# UNIVERSITY OF ALBERTA

## Business Regulations, Taxation, and Foreign Direct Investment

By

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## Abstract

My thesis is a collection of three papers analyzing the effects of government policies and regulations on foreign direct investment (FDI). In the first paper, we find empirical evidence of a nonlinear threshold effect in the relationship between FDI inflows and business regulatory costs. When a host country's regulatory costs are sufficiently low, a further decrease in regulations may not stimulate and, in fact, may even decrease FDI inflows. On the other hand, beyond some threshold, FDI inflows significantly rise as the regulatory costs fall. These results imply that while a fall in the costs could stimulate FDI inflows in heavily regulated countries, it might be counterproductive in low-cost countries. Also, we find that as regulatory costs rise, the marginal effect of taxes on FDI inflows falls. In other words, in low regulatory cost countries, tax incentives might be more effective to attract FDI than those in heavily regulated countries.

In the second paper, we develop a theoretical model with a dual tax system that provides preferential treatments for foreign investment. In order to benefit from the preferential tax incentives and gain better property rights, high-productivity domestic firms intend to disguise as foreign firms via a practice of round-tripping. We found that these preferential policies not only lead to government revenue losses; they also impose a higher tax rate on low-productivity and small firms. In addition, numerical simulation techniques are used to illustrate the impact of China's upcoming corporate income tax reforms scheduled for 2008. We found that China's domestic investment could decrease along with FDI under the upcoming unified system, though the tax rate on domestic firms falls.

The third paper provides empirical evidence of the effects of round-tripping incentives on the scale of round tripping, using the data on FDI reporting discrepancies between host and source countries. We found that the reporting discrepancies between countries is negatively correlated with FDI host countries' property rights protection and political stability, and positively related to the host countries preferential tax incentives. These results imply that FDI reporting discrepancies may be caused not purely by measurement errors but also by round-tripping.

**To my wife and my parents**

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# Table of Contents

# List of Tables

# List of Figures

# Chapter 1 Introduction

Over the last two decades, many countries have been engaging actively in competition to attract foreign direct investment (FDI). In practice, various forms of incentives for FDI have been offered, including reducing regulatory costs, decreasing red tape, and providing fiscal incentives, such as tax concessions and specific subsidies. Two main reasons are used by policy makers to justify these incentives. First, new technologies brought by multinational corporations are expected to increase the productivity of domestic firms through a spillover effect. Second, foreign investments could bring much-needed capital for economic growth.

One policy question is whether these incentives affect FDI inflows. Furthermore, if these incentives do matter, what is the nature of the relationship between them and FDI movements? Are there systematic differences across countries with different institutional "fundamentals"? In other words, does a reduction in regulatory costs or tax rate on FDI have identical effects in Canada and Brazil, for example, two countries that have very different business environments?

Another policy concern stems from distortions generated by FDI incentives. In some countries, as FDI incentives tend to discriminate against domestic investment, a large portion of domestic investment assumes the guise of foreign investment via a practice of round-tripping. The IMF (2004) defines "round-tripping" as domestic investors' channeling of funds abroad and the subsequent return of the funds to the local economy in the form of FDI. Round-tripping means that some FDI is actually bogus FDI, which

neither brings new technologies from multinational corporations nor provides new capital to domestic economy. Among the consequences of round-tripping are the possibilities that it could affect international capital market and could result in government tax revenue losses. Also, preferential policies generates a cost in terms of social equity since it imposes lower effective tax rates on large domestic firms, which have more channels and a higher incentive for round-tripping. Despite the many issues related to round-tripping, to our knowledge, no theoretical study related to this phenomenon has been undertaken; and no empirical study has examined the relationship between round-tripping FDI and its incentives since direct data on round-tripping are not available.

This dissertation addresses these policy concerns. In our second chapter, we apply three sets of econometric models to examine the impact of business regulations on foreign direct investment (FDI), using FDI statistics from 12 source countries to 64 host countries in 2000. Our log-linear results suggest that FDI inflows are strongly correlated with business regulatory costs in the FDI host countries. By using the endogenous threshold models of Hansen (1996, 2000) and the rolling-regression techniques of Rousseau and Wachtel (2002), we find evidence of a nonlinear threshold effect in the relationship between FDI inflows and regulatory costs. When a host country's regulatory costs are sufficiently low, a further decrease in regulations may not stimulate and, in fact, may even decrease FDI inflows. On the other hand, beyond some threshold, FDI inflows significantly rise as the regulatory costs fall. In addition, we find that the marginal effect of business taxes on FDI depends on the level of regulatory costs, i.e. as regulatory costs rise, the marginal effect of taxes on FDI inflows falls.

Our results suggest that the regulatory competition between FDI host countries may have different impacts on countries with different regulatory environments. While a fall in the costs can directly stimulate FDI inflows in heavily regulated countries such as Brazil and China, it might have no effect, or even a negative effect, on FDI inflows in low-cost countries such as Canada and the United States. In the low regulation cost countries, tax incentives might be more effective to attract FDI than those in heavily regulated countries.

In Chapter 3, we develop a theoretical model to examine two issues related to preferential FDI incentives in China. First, we analyze the impact of China's current preferential tax policies and weak property rights on investment decisions. We find that round-tripping, which is motivated by tax and property rights incentives, lowers effective tax rates and improves property rights for domestic investment. While round-tripping imposes some real costs, it reduces the inefficient differential of net rate of return between domestic and foreign investment. In addition, our results suggest that under the preferential tax system, weaker property protection could decrease the government's corporate income tax (CIT) revenue. The intuition is that a weaker property rights protection leads to an increased number of domestic firms that invest through round-tripping in order to gain better property rights. Under a preferential tax system, as the scale of round-tripping rises, domestic firms as a whole face a lower effective tax rate since more domestic firms pay the lower foreign CIT tax rate.

China will unify the current corporate rates (33% on domestic firms and around 15% on foreign firms) to a tax rate of 25% for both domestic and foreign firms in January 2008.

According to an OECD report, "any attempt to close the gap in income tax rates between foreign and domestic enterprises might have far larger consequences than would ordinarily be the case, because the 'foreigners' involved are not all foreign" (OECD, 2003, P. 179). Our theoretical model provides a framework for examining the impact of the upcoming corporate income tax reform. We find that the new unified tax system may decrease FDI inflows to China by reducing the capital level per foreign firm, the number of firms sold to foreign investors, and the price per firm that foreign investors are willing to offer. Also, our model suggests that total domestic investment could decreases along with FDI under the unified system, though the tax rate on domestic firms falls. In terms of intuition, domestic investors in a capital-import economy accumulate capital by selling ownerships of firms to foreigners. As the CIT rate on foreign firms rises, less capital is available for these domestic investors given that fewer firms are sold to foreigners at a lower price.

To our knowledge, the third chapter provides the first evidence of the effects of round-tripping incentives on the scale of round-tripping by considering the relationship between round-tripping incentives and the FDI reporting discrepancies between FDI host and source countries. We find that round-tripping could be an explanation for the data reporting discrepancies between FDI host and source countries since investors have no incentive to report their "bogus" foreign investment to their source countries. If the data reporting discrepancies were caused partly by round-tripping, those reporting differences should be correlated with the indicators of round-tripping incentives. Therefore, we first calculate the difference between the FDI inflows from 10 source regions reported by 50

host countries and FDI outflows reported by these 10 source regions. Second, these reporting differences are regressed on measures of the host countries' political stability, property rights protection and preferential fiscal incentives to foreign investment. Our results from both aggregate and disaggregated data show that the FDI reporting differences are positively related to the host countries' preferential fiscal incentives, and negatively correlated with the host country's property rights protection and political stability. These results are statistically significant and robust to different function specifications and different indicators for property rights protection.

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# Chapter 2. How Do Business Regulations Affect Foreign Direct Investment?

## 2.1. Introduction

The new institutional economics suggests that a sound regulatory environment and efficient supporting institutions attract foreign direct investments (FDI) by lowering the cost of "doing business", reducing investment uncertainty, and promoting market efficiency. Recent empirical studies (e.g., Quéré *et al.*, 2007; Aizenman and Spiegel, 2006; and Wei, 2000) also confirm the hypothesis that cross-country differences in FDI inflows are significantly related to a variety of regulatory factors, including the level of corruption, the protection of property rights, the quality of the judicial system, and the number of regulatory obstacles, and delays for investors to enter and operate in a country.

However, the empirical literature generally assumes that the relationship between FDI flows and regulatory costs holds equally for different types of countries. Common sense suggests that when regulatory quality is sufficiently high, it may no longer be a factor that affects investors' decisions. Moreover, when we examine the effects of business regulations, we should consider potential trade-off effects. On the one hand, business regulations raise the costs of "doing business" and this deters FDI inflows. For instance, in Brazil, 17 procedures and 152 days of processing time are required for starting a business (World Bank, 2005, p115). All other things being equal, foreign investors would prefer to invest in Australia, where there are two required procedures for starting a business and the waiting time is only two days (World Bank, 2005, p112) On the other hand, although business regulations and their enforcement impose costs on foreign

investors, they may benefit investors by providing them with such things as property protection and information services. Also, governments can use business regulations to ensure the soundness of markets and to stabilize the economy in response to shocks. Hence, in some cases, the absence of regulations also could be harmful to foreign investors.

Therefore, marginal costs of business regulations on FDI are not likely to be equal for countries with different regulation levels. While a reduction in Brazil's regulations might significantly increase its FDI inflows, the reduction in regulations in Australia might have no effect or even a negative effect on the country's FDI inflows since its regulatory costs are already sufficiently low, and a further reduction might lead to insufficient government services. It is likely that above a certain threshold of business regulatory costs, there is an inverse relationship between FDI and regulatory costs, but below the threshold, the relationship is expected to be nonexistent or even positive.

Business regulations not only have a direct impact on FDI, they also could affect FDI indirectly by changing the marginal effect of taxes on FDI. The intuition behind this result is straightforward. The cost a tax system includes the amount of tax paid and "tax compliance" costs (e.g., costs of tax planning and paperwork). In heavily regulated countries, tax compliance costs are usually higher; and the tax payments tend to become a smaller fraction of the total cost of the tax system. Also, in a "bad" regulatory environment, international investors are more likely to reduce their effective tax rates through tax evasion or corruption. In other words, a low quality regulatory environment

more likely generates corruption, which could provide potential relief on taxes (Wei, 2001). For instance, in countries with "bad" regulatory environments, taxpayers have more incentives to evade taxes, by bribing government officials in charge of tax collection.[1] As a result, FDI may be become less sensitive to taxes as the regulatory environment becomes more restrictive.

Motivated by these arguments, our study examines three questions related to the effects of host countries' business regulations on FDI inflows. First, do business regulations affect FDI inflows? Second, if regulations do matter, what is the nature of the relationship between FDI movements and regulatory costs? Are there systematic differences across countries with different regulatory levels? In other words, does a reduction in regulatory costs have identical effects in Canada and India, for example, two countries that have very different levels of regulatory costs? Third, is the marginal effect of tax reductions on FDI the same for countries with different levels of regulatory costs? In other words, does the effect of taxes on FDI depend on the host country's business regulatory costs?

To address these questions, we apply three sets of econometric models and employ bilateral FDI statistics from 12 source countries to 64 host countries in 2000. First, a double-log linear specification yields results consistent with those of previous studies on

[1]In practice, many countries have even offered tax deductibility for bribes to foreign public officials, which can be written off as expenses. This provides another incentive for international investors to employ corruption or tax evasion strategies to reduce effective tax rates. For instance, in many OECD countries, such as "Australia, Austria, Belgium, France, Germany, Luxembourg, Netherlands, Portugal, New Zealand and Switzerland, bribes to foreign public officials were still as deductible as any other business expense, at least in principle"(OECD Observer, 2000, "Writing off tax deductibility" http://www.oecdobserver.org/news/fullstory.php/aid/245 , last accessed date: Sep. 04, 2007).

regulation. That is, regulatory costs in FDI host countries significantly deter foreign investment.

Second, we test for the existence of nonlinear threshold effects in the relationship between FDI and business regulations, by using two recent threshold models developed by Hanson (1996, 2000) and by Rousseau and Wachtel (2002), respectively. To our knowledge, our study is the first to apply these techniques in this context. The results suggest that the marginal costs of business regulations on FDI depends on whether FDI host countries have high or low levels of regulatory costs. Beyond a certain threshold level of regulatory costs (that is, when the host country's regulatory costs are high), a fall in these costs significantly increases FDI inflows. Below the threshold level, a decrease in the host country's costs may not stimulate and may even decrease FDI inflows. The results imply that while regulatory cost reduction is especially important for heavily regulated countries such as China and Brazil to attract foreign investment, further cost reduction in countries with low costs, such as Canada and the US, could be ineffective or even counter-productive for FDI growth. Third, our study finds that the marginal effect of business taxes on FDI also depends on the level of regulatory costs. As regulatory costs rise, the marginal effect of taxes on FDI decreases. This result implies that tax incentives for inward FDI could be less effective in heavily regulated countries than in countries with low regulatory costs.

The remainder of the paper is organized as follows. Section 2.2 reviews the related literature. Section 2.3 describes the data used. Section 2.4 examines the impact of

regulatory costs on FDI using standard double-log linear specifications. Section 2.5 reports the results from the threshold regression models. Section 2.6 presents results from rolling regression models. Section 2.7 provides an overview of our results. Section 2.8 provides conclusions and policy implications.

## 2.2. Literature Review

Recent studies (e.g., Quéré *et al.*, 2007; Aizenman and Spiegel, 2006; Habib and Zurawicki, 2002; and Wei, 2000) have found that the quality of the domestic regulatory environment is a key factor in the explanation of cross-country differences in FDI activities. In general, good regulations lower investment costs and reduce the uncertainty of investment in a foreign country; and this attracts FDI inflows. Wei (2000) uses a gravity model to study the relationship between institutional quality and FDI. The data cover bilateral investment flows from 12 source countries to 45 host countries in 1993. FDI outflows (in logarithms) are regressed on a series of independent variables including measures of the host country's institutional quality, the tax rate on foreign corporations, the logarithms of host and source countries' GDP levels, and a set of bilateral dummies. Their results indicate that a decrease in a host country's institutional quality reduces inward FDI to host countries. Aizenman and Spiegel (2006) find a significant negative impact of regulatory inefficiency on FDI by using FDI data for a cross-section of developing countries. Their results also show that FDI is more sensitive to increases in regulatory costs than domestic investment. Quéré *et al.* (2007) and Pica and Mora (2005) find that regulations in both host and source countries matter for FDI flows. In particular,

they find that the FDI inflows are significantly related to both the host countries' regulation and the regulation differences between the host and source countries.

The econometric specifications in the current literature generally assume a fairly restrictive relationship between FDI flows and regulations. That is, the relationship between FDI flows and regulations is assumed to be "smooth" for different types of countries. However, as discussed above, when we examine the effects of business regulations, we should consider a wider variety of possibilities in terms of nonlinear effects of business regulations on FDI. Some authors have attempted to address this problem. Blonigen and Wang (2005) find that the relationship between FDI and its major determinants differs across different types of countries. They argue that determinants of FDI are systematically different for developed and developing countries. They apply standard dummy variable techniques to recent models considered by Blonigen, Davies and Head (2003) and Carr, Markusen, and Maskus (2001) to allow for differences across developed and developing countries, and find evidence of the structural difference in FDI determinants that are both statistically and economically significant.[2] This suggests that pooling both types of countries in an empirical analysis misrepresents the true relationships for both types of countries.

However, while the results of Blonigen and Wang (2005) are consistent with real-world facts, they do not provide an explanation of why the determinants for FDI differ across developing and developed countries. Moreover, their approach forces them to select somewhat arbitrarily a cut-off between developed and developing countries for their

[2] The model in Carr, Markusen, and Maskus (2001) will be denoted as the CMM model.

sample. In our study, we use the difference in business regulations to explain the structural difference between different types of countries by employing an endogenous threshold model. In particular, the rest of the paper will investigate the hypotheses that the marginal effect of regulation depends on the level of regulation and that there are threshold effects in the relationship between FDI inflows and regulatory costs.

## 2.3. Data

The United Nations Conference on Trade and Development's (UNCTD) FDI country profile and the OECD International Direct Investment Statistics Yearbooks (2002, 2003) provide cross-country FDI statistics. For the purpose of our study, we use bilateral FDI outflows from 12 source regions to 64 host countries in 2000. The 12 FDI source regions are Australia, Belgium and Luxembourg, France, Germany, Italy, Japan, Netherlands, Spain, Sweden, Switzerland, the United Kingdom and the United States.

The World Bank's report on "Doing Business in 2006" (2005) provides an overall ranking of the ease of "doing business" across countries in 2005. A high rank corresponds to high regulatory costs. According to the World Bank (2005, page 3), "a high ranking on the ease of "doing business" does mean that the government has created a regulatory environment conducive to the operation of business"; and "improvements on the Doing Business indicators proxy for broader reforms to laws and institutions, which affect more than the administrative procedures and the time and cost to comply with business regulation." This overall ranking averages countries' rankings on 10 topics: starting a business, dealing with licenses, hiring and firing workers, registering property,

obtaining credit, protecting investors, paying taxes, trading across borders, enforcing contracts and closing a business. These rankings are made up of a variety of indicators that record the number of procedures, processing times, and monetary costs for business-related activities.

Since the 2005's ranking is based on data before January 2005, there is a 4-year gap between FDI and regulatory data.[3] It is very common in the literature to use FDI and regulation data in different years because regulatory and institutional data generally are not available for every year and because they tend to change slowly over time. For instance, while Wei (2000) uses bilateral investment stock data in 1993, he uses the institutional data "based on surveys conducted and organized during 1980–1983 by Business International (BI)" (Wei, 2000, p3). Daude and Stein (2007) find that a wide range of institutional and regulatory variables are determinants of the location of FDI. In their cross-section analysis, the institutional and regulatory variables precede the FDI data by six years. They use the FDI data in 2002 and the institutional data in 1996. They find a high correlation for institutional and regulatory indicators in different years. "Thus, as is common knowledge, these institutional aspects tend to change slowly over time and identification will mainly come from the cross-section variation in the data." (Daude and Stein; 2007, p321). Pica and Mora (2005) find that regulations matter for FDI flows by using the World Bank dataset "Doing Business in 2004" and FDI flows from 1980 and 1997. Aizenman and Spiegel (2006) also find a significant negative impact of regulatory inefficiency on FDI by using FDI data from 1990 through 1999 and regulatory data in 1980s.

[3] I would like to thank Mark R. Huson for pointing out the problems of the regulatory cost data.

In our study, the regulation data is chosen based on the following reasons. First, the overall ranking data is only available for 2005, 2006 and 2007. The 2005 ranking data used is the first available in the World Bank's "doing business" Database. Moreover, only the "doing business" report in and after 2005 provided a comprehensive measure for regulatory costs of "doing business". The World Bank's "doing business" report in 2003 only provided original data such as the number of procedures and waiting times for five "doing business" activities: starting a business, hiring and firing workers, obtaining credit, enforcing contracts and closing a business.[4] The World Bank does not have 2003 data on registering property, protecting investors, paying taxes, trading across borders, enforcing contracts and enforcing contracts. While the 2005's ranking is based on around 40 regulatory indicators, the 2003 data only includes 16 indicators that measure the regulatory costs of "doing business".[5]

It is almost impossible to reconstruct the missing indicators and the rankings in years before 2005 because these indicators were constructed from the "contribution of more than 5,000 lawyers, accountants, freight forwarders, architects and public officials who serve as Local Partners in 178 economies."[6] For example, the "paying taxes" indicators record the costs of paying taxes and mandatory contributions that "a medium-size company must pay or withhold in a given year, as well as measures of the administrative burden in paying taxes and contributions. Taxes and contributions measured include "the profit or corporate income tax, social contributions and labour taxes paid by the employer, property taxes, property transfer taxes, the dividend tax, the

[4] The 2003 "Doing Business" dataset is the first dataset provided by the World Bank.
[5] These full reports can be found at http://www.doingbusiness.org/Downloads/.
[6] Please see the website http://www.doingbusiness.org/AskQuestion/.

capital gains tax, the financial transactions tax, waste collection taxes and vehicle and road taxes."[7] Since the World Bank started to collect the tax information in 2005, reconstructing the indicators is not feasible for years before 2005.

Second, the overall ranking variable as a whole does not show much variation through time, so that overall ranking in 2005 is still a pretty good proxy for the regulatory cost across countries. We find high correlations between three available rankings in the years from 2005 to 2007, though the methodology of constructing the business indicators and the overall rankings had been changed every year. The correlation coefficients of rankings in 2006 and 2007, 2005 and 2006, and 2005 and 2007 are 0.989, 0.960 and 0.944, respectively. Therefore, although the 2005's regulatory ranking is not a perfect measure, it should still be a very good measure for the regulatory costs in 2000.[8]

Third, the "doing business" cost database in 2005 produces a larger sample size for my study. In 2005, the regulatory costs are measured across 155 countries, while there are only 130 countries in 2003. If the 2003's data is used, 6 countries have to be dropped from the sample. [9]

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[7] Please see the website http://www.doingbusiness.org/ExploreTopics/PayingTaxes/

[8] The ranking in 2005 have 155 countries, while the ranking in 2006 and 2007 include 178 countries. Therefore, when we estimate the correlation coefficients, I use the sample of 155 countries and re-construct the ranking in 2006 and 2007. When we only look at the ranks in 2006 and 2007, the correlation coefficient is even higher (0.993).

