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Bilateral Tax Treaties and US Foreign Direct Investment Financing Modes

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Tax Treaties, Tax Holidays, and U.S. Foreign Direct Investment Financing Modes

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Abstract

Though it is often claimed that bilateral tax treaties promote foreign direct investment (FDI), previous empirical studies do not support this view. Using U.S. FDI outflows disaggregated into financing modes, equity, reinvested earnings, and inter-company debt, we estimate fixed-effects quantile regression models that include controls for new, existing-renegotiated tax treaties, and the total number of tax treaties a host country has in effect. Results, in general, indicate that U.S. bilateral tax treaties have a *negative* impact on total U.S. FDI outflows, equity capital, and reinvested earnings and a *positive* and significant impact on inter-company debt, while the total number of treaties a host countries has in place has a *positive* and statistically significant impact on total U.S. FDI flows, reinvested earnings, and equity capital to the host country. In addition, a full set of time controls also allows us to explore a policy anticipation effect and passage of the 2004 American Jobs Creation Act (AJCA). Results are consistent with a policy-anticipation effect in 2004 and actual policy effect in 2005 in which retained earnings and total FDI were, all other things constant, statistically significantly larger in 2004 and smaller in 2005. These controls are not statistically significant in the models for equity capital or inter-company debt.

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Tax Treaties, Tax Holidays, and U.S. Foreign Direct Investment Financing Modes

According to the United Nations Council on Trade and Development (UNCTAD 2011), there are over 6,100 treaties of one form or other governing bilateral investment relationships. Included in these treaties are over 2,500 bilateral tax treaties or double-tax treaties which are arguably the most pervasive international legal agreements on foreign investment and form the basis for the international tax regime. Reuven (2009) claims that, though they differ across countries, nearly all bilateral tax treaties are based on models dating back to the League of Nations.

As discussed in studies such Egger *et al*. (2006), Blonigen and Davies (2004) and Davies *et al*. (2009), bilateral tax treaties contain elements that may encourage foreign direct investment (FDI) and elements that may discourage FDI. One of the well-known positive aspects of a tax treaty is the assignment of tax jurisdiction which provides relief from double taxation. Standardization of tax rules also encourages FDI by reducing withholding rates and tax uncertainty. Rules on transfer pricing, in contrast, allow for increased information sharing and enforcement of price calculation guidelines and may reduce FDI flows between partner countries. Likewise, agreements on limiting treaty provision to the residents of the partner countries (by establishing limits on third-country residents' ownership) are intended to reduce treaty shopping and may reduce FDI.

Regarding treaty shopping, Davies (2004) describes the 'multilateral" aspect of

bilateral tax treaties. That is, how a bilateral treaty may have a third-country effect of distorting or diverting investment flows or how networks of bilateral treaties create complexities which make it difficult to determine where tax credits should be applied. Because tax treaties differ across country pairs, managers of multinational firms can practice "treaty shopping," and invest in a third country that offers a lower withholding rate to the host country. Hence, third country effects are magnified by the transfer pricing opportunities available to multinationals that operate in many countries.

Because of their opposing effects, the net effect of bilateral tax treaties on FDI is an empirical issue. In general, the existing and limited empirical literature finds little or no evidence that the signing of a bilateral tax treaty spurs new FDI, or weak evidence in support of a negative impact. In this study we use aggregate U.S. FDI outflows, but disaggregate the flow data into its three financing modes: equity capital, retained earnings, and inter-company debt. We view our contribution to the literature in three ways.

First, we examine how tax treaties might affect the different modes of financing in addition to aggregate flows. Second, we accommodate the distribution of the data by employing quantile regressions models as suggested by Millimet and Kumas (2007). We, however, use fixed-effects quantile-regression models to account for potential country-pair fixed effects, while including separate controls for new treaty countries (negotiated within the sample period), existing and renegotiated treaty countries, and

no treaty countries rather than pooling any two groups or dropping a group. Third we consider potential multilateral effects by including a control for the total number of treaties a host country has in place during a given year. Our models also allow us to consider the tax holiday included in the 2005 American Jobs Creation Act. These last two issues, to our knowledge, have not yet been considered in the empirical literature. In addition, we take advantage of new and expanded data that includes not only a longer time span than the data employed in earlier studies of tax treaties, but also a larger number of countries with new or in-sample treaties or with no treaty.

Our empirical results indicate that the total number of tax treaties a host country has in place has a statistically significant and positive impact on total U.S. FDI outflows and all three financing modes. In contrast, total FDI outflows, equity-financed FDI outflows, and retained earnings show a negative and statistically significant association with new and existing-renegotiated tax treaties. Further results for existing-renegotiated treaties point to a positive and statistically significant impact on inter-company debt while new treaties show a positive but statistically insignificant impact.

We offer as an explanation that, on the one hand, the positive multilateral effect measured by the total number of treaties is consistent with a treaty-shopping effect in which a host country with a large number of bilateral treaties facilitates income shifting by multinational firms for tax minimization purposes. On the other hand, new and renegotiated U.S. bilateral tax treaties enhance tax cooperation, information sharing,

and rules to reduce tax avoidance and outweigh positive aspects of the treaties thereby reducing both equity-financed FDI and reinvested earnings. Indeed Dagan (2000) argues that tax treaties are not even needed to eliminate double-taxation and are really used to simplify and coordinate taxation and redistribute tax revenues from developing to developed nations. Hence, our results are consistent with Davies observation that there exists a "mismatch" between the framing of tax treaties and how they are used in practice.

Results for a 2004 time control shows statistically significant results that are consistent with an anticipated policy (tax holiday) effect in which retained earnings were larger for that year, all other things considered. Results for the 2005 time controls display statistically significant results consistent with an actual policy effect in that earnings retained abroad we lower in 2005. As one would expect, these statistically significant positive-negative effects are also reflected in total FDI outflows but not in equity-financed FDI or intercompany debt.

The remainder of the paper is organized as follows: Section 2 provides a review of the literature on taxes and FDI and tax treaties and FDI. Section 3 describes the pattern of U.S. FDI flows, modes of financing FDI, and our research hypotheses. Section 4 describes the data and empirical methodology. Section 5 provides the results of the empirical models while Section 6 offers a conclusion.

2. Tax Treaties, and Foreign Direct Investment

2.2 Tax treaties, FDI, and Financing Modes

Reuven (2009) provides an excellent history and overview of the design and implementation of bilateral tax treaties, while Davies (2004) offers a review of the theoretical and empirical literature on tax treaties, in particular contrasting the conventional view that tax treaties are designed to increase FDI with the empirical evidence in the literature that shows otherwise. He points out that tax treaties may increase FDI through several different channels: elimination of double taxation through credits or exemptions, tax coordination, coordination of tax definitions and jurisdiction, which reduce tax uncertainty. However, tax treaties are also designed to promote information sharing between policymakers in the host and source country and setting standards for transfer pricing policies thereby reducing tax evasion and treaty shopping and may actually reduce FDI.

Blonigen and Davies (2000) offer the first empirical study of the impact of tax treaties on FDI. Focusing on U.S. FDI inflows and outflows, a dummy variable for a bilateral tax treaty implied a strong positive and significant effect, leading to the conclusion that tax treaties promote FDI. The authors note that the effects of a treaty may change over time and so they include an age or "vintage" variable reflecting the length of time the treaty has been in place. This variable was positive and significant, leading them to conclude that tax treaties have a positive impact on FDI that increases

over time.

Blonigen and Davies (2004), take issue with two aspects of their earlier study. First, the earlier analysis used a single dummy variable for tax treaties. Some countries in the sample had treaties existing prior to the sample period whiles others did not. Those with existing treaties tend to be the largest recipients of U.S. FDI flows and the largest source countries for FDI into the United States. Hence, the dummy variable may actually be reflecting differences of unobserved country characteristics between existing-treaty countries and new-treaty countries. Second, when FDI is measured in levels, new treaties were found to be significant and positive, while when measured in logs, they were not. The authors argue that because logging the dependent variable helps with the inherent skewness of the data, the analysis should be completed in log form.

Blonigen and Davies (2005) uses a similar approach but considers FDI flows of a group of OECD countries from 1982 through 1992. Using a single dummy variable for tax treaties they once again find a positive and significant effect on FDI stocks. However, when separating old and new treaties, they find a positive and significant effect for old treaties but a negative and significant effect for new treaties when the dependent variable is in levels and for new treaties a negative but insignificant effect when the dependent variable is in logs.

Davies (2004, p. 784) offers possible explanations for the lack of a consistent

significant effect of treaty variable in their empirical studies: FDI may be affected by factors other than government tax policies and the data may be too "noisy to tease out the positive effect of tax treaties" or that the way treaties are used in practice may be different than their potential as agued by theorists.

Davies (2003) considers the renegotiation of the old treaties using U.S. FDI data on stocks from 1966 to 2000, and affiliate sales and flows from 1983 to 2000. Controlling for country-fixed effects precludes using separate old and new treaty dummy variables as the old treaty dummy is time invariant. Hence, he includes a pooled-treaty variable and a dummy variable to reflect treaty renegotiation. He finds that the pooled treaty variable is negative and significant. The renegotiation variable is negative but not significant for stocks but positive and significant for sales and flows. He speculates that the differing sample period of the data for stocks versus flows is one reason for the difference. Restricting stocks to 1983 through 2000, he finds renegotiated treaties to be positive but insignificant. He offers additional explanations that it may take stocks a longer time to adjust to the renegotiated treaty than required by flows, there may be an endogeneity issue (large sales induce renegotiation), and that firms may be adjusting to decreased withholding rates by shifting and maintaining more income abroad.

