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Tax-based Capital Controls' Efficacy at Affecting the Composition of Foreign Capital

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Abstract: This paper investigates whether countries can use tax-based forms of capital controls to affect the share of foreign direct investment (FDI) relative to debt. Doing so might enable a country to influence capital-recipient countries' foreign capital towards FDI and away from debt. The empirical model and dependent, explanatory, and control variables have been drawn from existing literature and have been applied to a panel data set consisting of 20 countries spanning 1999 to 2011. The main empirical findings show that a tax preference for FDI is more effective and persistent than a tax discrimination against debt investments.

Keywords: foreign capital, capital controls, foreign direct investments, debt

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Abbreviations

Annual Report on Exchange Arrangements and Exchange Restrictions	AREAER
Augmented Dickey Fuller	ADF
Consumer price index	CPI
External Wealth of Nations	EWN
Foreign direct investment	FDI
International Investment Position	IIP
International Monetary Fund	IMF
Ordinary least squares	OLS
Variance inflation factor	VIF
Vector autoregression	VAR

1. Introduction

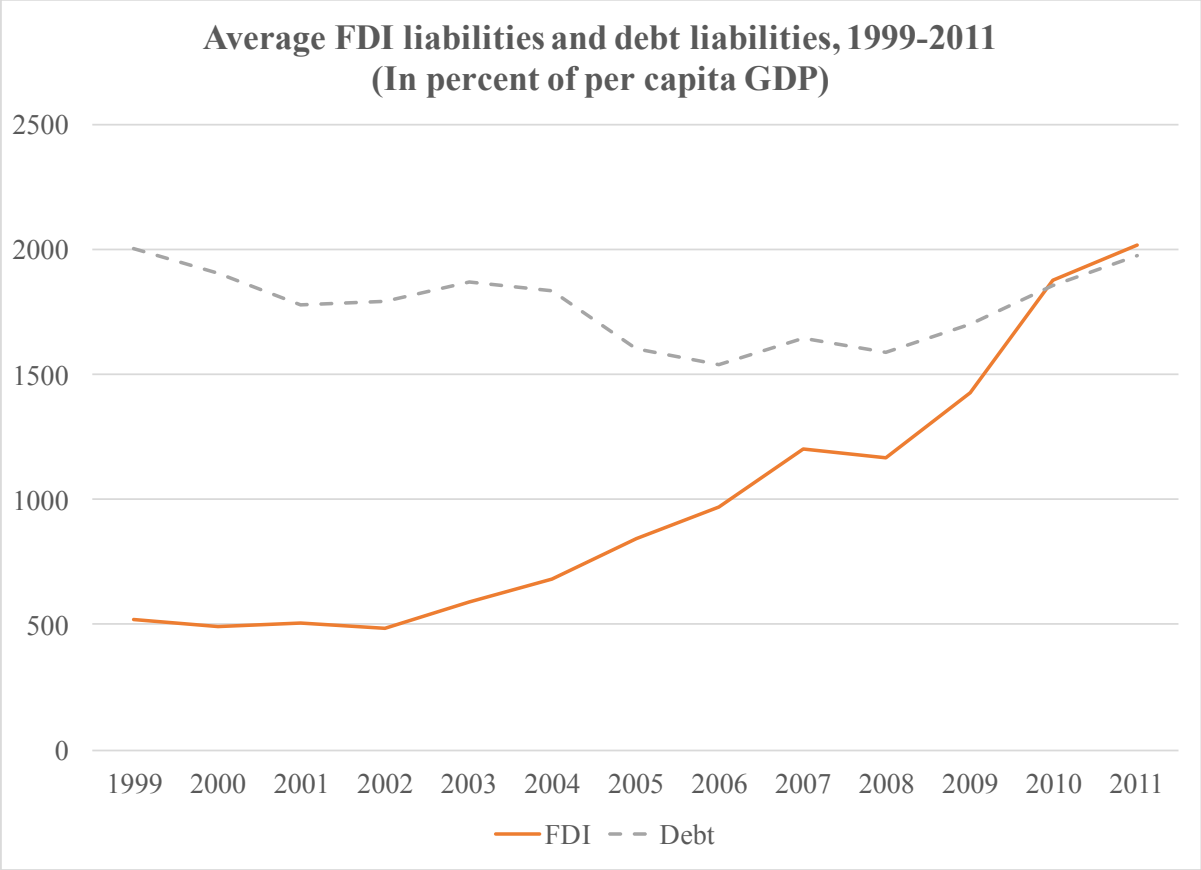
Policymakers and academics have reconsidered the role and suitability of capital controls since the Latin American, East Asian, and Russian crises in the late 1990s and especially since the Great Recession in the late 2000s. When faced with surges of capital inflows, many different countries have considered or implemented[1] capital controls to stabilize their financial sectors and economy. The International Monetary Fund (IMF) has recently adopted a more pragmatic stance despite historically being a proponent of unfettered capital flows. In 2002, Kenneth Rogoff, the then Chief Economist and Research Director of the IMF, wrote, "These days everyone agrees that a more eclectic approach to capital account liberalization is required." More recently, the IMF has published several papers that advise for the inclusion of capital controls in a country's policy toolkit (Ostry et al., 2010, 2011, 2012).

The present global economic environment warrants the further analysis of the use of capital controls to stabilize capital recipient countries' real and financial economy, especially given the numerous factors that could affect capital flows to emerging and developing economies both positively and negatively. Capital flows to emerging and developing economies are low when global risk aversion and uncertainty are high. Presently, there are several factors contributing to global uncertainty: lackluster growth in most advanced economies, the surprising result of the U.K. referendum on whether to stay in or leave the European Union, and structurally lower commodity and oil prices (IMF, 2016). Conversely, other factors are "pushing" capital flows to emerging and developing economies such as the real interest and growth rates in advanced economies[2]. Capital surged from advanced economies into emerging and developing economies in the years immediately following the Great Recession due to low real interest and growth rates in advanced economies and much stronger growth rates in emerging and developing economies. Capital flows to emerging and developing economies slowed starting in 2010 due to slower growth in these economies and the tightening of monetary policy by the United States' Federal Reserve (IMF, 2016). More recently, that trend has reversed, and emerging and developing economies are seeing a resurgence in their capital inflows. As recently as 20 July 2016, the Financial Times reported

[1] Examples include Brazil, Costa Rica, Indonesia, Korea, Peru, Thailand and Uruguay.
[2] Eduardo Fernandez-Arias first wrote about "push" and "pull" factors in a 1996 paper and was later expanded upon in Calvo, Leiderman, and Reinhart (1996).

"cross-border flows to EM stocks and bonds hit their highest level since the US Federal Reserve shocked markets by pulling back from a rise in interest rates in September 2013" (Wheatley, 2016). Figure 1 below plots the evolution of FDI liabilities and debt liabilities, averaged over the sample of 20 countries used in this paper's analysis, weighted by per capita GDP.

Figure 1. Average FDI liabilities and debt liabilities in percent of per capita GDP



Countries may attempt to mitigate the negative effects of unfettered capital inflows by implementing specific and targeted capital controls to influence the composition of capital. Doing so would foment a stronger international monetary system. In early 2016, Christine Lagarde, Managing Director of the IMF, said, "We need an international monetary system that helps emerging and developing economies preserve stability, achieve stronger, more sustainable growth, and embark on a path of convergence with advanced economies." Countries and policymakers may achieve this stronger international monetary system by striving towards longer-term and more stable capital flows. She notes that "recipient countries may consider policies to enhance the resilience of their financial systems to capital

flows. Both prudential and tax policies can play a useful role here. For example, the tax system could be structured to provide incentives to rely less on debt and more on direct investment and equity financing." Lessening the probability of reversals and reliance on financial buffers requires the coordinated adjustment in international capital flows away from short-term debt and towards long-term equity. (Lagarde, 2016).

My research question is whether countries may influence the composition of foreign capital by using differential tax treatments of foreign direct investment (FDI) and debt. In particular, it seeks to determine whether a tax preference for FDI or a tax discrimination against debt can influence the composition of foreign capital away from debt and towards FDI. To analyze this effect, I use panel data for 20 countries spanning 1999 to 2011. My explanatory variables are a novel dataset, drawn from the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) Online* database. The dataset is based on two subsets of capital controls: those which are applied on inward direct investment and those which are applied on the local purchase by non-residents of bonds or other debt securities The empirical model is based on existent literature on the determinants of capital flows and includes 5 standard macroeconomic control variables: (1) per capita GDP, (2) institutional quality, (3) trade openness, (4) a proxy for financial development, and (5) natural resources. I use the model to investigate whether tax-based capital controls can affect the ratio of FDI to debt.

My findings complement existent literature on tax-based capital controls, namely that tax-based capital controls are effective at affecting the composition of foreign capital. In the baseline specifications, I find that the coefficients for tax preferences for FDI, tax discriminations against debt, and combinations of the two are statistically significant and positively affect the ratio of FDI to debt, which is in line with my hypothesis. Furthermore, after adding a one period lag of the explanatory variables, I discovered some asymmetric results. The coefficient for the one period lagged tax preferences for FDI is positive and statistically significant whereas the coefficient for the one period lagged tax discriminations against debt is not. For the specifications which include the combinations of the explanatory variables, this indicates that tax preferences for FDI is driving the increase in the FDI to debt ratio, whereas tax discriminations against debt does not. This result adds to the literature by revealing the asymmetric effect of tax preferences for FDI versus tax discriminations against debt.

Policymakers may find this result informative when designing policies to attract or deter certain types of capital inflows. Such flows seem more sensitive to incentives versus disincentives. Policymakers wishing to insulate their economies from destabilizing debt flows, ought to rely more heavily on tax-based capital control incentives for FDI to a greater extent than they rely on tax-based capital control disincentives for debt investments.

This paper proceeds as follows: Section 2 discusses relevant empirical studies that also investigate the effect of capital controls on foreign capital; Section 3 describes the data, its sources, and some of its limitations; Section 4 details the methodology used to investigate the research question and includes a discussion of some potential issues with the analysis; Section 5 describes the results and extensions to the baseline models; Section 6 concludes with a summary and discussion of potential policy implications and areas for future research.

2. Literature review

2.1. Capital controls' efficacy: multiple and single country studies

This paper is most similar to Binici, Hutchison, and Schindler (2010) and Montiel and Reinhart (1999). These two papers use panel data sets to study the effect of capital controls on the volume and composition of capital inflows. Binici, Hutchison, and Schindler (2010) use a new capital controls panel data set based on Schindler (2009) which draws data from the *AREAER Online* database. Montiel and Reinhart (2010) construct their own index of the incidence and intensity of capital account restrictions. I construct my explanatory variables dataset using two sub-categories of the *AREAER Online* database: capital controls on inward direct investment (XI.A.5.b.) and on the local purchase by non-residents of bonds or other debt securities (XI.A.2.a.2.i.). Furthermore, I do not consider capital inflows, but instead look at a simple logged ratio of FDI to debt stocks.

Like the explanatory variables in this paper, the Schindler (2009) dataset is based on information from the *AREAER Online* database. The Schindler (2009) dataset codifies the restrictions on individual transactions and aggregates the sub-indices to obtain more nuanced inflow and outflow indices. Binici, Hutchison, and Schindler (2010) use the panel data set

constructed in Schindler (2009) to study the effect of controls on the volume and composition of capital flows on a disaggregated level. They use a standard model of capital flows for 74 countries between 1995 and 2005 and used 6 types of restrictions (on equity, FDI, and debt holdings for in and outflows) as their explanatory variables. They did not find a statistically significant result for capital controls on either debt or FDI and equity inflows. By contrast, this paper does find a statistically significant effect of controls on the composition of capital. However, our dependent variables differ: Binici, Hutchison, and Schindler (2010) use capital flows as their dependent variable, whereas I use a ratio of FDI to debt. This may explain the discrepancy between the results. (Binici, Hutchison, and Schindler, 2010).