[9] In addition, it may be appropriate to use the ranking data from a date that occurs after the investment took place because investors will make their investment decisions based at least in part on expected future levels of regulation and not just current regulations. If their expectations are unbiased, the actual regulation levels in the future should be good measures of the expectation that influenced their decisions at the time the investment took place. In this case, using future regulations would still be appropriate. My regression results support this argument. My study finds that those future regulations show up as significant explanatory variables in my regression results. I would like to thank Bev Dahlby for these argument and suggestions.

Several recent studies have also used the World Bank's "doing business" cost data as measures for regulatory costs. Bolaky and Freund (2004) examine whether the effect of international trade on growth depends on regulations using the "doing business" cost data on labor and business entry regulations. They find that trade has positive effects on economic growth only in economies with relatively good institutions. Pica and Mora (2005) used the absolute value of the difference between FDI host and source countries' "doing business" cost indexes as measures of "regulation distance." They find a significant negative effect of this regulation distance on FDI. They argue that the regulation distance increases investors' costs of learning foreign regulations, and then deters FDI inflows.

Our study will focus on the overall ranking of the ease of "doing business." This overall ranking is used to measure the overall level of regulatory costs. Data on "total tax rates" are also provided by the World Bank (2005). These tax rates are constructed as the ratio of total tax payable by business (including "profit or corporate income tax, social security contributions and other labor taxes paid by the employer, property taxes, turnover taxes and other small taxes") to the total business profits.[10] These tax rates are very comprehensive measures for the tax burdens on business across countries. Table 2.1 presents the data on the rankings and the total tax rates for the countries in our sample. In

[10] According to a statement from the World Bank, "the total amount of taxes is the sum of all the different taxes payable after accounting for deductions and exemptions. The taxes withheld (such as sales tax or value added tax) but not paid by the company are excluded. The taxes included can be divided into five categories: profit or corporate income tax, social security contributions and other labor taxes paid by the employer, property taxes, turnover taxes and other small taxes (such as municipal fees and vehicle and fuel taxes)". http://www.doingbusiness.org/MethodologySurveys/PayingTaxes.aspx (last accessed date: Sep. 12, 2007).

the sample, New Zealand has the lowest cost of "doing business" (it ranks the first place); and Egypt has the highest cost with ranking of 141.

Other control variables required for our study include GDP and GDP per capita in FDI host and source countries. These statistics are obtained from the World Bank's World Development Indicators (WDI) database and the IMF's World Economic Outlook database. In addition, we use the distance between the host and source countries and a set of dummies in our study. The dummies take a value of 1 (i) if a common language is spoken by at least 9 percent of the population in both the host and source countries, (ii) if the host and source countries have ever had a colonial link, and (iii) if the two countries are contiguous, respectively. These dummy variable definitions and the information required for their construction were obtained from the Centre d'Etudes Prospectives et d'Informations Internationales (CPII, 2004).

Table 2.2 presents the summary statistics for our main variables. FDI inflows range from 0 to $172 billion (flows from the United Kingdom to Germany); and the GDP in the host countries varies from $ 4.42 billion in Mauritius to $ 9760 billion in the United States. The ranking of costs of "doing business" is highly correlated with the GDP per capita, with a correlation coefficient of -0.702.

## 2.4. Effects of Business Regulations on FDI: Log-Linear Models

### 2.4.1. The Double-Log Linear Model

Our empirical examination of FDI flows will start with the double-log linear specification used by Quéré *et al.* (2007), Habib and Zurawicki (2002) and Wei (2000).[11] As shown in the following specification, the dependent variable is the logarithm of the bilateral FDI outflows from FDI source country i to host country j:

$$log(FDI_{ij}) = \beta ease_j + \chi\phi + \varepsilon_{ij}, \quad (2.1)$$

where $ease_j$ is the ease of "doing business" rank in FDI host country j and $\chi$ is a vector of control variables. A higher rank of ease of "doing business" corresponds to higher costs of "doing business".

According to the gravity model, bilateral FDI flows are positively correlated with both host and source countries' GDPs and negatively related to the geographic distance between the two countries. Our baseline specification therefore includes the logarithms of those three variables. In some specifications, we also include the logarithm of the absolute difference of GDP per capita between the source and the host countries as found in the CMM model and in Blonigen and Wang (2005). In addition, we include the three dummy variables indicating whether source and host countries have linguistic ties and /or colonial links, and whether they are contiguous.

[11] In these studies by Quéré et al (2007), Habib and Zurawicki (2002) and Wei (2000), key independent variables, such as the corruption level, tax rate and institutional quality, are not in logarithms. Therefore, this specification is actually a mix of functional forms. In our study, we use the terminology of Wei (2000) and refer to this as our double-log linear model.

Table 2.3 reports the estimation results from the double-log linear specification. Column (1) provides the results from a standard gravity model, in which the GDP of both the source and host countries, the distance between the countries, and our other three dummy variables are used as controls. Column (2) presents the results for the case where we add a control variable from the CMM model: the logarithm of the absolute difference of GDP per capita between the source and the host countries. In columns (1) and (2), coefficients on the ease of "doing business" are both negative and significant at 1%. In column (3), per capita GDPs for both the source and host countries are included in the regression. Since the GDP per capita is highly correlated with the ease of "doing business" (the correlation coefficient is -0.712), the p-value for the ease of "doing business" increases significantly. However, even in this version of our model, the coefficient on the ease of "doing business" is still negative and significant at 5%. Hence, we find a robust set of results indicating that the regulatory costs deter FDI inflows in the host countries.

In columns (4) through (6), we add source country dummies in an attempt to control for the source country characteristics that may affect FDI. When regressions include the source country dummies, the source country variables such as the GDP and the GDP per capita in source countries have to be dropped from the regressions due to perfect multicollinearity. Again, the results from columns (4) through (6) show a negative and statistically significant relationship between FDI and business regulatory costs. The coefficients on other variables are generally consistent with those in studies of Quéré *et al* (2007), Aizenman and Spiegel (2006) and Wei (2000). The coefficients for GDP and the distance are always positive and negative, respectively. These coefficients are all

significant at 1%. These results are consistent with the predictions from the gravity model. Moreover, our results imply that linguistic ties and colonial links between the host and source countries promote FDI inflows to host countries, again confirming the results from previous studies. However, while the coefficients on the absolute difference of per capita GDPs are all negative, they are generally not statistically significant. This result differs from that obtained by Blonigen and Wang (2005).

### 2.4.2. The Modified Double-Log Linear Model

In our dataset, source countries have not reported FDI outflows to some countries. These correspond to cases when these outflows are zero or negligible. When the double-log linear specification is used, these zero observations are dropped from our sample. However, these zero observations could convey important information. Dropping them potentially leads to a problem that induces an estimation bias. The most widely used method to solve this problem is to use $log(FDI_{ij}+A)$ instead of $log(FDI_{ij})$ in the regressions (e.g. Eaton and Tamura 1994; Wei 2000; Eichengreen and Irwin 1995, 1997; Quéré *et al.* 2007; and Yeyati *et al.*, 2002). By following Eichengreen and Irwin (1995, 1997) and Stein and Daude (2006), a simple transformation of the dependent variable is used to test for the robustness of the results in section 2.4.1: [12]

$$log(FDI_{ij}+1) = \beta ease_j + \chi\varphi + \varepsilon_{ij} \quad . \tag{2.2}$$

[12] Another method to solve the potential selection bias is to employ a modified Tobit model used by Eaton and Tamura (1994) and Wei (2000). This model uses $log(FDI_{ij}+A)$ as dependent variable and the threshold parameter, A, is estimated by the maximum-likelihood method.

When $FDI_{ij}$ is a large number, $log(FDI_{ij}+1) \approx log(FDI_{ij})$ ; and the estimated coefficients still can be interpreted as elasticities. When $FDI_{ij}$ is zero, $log(FDI_{ij}+1) = FDI_{ij} = 0$.

Eichengreen and Irwin (1995, 1997) and Stein and Daude (2006) argue that the results of this model approximate the Tobit relationship. This modified double-log linear specification can capture two effects of the regulatory costs on FDI. First, the ease of "doing business" affects foreign investors' decisions to invest in a certain host country. When regulatory costs are too high, they will not invest in the host country, so that a zero observation is produced. Second, after investors decide to invest in the host country, the degree of ease of "doing business" affects their decision on how much to invest. Since the double-log linear model discussed above dropped all zero observations, it is not able to account for the first effect, potentially yielding an underestimate of the impact of the ease of "doing business" on FDI.

Table 2.4 presents our results for this modified specification. Again, we find that the coefficients on the ease of "doing business" are always negative and significant at 1%, even after accounting for the effects of per capita GDP. This evidence strongly supports a negative impact of regulatory costs on FDI. As expected, the results show a positive and statistically significant relationship between FDI and the GDPs in both the source and host countries. Moreover, the coefficients for the distance variable are always negative and significant at 1%. These results are consistent with those of previous studies on the FDI gravity model. Generally, two control variables, linguistic ties and colonial links,

yield statistically significant results similar to those in section 2.4.1. Our results imply that linguistic ties and colonial links increase FDI inflows holding other factors constant.

Comparing the results in Tables 2.3 and 2.4, we find that, as expected, the modified specification yields larger estimates for the effects of ease of "doing business" than the double-log linear specification. In particular, while the estimated coefficients from the double-log linear specification range from -0.007 to -0.012, the smallest and largest estimates in the modified double-log linear specification are -0.021 and -0.037, respectively. This finding supports our conjecture that the modified "Tobit-type" model will produce larger and possibly more accurate estimates than the double-log linear model, which drops all zero observations.

### 2.4.3. The Effects of Regulations on the FDI-Tax Relationship

Blonigen and Wang (2005) find that determinants of FDI systematically differ for developed and developing countries. However, they do not offer an explanation regarding those differences. In this section, we offer a possible answer to the question by examining the effects of the regulatory costs on the relationship between FDI and tax rates. We find that as regulatory costs rise, the marginal effect of taxes on FDI decreases, even after accounting for the effects of the per capita GDP.

The intuition behind this result is straightforward. The cost of a tax system includes the amount of tax paid and "tax compliance" costs (e.g., costs of tax planning and paperwork). In heavily regulated countries, tax compliance costs are high, and the taxes

paid tend to become a smaller fraction of the total cost of tax system. Moreover, in some countries with "bad" regulatory environments, investors can even pay lower taxes in their host countries by paying more bribes to foreign government officers. As a result, FDI becomes less sensitive to taxes as regulatory costs increase. Since developing countries generally have higher regulatory costs than developed countries, the impact of taxes on FDI is expected to differ systematically for developed and developing countries. The following interactive model can be used to test our hypothesis that in high regulatory cost economies, the marginal effect of taxes is relatively small.[13]

$$log(FDI_{ij}+1)=\beta ease_j+\gamma tax_j+\lambda ease_j \cdot tax_j+\chi\varphi+\varepsilon_{ij} \qquad (2.3)$$

where $tax_j$ is the host country's total tax rate on business profits measured as the ratio of the total amount of taxes payable by business and commercial profits. Since both regulatory costs and taxes are expected to have negative effects on FDI, both $\beta$ and $\gamma$ should be negative. $ease_j \cdot tax_j$ is an interactive variable that combines the ease of "doing business" and the tax rate in the host country.

Table 2.5 provides the results for our regressions that include the tax variable and the interactive term. Columns (1) and (3) are our baseline regressions using $log(FDI_{ij})$ and $log(FDI_{ij}+1)$ as dependent variables, respectively. Columns (2) and (4) are the full regressions with all the available control variables. Each regression includes source country dummies in an attempt to control for other source country characteristics that

[13] In our tables, we also provide results from regressions that use $log(FDI_{ij})$ as dependent variables.

could be related to the FDI outflows. As in our previous regressions, source country GDP and GDP per capita are omitted due to multicolinearity problems.

In these regressions, the coefficients on regulatory cost (the rank of ease of "doing business") and on the tax rate are always negative and statistically significant. As expected, the coefficient on the interactive term is always positive and statistically significant. These results suggest that as regulatory costs rise, the marginal effect of taxes on FDI decreases. Since developing countries usually have higher regulatory costs than developed countries, the effect of tax on FDI could systematically differ for these two types of countries.

### 2.4.4. Other Ranks and Indicators

Table 2.6 provides estimated coefficients on indicators of the cost of "doing business" for 10 categories. We examine the relationships between FDI and these indictors by applying the following modified double-log linear specification, separately to each of these indicators:

$$log(FDI_{ij}+1) = \beta\, ind_j + \gamma\, tax_j + \lambda\, ease_j \cdot tax_j + \chi\varphi + \varepsilon_{ij}$$

where $ind_j$ represents one of the rankings or indicators for one of the 10 categories. As shown in Table 2.6, coefficients on the 10 rank indictors are all negative, and 6 of these coefficients (coefficients on rankings of starting a business, employing workers, registering property, protecting investors, trading across borders and enforcing contracts) are significant at a 10% level.

Table 2.6 also reports results for regressions of FDI on 39 other indicators of "doing business" costs. Coefficients on 20 indicators are significant, at least at the 10% level. Generally, the signs of these coefficients are consistent with our projection: regulatory costs deter FDI inflows in the host countries. The results suggest that costs imposed by time delays may be more important than the monetary costs of regulations. Moreover, Table 2.6 shows no statistically significant relationship between FDI and indicators on "dealing with licenses".

## 2.5. Endogenous Threshold Models

The effects of business regulations on FDI are not likely to be equal for countries with different regulation levels. It is likely that above a certain threshold of business regulatory costs, there is an inverse relationship between FDI and regulatory costs; but below some threshold (when the regulatory costs are sufficiently low), the relationship may be nonexistent or even positive. This section uses Hansen's (1996, 2000) endogenous threshold approach to test for the existence of these nonlinear threshold effects in the relationship between FDI and regulatory costs.

### 2.5.1. Model Specification

Our study employs the following specification to test for the existence of a threshold effect[14]:

[14] We also test for the existence of the threshold effect using the equation with $log(FDI_{ij})$ as our dependent variable.

$$log(FDI_{ij}+1) = \beta_1 \cdot ease_j \cdot I(ease_j \le R^*) + \beta_2 \cdot ease_j \cdot I(ease_j > R^*) + \chi\varphi + \varepsilon_{ij} \quad (2.4)$$

where R* is the unknown threshold level of regulatory costs (or the ease of "doing business"), $I(ease_j \le R^*)$ and $I(ease_j > R^*)$ are indicator functions that take value of 1 if $ease_j \le R^*$ and $ease_j > R^*$, respectively, and 0 otherwise. Therefore, $\beta_1$ reflects the effects of the regulatory costs in countries with regulatory costs below the threshold level, and $\beta_2$ denotes the effects in countries with regulatory costs above the threshold.

### 2.5.2. Endogenous Threshold Estimation Method and Inference

This section briefly describes how these estimation procedures are implemented. First, we need to estimate the unknown threshold level, R*, along with the slope parameters in equation 2.4. Following Hansen (1996, 2000), Girma (2005), and Khan and Senhadji (2001), a method called the "conditional least squares" is used to carry out our estimation. For any possible values of the threshold, specification 2.3 is estimated by OLS, yielding an error sum of squares, $S(R) = S[\beta(R) + \phi(R)]$. The estimated level, R*, then corresponds to the value of R that minimizes the error sum of squares; that is,

$$R^* = \underset{R}{argmin} \left\{ S(R),\ R = \underline{R}, \ldots, \bar{R} \right\}, \quad (2.5)$$

where the range of possible values of the threshold is given by $R = \underline{R}, \ldots, \bar{R}$.

After R* is estimated, we can examine whether or not the threshold effect is statistically significant via a test of the hypothesis that $\beta_1 = \beta_2$. Since the threshold R* is not identified under the null hypothesis, classical tests such as t-tests have highly nonstandard distributions. Hansen (2000) suggests a bootstrap approach. This bootstrap method carries out a significance test of no threshold against one threshold by simulating the asymptotic distributions of the following likelihood ratio test:

$$LR_0 = \frac{(S_0 - S_1)}{\hat{\sigma}^2} \tag{2.6}$$

where $S_0$ = the error sum of squares under $H_0 : \beta_1 = \beta_2$ (for equation 2.3), $S_1$ = the error sum of squares under $H_1 : \beta_1 \neq \beta_2$, and $\hat{\sigma}^2$ = the residual variance under $H_1 : \beta_1 \neq \beta_2$. Since the ratio in Equation 2.6 does not have a standard chi-square distribution, Hansen (2000) bootstrapped the distribution to tabulate valid asymptotic critical values.

### 2.5.3. Estimation and Inference Results

Table 2.7 describes the estimation results from specifications 2.4 and 2.5. Columns (1) and (3) present the results from regressions without the tax and interactive variables using $log(FDI_{ij})$ and $log(FDI_{ij}+1)$ as the dependent variables, respectively. Columns (2) and (4) are the full regression with all available control variables. Quasi-fixed-effects (source country dummies) have been included in the regressions to control for source country characteristics that could be related to FDI outflows.

As Table 2.7 shows, when $log(FDI_{ij})$ is used as the dependent variable (columns (1) and (2)), the threshold rank is estimated to be 24 by the conditional least squares. The coefficients on the regulatory costs (the rank of ease) above the threshold are always negative and statistically significant. In contrast, while the coefficients for the regulatory costs below the threshold are all positive, the coefficient is only statistically significant when the tax and interactive variables are omitted from the regression. These results suggest that if a country has a higher rank of regulatory costs than the threshold rank of 24, a fall in regulatory costs significantly increases FDI inflows; and when the country's rank is less than the threshold, a decrease in the host country's costs may not stimulate and may even deter FDI inflows.

In columns (3) and (4), the larger sample, including observations where FDI is equal to zero, is used by employing $log(FDI_{ij}+1)$ as the dependent variable. These regressions yield a similar threshold estimate of 28. Comparing the results in columns (1) and (2) with those in columns (3) and (4), we find again that the modified double-log linear specification yields larger estimates for the effects of ease of "doing business" than does the double-log linear specification. When the threshold specification is used, the coefficients for GDPs, distance language ties, and colonial links are still economically and statistically significant. This finding supports the FDI gravity model. However, the coefficients on the tax rate are only significant at 15% with the threshold specification.

The row labeled LR in Table 2.7 provides the values of the likelihood ratios for testing the hypothesis of no threshold against the hypothesis of a single threshold. The

significance levels have been computed by employing the bootstrap distributions of the likelihood ratios. The null hypothesis of no threshold effect is rejected at the 1% level of significance. Hence, the bootstrapping results strongly support the existence of the threshold effects for all regressions and with all samples. This finding implies (see Hansen 2000) that the t-tests presented for all the above coefficients are valid since they have the usual distribution under the alternative hypothesis of the existence of a threshold effect.

## 2.6. Results of Rolling Regressions

An alternative method, which can be used to examine nonlinear threshold effects in the relationship between FDI inflows and regulatory costs, is the rolling regression techniques of Rousseau and Wachtel (2002). The full sample, including observations where FDI is equal to zero, is used in order to avoid the estimation bias discussed in section 2.4.2 and to allow each regression to have a relatively large sample size. The rolling regression techniques are applied to the modified double-log linear model in section 2.4.2; i.e.

$$log(FDI_{ij} + 1) = \beta\, ease_j + \chi\varphi + \varepsilon_{ij}\,.$$

Following Rousseau and Wachtel (2002), observations are ordered by the overall "doing business" costs ranking. We then start the rolling regressions with a regression of FDI on regulatory costs (the ranking) in a sample of 10 top ranked countries (114 observations) and then estimate regressions by adding 1 country to the sample at a time. The final regression in this series includes the entire sample of 64 countries (743 observations).

Figures 2.1 and 2.2 show the evolution of the coefficients on regulatory costs as the sample size expands to include countries with higher regulatory costs. Figure 2.1 reports estimated coefficients and standard errors from the baseline regressions that exclude GDP per capita at the right hand side. Figure 2.2 shows the results from rolling regressions that include GDP per capita and other available control variables. Table 2.8 lists estimated coefficients and t-ratios from these two sets of rolling regressions.

As shown in Figure 2.1 and Table 2.8, coefficients on regulatory costs become consistently negative after the ranking is greater than 28 (after the number of countries in the sample is greater than 24) and become significant at the 10% level after the ranking is greater than 32 (after the number of countries is greater than 27). That is, no significant negative relationship between FDI and business costs can be found in the sample with 27 top ranked countries in our sample when the baseline specification is used. However, when the top ranks are between 41 and 57, the coefficients are not significant at the 10% level. After the top ranking is greater than 57, the relationship becomes far less variable and significant at the 5% level. Following Rousseau and Wachtel (2002), these results suggest a threshold of regulatory costs of somewhere between 28 and 57. Table 2.8 shows that the following 12 countries in our sample are within this range: South Africa, Israel, Spain, Austria, Taiwan of China, Slovak Republic, Czech Republic, Portugal, France, Hungary, Poland, and Panama.