Egger *et al*. (2006) emphasize the second suggestion of Davies, tax treaties are also bilateral agreements to share information and establish rules on transfer pricing and tax shopping so as to reduce tax avoidance and evasion and, thus, may actually

reduce FDI activity. By emphasizing these two major objectives of double taxation and tax avoidance, it is unclear whether these agreements promote or reduce FDI activity. Specifying a theoretical model and using numerical simulations they conclude that certain combinations of country characteristics determine the welfare effects of tax treaties and, therefore, the implementation of new treaties should be considered endogenous. Examining a group of OECD countries over the period from 1985 to 2000 and controlling for the potential endogeneity they find a significant negative effect for new treaties.

Following this, Barthel *et al.* (2009) use a large data set of bilateral FDI relationships to consider the impact of tax treaties on FDI stocks. Their estimates result from a fixed-effects model which, as explained above, eliminates the control for existing treaties. Again the benefit of this approach is that it eliminates the potential endogeniety of the existing treaties variable with the latent country-specific characteristics. The remaining tax treaty dummy variable then captures treaties negotiated during the sample period. Using stock data, they also include a variable for the age of the treaty to capture the impact of the treaty over time. Both variables are positive and significant with the treaty-age effect only "slightly higher" than the new-treaty effect. The authors attribute the positive and robust results to a larger sample of countries and longer time period.

Most recently, Blonigen *et al*. (2012) and Davies *et al*. (2009) use firm-level data to

explore the opposing effects tax treaties have on the intensive margin (the level of FDI flows as measured by affiliate sales) and extensive margin (the probability of new investment). Davies *et al*. find that the implementation of a new tax treaty has no effect on the level of FDI but does have a positive impact on the probability of investment. Blonigen *et al*. find that the positive effect of new tax treaties is reduced or reversed as the price transparency of inputs sold by the affiliate to the parent increases, thereby limiting income shifting via transfer pricing.

Though we are also interested in how tax treaties might affect FDI, in contrast to previous studies our main interest is in how these policies affect the *mode of financing FDI*. In other words, we are not just interested in whether these policies affect aggregate FDI flows, but also if they affect the way in which firms finance FDI.[1] Specifically we test if these international policies affect not only the attractiveness of FDI but also the profit or income shifting of firms and, hence, will be evident in individual financing modes but not necessarily in aggregate flows. The data used here, therefore, differs in two important ways: First, our sample cover a longer time span and runs from 1982 through 2007, over years when there were much more significant FDI flows. Second, the data is disaggregated into its three different financing modes. The next section describes the data on U.S. FDI outflows and offers our research hypotheses.

[1] Related to the work here, Wolff (2007) analyzes, in four separate models, total FDI flows and the three financing modes, finding that the different components of FDI respond differently to taxation as well as other explanatory variables used in the model. He finds that taxes are insignificant in the models for total FDI flows and equity financing but significant for reinvested earnings and debt.

3. Describing Patterns of U.S. FDI Flows and their Financing Patterns

Although little work has been done on modeling the financing modes of FDI, a notable exception is Lipsey (1993) who compares financing flows across U.S. inward and outward FDI from 1950 through 1991. He finds that U.S. firms tend to finance FDI abroad more consistently through reinvested earnings whereas foreign firms have a more varied pattern of financing. Lipsey however does not use a formal model of any kind to explain the asymmetry he finds. Furthermore, the Lipsey comparison is problematic in the sense that he relates U.S. MNE financing patterns in many different countries to that of foreign MNEs operating only in the United States. As such, it is difficult to identify whether the differences noted are driven by the uniqueness of U.S. MNE strategies, or by host country characteristics. For example, it may be the case that given the United States is a highly developed economy, with well-developed legal and financial institutions, a more varied set of financing options emerge. On the other hand, to the extent U.S. MNEs are operating in many different economies, with varied levels of institutional and legal development, this may lead to a relatively large reliance on retained earnings.

3.1 U.S. FDI Flows and Financing

The U.S. Bureau of Economic Analysis (BEA) categorizes U.S. FDI flows into three financing modes; equity capital, reinvested earnings, and inter-company debt. In regard

to outflows specifically, the BEA defines each type of flow as follows: A positive equity-capital outflow occurs when a U.S. parent company increases its equity investment in one of its existing foreign affiliates or makes a new equity investment in a foreign business enterprise, either by acquiring an existing business or establishing a new one. A negative equity capital outflow occurs when a U.S. parent company reduces its equity investment in one of its existing foreign affiliates.

Inter-company debt flows are of two types, U.S. parent receivables and U.S. parent payables. U.S. parent receivables represent loans that a U.S. parent extends to its foreign affiliate. A positive U.S. parent receivable occurs when the U.S. parent extends a new loan to its foreign affiliate. A negative parent receivable occurs when an affiliate repays part or all of a loan from its U.S. parent. A U.S. parent payable represents loans that a foreign affiliate extends to its U.S. parent. A positive U.S. parent payable occurs when the parent repays part or its entire loan from its foreign affiliate and a negative parent payable occurs when an affiliate extends a new loan to the U.S. parent.

Reinvested earnings are the parent's claim on undistributed after-tax earnings of its foreign affiliate. They are computed as the difference between the parent's claim on its affiliate's current earnings and the dividends that the affiliate pays to a parent during a given period. A positive reinvested earning outflow occurs when a parent has a claim on positive current earnings of its affiliate in excess of the dividends that it receives from its affiliate. A negative reinvested earning outflow occurs when these

claims on earnings are repatriated to the parent. Because each of these flows contain both positive and negative outflows, the net outflow can be positive, negative, or zero in any given period.

Managers of MNEs, therefore, can rely on any or all of the three financing modes as options for financing FDI. Razin, Sadka, and Yuen (1998) describe a "pecking" order among these international capital flows. Relying on corporate financial theory in which firms prefer internal financial modes, such as retained earnings first and inter-company debt second, over other external modes such as equity finance, they extend this notion to international finance flows by considering FDI as retained earnings capital flows, and separate portfolio flows into equity modes and debt modes. They demonstrate this pattern, or pecking order, in global flows (though their focus is specifically on developing countries).

Daniels, Hejazi, and von der Ruhr (2004) consider the pattern of U.S. FDI outflows disaggregated into the three financing modes over the period 1982 through 2000 and divide the data both by host country or region and by industry. They also show a similar pecking order in the data in that reinvested earnings are the most important source of financing for U.S. MNEs operating abroad. They show this to be the case both at country or region levels and industry levels. Furthermore, they find that reinvested earnings are more important regionally than globally both in aggregate and at industry levels. However, they also point out that although equity financing is less

important as a source of financing for U.S. MNEs operating abroad than is reinvested earnings, it is more important than inter-company debt.

The data used in the analysis here is from the same source as Daniels *et al.*, but is extended to include a larger number of countries and a longer time period.[2] Hence, Figures 1 through 3 show the same general pattern with reinvested earnings being the most important financing mode. This holds in aggregate as shown in Figure 1, for countries with which the U.S. has a tax treaty in place, as shown in Figure 2, and across developed and developing host countries, as shown in Figure 3. All three figures also show that though reinvested earnings are more important than equity finance, equity is more important than inter-company debt. With an understanding of the existing literature and the pattern of data, we next offer our research hypotheses.

Figures 1 through 3 Here

3.2 The American Jobs Creation Act

Though the 2004 AJCA initially began as a bill to compensate exporters for the repeal of the tax-based export subsidy, it quickly grew to include many tax breaks. One provision was a tax break or tax holiday offered to corporations for repatriation of foreign-earned income. In this provision, for the year 2005 only, U.S. multinationals paid a 5.25 percent tax rate on foreign source income (the statutory U.S. corporate tax rate was and is 35 percent). In order to receive this credit, firms were required to submit a proposal on

[2] Since their study, the BEA has extended the number of countries included in the FDI outflow database disaggregated to the country level.

how the repatriated earnings would be used to undertake specific domestic investment projects. Hence, this tax holiday was enacted to incentivize firms to permanently reinvest income earned abroad domestically in effort to promote job growth. Because 2004 was an election year, the bill was trumpeted throughout the year and so was anticipated early in the year, before eventually being signed by both the house and senate in October.

As a result, the approach used here is to view the act as both an anticipated policy action and an actual policy action. We expect that because the policy was anticipated, firms would tend to hoard foreign profits until 2005 and, hence, reinvested earnings would rise. Because reinvested earnings are the biggest component of FDI outflows, it may cause overall flows to rise as well. We do not *a priori* expect this policy to have an impact on equity or debt. One might argue, however, that if this policy action led managers to believe that such holidays would now be the norm as opposed to the exception, this would spur new FDI and also increase equity flows and inter-company debt.

For 2005 we expect the opposite as firms would repatriate earnings under the lower tax and so reinvested earnings and possibly total flows would decline. Again we have no *a priori* expectations for equity or debt. Our hypotheses, therefore, is that the 2004 dummy variable will be positive for total flows and reinvested earnings and the 2005 dummy variable will be negative for total flows and reinvested earnings.

3.3 New Tax Treaties

If, on the one hand, tax treaties promote FDI, then we should expect their effect on total flows and the three components of financing to be positive. It is unclear, *a priori*, which mode would be most elastic to the policy change and which the least elastic. If, on the other hand, treaties primarily serve to coordinate tax policy, set rules for transfer pricing and reduce tax evasion and treaty shopping, then they could well reduce FDI. Though this might reduce the transfer of new funds and be reflected in a decline in equity financing, we expect the biggest impact on retained earnings and debt as it would affect income shifting described in the review of the tax studies above.