Montiel and Reinhart (1999) study whether the capital control policies of capital-importing countries affect the volume and composition of capital inflows. They collect capital inflows data for 15 emerging market economies between 1990 and 1996, broken down into three categories: portfolio inflows, short-term inflows, and FDI. For their explanatory variables, they construct an index based on the incidence and intensity of capital account restrictions, where 0 indicates no restrictions and 2 indicates substantial restrictions. As in other studies, they do not find evidence that the capital account restrictions affect the volume of capital inflows. However, they do find that capital account restrictions influenced the composition of inflows away from short-term and portfolio flows and towards FDI. Their finding supports the findings in this paper. (Montiel and Reinhart, 1999).

The following papers consider the effect of capital controls on the volume and composition of capital flows on a country-by-country basis. Individual country studies may be academically informative but their lessons may not translate well to countries with markedly different experiences or fundamentals. Regardless, these do provide insights into the possible downsides with using capital controls, such as hampered access to finance by small- and medium-sized firms, adverse spillovers to other capital recipient countries, or inefficacy at reducing overall capital inflows. They are worth mentioning since these countries attempted to mitigate the adverse effects of capital inflows through the use of capital controls. However, since this paper uses a panel data approach, considering the experience of multiple countries, its findings may be more broadly applicable when designing capital control policies.

Ariyoshi et al. (2000) survey the experience of 14 countries that used a variety of capital controls for various objectives. Of the 14 countries, 5 implemented controls designed to limit

short-term capital inflows: Brazil, Chile, Colombia, Malaysia, and Thailand. Although these countries are economically diverse, all of them implemented capital controls based on concerns about macroeconomic implications of large and volatile capital flows. They found that macroprudential-oriented controls "seemed to be at least partly successful in reducing short-term capital inflows," although they did not reduce the overall volume of short-term capital flows (with the exceptions of Malaysia and Thailand). Ariyoshi et al. (2000) note that using capital controls on inflows "may not provide lasting protection against reversals in capital flows if they are not accompanied by necessary adjustments in macroeconomic policies and strengthening of the financial system." Their results corroborate with mine, indicating that certain capital controls may be effective at influencing the composition of capital. However, it does highlight the risk that countries may rely on capital controls instead of adjusting policy, thus exacerbating the eventual requisite policy adjustment. (Ariyoshi et al., 2000)

Forbes (2007) studies the effect on small- and medium-sized firms of the *encaje*, a tax on short-term capital inflows, in Chile between 1991 and 1998. She finds that during the *encaje* period, it had the overall intended effect of regulating short-term capital inflows, thus providing further evidence to support my hypothesis that specifically targeted capital controls can be effective. However, Forbes' study reveals that the *encaje* adversely affected small- and medium-sized firms which are disproportionately reliant on short-term forms of financing. Small- and medium-sized firms suffered more than large firms during the *encaje* period due to a number of factors: (1) asymmetric information; (2) alternative forms of finance; (3) finding and utilizing loopholes; (4) cost of borrowing from banks rose relative to other institutions; (5) capital flows shifted towards longer maturities. This example illustrates that while the *encaje* achieved its intended objective of financial and macroeconomic stability, it hampered the ability of smaller firms to obtain access to financing. Thus, "this inefficient allocation of capital and resources may have reduced growth and productivity in Chile." (Forbes, 2007)

Forbes et al. (2011) analyze the effects of imposing a tax on portfolio inflows to Brazil between 2006 and 2011. This directly relates to my paper since it is a tax-based capital control intended to mitigate the adverse effects of capital surges. They conclude that increases in the Brazilian *Imposto de Operaçoes Financeiras* (IOF) tax reduced investors' portfolio allocations to Brazil. Their finding supports the results in my paper: tax-based

capital controls can be effective at influencing foreign capital. Furthermore, they also study possible spillover effects on other countries resulting from Brazil's implementation of capital controls. They find that increases in Brazil's IOF had a mixed effect on neighboring or similar countries. An increase in Brazil's IOF decreased portfolio flows to countries that seemed likely to also implement similar capital controls. Conversely, an increase in the IOF increased flows to countries that shared certain attributes with Brazil[3]. Their results indicate that while capital controls may be able to attenuate risks from capital inflow surges, it is not without attendant implications for other countries: "there will be multilateral consequences as investors reallocate their portfolios away from the country instituting the controls." Thus, countries that wish to influence their foreign capital are seemingly able to do so. However, by doing so, countries may impose spillover effects onto neighbors or economically similar countries. (Forbes et al., 2011)

Magud and Reinhart (2006) categorize more than 30 papers based on whether they studied capital inflows, capital outflows, or were multi-country studies. 16 of the papers analyzing capital inflows indicate that the capital controls achieved the objective of altering the composition of inflows. However, of these 16 papers, 6 indicate that the effects were only temporary, i.e., the capital controls achieved their desired outcome but only on a short-term basis. The authors calculate two indices to measure the efficacy of capital controls reported in each paper: a capital controls effectiveness (CCE) and a weighted capital controls effectiveness (WCCE) index. The authors find that "capital controls were able to make monetary policy more independent, alter the composition of capital flows toward longer maturities, and reduce real exchange rate pressures." This supports my hypothesis that capital controls are not only effective at influencing foreign capital, but also allow countries to mitigate the adverse effects of capital inflows. (Magud and Reinhart, 2006)

2.2. The differential effects of foreign FDI and debt capital

The preceding literature showed that capital controls are effective at influencing the composition of inward foreign capital flows. Generally, capital-recipient countries do so with

[3] Forbes et al. (2011) describe such affected countries as "other countries that are in Latin America, that are large shares of the benchmark, and that are closely linked to growth in China (through commodity dependence or regional exports)."

the intention of insulating their economies and financial systems from the destabilizing effects of short-term and volatile capital flows. Klein (2012) notes, "the imposition of short-run capital controls could stem unsustainable asset booms, and the busts that follow." Thus, capital controls are used as a prudential buffer. Countries may temporarily impose capital controls "on inflows of categories of assets that pose a particular threat to the stability of the financial system (e.g. short-maturity debt rather than long-term direct investment) at a time when these inflows are surging" (Klein, 2012).

The motivation behind using the FDI to debt ratio for this paper is that, in theory, a country may greatly benefit from liberalizing their capital account, especially to FDI. The theoretical benefits range from greater long-term economic growth to positive vertical and horizontal spillovers. For example, the IMF notes FDI can facilitate the transfer of knowledge and technology through subsidiaries to capital-recipient countries (IMF, 2012). Furthermore, Korinek (2010) identifies a channel through which FDI might mitigate the adverse effects of a crisis: "if a parent company injects additional liquidity into its emerging market subsidiary during crises, then the resulting capital inflows entail positive externalities." Empirical studies' results, on the other hand, have been mixed. For example, Alfaro et al. (2006) investigate the linkages between FDI and economic growth and find that initial conditions, such as financial development, matter if FDI is to amplify economic growth and development. However, it is possible that FDI does affect growth to a greater extent than is shown in empirical studies. Empirical studies may suffer from a faulty hypothesis specification, the omission of second-round externalities following liberalization, or too short time samples (IMF, 2012).

Conversely, foreign capital in the form of debt may pose a particular challenge to countries when faced with a crisis. The challenge is that agents may not internalize that "their private risk-taking decisions affect the tightness of constraints in states of crisis" through a financial amplification effect (Korinek, 2010). Consequently, the amount of debt a decentralized agent assumes in normal times may exacerbate the financial constraints a country faces in the time of a crisis. Korinek (2010) notes that "foreign currency denominated debts seem to significantly magnify macroeconomic volatility and raise the risk of financial crisis without yielding the benefits in terms of higher growth."

Given that FDI is preferable to debt in terms of foreign capital, this paper seeks to investigate a particular research question: *can countries affect the composition of foreign capital inflows by using a differential tax treatment of FDI and debt?* In general, the limited availability and "coarseness" of capital controls indicators hampers researchers' ability to conduct empirical studies[4]. While it is somewhat easier to conduct empirical studies for individual countries, one must use panel data in order to analyze the experience of a multitude of countries. Until recently, existent panel data sets suffered from either a lack of granularity or from a limited sample size. This paper overcomes these difficulties and contributes to the literature by analyzing a particular subset of capital controls that relate to the differential taxation of FDI and debt instruments. Specifically, the explanatory variables indicate the presence or absence of such capital controls, on an annual basis, for 20 countries over the period 1999 to 2011. As discussed in greater detail below, this dataset is the product of the author's own analysis of the IMF's *AREAER Online* database. The dataset provides the basis for interesting analysis and economic policy implications due to its varied set of countries and that it covers a period of economic and policy fluctuation.

3. Data

This paper uses annual panel data for 20 countries spanning 1999 to 2011 to identify whether the use of a capital control differential tax on FDI or debt investments can affect the composition of capital towards FDI and away from debt. The source for the explanatory variables is the International Monetary Fund's *Annual Report on Exchange Arrangements and Exchange Restrictions* Online database. The dependent variables were obtained from the *External Wealth of Nations* Dataset (Lane and Milesi-Ferretti, 2007). The control variables were obtained from the World Bank's *World Development Indicators* database, and the *Worldwide Governance Indicators* project. Summary statistics can be found in the table below. Detailed information on countries and data sources can be found in the appendix.

[4] Binici, Hutchison, and Schindler (2010) point out that binary measures of de jure capital controls may provide useful information about "broad aggregate trends on financial liberalization," their coarseness obscures "subtle variations in capital account regimes."

Table 1. Summary statistics

Variable	Observations	Mean	Standard Deviation	Min	Max
Explanatory variables					
Tax preferences for FDI	260	0.48	0.51	0	2
Tax discrimination on debt investments	260	0.48	0.50	0	1
Sum of tax preferences for FDI and tax discriminations on debt	260	0.45	0.50	0	1
Either tax preferences for FDI or tax discriminations on debt	260	0.03	0.17	0	1
Dependent variables					
Foreign direct investment, net inflows	260	36,262.52	80,200.01	17.00	695,103.00
Direct investment debt liabilities	260	47,058.13	79,608.44	0.00	426,010.00
Control variables					
Per capita GDP	240	3,799.42	4,910.91	132.59	22,883.83
Institutional Quality	260	40.80	23.30	0.85	87.03
Trade Openness	234	77.79	40.64	0.31	220.41
Private credit	239	38.42	33.71	2.97	148.34
Natural resources	230	35.75	30.18	0.14	97.37

The biggest obstacle in conducting this study has to do with limited data availability. The ideal panel data set would contain a large number of countries, span multiple decades, and would entail highly disaggregated data so that the researcher could analyze the relative impact of capital controls across individuals, time, and industries. While this paper's dataset does not contain many countries or spans many years, since I use a panel data set looking at both cross-sectional and time dimensions, I am better able to analyze the effects in question. As noted in Verbeek (2008, p. 342), panel data is superior to time series or cross-sectional data in capturing individual and time effects. Furthermore, as aforementioned, I take advantage of a unique dataset for my explanatory variables which allows me to analyze the experience of multiple countries, thus strengthening the final results. One caveat worth mentioning here is that my dataset does suffer from some missing observations. In Table 1, I have 260 observations for all of my explanatory and dependent variables. However, four of my five control variables are missing between 20 to 30 observations. As a result, my baseline specifications are restricted to 197 observations. Despite the fact that my baseline specifications are restricted to fewer observations, it is still a sufficient amount of data from which I can draw meaningful results.