Figure 2.2 shows a similar pattern of coefficient evolution. As shown in Table 2.8, the coefficient on regulatory costs becomes negative after the ranking is greater than 28 and

significant at the 10% level when the ranking is between 32 and 44 or above 54. Therefore, the second specification yields a threshold of somewhere between 28 and 54. Compared with the range from the baseline specification, when we use the second specification, Panama is no longer in the range of threshold countries, while the other 11 countries remain potential breakpoint countries in our sample.

A shortcoming of this rolling regression technique is that the sample size varies as we include higher regulatory cost countries. To avoid this, we present results of rolling regressions holding the number of countries in the sample constant.

First, observations are ordered by the overall "doing business" cost ranking from the lowest to the highest regulatory costs. We start the rolling regressions with a regression of FDI on regulatory costs in the sample of 25 countries with lowest costs.[15] We then roll in an additional country and roll out a country with the lowest cost one-by-one until the last regression includes 25 countries with the highest regulatory costs. In this rolling-regression method, there are 25 countries in all samples.

Figure 2.3 and Table 2.9 provide the results from these rolling regressions. When the sample includes 25 countries (sample 10-34), the coefficient on regulatory costs becomes consistently negative and statistically significant. Coefficients are significant at 15% from three regressions 11-35, 32-56 and 33-57, and all other coefficients are significant at least at 10%. These results suggest that Poland could be a potential breakpoint country, above

[15] As shown in Figure 2.3 and Table 2.9, 1-25 means that the sample includes 25 countries from the lowest cost to the 25th lowest cost.

which regulatory costs have a significantly negative effect on FDI inflow. This result is consistent with that from the rolling regression without holding sample size constant. In our original rolling regressions, Poland is also found to be a potential breakpoint country.

## 2.7. Overview of Results

Our major findings can be summarized by using Figure 2.4 through 2.6. First, as Figure 2.4 shows, our double-log linear models support the hypothesis that regulatory costs have a negative impact on FDI. As regulatory costs rise, FDI inflows fall. Second, in Figure 2.5, when the endogenous threshold and rolling regression models are used, we find the existence of threshold effects in the relationship between FDI and business regulation. Beyond a certain threshold level of regulatory costs, R*, a fall in the costs significantly increases FDI inflows. Below the threshold level, a decrease in the host country's costs may not stimulate, and may even decrease, FDI inflows. Third, as Figure 2.6 shows, our study, using double-log linear interactive models, finds that the marginal effect of business taxes on FDI depends on the level of regulatory costs. That is, as regulatory costs rise, the marginal effect of taxes on FDI decreases.

Our results from rolling regressions are generally consistent with our findings from the endogenous threshold model. Both methods suggest that South Africa, which has a rank of 28, is a potential "breakpoint" country. Our results from rolling regressions find that 12 countries are within the range of potential threshold countries: South Africa, Israel, Spain, Austria, Taiwan of China, Slovak Republic, Czech Republic, Portugal, France, Hungary, Poland, and Panama. All "breakpoint" countries are high-income or at least

upper middle-income countries; and they have relatively good regulatory environments for investors. In these countries, a reduction in regulatory costs may no longer have significant effects on FDI inflows.

## 2.8. Conclusions and Policy Implications

In the current globalized capital market, in addition to competition in fiscal (e.g., tax) or financial (e.g. subsidies) treatments, governments are engaging in regulatory competition by reducing regulatory costs and offering regulatory incentives in order to attract FDI (see Fitzgerald, 2001). Our study suggests that this regulatory competition for FDI across host countries has different effects on economies with different regulatory cost levels; and it may even be harmful to some low-regulation countries. First, for heavily regulated countries such as China, India and Brazil, regulatory cost reductions could increase foreign investment via two channels. On the one hand, a fall in regulatory costs can directly stimulate FDI inflows by reducing the cost of "doing business". On the other hand, a low level of regulatory costs enforces the effectiveness of these countries' tax policies used to attract FDI inflows.

Second, for countries with low regulatory costs, such as Canada and the US, regulatory incentives might not be an effective tool to promote FDI, as further regulatory cost reductions could result in an inefficiently low regulation level, and then have no effect or even a negative effect on FDI inflows.

Therefore, although lowering regulatory costs may be an effective policy for some heavily regulated countries, unrestricted regulatory competitions could be harmful especially to countries with low regulatory costs as it is likely to end with an inefficient low regulatory level. For these low regulatory cost countries, other policy options such as tax reductions might be a more effective option to attract FDI inflows.

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Figure 2.1. Rolling regression results (baseline regressions without the variable of GDP per capita)

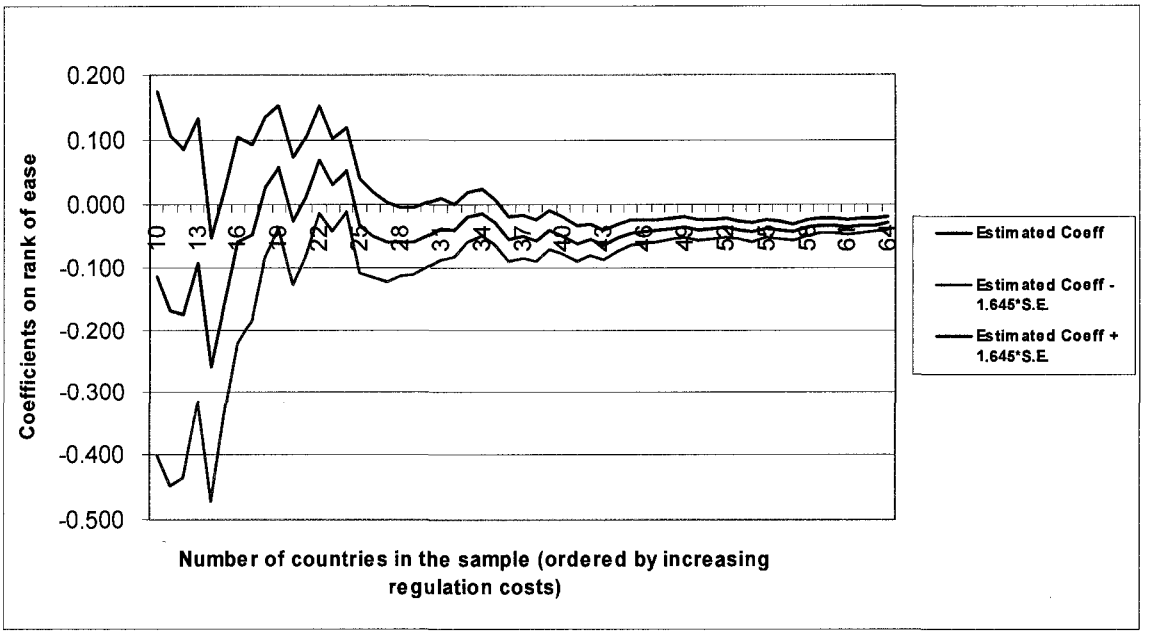


Figure 2.2. Rolling regression results (with GDP per capita as an independent variable)

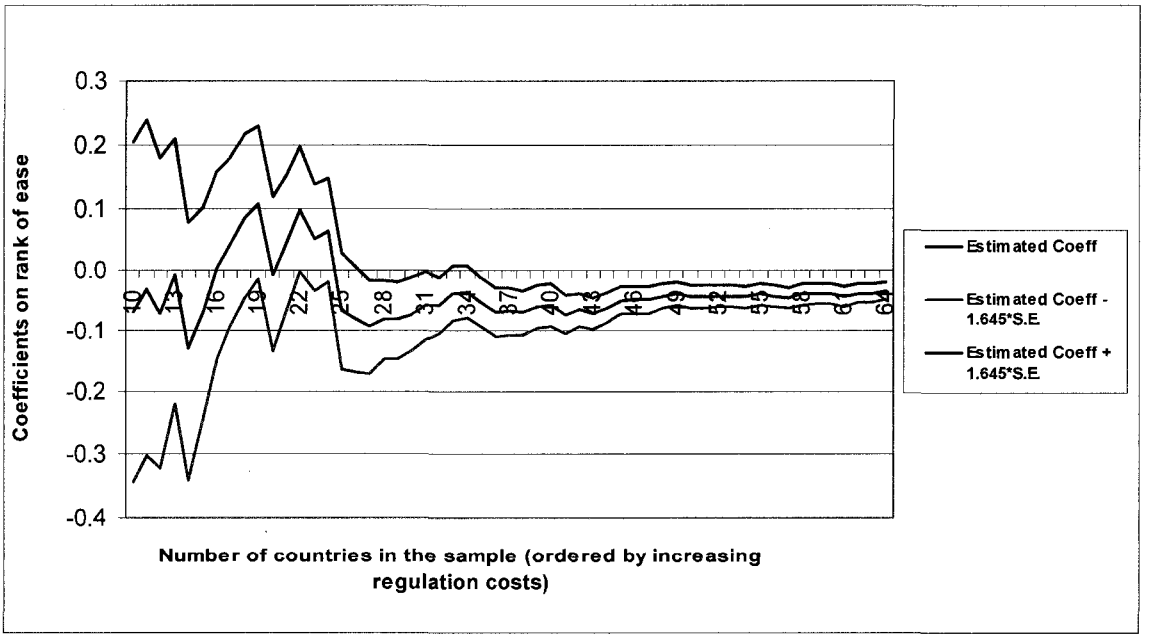

Figure 2.3. Rolling regression results with a fixed sample size of 25 countries (with GDP per capita as an independent variable)

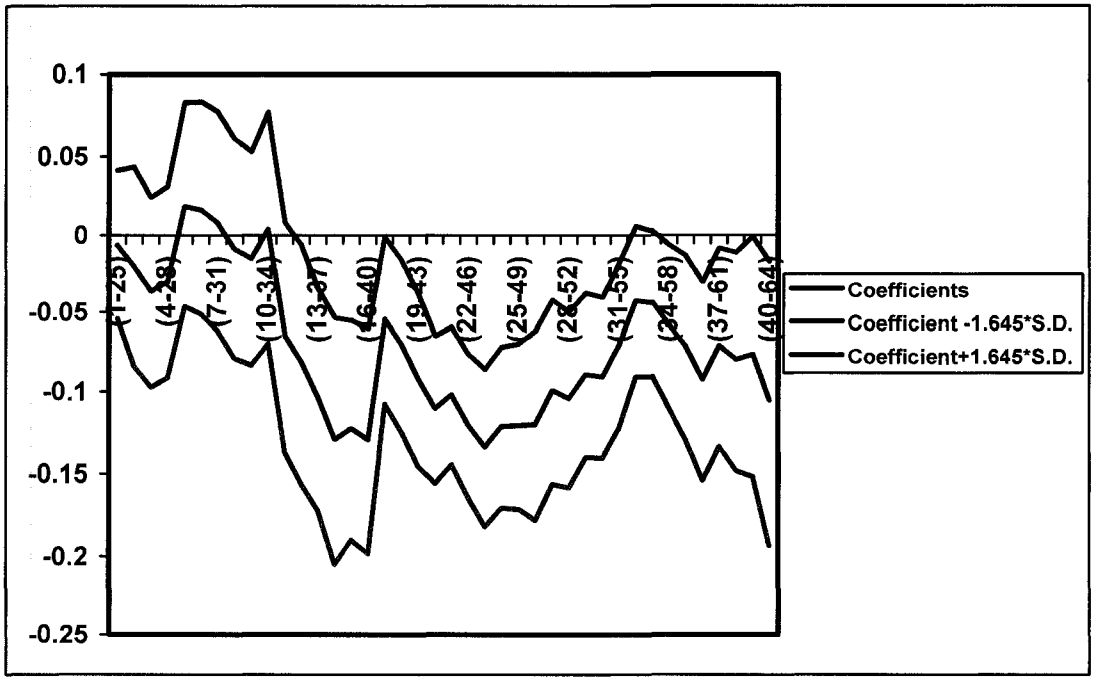


Figure 2.4. FDI and regulatory costs (double-log linear model)

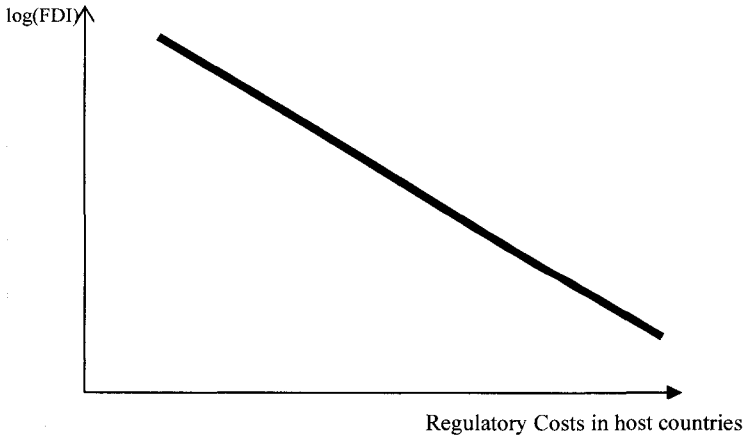

Figure 2.5. FDI and regulatory costs (Hansen's threshold model)

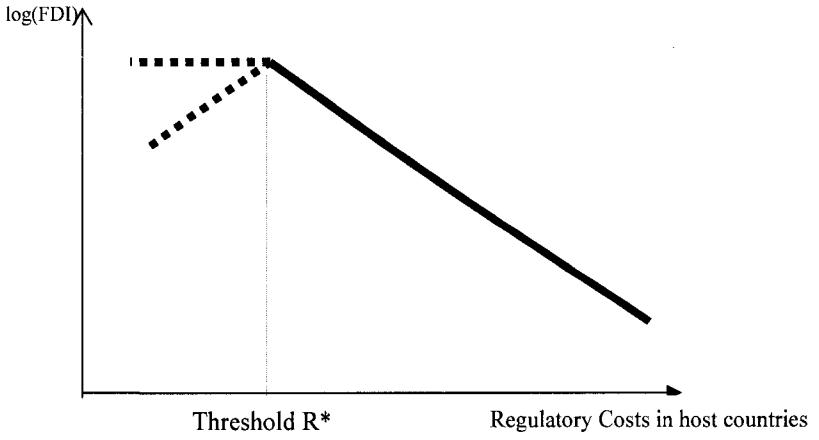


Figure 2.6. Marginal tax effect and regulatory costs (double-log linear interactive model)

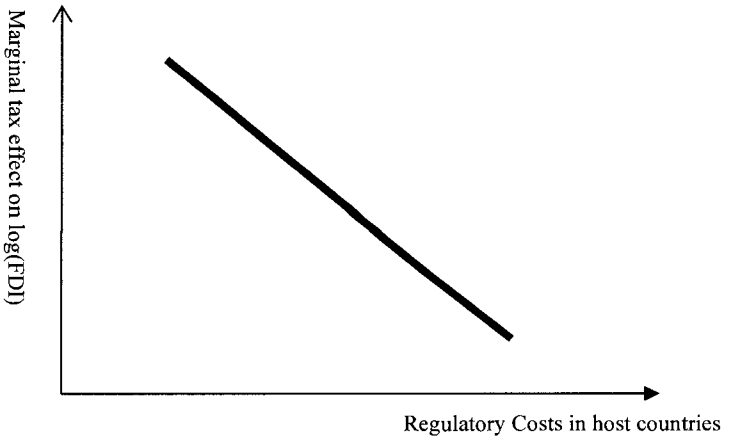

Table 2.1. The ranking of ease of "doing business" and business tax rates

| Host countries | Ranking of ease of "doing business" | Total tax payable (% gross profit) |
|---|---|---|
| New Zealand | 1 | 44.20 |
| Singapore | 2 | 19.50 |
| United States | 3 | 21.50 |
| Canada | 4 | 32.50 |
| Norway | 5 | 60.10 |
| Australia | 6 | 37.00 |
| China, Hong Kong | 7 | 14.30 |
| Denmark | 8 | 63.40 |
| United Kingdom | 9 | 52.90 |
| Japan | 10 | 34.60 |
| Ireland | 11 | 45.30 |
| Finland | 13 | 52.10 |
| Sweden | 14 | 52.60 |
| Estonia | 16 | 39.50 |
| Switzerland | 17 | 22.00 |
| BLEU | 18 | 44.60 |
| Germany | 19 | 50.30 |
| Thailand | 20 | 29.20 |
| Malaysia | 21 | 11.60 |
| Mauritius | 23 | 38.20 |
| Netherlands | 24 | 53.30 |
| Chile | 25 | 46.70 |
| Korea | 27 | 29.60 |
| South Africa | 28 | 43.80 |
| Israel | 29 | 57.50 |
| Spain | 30 | 48.40 |
| Austria | 32 | 50.80 |
| China, Taiwan | 35 | 23.60 |
| Slovak Republic | 37 | 39.50 |
| Czech Republic | 41 | 40.10 |
| Portugal | 42 | 45.40 |
| France | 44 | 42.80 |
| Hungary | 52 | 56.80 |
| Poland | 54 | 55.60 |
| Panama | 57 | 32.90 |
| Tunisia | 58 | 52.70 |
| Bulgaria | 62 | 38.60 |
| Slovenia | 63 | 47.30 |
| Colombia | 66 | 75.10 |
| Kenya | 68 | 68.20 |
| United Arab Emirates | 69 | 8.90 |
| Italy | 70 | 59.80 |
| Peru | 71 | 50.70 |
| Mexico | 73 | 31.30 |
| Argentina | 77 | 97.90 |

| | | |
|---|---|---|
| Romania | 78 | 51.10 |
| Russia | 79 | 40.80 |
| Greece | 80 | 47.90 |
| Uruguay | 85 | 80.20 |
| Costa Rica | 89 | 54.30 |
| China | 91 | 46.90 |
| Turkey | 93 | 51.10 |
| Nigeria | 94 | 27.10 |
| Viet Nam | 99 | 31.50 |
| Morocco | 102 | 54.80 |
| Ecuador | 107 | 33.90 |
| Iran | 108 | 14.60 |
| Philippines | 113 | 46.40 |
| Indonesia | 115 | 38.80 |
| India | 116 | 43.20 |
| Croatia | 118 | 47.10 |
| Brazil[16] | 119 | 147.90 |
| Ukraine | 124 | 51.00 |
| Egypt | 141 | 32.10 |

Note: data are from the World Bank (2005)

[16] In some countries, such as Brazil (total tax payable equals 147.9%) and Belarus (total tax payable equals 122%), despite many deductions and exemptions, the total tax payable is greater than total gross profit, "leaving the business with 2 choices: stop operating or start evading." (World Bank, 2006, p 45).

Table 2.2. Summary statistics of the main variables

| NAME | N | MEAN | ST. DEV | MINIMUM | MAXIMUM |
|---|---|---|---|---|---|
| FDI (No negative observations, millions) | 743 | 1580 | 8570 | 0 | 172000 |
| Ranks of ease of "doing business" | 743 | 54 | 39 | 1 | 141 |
| GDP in host countries (millions) | 743 | 462000 | 1320000 | 4420 | 9760000 |
| GDP in source countries (millions) | 743 | 1720000 | 2480000 | 240000 | 9760000 |
| GDP per capita in hosts | 743 | 11262 | 11164 | 337 | 37456 |
| GDP per capita in sources | 743 | 25859 | 7083 | 14061 | 37456 |
| Distance between two countries | 743 | 6732 | 4863 | 161 | 19517 |

| CORRELATION MATRIX OF VARIABLES - 743 OBSERVATIONS | | | | | | | |
|---|---|---|---|---|---|---|---|
| FDI | 1.000 | | | | | | |
| Rank of ease of "doing business" | -0.161 | 1.000 | | | | | |
| GDP in host countries | 0.287 | -0.238 | 1.000 | | | | |
| GDP in source countries | 0.028 | -0.010 | -0.019 | 1.000 | | | |
| GDP per capita in hosts | 0.225 | -0.702 | 0.426 | 0.013 | 1.000 | | |
| GDP per capita in sources | 0.033 | -0.001 | -0.010 | 0.470 | -0.003 | 1.000 | |
| Distance between two countries | -0.119 | 0.016 | 0.041 | 0.172 | -0.143 | 0.048 | 1.000 |
| | FDI | Rank | H. GDP | S.GDP | H.GDP/Cap | S. GDP/Cap | Distance |

Table 2.3. Double-log linear estimations.

| | Dependent variable = log(FDIij) | | | | | |
|---|---|---|---|---|---|---|
| Independent Variables | (1) | (2) | (3) | (4) | (5) | (6) |
| Rank of ease of "doing business" | -0.012* | -0.010* | -0.007** | -0.012* | -0.010* | -0.008** |
| | (0.002) | (0.002) | (0.003) | (0.002) | (0.002) | (0.003) |
| log(GDPj) | 0.836* | 0.818* | 0.787* | 0.858* | 0.838* | 0.808* |
| | (0.053) | (0.056) | (0.057) | (0.050) | (0.051) | (0.054) |
| log (GDPi) | 0.509* | 0.509* | 0.480* | | | |
| | (0.064) | (0.059) | (0.059) | | | |
| log (GDP per capita difference) | | -0.127 | -0.152 | | 0.144# | -0.101 |
| | | (0.112) | (0.126) | | (0.096) | (0.106) |
| log (distance) | -0.722* | -0.698* | -0.691* | -0.711* | -0.690* | -0.662* |
| | (0.079) | (0.079) | (0.081) | (0.072) | (0.072) | (0.077) |
| log (per cap GDPj) | | | 0.132 | | | 0.142 |
| | | | (0.116) | | | (0.111) |
| log(per cap GDPi) | | | 0.905* | | | |
| | | | (0.324) | | | |
| contiguous | -0.115 | -0.119 | -0.115 | -0.042 | -0.044 | -0.048 |
| | (0.370) | (0.341) | (0.340) | (0.326) | (0.321) | (0.323) |
| Linguistic tie | 0.937* | 0.946* | 0.868* | 0.685* | 0.680* | 0.673* |
| | (0.251) | (0.236) | (0.234) | (0.253) | (0.248) | (0.249) |
| colonial link | 1.170* | 1.139* | 1.315* | 1.076* | 1.067* | 1.110* |
| | (0.328) | (0.249) | (0.266) | (0.273) | (0.265) | (0.268) |
| Constant | -10.466 | -9.094* | -17.840* | 4.758* | 6.406* | 5.119** |
| | (2.227)* | (2.384) | (3.739) | (1.457) | (1.835) | (2.234) |
| Source country dummies | No | No | No | Yes | Yes | Yes |
| R square adjusted | 0.498 | 0.499 | 0.509 | 0.575 | 0.577 | 0.578 |
| Breusch-Pagan test (P-value) | 0.430 | 0.023 | 0.000 | 0.011 | 0.000 | 0.008 |
| Freset specification test | 0.817 | 0.454 | 0.268 | 0.904 | 0.568 | 0.198 |
| Observations | 559 | 559 | 559 | 559 | 559 | 559 |

Note: (a) *, **, *** and # denote significant at the 1%, 5% and 10% and 15%, respectively.
(b) Standard errors are in parentheses
(c) We use heteroskedasticity-consistent standard errors in regressions 3.