Given the work cited above, one should treat those countries with treaties existing prior to the sample period separately from those countries that negotiated a treaty during the sample period. The majority of the countries with new treaties are emerging or developing countries. Those with existing treaties are developed economies and all of the treaties were negotiated prior to 1957. Hence, because of differing country characteristics, the net effect of the dual objectives in the tax treaties may not necessarily have a similar impact on FDI flows to the two groups of countries. Because reinvested earnings are the most important financing mode for U.S. multinationals, we expect their biggest impact to be on the reinvested earnings of U.S. multinationals and be reflected in overall flows as well. In short, the impact of old and new treaties is an empirical question likely to be reflected in retained earnings flows.

3.4 Existing-Renegotiated Treaties

In our sample there are 22 countries with treaties in place prior to 1982, 15 with treaties completed during the sample period, 1982 through 2008, and 16 countries with no treaty in place. There are 17 of the 22 countries with existing treaties who renegotiated the tax treaty. Some treaties were renegotiated prior to the start of our sample period and some after (4 prior to 1982 and the remainder after 1982). Table 1 provides a list of all the countries in the study, the date the tax treaty came into force, and the date of a renegotiation of the treaty.

The renegotiated treaties updated the old treaties in a number of different ways. The most important were conditions to reduce treaty shopping and revisions on the treatment of branch profits versus subsidiary profits in line with the 1986 U.S. tax revision. In addition, for some of these countries the withholding rates and dividends on direct investment changed.

The renegotiated treaties also had an impact on the taxation of dividends of direct investment in countries including Switzerland, Ireland, and Italy. Most countries tax dividends on direct investment at a lower rate (typically 5 percent) than dividends on portfolio investment (typically 15 percent). However, the definition of direct versus portfolio investment can vary across countries. In these three countries there had to be a 95 percent ownership share to be considered direct investment. The renegotiation reduced that threshold to the standard 10 percent threshold in both Switzerland and

Ireland. For Italy, it was reduced from 95 percent to 50 percent to qualify for the 5 percent tax rate, and between 10 percent and 50 percent for a 10 percent tax rate. Therefore, as with new treaties, the net effect of the renegotiation of existing treaties is an empirical question. Our approach to coding the existing-renegotiated treaties is described in the next section.

Of course, managers of firms face a number of different choices beyond the foreign entry modes of exporting or FDI. Indeed the 2011 UNCTAD *World Investment Report* focuses on the growing importance of non-equity modes (NEM) of international production. UNCTAD defines NEM as alternatives to taking ownership share of a foreign entity, such as franchising, licensing, outsourcing, and so on. Though our focus is how tax treaties and tax holidays might affect U.S. FDI outflows and the financing of those flows, we do not intend to minimize the importance of other global strategies. In the next section, we describe both our empirical approach and the data in much more detail.

4. Data and Empirical Methodology

To explore the role of tax treaties and the tax holiday of the 2004 AJCA, we employ a standard model that includes explanatory variables suggested by the existing literature on FDI (see Bonigen 2005 in particular). Our empirical analysis considers aggregate or total U.S. FDI outflows and outflows separated into their three financing modes.

4.1 Data Description

Our dependent variable is U.S. FDI outflows and is from the Bureau of Economic Analysis. The sample period is driven by data availability and covers the period of 1982 through 2007. (We do not include 2008 to 2010 because of the potential impact of the global financial crisis on FDI patterns.) All models include as an independent variable the lag of the log of real U.S. FDI stocks in the host country to capture FDI dynamics and agglomeration effects. Stocks are converted to real values using the Nonresidential Gross Private Domestic Investment Deflator. The FDI data and deflator are from the BEA and consist of annual observations for the 53 countries listed in Table 1.

Independent variables also include the lag of real GDP, the log of the host country's population, trade openness expressed as the total of exports and imports as a percentage of GDP, financial openness measured by capital inflows as a percentage of GDP, and domestic credit to the private sector as a percentage of GDP which serves as a measure of the financial depth of the host economy. Size similarity is measured following Egger and Pfaffermayr (2004) using GDP data. The log of the sum of phone (land-line) subscriptions and mobile phone subscriptions per 100 people is used to capture information capabilities of the host economy. All of these variables are taken from the World Bank's *World Development Indicators*.

All models also include the log of the real exchange rate between the dollar and the currency of the host country (expressed as U.S. dollar/host currency so that an

increase in its value indicates a real appreciation of the host country currency against the U.S. dollar) and is calculated using the annual average exchange value and CPI data from the International Monetary Fund's *International Financial Statistics.* The host country's statutory corporate tax rate is used as a measure of tax difference across countries and changes in taxes over time.[3]

Time-varying dummy variables for bilateral investment treaties, trade agreements, and NAFTA are included, and are derived from information at the U.S. Trade Compliance Center. We code bilateral trade agreements separate from NAFTA as bilateral agreements may not have the same impact on U.S. FDI as a regional agreement.

The key independent variables of our analysis include a dummy variable for new (enacted during the sample period) tax treaties coded with the value of 1 when a treaty is in place and 0 otherwise. To code the existing-renegotiated treaties (existing prior to the sample period) we follow Allee and Peinhardt's (2010) treatment of investment treaties in an empirical model. Hence, existing treaties are assigned a value of 1 and when renegotiated a value of 2 thereby creating a control that varies over time. This approach is consistent with the fact that the existing treaties are improved and updated rather than replaced. Using these two variables for new and old-renegotiated treaties,

[3] It would be preferred to also include effective tax rates but they are not available for the broad set of countries in this study. The statutory tax rates were kindly provided by the Center for Global and Economic Studies and PricewaterHouseCoopers and are available from the authors by email.

leaving "no treaty" as the omitted category, we are able to distinguish between various groups of countries and their treaty status. Note that previous studies either pooled the different groups or only considered new treaty countries. Treaty information can be found in Table 1 and is derived from information available on the website of the U.S. Internal Revenue Service.

A count variable is used to code the number of treaties that a host country has in place in any given year and is derived from the United Nations Conference on Trade and Development (UNCTAD) database on country-specific double-taxation treaties. Finally, given that we are exploring panel data, all models include year controls. In order to consider the impact of the AJCA, we consider the controls specific to 2004 and 2005. Table 2 provides summary statistics for all variables prior to their transformation.

4.2 Empirical Model: The Problem of Negative FDI Flows

As described earlier, the four FDI flow measures are *net* flows of capital, which can assume either a positive or negative value. To understand how a FDI outflow measure can be either positive or negative first consider an equity capital increase which reflects an additional capital contribution to an existing affiliate, an acquisition of an existing entity, or the establishment of a new affiliate. Second, decreases in equity capital also occur when a U.S. parent partially or fully liquidates or sells a previously established affiliate, or simply returns or borrows capital from an affiliate, all of which can be referred to as capital repatriation.

Typically aggregate total outward investment flows are positive for a given year. However, for a specific country during a given year, a decrease in equity capital position can exceed an increase in equity capital position resulting in a negative net value. In 2006, for example, the total U.S. outward direct investment flow was positive. However, for Canada in specific, capital decreases or capital repatriation exceeded capital increases resulting in a negative flow value.

These negative values create a problem as the variable of interest cannot be logged. Most often researchers base their analysis on the level of flows (see for example Wolff 2007). In other cases, various transformations of the data are proposed. Some authors set the negative values to some minimum positive value (for example Blonigen and Davies, 2004, who use the value of 0.1) and then log the flow measure. Blonigen and Davies argue for this approach as FDI flows tend to be skewed.

Others treat the negative observations as missing or set at zero and employ a truncated-data approach, such as a Tobit model (see for example Razin and Sadka, 2007). Rationalizing this later approach, Razin and Sadka argue that instances of capital repatriation (the negative observations) are related to *past* positive outflows and not *current* positive outflows. This indeed may be the case, but capital repatriation decisions may also hinge upon changes in contemporaneous costs associated with producing abroad, contemporaneous business conditions, or policy actions or even anticipated policy actions (which is our interest here), that could well be the variable of interest in

the model. Furthermore, this approach implicitly assumes that the negative observations represent only the return of capital outflows and no *new* outflows (which rejects the possibility that new outflows are occurring as in the case of Canada given above).

Treating negative values as missing is unacceptable as negative occurrences may be systematic (and thus should not be treated as non-systematic missing values) and implicitly assuming that there are no new acquisitions. Examining the individual financing modes illustrates that caution should be exercised in the treatment of negative values. On the other hand, the other transformations described above do not treat negative and positive values symmetrically (reducing the monotonicity of the variable) and can result in biased or inconsistent estimates.[4] Alternative transformations – such as the neglog transformation suggested by Whittaker, Whitehead, and Somers (2005) which do treat negative and positive values symmetrically – when applied to FDI data that is peaked near zero and has long tails, results in a bimodal distribution and require nonparametric approaches.

Because these approaches are less than satisfactory, some researchers avoid using flow data and opt for stock data. Of course this approach is fine, but one would expect stocks to react rather slowly to some variables, such as changes in transportation costs, making it difficult to flesh out the impact of these variables on FDI. For some studies,

[4] The extent of the bias is proportional to the share of the sample that is screened or truncated. See Greene(2003) for an explanation and Coe *et al*. (2007) for a discussion relating to trade data.

like the one here, stock data is not available for some measures (such as the various financing modes) and so this last approach is not an option.