3.1. Explanatory variables

I obtain the data for the explanatory variables from the IMF's *AREAER Online* database, which contains capital controls data beginning in 1999. Of the 250 categories, this paper

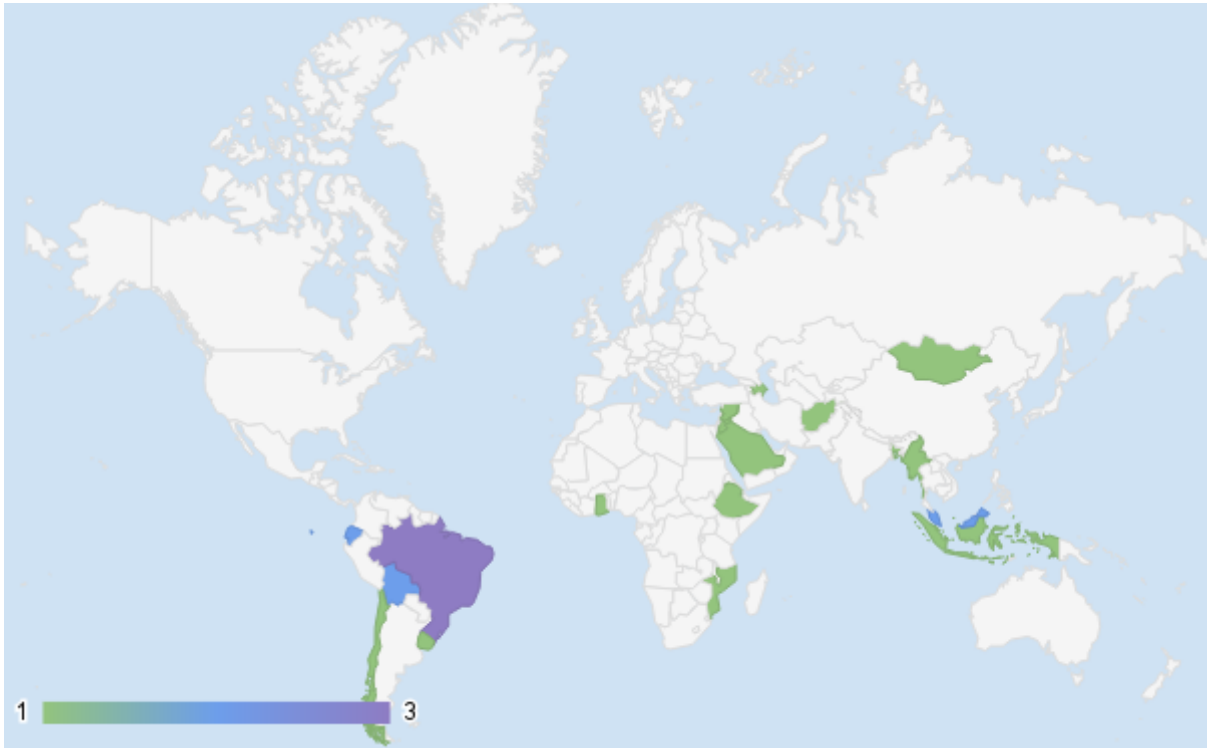
examines and codifies two in particular: capital controls on inward direct investment (XI.A.5.b.) and on the local purchase by non-residents of bonds or other debt securities (XI.A.2.a.2.i.). The *AREAER Online* database contains data for the 188 IMF member countries plus 3 territories (Aruba, Hong Kong SAR, and Curaçao and Sint Maarten—formerly the Netherlands Antilles).

I examine and codify the data in the *AREAER Online* database using the following approach. When the *AREAER Online* database indicates the country provided foreign investors in direct investment a tax preference, I code the entry as 1. An example of a tax preference is a tax exemption or holiday for a certain number of years, provided that the investment meets certain criteria such as investment in a particular location, sector, or a minimum threshold of foreign equity capital ownership. When the *AREAER Online* database indicates the country applied a tax discrimination against the investment in bonds or other debt securities, I code the entry as 1. An example of a tax discrimination is the application of a higher tax rate on investments in such instruments. In all other cases where it appeared the country did not apply either a tax preference for FDI or tax discrimination against debt, I code the entries as 0. The reason I encode both tax preferences for FDI and tax discriminations against debt as 1 is that they should have the same effect on the dependent variable, the ratio of FDI to debt. When countries give a tax preference for FDI, it should make FDI larger relative to debt, thus making the ratio of FDI to debt larger. When countries apply a tax discrimination against debt, it should make debt smaller relative to FDI, also making the ratio of FDI to debt larger.

The four capital control specifications are entitled *Tax_FDI, Tax_Debt, Tax_FDI_Debt_Sum*, and *Tax_FDI_Debt_DV*. *Tax_FDI* contains the observations specifically related to tax preferences for FDI. *Tax_Debt* contains observations specifically related to tax discrimination against debt investments. *Tax_FDI_Debt_Sum* is simply the sum of *Tax_FDI* and *Tax_Debt*. Only once did a country offer both a tax preference for FDI and applied a tax discrimination against debt investments, resulting in a value of 2. *Tax_FDI_Debt_DV* is a dummy variable series and takes the value of 0 if both *Tax_FDI* or *Tax_Debt* are 0, and takes the value of 1 otherwise. Furthermore, econometric tests revealed there is no collinearity between the two main explanatory variables. The Variance Inflation Factor (VIF) for both *Tax_FDI* and *Tax_Debt* was 1.01 which indicates the two variables are not correlated. A table detailing the VIFs can be found in the appendix.

Figure 2. Countries using a tax-based capital control on FDI and debt

Countries that only used a tax preference for FDI are coded as 1 and are colored green. Countries that only used a tax discrimination against debt are coded as 2 and are colored blue. Countries that used both tax preferences for FDI and tax discrimination against debt are coded as 3 and are colored purple.



Of the 191 countries and territories, only 20 countries applied either of the aforementioned capital controls. In terms of income groups, most countries enacting this type of capital control fall into the upper or lower middle income category. Figure 2 indicates which countries have implemented these types of capital control. Brazil, colored purple, was the only country to have implemented a tax preference for FDI and a tax discrimination against debt simultaneously. For the 20 countries which applied either capital control, there are 146 observations where the explanatory variable is 1, indicating either a tax preference for FDI or a tax discrimination against debt. Of the 146 observations, there are 137 observations of a tax preference for FDI and there are 10 observations of a tax discrimination against debt.

3.2. Dependent variable

The dependent variable is a logged ratio of FDI liabilities over debt liabilities. These series were obtained from the *External Wealth of Nations* (EWN) dataset, compiled by Lane and Milesi-Ferretti (2007). They begin construction of the dataset by following the methodology outlined in the IMF's Balance of Payments Manual. They estimate stock positions beginning with estimates of countries' International Investment Position (IIP) and work backwards with capital flows data and include capital valuation changes to arrive at their final dataset.

After obtaining series for the dependent variable from the EWN, I calculate the ratio of FDI to debt. Subsequently, I take the log of the ratio to facilitate the interpretation of results. Verbeek (2008, p. 53) notes that converting a model into a loglinear form facilitates the estimation of elasticities which are often of greater interest than marginal effects. Furthermore, using logarithms "may help reducing heteroskedasticity problems" (Verbeek, 2008, p. 53) which are important when interpreting standard errors and statistical tests.

3.3. Control variables

The main control variables are drawn from existing literature and are significant determinants of capital flows: per capita GDP, institutional quality, trade openness, private credit, and natural resources. I describe the motivation for using each control variable in the following paragraphs.

Per capita GDP

Per capita GDP is used as an indicator of economic development, i.e., the more developed an economy is, the more likely it will attract foreign capital. Martin and Rey (2004) construct a theoretical framework in which economic size is a determinant of asset returns, financial market breadth, and the extent of home bias and risk sharing (Martin and Rey, 2004). As also noted in Lane and Milesi-Ferretti (2003), per capita GDP may affect the likelihood of investment in international asset markets. "To the extent that higher income per capita is associated with lower risk aversion and international investments are perceived as riskier than domestic alternatives, it may also raise international asset trade" (Lane and Milesi-Ferretti, 2003). Furthermore, fixed costs, in the form of learning costs, may also explain the positive relationship between income levels and international cross-holdings, i.e., as a country's

economy grows, local investors spend time and effort learning how to optimally allocate their resources (Lane and Milesi-Ferretti, 2003).

Institutional quality

Following the methodology in Binici, Hutchison, and Schindler (2010), I construct the institutional quality control variable by collecting data from the World Bank's *Worldwide Governance Indicators* project. It contains aggregated indicators for six dimensions of governance: (1) Voice and Accountability; (2) Political Stability and the Absence of Violence; (3) Government Effectiveness; (4) Regulatory Quality; (5) Rule of Law; and (6) Control of Corruption. I calculate the percentile rank in each dimension for the 20 countries used in this study. Then, I take the average of the percentile rank across each dimension to obtain one observation per country per year. Other sources for institutional quality, such as the International Country Risk Guide, are only available through a paid subscription. Therefore, I took advantage of the freely available dataset and constructed my own measure for this particular control variable.

The motivation for using institutional quality as a control variable is that capital flows are positively associated with institutional quality. Countries with stronger institutions are better able to provide investors with property protection rights, are typically more politically stable and less corrupt, and have stronger regulations. These attributes attract capital inflows and dampen capital outflows. Furthermore, countries with weaker institutions tend to experience more volatile capital flows.

In a seminal paper, Lucas identifies weak institutions to explain the phenomenon of capital flowing from poor to rich countries, contrary to the standard neoclassical theory, now dubbed the "Lucas paradox" (Lucas, 1990). Subsequent theoretical and empirical studies supported Lucas' conclusion such as Tornell and Velasco, 1992; Alfaro et al., 2007, 2008; and Faria and Mauro, 2005.

Tornell and Velasco (1992) model a "tragedy of commons" that afflicts productive assets in poor countries: "because of a weak system of property rights in poor countries, each interest group has common access to other groups' domestic capital stocks." Conversely, poor citizens may invest abroad in countries with strong property rights and ensure private access

to their investments. Thus, capital flight is a rational response for citizens whose domestic financial markets do not provide protection of property.

In a series of papers, Alfaro et al. establish a positive connection between capital inflows and a country's institutional quality, legal system, and policies. Furthermore, they find that higher institutional quality is associated with less volatile capital flows. With regard to a country's institutional quality: their "ordinary least squares (OLS) estimates show that improving the quality of institutions to the United Kingdom's level from that of Turkey's implies a 60% increase in foreign investment" (Alfaro et al., 2008). In another paper, they establish that "the historical legal origin of a country has a direct impact on capital inflows during 1970–2000" and that "policy variables, such as inflation, capital controls, and financial development, are shown to have a role in explaining the changes in capital inflows" (Alfaro et al., 2007). In the same paper, they find evidence to support the hypothesis that poor institutional quality and bad policies exacerbated capital flow volatility between 1970 and 2000 (Alfaro et al., 2007).

