imputation systems that do not extend to foreign investors. This evidence supports claims by the ECJ that imputations systems used by many countries discriminate against foreign investors. These results are robust to a variety of sensitivity tests examining different subsamples and empirical specifications, including instrumental variables. Overall, we interpret our results as evidence that investors consider the taxation of dividends when constructing their foreign equity portfolios.

Desai and Dharmapala (2009a, 2009b) begin to address the effects of taxes on FPI by examining the effects of U.S. dividend tax rates and foreign corporate tax rates, respectively, on outbound U.S. FPI.¹³ We build on this prior research, which focuses on U.S. FPI, and examine FPI across countries. As noted by Bekaert and Wang (2009), empirical evidence based solely on U.S. FPI limits the ability to make inferences about the effects of home country characteristics and their interaction with foreign country characteristics. The evidence they provide suggests that prior results based on U.S. FPI do not generalize to an international setting. By extending beyond U.S. FPI, this paper incorporates the effect of home and foreign countries' tax policies for dividend income on a foreign investor's portfolio choice.

The paper proceeds as follows: Section I discusses the taxation of domestic and foreign dividends and our research design. Section II defines the sample and variables, while section III presents the results and sensitivity tests. We conclude in section IV.

1. The Taxation of Dividends from Foreign Equity Portfolio Investments

When deciding on whether and where to make foreign equity investments, there are many tax factors such as the residence (home) and source (foreign) countries' tax systems for corporate income, the residence country's tax system for foreign income, and the residence and source countries' tax rates on corporate and dividend income that have the potential to affect after-tax

setting. However, we still control for country-level dividend payout because research finds an association between firms' payout policies and foreign institutional investors.

¹² The data was compiled by researchers at the International Bureau of Fiscal Documentation (IBFD), a leading provider of cross-border tax expertise, and then verified by the authors.

¹³ Desai and Dharmapala (2009a) examine the effect of a change in the U.S. tax rate on foreign dividends from U.S. outbound foreign portfolio investment, which Congress enacted in the Job and Growth Tax Relief Reconciliation Act of 2003. Desai and Dharmapala (2009b) examine the effect of foreign countries' investor protections and corporate tax rates on U.S. outbound foreign portfolio investment. Chan, Covrig and Ng (2005) also control for the average source countries' default withholding tax rate on dividend income when examining home and foreign bias in mutual funds' portfolio investments.

returns to the investment decision. While research has examined many of these factors extensively in the context of FDI (Morisset and Pirnia 2002), national tax policies and the type of investors differ for FPI and FDI. Countries' definitions for FPI and FDI for tax purposes are similar to The IMF (*Balance of Payments Manual*, 1993), which defines foreign equity investment as FPI (FDI) if investments comprise less than (more than) 10% of the controlling rights. As a result, research on FDI assumes the investor is a corporation.¹⁴ While corporations can obviously hold less than 10% of a foreign corporation's controlling rights, throughout the remainder of the study, we assume the investor in FPI is an individual as opposed to a corporation.¹⁵

1.1 Residence country taxation on domestic investments

When deciding where to allocate an equity portfolio, an investor should consider the after-tax, risk-adjusted expected returns across countries including his country of residence. Therefore, countries' tax policies on dividend income paid by domestic corporations to domestic investors could affect the decision of whether to invest abroad. Variation in these tax policies across countries arises from difference in rates and the level of *economic* double taxation (i.e. the integration of corporate and shareholder taxes through imputation systems). Appendix B provides more discussion of *economic* double taxation of corporate income. We incorporate the various tax systems on corporate income paid through dividends to domestic investors in Equation (1).¹⁶ Equation (1) provides the after-tax dividend from \$1 of pretax corporate earnings paid to the corporation's domestic investors under these various systems.

$$(1 - t_{cr}) * \left(1 + \frac{t_{ir}}{(1-t_{ir})}\right) (1 - t_{pr}) \quad (1)$$

where

t_{cr} = the tax rate on corporate income earned in the investor's residence country.

t_{pr} = the tax rate on dividend income paid by the resident (domestic investor).

t_{ir} = the imputation rate on dividend income paid to the resident. If there is no imputation system in the residence country then $t_{ir} = 0$.

1.2 Residence and source country taxation on foreign investments

The relief from *economic* double taxation on dividends from domestic corporations that countries provide their residents (domestic investors) through imputation systems usually does not extend to cross-border portfolio investments. Therefore, the extent of economic double taxation on corporate dividend income can differ for (1) residents and non-residents (foreign

¹⁴ On average, corporations likely prefer FDI over FPI because they receive more relief from double tax consequences through FDI. The relief comes from indirect tax credits from residence countries and lower withholding rates from source countries. These types of relief are available to investors provided that they have substantial ownership, which is similar to the definition of FDI.

¹⁵ There is no difference in the taxation of dividends for individual investors, who hold foreign equity directly or indirectly through investment funds (e.g., mutual funds), if the source and residence countries treat investment funds as pass-through entities. While not every country treats investment funds as pass-through entities, leading to measurement error in one of our variables of interest, we do not expect the measurement error to bias in favor of results. Sensitivity tests confirm this expectation.

¹⁶ Most countries use some form of a classical or an imputation system. They may modify a classical system with lower tax rates on dividends than interest or modify an imputation system by providing credits for only a portion of the corporate tax. Other examples of possible tax systems include partial inclusion and split-rate systems. The OECD provides data to compute Equation (1) for a variety of countries.

investors) in the same domestic corporation and (2) residents holding domestic and foreign corporations. Appendix B provides more discussion of these differences leading to Equation (2) which provides the after *corporate* tax dividend income paid to foreign investors. Similar to Equation (1), Equation (2) allows for the variation in methods of relief from economic double taxation that source countries (i.e. countries where the corporation located) provide foreign investors.

$$(1 - t_{cs}) * \left(1 + \frac{t_{is}}{(1-t_{is})}\right) \quad (2)$$

t_{cs} = the source country's tax rate on corporate income earned in the source country.¹⁷

t_{is} = the imputation rate on dividend income paid to non-residents (foreign investors). If the source country does not have an imputation system or its imputation system is not extended to non-residents, then $t_{is} = 0$.

Equation (2) only addresses variation in corporate and shareholder integration because of variation in economic double taxation across countries. However, dividends from FPI can also be subject to two layers of *shareholder* taxes when a country taxes the worldwide income of its residents: 1) withholding taxes paid to the country of the corporation (i.e. source country) and 2) income taxes paid to the residence country of the foreign investor. This type of double taxation is *international juridical*: The source and residence countries tax the same investor on the same income. The investor's country of residence provides relief from international juridical double taxation in different ways (i.e., tax credit, deduction, or no relief), which result in different representations of the after-tax dividend from \$1 of pretax corporate earnings from FPI. To capture these differences, we adjust Equation (2). Equations (3a), (3b), and (3c) provide the dividend received after corporate- and shareholder-level taxes are paid on \$1 of pretax corporate earnings paid from a source country and received by investors living in residence countries with credits (3a), deductions (3b), and no relief (3c) for foreign taxes paid.¹⁸

$$(1 - t_{cs}) * \left(1 + \frac{t_{is}}{(1-t_{is})}\right) (1 - t_f) \quad (3a)$$

$$(1 - t_{cs}) * \left(1 + \frac{t_{is}}{(1-t_{is})}\right) (1 - t_f)(1 - t_{pr}) \quad (3b)$$

$$(1 - t_{cs}) * \left(1 + \frac{t_{is}}{(1-t_{is})}\right) (1 - t_f - t_{pr}) \quad (3c)$$

¹⁷ Equations (1) and (2) represent the cash dividend after paying corporate taxes to the country in which the income is incorporated. We include corporate tax rates in the equations for several reasons. First, source country corporate tax rates may not be fully capitalized into prices because market frictions prevent prices from completely adjusting. Second, it is not clear how to separate corporate taxation from shareholder dividend taxation for countries with imputation systems. Finally, Gordon (1986), which concludes national corporate taxes are capitalized into equity prices in an open economy, assumes a world of certainty where firms across countries have the same technology and capital and output are mobile. Gordon and Varian (1989) investigate the effect of tax policy on prices using an after-tax CAPM model and arrive at different conclusions. Even if national corporate taxes are capitalized into prices, including $(1-t_c)$ in *ATRATIO* will bias against concluding favorable tax policies on dividends are associated with more FPI.

¹⁸ The latest empirical and theoretical analyses in Bond, Devereaux and Klemm (2007) and Desai and Dharmapala (2009a, 2009c) suggest that an after-tax CAPM pricing model in an open economy leads to the global average of shareholder tax burdens weighted by wealth endowments, and not the marginal investor's tax burden, affecting equity prices. The models imply that national tax policies have little effect on equity prices in an open economy, but can have substantial influence on the portfolio allocation decisions. The positive relation between FPI and *ATRATIO* discussed above assumes that the global average of shareholder tax burdens or no shareholder tax burden is capitalized into price.

where

t_f = the tax rate on dividend income paid by the non-resident investor.

When the residence country has a tax system with (1) no relief, (2) foreign tax deductions, or (3) foreign tax credits and the investor is in an excess credit situation, then t_f is the source country's withholding rate on dividends. When the residence country has a tax system with foreign tax credits and the investor is in an excess limit situation, then t_f is the residence country's tax rate on dividends (t_{pr}).¹⁹

1.3 The relation between the FPI and the after-tax dividend from \$1 of pre-tax corporate earnings

As posited above, a mix of factors relating to the taxation of dividends from source and residence countries across time could affect FPI. Therefore, we use a measure that combines these factors: *ATRATIO*. *ATRATIO* is the after-tax, foreign-source dividend an investor receives relative to the after-tax, domestic-source dividend. As noted above in Equations (3a) – (3c), the after-tax dividend from a foreign country differs depending on tax system for foreign source income of the residence country. As a result, we define *ATRATIO* as Equation (3a), (3b), or (3c) divided by Equation (1). Using equation (1) in the denominator controls for the effects that a country's tax policies on domestic dividend income could have on total foreign portfolio investment relative to domestic portfolio investment.²⁰ We interpret *ATRATIO* as the tax advantage that an investor receives from allocating her equity portfolio to a foreign country over her residence country in a specific year. That is, the investor has a tax advantage in a foreign country relative to her residence country if *ATRATIO* is more than one. We expect that investors prefer to allocate more of their equity portfolios to source (foreign) countries that have a higher after-tax dividend from \$1 of pretax corporate earnings relative to their after-tax dividend from \$1 of pretax corporate earnings in their residence country. That is, FPI holdings are larger for countries with a higher *ATRATIO*. To examine the relation between *FPI* and *ATRATIO*, we estimate Equation (4) for each investor's residence country (*i*) by source country (*j*) pairing for the years in which we have the FPI data: 1997, 2001–06.

$$FPI_{ijt} = \beta_0 + \beta_1 * ATRATIO_{ijt} + \beta_{2-k} X_{jt} + \psi_i + \xi_t + \mu_{it} \quad (4)$$

FPI_{ijt} measures the equity portfolio holdings of investors from residence country *i* in source country *j* at year *t*. X_{jt} is the set of control variables for non-tax factors of the source countries affecting *FPI*, ψ_i are residence country fixed effects and ξ_t are year fixed effects. We expect source countries, which offer non-residents the highest after-tax dividend on \$1 of pretax corporate earnings relative to their resident country, will have a larger allocation of the foreign portfolio investments, implying $\beta_1 > 0$.