Table 2.4. Modified double-log linear estimation

| | Dependent variable = log(FDIij+1) | | | | | |
|---|---|---|---|---|---|---|
| Independent Variables | (1) | (2) | (3) | (4) | (5) | (6) |
| Rank of ease of "doing business" | -0.021* | -0.027* | -0.037* | -0.023* | -0.026* | -0.035* |
| | (0.007) | (0.007) | (0.010) | (0.006) | (0.007) | (0.009) |
| log(GDPj) | 2.866* | 2.945* | 3.032* | 2.830* | 2.879* | 2.964* |
| | (0.143) | (0.148) | (0.161) | (0.132) | (0.136) | (0.150) |
| log (GDPi) | 0.883* | 0.864* | 0.717* | | | |
| | (0.211) | (0.210) | (0.208) | | | |
| log (GDP per capita difference) | | 0.584** | -0.037 | | 0.360# | 0.208 |
| | | (0.264) | (0.257) | | (0.231) | (0.242) |
| log (distance) | -2.394* | -2.465* | -2.540* | -1.772* | -1.814* | -1.891* |
| | (0.245) | (0.249) | (0.250) | (0.232) | (0.235) | (0.245) |
| log (per cap GDPj) | | | -0.725** | | | -0.422 |
| | | | (0.351) | | | (0.324) |
| log(per cap GDPi) | | | 3.933* | | | |
| | | | (0.938) | | | |
| contiguous | -2.250* | -2.174* | -2.017* | -2.143** | -2.115** | -2.079** |
| | (0.796) | (0.804) | (0.835) | (0.894) | (0.896) | (0.899) |
| Linguistic tie | 1.354# | 1.323# | 1.129 | 1.437*** | 1.446*** | 1.427*** |
| | (0.834) | (0.830) | (0.826) | (0.829) | (0.827) | (0.821) |
| colonial link | 1.753# | 1.926*** | 2.343** | 2.042*** | 2.080** | 2.014** |
| | (1.122) | (1.119) | (1.090) | (1.057) | (1.056) | (1.045) |
| Constant | -64.111* | -68.198* | -92.901* | -36.487* | -40.742* | -11.116* |
| | (6.689) | (7.245) | (10.760) | (4.067) | (4.756) | (1.013) |
| Source country dummies | No | No | No | Yes | Yes | Yes |
| R square adjusted | 0.407 | 0.410 | 0.425 | 0.511 | 0.511 | 0.512 |
| Breusch-Pagan test (P-value) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Freset specification test | 0.276 | 0.015 | 0.453 | 0.759 | 0.679 | 0.963 |
| Observations | 743 | 743 | 743 | 743 | 743 | 743 |

Note: (a) *, **, *** and # denote significant at the 1%, 5%, 10% and 15%, respectively.
(b) Standard errors are in parentheses
(c) We use heteroskedasticity-consistent standard errors in regressions 1- 6.

Table 2.5. Estimation results for regressions with tax variables

| | Dependent variable = log(FDIij) | | Dependent variable = log(FDIij+1) | |
|---|---|---|---|---|
| Independent Variables | (1) | (2) | (3) | (4) |
| Rank of ease of "doing business" | -0.026* | -0.025* | -0.062* | -0.076* |
| | (0.004) | (0.005) | (0.013) | (0.015) |
| Tax rate | -0.014*** | -0.014*** | -0.044*** | -0.044*** |
| | (0.007) | (0.007) | (0.025) | (0.025) |
| Ease*Tax rate | 0.0003* | 0.0003* | 0.0008* | 0.001* |
| | (0.0001) | (0.0001) | (0.0002) | (0.0003) |
| log(GDPj) | 0.798* | 0.792* | 2.790* | 2.902* |
| | (0.051) | (0.053) | (0.138) | (0.150) |
| log (GDP per capita difference) | -0.138# | -0.128# | 0.347# | 0.129 |
| | (0.092) | (0.103) | (0.227) | (0.237) |
| log (distance) | -0.773* | -0.766* | -2.002* | -2.114* |
| | (0.077)) | (0.081) | (0.257) | (0.266) |
| log (per cap GDPj) | | 0.035 | | -0.597*** |
| | | (0.110) | | (0.328) |
| contiguous | -0.082 | -0.083 | -2.192* | -2.143** |
| | (0.319) | (0.319) | (0.896) | (0.881) |
| Linguistic tie | 0.612* | 0.610* | 1.339*** | 1.310*** |
| | (0.245) | (0.245) | (0.815) | (0.805) |
| colonial link | 1.122* | 1.143* | 2.208** | 2.126** |
| | (0.260) | (0.263) | (1.046) | (1.026) |
| Constant | -8.756* | -8.432* | -34.739* | -28.695* |
| | (1.863) | (2.297) | (5.278) | (6.106) |
| Source country dummies | Yes | Yes | Yes | Yes |
| R square adjusted | 0.596 | 0.595 | 0.518 | 0.519 |
| Breusch-Pagan test (P-value) | 0.000 | 0.018 | 0.000 | 0.000 |
| Freset specification test (2) | 0.647 | 0.672 | 0.758 | 0.781 |
| Observations | 559 | 559 | 743 | 743 |

Note: (a) *, **, *** and # denote significant at the 1%, 5%, 10% and 15%, respectively.
(b) Standard errors are in parentheses
(c) We use heteroskedasticity-consistent standard errors in regressions 1- 4.

Table 2.6. Estimated coefficients on indicators of "doing business" costs

| "Doing business" cost indicators | | Estimated Coeff. | Standard Errors | P-Values |
|---|---|---|---|---|
| Starting a Business | Rank | -0.017 | 0.007 | 0.021 |
| | Procedures (number) | -0.185 | 0.081 | 0.023 |
| | Time (days) | -0.015 | 0.011 | 0.164 |
| | Cost (% of income per capita) | -0.013 | 0.014 | 0.322 |
| | Min. capital (% of income per capita) | 0.001 | 0.001 | 0.464 |
| Dealing with Licenses | Rank | -0.002 | 0.007 | 0.818 |
| | Procedures (number) | -0.007 | 0.040 | 0.861 |
| | Time (days) | -0.001 | 0.003 | 0.821 |
| | Cost (% of income per capita) | -0.001 | 0.001 | 0.337 |
| Employing Workers | Rank | -0.015 | 0.006 | 0.007 |
| | Difficulty of Hiring Index | -0.015 | 0.009 | 0.090 |
| | Rigidity of Hours Index | -0.037 | 0.011 | 0.001 |
| | Difficulty of Firing Index | -0.027 | 0.011 | 0.017 |
| | Rigidity of Employment Index | -0.056 | 0.013 | 0.000 |
| | Non-wage labor cost (% of salary) | 0.013 | 0.020 | 0.511 |
| | Firing costs (weeks of wages) | -0.004 | 0.007 | 0.568 |
| Registering Property | Rank | -0.008 | 0.006 | 0.242 |
| | Procedures (number) | -0.178 | 0.084 | 0.035 |
| | Time (days) | -0.006 | 0.002 | 0.004 |
| | Cost (% of property value) | 0.003 | 0.054 | 0.957 |
| Getting Credit | Rank | -0.015 | 0.007 | 0.041 |
| | Legal Rights Index | 0.142 | 0.117 | 0.228 |
| | Credit Information Index | 0.261 | 0.154 | 0.091 |
| | Public registry coverage (% adults) | 0.022 | 0.014 | 0.124 |
| | Private bureau coverage (% adults) | 0.026 | 0.009 | 0.004 |
| Protecting Investors | Rank | -0.017 | 0.006 | 0.005 |
| | Disclosure Index | 0.350 | 0.090 | 0.000 |

| | | | | |
|---|---|---|---|---|
| | Director Liability Index | -0.126 | 0.099 | 0.206 |
| | Shareholder Suits Index | 0.487 | 0.126 | 0.000 |
| | Investor Protection Index | 0.544 | 0.161 | 0.001 |
| Paying Taxes | Rank | -0.003 | 0.007 | 0.615 |
| | Payments (number) | -0.010 | 0.017 | 0.565 |
| | Time (hours) | 0.000 | 0.001 | 0.750 |
| Trading Across Borders | Rank | -0.028 | 0.010 | 0.007 |
| | Documents for export (number) | -0.301 | 0.171 | 0.079 |
| | Signatures for export (number) | -0.144 | 0.050 | 0.005 |
| | Time for export (days) | -0.072 | 0.038 | 0.057 |
| | Documents for import (number) | 0.076 | 0.083 | 0.359 |
| | Signatures for import (number) | -0.080 | 0.029 | 0.007 |
| | Time for import (days) | -0.078 | 0.029 | 0.007 |
| Enforcing Contracts | Rank | -0.016 | 0.007 | 0.026 |
| | Procedures (number) | 0.008 | 0.028 | 0.773 |
| | Time (days) | -0.002 | 0.001 | 0.029 |
| | Cost (% of debt) | -0.004 | 0.017 | 0.792 |
| Closing a Business | Rank | -0.015 | 0.010 | 0.144 |
| | Time (years) | 0.027 | 0.130 | 0.836 |
| | Cost (% of estate) | -0.004 | 0.031 | 0.900 |
| | Recovery rate (cents on the dollar) | 0.024 | 0.015 | 0.096 |

Note: Shaded areas list coefficients are significant at the 10% level.

Table 2.7. Results of threshold estimation

| | Dependent Variable Log (FDIij) | | Dependent Variable Log (FDIij + 1) | |
|---|---|---|---|---|
| Independent Variables | (1) | (2) | (3) | (4) |
| Ranking of Ease (below | 0.028** | 0.014 | 0.082 * | 0.028 |
| estimated thresholds) | (0.012) | (0.013) | (0.033) | (0.038) |
| Ranking of Ease (above | -0.007* | -0.020* | -0.014*** | -0.059* |
| estimated thresholds) | (0.002) | (0.005) | (0.008) | (0.017) |
| Tax rate | | -0.012# | | -0.039# |
| | | (0.008) | | (0.025) |
| Tax rate*Ease | | 0.0003* | | 0.001* |
| | | (0.0001) | | (0.0003) |
| Log (GDPj) | 0.832* | 0.780* | 2.878* | 2.874* |
| | (0.052) | (0.053) | (0.136) | (0.150) |
| Log(GDPj per cap) | N.A. | 0.068 | N.A. | -0.456 |
| | | (0.111) | | (0.330) |
| Log(difference of GDP per capita) | -0.143# | -0.116 | 0.234 | 0.063 |
| | (0.093) | (0.101) | (0.230) | (0.234) |
| Contiguous | -0.095 | -0.127 | -2.250** | -2.273* |
| | (0.320) | (0.319) | (0.922) | (0.909) |
| Linguistic tie | 0.724* | 0.659* | 1.328 # | 1.216# |
| | (0.236) | (0.235) | (0.824) | (0.805) |
| Colonial link | 1.107* | 1.189* | 2.186* | 2.243** |
| | (0.249) | (0.248) | (1.034) | (1.013) |
| log (distance ij) | -0.659* | -0.720* | -1.858* | -2.114* |
| | (0.072) | (0.082) | (0.237) | (0.268) |
| Constant | 5.950* | 7.450* | -40.220* | -29.937* |
| | (1.851) | (2.348) | (4.662) | (6.114) |
| Threshold Level (R*) | 24 | 24 | 28 | 28 |
| Search Range | {5,110} | {5,110} | {5,110} | {5,110} |
| LR: No threshold versus | | | | |
| one threshold | 9.803 | 9.040 | 9.499 | 11.781 |
| Bootstrapping: | | | | |
| Significance level | 1% | 1% | 1% | 1% |
| R Square Adjusted | 0.584 | 0.601 | 0.517 | 0.5237 |
| | | | | |
| No. of Countries | 64 | 64 | 64 | 64 |
| No. of Observations | 559 | 559 | 743 | 743 |

Note: (1) *, **, *** and # denote significant at the 1%, 5%, 10% and 15%, respectively.
(2) Standard errors are in parentheses.

Table 2.8. Estimated coefficients on regulatory costs of rolling regressions

| | | **Baseline model without GDP per capita (Figure 2.1)** | | **Model with GDP per capita (Figure 2.2)** | |
|---|---|---|---|---|---|
| Number of Countries | Highest ranking in the sample | Coefficient | T-ratio | Coefficient | T-ratio |
| 10 | 10 | -0.114 | -0.651 | -0.069 | -0.412 |
| 11 | 11 | -0.170 | -1.004 | -0.032 | -0.192 |
| 12 | 13 | -0.175 | -1.107 | -0.071 | -0.467 |
| 13 | 14 | -0.092 | -0.673 | -0.005 | -0.039 |
| 14 | 16 | -0.261 | -2.051 | -0.131 | -1.022 |
| 15 | 17 | -0.157 | -1.451 | -0.069 | -0.654 |
| 16 | 18 | -0.059 | -0.593 | 0.004 | 0.045 |
| 17 | 19 | -0.046 | -0.538 | 0.043 | 0.518 |
| 18 | 20 | 0.027 | 0.401 | 0.086 | 1.083 |
| 19 | 21 | 0.057 | 0.985 | 0.108 | 1.462 |
| 20 | 23 | -0.026 | -0.420 | -0.007 | -0.091 |
| 21 | 24 | 0.012 | 0.221 | 0.044 | 0.651 |
| 22 | 25 | 0.069 | 1.359 | 0.099 | 1.635 |
| 23 | 27 | 0.030 | 0.693 | 0.053 | 1.009 |
| 24 | 28 | 0.054 | 1.353 | 0.065 | 1.286 |
| 25 | 29 | -0.033 | -0.741 | -0.066 | -1.129 |
| 26 | 30 | -0.048 | -1.176 | -0.083 | -1.556 |
| 27 | 32 | -0.060 | -1.560 | -0.094 | -1.963 |
| 28 | 35 | -0.059 | -1.758 | -0.082 | -2.078 |
| 29 | 37 | -0.058 | -1.772 | -0.083 | -2.143 |
| 30 | 41 | -0.048 | -1.540 | -0.074 | -1.970 |
| 31 | 42 | -0.038 | -1.271 | -0.058 | -1.682 |
| 32 | 44 | -0.040 | -1.575 | -0.058 | -1.994 |
| 33 | 52 | -0.019 | -0.790 | -0.038 | -1.376 |
| 34 | 54 | -0.013 | -0.572 | -0.035 | -1.331 |
| 35 | 57 | -0.029 | -1.330 | -0.052 | -2.060 |
| 36 | 58 | -0.053 | -2.441 | -0.069 | -2.776 |
| 37 | 62 | -0.050 | -2.369 | -0.068 | -2.752 |
| 38 | 63 | -0.056 | -2.749 | -0.071 | -3.078 |
| 39 | 66 | -0.040 | -2.184 | -0.060 | -2.730 |
| 40 | 68 | -0.048 | -2.727 | -0.058 | -2.638 |
| 41 | 69 | -0.061 | -3.565 | -0.073 | -3.710 |
| 42 | 70 | -0.055 | -3.690 | -0.065 | -3.809 |
| 43 | 71 | -0.063 | -4.323 | -0.072 | -4.336 |
| 44 | 73 | -0.052 | -3.979 | -0.061 | -4.011 |
| 45 | 77 | -0.043 | -3.600 | -0.049 | -3.527 |
| 46 | 78 | -0.042 | -3.539 | -0.048 | -3.479 |
| 47 | 79 | -0.041 | -3.688 | -0.048 | -3.518 |
| 48 | 80 | -0.038 | -3.566 | -0.042 | -3.346 |
| 49 | 85 | -0.035 | -3.405 | -0.038 | -3.087 |
| 50 | 89 | -0.039 | -3.891 | -0.043 | -3.692 |

| | | | | | |
|---|---|---|---|---|---|
| 51 | 91 | -0.038 | -4.040 | -0.043 | -3.720 |
| 52 | 93 | -0.036 | -3.971 | -0.042 | -3.668 |
| 53 | 94 | -0.040 | -4.412 | -0.042 | -3.692 |
| 54 | 99 | -0.043 | -4.777 | -0.043 | -3.817 |
| 55 | 102 | -0.038 | -4.395 | -0.039 | -3.511 |
| 56 | 107 | -0.040 | -4.824 | -0.042 | -3.909 |
| 57 | 108 | -0.043 | -5.165 | -0.045 | -4.172 |
| 58 | 113 | -0.036 | -4.434 | -0.039 | -3.693 |
| 59 | 115 | -0.032 | -4.120 | -0.037 | -3.525 |
| 60 | 116 | -0.032 | -4.334 | -0.037 | -3.544 |
| 61 | 118 | -0.036 | -4.867 | -0.043 | -4.301 |
| 62 | 119 | -0.032 | -4.556 | -0.037 | -3.917 |
| 63 | 124 | -0.032 | -4.619 | -0.037 | -3.906 |
| 64 | 141 | -0.028 | -4.332 | -0.032 | -3.578 |

Note: Shaded areas list coefficients that are significant at the 10% level.

Table 2.9. Results of Rolling Regressions with a constant 25-country window (full model with GDP per capital).

| Regression Samples | Coefficients | Standard Error. | T-value |
|---|---|---|---|
| 1-25 | -6.52E-03 | 2.89E-02 | -0.2255651 |
| 2-26 | -2.04E-02 | 3.87E-02 | -0.5273169 |
| 3-27 | -3.67E-02 | 3.68E-02 | -0.9960236 |
| 4-28 | -3.03E-02 | 3.71E-02 | -0.8164366 |
| 5-29 | 1.81E-02 | 3.93E-02 | 0.45945 |
| 6-30 | 1.58E-02 | 4.10E-02 | 0.3851475 |
| 7-31 | 7.59E-03 | 4.23E-02 | 0.17919 |
| 8-32 | -9.21E-03 | 4.26E-02 | -0.216153 |
| 9-33 | -1.54E-02 | 4.14E-02 | -0.3707524 |
| 10-34 | 3.52E-03 | 4.47E-02 | 0.07871669 |
| 11-35 | -6.47E-02 | 4.42E-02 | -1.465151[17] |
| 12-36 | -8.16E-02 | 4.56E-02 | |
| 13-37 | -1.04E-01 | 4.17E-02 | |
| 14-38 | -1.29E-01 | 4.60E-02 | |
| 15-39 | -1.23E-01 | 4.10E-02 | |
| 16-40 | -1.30E-01 | 4.20E-02 | |
| 17-41 | -5.45E-02 | 3.24E-02 | |
| 18-42 | -7.06E-02 | 3.29E-02 | |
| 19-43 | -9.20E-02 | 3.26E-02 | |
| 20-44 | -1.10E-01 | 2.77E-02 | |
| 21-45 | -1.02E-01 | 2.59E-02 | |
| 22-46 | -1.21E-01 | 2.69E-02 | |
| 23-47 | -1.34E-01 | 2.91E-02 | |
| 24-48 | -1.21E-01 | 3.00E-02 | |
| 25-49 | -1.21E-01 | 3.08E-02 | |
| 26-50 | -1.20E-01 | 3.53E-02 | |
| 27-51 | -9.94E-02 | 3.47E-02 | |
| 28-52 | -1.04E-01 | 3.29E-02 | |
| 29-53 | -8.91E-02 | 3.10E-02 | |
| 30-54 | -9.05E-02 | 3.03E-02 | |
| 31-55 | -7.05E-02 | 3.15E-02 | |
| 32-56 | -4.27E-02 | 2.92E-02 | -1.459131[2] |
| 33-57 | -4.42E-02 | 2.83E-02 | -1.560181[2] |
| 34-58 | -5.86E-02 | 3.17E-02 | |

[17] The coefficient is significant at 15%.

| | | | |
|---|---|---|---|
| 35-59 | -7.15E-02 | 3.53E-02 | |
| 36-60 | -9.25E-02 | 3.76E-02 | |
| 37-61 | -7.12E-02 | 3.81E-02 | |
| 38-62 | -7.99E-02 | 4.16E-02 | |
| 39-63 | -7.65E-02 | 4.59E-02 | |
| 40-64 | -1.05E-01 | 5.36E-02 | |

Note: Shaded areas list coefficients that are significant at the 10% level.