Trade openness

Lane and Milesi-Ferretti (2003) highlight a number of reasons why goods trade matters for capital flows: (1) as goods trade increases so do countries' financial transactions such as trade credit and export insurance; (2) "following Obstfeld and Rogoff (2001), there is a close connection between the gains to international financial diversification and the extent of goods trade: trade costs create an international wedge between marginal rates of substitution and hence limit the gains to asset trade" (Lane and Milesi-Ferretti, 2003); (3) goods trade is linked with financial positions through flows such as FDI, i.e., firms conduct trade between subsidiaries and intermediaries; (4) goods trade induces a "familiarity" effect: the increased inclination to conduct cross-border financial transactions and reduced financial home bias. (Lane and Milesi-Ferretti, 2003)

Portes et al. (2001) and Portes and Rey (2005) use a gravity model, often used in modeling goods trade, to explain international financial transactions. As in the case with goods trade, they find that distance negatively affects financial flows, indicating that asymmetric information and a home bias affects financial flows in the same manner as it affects goods trade (Portes et al., 2001). Whereas the 2001 paper focuses on bilateral flows between the United States and a set of 40 advanced and emerging markets, Portes and Rey (2005) expand the analysis by looking at bilateral gross cross-border equity flows between 14 countries. The

subsequent paper supports the results obtained in the first: there is "strong evidence that there is a very important geographical component in international asset flows. International capital markets are not frictionless: they are segmented by informational asymmetries or familiarity effects" (Portes and Rey, 2005).

Domestic financial sector development

The fourth control variable is a proxy for financial sector development which is also positively linked to international capital flows. As a country's financial sector deepens and broadens, domestic intermediaries may begin to offer international assets. Furthermore, following the exposure to domestic financial markets may induce domestic investors to diversify their portfolios through internationally. From a foreign investor's perspective, the more developed a country's financial sector becomes, the more attractive it becomes. Conversely, underdeveloped domestic financial sectors may force domestic agents to invest internationally, thereby producing a substitution effect. (Lane and Milesi-Ferretti, 2003)

Natural resources

Natural resources fall in the category of "pull" factors: attributes which attract foreign capital. Countries with natural resources may attract FDI more than other types of capital: multinational firms, seeking to profit from the extraction of natural resources, invest in extraction activities. Multinational firms often have superior technology and expertise, without which natural resources may go unexploited or even undiscovered (Markusen, 1997). Mauro and Faria (2005) find empirical evidence linking natural resources with international capital flows, especially FDI.

4. Methodology

In order to address the question of interest – whether countries may affect the composition of foreign capital through the use of a capital control tax – this paper estimates the following baseline regression equation for several capital control specifications:

(1) $$CapComp_{it} = \beta_1 CapitalControl_{it} + \beta_{1\dots m} CountryDummy + \beta_{1\dots t} YearDummy + X'_{it}\theta + \varepsilon_{it}$$

where *i* and *t* denote country and year, respectively, and *X'it* is a vector of 5 control variables, including the log of real per capita GDP, institutional quality, trade openness, a proxy for financial development, and a measure of a country's natural resources. Existing empirical studies, which have identified apparently robust determinants of capital flows, guided the choice of control variables, such as Alfaro et al., 2008; Lane and Milesi-Ferretti, 2003; Montiel and Reinhart, 1999; Portes et al., 2001; and Portes and Rey, 2005. This paper estimates the above equation for various capital control specifications using a panel data set of 20 countries during 1999-2011. Joint data availability between the dependent and explanatory variables dictated the country and time coverage. The *AREAER Online* database contains information on capital controls beginning in 1999 through 2014. The Lane and Milesi-Ferretti database, from which I obtain my dependent variable data, begins in 1970 and ends in 2011. Hence, I was only able to obtain data for the years which the two data sources overlap: 1999 through 2011.

This paper's hypothesis is whether countries can influence inward foreign capital towards FDI and away from debt by implementing tax-based capital controls. The dependent variable is the logged ratio of FDI to debt. The explanatory variables are based on two categories of capital controls (1) on inward direct investment (XI.A.5.b.) and (2) on the local purchase by non-residents of bonds or other debt securities (XI.A.2.a.2.i.). As previously mentioned, I expect both a tax preference for FDI and a tax discrimination against debt to affect the dependent variable positively. Countries implementing a tax preference for FDI should encourage foreign investors to allocate more investments towards FDI, thereby making FDI larger relative to debt. Countries implementing a tax discrimination against debt should discourage further investment in bonds and other debt securities, thereby making debt smaller relative to FDI. Thus, the ratio of FDI to debt should increase with either tax preferences for FDI or tax discriminations against debt.

In addition to the aforementioned specification (1), I include specifications with a one period lag of the explanatory variables (2).

(2) $$CapComp_{it} = \beta_1 CapitalControl_{it} + \beta_2 CapitalControl_{it-1} + \beta_{1\dots m} CountryDummy + \beta_{1\dots t} YearDummy + X'_{it}\theta + \varepsilon_{it}$$

Including lagged explanatory variables captures the fact that investors may take time to respond to changes in capital controls. Many other empirical studies include lagged explanatory variables with mixed outcomes. For example, Forbes et al. (2011) conducted interviews with investors to determine their sensitivity to changes in capital controls: "Most investors—even those strongly opposed to controls— admitted they would not usually make an immediate portfolio adjustment after new capital controls were implemented, although there was a good chance they would adjust their flows to the country over time." They find that contemporaneous capital flows did not adjust to changes in capital controls in the same period, however, capital flows do appear to respond with a lag. Conversely, Binici, Hutchison, and Schindler (2010) extend their baseline model to account for the fact that "the dynamics of the effects of capital controls may be more complicated than simply through a contemporaneous effect." In their analysis, lagging the explanatory variables does not produce significant results for controls on capital inflows. I discuss results for my specifications below.

Nonstationarity is a well-known issue in time series analysis. Thus, I test for nonstationarity by conducting unit root tests, given that some control variables were likely to contain a time trend. The presence of a unit root indicates the series in question is nonstationary and thus requires addressing to avoid the possibility of spurious regression results. For this paper's purposes, I use the Augmented Dickey Fuller (ADF) test which tests for "the joint null hypothesis of a unit root (or the absence of cointegration) for each of the countries involved" (Verbeek, 2008, p. 369). There is sufficient evidence to reject the null hypothesis of a unit root for the natural resources control variable. Meanwhile, there is insufficient evidence to reject the null hypothesis of a unit root for per capita GDP, institutional quality, trade openness, and domestic credit to the private sector. Verbeek (2008, p. 267) notes that "first differencing quite often can transform a nonstationary series into a stationary one [particularly for] aggregate economic time series or their natural logarithm." Thus, I convert those series by taking the logarithm and then obtaining the first difference. After running the ADF test again on the logged first-differenced series, there is sufficient evidence to reject the null hypothesis of a unit root for per capita GDP, institutional quality, trade openness, and domestic credit to the private sector.

Using a country fixed-effects model allows for the control of systematic capital flows due to unique country-specific factors. Moreover, using a random-effects model would be

inappropriate since individuals in this sample are countries and not a "random draw from some underlying population" (Verbeek, 2008, p. 351). Verbeek notes that there may be interest in α_i, the individual-specific effect, "which makes sense if the number of units is relatively small and of a specific nature. That is, identification of individual units is important" (Verbeek, 2008, p. 351). Furthermore, using time fixed-effects allows for the control of the simultaneous surge or reversal in capital flows which likely affect all countries simultaneously. Thus, this paper finds the most appropriate model is one with both country and time fixed-effects.

4.1. Possible issues with analysis

Nonstationarity in the dependent variable

In addition to conducing unit root tests for the control variables, I also conduct a unit root test for the dependent variable, the ratio of FDI to debt. I find there is insufficient evidence to reject the null hypothesis of a unit root for the ratio of FDI to debt. As with the control variables, I take the logged first-difference to correct for nonstationarity. I use the ADF test to confirm that the logged first-differenced series is stationary. However, once I use the logged first-differenced ratio of FDI to debt, I obtain meaningless results, i.e., none of the explanatory or control variables are statistically significant. First differencing the dependent variable is more econometrically strict, however, doing so produces meaningless results. Thus, I proceed without first differencing the ratio of FDI to debt so that I am able to produce some meaningful results. The results of the regression with the first differenced dependent variable can be found in the appendix.

Variation in capital controls

One issue with analyzing the effects of capital controls is that countries have adopted different tax preferences for FDI or tax discriminations against debt investments. Some countries' tax preferences for FDI apply to investments in any sector for many years and are not subject to prior approval, e.g., Chile does not restrict foreign investment to particular sectors or to a particular ownership structure. Furthermore, under the Decree-Law 600, foreign investments in Chile over US$1 million provide investors with their choice of taxation scheme. Conversely, other countries have very strict restrictions on foreign investment and prohibit foreigners from investing in certain sectors, or from holding a certain

percentage of ownership shares. For example, Ghana prohibits foreign investment in certain sectors; requires the prior approval of Ghana Investment Promotion Center; and requires investments to meet a matrix of amount and ownership/employment structure parameters. While it would be interesting to study the different effects of the variation in capital controls, doing so requires the formation of a framework with which I would categorize differences in capital controls. This is a bit beyond the scope of this thesis but would be an interesting area for future research.

De jure *versus* de facto *measures of capital controls*

Another possible issue with this analysis is that the explanatory variables are based on de jure measures of capital controls. As such, one cannot be sure to what extent controls were actually enforced. Fernandez et al. (2015) note the difficulty in constructing an empirically-based de facto indicators of capital account restrictions: "there is not a clear benchmark of the gross capital flows consistent with free capital mobility." Assuming that capital controls were fully and effectively enforced would overstate the controls' effect on the composition of capital. As with the variation in capital controls, estimating the difference between *de jure* and *de facto* capital controls is a difficult empirical challenge and beyond the scope of this thesis.

Spillover effects and simultaneous changes

Since capital may flow towards particular geographic regions or economically similar countries simultaneously, many countries may experience surges or reversals in capital flows at once. If countries do not coordinate the implementation of capital controls, they may impose spillover costs on their neighbors as capital flows recalibrate towards countries not seen as at risk of raising capital controls (Forbes et al., 2011). Thus, the model results might be skewed by this phenomenon of simultaneous capital recalibration to avoid the risk of greater capital controls. Furthermore, measuring the impact of capital controls is complicated by the difficulty in controlling for the simultaneous changes in other domestic policies that could affect capital flows, e.g., the liberalization of capital outflows and the improvement in other macroeconomic policies or conditions (Forbes et al, 2011).

Endogeneity

In an influential paper, Cardoso and Goldfajn (1998) derive a government reaction function and find "strong evidence that net capital flows strongly influence policy decisions on

implementing or reducing restrictions on capital flows." This paper might suffer from an endogeneity problem if governments react to higher capital flows by implementing capital controls, since I am studying the effect of capital controls on capital flows. However, they note that the "government reaction function seems to be driven solely by equity security flows. Higher debt or net direct investment flows have no effect on controls." Furthermore, they note that "while debt flows are largely affected by capital controls, the government control function does not react to debt flows." They also conducted a vector autoregression (VAR) analysis to "analyze the effects of capital controls on capital flows." Doing so allowed them to further investigate the dynamic response of flows to controls. Interestingly, the VAR analysis showed that debt and equity flows respond to controls whereas FDI does not. Therefore, it is safe to assume that while capital controls may be endogenous, since this paper solely considers FDI and debt flows, the particular issue of capital control endogeneity does not apply in this paper's analysis. (Cardoso and Goldfajn, 1998)

Many recent empirical studies have tried to address the issue of endogeneity by replacing the endogenous contemporaneous explanatory variable with a one-period lagged version. For example, Asiedu and Lien (2004) recognized that their main explanatory variable might be endogenous due to simultaneity – "where an independent variable is determined simultaneously along with the dependent variable." They note that a typical econometric solution is to use instrumental variables, however, "finding reliable instruments can be […] problematic." To overcome this issue, they attempted to address endogeneity by using lagged values of their explanatory variable. Recent empirical and theoretical papers reveal that while doing so may seem appealing, it is an inappropriate econometric method (see Bellemare, Masaki, and Pepinsky, 2015; Reed, 2015). "'Lag identification' […] is an illusion: lagging independent variables merely moves the channel through which endogeneity biases causal estimates, replacing a "selection on observables' assumption with an equally untestable 'no dynamics among unobservables' assumption" (Bellemare, Masaki, and Pepinsky, 2015). In a related paper, Reed (2015) also cautions against the use of lagged explanatory variables for similar reasons: "replacing a contemporaneous explanatory variable with its lagged value does not avoid the inconsistency problems associated with simultaneity." However, he does note that one could use lagged endogenous explanatory variables under two conditions: "(i) the lagged values do not themselves belong in the respective estimating equation, and (ii) they are sufficiently correlated with the simultaneously determined explanatory variable" (Reed, 2015). This paper proceeds with the use of lagged explanatory variables despite the

aforementioned issues since the intention is to capture the fact that investors may respond to tax-based capital control incentives or disincentives with a lag.