1.4 The relation between FPI and imputation systems

¹⁹ As discussed earlier, countries can also differ in the foreign taxes that are creditable or deductible to portfolio investors. For example, most countries do not provide an *indirect* tax credit to portfolio investors for corporate taxes paid to the source country. Because of limited data and the few countries that we know provide indirect tax credits to portfolio investors, we assume residence countries only provide credits for shareholder-level taxes (i.e., withholding taxes) paid to the source country.

²⁰ The inferences from our tests are unchanged if we use only the numerator of *ATRATIO* or include the numerator and denominator of *ATRATIO*, separately.

We also separately examine the effect of imputation systems on FPI because the European Court of Justice (ECJ) recently ruled that member countries with imputation systems discriminate against foreign investors. Through its rulings, the ECJ has been particularly active in ensuring that the tax policies of its members do not create incentives or barriers to the flow of portfolio investments between its members. An example of a tax policy that the court ruled as discriminatory is an imputation system that grants residents a credit for domestic corporate taxes paid but does not extend the credit to non-resident shareholders. The credits increase the after-tax return from investments made in the source country for residents relative to non-residents, holding all else constant. This relatively lower after-tax return could lead non-residents to prefer other source countries that do not create disadvantages for non-residents relative to residents.²¹ The reason for that is that residents have tax advantage over non-resident investors which can crowd out foreign investors from the domestic market. Because the courts began ruling that aspects of countries' imputation systems were discriminatory, many EU countries that once used imputation systems have changed their tax policies. It is possible, however, that in theory, these policies are discriminatory, but in practice, other factors prevent these tax policies from affecting FPI. To help provide empirical insight into the discriminatory nature of these imputation systems, we examine whether FPI is lower in source countries that have imputation systems that favor resident investors.

To analyze the effect of imputation systems on *FPI*, we estimate Equation (5), which substitutes *IMP_DUM* for *ATRATIO*. *IMP_DUM* is an indicator variable equal to one if the source country-year observation has an imputation system that does not extend imputation credits to non-resident shareholders and zero otherwise.

$$FPI_{ijt} = \gamma_0 + \gamma_1 * IMP_DUM_{jt} + \gamma_{2-k} X_{jt} + \eta_i + \lambda_t + \varepsilon_{it} \quad (5)$$

The dependent variable and X_{jt} are the same as in Equation (4). η_i are resident country fixed effects and λ_t are year fixed effects. We expect that source countries with imputation systems that favor domestic shareholders will have lower foreign investment holdings relative to other source countries, implying $\gamma_1 < 0$.

2. Data and Sample

2.1 Foreign portfolio investments holdings

The International Monetary Fund (IMF) provides data on worldwide holdings of foreign portfolio investment at <http://www.imf.org/external/np/sta/pi/cpis.htm>, the Coordinated Portfolio Investment Survey (CPIS) Website. The CPIS reports bilateral data on residence countries' foreign portfolio holdings in non-resident issuers (i.e., source countries). The holdings data is divided into three groups: equity portfolio holdings (the focus of our analysis), short-term debt holdings, and long-term debt holdings. The first CPIS was conducted at the end of 1997, when 29 economies participated. Since 2001, the survey has been conducted annually and contains data on foreign holdings as of the end of 2006 for 73 source countries. For each residence country, the survey reports holdings in approximately 240 source countries or territories.

²¹ Another example of a tax policy that the court ruled as discriminatory is an imputation system that grants its residents a credit for only domestic corporate taxes paid. The credits increase the after-tax return from domestic investments relative to foreign investments for the residents, holding all else constant. This higher after-tax return could lead residents to prefer domestic securities if non-tax factors do not outweigh the tax incentives. Given our data, we cannot address the discriminatory nature of this tax policy.

Participants in the CPIS follow definitions and classifications that are mutually consistent by following the methodology set out in the IMF Balance of Payment Manual (1993).

Prior research notes several sources of measurement error in the CPIS data.²² Because there are no indications that these sources of measurement error are correlated with our variables of interest (*ATRATIO* and *IMP_DUM*), we expect the measurement error to impede our ability to find significant results, but do not expect it to bias in favor of our predicted results. In later sensitivity tests, we address this issue by examining country-level mutual fund data. Countries also do not report their foreign portfolio holdings each year. (e.g., Germany did not participate in 1997), which creates an unbalanced panel dataset. Even with its shortfalls, the CPIS data are recognized as the most valuable and accurate source of foreign portfolio investments data publically available.²³

2.2 International tax data

To capture the many aspects of taxation that affect dividend income during our sample period, we built a database from a variety of sources. From the OECD, we obtained the tax system for corporate taxation (e.g., full and partial imputation, classical, etc.), the statutory tax rate on corporate income as well as the residents' imputation rate and income tax rate on dividends for each country. For each country with an imputation system, we also collected the imputation rates applicable for non-resident investors from each country if one existed.²⁴ For each residence-source country pairing, we also collected the appropriate withholding rates on dividends paid to FPI investors, which could be the rate in the treaty if one exists or the default rate. If the default rate is lower than the treaty rate, then the withholding rate is the default rate. Finally, we collected information on the tax systems that the residence countries use when taxing their residents on their foreign portfolio income.^{25, 26}

2.3 Control variables

We obtain the control variables from a variety of sources. GDP, population, and the risk ratings are obtained from the *Global Insight* database. The World Bank's *World Development*

²² One source is that countries use a variety of methods to determine their portfolio holdings. The various methods include end-investor data, custodians' data, and a combination of the two, which can result in an underreporting of specific types of investors. A second source is the different ways that the participants collect the data. Some participants, such as the United States, collect the data on an asset-by-asset basis, while other participants collect the data on an aggregate basis. A third source of measurement error is the possibility of underreporting assets, which results from incomplete institutional coverage. For example, the Cayman Islands report only the holdings of its banking sector and not the holdings of its mutual funds and households. A fourth source is the possibility of third-party holdings. This concern arises when a resident of one country holds a security that was issued by a second country for a resident in a third country. The fifth source is American Depositary Receipts (ADR) and Foreign Depositary receipts (FDR), which can be taxed differently than other foreign investments, and are reported as foreign holdings in the CPIS data. See further discussion in Lane and Milesi-Ferretti (2005) and Bertaut and Kole (2004).

²³ See Lane and Milesi-Ferretti (2008) and Bekaert and Wang (2009) for examples of examination of different research questions using this dataset.

²⁴ This data requires not only knowing if the imputation systems extend to non-residents, but also how much and to which non-residents.

²⁵ We have assumed that only withholding taxes are creditable or deductible. For a small minority of residence-source country relations, this is not a valid assumption.

²⁶ We thank Rene Offermanns at the International Bureau of Fiscal Documentation (IBFD) for his assistance in collecting the international tax data that was not available on the OECD. We especially thank the International Tax Policy Forum that provided the financial support to collect the international tax data.

Indicators (WDI) database provides the market capitalizations.²⁷ The United Nations division of statistics website provides the data on imports. For brevity, we provide Appendix A which discusses the sources of data for the variables.

2.4 Definition of variables

We use three different dependent variables as FPI_{ijt} to examine Equations (4) and (5). First, we follow Lane and Milesi-Ferretti (2005) that develop and test a model, which explains bilateral FPI, based on a generalization of the gravity of trade model in Obstfeld and Rogoff (1996).²⁸ The dependent variable in their study is the natural log of the level of equity holdings of country i (residence country) in country j (source country) at time t ($LHOLD$).²⁹ In our second measure, we use the holdings that investors' from residence country i have in equities from source country j relative to the worldwide portfolio holdings of the residence country i 's investors. This variable ($RATIO$) assumes that investors choose a portfolio weight for their investment in foreign countries rather than a level of investment as well as controls for changes in the overall preference of investors for foreign equity portfolio investments. The final measure ($MRATIO$) scales the percentage that portfolio investors from residence country i hold in source country j ($RATIO$) by the ratio of country j 's market capitalization relative to the world market capitalization (Ahearne, Grier and Warnock (2004)). This market capitalization ratio used in the denominator is the theoretical portfolio weight based on the international capital asset pricing model. Therefore, a value of one for $MRATIO$ suggests that investors of country i have allocated their foreign portfolio to country j consistent with the international capital asset pricing model.

To mitigate the possibility that omitted correlated variables are influencing our results, we use an extensive set of control variables that are common in prior literature in our main regression as well as add other popular controls variables in additional sensitivity tests.³⁰ Our control variables for the source country characteristics in our main tests include the following: The natural log of imports between country i and country j ($LIMPORT$) captures the economic trade characteristics between residence-source country pairings in our sample. The natural log of GDP ($LGDP$) of the source country (i.e., investee) captures the economic size of the source country and its growth opportunities. The natural log of the population of the source ($LPOP$) controls for the size of the source country. The natural log of the market capitalization of the source ($LMCAP$) captures the size of the source country capital market and its available capital for foreign investors. We also include a financial openness index ($OPENESS$) created by Chinn and Ito (2007), which captures the differences and trends in financial openness across the source countries. In addition, we use five different risk measures as controls for the economic risk ($ECORISK$), political risk ($POLRISK$), legal risk ($LEGRISK$), operational risk ($OPERISK$), and

²⁷ This dataset is available at www.worldbank.org/data/online-databases/online-databases.html.

²⁸ The log specification is a direct result of the Lane and Milesi-Ferretti (2005). They test their model using the CPIS bilateral data; Desai and Dharmapala (2009b) use a similar empirical model with TIC data for U.S. investments; and Portes and Rey (2005) also use a similar specification.

²⁹ To keep observations with FPI in country j equal to 0 in the log form, we add 1 to all the FPI data, which is consistent with Lane and Milesi-Ferretti (2005). A similar procedure is applied by Desai and Dharmapala (2009b) and Amiram (2010).

³⁰ To increase the external validity of the results, we include in the main tests control variables that are available for all the OECD countries. In our sensitivity tests, we remove this restriction and add a variety of control variables that severely reduce the number of countries in our sample. These control variables include familiarity and information proxies, corporate governance proxies, return correlation, and resident county characteristics. The results are robust to the inclusion of these additional control variables.

security risk (*SECRISK*) of the source country. The fixed effects control for mean differences in preferences for foreign portfolio investments across residence countries (i.e., investors) and across years. Appendix A describes the calculation of the variables as well as the additional control variables for our sensitivity tests in detail.