# Chapter 3. Investment Decisions under a Dual Tax System

## 3.1. Introduction

China has been highly successful in attracting foreign direct investment over the last two decades. Since 1992, it has been the largest foreign direct investment (FDI) recipient among developing countries. However, several studies (e.g., OECD, 2003; Aykut and Ratha, 2003; IMF, 2004; Xiao, 2004) have reported that around 25% to 40% of China's FDI inflows are cases of bogus "round-tripping" FDI. The IMF (2004) defines this round-tripping FDI as the channeling of funds by domestic investors to special purpose entities abroad and the subsequent return of the funds to the local economy in the form of FDI.

A large portion of domestic investment in China assumes the guise of foreign investment via the practice of round-tripping. This is done in order to gain better property rights protection and to benefit from preferential fiscal policies for FDI. China's current tax regime provides preferential treatment for foreign investment, mainly through reduced corporate tax rates, tax holidays and refunds of taxes on foreign investment. These preferential fiscal policies for FDI provide incentives for domestic investors to round-trip their funds in order to benefit from these policies. Furthermore, property rights protection in China is relatively weak, in spite of improvements that have been made in recent years. Governments in China generally provide better protection of the property rights of foreign investors than of domestic investors. This may be due to a desire to attract more foreign investment or in response to international political pressure. According to the Minutes of the Select Committee of the Treasury of the UK Parliament in 2005, "... the

complaint in terms of legal protection has usually come from Chinese firms because joint ventures have traditionally been given better property rights protection than Chinese entrepreneurs and enterprises, ...". Moreover, when property rights protection is weak, some domestic investors prefer to keep their identities anonymous, and this can be accomplished by investing through round-tripping.

Among the consequences of round-tripping are the possibilities that it could affect China's capital market and could result in government tax revenue losses. Also, the prevalence of round-tripping has become one of the catalysts for the Chinese government's move to unify the preferential tax system in 2008. Despite the many issues related to round-tripping, to our knowledge, no theoretical study related to this phenomenon has been undertaken; and our study is the first to model round-tripping.

Our study concerns two issues related to round-tripping. First, we analyze the impact of China's current preferential policies and weak property rights on investment decisions. We find that round-tripping, which is motivated by tax and property rights incentives, lowers effective tax rates and improves property rights for domestic investment. Although round-tripping imposes some real costs and leads to government revenue losses, it could reduce the inefficient interest-rate differential between domestic and foreign investment. In addition, our results suggest that under the preferential tax system, weaker property protection could decrease the government's corporate income tax (CIT) revenue. The intuition is that a weaker property rights protection leads to an increased number of domestic firms that invest through round-tripping in order to gain better property rights.

Under a preferential tax system, as the scale of round-tripping rises, domestic firms as a whole face a lower effective tax rate since more domestic firms pay the lower foreign CIT tax rate.

Second, our study examines the impact of China's upcoming corporate income tax reforms scheduled for 2008. Since 1994, the Chinese government has been carefully studying the question of whether or not different tax rates should be applied to foreign and domestic investment. On March 16 2007, the National People's Congress of China passed a new corporate income tax law that will unify the current corporate rates (33% on domestic firms and around 15% on foreign firms) to a tax rate of 25 percent for both domestic and foreign enterprises. The new rate, which will lower the rate on domestic firms while raising the rate foreign firms pay, will take effect on January 1, 2008. According to an OECD report, "any attempt to close the gap in income tax rates between foreign and domestic enterprises might have far larger consequences than would ordinarily be the case, because the 'foreigners' involved are not all foreign" (OECD, 2003, P. 179).

Our study suggests that the new unified tax system may decrease FDI inflows to China by reducing the capital level per foreign firm, the number of firms sold to foreign investors, and the price per firm that foreign investors are willing to offer. Also, our model suggests that total domestic investment could decrease under the unified system, though the tax rate on domestic firms falls. In terms of intuition, domestic investors in a capital-import economy accumulate capital by selling ownerships of firms to foreigners.

As the CIT rate on foreign firms rises, less capital is available for these domestic investors given that fewer firms are sold to foreigners at a lower price.

The remainder of this paper is structured as follows. Section 3.2 reviews the relevant literature. Section 3.3 develops the model of a dual-tax system. Section 3.4 uses the model to analyze the upcoming tax reform in China. Section 3.5 concludes with a discussion of some empirical implications of our theoretical results.

## 3.2. Literature Review

### 3.2.1. China's Round-tripping FDI

China has been the largest FDI recipient among all the developing countries since 1992, and in 2002 China surpassed the US as the largest recipient of FDI in the world. However, numerous studies (e.g., OECD, 2003; Aykut and Ratha, 2003; IMF, 2003) have argued that the figures for foreign investment in China may be overstated because of round-tripping. The remainder of this section will provide pertinent background information and a review of the literature regarding the tax incentives for round-tripping and its scale in China.

#### a. Tax Incentives for Round-tripping

China's current tax regime provides preferential treatment for foreign-invested enterprises (FIEs). The availability of tax incentives to FIEs depends on a number of factors, including geographic location, type of entity, industrial classification, and the period of operation. The tax incentive regime consists mainly of reduced corporate tax

rates, tax holidays and refunds of tax on reinvestments (OECD, 2003).

**Dual Corporate Tax Regimes**

China has a dual corporate tax regime for domestic and foreign enterprises. The 33 percent corporate income tax rate for domestic enterprises may be reduced to 15 percent for FIEs, depending on the geographic location and the type of foreign investment. In particular, the 15 percent tax rate is applicable for FIEs established in special economic zones, FIEs engaging in specifically designated industries in western and central China, and high-tech FIEs in technological-development zones, open provincial or port cities, etc. The tax rate for production-oriented FIEs established in open coastal economic zones and in port cities is 24 percent (OECD, 2003; Lin, 2004).

**Tax Concessions**

China offers production-oriented FIEs, which are scheduled to operate for a period of not less than ten years, tax exemptions in the first and second year, and a 50 percent reduction of tax rates in the following three years. Moreover, a preferential tax holiday may be applied to particular types of foreign investments, such as export-oriented enterprises and technologically advanced enterprises (OECD, 2003; Lin, 2004). In addition to lower corporate tax rates and tax concessions, China also offers preferential tax policies for foreign reinvestments and foreign investments in western and central China. The tax advantages cited above provide incentives for domestic enterprises to disguise themselves as foreign enterprises.

**b. Scale of Round-tripping in China**

Although there are no data that clearly identify the magnitude of round-tripping, some studies have attempted to estimate its scale in China. A World Bank report (2002) and other studies (e.g., Harrold and Lal, 1993; Lardy 1995; Aykut and Ratha, 2003) estimate that in 1992, the scale of round-tripping in China could have been around one quarter of the total FDI. However, these studies did not describe in detail the estimation methods used to obtain this figure.

The World Bank report (2002) and Aykut and Ratha (2003) also conclude that the extent of round-tripping in China might have increased after 1992. As shown in Table 3.1, FDI inflows from Hong Kong constituted about 50 percent of the total FDI flows into China in 1996. The decline of Hong Kong's share over the period from 1997 to 2000 has been offset by a comparable increase in FDI inflows from the Virgin Islands. Moreover, as shown in Figure 3.1, China's FDI inflows from Hong Kong and Macao appear to be highly correlated with its outflows in the form of "other investment assets," which are mostly bank deposits held abroad by Chinese residents, and errors and omissions in China's balance of payments. The report argued that these facts suggest substantial amounts of round-tripping through Hong Kong and other offshore financial centers.

In order to remove the effect of round-tripping and estimate the true extent of direct investment, the Hong Kong SAR (Special Administrative Region) compiled an alternative set of statistics as supplementary information. These statistics excluded "inward/outward FDI from/to 'nonoperating companies' set up by Hong Kong SAR

companies in offshore financial centers for indirect channeling of funds" (IMF, 2003). These statistics show that after removing the effect of round-tripping, the end-2001 stock of inward and outward FDI in Hong Kong decreased by 32 percent and 38 percent, respectively.

Xiao (2004) provides a comprehensive study of round-tripping in China. He finds that the FDI inflow statistics reported by China are higher than the FDI outflow statistics reported by the source regions. Because the foreign investors have no incentives to report their bogus investment in China to their home countries, Xiao argues that the FDI outflow statistics reported by the source regions reflected the scale of the true FDI. He then uses the gap between the FDI inflow statistics reported by China and the FDI outflow statistics reported by the source regions as a proxy measure of the round-tripping FDI in China. Xiao shows that based on the available statistical information, China's round-tripping FDI is around 40 percent or within the range of 30 percent to 50 percent of total FDI.

### 3. 2. 2. The Upcoming Tax Reform in China

On March 16 2007, the National People's Congress (NPC) in China passed the "Law on Enterprises' Income Tax" that will unify the current dual tax rates on foreign and domestic investment. Under the new tax system, the unified tax rate would be 25%, which is between the current rates on foreign (around 15%) and on domestic owned firms (33%). In other words, the new law on enterprises' income tax will lower the rate for domestic firms and raise it for foreign firms.

An OECD report (2003) argues that a unified tax system in China would comply with the principle of tax neutrality and reduce the existing incentives for round-tripping investment. The tax reform will affect the investment behaviors of both foreign and domestic investors. Lin (2004) uses an overlapping generation equilibrium model in order to analyze the effects of China's upcoming corporate tax reform. His model includes three sectors: firms, consumers and the government. Since there are no financial assets in his model, the domestic interest rate is determined by the marginal productivity of capital. Government spending in his model is financed by the corporate income tax and a lump-sum tax. He considers two possible tax reforms: an increase in the tax rate on foreign-invested firms and a decrease in the tax rate on domestic firms. His results show that a decrease in the tax rate on domestic firms reduces foreign capital and increases domestic capital and trade surplus; however, it does not affect the domestic interest rate. On the other hand, an increase in the tax rate on foreign firms may increase the domestic interest rate and decrease domestic and foreign capital stocks along with the trade surplus in China. However, Lin (2004) does not consider the problem of round-tripping under the dual tax system in China. Since round-tripping involving large amounts of money and might therefore produce important effects on China's capital market, Lin's results need to be reexamined.

### 3. 2. 3. Optimal Tax Policy under a Dual Tax System

**The Gordon-Bovenberg (G-B) model**

There is a large literature on the optimal tax system in the international capital market. This section only briefly describes the basic structure of the G-B model that will be extended with a dual tax system in my model to analyze the effects of round-tripping.

Gordon and Bovenberg (1996) developed a model with asymmetric information between countries to rationalize observed immobility of international capital. In their two-period model, domestic savings are invested only in the domestic market. On the other hand, foreign investment can be in the form of new firms (greenfield investment) or the acquisitions of existing domestic firms.

In the production sector, the domestic representative agent initially owns a fixed number of N firms. These firms are ex ante identical but differ ex post due to a random productivity shock. If firm i invests $K_i$ dollars in the first period, output in the second period will be $f(K_i)(1+\varepsilon_i)$, where $f(K_i)$ is a positive concave function, and $\varepsilon_i$ is a random productivity shock with $E(\varepsilon_i)=0$; the underlying distribution is assumed to be such that $(1+\varepsilon_i)$ is always greater than 0. Moreover, at the time when investment decisions are made, $\varepsilon_i$ is not known.

In the G-B model, investment decisions take place in the first period but involve two stages. During the first stage, foreign investors buy ownership of J domestic firms by

paying E dollars per firm before any investment has been made in them. If the foreign investors invest $K_j$ in firm j, the resulting income in the second period will be $f(K_j)(1-\gamma)$, where $\gamma$ captures the costs incurred by the foreign investors because of their lack of knowledge about the domestic economy. The investment in the firm would continue until $f'(1-\gamma)=1+r^*$, i.e., the marginal return from foreign investment is equal to the world interest rate. On the other hand, domestic investors can invest in the remaining (N-J) firms. Since firms are *ex ante* identical, the level of investment, K, is the same across these domestic firms.

During the second stage, the values of $\varepsilon_i$ are revealed to domestic investors but not to foreign investors. On the one hand, foreign investors offer the same price $\frac{(1+\bar{e})f(K_i)}{1+r^*}$ for each firm, reflecting the average productivity for the group of low-productivity firms purchased by foreign investors, where $\bar{e}$ is the expected value of $\varepsilon$ for low-productivity firms and $1+\bar{e}<1$ since foreign investors purchase the "lemons" among the domestic firms. On the other hand, the domestic investor will sell his shares to foreign bidders if and only if the price offered by them is greater than present value of keeping the firm: $\frac{(1+\bar{e})f(K_i)}{1+r^*} \geq \frac{f(K_i)(1+\varepsilon_i)}{1+r}$. According to this inequality, only low-productivity firms are then purchased by foreign investors. Therefore, under asymmetric information, foreign investors in the equity market systematically overpay for the domestic firms they acquire. However, the foreign investors may still acquire the shares of some firms

because the opportunity cost of funds of the foreign investors is lower than that of the domestic investors. In the G-B model, the domestic interest rate or domestic investors' return to saving exceeds marginal productivity of capital since domestic investors overcharge foreign investors in the equity market.

Gordon and Bovenberg argue that in the presence of asymmetric information in the international capital market, a capital-importing country should subsidize foreign investment since asymmetric information across countries induces insufficient imports of capital. Many other studies (e.g., Razin *et al.,* 1998; Fuest *et al.,* 2002; Westerhout, 2002) have used or extended the G-B model to analyze issues of optimal taxation in the international capital market. Razin *et al.* (1998) consider optimal tax design in a small open economy by analyzing separately three types of capital inflows: foreign direct investment (FDI), foreign portfolio debt investment (FPDI), and foreign portfolio equity investment (FPEI). Their study emphasizes the efficiency of separate tax treatments for the three types of capital inflows. Fuest et al. (2002) extends the G-B model to explain the differential tax treatment of personal and corporate income. Following the G-B framework, Westerhout (2002) finds that the asymmetric information between foreign and domestic investors might be welfare-improving in some cases. In particular, he shows that according to the second-best theory, the distortionary effects of asymmetric information might improve social welfare if these effects reduce the distortions generated by the capital-tax competition between governments.

**Optimal tax policy and round-tripping behaviors**

The models discussed in the last section have not considered differential taxation of domestic and foreign investment. While Gordon and Bovenberg (1996) concluded that asymmetric information calls for subsidizing foreign investment, they argued that their model omits consideration of some important costs related to these subsidies. In particular, "such subsidies might induce domestic investors to assume the guise of a foreign investor, in order to qualify for the subsidy" (Gordon and Bovenberg, 1996, p1072). In contrast, when Westerhout (2002) sets up his model, he assumes that governments are not able to differentiate between taxes on the domestic and foreign investments. He rationalizes this assumption by arguing that "in case the tax rate on the investment by nonresidents were lower than the tax rate on investment by residents, residents would have an incentive to invest their money into a foreign company that makes a reinvestment on their behalf into the residents' country" (Westerhout, 2002, p. 222). However, these assumptions contradict the empirical observations indicating that both tax incentives to foreign investment and round-tripping exist. Therefore, whether their results will change after relaxing these counterfactual assumptions requires further investigation.

## 3. 3. A Model with a Dual Tax System

In our model, the representative agent in a small capital-importing country has a utility function of $U(C_1, C_2)$. In the first period, this individual is endowed with real assets of A,

which can be used for first period consumption or be invested in the home country.[18] We assume that there are no other financial assets and capital imports are channeled solely through the foreign direct investment (FDI).

The production sector in our model is inspired by Gordon and Bovenberg (1996) and Razin et al. (1998, 1999). The firms are *ex ante* identical but differ *ex post* due to a random productivity shock. If firm i invests $K_i$ in the first period, the output in the second period will be $f(K_i)(1+\varepsilon_i)$, where $f(K_i)$ is a positive concave function; $\varepsilon_i$ is a random productivity shock with $E(\varepsilon_i)=0$; and the distribution is such that $(1+\varepsilon_i)$ can be assumed to be greater than 0. Moreover, $\varepsilon_i$ is not known at the time investment decisions are made.

As illustrated in Figure 3.2, investment and finance decisions are undertaken in the first period, but involve in three stages. The representative domestic individual initially owns a fixed number (N) of firms. During the first stage, foreign investors buy ownership of J of these domestic firms by paying an amount E per firm before any investment has occurred in these firms. The domestic individual then retains ownerships of the remaining (N-J) firms.

[18] Our model assumes that the representative agent can invest only in domestic firms. This home bias investment phenomenon is widely observed in the world capital market. According to Gordon and Bovenberg (1996), possible explanations includes that investors faces high transaction costs when purchasing foreign assets and that they cannot enter the foreign market due to their lack of information on foreign markets.

During the second stage, the domestic and foreign investors determine their investment levels before the value of the random productivity shocks $\varepsilon_i$ are known. If the foreign investors invest $K_j$ in a firm j, the resulting expected income in the second period will be $f(K_j)(1+\varepsilon_j)$. Since all these J firms are *ex ante* identical, investment must be the same across these firms, i.e., $K_j = K^*$. Domestic investors can invest in the remaining (N-J) firms. Similarly, since firms are ex ante identical, each firm decides to employ the same level of capital input K. After values of $\varepsilon_i$ are revealed, firms cannot modify their investment levels.

At the third stage, the values of $\varepsilon_i$ are revealed to domestic investors, after the domestic investment decisions are made. Under the dual tax system, $\tau_h > \tau_f$, where $\tau_h$ and $\tau_f$ are the corporate income tax rates applicable to the domestic and foreign firms, respectively. We assume that there is better protection of the property rights of foreign investors than of domestic investors. This may be either the result of the domestic government's desire to attract more foreign investment or a reaction to international political pressure. In our model, a domestic firm has to pay an extra cost of μ percent of total income to guarantee enforcement of its property rights.

Therefore, some domestic firms assume the guise of foreign firms, in order to qualify for the lower corporate income tax rate and to obtain the better property rights protection that is provided for foreign firms. In particular, domestic investors can channel their funds abroad and subsequently buy the domestic firms' ownerships in the form of foreign

investment. In other words, the domestic investor bogusly sells the firm to foreigners by round-tripping. This round-tripping induces neither any actual new investment nor any real changes in the firm's ownership since it is simply a "paper transaction". For example, after the productivities of firms are known, the domestic owner can disguise high-productivity firms as foreign firms by using false financial documents or bogusly selling the firms to "foreigners". This kind of round-tripping can be conducted no matter whether the business investment has been made. True foreign investors will buy firms' ownerships before the productivity is known if the expected return on these firms is equal to or greater than the world interest rate.

While successful round-tripping reduces tax payments and provides better property rights protection, some costs are incurred. Our model assumes that with illegal round-tripping, there is some positive probability of being caught by the government. In the model, the investor pays a total expected value of $\eta f(K)$ per firm for round-tripping. This cost could include expected value of fine and other real costs. We assume that the cost is a constant share of the expected production. This assumption is consistent with the fact that larger firms generally have higher costs of round-tripping because they need to round-trip larger amounts of funds. In equilibrium, the domestic agent finances a firm by round-tripping only if the after-tax (CIT for foreign investment) return from round-tripping, net of the cost $\eta f(K)$, is greater or equal to the after-tax (CIT for domestic firms) return

from remaining to be a domestic firm [19]. That is, round-tripping occurs if

$$(1-\tau_h-\mu)f(K)(1+\varepsilon_i)\le(1-\tau_f)f(K)(1+\varepsilon_i)-\eta f(K) \tag{3.1}$$

or $$(1+\varepsilon_i)\ge\frac{\eta}{\tau_h-\tau_f+\mu}.$$

Equation (3.2) determines a critical value $\varepsilon^*$ where a firm is just indifferent between the round-tripping and non-round-tripping investment.

$$1+\varepsilon^*=\frac{\eta}{\tau_h+\mu-\tau_f} \tag{3.2}$$

High-productivity firms with $\varepsilon_i>\varepsilon^*$ will prefer the round-tripping investment, while the low-productivity firms with $\varepsilon_i\le\varepsilon^*$ will not round-trip. Equation (3.2) suggests that the threshold productivity level, $\varepsilon^*$, decreases as the cost of round-tripping decreases ($\eta$ decreases). Moreover, either a higher cost of property rights enforcement (a higher $\mu$) or a larger tax rate differential of $(\tau_h-\tau_f)$ would lead to a lower value of $\varepsilon^*$. In other words, the threshold level falls when round-tripping could yield higher tax and property rights benefits.