5. Results

The eight baseline specifications are a combination of the two regression equations (equations (1) and (2) above) and the four different explanatory variables described in section *3.1 Explanatory variables*: (1) *Tax_FDI*, (2) *Tax_Debt*, (3) *Tax_FDI_Debt_Sum*, and (4) *Tax_FDI_Debt_DV*. Table 2 below presents the results from the eight baseline specifications. All specifications use the logged ratio of FDI liabilities to debt. Furthermore, all specifications use two-way fixed effects to capture systematic changes by country and by year. Each pair of specifications feature the same contemporaneous explanatory variable. Even numbered specifications include the contemporaneous explanatory variable plus a one period lag of the explanatory variable, i.e. both (1) and (2) use *Tax_FDI_Debt_Sum*, and (2) includes a one period lag of *Tax_FDI_Debt_Sum*. All eight specifications include the same control variables: per capita GDP, institutional quality, trade openness, private credit, and the country's share of natural resources. I have taken logarithms of all variables except the explanatory variables, as taking the logarithm of a dummy variable series would render meaningless results. However, taking the logarithm of the other variables facilitates their analysis. Logged regression coefficients are interpreted as percent changes rather than level changes. Some of the control variables are nonstationary so they have been first-differenced, i.e., per capita GDP, institutional quality, trade openness, and private credit. The interpretation of first-differenced coefficients no longer reflects the control variables' percent changes effect, but rather how changes in the control variables' growth rates affect the dependent variable.

The odd-numbered specifications, featuring only the contemporaneous explanatory variable, indicate the capital controls have a statistically significant and positive effect. The coefficients for the summed and "dummy" explanatory variables, *Tax_FDI_Debt_Sum* and *Tax_FDI_Debt_DV*, are statistically significant at the 5 percent level, whereas coefficients for the individual explanatory variables, *Tax_FDI* and *Tax_Debt*, are statistically significant at the 10 percent level. This seems to indicate that both independent capital controls and combinations of capital controls are effective at improving the ratio of FDI liabilities to debt

within the same year. Other studies' results have indicated that capital controls are effective within the first few months of implementation which supports this result (See Forbes et al., 2011 and Ariyoshi et al., 2000). Of the 4 contemporaneous specifications, the *Tax_Debt* coefficient (0.215) is smaller than that of *Tax_FDI* (0.436), indicating tax discriminations against debt are weaker than tax preferences for FDI. The reason for the asymmetry in efficacy may be due to other effects that dominate the determination of different types of capital flows such as a country's interest rate differential with that of advanced economies or the global appetite for or aversion to risk.

Lagged explanatory variables, when added to the specification, are found to be statistically significant in three of the four even-numbered specifications. An additional benefit of including lagged explanatory variables is that the models' explanatory power, the R-squared, improves with their inclusion. For example, the R-squared values increase by about 2.4 percentage points. While the coefficients for *Tax_FDI_Debt_Sum*, *Tax_FDI_Debt_DV*, and *Tax_FDI* are statistically significant, the coefficient for *Tax_Debt* is not. This reveals that what is driving the increase in the FDI to debt ratio is tax preferences for FDI, not tax discriminations against debt. The results for *Tax_FDI* indicate the persistent efficacy of using tax preferences to skew a country's composition of foreign capital towards FDI. The possible reason for this is that FDI typically involves more coordination and planning versus portfolio investments. The economic implication here is that foreign investors react more quickly to tax disincentives against debt versus tax preferences for FDI. Within a year of implementation, foreign investors will internalize the change in capital controls and adjust their investment allocations accordingly.

Table 2. Benchmark results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory Variables[1]	*Tax_FDI_Debt_Sum*	*Lagged Tax_FDI_Debt_Sum*	*Tax_FDI_Debt_DV*	*Lagged Tax_FDI_Debt_DV*	*Tax_FDI*	*Lagged Tax_FDI*	*Tax_Debt*	*Lagged Tax_Debt*
Explanatory Variable	0.364**	0.126	0.398**	0.0971	0.436*	0.0772	0.215*	0.210
	(0.168)	(0.139)	(0.180)	(0.171)	(0.218)	(0.202)	(0.106)	(0.165)
Lagged Explanatory Variable	-	0.365**	-	0.430**	-	0.506**	-	0.0102
	-	(0.171)	-	(0.197)	-	(0.198)	-	(0.141)
diffln_gdp_pc	3.543***	3.422**	3.497***	3.484**	3.685***	3.621***	3.320***	3.317***
	(1.130)	(1.216)	(1.145)	(1.203)	(1.165)	(1.236)	(0.990)	(0.988)
diffln_inst_qual	0.0605	0.159	0.0550	0.170	0.0833	0.231	0.240	0.240
	(0.445)	(0.415)	(0.448)	(0.412)	(0.446)	(0.405)	(0.475)	(0.477)
diffln_trade_open	0.216	0.179	0.193	0.162	0.177	0.152	0.201	0.201
	(0.546)	(0.511)	(0.539)	(0.502)	(0.528)	(0.494)	(0.550)	(0.553)
diffln_priv_cred	0.0844	0.0814	0.0696	0.0821	0.0975	0.0865	0.180	0.180
	(0.303)	(0.302)	(0.306)	(0.308)	(0.297)	(0.303)	(0.305)	(0.305)
ln_nat_res	-0.312**	-0.331**	-0.310**	-0.329**	-0.309**	-0.335**	-0.294**	-0.294**
	(0.125)	(0.126)	(0.126)	(0.126)	(0.124)	(0.127)	(0.126)	(0.126)
Constant	4.140***	4.108***	4.117***	4.080***	4.090***	4.062***	4.298***	4.298***
	(0.370)	(0.376)	(0.376)	(0.378)	(0.390)	(0.396)	(0.338)	(0.339)
R-squared	0.487	0.516	0.491	0.521	0.488	0.526	0.440	0.440

The dependent variable for all specifications is the logged ratio of FDI to debt liabilities.

[1] Odd numbered specifications include the contemporaneous explanatory variable (EV). Even numbered specifications include the contemporaneous EV plus a one period lag of the same EV.

Robust standard errors in parentheses and are used to correct for the likely presence of heteroskedasticity.

Regressions include country and year fixed-effects.

*** p<0.01, ** p<0.05, * p<0.1

Observations: 197

Number of countries: 18

Turning now to the control variables, 3 out of 5 are statistically insignificant: institutional quality, trade openness, and private credit. The statistically significant control variables, per capita GDP and natural resources, show mixed signs relative to expectations. As expected, per capita GDP is positive and significant at the 1 percent level, indicating that economic development is an important determinant of capital flows. Interestingly, the coefficient of per capita GDP is quite large. This could be due to the fact that the per capita GDP control variable has been first differenced, whereas the dependent variable has not. Conversely, the coefficient for natural resources is negative and significant at the 5 percent level. However, this puzzling result also appeared in another study using this same control variable (see Binici, Hutchison, and Schindler, 2010).

5.1. Robustness checks

Extensions for this analysis include unemployment rates and CPI as additional control variables; and subsets of countries by income group and region. Tables for these additional specifications can be found in the appendix. Unemployment and CPI are commonly used as a proxy for macroeconomic conditions (Nordhaus, 1975). Including these additional control variables in the specification allows for controlling fluctuations in business cycles. Adding unemployment and CPI to the model produces the same coefficient statistical significance and sign results as the baseline specifications. However, none of the specifications produce statistically significant coefficients for either control variable. In another set of extensions, I ran regressions by income group and country. Unfortunately, the small sample size of 20 countries results in the poor distribution of countries by groups. Thus, when running regressions for these smaller subsets of countries, the regressions fail to produce any interesting or meaningful results. Tables for these results are included in the appendix.

6. Conclusion

This paper has taken a unique look at the effects of a tax-based capital control on the composition of foreign capital. Recent panel data studies analyze the effects of capital controls using more detailed and precise data for capital controls. This paper extends the analysis by considering two categories of capital controls in particular: tax preferences for

FDI and tax discriminations against debt. Effects are estimated using a panel data set of 20 countries between 1999 and 2011. The baseline set of specifications are based on a two-way fixed effects model, controlling for country and year systemic effects. Control variables were drawn from literature on the determinants of capital flows.

The main conclusion is that a tax preference for FDI or a tax discrimination against debt is effective at influencing the composition of foreign capital. However, the tax preference for FDI is found to be more effective and persistent than a tax discrimination against debt. Policymakers in capital-recipient countries may learn from this analysis that one can influence their composition of foreign capital by offering tax-based capital control incentives to FDI. Doing so may help insulate their economies from potentially destabilizing forms of capital, such as short-term debt investments.

These conclusions could be extended in future research. For example, it would be interesting to investigate the asymmetry between tax preferences for FDI and tax discriminations against debt. In doing so, it might be beneficial to use more or different variables. For example, one could use proxies for FDI and debt to address the nonstationarity issue found in this paper. Furthermore, one could include the growth rate in GDP as an additional control variable. Doing so would draw a connection between the state of global uncertainty and its effect on capital recipient countries' composition of foreign capital.