Based on prior literature we expect the coefficient on *LIMPORT* to be positive (Lane and Milesi-Ferretti (2005)). We also expect the degree of openness in the source country, *OPENESS*, to positively explain FPI (Lane and Milesi-Ferretti (2005)); however, most economies in our sample are relatively open for capital movement, which limits the variation in this variable and could cause the coefficient on this index to be insignificant. All the risk measures should be negatively associated with FPI, but the coefficients on the risk variables could also be insignificant because the risk measures are highly correlated. Similarly, multicollinearity could affect the significance of the coefficients on *LMCAP* and *LGDP*.

2.5 Sample

We begin with the foreign portfolio equity investments available in the CPIS, which results in a potential of 122,640 country-country-year observations ((73 residence countries in 2006) \times (240 possible source countries) \times (7 years when the survey was conducted)). Deleting observations missing *FPI* yields a dataset with 47,681 residence country-source country-year observations. We use these 47,681 observations with *FPI* to calculate *RATIO* and *MRATIO* because these measures require aggregate foreign holdings and world market capitalization. Because the calculation of the control variable, *MCAP*, requires market capitalization of the source country, we eliminated observations with this variable missing, resulting in a sample of 25,247 residence country-source country-year observations. We merge the 25,247 observations with our international tax dataset. Merging these two datasets yields a dataset of 4,383 residence country-source country-year observations because our tax database only contains countries reported in the OECD database.³¹ Table 1 presents the allocation of the 4,383 observations in the final sample across residence country and year. The observations are broadly distributed across residence country and year. Mexico reports the fewest observations (36) while Italy, Japan and the U.S. all report 190 or more observations. Each year reports at least 660 observations except for 1997 and 2006 which report 432 and 452 observations, respectively.

Table 2, panel A provides the descriptive statistics for our sample. The mean of *MRATIO* is larger than one while the median is well below one, suggesting that a few source countries are highly over-weighted in foreign equity portfolios relative to their market capitalization.³² However, the average and median *RATIO* are only 0.03 and 0.01, respectively, implying that the weight allocated to the average source country is quite small. The average (median) *ATRATIO* is 0.90 (0.89) which suggests that, on average, the after-tax dividend that portfolio investors receive from foreign investments is 90% of the after-tax dividend from investments in their residence country. The higher after-tax return from residence countries as compared to source countries would lead portfolio investors to prefer domestic equities relative to foreign equities consistent

³¹ The maximum merged sample could contain 6,090 (30 OECD residence countries \times 29 OECD source countries \times 7 years).

³² We find that the full sample of 25,247 source country-residence country-year observations with FPI data has a significantly smaller mean (median) for *LHOLD* and *MRATIO*. In untabulated results, the mean (median) for *LHOLD* and *MRATIO* are 2.20 (0.63) and 0.87 (0.00), respectively. *RATIO* is not significantly different between the two samples. The difference in *LHOLD* for these two samples is consistent with the residence countries in our sample being larger because of the limitation imposed by our tax database of OECD countries.

with the well documented home bias. Thirty-seven percent of our residence country-source country-year observations are from foreign portfolio investments in source countries with imputation systems that do not extend to foreigners (*IMP_DUM*). *LGDP* and *LMCAP* are large with minimal variation as expected because the countries in the sample are members of the OECD. Similarly, all of the risk variables suggest that the source countries have relatively low risk. The maximum value is never more than 3.5, with 5 representing the riskiest countries, and the average values range from 1.37 to 1.78. Panel A also provides the descriptive for the tax rates used to compute *ATRATIO*. As discussed in policy debates, the U.S. corporate tax rate of 35% is higher than the average corporate tax rate (t_{cs} and t_{cr}) during our sample period. However, the 15% tax on dividend income currently imposed by U.S. is well below the average dividend tax rate of 32% (t_{pr}) and similar to the average withholding tax rate of 12% (t_w).

Panel B provides the descriptive statistics for our dependent variables and our tax variables by tax system for international juridical double tax relief. Because all of the countries in our sample have a worldwide tax system for dividend income earned by individual residents, the variation in the taxation of foreign source income comes from the method of relief that the residence country provides: foreign tax credits, foreign tax deduction, or no relief. We find that 80% of the 4,383 observations have a foreign tax-credit system, 11% offer foreign-tax deductions, and 9% provide no relief to residents for investments in source countries. Of the 80% (3,502 observations) that offer foreign-tax credits, only 11% (372) are in an excess foreign tax credit situation. Comparing the variables across tax systems, there are few obvious and consistent patterns because most of the variables are similar across the three groups. Investors from residence countries that provide no relief from international juridical double taxation either through no explicit relief or tax policies that lead to an excess credit situation ($t_w > t_{pr}$) invest less abroad (i.e. lower *LHOLD* and *MRATIO*). However, these same residence countries earn the same from domestic investments relative to their foreign investments (*ATRATIO*) as investors from residence countries with excess foreign tax limits ($t_w < t_{pr}$). Investors from residence countries that provide foreign-tax deductions appear to earn more domestically relative to foreign investments compared to the other three groups (i.e., *ATRATIO* is the smallest). All four types of residence countries earn more from domestic investments relative to their foreign investments on average (i.e., *ATRATIO* < 1). Finally, the residence countries that do not provide relief to shareholders from international juridical double taxation also do not provide relief to shareholders from economic double taxation through imputation systems (i.e., $t_{ir} = 0$ for all observations) but have lower tax rates on dividends (t_{pr}).

3. Results

3.1. The relation between FPI and residence and source countries' tax policies

Table 3 presents the results from the estimation of Equation (4) using OLS.³³ Model 1 presents the results with *LHOLD* as the dependent variable. In this model, the coefficient on *ATRATIO* is positive and significant (coefficient of 1.076 with a t-statistic of 2.35). This result is consistent with our prediction that investors have larger holdings in their foreign equity portfolios allocated to source countries in which they have a larger tax advantage. Model 2 (*RATIO*) and model 3 (*MRATIO*) in Table 3 also show statistically significant positive coefficients on *ATRATIO* at the .01 level. The coefficient on *ATRATIO* suggests that a one standard deviation change in *ATRATIO* increases the weight placed on a country within a foreign

³³ We use standard errors clustered by the country of the investors (i.e., residence country) following the recommendation of Bekaert and Wang (2009).

equity portfolio by 13.2% relative to the mean *RATIO* $((0.022*0.18)/0.03)$ while a one standard deviation increase in *ATRATIO* increases the weight in the foreign portfolio adjusted for the CAPM benchmark (*MRATIO*) by 12.9% relative to the mean *MRATIO* $((1.178*0.18)/1.65)$. Not surprisingly given the collinearity among the control variables, their coefficients are inconsistent across the three models.³⁴ The risk variables, however, are generally negative and *LGDP*, *LMCAP*, and *LIMPORT* are positive as expected.³⁵

To calibrate our results with estimates reported in Desai and Dharmapala (2009a), we also estimate the relation between *LHOLD* and the numerator of *ATRATIO* using equation (4). We modify equation (4) because Desai and Dharmapala (2009a) examine the log of FPI in their analysis and provide implied elasticities of FPI with respect to a foreign portfolio investor's after-tax foreign dividend (i.e. the numerator of *ATRATIO*). The conclusions drawn from this modified estimation model are similar to the results presented in Table 4. The coefficient on the numerator of *ATRATIO* is 2.06 and statistically significant at a 0.05 level. Using the same assumptions about tax rates as Desai and Dharmapala (2009a), the Jobs and Growth Tax Relief Reconciliation Act of 2003 resulted in an increase in the after-tax foreign dividend (percentage) of 0.20 (32.6%) for treaty countries relative to non-treaty countries.³⁶ This increase implies a 51% increase in FPI $(e^{(2.059 * 0.20)} = 1.51)$ and an implied elasticity of 1.56 (51% / 32.6%). This implied elasticity is consistent with estimates in Desai and Dharmapala (2009a) after adjusting for possible overstatements in their estimated elasticities. While the elasticities are large, they are comparable with other estimates in the literature.

3.2. The relation between FPI and imputation systems in source countries

Table 4 presents the results of the estimation of Equation (5) using OLS. While the signs of the coefficients on *IMP_DUM* in all three models are negative as predicted, only the coefficients from Models 2 and 3 are significant. The negative coefficients are consistent with investors placing less weight within their foreign equity portfolios on source countries that have imputation systems, which benefit domestic investors but not foreign investors. Specifically, Model 2 suggests that the average source country with an imputation system that is not extended to foreign investors has a 50% (0.015/0.030) lower foreign portfolio weight relative to the mean *RATIO*. Similarly, Model 3 suggests the average source country with an imputation system that does not extend to foreign investors has a 61% (1.01/1.650) lower foreign portfolio weight

³⁴In untabulated results, both the Pearson and Spearman correlations confirm that many control variables are highly collinear, especially *LGDP* and *LMCAP* (0.91 correlation). Because *LGDP* and *LMCAP* are not variables of interest, we include them in the next analyses even though they are highly collinear. In addition all the risk variables are highly correlated with each other.

³⁵Because our dependent variables are truncated and clustered at zero, we also estimate Tobit regressions which could be more appropriate in this situation. Our conclusions are unchanged if we estimate Equations (4) and (5) using Tobit models. We note that Tobit analysis of a panel of data with fixed effects is a problematic approach and might yield more or less reliable estimates than OLS (Green (2003)). We also estimate annual cross-sectional regressions and compute the Fama-Macbeth t-statistics. Untabulated results indicate that our inferences are unchanged if we use this estimation technique.

³⁶Desai and Dharmapala (2009a) use *LHOLD* as their dependent variable and find that U.S. FPI in treaty countries increased by 91% relative to non-treaty countries after the Jobs and Growth Tax Relief Reconciliation Act of 2003 (JGTRRA). They estimate that this increase in FPI is associated with a 32.6% decrease in the U.S. tax rate on dividends from treaty countries relative to non-treaty countries. They assume corporate tax rates are zero and the percentage change in the after-tax dividend from treaty countries relative to non-treaty countries is captured by $((1-15\%)-(1-38.6\%))/(1-38.6\%) - (((1-35\%)-(1-38.6\%))/(1-38.6\%))$. See p.19 and footnote 40 for their discussion of the implied elasticity with respect to after-tax foreign dividends.

adjusted for the theoretical CAPM benchmark relative to the mean *MRATIO*. These results are consistent with the claim that dividend imputation systems discriminate against foreign investors and thus foreign investors shift their investments away from these imputation countries.