As mentioned above, kurtosis is another problem with FDI data but is not often discussed in the literature on FDI flows. The prevalence of extreme values in total flows and the disaggregated flows leads to a peaked distribution with very long tails (common in financial data). Hence, a mean estimation approach on the level of flows is not likely to be robust to these extreme values and results may be misleading.

Our empirical strategy is to take a nonparametric approach and use a quantile regression estimator. (See Yu, Lu and Stander, 2003, for a discussion on applications of quantile regression.) This approach is motivated by Millimet and Kumas (2008) who consider U.S. FDI data covering the period examined by Blonigen and Davies (2004). They find that the effects of new treaties are not homogeneous over the distribution and argue (p. 11) that "…the distinction between levels and logs appears to be primarily and artifact of the focus on the (condition) mean effect of tax treaties."

Though novel in the FDI literature, the approach of Millimet and Kumas has a shortcoming as pointed out by Egger *et al.* (2006) in that treaty implementation may be a "self-selection" event. This means that the treaty variable may be correlated with the latent country-specific characteristic which, in this application, is the unobserved propensity of U.S. firms to FDI to a given country. This problem would require a fixed-effects model approach. Indeed a Hausman test on standard random-effects models

versus fixed-effects models which include all variables described above for total and disaggregated flows reject a random effects model. Therefore, we settle on a pooled-quantile regression model with fixed-effects by following Canay (2011) and Wooldridge (2010) using bootstrapped errors to compare results across the conditional quantiles.[5]

5. Results

Tables 4 through 7 provide results for the mean and quantile regressions on total FDI flows, retained earnings, equity capital, and inter-company debt respectively. The estimates of the lag of the real stock, real GDP, credit, and NAFTA on total FDI flows are positive and statistically significant and have a greater impact at the 0.90 quantile than at the median. Trade openness is positive and significant for values in the middle quantiles. Size similarity and population are negative and statistically significant and the estimates are not statistically significantly different across quantiles. The real exchange rate is negative and statistically significant implying that a real appreciation of the host country's currency is associated with smaller FDI flows. This effect is larger in magnitude in the lower quantiles, which would include net negative flows to the country. These results are very similar in the models for reinvested earnings, except for population which is not statistically significant. The similarity is not surprising, given that, as explained earlier, retained earnings are the most important mode of FDI

[5] Our data and STATA do files are available upon request.

outflows for U.S. firms and so the outcome for reinvested earnings is reflected in total flows.

The models for equity capital show some differential results from those for total flows. Real GDP is negative and statistically significant. The corporate tax rate is negative and statistically significant for the middle quantiles. Trade openness is significant only for the top quantiles and NAFTA is not statistically significant.

The models for intercompany debt provide the most heterogeneous results. Real FDI stocks, size similarity, credit, and the real exchange rate are all statistically significant and of the opposite sign as the results for total flows and reinvested earnings. Trade agreement is positive and statistically significant across the entire distribution of data.

5.1 Results for New, Old-Renegotiated, and Total Number of Treaties

Figures 4 through 7 illustrate the estimated treaty effects across total FDI flows and the three financing modes. Results for the new treaty control show a negative and statistically significant relationship with total FDI flows, reinvested earnings, and equity capital. Evaluated at the median to quantify this effect, a new tax treaty reduces U.S. FDI outflows to the host country by approximately $7 million. As shown in Figure 4, the negative impact of a new treaty is increasing across the distribution of total flows. A similar pattern for reinvested earnings and equity capital is evident in Figures 5 and 6. The new treaty control is not statistically significant in the inter-company debt model.

The old-renegotiated treaty control is also negative and statistically significant in the models for total FDI flows, reinvested earnings, and equity capital. (Note in Table 5, the estimated coefficient in the fixed-effects mean regression has a p-value of 0.055.) A pattern where the variable is significant for all but the largest quantile is consistent across all three of these flows. As displayed in Figures 4 through 6, in general the negative impact of old-renegotiated treaties is diminishing across the distribution of these flows. In contrast, the impact of an old-renegotiated treaty on inter-company debt is *positive* and statistically significant with the estimated effect increasing across the distribution of debt flows as shown in Figure 7.

Evaluated at the median, an old-renegotiated treaty reduces U.S. FDI outflows to the host country by approximately $3 million. This rather modest effect is due to the differential impact across the three financing modes. Viewing Tables 5 through 7 and again evaluating at the median, an old-renegotiated treaty has a relative small negative effect on reinvested earnings, a large negative effect on equity capital and a relatively large positive impact on inter-company debt.

The count variable for total number of tax treaties in place in the host country is positive and statistically significant across the entire distribution of total FDI flows, reinvested earnings, and equity capital. Though the control is positive for inter-company debt, it is significant only around the median value. Figures 4 through 6 show that the impact of the total number of treaties is increasing across the distribution of

these three flows. Evaluated at the median, the economic significance is rather modest at approximately $0.4 million for total FDI flows, $0.3 for reinvested earnings, and $1.1 million for equity capital. It is important to note, however, that these estimates reflect the impact of the host country increasing the total number of tax treaties it has with other countries on just U.S. FDI flows to the host. In aggregate (or considering beyond U.S. flows alone) this effect could be quite substantial.

What we take from this is that tax cooperation, information sharing, and agreements on treatment of activities such as transfer pricing are the most important aspects of new treaties and the renegotiation of existing treaties. As such, all other things held constant, bilateral tax policies affect the attractiveness of new FDI and lead to changes in the management of overseas earnings. Hence, the effects of these policies are not homogenous across the types of financing modes. The total number of tax treaties a host country has in place may allow multinationals to treaty shop and pay lower withholding taxes when repatriating earnings from the network of treaty countries to the host country. It may also offer greater clarity on how earnings made abroad will be taxed by the host. (For a specific example, see the recent discussion on the number of tax treaties and the attractiveness of operating in the Netherlands in the *Financial Times*, 2013.)

5.2 Results for 2004 and 2005 Controls

We consider the estimated coefficients on the 2004 and 2005 year controls to evaluate

the potential for an anticipated and actual policy effect form the passage of the AJCA. Of course the sign and magnitude of these coefficients and the model constant is dependent on the selection of the omitted year, which by default we leave at 1982. Therefore we gauge the effect by viewing the significance and magnitude relative to the other year controls.

The 2004 control is statistically significant in the models for total FDI flows and reinvested earnings. In both models it is the largest value among all the year controls. It is neither significant nor the largest value for equity capital and inter-company debt. The 2005 control is statistically significant in the models for total FDI flows and reinvested earnings. In both models it is the largest negative value among all the year controls and statistically significantly different from the next largest negative value. It is neither significant nor the largest negative value for equity capital and inter-company debt.

These results are consistent with an anticipated policy effect increasing the net retained earnings of U.S. multinationals in 2004 and an actual policy effect of reducing net retained earnings in 2005. Because retained earnings are the most important mode of FDI outflows for U.S. multinationals, the impact on retained earnings is also reflected in total flows.

5.3 Robustness Test

The results for reinvested earnings, equity capital, and inter-company debt are based on

individual regression equations. Of course managers of multinational firms and select among these different modes of financing or combine these modes. Hence, the three types of flows, in aggregate net flows may not be independent. For each type of flow we use the fixed-effects (within) estimator on the models (which do not include time-invariant variables), with a full set of period controls and standard errors robust to heteroskedasticity and autocorrelation, to obtain estimates of the unit-specific residuals. These residuals are then incorporated into each equation to estimate a seemingly unrelated regression (SUR). These results are then compared and contrasted with the estimates of the fixed-effects mean regressions provided in Tables 5 through 7. (See Blackwell 2005 for a presentation on estimating multiple-equation fixed-effects panel-data equations.)

Individual coefficients and standard errors for the key variables of interest are only slightly different. (For the sake of space they are not reported here but are available upon request.) Nonetheless, there are no changes in sign or significant for any of the treaty variables. In addition to a robustness check, the SUR model allows us to compare estimates across equations. Post-regression hypothesis tests indicate the following. For new treaties we are unable to reject the null that there is a statistically significant difference between the estimated coefficient for reinvested earnings and equity capital. For old-renegotiated treaties and the total number of treaties we find that the absolute value of the estimated coefficients for equity capital are statistically significantly larger

than for reinvested earnings.

6. Conclusion

The origins of current bilateral tax treaties can be traced back to the League of Nations and continue to be negotiated today. With over 2,500 such treaties in place, they form the basis for the legal framework governing international investment flows. By their nature, these treaties have two primary objectives; the avoidance of double taxation, and the prevention of tax evasion and fraud. Though typically promoted as a policy to spur new FDI flows, the dual nature of bilateral tax treaties may provide incentives for multinationals to increase or decrease FDI activity.

In general, empirical studies do not provide robust conclusions for old treaties, mixed evidence that new treaties have a negative effect, and limited evidence that renegotiated treaties have a positive effect. Davies (2004 p. 784) notes this "dearth of significant evidence" and suggests that the potential uses of tax treaties discussed by theorists may be quite different from their use in practice.

Nonetheless, international tax policies are an important and controversial policy issue and may well be consequential to the FDI decisions of managers of multinational firms. Here we consider the impact of tax treaties and the 2005 AJCA tax holiday on U.S. FDI outflows. We argue that these polices may well have differential impacts on how firms finance acquisitions and their decisions on retaining profits abroad and,

therefore, may not be evident in aggregated flows.