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8. Appendix

Appendix table 1. Countries used in this paper's analysis

Country	Region	Income group
Afghanistan	South Asia	Low income
Azerbaijan	Europe & Central Asia	Upper middle income
Bangladesh	South Asia	Lower middle income
Bolivia	Latin America & Caribbean	Lower middle income
Brazil	Latin America & Caribbean	Upper middle income
Chile	Latin America & Caribbean	High income: OECD
Côte d'Ivoire	Sub-Saharan Africa	Lower middle income
Ecuador	Latin America & Caribbean	Upper middle income
Ethiopia	Sub-Saharan Africa	Low income
Ghana	Sub-Saharan Africa	Lower middle income
Indonesia	East Asia & Pacific	Lower middle income
Jordan	Middle East & North Africa	Upper middle income
Korea, Rep.	East Asia & Pacific	High income: OECD
Malaysia	East Asia & Pacific	Upper middle income
Mongolia	East Asia & Pacific	Upper middle income
Mozambique	Sub-Saharan Africa	Low income
Myanmar	East Asia & Pacific	Lower middle income
Saudi Arabia	Middle East & North Africa	High income: nonOECD
Syrian Arab Republic	Middle East & North Africa	Lower middle income
Uruguay	Latin America & Caribbean	High income: nonOECD

Appendix table 2. Detailed variable source information

Variable	Description	Source
Explanatory variables		
Tax preference for FDI	Preferential tax on FDI	IMF AREAER Online
Tax discrimination on debt investments	Discriminatory tax on debt	IMF AREAER Online
Dependent variables		
FDI liabilities (stock)	FDI liabilities (Millions of current US$)	*External Wealth of Nations* Dataset, 1970-2011
Debt liabilities (stock)	Debt liabilities (Portfolio debt+other investment) (Millions of current US$)	*External Wealth of Nations* Dataset, 1970-2011
Control variables		
Per capita GDP	GDP per capita (constant 2005 US$)	World Bank*World Development Indicators*
Institutional quality	Average percentile rank of six indicators	World Bank*Worldwide Governance Indicators*
Trade openness	Trade (% of GDP)	World Bank*World Development Indicators*
Private credit	Domestic credit to private sector by banks (% of GDP)	World Bank*World Development Indicators*
Natural resources	Sum of fuel and ores and metal exports (% of merch exp)	World Bank*World Development Indicators*
	Fuel exports (% of merchandise exports)	World Bank*World Development Indicators*
	Ores and metals exports (% of merchandise exports)	World Bank*World Development Indicators*
Consumer price index	Inflation, consumer prices (annual %)	World Bank*World Development Indicators*
Unemployment rate	Unemployment, total (% of total labor force)	World Bank*World Development Indicators*

Appendix table 3. Explanatory variables' variance inflation factors

Variable	VIF	1/VIF
tax_debt	1.01	0.986295
tax_fdi	1.01	0.986295
Mean VIF	1.01	

Note: A VIF close to 1 indicates no correlation.

Appendix table 4. Regression results using logged first differenced dependent variable

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory Variables[1]	*Tax_FDI_Debt_Sum*	*Lagged Tax_FDI_Debt_Sum*	*Tax_FDI_Debt_DV*	*Lagged Tax_FDI_Debt_DV*	*Tax_FDI*	*Lagged Tax_FDI*	*Tax_Debt*	*Lagged Tax_Debt*
Explanatory Variable	0.0228	-0.00801	0.0276	0.00303	0.0445	0.00256	-0.0348	-0.0408
	(0.0403)	(0.0503)	(0.0454)	(0.0625)	(0.0519)	(0.0672)	(0.0288)	(0.0410)
Lagged Explanatory Variable		0.0471		0.0350		0.0591		0.0110
		(0.0560)		(0.0672)		(0.0739)		(0.0489)
diffln_gdp_pc	-0.388	-0.404	-0.390	-0.391	-0.367	-0.374	-0.390	-0.393
	(1.179)	(1.192)	(1.180)	(1.184)	(1.185)	(1.197)	(1.168)	(1.173)
diffln_inst_qual	0.200	0.213	0.198	0.208	0.194	0.211	0.218	0.218
	(0.220)	(0.221)	(0.220)	(0.221)	(0.221)	(0.221)	(0.227)	(0.228)
diffln_trade_open	-0.0727	-0.0774	-0.0740	-0.0765	-0.0751	-0.0781	-0.0786	-0.0790
	(0.342)	(0.337)	(0.342)	(0.339)	(0.341)	(0.336)	(0.344)	(0.345)
diffln_priv_cred	0.0206	0.0202	0.0188	0.0198	0.0175	0.0162	0.0304	0.0306
	(0.121)	(0.122)	(0.121)	(0.121)	(0.120)	(0.122)	(0.122)	(0.122)
ln_nat_res	-0.0510	-0.0533	-0.0510	-0.0525	-0.0515	-0.0545	-0.0490	-0.0489
	(0.0361)	(0.0354)	(0.0359)	(0.0351)	(0.0360)	(0.0350)	(0.0349)	(0.0350)
Constant	0.211**	0.207**	0.208**	0.205**	0.200**	0.197**	0.219**	0.219**
	(0.0886)	(0.0879)	(0.0876)	(0.0873)	(0.0861)	(0.0851)	(0.0920)	(0.0923)
R-squared	0.102	0.105	0.102	0.103	0.104	0.107	0.101	0.101

The dependent variable for all specifications is the logged first-differenced ratio of FDI to debt.

[1] Odd numbered specifications include the contemporaneous explanatory variable (EV). Even numbered specifications include the contemporaneous EV plus a one period lag of the same EV.

Robust standard errors in parentheses and are used to correct for the likely presence of heteroskedasticity.

Regressions include country and year fixed-effects.

*** p<0.01, ** p<0.05, * p<0.1

Observations: 197

Number of countries: 18

Appendix table 5. Robustness check regression including unemployment rate

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory Variables[1]	*Tax_FDI_Debt_Sum*	*Lagged Tax_FDI_Debt_Sum*	*Tax_FDI_Debt_DV*	*Lagged Tax_FDI_Debt_DV*	*Tax_FDI*	*Lagged Tax_FDI*	*Tax_Debt*	*Lagged Tax_Debt*
Explanatory Variable	0.376**	0.136	0.412**	0.110	0.441*	0.0767	0.238*	0.237
	(0.166)	(0.132)	(0.176)	(0.163)	(0.215)	(0.199)	(0.113)	(0.175)
Lagged Explanatory Variable	-	0.368**	-	0.432**	-	0.516**	-	0.00157
	-	(0.170)	-	(0.195)	-	(0.199)	-	(0.142)
ln_unempl	0.253	0.267	0.263	0.270	0.204	0.242	0.197	0.197
	(0.437)	(0.416)	(0.431)	(0.410)	(0.416)	(0.398)	(0.500)	(0.503)
diffln_gdp_pc	3.620***	3.502**	3.575***	3.565***	3.747***	3.692***	3.369***	3.369***
	(1.136)	(1.229)	(1.154)	(1.220)	(1.168)	(1.249)	(0.989)	(0.986)
diffln_inst_qual	0.0305	0.128	0.0232	0.138	0.0624	0.209	0.219	0.219
	(0.414)	(0.383)	(0.416)	(0.378)	(0.422)	(0.382)	(0.447)	(0.448)
diffln_trade_open	0.215	0.178	0.192	0.161	0.176	0.150	0.202	0.202
	(0.537)	(0.503)	(0.530)	(0.493)	(0.520)	(0.487)	(0.548)	(0.551)
diffln_priv_cred	0.0646	0.0604	0.0482	0.0602	0.0833	0.0693	0.165	0.165
	(0.274)	(0.272)	(0.276)	(0.277)	(0.272)	(0.275)	(0.277)	(0.277)
ln_nat_res	-0.359**	-0.380**	-0.358**	-0.378**	-0.346**	-0.380**	-0.330*	-0.330*
	(0.158)	(0.161)	(0.157)	(0.160)	(0.153)	(0.159)	(0.165)	(0.166)
Constant	3.765***	3.711***	3.726***	3.677***	3.790***	3.703***	4.011***	4.011***
	(0.643)	(0.608)	(0.637)	(0.602)	(0.641)	(0.601)	(0.708)	(0.712)
R-squared	0.492	0.522	0.496	0.527	0.491	0.530	0.442	0.442

The dependent variable for all specifications is the logged ratio of FDI liabilities to debt liabilities.

[1] Odd numbered specifications include the contemporaneous explanatory variable (EV). Even numbered specifications include the contemporaneous EV plus a one period lag of the same EV.

Regressions include country and year fixed-effects.

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Observations: 197

Number of countries: 18

Appendix table 6. Robustness check regression including CPI

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory Variables[1]	*Tax_FDI_Debt_Sum*	*Lagged Tax_FDI_Debt_Sum*	*Tax_FDI_Debt_DV*	*Lagged Tax_FDI_Debt_DV*	*Tax_FDI*	*Lagged Tax_FDI*	*Tax_Debt*	*Lagged Tax_Debt*
Explanatory Variable	0.359**	0.145	0.393**	0.123	0.431*	0.104	0.217**	0.228
	(0.163)	(0.135)	(0.174)	(0.167)	(0.212)	(0.198)	(0.0944)	(0.151)
Lagged Explanatory Variable	-	0.332*	-	0.390*	-	0.467**	-	-0.0189
	-	(0.164)	-	(0.191)	-	(0.194)	-	(0.133)
ln_cpi	-0.0686	-0.0525	-0.0664	-0.0490	-0.0653	-0.0458	-0.0756	-0.0757
	(0.0674)	(0.0623)	(0.0669)	(0.0614)	(0.0653)	(0.0612)	(0.0742)	(0.0745)
diffln_gdp_pc	4.225***	4.101***	4.187***	4.155***	4.360***	4.285***	4.015***	4.020***
	(1.072)	(1.194)	(1.090)	(1.191)	(1.106)	(1.236)	(0.870)	(0.860)
diffln_inst_qual	-0.0180	0.0855	-0.0231	0.0985	0.0145	0.170	0.142	0.142
	(0.413)	(0.395)	(0.415)	(0.396)	(0.411)	(0.391)	(0.434)	(0.436)
diffln_trade_open	0.205	0.167	0.180	0.149	0.164	0.138	0.198	0.199
	(0.543)	(0.512)	(0.535)	(0.502)	(0.523)	(0.493)	(0.551)	(0.555)
diffln_priv_cred	0.000440	0.0201	-0.0119	0.0241	0.0175	0.0342	0.0878	0.0872
	(0.288)	(0.293)	(0.291)	(0.298)	(0.279)	(0.294)	(0.295)	(0.295)
ln_nat_res	-0.304**	-0.320**	-0.301**	-0.319**	-0.300**	-0.324**	-0.289**	-0.289**
	(0.120)	(0.120)	(0.119)	(0.119)	(0.117)	(0.119)	(0.124)	(0.124)
Constant	4.257***	4.203***	4.233***	4.170***	4.203***	4.144***	4.415***	4.415***
	(0.350)	(0.358)	(0.355)	(0.360)	(0.366)	(0.377)	(0.322)	(0.323)
R-squared	0.497	0.521	0.500	0.526	0.497	0.530	0.449	0.449

The dependent variable for all specifications is the logged ratio of FDI liabilities to debt liabilities.

[1] Odd numbered specifications include the contemporaneous explanatory variable (EV). Even numbered specifications include the contemporaneous EV plus a one period lag of the same EV.

Regressions include country and year fixed-effects.