3.3 Additional tests

3.3.1 The incremental effects of *ATRATIO* and *IMP_DUM*

The results from Tables 3 and 4 suggest that source countries with higher after tax dividends attract foreign investment while source countries with imputation systems for only its domestic investors deter foreign investment. Because a source countries' tax system for corporate income affects the after-tax dividend to foreign investors, the results from Tables 3 and 4 could be capturing the same effect. However, *IMP_DUM* captures only the presence of an imputation system while *ATRATIO* captures variation in the imputation rate as a component of the after-tax dividend from \$1 of pretax corporate earnings generated within the source country relative to the after-tax dividend from \$1 of pretax corporate earnings generated within the residence country. To examine the incremental effects of each tax variable, we estimate Equation (3) including both *ATRATIO* and *IMP_DUM*. As reported in Table 5, we find that *ATRATIO* and *IMP_DUM* are significant and in the predicted directions. While we expect both coefficients to be significant because *ATRATIO* captures more of a source country's tax policies than its tax system for corporate income (*IMP_DUM*), the size of the coefficients on both tax variables do not differ significantly from the coefficients reported in Tables 3 and 4 and the adjusted R^2 is also not significantly different than Tables 3 and 4. We conclude from these results that *ATRATIO* and *IMP_DUM* represent different constructs.³⁷

3.3.2 Payout policy of the source country

We calculate *ATRATIO* based on the assumption that the foreign equity investment distributes its earnings in the form of a dividend. While admittedly our simplifying assumption does not hold in reality, *ATRATIO* should matter more for countries with a larger percentage of their earnings paid in the form of a dividend (*PAYOUT*). Therefore, we include *PAYOUT* reported by Alzahrani and Lasfer and the interaction of *PAYOUT* and *ATRATIO* in Equation (4).³⁸ We expect the coefficient on the interaction of *PAYOUT* and *ATRATIO* to be positive. Receiving a higher after-tax dividend from a foreign equity investment should attract more foreign portfolio investment if the companies located in the source country pay a larger share of their earnings as dividends. Including *PAYOUT* also addresses concerns that we have omitted a correlated variable because Ferreira et al. (2010) find foreign institutional ownership is positively related to firms' payout policies.

Jaccard, Wan, and Turrisi (1990) conclude that when a continuous variable representing a main effect never takes the value of zero (as is in the case of *ATRATIO* and *PAYOUT*) a straight forward interpretation of its coefficient does not exist. Therefore, we employ the common

³⁷ One reason that the tax variables may address different constructs is that they capture two different decision criteria of the foreign investor. *IMP_DUM* captures the investor's decision to invest in a foreign country that favors its *domestic* investors. However, *ATRATIO* captures the investor's decision to invest in a foreign country that has a relatively favorable after-tax return.

³⁸ See Appendix A for detailed discussion of *PAYOUT*. Of the observations with *PAYOUT* available, the mean (median) is 0.41 (0.40) suggesting that the median company in our source countries pays 40% of its current earnings in dividends. Untabulated results show that when we include *PAYOUT* and *ATRATIO* without the interaction term in Equation (4), *ATRATIO* is still positive and statistically significant in all three models while *PAYOUT* is negative and statistically significant in models (2) and (3).

solution, which is to subtract the means from the variables of interest and include the adjusted variables and their interaction term in the regression. Table 6 reports that the coefficient on the adjusted interaction term and the adjusted *ATRATIO* (*ADJ ATRATIO*) are positive and significant across all three models as expected and the coefficient on the adjusted *PAYOUT* is negative and significant in all regressions.³⁹

3.3.3. Components of *ATRATIO*

Our main analyses examine the relation between *FPI* and *ATRATIO*. *ATRATIO* is the after-tax, foreign-source dividend an investor receives represented by equations (3a) – (3c) (*SATR*) relative to the after-tax, domestic-source dividend represented by equation (1) (*RATR*). By including *RATR* in the denominator, *ATRATIO* controls for the effects that a country's tax policies on domestic dividend income could have on total foreign portfolio investment. However, the ratio does not allow for interpretation of each component. To assess the incremental value of both components, we estimate equation (4) but substitute *SATR* and *RATR* for *ATRATIO*. Table 7 reports that *SATR* is positive and significant consistent with our other results and higher after-tax dividends from foreign countries attracting *FPI*. By contrast, *RATR* is negative and significant consistent with higher after-tax dividends from the investor's country of residence discouraging *FPI*.

3.3.4 Additional control variables

The rationale for choosing the control variables for our model reported in Table 3 is to balance between including factors that prior literature suggests affect *FPI* and increasing the external validity of our analysis by keeping as many countries in the sample as possible. To mitigate concerns that the coefficient on *ATRATIO* simply reflects omitted correlated variables, we examine our model with additional control variables. The cost of adding these control variables is the loss of approximately one quarter of our sample size (1,117 observations) and additional multicollinearity.

Specifically, we include additional variables for a source country's investor protection environment (*SDINDEX* and *CORRUPTION*), economic characteristics (*LEXPORT*, *MCAPTOGP*, and *RETCORR*) and information characteristics (*LDIST*, *COMMON_LANGUAGE*, *CONTINGENT*), as well as time-varying characteristics of the *resident* country (*LGDP*, *LMCAP*, *LPOP*, *CORRUPTION* and *OPENESS*), and time-trends (*TIME*). The source and a description of these additional control variables are provided in Appendix A. Table 8 reports the relation between *FPI* and *ATRATIO* remains positive and significant, and the relation between *FPI* and *IMP_DUM* remains negative and significant. The magnitudes and statistical significance of the variables of interests are also similar to the results in Tables 3 and 4. Moreover, the additional control variables do not add significant explanatory power to the models. These results suggest that taxation affects *FPI* incrementally to agency conflicts, familiarity, and economic characteristics.

3.3.5 Endogeneity and Omitted Correlated Variables

We also employ an instrumental variables approach to address possible endogeneity and omitted correlated variables in our main analysis. Endogeneity may arise if countries set their tax

³⁹ The significance and the sign on the interaction term do not change if we do not demean *PAYOUT* and *ATRATIO*. The issue being addressed by this adjustment only concerns the interpretation of the coefficients on the two main effects.

policies in response to the demands of current foreign investors. Omitted correlated variables are a concern if our extensive control variables are not adequate and *ATRATIO* captures other country characteristics that attract foreign investors and we omit them from our regression. Although these concerns are different, they both create bias in our coefficients. We address these concerns through a two-stage least squares model, which requires an instrument for *ATRATIO* which can be a daunting task.

Our instrument for *ATRATIO* is a country's government debt burden, which we define as government debt to GDP. The idea that tax policies are related to government debt goes back at least as far as Ricardo (1820), who argues that governments cover their debt burden through higher taxes, holding the tax base of their taxpayers constant.⁴⁰ If this reasoning holds then government debt burden should be positively (negatively) related to taxes (after-tax dividend). Because *ATRATIO* captures the after-tax dividend on \$1 of pretax corporate earnings generated in the source country relative to the residence country, we calculate our instrument, *GOVDEBTRATIO*, as the ratio of the source-country government debt burden to the resident-country government debt burden.

The instrument should also be uncorrelated with *FPI*. This criterion is harder to address. It is possible a country's government debt burden would deter *FPI* if investors believe that the burden creates more risk for their holdings located in the country. Because our sample includes more financially stable countries (OECD) in a relatively favorable economic period, we hope that this possible relation is minimal. In addition, our extensive set of control variables should capture many aspects of country risk.

The first column of Table 9 presents the results from the first stage regression. The results reveal that *GOVDEBTRATIO* is negatively and significantly related to *ATRATIO* as predicted. The F-statistic for the instrument of 13.1 suggests that weak instruments should not be a concern (Stock and Yogo (2005), Larcker and Rusticus (2008)).

Models 1 to 3 in Table 19 reveal that the inferences about the relation between *FPI* and *ATRATIO* are not affected by endogeneity or omitted correlated variables. In all three models, *ATRATIO* remains positive and significant. The magnitudes of the coefficients on *ATRATIO* increase significantly compared to the OLS estimation, and these larger magnitudes could suggest a problem with weak instruments. Larcker and Rusticus (2008) note that using weak instruments with 2SLS can lead to more biased coefficients than OLS. Therefore, we report these results as a sensitivity analysis even though the F-statistic reported above does not support the weak instruments argument.

3.3.6 *FPI using Country-Level Bilateral Mutual Fund Data*

In an effort to address concerns about the CPIS data used to compute *FPI*, we estimate equations (4) and (5) using bilateral mutual fund holdings from 2005 reported by source country - residence country pairing in table A2 of Ferreira and Matos (2008) to compute *RATIO*. In untabulated results, we find a negative and significant coefficient on *IMP_DUM* consistent with Table 4 and a positive, but insignificant, coefficient on *ATRATIO*. The insignificant coefficient on *ATRATIO* appears to be driven by increases in the standard error of the coefficient, which is at least partly driven by the decrease in the observations. The magnitude of the coefficient on *ATRATIO* is actually 2.8 times more positive than the coefficient reported in Table 3.

⁴⁰ We realize that these statements are not without controversy; however, a thorough discussion of the relation between government debt and spending and tax policy is beyond the scope of this paper.

3.3.7 Changes Specifications for *ATRATIO*

We analyze FPI holdings and not FPI flows. There are two reasons for this choice. First, the theoretical models and prior empirical research that serve as a basis for our analyses use foreign portfolio holdings or weights. Second, we do not have access to annual foreign portfolio investment flows. In order to approximate portfolio flows, we estimate equation (4) using the changes in each variables instead of the levels.

We examine 1) annual changes and 2) changes across two five year periods (1997-2001 and 2001-2005). For all three models in both analyses, the coefficients on the change in *ATRATIO* are positive (not tabulated). The coefficients are significant in the regressions of annual changes when *MRATIO* is the dependent variable and in the regressions of five year changes when *RATIO* or *MRATIO* are the dependent variables.

3.3.8 Pre-Post Analysis of Elimination of Imputation Systems

Our sample contains several countries that eliminated their imputation systems in response to ECJ rulings as well as other reasons. To examine whether the change in the tax system for corporate and shareholder dividend income had significant effects on FPI, we substitute three new indicator variables for *IMPDUM* in equation (5). *ALWAYS* takes the value of 1 for countries that never change their imputation systems during our sample period. *PREIMP* takes the value of 1 for countries, which change from an imputation system to a classical system, in the years before the change. *POSTCLASS* takes the value of 1 for countries, which change from an imputation system to a classical system, in the years after the change. We estimate equation (5) with these three new variables. In untabulated results, we find that the coefficients on *ALWAYS* and *PREIMP* are not statistically different from the results for *IMP_DUM* reported in Table 4 for all three models. However, the coefficient on *POSTCLASS* is statistically higher than *ALWAYS* and *PREIMP* at least at the 5% level in all three models. These results are consistent with countries, which changed from imputation to classical systems, experiencing increases in inbound foreign portfolio flows.⁴¹

3.3.9 Exclusion of Financial Centers and 1997 from the Sample

One common concern with research using our data on FPI is that foreign investments flow through financial centers, which could bias our results. We estimate Equations (4) and (5) after excluding the financial centers: Luxembourg, the United Kingdom, and the United States. We find that excluding financial centers (untabulated results) has no effect on the inferences drawn from Tables 3 and 4.