The fraction of non-round-tripping firms equals $\Phi(\varepsilon^*)$, where $\Phi(\bullet)$ is a cumulative distribution function for $\varepsilon_i$. Therefore, domestic investors would directly invest $\Phi(\varepsilon^*)(N-J)$ firms and invest $[1-\Phi(\varepsilon^*)](N-J)$ firms by round-tripping. In the

[19] The model simply considers a proportional corporate income tax and does not consider the complications like depreciation allowances and the deductibility of interest. I also assume that the capital fully depreciates.

second period, this domestic investor will receive $(N-J)\Phi(\varepsilon^*)(1-\tau_h-\mu)f(K)(1+e^-)$ from the non-round-tripping firms and $(N-J)[1-\Phi(\varepsilon^*)]f(K)[(1-\tau_f)(1+e^+)-\eta]$ from round-tripping firms, where $e^-$ is the mean value of $\varepsilon_i$ realized by the non-round-tripping low-productivity firms: $e^- \equiv E(\varepsilon_i | \varepsilon_i \le \varepsilon^*)$, and $e^+$ is the mean value of $\varepsilon_i$ realized by the high-productivity firms: $e^+ \equiv E(\varepsilon_i | \varepsilon_i > \varepsilon^*)$. Note that the weighted average of $e^-$ and $e^+$ must equal the average value of $\varepsilon_i$, which is zero; i.e.

$$[1-\Phi(\varepsilon^*)]e^+ + \Phi(\varepsilon^*)e^- = E(\varepsilon) = 0, \tag{3.3}$$

from which it follows that

$$[1-\Phi(\varepsilon^*)](1+e^+) + \Phi(\varepsilon^*)(1+e^-) = 1 \tag{3.4}$$

Therefore, the representative agent can consume

$$C_1 = A-(N-J)K+JE \tag{3.5}$$

$$C_2 = (N-J)f(K)\{\Phi(\varepsilon^*)(1-\tau_h-\mu)(1+e^-) + [1-\Phi(\varepsilon^*)][(1-\tau_f)(1+e^+)-\eta]\} \tag{3.6}$$

The representative agent maximizes $U(C_1, C_2)$ subject to the constraints (3.5) and (3.6) by choosing two endogenous variables K and J. Appendix 3.1 provides the formal maximization results.

If a firm is retained by the domestic investor, its expected return in the second period, net of corporate taxes, will be

$$V = f(K)\{\Phi(\varepsilon^*)(1-\tau_h-\mu)(1+e^-) + [1-\Phi(\varepsilon^*)][(1-\tau_f)(1+e^+)-\eta]\}$$

which, in the present terms, is worth to the domestic investor

$$\frac{f(K)\{\Phi(\varepsilon^*)(1-\tau_h-\mu)(1+e^-)+[1-\Phi(\varepsilon^*)][(1-\tau_f)(1+e^+)-\eta]\}}{1+r}$$

Therefore, if a domestic investor sets up a firm by himself, the present market value of the income produced by this investment, net of the initial capital expenditure, would equal

$$PV=-K+\frac{f(K)\{\Phi(\varepsilon^*)(1-\tau_h-\mu)(1+e^-)+[1-\Phi(\varepsilon^*)][(1-\tau_f)(1+e^+)-\eta]\}}{1+r} \quad (3.7)$$

In contrast, if a firm is bought by a foreign investor, its second-period value of $(1-\tau_f)f(K^*)$ is discounted by the factor $1+r^*$ since the foreign investor's after-tax rate of return must equal the world interest rate, $r^*$. Therefore, a foreign-invested firm's present value of its second-period cash receipts will be

$$PV^*=-K^*+\frac{(1-\tau_f)f(K^*)}{1+r^*}. \quad (3.8)$$

The foreign and domestic firms maximize their present values. Maximizations of equations (3.7) and (3.8) with respect to K and K* yield

$$f'(K)\{\Phi(\varepsilon^*)(1-\tau_h-\mu)(1+e^-)+[1-\Phi(\varepsilon^*)][(1-\tau_f)(1+e^+)-\eta]\}=1+r \quad (3.9)$$

$$(1-\tau_f)f'(K^*)=1+r^*.^{20} \quad (3.10)$$

We find from equation (3.9) that the preferential tax system produces distortions that favour high-productivity firms over low-productivity firms. Only high-productivity firms,

[20] Recall that in our model, while the world interest rate, r*, is exogenous, the domestic interest rate is determined by net return on domestic capital.

which account for $[1-\Phi(\varepsilon^*)]$ percent of total domestic firms, can employ round-tripping to increase their investment return rate since round-tripping is too costly for low-productivity firms. The low-productivity firms thus face a higher effective tax rate and a larger cost of property rights enforcement than high-productivity firms.

Substituting equation (3.10) into equation (3.8) gives the following equation.

$$PV^* = -K^* + \frac{f(K^*)}{f'(K^*)} = \frac{f(K^*) - K^* f'(K^*)}{f'(K^*)} \tag{3.11}$$

Similarly, substituting equation (3.9) into equation (3.7) gives

$$PV = -K + \frac{f(K)\left\{\Phi(\varepsilon^*)(1-\tau_h)(1+e^-) + [1-\Phi(\varepsilon^*)][(1-\tau_f)(1+e^+) - \eta]\right\}}{f'(K)\left\{\Phi(\varepsilon^*)(1-\tau_h)(1+e^-) + [1-\Phi(\varepsilon^*)][(1-\tau_f)(1+e^+) - \eta]\right\}} \tag{3.12}$$

$$= \frac{f(K) - Kf'(K)}{f'(K)}.$$

There are two solutions in this model. First, if $PV > PV^*$, no FDI takes place (i.e., J=0) since the price that foreign investors can offer is less than the present value to domestic owners of retaining the firms. In our study, we assume there is an interior solution, in which the domestic investor will sell a positive number of firms to foreign investors. In other words, we assume that $PV < PV^*$ when J=0. From equations (3.11) and (3.12), this assumption suggests that $K<K^*$, if no FDI takes place. Based on equation (3.5), this condition is satisfied when $K = \frac{A - C_J}{N} < K^*$, where $K^*$ is exogenously determined by equation (3.10). This result implies that when J=0, $PV < PV^*$ (or $K<K^*$) if the original domestic capital, A, is sufficiently small and (or) the economy is sufficiently large (N is

sufficiently large). This assumption is consistent with the facts that China is a large and capital-scarce economy.

According to the backward induction, the value of $K$ is positively related to J, the number of firms purchased by foreign investors, since as J increases, the domestic investor has more capital ($JE$) to invest in fewer firms (in (N-J) firms). The domestic investor will sell firms until $PV = PV^*$. In other words, in an equilibrium with a positive number of both foreign and domestic firms, $PV^*$ must be equal to $PV$, i.e.,

$$E = PV = PV^* \tag{3.13}$$

where E is the payment per firm from the foreign investor to the domestic investor.

Equations (3.11), (3.12) and (3.13) imply that

$$E = PV = PV^* = \frac{f(K^*) - K^* f'(K^*)}{f'(K^*)} = \frac{f(K) - Kf'(K)}{f'(K)}. \tag{3.14}$$

Equation (3.14) suggests that in the equilibrium, the investment in each domestic firm is equal to that in each foreign-invested firm, i.e., $K = K^*$.

Equations (3.9) and (3.10) combined with the equation of $K = K^*$ suggest that

$(1 - \tau_h - \mu) f'(K) < 1 + r < 1 + r^*$,

where $(1 - \tau_h - \mu) f'(K)$ is the net rate of return in the case that no round-tripping takes place.

Appendix 3.2 provides a formal proof for this inequality. The intuition behind the interest rate differentials is as follows. The weaker property rights protection and the higher tax

rate on domestic firms lead to an inefficient interest rate differential between domestic and world interest rate; i.e., $1+r<1+r^*$. On the other hand, round-tripping raises the net return rate on domestic investment by reducing the costs of property rights enforcement and lowering effective tax rate on domestic firms. The net return rate on domestic investment, 1+r, is then greater than the net return rate in the case that the domestic individual cannot invest by round-tripping; i.e., $(1-\tau_h-\mu)f'(K)<1+r$.[21] Therefore, in an economy with a preferential-tax system and weak property rights protection, round-tripping reduces the inefficient interest rate differential between domestic and world interest rates

Under the preferential tax system, a weaker property protection (or a higher value of $\mu$) could decrease the government's corporate income tax revenue by reducing the effective tax rate on domestic firms. The total government CIT revenue, R, equals the summation of tax revenues from domestic firms and from foreign firms:

$$R = (N - J)f(K)\tau_e + J\tau_f f(K^*)$$

where the effective tax rate on domestic firms, $\tau_e$, equals the weighted average of tax rates on round-tripping and non-round-tripping domestic firms; i.e.,

$$\tau_e = \tau_h \Phi(\varepsilon^*)(1+e^-) + \tau_f [1-\Phi(\varepsilon^*)](1+e^+)$$

[21] Recall that 1+r is equal to the net return rate on domestic capital including both round-tripping and non-round-tripping capital.

A change in $\mu$ affects $\tau_e$ by changing the size of $\varepsilon^*$, but has no effects on $K^*$, $K$ and $J$, which are essentially determined by the world interest rate, $1+r^*$. After differentiating $\tau_e$ with respective to $\mu$, we find

$$\frac{\partial \tau_e}{\partial \mu} = \tau_h(1+\bar{e})\frac{\partial \Phi(\varepsilon^*)}{\partial \mu} + \tau_h \Phi(\varepsilon^*)\frac{\partial \bar{e}}{\partial \mu} + \tau_f[1-\Phi(\varepsilon^*)]\frac{\partial e^+}{\partial \mu} - \tau_f \frac{\partial \Phi(\varepsilon^*)}{\partial \mu}(1+e^+)$$

Since $\tau_h > \tau_f$, $\frac{\partial \Phi(\varepsilon^*)}{\partial \mu} < 0$, and $\frac{\partial \bar{e}}{\partial \mu} < 0$,

$$\frac{\partial \tau_e}{\partial \mu} < \tau_f(1+\bar{e})\frac{\partial \Phi(\varepsilon^*)}{\partial \mu} + \tau_f \Phi(\varepsilon^*)\frac{\partial \bar{e}}{\partial \mu} + \tau_f[1-\Phi(\varepsilon^*)]\frac{\partial e^+}{\partial \mu} - \tau_f \frac{\partial \Phi(\varepsilon^*)}{\partial \mu}(1+e^+)$$

$$= \tau_f\left\{(1+\bar{e})\frac{\partial \Phi(\varepsilon^*)}{\partial \mu} + \Phi(\varepsilon^*)\frac{\partial \bar{e}}{\partial \mu} + [1-\Phi(\varepsilon^*)]\frac{\partial e^+}{\partial \mu} - \frac{\partial \Phi(\varepsilon^*)}{\partial \mu}(1+e^+)\right\} = 0$$

since equation (3.4) implies that

$$(1+\bar{e})\frac{\partial \Phi(\varepsilon^*)}{\partial \mu} + \Phi(\varepsilon^*)\frac{\partial \bar{e}}{\partial \mu} + [1-\Phi(\varepsilon^*)]\frac{\partial e^+}{\partial \mu} - \frac{\partial \Phi(\varepsilon^*)}{\partial \mu}(1+e^+) = 0.$$

Therefore, the effective tax rate on the domestic investment is negatively related to the cost of property rights enforcement; i.e. $\frac{\partial \tau_e}{\partial \mu} < 0$. Total government CIT revenues then fall as the effective tax rate on domestic firm decreases. This then suggests that $\frac{\partial R}{\partial \mu} < 0$.

The intuition is straightforward. Weaker property rights protection induces a larger share of domestic firms to invest via round-tripping in order to secure better property rights. Under the preferential tax system, as the scale of round-tripping rises, domestic firms as a whole face a lower effective tax rate since more domestic firms pay the lower foreign

CIT tax rate. The higher property rights costs then leads to larger government revenue losses.

We use numerical simulation techniques to illustrate the effects of round-tripping in an economy with a preferential-tax system and weak property rights protection. For the purpose of our simulation, we employ a logarithmic utility function: $U(C_1, C_2) = \ln(C_1) + \delta \ln(C_2)$ . The production functions are Cobb-Douglas: $f(K) = B k^{\alpha}$ and $f(K^*) = B k^{*\alpha}$ . We use a uniform distribution of $\varepsilon$ defined over the interval of $[a, b]$. Appendix 3.3 presents solutions to our simulation model and describes parameter values used in the simulation.

Figure 3.3 presents the evolution of the government CIT revenue as the property rights costs parameter, $\mu$, rises from 0 to 0.3. We find that weaker property protection (a higher value of $\mu$) decreases the government's CIT revenue. Figure 3.4 shows that the domestic interest rate falls as the cost of property rights enforcement increases. Both trends are consistent with the results from our theoretical model.

## 3.4. An Analysis of the Upcoming Capital Reform in China

China currently imposes different CIT rates on domestic (33%) and foreign firms (around 15%). The current rates will be unified to a single rate of 25% on Jan 01 2008. We analyze this upcoming tax reform by using the model developed in Section 3.3.

Under the unified tax system, round-tripping will still exist because property rights protection remains weak for domestic investors. The representative agent maximizes the utility $U(C_1, C_2)$ subject to constraints (3.5) and (3.6') by choosing the levels of two endogenous variables K and J.

$$C_1 = A - (N - J)K + JE \tag{3.5}$$

$$C_2 = (N - J)f(K)\{\Phi(\varepsilon^*)(1 - \tau - \mu)(1 + e^-) + [1 - \Phi(\varepsilon^*)][(1 - \tau)(1 + e^+) - \eta]\} \tag{3.6'}$$

where $\tau$ is the unified CIT tax rate. Since $[1 - \Phi(\varepsilon^*)](1 + e^+) + \Phi(\varepsilon^*)(1 + e^-) = 1$, equation (3.6') can be expressed as

$$C_2 = (N - J)f(K)\{1 - \tau - \mu\Phi(\varepsilon^*)(1 + e^-) - \eta[1 - \Phi(\varepsilon^*)]\} \tag{3.15}$$

First order conditions then are:

K: $$U_1 = U_2 f'(K)\{1 - \tau - \mu\Phi(\varepsilon^*)(1 + e^-) - \eta[1 - \Phi(\varepsilon^*)]\} \tag{3.16}$$

J: $$U_1(K + E) = U_2 f(K)\{1 - \tau - \mu\Phi(\varepsilon^*)(1 + e^-) - \eta[1 - \Phi(\varepsilon^*)]\} \tag{3.17}$$

Equations (3.16) and (3.17) yield that

$$E = \frac{f(K) - Kf'(k)}{f'(K)}$$

Therefore, the equation (3.14) still holds under the new tax system; that is,

$$E = PV = PV^* = \frac{f(K^*) - K^* f'(K^*)}{f'(K^*)} = \frac{f(K) - Kf'(k)}{f'(K)}.$$

Thus, under the unified tax system, the investment level in a domestic firm still equals the investment in a foreign firm, i.e., $K = K^*$. Equation (3.16) implies that

$$1 + r = \frac{U_1}{U_2} = f'(K)\left\{1 - \tau - \mu\Phi(\varepsilon^*)\left(1 + e^{-}\right) - \eta[1 - \Phi(\varepsilon^*)]\right\} \tag{3.18}$$

$$< f'(K^*)(1 - \tau) = 1 + r^* \qquad \text{since } K = K^*.$$

This inequality suggests that even when the tax rate on domestic firms is equal to the rate on foreign firms, the domestic capital return rate is below the world rate. On the one hand, the domestic return rate falls by $\mu\Phi(\varepsilon^*)\left(1 + e^{-}\right)$ since low-productivity and non-round-tripping firms have to pay the costs of property rights enforcement. On the other hand, although high-productivity firms gain better property rights protection by round-tripping, they have to pay the costs of round-tripping, which further decrease the domestic return rate by $\eta[1 - \Phi(\varepsilon^*)]$.

We next show that total FDI, which equals $J(K^* + E)$, will fall under the unified tax system since values of J, K* and E will all decrease. First, the future unified tax rate will lie between the current rates on domestic and foreign firms, i.e. $\tau_f < \tau < \tau_h$. The higher rate on foreign firms combined with equation (3.10) suggest that $K^*$ will decrease under the new tax system. Second, $E = \frac{f(K^*) - K^* f'(K^*)}{f'(K^*)}$ will decrease along

with $K^*$ since $f(K^*)$ is a positive concave function.[22] That is, a lower value of $K^*$ under the new tax system will reduce the unit price of domestic firms, $E$. Third, the condition of $K = K^*$ implies that $K$ will fall along with $K^*$. As discussed, the number of firms sold to foreigners, $J$, is positively correlated with $K$ since as J increases, the domestic investor has more capital ($JE$) to invest in fewer firms (in (N-J) firms). Therefore, $J$ will also fall under the new tax system as $K$ decreases.

In contrast, the change in domestic investment is ambiguous under the unified tax system. On the one hand, the number of firms held by the domestic investor, $(N-J)$, will rise as J decreases. On the other hand, in this capital-importing country, a large portion of domestic capital derives from foreigners' payments for ownerships of firms. The amount of capital available for each domestic firm, $K$, is then essentially determined by how much a foreign investor is willing to pay for firm ownership.[23] Therefore, as the tax rate on foreign firms rises, $K$ decreases since foreign investors will pay less to buy firms from the domestic investor.

We also employ numerical simulation to illustrate the effects the upcoming tax reform in China. Appendix 3.3 describes the simulation model and presents parameter values used in the simulation. Because China's current tax rates on domestic (33%) firms and foreign-invested firms (around 15%) will be unified to 25%, our simulation considers the case in

[22] $\frac{\partial\{[f(K)-Kf'(K)]/f'(K)\}}{\partial K} = \frac{-f''(K)f(K)}{[f'(K)]^2} > 0$ since $f'(K) > 0$ and $f''(K) < 0$.

[23] Recall that $E = \frac{f(K^*)-K^*f'(K^*)}{f'(K^*)} = \frac{f(K)-Kf'(k)}{f'(K)}$.

which the government unifies the tax rates by both decreasing the rate on domestic firms and increasing the rate on foreign-invested firms. Starting from the rates of 33% on domestic firms and of 15% on foreign-invested firms, the domestic and foreign rates decrease and increase respectively, until they reach the unified rate of 25%. In each instance, the domestic rate decreases by 1%; and foreign rate increases by 1.25%. For instance, in Figure 3.5, we show the changes in number of firms' ownerships as domestic and foreign rates change from 33% and 15% to 32% and 16.25%, to 31% and 17.5%, and so on until both rates reach 25%.

Figures 3.5-3.10 provide the results from our simulations. These results are consistent with the predictions from our theoretical model. Figure 3.5 shows that under the unified tax system, foreign investors will own fewer firms compared to the number they own under the current preferential tax system. In other words, J, the number of firms sold to foreign investors, will decrease under the new system. As shown in Figure 3.6, both domestic and foreign investment per firm, K and K*, will decrease after tax rates are unified. Figure 3.7 suggests that the sale price of a firm will fall along with the value of K.

Figure 3.8 shows that total FDI, which equals J(K*+E), will fall as a result of decreases in K*, J and E. In our simulation, we find that total domestic investment, which is equal to (N-J)K, will also decreases slightly, although the tax rate on domestic firms falls. In terms of intuition, the domestic investor in this capital-import economy accumulates capital by selling firms to foreigners. When the CIT rate on foreign firms rises, less capital is available for the domestic investor given that fewer firms are sold to foreigners

at a lower price. As shown in Figure 3.9, under the new tax system, the domestic interest rate could be higher than that in the current system. In addition, Figure 3.10 suggests that the CIT revenue could rise after the tax rates are unified.

## 3.5. Implications for Empirical Studies

Round-tripping exists not only in China but also in other countries. For instance, Broadman (1999) argues that round-tripping had been used by firms in Russia to "take advantage of tax sweeteners and other concessions available to foreigners."(Broadman, 1999, p 9). Bureau (2004) reports that the double taxation avoidance treaty between India and Mauritius has encouraged Indian firms to make round-tripping investments through Mauritius and other tax havens such as Bermuda and the British Virgin Islands in order to qualify for the tax benefits enjoyed by overseas investors. The Finance Diary (2001) reports a case of attempted round-tripping investment by two Indian firms. According to this report, Bharti Telecom Ltd. and Bharti Healthcare planned to invest through a Mauritius-based firm. However, the government of India rejected their foreign investment proposals on the grounds that "round-tripping of FDI had negative tax implications."

It is of interest to test the implications of our theoretical model that the scale of round-tripping is positively related to preferential tax incentives and the cost of property rights protection. Although the idea is straightforward, testing this hypothesis is difficult since there are no firm data on the magnitude of round-tripping investments. Two studies suggest a method that can be used to empirically study the round-tripping phenomenon.

Fisman and Wei (2004) and Xiao (2004) use indirect approaches to estimate scales of tax evasion and round-tripping, respectively. Fisman and Wei (2004) argues that evasion of tariffs and other taxes could be an explanation for the trade data reporting discrepancies of China (the import country) and Hong Kong (the export country), as exporters do not have incentives to report bogus data to the export country/region. Xiao (2004) uses FDI reporting discrepancies between China and its FDI source countries as a proxy the capture the extent of round-tripping FDI in China. Since both the "true" and "bogus" foreign investors have no incentive to report any "bogus" investment to their source countries, the FDI inflows reported by China (the host country) are much greater than the FDI outflows reported by source countries.