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Observations: 191

Number of countries: 18

Appendix table 7. Robustness check regression for high income: OECD countries

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variables[1]	*Tax_FDI_Debt_Sum*	*Lagged Tax_FDI_Debt_Sum*	*Tax_FDI_Debt_DV*	*Lagged Tax_FDI_Debt_DV*	*Tax_FDI*	*Lagged Tax_FDI*	*Tax_Debt*	*Lagged Tax_Debt*
Explanatory variable	0.235***	0.249***	0.235***	0.249***	0.235***	0.249***	-	-
	(3.51e-06)	(3.05e-06)	(3.51e-06)	(3.05e-06)	(3.51e-06)	(3.05e-06)		
Lagged explanatory variable		0.0416***		0.0416***		0.0416***		-
		(1.54e-06)		(1.54e-06)		(1.54e-06)		
diffln_gdp_pc	-4.955***	-4.559***	-4.955***	-4.559***	-4.955***	-4.559***	-5.622***	-5.622***
	(1.65e-05)	(2.65e-05)	(1.65e-05)	(2.65e-05)	(1.65e-05)	(2.65e-05)	(5.99e-06)	(5.99e-06)
diffln_inst_qual	-4.598***	-4.330***	-4.598***	-4.330***	-4.598***	-4.330***	-4.903***	-4.903***
	(6.61e-06)	(1.47e-05)	(6.61e-06)	(1.47e-05)	(6.61e-06)	(1.47e-05)	(1.87e-06)	(1.87e-06)
diffln_trade_open	-1.645***	-1.549***	-1.645***	-1.549***	-1.645***	-1.549***	-1.147***	-1.147***
	(1.29e-05)	(5.64e-06)	(1.29e-05)	(5.64e-06)	(1.29e-05)	(5.64e-06)	(4.97e-06)	(4.97e-06)
diffln_priv_cred	0.791***	0.841***	0.791***	0.841***	0.791***	0.841***	0.948***	0.948***
	(6.23e-06)	(2.61e-06)	(6.23e-06)	(2.61e-06)	(6.23e-06)	(2.61e-06)	(3.56e-06)	(3.56e-06)
ln_nat_res	-0.957***	-0.939***	-0.957***	-0.939***	-0.957***	-0.939***	-1.269***	-1.269***
	(8.74e-06)	(6.91e-06)	(8.74e-06)	(6.91e-06)	(8.74e-06)	(6.91e-06)	(3.73e-06)	(3.73e-06)
Constant	6.949**	6.811**	6.949**	6.811**	6.949**	6.811**	8.102**	8.102**
	(0.236)	(0.265)	(0.236)	(0.265)	(0.236)	(0.265)	(0.211)	(0.211)
Observations	24	24	24	24	24	24	24	24
R-squared	0.826	0.827	0.826	0.827	0.826	0.827	0.815	0.815
Number of cty_grp	2	2	2	2	2	2	2	2

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix table 8. Robustness check regression for high income: non-OECD countries

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variables[1]	*Tax_FDI_Debt_Sum*	*Lagged Tax_FDI_Debt_Sum*	*Tax_FDI_Debt_DV*	*Lagged Tax_FDI_Debt_DV*	*Tax_FDI*	*Lagged Tax_FDI*	*Tax_Debt*	*Lagged Tax_Debt*
Explanatory variable	-0.433**	0.306	-0.433**	0.306	-0.433**	0.306	-	-
	(0.0171)	(0.234)	(0.0171)	(0.234)	(0.0171)	(0.234)		
Lagged explanatory variable		-0.739		-0.739		-0.739		-
		(0.251)		(0.251)		(0.251)		
diffln_gdp_pc	15.08***	15.08	15.08***	15.08	15.08***	15.08	15.08***	15.08***
	(2.27e-07)		(2.27e-07)		(2.27e-07)		(2.11e-06)	(2.11e-06)
diffln_inst_qual	2.138***	2.138***	2.138***	2.138***	2.138***	2.138***	2.138***	2.138***
	(2.07e-07)	(3.32e-07)	(2.07e-07)	(3.32e-07)	(2.07e-07)	(3.32e-07)	(1.10e-06)	(1.10e-06)
diffln_trade_open	0.210***	0.210***	0.210***	0.210***	0.210***	0.210***	0.210***	0.210***
	(4.22e-07)	(5.16e-07)	(4.22e-07)	(5.16e-07)	(4.22e-07)	(5.16e-07)	(5.93e-07)	(5.93e-07)
diffln_priv_cred	0.659***	0.659***	0.659***	0.659***	0.659***	0.659***	0.659***	0.659***
	(1.03e-07)	(1.29e-07)	(1.03e-07)	(1.29e-07)	(1.03e-07)	(1.29e-07)	(1.93e-07)	(1.93e-07)
ln_nat_res	-0.280***	-0.280***	-0.280***	-0.280***	-0.280***	-0.280***	-0.280***	-0.280***
	(2.03e-07)	(2.53e-07)	(2.03e-07)	(2.53e-07)	(2.03e-07)	(2.53e-07)	(4.13e-07)	(4.13e-07)
Constant	4.941**	4.941**	4.941**	4.941**	4.941**	4.941**	4.508**	4.508**
	(0.229)	(0.229)	(0.229)	(0.229)	(0.229)	(0.229)	(0.212)	(0.212)
Observations	24	24	24	24	24	24	24	24
R-squared	0.898	0.898	0.898	0.898	0.898	0.898	0.898	0.898
Number of cty_grp	2	2	2	2	2	2	2	2

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix table 9. Robustness check regression for low income countries

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variables[1]	*Tax_FDI_Debt_Sum*	*Lagged Tax_FDI_Debt_Sum*	*Tax_FDI_Debt_DV*	*Lagged Tax_FDI_Debt_DV*	*Tax_FDI*	*Lagged Tax_FDI*	*Tax_Debt*	*Lagged Tax_Debt*
Explanatory variable	-	-	-	-	-	-	-	-
Lagged explanatory variable		-		-		-		-
diffln_gdp_pc	14.42	14.42	14.42	14.42	14.42	14.42	14.42	14.42
diffln_inst_qual	-8.637	-8.637	-8.637	-8.637	-8.637	-8.637	-8.637	-8.637
diffln_trade_open	23.62	23.62	23.62	23.62	23.62	23.62	23.62	23.62
diffln_priv_cred	-2.432	-2.432	-2.432	-2.432	-2.432	-2.432	-2.432	-2.432
ln_nat_res	-1.394	-1.394	-1.394	-1.394	-1.394	-1.394	-1.394	-1.394
Constant	6.571	6.571	6.571	6.571	6.571	6.571	6.571	6.571
Observations	15	15	15	15	15	15	15	15
R-squared	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Number of cty_grp	2	2	2	2	2	2	2	2

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix table 10. Robustness check regression for lower middle income countries

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variables[1]	*Tax_FDI_Debt_Sum*	*Lagged Tax_FDI_Debt_Sum*	*Tax_FDI_Debt_DV*	*Lagged Tax_FDI_Debt_DV*	*Tax_FDI*	*Lagged Tax_FDI*	*Tax_Debt*	*Lagged Tax_Debt*
Explanatory variable	0.0149	-0.115	0.0149	-0.115	0.135	0.104	-0.638*	-0.638*
	(0.398)	(0.297)	(0.398)	(0.297)	(0.405)	(0.280)	(0.258)	(0.258)
Lagged explanatory variable		0.217		0.217		0.0429		-
		(0.317)		(0.317)		(0.256)		
diffln_gdp_pc	3.393	3.736	3.393	3.736	3.261	3.311	3.987	3.987
	(3.984)	(3.451)	(3.984)	(3.451)	(3.907)	(3.724)	(2.696)	(2.696)
diffln_inst_qual	-1.246*	-1.077	-1.246*	-1.077	-1.252	-1.218	-1.240*	-1.240*
	(0.613)	(0.817)	(0.613)	(0.817)	(0.654)	(0.824)	(0.602)	(0.602)
diffln_trade_open	0.778	0.755	0.778	0.755	0.784	0.782	0.701	0.701
	(0.773)	(0.801)	(0.773)	(0.801)	(0.744)	(0.755)	(0.783)	(0.783)
diffln_priv_cred	-0.729	-0.756	-0.729	-0.756	-0.727	-0.736	-0.627	-0.627
	(0.655)	(0.698)	(0.655)	(0.698)	(0.543)	(0.587)	(0.625)	(0.625)
ln_nat_res	-0.447**	-0.455**	-0.447**	-0.455**	-0.447**	-0.448**	-0.463**	-0.463**
	(0.151)	(0.157)	(0.151)	(0.157)	(0.155)	(0.160)	(0.154)	(0.154)
Constant	3.800***	3.757***	3.800***	3.757***	3.744***	3.736***	3.854***	3.854***
	(0.399)	(0.399)	(0.399)	(0.399)	(0.408)	(0.395)	(0.432)	(0.432)
Observations	66	66	66	66	66	66	66	66
R-squared	0.767	0.770	0.767	0.770	0.769	0.769	0.776	0.776
Number of cty_grp	6	6	6	6	6	6	6	6

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix table 11. Robustness check regression for upper middle income countries

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variables[1]	*Tax_FDI_Debt_Sum*	*Lagged Tax_FDI_Debt_Sum*	*Tax_FDI_Debt_DV*	*Lagged Tax_FDI_Debt_DV*	*Tax_FDI*	*Lagged Tax_FDI*	*Tax_Debt*	*Lagged Tax_Debt*
Explanatory variable	0.384*	0.158	0.459	0.113	0.600	0.0175	0.316	0.428*
	(0.182)	(0.153)	(0.235)	(0.241)	(0.401)	(0.411)	(0.234)	(0.192)
Lagged explanatory variable		0.421		0.542		1.331**		-0.170
		(0.331)		(0.528)		(0.441)		(0.212)
diffln_gdp_pc	3.350***	2.864**	3.280**	3.014**	3.726***	3.022***	3.111**	3.193**
	(0.805)	(0.964)	(0.851)	(0.869)	(0.741)	(0.432)	(0.798)	(0.809)
diffln_inst_qual	0.482	0.317	0.568	0.308	0.476	-0.154	0.772	0.763
	(0.962)	(0.662)	(0.960)	(0.623)	(1.019)	(0.551)	(0.998)	(1.006)
diffln_trade_open	1.749	1.358	1.718	1.190	1.586	0.547	1.756	1.790
	(1.986)	(1.579)	(1.935)	(1.490)	(1.786)	(0.703)	(2.040)	(2.077)
diffln_priv_cred	0.432	0.391	0.384	0.382	0.449	0.245	0.472	0.462
	(0.395)	(0.337)	(0.338)	(0.305)	(0.425)	(0.252)	(0.452)	(0.457)
ln_nat_res	-0.424	-0.535	-0.402	-0.486	-0.401	-0.722	-0.370	-0.367
	(0.665)	(0.592)	(0.648)	(0.578)	(0.715)	(0.426)	(0.754)	(0.767)
Constant	5.007*	5.361**	4.925*	5.192**	4.872*	5.818***	4.956*	4.941*
	(2.034)	(1.775)	(1.977)	(1.724)	(2.189)	(1.322)	(2.310)	(2.353)
Observations	68	68	68	68	68	68	68	68
R-squared	0.410	0.467	0.417	0.470	0.403	0.612	0.357	0.361
Number of cty_grp	6	6	6	6	6	6	6	6

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix table 12. Robustness check regression for countries in East Asia and the Pacific

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variables[1]	*Tax_FDI_Debt_Sum*	*Lagged Tax_FDI_Debt_Sum*	*Tax_FDI_Debt_DV*	*Lagged Tax_FDI_Debt_DV*	*Tax_FDI*	*Lagged Tax_FDI*	*Tax_Debt*	*Lagged Tax_Debt*
Explanatory variable	0.558***	0.381	0.558***	0.381	0.504*	0.139	0.610	0.732
	(0.0935)	(0.195)	(0.0935)	(0.195)	(0.184)	(0.281)	(0.398)	(0.357)
Lagged explanatory variable		0.295		0.295		0.747**		-0.225
		(0.328)		(0.328)		(0.164)		(0.184)
diffln_gdp_pc	11.30**	9.428**	11.30**	9.428**	12.47**	9.389***	14.73**	15.41**
	(1.962)	(1.908)	(1.962)	(1.908)	(2.134)	(1.345)	(3.052)	(2.766)
diffln_inst_qual	0.163	0.309	0.163	0.309	0.723	1.501	-0.484	-0.374
	(0.610)	(0.710)	(0.610)	(0.710)	(0.995)	(0.990)	(0.298)	(0.391)
diffln_trade_open	1.215	1.163	1.215	1.163	1.699	2.225*	0.275	0.447
	(1.114)	(1.161)	(1.114)	(1.161)	(0.938)	(0.850)	(0.973)	(0.862)
diffln_priv_cred	0.320	0.202	0.320	0.202	-0.166	-0.749	0.928**	0.856**
	(0.294)	(0.204)	(0.294)	(0.204)	(0.643)	(0.471)	(0.204)	(0.240)
ln_nat_res	-1.646	-1.407	-1.646	-1.407	-1.740*	-0.796	-3.355**	-3.329**
	(0.921)	(0.974)	(0.921)	(0.974)	(0.569)	(0.554)	(0.954)	(0.948)
Constant	7.023*	6.383	7.023*	6.383	7.194**	4.465*	11.96**	11.84**
	(2.555)	(2.812)	(2.555)	(2.812)	(1.626)	(1.636)	(2.514)	(2.499)
Observations	44	44	44	44	44	44	44	44
R-squared	0.837	0.852	0.837	0.852	0.795	0.857	0.784	0.788
Number of cty_grp	4	4	4	4	4	4	4	4