An additional concern is that the presence of 1997, which is far apart from our main sample years, may bias our results. To address concerns about 1997 driving the results, we estimate Equations (4) and (5) after excluding 1997 from the sample, and find quantitatively similar (untabulated) results.

4. Conclusion

⁴¹ For the models with *RATIO* and *MRATIO* as the dependent variables, the coefficients on *POSTCLASS* are less negative than the coefficients on *ALWAYS* and *PREIMP* by approximately 50%. In the model with *LHOLD* as the dependent variable, the coefficient on *POSTCLASS* is approximately 10 times higher than the coefficients on *ALWAYS* and *PREIMP*.

In this study, we address whether investors consider the taxation of dividends when allocating their foreign equity portfolio investments around the globe. We use two different approaches to examine the question.

First, we construct a measure that captures the tax advantage for investors to invest abroad in a source country relative to their country of residence (*ATRATIO*). We find consistent evidence that investors allocate more of their foreign portfolio to source countries in which they expect relatively lower tax costs and thus greater after-tax returns. This relation exists for different measures of *FPI* from the prior literature and numerous sensitivity tests. In addition, we find that this relation is stronger for source countries that have higher dividend payout ratios.

Second, we test and find that investors allocate less of their foreign portfolio to source countries that have imputation systems that do not extend imputation benefits to foreign investors. This result supports claims by the ECJ that many imputation systems discriminate against foreign investors.

While this study utilizes the most comprehensive data available on international tax policies, our results are still subject to several caveats. While we attempt to address endogeneity in our sensitivity tests, our results could still suffer from endogeneity between tax policy and foreign portfolio investments. In addition, to the extent the source-country control variables and the residence-country fixed effects do not adequately control for other factors and our sensitivity tests do not address them, the results could also be subject to bias from omitted correlated variables. We also implicitly assume in that the return to foreign equity portfolio investments is paid in the form of dividends because we do not incorporate taxes paid on capital gains into our measure of the after-tax return to the investor, nor do we control for capital gains taxes in our regressions. Capital gains taxes paid by foreign investors to source countries are of less concern than dividend taxes because most countries exempt foreign portfolio investors from capital gain taxes. Instead, foreign portfolio investors may pay taxes on capital gains from foreign stocks to their country of residence. However, they would also pay capital gains taxes on appreciation in domestic equities. Thus, the investors face the same capital gains tax no matter who the source country, which leaves them indifferent among source countries, including their country of residence. We look forward to future research in this area to help resolve the concerns raised by the limitations of the study.

The study is the first to examine the effect of taxes on FPI allocation around the world in part due to a lack of data on the various aspects of tax systems from source and residence countries. Through our efforts to compile the data to address this question, we also provide insights into the taxation of FPI and key differences in the taxation of FDI and FPI that are not discussed in a prior literature that focuses on FDI. Because most of the literature currently focuses on FDI, as FPI continues to grow as a source of capital and countries begin to take more interest in the effect of their policies on FPI, many questions remain for future research.

Appendix A Definitions of Variables

<i>Type of Countries</i>	<i>Description</i>	<i>Detailed Description and Source</i>
<i>INVESTOR, RESIDENT, HOME, COUNTRY i</i>	A country with outbound foreign portfolio equity investment.	Countries with residents that report foreign equity holdings in their portfolio to the IMF CPIS. Source: IMP CPIS
<i>INVESTEE, SOURCE, FOREIGN, COUNTRY j</i>	A country with inbound foreign portfolio equity investment.	Countries in the IMF CPIS dataset in which the “investor” countries report their residents have holdings.

<i>Names of Dependent Variables</i>	<i>Description</i>	<i>Detailed Description and Source</i>
<i>LHOLD</i>	Natural log (1+ holdings)	Equals the natural log of 1 + holdings where holdings is the level of holdings that the residents of a country (investor) have in the equity of the source country (in millions of USD). The addition of 1 is to avoid eliminating observations with the holdings equal to 0 when the log is taken. Source: IMF CPIS
<i>RATIO</i>	$HOLD_{ijt} / \sum_i HOLD_{ijt}$	The resident country's (<i>i</i>) holdings in the source country (<i>j</i>) at year <i>t</i> divided by the sum of all of the resident country's investments in all the source countries in year <i>t</i> .
<i>MRATIO</i>	<i>RATIO</i> divided by $(MCAP_{jt} / \sum_i MCAP_{ijt})$	The percentage of equity that investors from country <i>i</i> hold in country <i>j</i> divided by the ratio of country <i>j</i> 's market capitalization relative to the world market capitalization. The theoretical portfolio weight based on the international capital asset-pricing model. Source: The World Bank's <i>World Development Indicators</i>

Appendix A - continued

<i>Names of Tax Variables</i>	<i>Description</i>	<i>Detailed Description and Source</i>
<i>ATRATIO</i>	$(1 - t_{cs}) * \left(1 + \frac{t_{is}}{(1-t_{is})}\right) (1 - t_f) \text{ or}$ $(1 - t_{cs}) * \left(1 + \frac{t_{is}}{(1-t_{is})}\right) (1 - t_f)(1 - t_{pr})$ <p>or</p> $(1 - t_{cs}) * \left(1 + \frac{t_{is}}{(1-t_{is})}\right) (1 - t_f - t_{pr})$ <p>divided by</p> $(1 - t_{cr}) * \left(1 + \frac{t_{ir}}{(1-t_{ir})}\right) (1 - t_{pr})$	<p>The after-tax dividend from a \$1 of pretax corporate earnings earned by a corporation in a source country relative to after-tax dividend from a \$1 of pretax corporate earnings from a corporation in the resident country.</p> <p>Sources: OECD and hand collected data</p>
<i>IMP_DUM</i>	Equal to 1 if the source country has dividend imputation system in year <i>t</i> and 0 otherwise	<p>The source country has a dividend imputation system that does not extend to non-resident investors in year <i>t</i>.</p> <p>Sources: OECD and hand collected data.</p>
<i>Names of Control Variables for Source Country</i>	<i>Description</i>	<i>Detailed Description and Source</i>
<i>LIMPORT</i>	Imports between countries	<p>Equals to the natural log of imports to the resident country (<i>i</i>) from the source country (<i>j</i>).</p> <p>Source: The United Nation's Statistics Division</p>
<i>LGDP*</i>	Gross domestic product	<p>Equals to the natural log of <i>GDP</i> where <i>GDP</i> is equal to the source country's gross domestic product in millions of USD.</p> <p>Source: Global insight</p>
<i>LMCAP*</i>	Market capitalization	<p>Equals to the natural log of <i>MCAP</i> where <i>MCAP</i> equals the source country's market capitalization in millions of USD.</p> <p>Source: WDI</p>
<i>LPOP*</i>	Population	<p>Equals to the natural log of the source country's population in millions.</p> <p>Source: Global Insight</p>
<i>OPENESS*</i>	Kaopen financial openness index	<p>The Kaopen is based on binary indicator variables that codify the tabulation of restrictions on cross-border financial transaction reported by the IMF. The index takes higher values for more open countries.</p> <p>Source: Chinn and Ito (2007)</p>

*Variables for source and resident country characteristics included in untabulated sensitivity tests.

Appendix A - continued

<i>Names of Control Variables for Source Country</i>	<i>Description</i>	<i>Detailed Description and Source</i>
<i>POLRISK</i>	Political risk index	An index that assesses a country's political risk according to Global Insight's analysts. The index takes the values of 1 to 5, where 5 are the riskiest countries. Source: Global Insight
<i>ECORISK</i>	Economic risk index	An index that assess a country's economic risk according to Global Insight's analysts. The index takes the values of 1 to 5, where 5 are the riskiest countries. Source: Global insight
<i>LEGRISK</i>	Legal risk index	An index that assess a country's legal risk according to Global Insight's analysts. The index takes the values of 1 to 5, where 5 are the riskiest countries. Source: Global Insight
<i>OPERISK</i>	Operational risk index	An index that assess a country's operational risk according to Global Insight's analysts. The index takes the values of 1 to 5, where 5 are the riskiest countries. Source: Global Insight
<i>SECRISK</i>	Security risk index	An index that assess the investee country security risk according to Global Insight's analysts. The index takes the values of 1 to 5, where 5 are the riskiest countries. Source: Global Insight
<i>PAYOUT</i>	Dividend payout ratio	Median dividend per share divided by earning per share for a country for a sample between 2000–06 as reported by Alzahrani and Lasfer (2009).
<i>GOVDEBRATIO</i>	A ratio between the source country government debt to the resident country government debt	A variable that serves as an instrument for ATRARIO. It is A ratio between the source country government debt to the resident country government debt Source: OECD database

Appendix A - continued

<i>Untabulated Sensitivity Tests</i>		
<i>Names of Control Variables for Source Country</i>	<i>Description</i>	<i>Detailed Description and Source</i>
<i>SDINDEX</i>	Anti Self Dealing index	A measure of legal protection of minority shareholders against expropriation by corporate insiders Source: Djankov et al. (2008)
<i>CORRUPTION</i>	Corruption index	Transparency International Corruption Perceptions Index. The CPI is a composite index making use of surveys of business people and assessments by country analysts. The CPI index takes higher values for less corrupted countries
<i>LEXPORT</i>	Export between countries	Equals to the natural log of exports to the resident country (<i>i</i>) from the source country (<i>j</i>). Source: The United Nation's Statistics Division
<i>MCAPTOGDP</i>	Market capitalization to GDP	The ratio of the source country market capitalization to the source country GDP
<i>RETCORR</i>	Market returns correlation between countries	The correlation between monthly returns at the source county market to monthly returns in the resident country. Measured in the five years prior to the year of observation. Source: DataStream
<i>LDIST</i>	Distance between countries	The natural log of the distance between the resident and source country Source CEPII Website
<i>COMMON_LANGUAGE</i>	Common language	An indicator variable that takes the value 1 when 9% of the residents in the investor and investee countries speaks the same language. Source CEPII Website
<i>CONTINGENT</i>	Contingent countries	An indicator variable that takes the value 1 if the source and resident country share a boarder Source CEPII Website
<i>TIME</i>	Time	A variable that takes the value of 1 in 1997, 2 in 2001, and so on until 7 in 2006

Appendix B

Taxation of Equity Portfolio Income

Economic Double Taxation of Domestic Corporate Income

The United States and many other countries have a “classical” tax system for domestic corporate income. A classical tax system imposes tax on income earned by corporations at the corporate and investor levels at the applicable tax rates. That is, this tax system results in *economic* double taxation because different taxpayers are taxed on the same income.⁴² Australia, however, imposes only a single layer of taxation on domestic-sourced corporate income through an imputation tax system. A typical imputation system imposes a tax on corporate income, but the investors get credits for the taxes paid by the corporation such that the investors pay only the difference between the corporate tax rate and the tax rate on dividend income. As a result, the overall tax burden on dividends in an imputation system is equivalent to the shareholder’s tax burden. In between the classical and imputation tax systems exists a variety of tax systems on corporate income used by other countries.