Inspired by these studies, in Chapter 4 of our dissertation, we examine the effects of round-tripping incentives on the scale of round-tripping by considering the relationship between round-tripping incentives and the FDI reporting discrepancies between FDI host and source countries. We find that round-tripping could provide an explanation for the data reporting discrepancies between FDI host and source countries since investors have no incentive to report their "bogus" foreign investment to their source countries. Our results from both aggregate and disaggregated data show that the FDI reporting differences are positively related to the host countries' preferential fiscal incentives, and negatively correlated with the host country's property rights protection and political stability. These results strongly support the hypothesis in our theoretical model.

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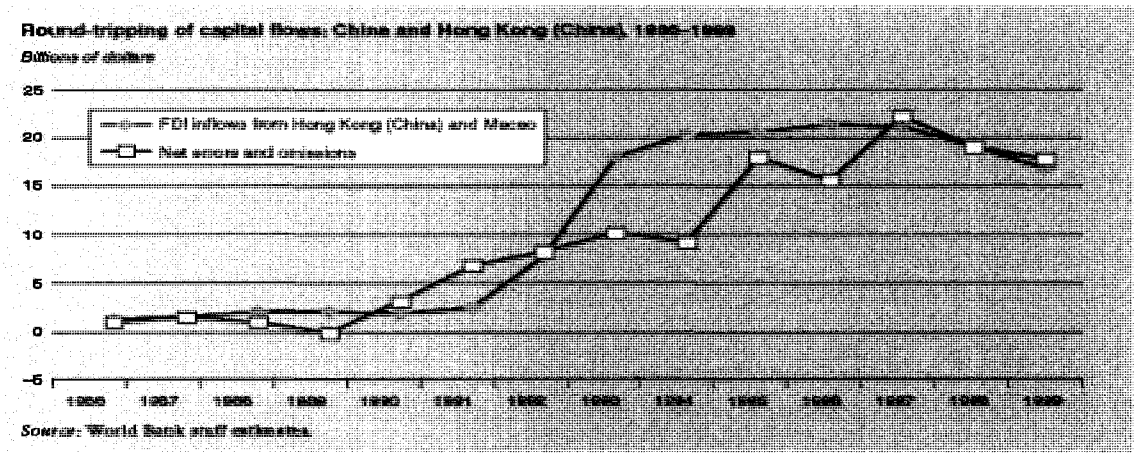
Table 3.1. China's FDI by source

| (percent) | 1996 | 1998 | 1999 | 2000 |
|---|---|---|---|---|
| Hong Kong (China) | 50 | 42 | 40 | 38 |
| Virgin Islands (U.K.) | 0 | 9 | 7 | 9 |
| United States | 8 | 9 | 10 | 11 |
| Singapore | 0 | 8 | 7 | 5 |
| Japan | 9 | 8 | 7 | 7 |
| Taiwan (China) | 8 | 7 | 6 | 6 |
| Korea, Democratic People's Republic of | 0 | 4 | 3 | 4 |
| Germany | 0 | 2 | 3 | 3 |
| Netherlands | 0 | 2 | 3 | 2 |
| France | 1 | 2 | 2 | 2 |
| Others | 24 | 7 | 14 | 13 |

Source: World Bank report, 2002

Figure 3.1. Round-tripping of capital flows: China and Hong Kong (China)




Source: World Bank report, 2002.

Figure 3.2. The order of investment decisions in the model with round-tripping behavior

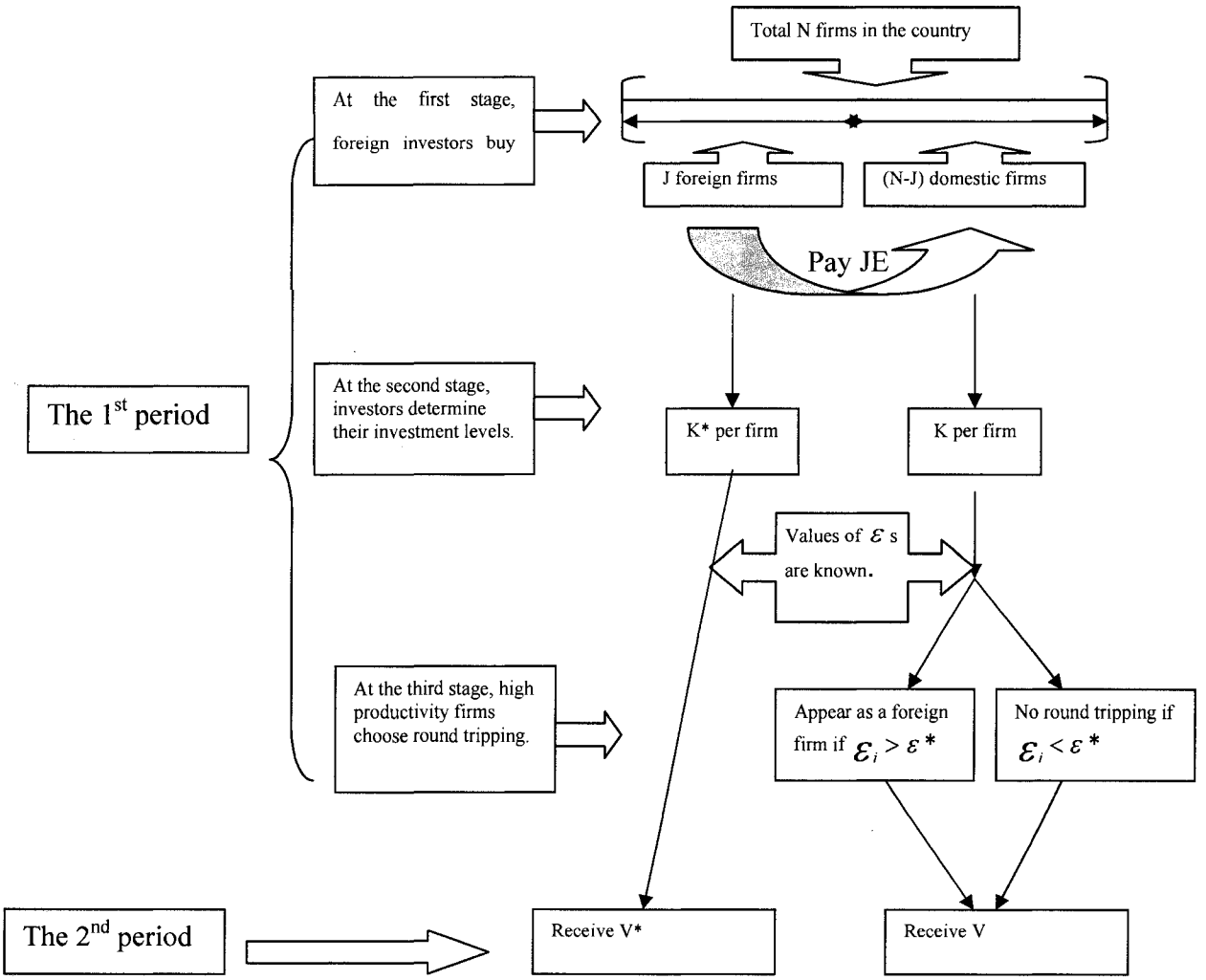


Figure 3.3. Property rights protection and government CIT revenue

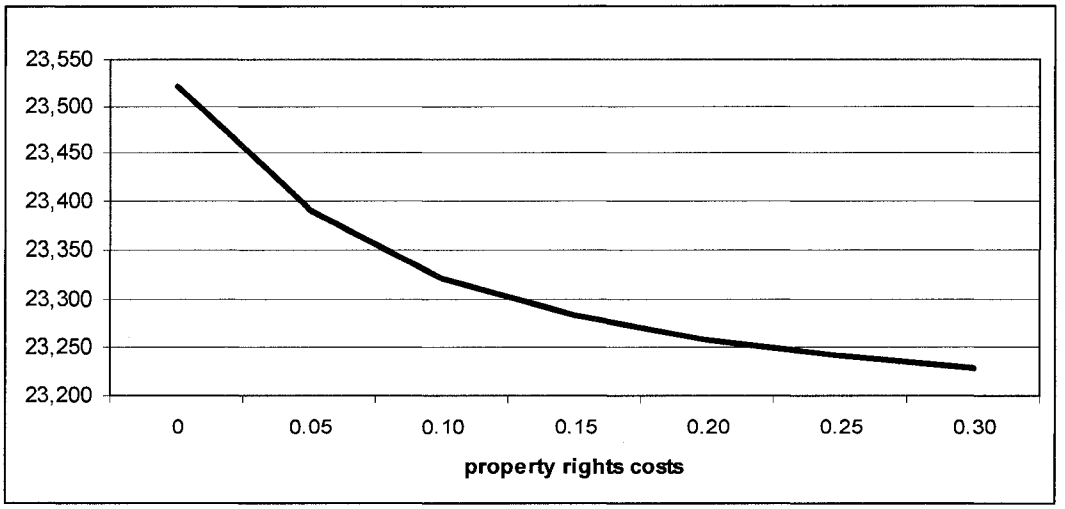



Figure 3. 4. Property rights protection and domestic interest rate

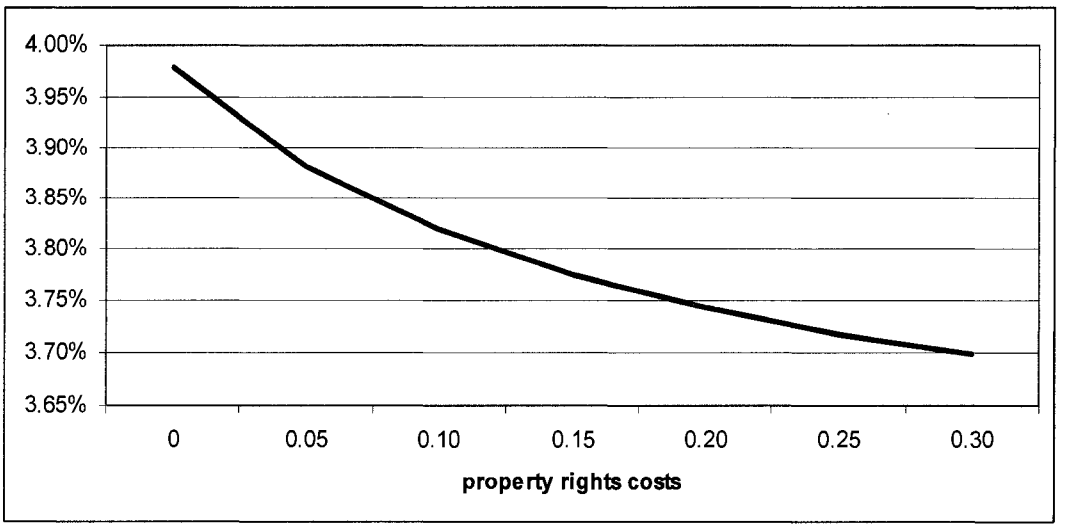


Figure 3.5. Effects of CIT rate changes on firm ownership

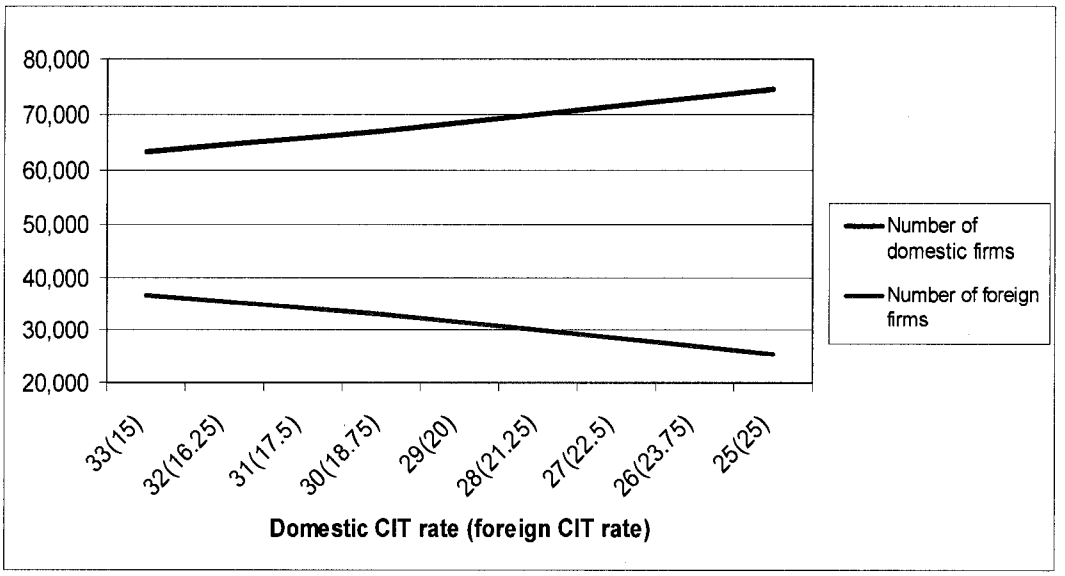



Figure 3.6. Tax rate changes and investment level per firm (K and K*)

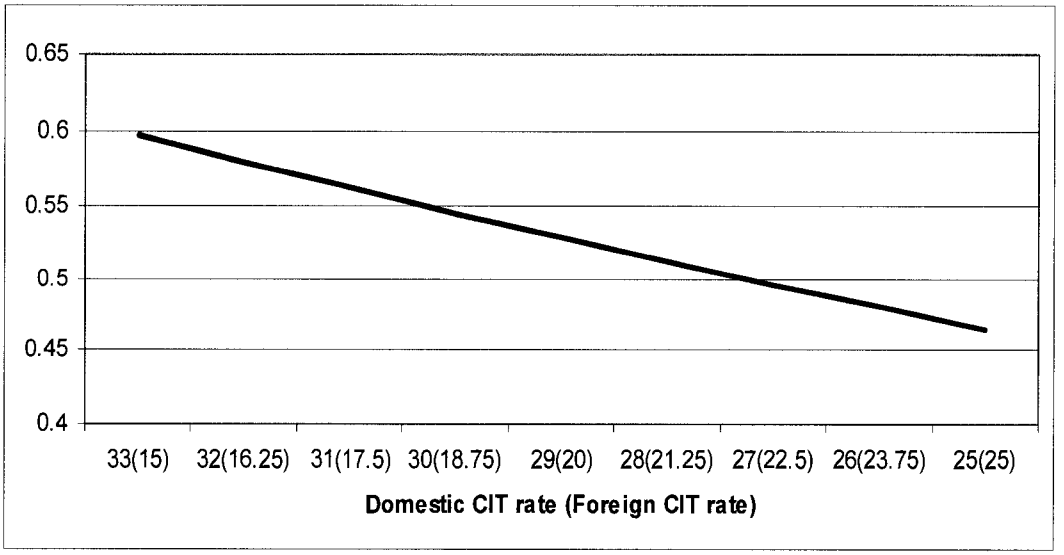


Figure 3.7. Impact of CIT rate changes on the price of a firm's ownership

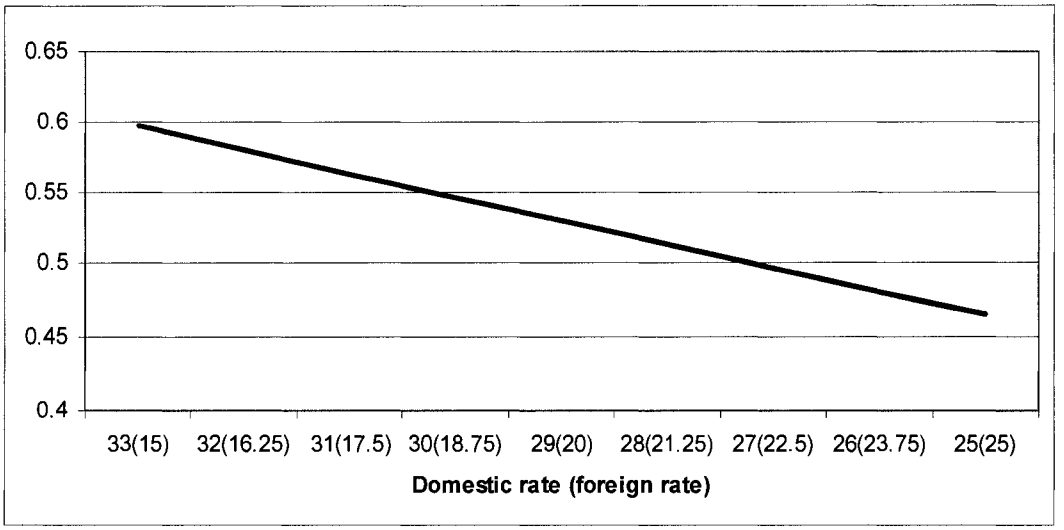



Figure 3.8. Impact of CIT rate changes on total FDI and domestic investment

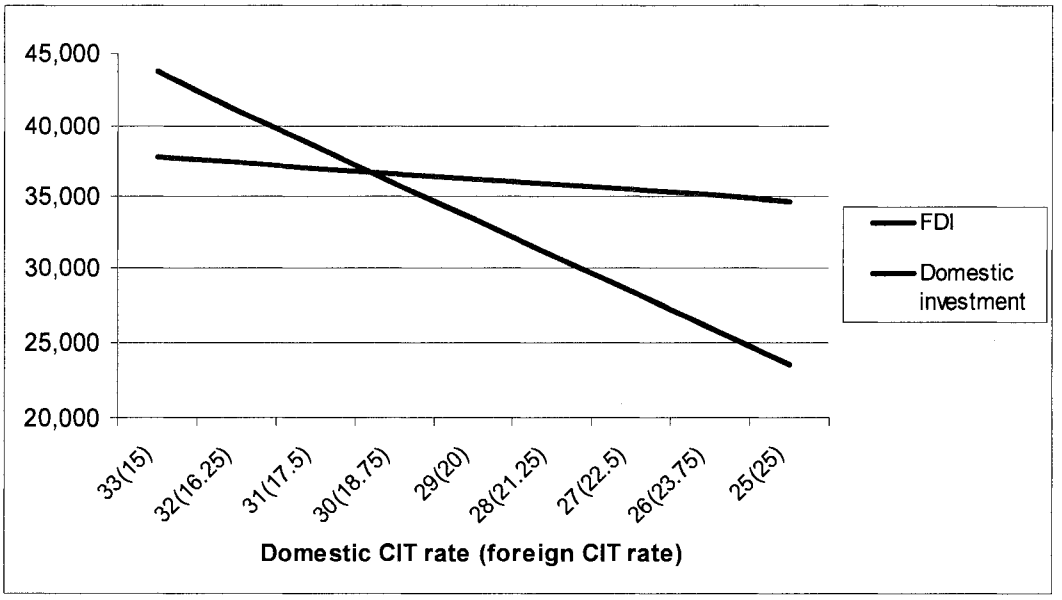


Figure 3.9. Impact of tax-rate changes on domestic after tax interest rate

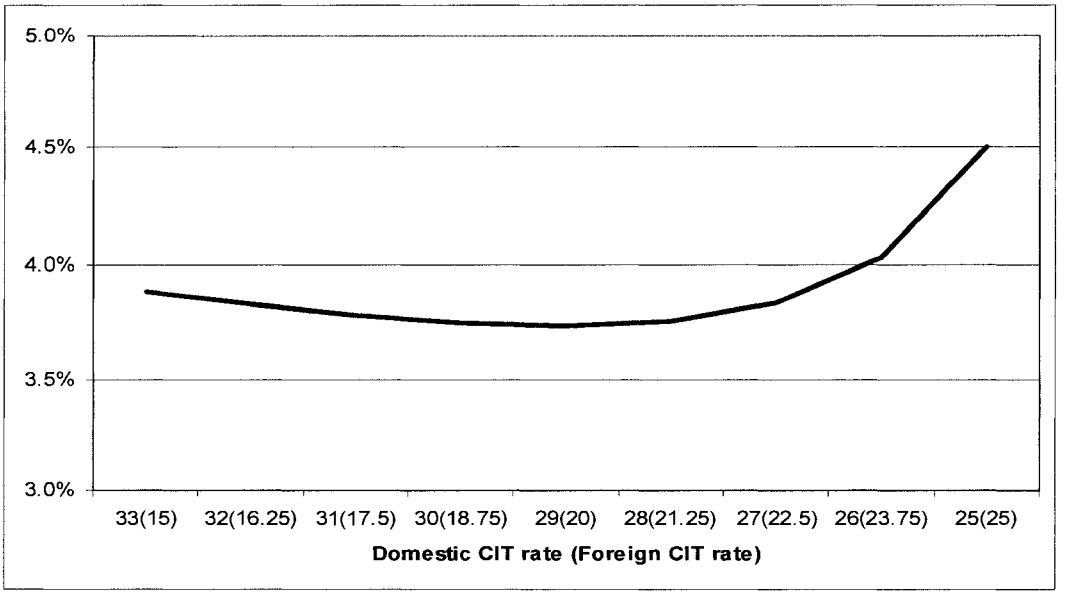
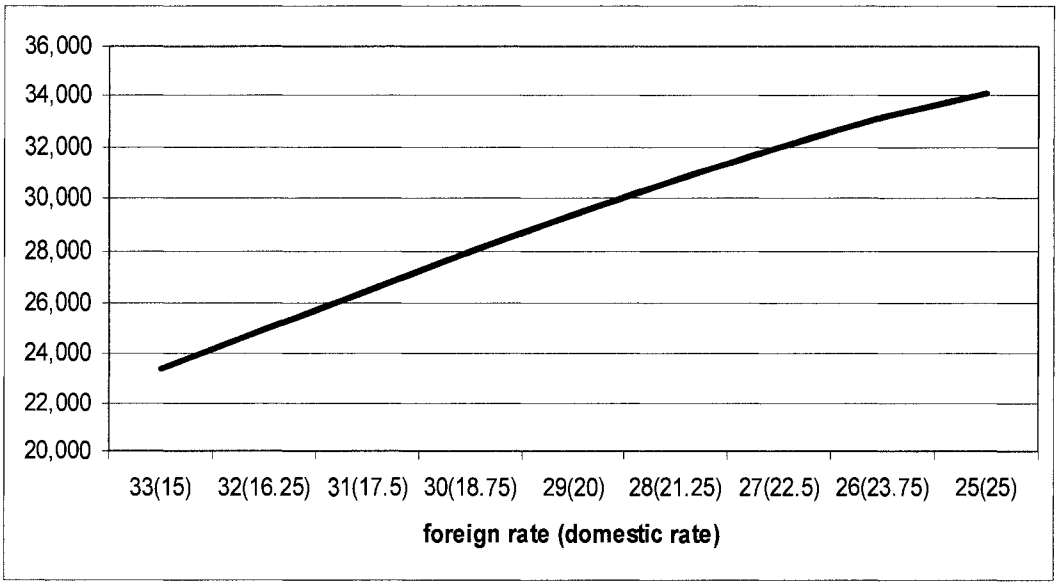



Figure 3.10. Impact of CIT rate changes on government CIT revenue



## Appendix 3.1.

The representative agent maximizes $U(C_1, C_2)$ subject to the constraints (3.5) and (3.6) by choosing two endogenous variables K and J.

$$C_1 = A - (N - J)K + JE \tag{3.5}$$

$$C_2 = (N - J)f(K)\{\Phi(\varepsilon^*)(1 - \tau_h - \mu)(1 + e^-) + [1 - \Phi(\varepsilon^*)][(1 - \tau_f)(1 + e^+) - \eta]\} \tag{3.6}$$

The first order conditions are:

K: $$U_1 = U_2 f'(K)\{\Phi(\varepsilon^*)(1 - \tau_h - \mu)(1 + e^-) + [1 - \Phi(\varepsilon^*)][(1 - \tau_f)(1 + e^+) - \eta]\} \tag{3.A1}$$

J: $$U_1(K + E) = U_2 f(K)\{\Phi(\varepsilon^*)(1 - \tau_h - \mu)(1 + e^-) + [1 - \Phi(\varepsilon^*)][(1 - \tau_f)(1 + e^+) - \eta]\} \tag{3.A2}$$

Equation (3.A1) implies that

$$\frac{U_1}{U_2} = 1 + r = f'(K)\{\Phi(\varepsilon^*)(1 - \tau_h - \mu)(1 + e^-) + [1 - \Phi(\varepsilon^*)][(1 - \tau_f)(1 + e^+) - \eta]\}$$

Equations (3.A1) and (3.A2) yield that

$$E = \frac{f(K) - Kf'(k)}{f'(K)}$$

## Appendix 3.2.

The interest rate inequality, $(1-\tau_h-\mu)f'(K)<1+r<1+r^*$, is derived as follows.