Regression results indicate that anticipation of the passage of the American Jobs Creation Act led to an increase in outflows of reinvested earnings while the tax break it offered in 2005 lead to a decrease. Results for tax treaties indicate that new treaties have a negative and statistically significant impact on total FDI flows, reinvested earnings, and equity capital but are not significant for inter-company debt. Old-renegotiated treaties have a negative impact on total FDI flows, reinvested earnings, and equity capital and a positive impact on inter-company debt. The total number of treaties a host country has in place has a positive and statistically significant impact on total FDI flows, reinvested earnings, and equity capital but not for inter-company debt. We offer as a possible explanation that tax avoidance is the most important contribution of new treaties while reduced withholdings and reductions in taxes on direct investment dividends are the most important contributions of new treaties.

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Figure 1: Total U.S. FDI Outflows

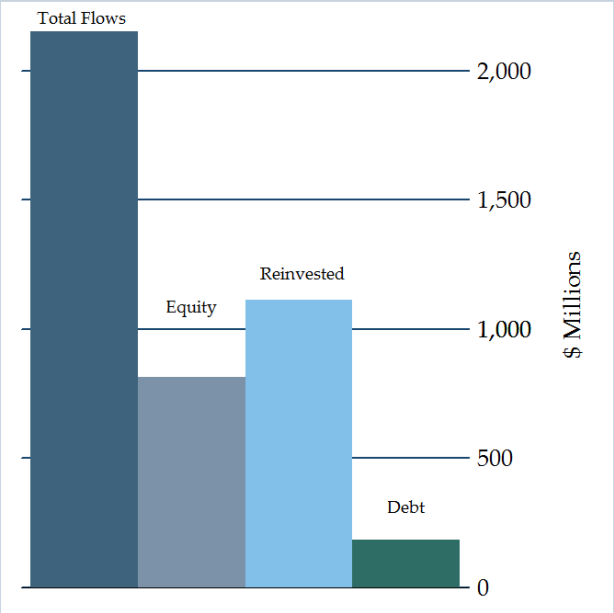


Figure 2: U.S. FDI Outflows by Treaty

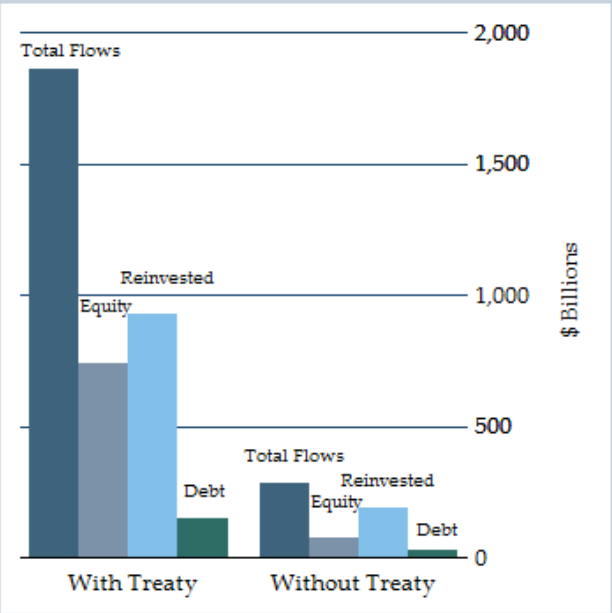
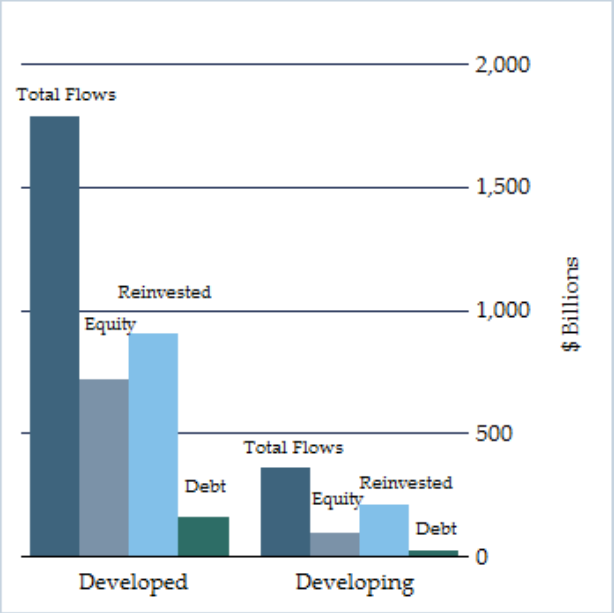


Figure 3: U.S. FDI Outflows By Developed/Developing



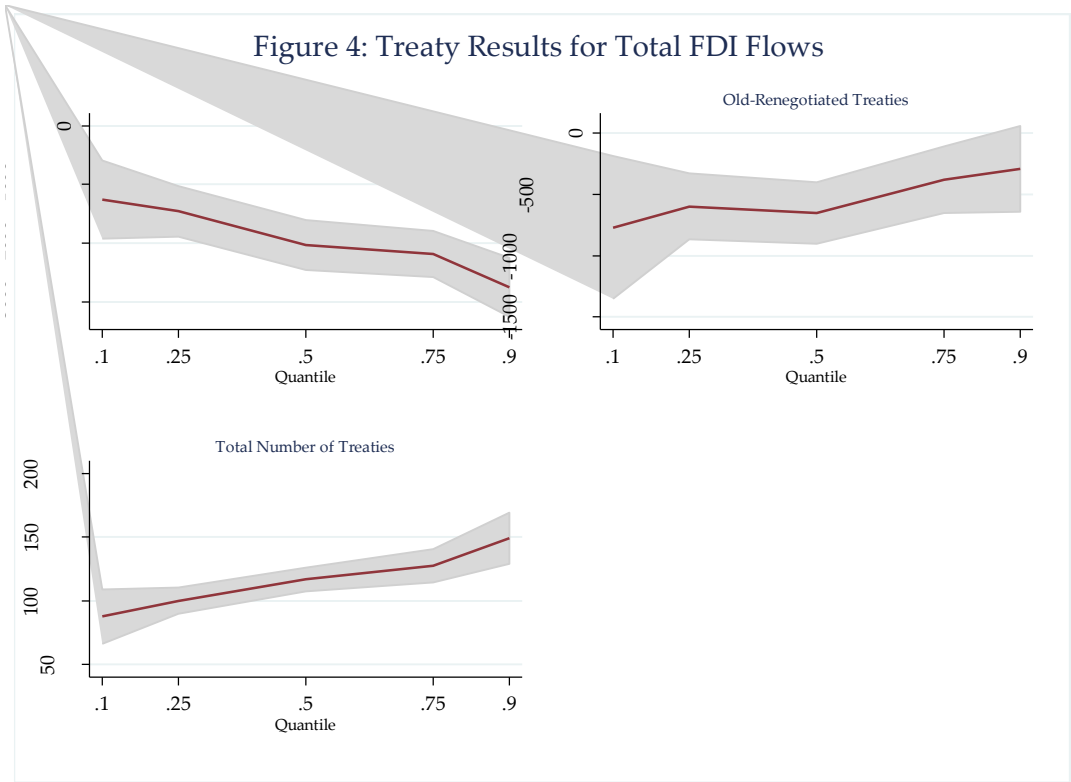


Figure 4: Treaty Results for Total FDI Flows
Old-Renegotiated Treaties
0
-500
-1000
-1500
.1
.25
.5
.75
.9
Quantile
Total Number of Treaties
50
100
150
200
Quantile

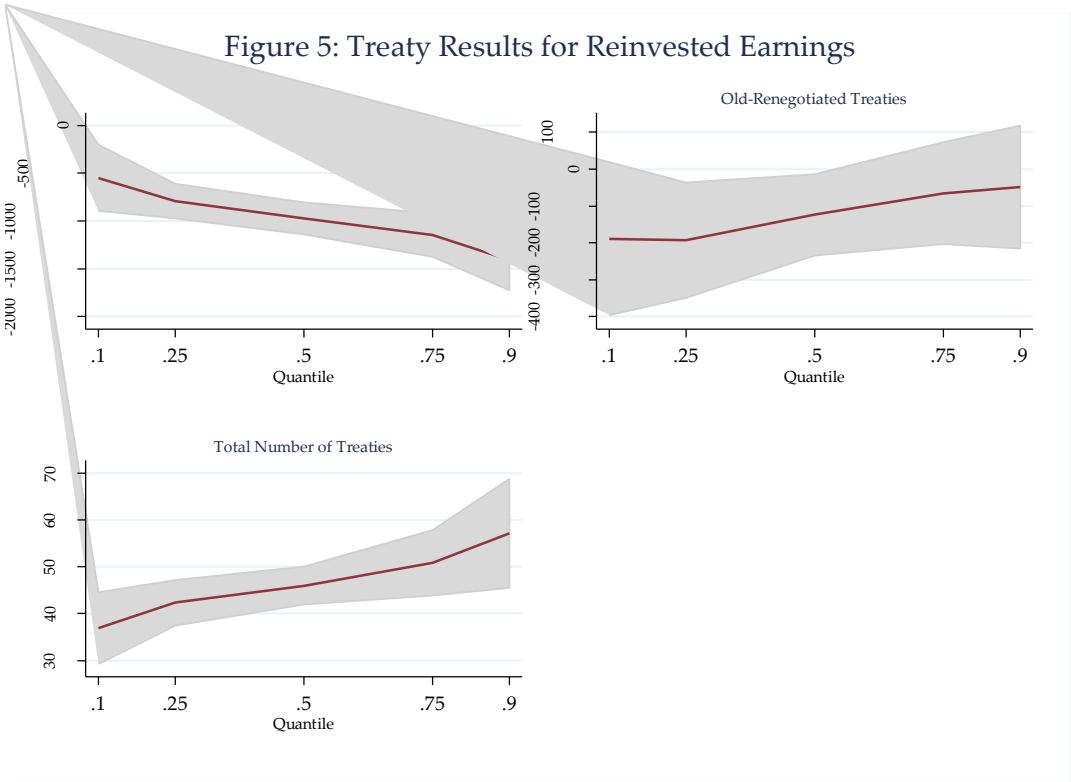


Figure 5: Treaty Results for Reinvested Earnings
Old-Renegotiated Treaties
0
-500
-1000
-1500
-2000
100
0
-100
-200
-300
-400
.1
.25
.5
.75
.9
Quantile
Total Number of Treaties
30
40
50
60
70
Quantile