Economic Double Taxation of Foreign Corporate Income

While most countries do not extend their methods of relief from economic double taxation on dividends to foreign investors, if they do, they will do so in a variety of ways. Some countries extend the same or smaller imputation credits (e.g., France) to foreign investors while others exempt foreign investors from withholding taxes (e.g., Australia). Some countries provide relief to all foreign investors (e.g., New Zealand) while others provide relief to foreign investors from certain treaty countries (e.g., United Kingdom).

Not only do countries provide different relief from economic double taxation to residents and non-resident (dividends to inbound foreign portfolio investments), but they also provide different relief to dividend income paid to residents by domestic versus foreign corporation (dividends from outbound foreign portfolio investments). Because the objective of countries that provide relief to their residents from economic double taxation is to tax the same income generated *within* the country only once, these countries typically do not provide relief to their residents for foreign *corporate* taxes paid by their foreign equity portfolio holdings. There are a few exceptions, such as Mexico, that provide a credit to its residents for foreign corporate taxes paid by its foreign portfolio holdings in certain countries.⁴³ Overall, most dividends from FPI are

⁴² The United States mitigates economic triple taxation of corporate income (i.e., income distributed from a corporation to a corporate shareholder and then to a non-corporate shareholder) by providing a deduction for dividends received by corporate shareholders. The dividend received deduction (DRD) in the United States varies depending on the ownership of the corporate shareholder. A corporation that owns 80% or more of another corporation receives a 100% DRD. If ownership of the corporation is 20% to 80%, the corporate shareholder receives an 80% DRD. Corporations owning less than 20% of another corporation receive a 70% DRD. The DRD is not applicable to dividend income from foreign subsidiaries, so the U.S. allows foreign tax credits for foreign taxes paid on foreign source income.

⁴³ In contrast, most countries mitigate corporate taxation on dividend income from FDI through various methods. Residence countries that tax worldwide income provide a tax credit to a resident corporate shareholder for *corporate* income taxes paid by the foreign corporation (i.e., an *indirect* tax credit). Other residence countries mitigate corporate taxation on dividend income from FDI through exemptions on dividends or a territorial tax system (e.g., France). The minimum equity participation to qualify for these methods of relief also varies across countries but is usually at least the 10% threshold required to be classified as FDI. For example, Australia, Canada, and the United States grant indirect tax credits to investors that own at least 10% of the foreign corporation, while Ireland and Turkey require 20% to provide an indirect tax credit. Another difference that exists is the source country’s taxes that are eligible for an indirect tax credit in the residence country. The United States offers the 10% indirect tax credit

subject to corporate- and shareholder-level taxes while dividends from domestic sources can be subject to only one level of tax in many countries.

International Juridical Double Taxation of Foreign Corporate Income

When the source and residence countries tax the same investor on the same dividend income, this type of double taxation is *international juridical*. Source countries commonly withhold taxes on dividends paid from domestic corporations to foreign investors, and if those investors' foreign sourced dividend income is subject to tax by their residence countries then the dividend income suffers two layers of shareholder taxes in different jurisdictions. The investor's country of residence will typically provide some form of relief from this source of double taxation.

Most discussions surrounding relief from international juridical double taxation refer to a territorial tax system, which is when a residence country only taxes its residents on income earned within its borders. However, territorial tax systems apply to income from FDI, because almost all countries limit their territorial tax systems to large shareholders. For example, France is often cited as a territorial tax system, but it has a worldwide tax system for its residents who have portfolio investments in foreign corporations. In fact, all of the OECD countries' tax dividends from FPI earned by their residents irrespective of their source (i.e., they have a worldwide income tax system).

While territorial tax systems are not prevalent for income from FPI, countries do provide other means of relief for international juridical double taxation. Most residence countries provide a tax credit for withholding taxes paid to the source country on the dividend, while some countries provide a tax deduction for the withholding taxes. Another difference across countries is that some residence countries provide unilateral relief. For example, the United States provides foreign tax credits for foreign taxes paid to any other country. While others, like France, provide foreign tax credits only for taxes paid to treaty countries.⁴⁴

irrespective of where the equity investment is located; however, Australia and Canada only provide the credit when the foreign corporation is located in certain treaty countries.

⁴⁴ Another source of differential taxation between FDI and FPI is the source country's withholding tax rates applicable to dividends from the two types of foreign equity investment. Source countries typically have lower withholding tax rates for FDI, either unilaterally or targeted to specific countries through tax treaties or special negotiated tax incentives.

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Table 1

The Number of Source Countries with FPI by Residence Country and Year

The table presents the 4,383 residence country-source country-year observations used in the analyses by residence country and year. Residence countries are countries that report their outbound FPI holdings in the CPIS dataset for at least one year during our sample period (i.e. the investor). Source countries, are countries that had at least one residence country report FPI holdings in it for at least one year of our sample period (i.e. the investees). Source and residence countries in the sample are limited to the 30 OECD countries in the tax database. The maximum sample is 6,090 observations (30 residence countries x 29 source countries x 7 years).

Residence Countries (Investors)	Number of Source Countries (Investees)							Total
	1997	2001	2002	2003	2004	2005	2006	
Australia	23	28	20	25	17	14	15	142
Austria	23	28	28	28	28	28	0	163
Belgium	0	28	28	28	28	28	28	168
Canada	22	28	28	28	28	28	0	162
Czech Republic	0	28	24	27	27	26	27	159
Denmark	23	28	28	28	0	0	0	107
Finland	23	22	21	26	21	23	24	160
France	23	28	28	28	28	28	0	163
Germany	0	27	27	27	27	28	0	136
Greece	0	26	25	28	26	25	28	158
Hungary	0	28	28	25	24	24	25	154
Iceland	23	19	21	20	21	21	21	146
Ireland	23	27	25	26	25	26	26	178
Italy	23	28	28	28	28	28	28	191
Japan	23	28	28	28	28	28	28	191
Korea, Republic of	23	28	18	23	23	22	0	137
Luxembourg ^a	0	29	29	29	29	29	0	145
Mexico	0	0	0	1	12	10	13	36
Netherlands	23	28	28	28	28	28	0	163
New Zealand	22	16	15	13	19	12	0	97
Norway	20	28	27	27	27	0	0	129
Poland	0	28	3	14	14	15	15	89
Portugal	23	17	28	28	28	28	25	177
Slovak Republic	0	20	18	19	25	25	25	132
Spain	23	25	28	28	0	28	0	132
Sweden	23	27	27	28	28	27	28	188
Switzerland	0	27	27	27	13	13	27	134
Turkey	0	13	10	13	13	13	14	76
United Kingdom	23	27	24	24	27	27	28	180
United States	23	28	28	28	28	28	27	190
Total	432	742	697	730	670	660	452	4383

^a Luxembourg is not included as a source country because we do not have control variables required for the analyses.

Table 2 Descriptive Statistics

The descriptive statistics presented below are taken from a pooled sample of countries from years 1997 and 2001–2006 that are used in the analyses. Panel A reports the descriptive statistics for the entire pooled

sample. Panel B reports the foreign portfolio holdings and tax variables by tax system for international juridical double tax relief. See Appendix A for detailed variable definitions.

Panel A: Full sample					
N = 4,383	Mean	Median	Std Dev	Minimum	Maximum
Dependent variables					
<i>LHOLD</i>	5.12	5.77	2.82	0.00	9.21
<i>RATIO</i>	0.03	0.01	0.06	0.00	0.98
<i>MRATIO</i>	1.65	0.54	3.41	0.00	62.68
Independent variables					
<i>ATRATIO</i>	0.90	0.89	0.18	0.47	1.51
<i>IMP_DUM</i>	0.37	0.00	0.48	0.00	1.00
<i>LIMPORT</i>	6.91	7.07	2.04	-1.98	12.63
<i>LGDP</i>	12.71	12.44	1.45	8.92	16.24
<i>LMCAP</i>	26.20	26.19	1.82	21.17	30.60
<i>LPOP</i>	2.92	2.77	1.38	-1.31	5.70
<i>OPENESS</i>	2.00	2.54	0.99	-1.13	2.54
<i>POLRISK</i>	1.61	1.50	0.45	1.00	3.00
<i>ECORISK</i>	1.73	1.50	0.40	1.00	3.50
<i>LEGRISK</i>	1.37	1.00	0.45	1.00	2.50
<i>OPERISK</i>	1.78	1.75	0.43	1.00	3.25
<i>SECRISK</i>	1.71	1.50	0.71	1.00	3.50
Tax rates					
t_{cs}	0.31	0.31	0.07	0.13	0.53
t_{is}	0.02	0	0.06	0	0.36
t_w	0.12	0.15	0.06	0	0.35
t_{ir}	0.08	0	0.13	0	0.37
t_{cr}	0.31	0.31	0.07	0.13	0.532
t_{pr}	0.32	0.35	0.15	0	0.62

Table 2 - continued

Panel B: By residence countries' tax system for international juridical double tax relief																
	FTC ($t_w < t_{pr}$)				FTC ($t_w > t_{pr}$)				Deduction				None			
	N	Mean	Median	Std Dev	N	Mean	Median	Std Dev	N	Mean	Median	Std Dev	N	Mean	Median	Std Dev
Dependent variables																
<i>LHOLD</i>	3130	5.45	6.29	2.78	372	3.59	3.17	2.46	479	5.11	5.72	2.78	402	3.99	4.03	2.76
<i>RATIO</i>	3130	0.03	0.01	0.06	372	0.03	0.01	0.08	479	0.03	0.01	0.04	402	0.03	0.01	0.07
<i>MRATIO</i>	3130	1.67	0.61	3.36	372	1.69	0.27	4.91	479	1.49	0.57	2.28	402	1.61	0.24	3.27
Independent variables																
<i>ATRATIO</i>	3130	0.91	0.90	0.18	372	0.92	0.90	0.17	479	0.80	0.78	0.15	402	0.88	0.88	0.15
<i>IMP_DUM</i>	3130	0.37	0.00	0.48	372	0.33	0.00	0.47	479	0.35	0.00	0.48	402	0.37	0.00	0.48
Tax rates																
t_{cs}	3130	0.31	0.32	0.07	372	0.31	0.31	0.07	479	0.31	0.31	0.07	402	0.31	0.31	0.07
t_{is}	3130	0.02	0.00	0.06	372	0.01	0.00	0.05	479	0.01	0.00	0.05	402	0.01	0.00	0.05
t_w	3130	0.12	0.15	0.06	372	0.16	0.15	0.06	479	0.11	0.15	0.06	402	0.12	0.15	0.06
t_{ir}	3130	0.10	0.00	0.13	372	0.00	0.00	0.00	479	0.10	0.00	0.15	402	0.00	0.00	0.00
t_{cr}	3130	0.31	0.30	0.07	372	0.31	0.33	0.08	479	0.30	0.31	0.06	402	0.31	0.34	0.07
t_{pr}	3130	0.37	0.40	0.11	372	0.06	0.10	0.06	479	0.38	0.41	0.18	402	0.15	0.15	0.08