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix table 13. Robustness check regression for countries in Europe and Central Asia

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variables[1]	*Tax_FDI_Debt_Sum*	*Lagged Tax_FDI_Debt_Sum*	*Tax_FDI_Debt_DV*	*Lagged Tax_FDI_Debt_DV*	*Tax_FDI*	*Lagged Tax_FDI*	*Tax_Debt*	*Lagged Tax_Debt*
Explanatory variable	-1.774	-2.884	-1.774	-2.884	-1.774	-2.884	0	0
Lagged explanatory variable		1.110		1.110		1.110		0
diffln_gdp_pc	3.115	3.115	3.115	3.115	3.115	3.115	0.570	0.570
diffln_inst_qual	-4.077	-4.077	-4.077	-4.077	-4.077	-4.077	-1.125	-1.125
diffln_trade_open	3.253	3.253	3.253	3.253	3.253	3.253	1.136	1.136
diffln_priv_cred	4.469	4.469	4.469	4.469	4.469	4.469	1.653	1.653
ln_nat_res	4.330	4.330	4.330	4.330	4.330	4.330	-0.0802	-0.0802
Constant	-15.62	-15.62	-15.62	-15.62	-15.62	-15.62	4.620	4.620
Observations	12	12	12	12	12	12	12	12
R-squared	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Number of cty_grp	1	1	1	1	1	1	1	1

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix table 14. Robustness check regression for countries in Latin America and the Caribbean

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variables[1]	*Tax_FDI_Debt_Sum*	*Lagged Tax_FDI_Debt_Sum*	*Tax_FDI_Debt_DV*	*Lagged Tax_FDI_Debt_DV*	*Tax_FDI*	*Lagged Tax_FDI*	*Tax_Debt*	*Lagged Tax_Debt*
Explanatory variable	0.112	0.0760	0.115	0.0385	0.0600	0.0132	0.338**	0.238**
	(0.0695)	(0.0579)	(0.108)	(0.0799)	(0.132)	(0.140)	(0.0973)	(0.0671)
Lagged explanatory variable		0.0594		0.107		0.0643		0.239
		(0.0673)		(0.0916)		(0.109)		(0.116)
diffln_gdp_pc	6.951**	6.982**	6.870**	7.018**	6.583**	6.624**	6.901**	6.837**
	(1.998)	(2.142)	(2.002)	(2.111)	(2.009)	(2.160)	(2.188)	(2.280)
diffln_inst_qual	-0.730	-0.698	-0.695	-0.681	-0.678	-0.666	-0.584	-0.465
	(0.597)	(0.591)	(0.574)	(0.539)	(0.633)	(0.623)	(0.568)	(0.617)
diffln_trade_open	-1.086**	-1.090**	-1.082**	-1.087**	-1.048*	-1.053*	-0.987*	-0.961*
	(0.370)	(0.369)	(0.383)	(0.377)	(0.441)	(0.444)	(0.411)	(0.421)
diffln_priv_cred	0.393	0.406	0.390	0.425*	0.418	0.434	0.430*	0.430*
	(0.188)	(0.191)	(0.200)	(0.196)	(0.214)	(0.227)	(0.176)	(0.175)
ln_nat_res	-0.430**	-0.441**	-0.423**	-0.435**	-0.374*	-0.385*	-0.513***	-0.533***
	(0.125)	(0.117)	(0.122)	(0.119)	(0.164)	(0.166)	(0.0984)	(0.0748)
Constant	5.212***	5.238***	5.192***	5.215***	5.071***	5.097***	5.495***	5.556***
	(0.371)	(0.341)	(0.370)	(0.349)	(0.520)	(0.524)	(0.292)	(0.224)
Observations	60	60	60	60	60	60	60	60
R-squared	0.874	0.876	0.872	0.874	0.866	0.867	0.885	0.890
Number of cty_grp	5	5	5	5	5	5	5	5

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix table 15. Robustness check regression for countries in the Middle East and North Africa

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variables[1]	*Tax_FDI_Debt_Sum*	*Lagged Tax_FDI_Debt_Sum*	*Tax_FDI_Debt_DV*	*Lagged Tax_FDI_Debt_DV*	*Tax_FDI*	*Lagged Tax_FDI*	*Tax_Debt*	*Lagged Tax_Debt*
Explanatory variable	0.0985	0.0557	0.0985	0.0557	0.0985	0.0557	-	-
	(0.370)	(0.0959)	(0.370)	(0.0959)	(0.370)	(0.0959)		
Lagged explanatory variable		0.0745		0.0745		0.0745		-
		(0.498)		(0.498)		(0.498)		
diffln_gdp_pc	-4.602	-4.753	-4.602	-4.753	-4.602	-4.753	-4.581	-4.581
	(5.227)	(4.271)	(5.227)	(4.271)	(5.227)	(4.271)	(4.824)	(4.824)
diffln_inst_qual	-0.550	-0.516*	-0.550	-0.516*	-0.550	-0.516*	-0.539	-0.539
	(0.372)	(0.175)	(0.372)	(0.175)	(0.372)	(0.175)	(0.368)	(0.368)
diffln_trade_open	-0.755	-0.686	-0.755	-0.686	-0.755	-0.686	-0.595	-0.595
	(0.641)	(1.140)	(0.641)	(1.140)	(0.641)	(1.140)	(1.279)	(1.279)
diffln_priv_cred	-1.140	-1.166	-1.140	-1.166	-1.140	-1.166	-1.061	-1.061
	(0.700)	(0.504)	(0.700)	(0.504)	(0.700)	(0.504)	(0.912)	(0.912)
ln_nat_res	-1.939	-1.874	-1.939	-1.874	-1.939	-1.874	-2.009	-2.009
	(0.935)	(0.936)	(0.935)	(0.936)	(0.935)	(0.936)	(0.982)	(0.982)
Constant	10.75*	10.48*	10.75*	10.48*	10.75*	10.48*	11.07	11.07
	(3.484)	(3.492)	(3.484)	(3.492)	(3.484)	(3.492)	(3.820)	(3.820)
Observations	32	32	32	32	32	32	32	32
R-squared	0.852	0.852	0.852	0.852	0.852	0.852	0.851	0.851
Number of cty_grp	3	3	3	3	3	3	3	3

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix table 16. Robustness check regression for countries in South Asia

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variables[1]	*Tax_FDI_Debt_Sum*	*Lagged Tax_FDI_Debt_Sum*	*Tax_FDI_Debt_DV*	*Lagged Tax_FDI_Debt_DV*	*Tax_FDI*	*Lagged Tax_FDI*	*Tax_Debt*	*Lagged Tax_Debt*
Explanatory variable	-	-	-	-	-	-	-	-
Lagged explanatory variable		-		-		-		-
diffln_gdp_pc	14.39***	14.39***	14.39***	14.39***	14.39***	14.39***	14.39***	14.39***
	(0.000136)	(0.000136)	(0.000136)	(0.000136)	(0.000136)	(0.000136)	(0.000136)	(0.000136)
diffln_inst_qual	6.741***	6.741***	6.741***	6.741***	6.741***	6.741***	6.741***	6.741***
	(6.94e-05)	(6.94e-05)	(6.94e-05)	(6.94e-05)	(6.94e-05)	(6.94e-05)	(6.94e-05)	(6.94e-05)
diffln_trade_open	-0.400***	-0.400***	-0.400***	-0.400***	-0.400***	-0.400***	-0.400***	-0.400***
	(6.53e-06)	(6.53e-06)	(6.53e-06)	(6.53e-06)	(6.53e-06)	(6.53e-06)	(6.53e-06)	(6.53e-06)
diffln_priv_cred	-0.201***	-0.201***	-0.201***	-0.201***	-0.201***	-0.201***	-0.201***	-0.201***
	(6.16e-07)	(6.16e-07)	(6.16e-07)	(6.16e-07)	(6.16e-07)	(6.16e-07)	(6.16e-07)	(6.16e-07)
ln_nat_res	-0.331***	-0.331***	-0.331***	-0.331***	-0.331***	-0.331***	-0.331***	-0.331***
	(5.61e-06)	(5.61e-06)	(5.61e-06)	(5.61e-06)	(5.61e-06)	(5.61e-06)	(5.61e-06)	(5.61e-06)
Constant	2.718***	2.718***	2.718***	2.718***	2.718***	2.718***	2.718***	2.718***
	(6.25e-06)	(6.25e-06)	(6.25e-06)	(6.25e-06)	(6.25e-06)	(6.25e-06)	(6.25e-06)	(6.25e-06)
Observations	15	15	15	15	15	15	15	15
R-squared	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Number of cty_grp	2	2	2	2	2	2	2	2

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix table 17. Robustness check regression for countries in Sub-Saharan Africa

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory variables[1]	*Tax_FDI_Debt_Sum*	*Lagged Tax_FDI_Debt_Sum*	*Tax_FDI_Debt_DV*	*Lagged Tax_FDI_Debt_DV*	*Tax_FDI*	*Lagged Tax_FDI*	*Tax_Debt*	*Lagged Tax_Debt*
Explanatory variable	-	-	-	-	-	-	-	-
Lagged explanatory variable		-0.320		-0.320		-0.320		-
		(0.355)		(0.355)		(0.355)		
diffln_gdp_pc	4.174**	4.652*	4.174**	4.652*	4.174**	4.652*	4.174**	4.174**
	(0.810)	(1.253)	(0.810)	(1.253)	(0.810)	(1.253)	(0.810)	(0.810)
diffln_inst_qual	-1.054	-1.276	-1.054	-1.276	-1.054	-1.276	-1.054	-1.054
	(0.938)	(0.906)	(0.938)	(0.906)	(0.938)	(0.906)	(0.938)	(0.938)
diffln_trade_open	0.0307	-0.179	0.0307	-0.179	0.0307	-0.179	0.0307	0.0307
	(1.063)	(1.188)	(1.063)	(1.188)	(1.063)	(1.188)	(1.063)	(1.063)
diffln_priv_cred	-0.604	-0.560	-0.604	-0.560	-0.604	-0.560	-0.604	-0.604
	(0.424)	(0.381)	(0.424)	(0.381)	(0.424)	(0.381)	(0.424)	(0.424)
ln_nat_res	-0.0607	-0.0479	-0.0607	-0.0479	-0.0607	-0.0479	-0.0607	-0.0607
	(0.163)	(0.189)	(0.163)	(0.189)	(0.163)	(0.189)	(0.163)	(0.163)
Constant	3.037***	3.314***	3.037***	3.314***	3.037***	3.314***	3.037***	3.037***
	(0.205)	(0.0686)	(0.205)	(0.0686)	(0.205)	(0.0686)	(0.205)	(0.205)
Observations	34	34	34	34	34	34	34	34
R-squared	0.861	0.865	0.861	0.865	0.861	0.865	0.861	0.861
Number of cty_grp	3	3	3	3	3	3	3	3

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1