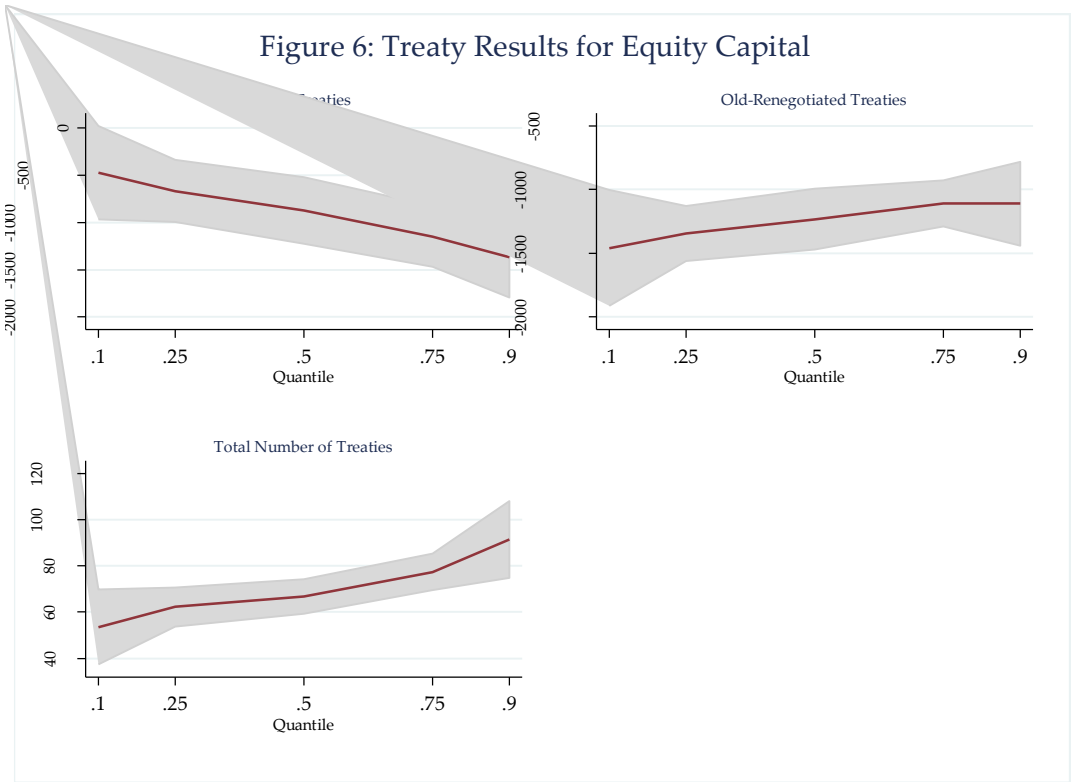


Figure 6: Treaty Results for Equity Capital
Old-Renegotiated Treaties
Total Number of Treaties
Quantile
.1
.25
.5
.75
.9

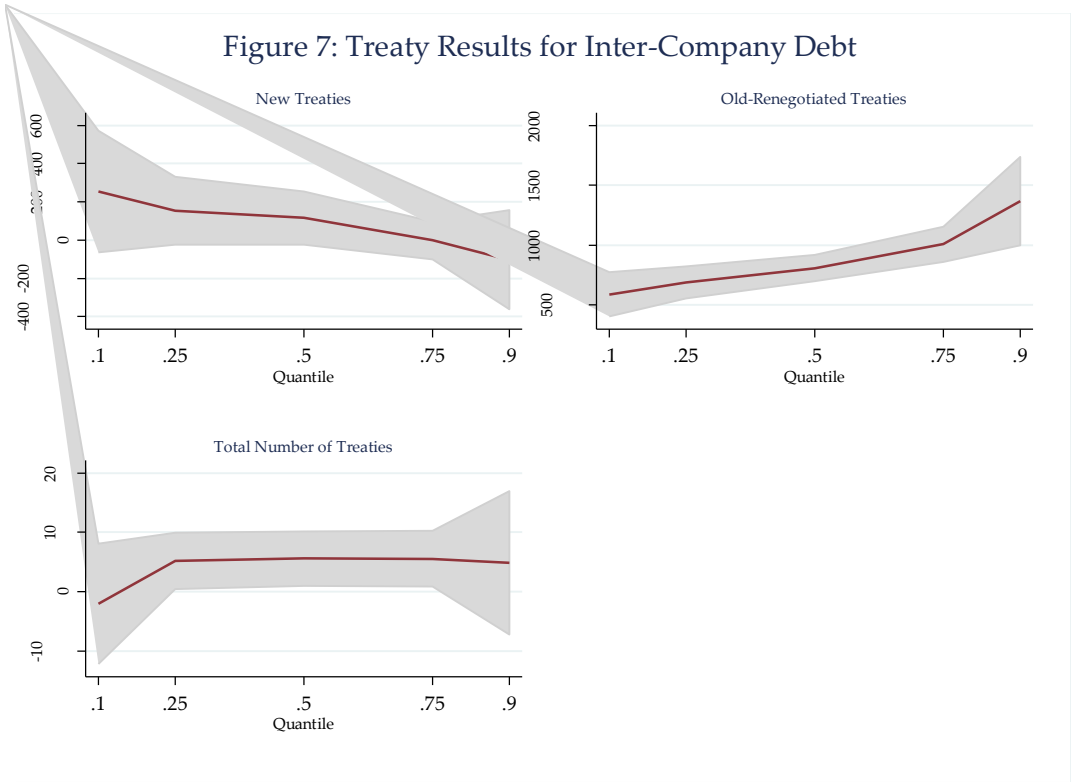


Figure 7: Treaty Results for Inter-Company Debt
New Treaties
Old-Renegotiated Treaties
Total Number of Treaties
Quantile
.1
.25
.5
.75
.9

Table 1: U.S. BILATERAL TAX AGREEMENTS

	Country	Date of Tax Treaty[1]	#[2]		Country	Date of Tax Treaty[1]	#[2]
1	Argentina	NA	37	28	Japan	1954 (1971)	51
2	Australia	1953 (1982)	44	29	Korea	1980	68
3	Austria	1956 (1996)	75	30	Luxembourg	1963[4]	54
4	Belgium	1948 (1970)	86	31	Malaysia	NA	62
5	Brazil	NA	33	32	Mexico	1994	36
6	Canada	1941 (1980)	87	33	Netherlands	1949 (1992)	92
7	Chile	NA	23	34	New Zealand	1948 (1982)	32
8	Columbia	NA	4	35	Nigeria	NA	14
9	Costa Rica	NA	4	36	Norway	1951 (1971)	92
10	China	1987	87	37	Panama	NA	5
11	Czech Republic	1993	70	38	Peru	NA	6
12	Denmark	1948 (2000)	90	39	Philippines	1983	39
13	Ecuador	NA	9	40	Poland	1974	82
14	Egypt	1982[3]	47	41	Portugal	1994	53
15	Finland	1952 (1989)	67	42	Russia	1994	65
16	France	1940 (1994)	107	43	Saudi Arabia	NA	12
17	Germany	1954 (1989)	81	44	Singapore	NA	63
18	Greece	1950	45	45	South Africa	1998	55
19	Guatemala	NA	0	46	Spain	1991	76
20	Honduras	NA	1	47	Sweden	1940 (1994)	90
21	Hong Kong	NA	13	48	Switzerland	1951 (1996)	90
22	Hungary	1979	61	49	Thailand	1998	60
23	India	1991	69	50	Turkey	1997	71
24	Indonesia	1990	53	51	UAE	NA	43
25	Ireland	1952 (1997)	45	52	United Kingdom	1945 (1975)	110
26	Israel	1995	44	53	Venezuela	2000	25
27	Italy	1955 (1984)	81				

[1] Renegotiated treaty in parentheses.
[2] Number of treaties in place in 2007.
[3] Came into force the first year of the sample and treated as a new treaty.
[4] Renegotiated but not ratified. Treated as a country with an existing treaty not renegotiated.
Source: U.S. Internal Revenue Service, www.irs.gov/business/international/