Table 3
The Relation between FPI and After-Tax Returns to Dividends

This table presents the results of the estimation of Equation 3.

$$FPI_{ijt} = \gamma_0 + \gamma_1 * ATRATIO_{ijt} + \gamma_{2-k} X_{jt} + \psi_i + \xi_t + \mu_{it}$$

The dependent variable, FPI_{ijt} , varies between $LHOLD_{ijt}$, $RATIO_{ijt}$ and $MRATIO_{ijt}$. $ATRATIO_{ijt}$ is the after-tax dividend that the investor from residence country i receives for \$1 of pretax corporate income from holdings in source country j, relative to the after-tax dividend she receives for \$1 of pretax corporate income from holdings in residence country i. All models include untabulated residence country and year fixed effects, and t-statistics are based on clustered standard errors. All other variables are described in Appendix A. *Significance at the 10% level, **Significance at the 5% level, *** Significance at the 1% level

Dependent variable	(1) <i>LHOLD</i>	(2) <i>RATIO</i>	(3) <i>MRATIO</i>
<i>ATRATIO</i>	1.076** (2.35)	0.022*** (3.58)	1.178*** (3.32)
<i>LIMPORT</i>	0.503*** (6.50)	0.009*** (4.28)	0.407*** (4.07)
<i>LGDP</i>	-0.667*** (4.70)	0.005 (1.09)	0.618** (2.36)
<i>LMCAP</i>	0.710*** (8.54)	0.007*** (3.12)	0.279** (2.36)
<i>LPOP</i>	0.424*** (3.20)	-0.006 (1.65)	-0.529** (2.35)
<i>OPENESS</i>	0.324*** (6.19)	0.001 (0.83)	0.065 (0.87)
<i>POLRISK</i>	-0.097 (0.82)	-0.001 (0.25)	-0.138 (0.72)
<i>ECORISK</i>	-0.234 (1.70)	0.007* (1.73)	0.438** (2.14)
<i>LEGRISK</i>	-0.581*** (4.52)	0.00 (0.08)	-0.23 (0.92)
<i>OPERISK</i>	0.709*** (3.97)	-0.016** (2.51)	-0.947** (2.64)
<i>SECRISK</i>	-0.167 (1.63)	0.013** (2.71)	1.015* (3.40)
<i>Constant</i>	-10.234*** (4.93)	-0.261*** (4.61)	-15.329*** (4.91)
Observations	4,383	4,383	4,383
R-squared	0.787	0.246	0.259

Table 4
The Relation between FPI and Dividend Imputation Systems

This table presents the results of the estimation of Equation 4.

$$FPI_{ijt} = \beta_0 + \beta_1 * IMP_DUM_{jt} + \beta_{2-k} X_{jt} + \eta_i + \lambda_t + \varepsilon_{it}$$

The dependent variable, FPI_{ijt} , varies between $LHOLD_{ijt}$, $RATIO_{ijt}$ and $MRATIO_{ijt}$. IMP_DUM_{jt} is an indicator variable that equals 1 if source country j has a dividend imputation system that does not extend to non-resident investors. All models include untabulated residence country and year fixed effects, and t-statistics are based on clustered standard errors. All other variables are described in Appendix A.

*Significance at the 10% level, **Significance at the 5% level, *** Significance at the 1% level

Dependent Variable	(1) <i>LHOLD</i>	(2) <i>RATIO</i>	(3) <i>MRATIO</i>
<i>IMP_DUM</i>	-0.084 (0.85)	-0.015*** (4.00)	-1.011*** (4.39)
<i>LIMPORT</i>	0.502*** (6.67)	0.007*** (3.69)	0.322*** (3.24)
<i>LGDP</i>	-0.768*** (6.28)	0.002 (0.41)	0.426* (1.78)
<i>LMCAP</i>	0.751*** (9.76)	0.008*** (3.65)	0.347*** (2.93)
<i>LPOP</i>	0.434*** (3.25)	-0.004 (1.16)	-0.382* (1.87)
<i>OPENESS</i>	0.318*** (6.00)	0.002 (0.98)	0.084 (1.12)
<i>POLRISK</i>	-0.074 (0.63)	-0.001 (0.36)	-0.171 (0.93)
<i>ECORISK</i>	-0.235* (1.76)	0.005 (1.30)	0.325 (1.57)
<i>LEGRISK</i>	-0.648*** (4.66)	-0.007 (1.48)	-0.733** (2.67)
<i>OPERISK</i>	0.727*** (4.33)	-0.012** (2.05)	-0.701** (2.10)
<i>SECRISK</i>	-0.128 (1.13)	0.016*** (3.05)	1.187*** (3.70)
<i>Constant</i>	-9.342*** (4.46)	-0.223*** (4.14)	-13.059*** (4.48)
Observations	4,383	4,383	4,383
R-squared	0.786	0.258	0.274

Table 5
The Relation between FPI and After-Tax Returns to Dividends
and Dividend Imputation Systems

This table presents the results of the estimation of a variation of Equation 3.

$$FPI_{ijt} = \gamma_0 + \gamma_1 * ATRATIO_{jt} + \gamma_2 * IMP_DUM_{jt} + \gamma_{3-k} X_{jt} + \psi_i + \xi_t + \mu_{it}$$

The dependent variable, FPI_{ijt} , varies between $LHOLD_{ijt}$, $RATIO_{ijt}$ and $MRATIO_{ijt}$. $ATRATIO_{ijt}$ is the after-tax dividend that the investor from residence country i receives for \$1 of pretax corporate income from holdings in source country j , relative to the after-tax dividend she receives for \$1 of pretax corporate income from holdings in residence country i . IMP_DUM_{jt} is an indicator variable that equals 1 if source country j has a dividend imputation system that does not extend to non-resident investors. All models include untabulated residence country and year fixed effects, and t-statistics are based on clustered standard errors. All other variables are described in Appendix A. * Significance at the 10% level, ** Significance at the 5% level, *** Significance at the 1% level

Dependent Variable	(1) <i>LHOLD</i>	(2) <i>RATIO</i>	(3) <i>MRATIO</i>
<i>ATRATIO</i>	1.081** (2.35)	0.023*** (4.31)	1.242*** (4.20)
<i>IMP_DUM</i>	-0.087 (0.88)	-0.015*** (4.01)	-1.014*** (4.40)
<i>LIMPORT</i>	0.495*** (6.56)	0.007*** (3.58)	0.314*** (3.14)
<i>LGDP</i>	-0.675*** (4.79)	0.004 (0.86)	0.534** (2.20)
<i>LMCAP</i>	0.712*** (8.73)	0.008*** (3.35)	0.301** (2.63)
<i>LPOP</i>	0.437*** (3.30)	-0.004 (1.13)	-0.378* (1.85)
<i>OPENESS</i>	0.327*** (6.19)	0.002 (1.10)	0.094 (1.26)
<i>POLRISK</i>	-0.103 (0.85)	-0.002 (0.54)	-0.204 (1.11)
<i>ECORISK</i>	-0.245* (1.84)	0.005 (1.25)	0.314 (1.53)
<i>LEGRISK</i>	-0.621*** (4.40)	-0.007 (1.38)	-0.702** (2.58)
<i>OPERISK</i>	0.731*** (4.36)	-0.012* (2.04)	-0.697** (2.09)
<i>SECRISK</i>	-0.155 (1.39)	0.015*** (2.96)	1.156*** (3.62)
<i>Constant</i>	-10.116*** (4.75)	-0.240*** (4.34)	-13.947*** (4.66)
Observations	4,383	4,383	4,383
R-squared	0.788	0.259	0.275

Table 6
The Relation between FPI and After-Tax Returns to Dividends and Payout Ratios

This table presents the results of the estimation of a variation of Equation 3.

$$FPI_{ijt} = \gamma_0 + \gamma_1 * ADJATRATIO_{ijt} + \gamma_2 * ADJPAYOUT_j + \gamma_3 * ADJATRATIO_{ijt} * ADJPAYOUT_j + \gamma_{4-k} X_{jt} + \psi_i + \xi_t + \mu_{it}$$

The dependent variable, FPI_{ijt} , varies between $LHOLD_{ijt}$, $RATIO_{ijt}$ and $MRATIO_{ijt}$. $ADJPAYOUT_j$ is the median dividend per share divided by earning per share for a country j as reported by Alzahrani and Lasfer 2009 minus its mean for all countries in the sample. $ADJATRATIO_{ijt}$ is the after-tax dividend that the investor from residence country i receives for \$1 of pretax corporate income from holdings in source country j , relative to the after-tax dividend she receives for \$1 of pretax corporate income from holdings in residence country i minus its mean in the sample. All models include untabulated residence country and year fixed effects, and t-statistics are based on clustered standard errors. All other variables are described in Appendix A. *Significance at the 10% level, ** Significance at the 5% level, *** Significance at the 1% level

Dependent Variable	(1) <i>LHOLD</i>	(2) <i>RATIO</i>	(3) <i>MRATIO</i>
<i>ADJATRATIO</i>	1.260** (2.71)	0.026*** (3.53)	1.354*** (3.32)
<i>ADJPAYOUT</i>	-0.801* (1.95)	-0.042*** (3.28)	-2.591*** (3.65)
<i>ADJATRATIO*ADJPAYOUT</i>	4.220* (1.85)	0.255*** (3.63)	14.673*** (3.59)
<i>LIMPORT</i>	0.469*** (6.39)	0.008*** (4.02)	0.411*** (3.55)
<i>LGDP</i>	-0.29 (1.63)	-0.010** (2.63)	-0.532** (2.30)
<i>LMCAP</i>	0.688*** (6.50)	0.009** (2.62)	0.435** (2.50)
<i>LPOP</i>	-0.113 (0.62)	0.015*** (3.29)	0.862*** (3.50)
<i>OPENESS</i>	0.084 (1.11)	0.005** (2.68)	0.413*** (3.80)
<i>POLRISK</i>	-0.203* (1.92)	0.006 (1.26)	0.354 (1.38)
<i>ECORISK</i>	-0.157 (1.12)	-0.003 (0.54)	-0.158 (0.51)
<i>LEGRISK</i>	-0.04 (0.18)	-0.025*** (3.91)	-1.724*** (4.54)
<i>OPERISK</i>	0.392*** (3.03)	-0.005 (0.89)	-0.354 (1.01)
<i>SECRISK</i>	-0.075 (1.07)	0.005 (1.16)	0.549** (2.08)
<i>Constant</i>	-11.406*** (3.80)	-0.117 (1.54)	-6.781* (1.70)
Observations	3,637	3,637	3,637
R-squared	0.812	0.271	0.279