Table 2: Summary Statistics, 1982 – 2007

Variable		Mean	Std. Dev.	Min	Max	Observations
Real Total Stock	Overall	17422.67	39853.65	-396.096	403575.2	N = 1293
	Between		28758	219.1515	157314.8	n = 53
	Within		27105.64	-110311	317379.9	T = 24.40
Total Flows	Overall	1681.23	5272.50	-19284.00	109097.00	N = 1279
	Between		2745.15	-5.50	14838.50	n = 53
	Within		4465.86	-28657.30	99723.70	T = 24.13
Equity	Overall	789.87	3335.14	-7390.00	67724.00	N = 1032
	Between		1554.04	-137.55	10107.42	n = 53
	Within		2848.84	-8969.56	63606.41	T = 19.47
Reinvested	Overall	856.57	2605.41	-33848.00	35679.00	N = 1301
	Between		1226.72	-143.62	5848.04	n = 53
	Within		2289.49	-38839.47	30687.53	T = 24.55
Debt	Overall	178.85	2000.97	-17828.00	18139.00	N = 1028
	Between		265.66	-68.28	1439.69	n = 53
	Within		1980.11	-17802.15	16878.15	T = 19.40
Real GDP Growth	Overall	2.19	3.87	-23.35	16.24	N = 1352
	Between		1.75	-1.75	9.14	n = 53
	Within		3.46	-19.41	18.14	T = 25.51
Financial Openness	Overall	5.89	33.38	-14.92	564.92	N = 1345
	Between		22.87	0.08	168.40	n = 53
	Within		24.25	-153.67	402.40	T = 25.38
Population (thousands)	Overall	75000	201000	365.5	1320000	N = 1378
	Between		202000	410.2697	1180000	n = 53
	Within		22300	-130000	276000	T = 26
Trade Openness	Overall	0.80	0.64	0.12	4.38	N = 1355
	Between		0.61	0.20	3.52	n = 53
	Within		0.19	-0.21	2.13	T = 25.57
Credit to Private Sector	Overall	65.84	44.65	8.33	231.08	N = 1347
	Between		39.76	13.59	188.20	n = 53
	Within		21.61	-9.56	190.39	T = 25.41
Top Corporate Tax	Overall	33.83	9.54	8.50	68.25	N = 1305
	Between		6.32	11.68	50.34	n = 53
	Within		7.13	7.75	58.98	T = 24.62
Real Exchange Rate	Overall	0.36	0.43	0.00	2.72	N = 1356
	Between		0.35	0.00	1.58	n = 53
	Within		0.25	-0.08	2.69	T = 25.58
Phone Subs.	Overall	49.61	47.87	0.19	214.80	N = 1378
	Between		30.17	3.26	103.77	n = 53
	Within		37.39	-13.33	201.36	T = 26
Investment Treaty	Overall	0.09	0.29	0	1	N = 1378
Trade Agreement	Overall	0.04	0.20	0	1	N = 1378
NAFTA	Overall	0.02	0.14	0	1	N = 1378
New Treaty	Overall	0.17	0.37	0	1	N = 1378
Old/Reneg. Treaty	Overall	0.66	0.84	0	2	N = 1378
Total # of Treaties	Overall	33.33	26.41	0	110	N = 1378

Table 3: Additional Summary Statistics on Dependent Variables
1982 – 2007

Variable	Percentile	Value	Std. Dev.	Skewness	Kurtosis	Obs.
Total Flows	**Mean**	1681.234	5272.469	9.1488	150.7042	1279
	0.10	-126				
	0.25	32				
	0.50	287				
	0.75	1223				
	0.90	4126				
Equity	**Mean**	789.8672	3335.135	11.0321	179.6157	1032
	0.10	-215				
	0.25	0				
	0.50	65				
	0.75	418				
	0.90	1553				
Reinvested Earnings	**Mean**	865.5696	2605.407	3.1657	71.7436	1301
	0.10	-70				
	0.25	30				
	0.50	191				
	0.75	732				
	0.90	1981				
Debt	**Mean**	178.8473	2000.973	0.9257	37.4989	1028
	0.10	-480				
	0.25	-119				
	0.50	13				
	0.75	235				
	0.90	1009				

Table 4: Fixed-Effects Mean Regression and Fixed-Effects Quantile Regression Results for Total Flows, 1982-2007

Explanatory Variable	Mean	0.10 Quantile	0.25 Quantile	Median	0.75 Quantile	0.90 Quantile
Real Stock (lag)	551.619***	-33.033	225.784***	344.565***	489.176***	733.624***
	(132.520)	(112.831)	(64.265)	(52.408)	(63.533)	(97.635)
Real GDP (lag)	849.172	981.616**	552.495**	619.178***	812.032***	841.589**
	(463.126)	(331.655)	(212.371)	(186.567)	(178.927)	(300.899)
Size Similarity	-48184.4***	-49780.9***	-48035.7***	-48655***	-49856.979***	-49145.7***
	(2817.703)	(2311.493)	(1519.673)	(1191.622)	(1411.405)	(2099.576)
Population	-3465.78***	-3268.88***	-2918.46***	-2951.42***	-3226.308***	-3487.05***
	(429.577)	(296.831)	(188.444)	(189.312)	(198.812)	(319.747)
FDI Openness	17.098***	10.964	9.024	18.205	39.977***	36.075***
	(3.819)	(10.798)	(7.666)	(11.968)	(10.713)	(8.096)
Trade Openness	391.662	472.487	632.433***	712.244***	370.736*	-82.103
	(265.983)	(286.814)	(158.435)	(144.132)	(167.240)	(229.841)
Credit	23.535***	16.755***	17.753***	18.433***	24.145***	29.413***
	(3.746)	(2.772)	(2.169)	(1.882)	(2.765)	(4.233)
Top Corp. Tax	-1678.22	-607.287	-1330.93	-1913.38*	-1529.509*	-979.306
	(1654.538)	(715.705)	(767.617)	(791.547)	(767.163)	(918.418)
Real Exchange Rate	-533.998***	-539.551***	-514.398***	-494.479***	-485.89***	-459.206***
	(54.220)	(23.313)	(22.925)	(18.709)	(25.628)	(32.522)
Phone Total	-544.523	-137.9	82.209	-0.876	-318.59*	-615.852*
	(281.756)	(192.433)	(149.885)	(130.077)	(146.888)	(251.730)
Investment Treaty	-216.934	-499.529	-131.919	-6.925	-219.277	61.905
	(479.970)	(260.988)	(263.838)	(155.257)	(152.944)	(248.994)
Trade Agreement	-453.736	-152.771	-663.665**	-917.483*	-319.56	-427.021
	(644.811)	(239.678)	(226.019)	(456.507)	(377.693)	(507.824)
NAFTA	5102.042***	3434.585	4016.512***	5272.185***	5847.462***	6598.269**
	(920.811)	(2218.577)	(680.827)	(913.669)	(995.230)	(2537.396)
New Treaty	-2287.31***	-1477.82***	-1789.92***	-1966.29***	-2241.77***	-2533.52***
	(419.207)	(333.897)	(251.217)	(190.718)	(193.186)	(283.297)
Old/Renegotiated Treaty	-976.091***	-1031.51**	-743.171***	-766.276***	-652.373***	-409.176
	(263.926)	(323.886)	(145.340)	(136.302)	(145.908)	(213.613)
Total # of Tax Treaties	135.824***	96.634***	110.879***	121.068***	133.08***	144.427***
	(8.375)	(10.336)	(5.035)	(4.777)	(6.001)	(8.837)
Constant	36209.51***	29035.82***	32778.06***	31641.76***	31887.289***	34197.1***
	(6370.736)	(4235.956)	(2883.613)	(2331.394)	(2178.647)	(3261.136)
R^2 – pseudo R^2	0.804	0.758	0.755	0.754	0.719	0.690
N	1179	1179	1179	1179	1179	1179

* p<0.05, ** p<0.01, *** p<0.001

Fixed-Effects mean estimator robust standard errors in parentheses. Fixed-Effects quantile regression estimates and standard errors, in parentheses, were obtained via bootstrapping with 100repetitions.

Table 5: Fixed-Effects Mean Regression and Fixed-Effects Quantile Regression Results for Reinvested Earnings, 1982-2007

Explanatory Variable	Mean	0.10 Quantile	0.25 Quantile	Median	0.75 Quantile	0.90 Quantile
Real Stock (lag)	415.738***	197.761***	266.991***	328.528***	397.221***	535.331***
	(66.745)	(39.187)	(26.435)	(25.058)	(32.467)	(38.122)
Real GDP (lag)	599.227*	418.723*	512.174***	512.182***	684.873***	565.769***
	(233.981)	(169.490)	(102.138)	(84.217)	(120.092)	(163.197)
Size Similarity	-19725.9***	-20011.8***	-20721.1***	-19949***	-20254.9***	-19499.7***
	(1424.952)	(898.978)	(559.269)	(613.435)	(727.590)	(1047.441)
Population	-152.421	87.744	100.817	22.909	-220.115	-282.488
	(216.854)	(147.423)	(85.032)	(90.501)	(124.941)	(165.213)
FDI Openness	8.054***	6.112	5.563***	4.817*	7.89	26.016*
	(1.934)	(6.353)	(1.211)	(1.927)	(10.036)	(10.692)
Trade Openness	447.371***	495.886***	532.907***	575.656***	415.51***	18.429
	(131.817)	(124.987)	(60.082)	(60.569)	(87.372)	(142.367)
Credit	10.292***	7.502***	6.158***	6.204***	10.01***	15.441***
	(1.892)	(1.226)	(0.861)	(0.934)	(1.329)	(2.155)
Top Corp. Tax	589.219	1107.625*	145.909	521.731	621.044	108.236
	(832.458)	(467.539)	(329.107)	(335.250)	(409.836)	(532.728)
Real Exchange Rate	-247.225***	-247.856***	-222.361***	-226.999***	-232.115***	-211.403***
	(27.334)	(18.279)	(8.988)	(9.704)	(12.181)	(14.208)
Phone Total	-398.495**	-77.881	-109.216	-184.03**	-363.172***	-519.743***
	(142.184)	(107.651)	(66.579)	(69.860)	(88.856)	(119.219)
Investment Treaty	-320.954	-486.678**	-216.456	-244.299**	-284.009**	-202.181
	(242.255)	(176.879)	(113.743)	(77.731)	(95.110)	(113.393)
Trade Agreement	-330.002	-537.53	-315.669*	-392.908**	-217.991	-3.027
	(323.180)	(294.404)	(144.797)	(125.398)	(328.075)	(359.368)
NAFTA	3224.103***	1989.513**	2348.447***	2828.374***	3761.971***	3668.581**
	(465.592)	(657.682)	(528.031)	(402.896)	(737.612)	(1315.691)
New Treaty	-1091.75***	-709.351***	-903.067***	-896.571***	-1112.84***	-1300.13***
	(210.264)	(162.038)	(102.143)	(89.415)	(102.402)	(146.179)
Old/Renegotiated Treaty	-254.603	-295.96**	-174.168*	-125.905*	-234.021***	-149.538
	(132.607)	(103.838)	(68.691)	(64.040)	(69.217)	(92.230)
Total # of Tax Treaties	53.959***	44.595***	44.689***	49.143***	55.999***	60.339***
	(4.191)	(4.293)	(2.383)	(2.001)	(2.793)	(3.884)
Constant	-14483.3***	-15507.9***	-17432.2***	-16133.7***	-14958.3***	-10562.1***
	(3217.096)	(1906.472)	(1186.691)	(875.249)	(1378.617)	(2872.246)
R^2 – pseudo R^2	0.498	0.447	0.498	0.524	0.541	0.563
N	1193	1193	1193	1193	1193	1193

* p<0.05, ** p<0.01, *** p<0.001

Fixed-Effects mean estimator robust standard errors in parentheses. Fixed-Effects quantile regression estimates and standard errors, in parentheses, were obtained via bootstrapping with 100repetitions.

Table 6: Fixed-Effects Mean Regression and Fixed-Effects Quantile Regression Results for Equity Capital, 1982-2007

Explanatory Variable	Mean	0.10 Quantile	0.25 Quantile	Median	0.75 Quantile	0.90 Quantile
Real Stock (lag)	632.529***	291.284**	411.73***	514.197***	553.888***	627.533
	(97.257)	(92.354)	(59.322)	(43.555)	(39.933)	(744.495)
Real GDP (lag)	-1751.09***	-1443.44***	-1847.02***	-2018.08***	-1843.79***	-1633.59
	(351.175)	(206.598)	(186.770)	(149.447)	(127.470)	(1143.164)
Size Similarity	-33915***	-36227.3***	-33513.9***	-33428.1***	-34026***	-35299.1***
	(2009.687)	(2531.275)	(1188.897)	(1126.517)	(1129.977)	(8117.946)
Population	-3979.79***	-3946.14***	-3648.79***	-3537.85***	-3759.81***	-4010.16***
	(328.899)	(166.852)	(164.034)	(152.811)	(149.146)	(482.310)
FDI Openness	5.082	6.022***	4.44**	5.328	4.906	3.26
	(2.687)	(1.533)	(1.541)	(2.820)	(7.002)	(7.272)
Trade Openness	-306.447	166.001	39.6	-62.789	-213.274*	-448.581*
	(183.839)	(149.248)	(81.610)	(90.924)	(93.669)	(222.416)
Credit	26.356***	19.662***	17.743***	22.047***	24.017***	29.62***
	(2.764)	(2.997)	(1.645)	(1.613)	(1.959)	(6.599)
Top Corp. Tax	-1842.24	-1360.92	-2400.18***	-2402.47***	-1950.8***	-1887.65
	(1189.197)	(713.764)	(413.389)	(693.750)	(552.378)	(6103.207)
Real Exchange Rate	-469.412***	-488.035***	-446.912***	-437.577***	-455.637***	-438.651***
	(40.274)	(21.727)	(16.824)	(15.104)	(20.609)	(19.382)
Phone Total	7.325	175.883	402.725***	404.438***	250.453*	-15.981
	(211.620)	(130.500)	(112.230)	(95.856)	(103.865)	(535.774)
Investment Treaty	37.58	-107.198	-252.428	-37.387	13.655	73.362
	(373.950)	(358.002)	(235.531)	(153.256)	(165.973)	(442.064)
Trade Agreement	-973.05	-393.87	-797.553***	-909.657*	11.313	-691.349
	(519.464)	(705.725)	(217.763)	(403.956)	(496.661)	(1042.589)
NAFTA	1204.985	970.262	905.283	920.811	1275.054	2854.37
	(654.936)	(674.250)	(465.247)	(510.234)	(836.894)	(3044.570)
New Treaty	-1313.09***	-591.924	-713.864***	-997.547***	-1052.43***	-1275.78*
	(312.883)	(309.026)	(176.067)	(162.706)	(154.134)	(507.393)
Old/Renegotiated Treaty	-1517.79***	-1471.94***	-1293.35***	-1263.75***	-1137.52***	-925.497
	(188.889)	(269.986)	(119.146)	(113.388)	(104.138)	(474.162)
Total # of Tax Treaties	84.134***	49.262***	64.104***	69.19***	75.485***	85.468***
	(6.113)	(8.933)	(5.169)	(3.893)	(4.673)	(21.584)
Constant	108654.9***	101738.5***	106607.5***	108571.1***	108241.8***	106945.1***
	(4689.595)	(3132.347)	(2101.053)	(2037.250)	(1735.575)	(13089.254)
R^2 – pseudo R^2	0.941	0.883	0.884	0.875	0.849	0.810
N	944	944	944	944	944	944

* p<0.05, ** p<0.01, *** p<0.001

Fixed-Effects mean estimator robust standard errors in parentheses. Fixed-Effects quantile regression estimates and standard errors, in parentheses, were obtained via bootstrapping with 100repetitions.

Table 7: Fixed-Effects Mean Regression and Fixed-Effects Quantile Regression Results for Inter-Company Debt, 1982-2007

Explanatory Variable	Mean	0.10 Quantile	0.25 Quantile	Median	0.75 Quantile	0.90 Quantile
Real Stock (lag)	-368.738***	-471.317***	-403.152***	-325.577***	-307.242***	-248.595***
	(74.383)	(55.937)	(32.977)	(22.133)	(23.817)	(40.655)
Real GDP (lag)	1348.817***	1282.744***	1220.21***	1266.842***	1312.681***	1564.515***
	(269.149)	(172.468)	(114.044)	(69.903)	(87.815)	(169.667)
Size Similarity	4145.027**	2357.237	3337.968***	3318.541***	3727.922***	3540.524***
	(1548.400)	(1236.266)	(653.672)	(532.853)	(823.724)	(1000.351)
Population	180.993	355.889*	310.665**	220.526**	175.249*	-94.974
	(253.018)	(172.086)	(119.727)	(71.761)	(84.249)	(159.175)
FDI Openness	4.922*	-10.061	-0.241	3.311	15.886	33.127*
	(2.070)	(8.471)	(7.227)	(5.724)	(12.048)	(13.611)
Trade Openness	680.504***	393.921*	575.67***	538.232***	528.008***	350.246**
	(141.139)	(192.909)	(71.474)	(61.882)	(72.802)	(127.209)
Credit	-5.845**	-6.335**	-5.818***	-3.517***	-2.088	3.304
	(2.125)	(2.310)	(1.155)	(0.760)	(1.346)	(2.735)
Top Corp. Tax	-750.884	-462.761	-274.662	174.489	-183.971	-66.723
	(916.634)	(448.579)	(291.228)	(273.841)	(289.399)	(489.462)
Real Exchange Rate	99.368**	78.307***	81.868***	86.047***	106.793***	119.516***
	(30.781)	(11.890)	(9.570)	(6.981)	(9.212)	(12.518)
Phone Total	-44.892	114.981	98.401	-24.256	-139.987**	-358.716***
	(162.779)	(112.916)	(84.218)	(49.790)	(50.670)	(101.882)
Investment Treaty	111.705	129.493	81.118	122.134	58.953	251.609
	(288.187)	(126.530)	(101.722)	(88.151)	(103.885)	(187.497)
Trade Agreement	1353.584***	705.477*	1089.465***	1078.168***	1158.538*	1816.439**
	(393.714)	(313.110)	(182.597)	(182.420)	(478.265)	(674.342)
NAFTA	-103.174	8.555	-308.569	562.731	922.518	884.912
	(503.042)	(2980.528)	(458.634)	(572.727)	(639.500)	(605.735)
New Treaty	133.814	53.452	150.092	77.576	-40.97	-140.377
	(241.499)	(157.550)	(106.927)	(60.136)	(73.900)	(117.942)
Old/Renegotiated Treaty	916.876***	556.044***	659.467***	801.213***	981.057***	1265.986***
	(145.562)	(85.884)	(62.295)	(60.178)	(66.358)	(143.647)
Total # of Tax Treaties	3.835	4.486	5.425	6.028**	6.887**	4.797
	(4.709)	(4.546)	(2.788)	(2.279)	(2.579)	(5.719)
Constant	-37127***	-36819.2***	-35097.4***	-35064.8***	-35194.2***	-37040.2***
	(3569.838)	(2228.113)	(1445.425)	(901.151)	(1083.168)	(1661.729)
R^2 – pseudo R^2	0.547	0.521	0.577	0.605	0.611	0.558
N	946	946	946	946	946	946

* p<0.05, ** p<0.01, *** p<0.001

Fixed-Effects mean estimator robust standard errors in parentheses. Fixed-Effects quantile regression estimates and standard errors, in parentheses, were obtained via bootstrapping with 100repetitions.