Table 7

The Relation between FPI and Source and Residence Country Tax Policies

This table presents the results of the estimation of a variation of Equation 3.

$$FPI_{ijt} = \gamma_0 + \gamma_1 * SATR_{jt} + \gamma_2 * RATR_{ijt} + \gamma_{3-k} X_{jt} + \psi_i + \xi_t + \mu_{it}$$

The dependent variable, FPI_{ijt} , varies between $LHOLD_{ijt}$, $RATIO_{ijt}$ and $MRATIO_{ijt}$. $SATR_{jt}$ is the after-tax dividend that the investor from residence country i receives for \$1 of pretax corporate income from holdings in source country j , $RATR_{ijt}$ is the after-tax dividend she receives for \$1 of pretax corporate income from holdings in residence country i . All models include untabulated residence country and year

fixed effects, and t-statistics are based on clustered standard errors. All other variables are described in Appendix A. * Significance at the 10% level, ** Significance at the 5% level, *** Significance at the 1% level

Dependent Variable	(1) <i>LHOLD</i>	(2) <i>RATIO</i>	(3) <i>MRATIO</i>
<i>SATR</i>	2.620*** (2.822)	0.040*** (3.122)	1.790** (2.515)
<i>RATR</i>	-1.294 (-1.119)	-0.034** (-2.697)	-1.857** (-2.488)
<i>LIMPORT</i>	0.502*** (6.547)	0.009*** (4.303)	0.408*** (4.096)
<i>LGDP</i>	-0.641*** (-4.427)	0.005 (1.105)	0.598** (2.357)
<i>LMCAP</i>	0.698*** (8.539)	0.007*** (3.166)	0.287** (2.437)
<i>LPOP</i>	0.422*** (3.184)	-0.006 (-1.663)	-0.531** (-2.362)
<i>OPENESS</i>	0.325*** (6.287)	0.001 (0.809)	0.062 (0.827)
<i>POLRISK</i>	-0.104 (-0.877)	-0.001 (-0.235)	-0.132 (-0.683)
<i>ECORISK</i>	-0.236* (-1.742)	0.007* (1.737)	0.439** (2.152)
<i>LEGRISK</i>	-0.573*** (-4.357)	0.000 (0.066)	-0.238 (-0.952)
<i>OPERISK</i>	0.705*** (3.931)	-0.016** (-2.518)	-0.948** (-2.652)
<i>SECRISK</i>	-0.172* (-1.702)	0.013** (2.710)	1.022*** (3.397)
<i>Constant</i>	-9.712*** (-4.351)	-0.241*** (-4.206)	-14.170*** (-4.574)
Observations	4,383	4,383	4,383
R-squared	0.786	0.238	0.251

Table 8

The Relation between FPI and After-Tax Returns to Dividends Including Additional Controls Variable

This table presents the results of the estimation of variations of Equations 3 and 4 where the vector of control variables (X) is expanded.

$$FPI_{ijt} = \gamma_0 + \gamma_1 * ATRATIO_{ijt} + \gamma_{2..k} X_{jt} + \psi_i + \xi_t + \mu_{it}$$

$$FPI_{ijt} = \beta_0 + \beta_1 * IMP_DUM_{jt} + \beta_{2..k} X_{jt} + \eta_i + \lambda_t + \varepsilon_{it}$$

The dependent variable, FPI_{ijt} , varies between $LHOLD_{ijt}$, $RATIO_{ijt}$ and $MRATIO_{ijt}$. $ATRATIO_{ijt}$ is the after-tax dividend that the investor from residence country i receives for \$1 of pretax corporate income from holdings in source country j , relative to the after-tax dividend she receives for \$1 of pretax corporate income from holdings in residence country i . IMP_DUM_{jt} is an indicator variable that equals 1 if source country j has a dividend imputation system that does not extend to non-resident investors. All models include untabulated residence country and year fixed effects, and t-statistics are based on clustered standard errors. All other variables are described in Appendix A. *Significance at the 10% level, **Significance at the 5% level, *** Significance at the 1% level

	<i>ATRATIO</i>			<i>IMP_DUM</i>		
	<u><i>LHOLD</i></u>	<u><i>RATIO</i></u>	<u><i>MRATIO</i></u>	<u><i>LHOLD</i></u>	<u><i>RATIO</i></u>	<u><i>MRATIO</i></u>
<i>ATRATIO or IMP_DUM</i>	1.343***	0.024**	1.398**	-0.047	-0.016***	-1.153***
<i>LIMPORT</i>	0.393***	0.004**	0.137	0.429***	0.004**	0.128
<i>LGDP</i>	-0.364**	-0.006	-0.042	-0.451***	-0.011**	-0.398
<i>LMCAP</i>	0.910***	0.012***	0.421**	0.943***	0.013***	0.500**
<i>LPOP</i>	-0.332**	0.003	0.212	-0.352**	0.007	0.458
<i>OPENESS</i>	-0.098	0.005**	0.347***	-0.125*	0.006**	0.422***
<i>POLRISK</i>	-0.558***	0.001	0.036	-0.586***	-0.001	-0.093
<i>ECORISK</i>	-0.086	0.009	0.426	-0.08	0.005	0.103
<i>LEGRISK</i>	-0.490*	-0.023***	-1.334***	-0.614**	-0.026***	-1.463***
<i>OPERISK</i>	0.348**	-0.009	-0.355	0.263*	-0.01	-0.399
<i>SECRISK</i>	-0.234**	0.004	0.538*	-0.211*	0.007	0.717**
<i>SDINDEX</i>	-0.254	-0.003	-0.178	-0.103	0.012	0.832
<i>CORRUPTION</i>	-0.146**	-0.004***	-0.102	-0.190***	-0.003**	-0.068
<i>LEXPORT</i>	0.215**	0.007*	0.351*	0.181*	0.006	0.294
<i>MCAPTOGDP</i>	-0.235	0.001	0.145	-0.204	0.000	0.087
<i>RETCORR</i>	0.103	-0.005	-0.297	0.125	-0.001	-0.005
<i>LDIST</i>	0.027	0.002	0.057	0.013	0.002	0.081
<i>COMMON_LANGUAGE</i>	0.031	0.01	0.622	-0.019	0.008	0.516
<i>CONTINGENT</i>	0.000	0.004	0.084	0.007	0.007	0.282

<i>INVESTOR_LGDP</i>	3.953**	-0.046	-2.344	3.716**	-0.048	-2.442
<i>INVESTOR_LMCAP</i>	0.248	0.003	0.077	0.193	0.002	0.022
	-			-		
<i>INVESTOR_LPOP</i>	15.093***	0.181	11.224	15.112***	0.175	10.805
<i>INVESTOR_CORRUPTION</i>	0.074	0.006*	0.394**	0.015	0.005*	0.33*
<i>INVESTOR_OPENESS</i>	0.177	0.005	0.267	0.155	0.005	0.233
<i>TIME</i>	-0.002	-0.004**	-0.142*	0.026	-0.004***	-0.162**
<i>Constant</i>	-24.996*	-0.278	-20.468	-18.809	-0.162	-13.643
Observations	3,206	3,206	3,206	3,206	3,206	3,206
R-squared	0.802	0.309	0.311	0.800	0.319	0.327

Table 9

Two stage least squares estimation for the relation between FPI, and tax policy

This table presents the results of the estimation of Equation 3.

$$FPI_{ijt} = \gamma_0 + \gamma_1 * ATRATIO_{ijt} + \gamma_{2-k} X_{jt} + \psi_i + \xi_t + \mu_{it}$$

where *ATRATIO* is instrumented by *GOVDEBTRATIO*. *GOVDEBTRATIO* is the ratio of government debt burden in the source country to the government debt burden in the resident country. The dependent variable, *FPI_{ijt}*, varies between *LHOLD_{ijt}*, *RATIO_{ijt}* and *MRATIO_{ijt}*. *ATRATIO_{ijt}* is the after-tax dividend that the investor from residence country i receives for \$1 of pretax corporate income from holdings in source country j, relative to the after-tax dividend she receives for \$1 of pretax corporate income from holdings in residence country i. All models include untabulated residence country and year fixed effects, and t-statistics are based on clustered standard errors. F-statistic for Instruments indicates the results of Wald tests for the joint significance of the instruments following Stock and Yogo 2005,. All other variables are described in Appendix A. *Significance at the 10% level, ** Significance at the 5% level, *** Significance at the 1% level

Dependent Variable	First stage <i>ATRATIO</i>	(1) <i>LHOLD</i>	(2) <i>RATIO</i>	(3) <i>MRATIO</i>
<i>GOVDEBTRATIO</i>	-0.001*** (3.63)			
<i>ATRATIO</i>		10.008** (2.50)	0.343*** (4.00)	19.096*** (4.24)
<i>LIMPORT</i>	0.006*** (5.38)	0.450*** (13.89)	0.007*** (7.10)	0.303*** (6.15)
<i>LGDP</i>	-0.082*** (13.68)	0.072 (0.21)	0.032*** (3.86)	2.078*** (4.64)
<i>LMCAP</i>	0.035*** (11.18)	0.400*** (2.67)	-0.004 (1.14)	-0.327* (1.70)
<i>LPOP</i>	-0.006 (1.15)	0.474*** (4.85)	-0.005* (1.70)	-0.421*** (2.74)
<i>OPENESS</i>	-0.008*** (3.53)	0.394*** (7.51)	0.004* (2.96)	0.205*** (2.94)
<i>POLRISK</i>	0.026*** (5.33)	-0.337** (2.50)	-0.009** (2.53)	-0.613*** (3.00)
<i>ECORISK</i>	0.009 (1.58)	-0.311*** (3.09)	0.004 (1.41)	0.322** (2.06)
<i>LEGRISK</i>	-0.025*** (3.25)	-0.335** (2.02)	0.009* (1.80)	0.269 (0.97)
<i>OPERISK</i>	0.003 (0.35)	0.684*** (6.24)	-0.017*** (3.31)	-1.059*** (3.53)
<i>SECRISK</i>	0.024*** (7.08)	-0.390*** (3.44)	0.005* (1.74)	0.586* (3.51)
<i>Constant</i>	0.714*** (11.48)	-16.729*** (5.21)	-0.494* (6.73)	-28.396*** (7.23)
Observations	4,342	4,342	4,342	4,342
R-squared	0.728	0.7022	0.2073	0.2103
F-statistic for instruments	13.194			