First, we derive the inequality $1+r<1+r^*$. According to equations (3.9) and (3.10)

(9) $1+r=f'(K)\{\Phi(\varepsilon^*)(1-\tau_h-\mu)(1+e^-)+[1-\Phi(\varepsilon^*)][(1-\tau_f)(1+e^+)-\eta]\}$

(10) $1+r^*=(1-\tau_f)f'(K^*)$

$$
\begin{aligned}
1+r &= f'(K)\{\Phi(\varepsilon^*)(1-\tau_h-\mu)(1+e^-)+[1-\Phi(\varepsilon^*)][(1-\tau_f)(1+e^+)-\eta]\} \\
&< f'(K)\{1-\tau_f-\mu\Phi(\varepsilon^*)(1+e^-)-\eta[1-\Phi(\varepsilon^*)]\}, \text{ since } [1-\Phi(\varepsilon^*)](1+e^+)+\Phi(\varepsilon^*)(1+e^-)=1 \\
&< f'(K^*)(1-\tau_f)=1+r^* \text{ since } K=K^*.
\end{aligned}
$$

$\Rightarrow 1+r<1+r^*$

Second, we want to proof $(1-\tau_h-\mu)f'(K)<1+r$ by showing $1+r-(1-\tau_h-\mu)f'(K)>0$.

$$
\begin{aligned}
&1+r-(1-\tau_h-\mu)f'(K) \\
&= f'(K)\{\Phi(\varepsilon^*)(1-\tau_h-\mu)(1+e^-)+[1-\Phi(\varepsilon^*)][(1-\tau_f)(1+e^+)-\eta]\}-f'(K)(1-\tau_h-\mu) \\
&= f'(K)\{-[1-\Phi(\varepsilon^*)](1-\tau_h-\mu)(1+e^+)+[1-\Phi(\varepsilon^*)][(1-\tau_f)(1+e^+)-\eta]\} \\
&= f'(K)[1-\Phi(\varepsilon^*)]\{(\tau_h+\mu-\tau_f)(1+e^+)-\eta\}
\end{aligned}
$$

Equation (3.2) in section 3.3 gives

$(\tau_h+\mu-\tau_f)(1+\varepsilon^*)-\eta=0$.

This implies that

$(\tau_h+\mu-\tau_f)(1+e^+)-\eta>0$, since $e^+>\varepsilon^*$.

Therefore, $1+r-(1-\tau_h-\mu)f'(K)$

$$= f'(K)[1-\Phi(\varepsilon^*)]\{(\tau_h+\mu-\tau_f)(1+e^+)-\eta\}>0$$

$\Rightarrow (1-\tau_h-\mu)f'(K)<1+r<1+r^*$

## Appendix 3.3.

In the simulation, we employ a logarithmic utility function: $U(C_1, C_2) = \ln(C_1) + \delta \ln(C_2)$. The production functions are Cobb-Douglas: $f(k) = B k^{\alpha}$ and $f(k^*) = B k^{*\alpha}$.

The $U(C_1, C_2)$ is maximized subject to the following constraints by choosing endogenous variables K and J.

$$C_1 = A - (N - J)k + JE \tag{3.5}$$

$$C_2 = (N - J)B k^{\alpha} \left\{ \Phi(\varepsilon^*)(1 - \tau_h - \mu)(1 + e^{-}) + [1 - \Phi(\varepsilon^*)][(1 - \tau_f)(1 + e^{+}) - \eta] \right\} \tag{3.6}$$

First order conditions are:

$$\text{K: } \frac{C_2}{\delta C_1} = B\alpha k^{\alpha - 1} \left\{ \Phi(\varepsilon^*)(1 - \tau_h - \mu)(1 + e^{-}) + [1 - \Phi(\varepsilon^*)][(1 - \tau_f)(1 + e^{+}) - \eta] \right\} \tag{3.A3}$$

$$\text{J: } \frac{C_2}{\delta C_1}(k + E) = B k^{\alpha} \left\{ \Phi(\varepsilon^*)(1 - \tau_h - \mu)(1 + e^{-}) + [1 - \Phi(\varepsilon^*)][(1 - \tau_f)(1 + e^{+}) - \eta] \right\} \tag{3.A4}$$

Equations (3.A3) and (3.6) yield

$$C_1 = \frac{(N - J)k}{\alpha\delta} \tag{3.A5}$$

Equations (3.A5) and (3.5) imply $\frac{(N - J)k}{\alpha\delta} = A - (N - J)k + JE$, which determines the value of $J$:

$$J = \frac{\frac{Nk}{\alpha\delta} + Nk - A}{k + \frac{k}{\alpha\delta} + E}$$

Equations (3.A3) and (3.A4) suggest that

$$E = k\left(\frac{\alpha}{1 - \alpha}\right)$$

where $E = \frac{f(K^*) - K^* f'(K^*)}{f'(K^*)} = k^*\left(\frac{1 - \alpha}{\alpha}\right)$. This also implies that $k = k^*$.

Based on equation (3.10), $1 + r^* = (1 - \tau_f) f'(K^*)$, we get $1 + r^* = (1 - \tau_f) B\alpha k^{*\alpha - 1}$, which determines the size of $k^*$ and $k$.

$$k = k^* = \left[ \frac{1+r^*}{(1-\tau_f)B\alpha} \right]^{\frac{1}{\alpha-1}}$$

In summary, we know that $J = \dfrac{\frac{Nk}{\alpha\delta} + Nk - A}{k + \frac{k}{\alpha\delta} + E}$, $k = k^* = \left[ \dfrac{1+r^*}{(1-\tau_f)B\alpha} \right]^{\frac{1}{\alpha-1}}$, and $E = k\left(\dfrac{\alpha}{1-\alpha}\right)$. Using these values, we can calculate the values of FDI, government CIT revenues (R), and domestic investment (D):

$$FDI = J(K^* + E)$$

$$D = (N - J)k$$

$$1 + r^* = B\alpha k^{\alpha-1}\left\{\Phi(\varepsilon^*)(1-\tau_h-\mu)(1+e^-) + [1-\Phi(\varepsilon^*)][(1-\tau_f)(1+e^+) - \eta]\right\}$$

$$R = (N - J)B k^{\alpha} \tau_e + J \tau_f B k^{\alpha}$$

where $\tau_e = \tau_h \Phi(\varepsilon^*)(1 + e^-) + \tau_f [1 - \Phi(\varepsilon^*)](1 + e^+)$

We use a simple uniform distribution of $\varepsilon$ defined over the interval of $[a, b]$.

$$\Phi(\varepsilon^*) = \frac{\varepsilon^* - a}{b - a}, \text{ where } 1 + \varepsilon^* = \frac{\eta}{\tau_h + \mu - \tau_f}.$$

Table 3.A3 describes parameter values in our simulation.

Table 3.A3. Parameter values in the simulation

| Preference | Technology | Tax rates and property rights | Other Parameters |
|---|---|---|---|
| $\delta = 0.9$ | $B = 2$ | $\tau_f = 0.15$ | $A = 10000$ |
| | $\alpha = 0.5$ | $\tau_h = 0.33$ | $r^* = 0.1$ |
| | $a = -1$ | $\tau = 0.25$ | $N = 10000$ |
| | $b = 1$ | $\mu = 0.05$ | $\eta = 0.05$ |

# Chapter 4 Property Rights, Tax Incentives and Bogus FDI

## 4.1. Introduction

An IMF (2004) report defines "round-tripping" as domestic investors' channeling of funds to special purpose entities abroad and the subsequent return of the funds to the local economy in the form of foreign direct investment (FDI). Studies (e.g., Xiao, 2004 and IMF, 2004) describe two major incentives for round-tripping. First, preferential fiscal policies (e.g., reduced tax rates and tax holidays) for foreign direct investment (FDI) produce incentives for domestic investors to round trip their funds to benefit from these policies.

Second, domestic investors in countries with weak protection of property rights or an unstable political environment may have a strong incentive for round-tripping in order to gain property rights protection and to diversify domestic risk. In countries with weak protection of property rights, domestic investors are motivated to park their wealth in countries with relatively strong property rights protection. When these investors see profit opportunities, they return their funds to the domestic economy. Besides, according to IMF (2004), when the property rights protection is weak, some domestic investors prefer to keep their identities anonymous by investing through round-tripping. Moreover, in some countries (especially developing countries), the protection of property rights is generally weak, but there is better protection of the property rights of foreign investors than of domestic investors. This may be due to a desire to attract more foreign investment or in response to international political pressure. A UNCTAD (2003) study reported that

in 2002, a total of 248 new FDI regulations were adopted by 70 countries, 236 of them representing changes more favorable to FDI. In particular, "76 of the 248 measures were promotional in nature, including incentives and 49 provided further protection to FDI and foreign investors".

Numerous studies (e.g., Broadman, 1999; Chipalkatti & Rishi, 2001; OECD, 2003; Aykut & Ratha, 2003; IMF, 2003; Xiao, 2004) have reported the existence of round-tripping in some developing countries such as China and Russia. However, round-tripping is difficult to observe. To our knowledge, no empirical study has examined the relationship between round-tripping FDI and tax and property rights incentives since direct data on round-tripping are not available.

However, direct observations are not necessarily required to empirically study this phenomenon. A United Nation's report finds that "the discrepancy of home and host country statistics is pointing towards the existence of round-tripping" (World Investment Directory, 2003, p46). For instance, while Russia reported that its FDI inflows from Cyprus were 678 million US dollars in 2000 and 512 million dollars in 2001, the total FDI outflows to the whole world reported by Cyprus were only 126 million Cyprus pounds (or 202 million US dollars) in 2000 and 140 million Cyprus pounds (or 218 million US dollars) in 2001.[24] This statistical discrepancy signals round-tripping since domestic investors in Cyprus have no incentive to report fake FDI outflows to their country. Two recent studies (Fisman and Wei, 2004; Xiao, 2004) take new indirect

[24] The FDI data of Russia and Cyprus are from the United Nations' World investment directory, 2004 and the Annual Report of Balance of Payment 2002, the Central Bank of Cyprus.

approaches to estimate scales of tax evasion and round-tripping, respectively. In particular, Fisman and Wei (2004) argues that evasion of tariffs and other taxes could be an explanation for the trade data reporting discrepancies of China (the import country) and Hong Kong (the export country) because exporters do not have incentives to report fake data to the export country/region. On the other hand, Xiao (2004) argues part of China's FDI inflows is financed by domestic capital that leaves the country and then returns as round-tripping FDI. Moreover, he also reports that "it is common for fake foreign invested enterprises to use false capital auditing reports and false bank deposit documents to meet requirements of registered capital input by foreign partners" (Xiao, 2004, page 16). That is, investors cannot only round trip their domestic capital but they can also inflate the true foreign investment in their enterprises. Xiao (2004) then used FDI reporting discrepancies between China and its FDI source countries as a proxy measure of round-tripping FDI in China. Since both the "true" or "fake" foreign investors have no incentive to report any "bogus" investment to their source countries, the FDI inflows reported by China (the host country) are much greater than the FDI outflows reported by source countries.

The above studies provide a method that might be used to examine relationships between the scale of round-tripping and its incentives. Our study examines the effects of round-tripping incentives on the scale of round-tripping by considering the relationship between indicators of round-tripping incentives and the reporting discrepancies between FDI host and source countries. First, we calculate the difference between the FDI inflows from 10 source regions reported by 50 host countries and FDI outflows reported by these 10

source regions. Second, these reporting differences are regressed on indicators that measure the host countries' political stability, property right's protection and preferential fiscal incentives to foreign investment. Our results show that the reporting difference between FDI host and source countries is positively related to the host countries' preferential fiscal incentives, and negatively correlated with the FDI host country's property rights protection and political stability. Overall, these results are statistically significant and robust to different functional form specifications and different indicators for property rights protection.

The rest of this paper is organized as follows. Section 4.2 reviews the related literature. Section 4.3 describes our data. Section 4.4 discusses the aggregate reporting discrepancies across countries. Section 4.5 uses disaggregated date to examine the relationship between reporting discrepancies and the indicators of round-tripping incentives. Section 4.6 provides conclusions and policy implications.

## 4.2. Literature Review

Some types of behavior, such as tax evasion and round-tripping, are difficult to observe. Two recent studies (Fisman and Wei, 2004; Xiao, 2004) use a new approach to estimate the extent of tax evasion and round-tripping in China, respectively. Fisman and Wei (2004) studied the effect of tax rates on evasion by examining evasion related to China's imports from Hong Kong. They argue that evasion of tariffs and other taxes could be an explanation for the trade data reporting discrepancies of China and Hong Kong. That is, if there is no tax evasion and measurement error, the exports to China reported by Hong

Kong should be the same as the imports from Hong Kong reported by China. They computed the difference between Hong Kong's reported exports and China's reported imports of the same products by using the World Bank's World Integrated Trade Solution database. They then used the following specification to examine their prediction.

$$\log(export) - \log(import) = \alpha + \beta taxrate + \varepsilon$$

That is, they regressed the logarithm ratio of Hong Kong's reported exports and China's reported imports on the tax rates. Their results showed that the indicator for evasion gap, $\log(\frac{export}{import})$, is highly correlated with tax rates. They argued that their approach could be extended to measure other behaviors such as corruption that is also difficult to observe directly.

Xiao (2004) estimated the scale of round-tripping in China. He found that the FDI inflow statistics reported by China are higher than the FDI outflow statistics reported by the source regions. Because foreign investors do not have an incentive to report "fake investment" in China to their home countries, Xiao argued that the FDI outflow statistics reported by the source regions reflected the scale of the true FDI. He then used the gap between the FDI inflow statistics reported by China and the FDI outflow statistics reported by the source regions as a proxy measure of round-tripping FDI in China. Xiao (2004) showed that based on the available statistical information, China's round-tripping FDI was around 40 percent or within the range of 30 percent to 50 percent of total FDI over the period 1994 to 2001. The underlying logic behind these two studies is similar.

Wei (2000) studied the relationship between corruption and FDI using data on bilateral investment from 12 source countries to 45 host countries in 1993. He regressed the FDI outflows reported by source countries on a series of independent variables including host country's corruption level, political stability, the tax rate on foreign corporation, a dummy on linguistic ties, etc. After using three different indexes of corruption individually, he found that an increase in the tax rate on foreign corporations, political instability or the corruption reduced inward FDI in host countries. Our study extends these empirical studies by examining the effects of property rights and fiscal incentives on the scale of round-tripping.

## 4.3. Data

### 4.3.1 FDI Data

The United Nations Conference on Trade and Development's (UNCTD) FDI country-profile database and the OECD International Direct Investment Statistics Yearbooks (2002, 2003) provide FDI statistics for 112 countries.[25] Basically, these two databases provide FDI statistics in developed and developing countries in Europe, America, and Africa and in several Asian countries.[26] Generally, there is no discrepancy between the FDI data reported by these two databases because they compile FDI statistics based on national official sources (e.g. central banks or national statistics organizations).

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[25] Hard copies of the FDI data for Latin America (World Investment Directory, 2004) and Central and Eastern Europe (World Investment Directory, 2003) are available. The data for other countries are available at the website of UNCTD's FDI database http://www.unctad.org/Templates/Page.asp?intItemID=1923&lang=1 (last accessed data: Oct. 3, 2007).

[26] These two databases do not cover China, the largest FDI recipient developing country. We collected FDI data for China from Statistical Yearbook of China, 2001. The website is http://www.stats.gov.cn/yearbook2001/indexC.htm (last accessed data: Oct.03, 2007).

The FDI statistics that can be used in this study must have the following characteristics. First, the study requires disaggregated data on FDI inflows and outflows by country. However, the data for most African and Caribbean countries as well as some countries on other continents have not reported in disaggregated form by country in these databases. Second, the study requires the inflow data to be reported by FDI host countries and the outflow data by source countries. Although disaggregated statistics are available for some countries, the inflow data are sometimes based on information reported by the source countries. For example, UNCTD provides the data of FDI inflows to the Bahamas. However, these FDI inflow data are not reported by Bahamas (the host country) but by the source countries.

After considering these two requirements, we find that FDI statistics for about 60 countries cannot be used for the purposes of this study. Third, in order to calculate the FDI reporting difference between countries, we need to use both the inflows reported by FDI host countries and outflows reported by the FDI source countries. As a result of this strict requirement for data, we lose observations since some countries have not reported FDI flows to or from certain countries. For instance, Canada only reported FDI flows to and from three specific countries (United States, United Kingdom and Japan) with the remaining flows being broadly defined geographical destinations such as "European Union", "other developed countries" and "unspecified". Therefore, only for the case of Canada, we lose 52 observations.[27] In another example, Italy and the Netherlands have not reported outflows to Bolivia, which reported inflows of 51.90 and 47.4 million dollars from Italy and the Netherlands. After deleting these missing values, there are a total of

[27] Since Canada is also a source country in our sample, the missing values related to Canada is 52.

276 paired observations for FDI between host and source countries. [28] Fourth, the number of FDI host countries in the sample is also constrained by the availability of data on political stability, property rights protection, and preferential tax incentives. For example, data on property rights protection of four countries (Armenia, Azerbaijan, Cambodia and Kazakhstan) are not available.[29] Fifth, the disaggregated FDI inflow data for most Central and Eastern Europe countries are not available after 2000. Therefore, our study will focus on the data in 2000. Sixth, for some countries (especially for developed countries in Europe), FDI flows are reported in their local currencies. We converts these statistics into US$ values by employing yearly average exchange rates reported by OECD and the CIA World Factbook. [30]

Based on available statistical information, we use bilateral FDI flows from 10 source regions to 50 host countries in 2000. The 10 FDI source regions are Australia, Belgium and Luxembourg, Canada, France, Germany, Italy, Japan, Spain, Switzerland, and the United States.[31] All of these countries are among the top sources of outward FDI. [32] The 50 host countries are listed in table 4.1.

[28] If there is no missing value problem, there should be 490 (50x10-10) observations.
[29] We still use the FDI data of these countries when we regress FDI reporting difference on political stability and preferential tax incentives.
[30] The website of this factbook is http://www.cia.gov/cia/publications/factbook/fields/2076.html (last accessed data: Oct. 3, 2007).
[31] FDI data for the US is collected individually from the database of US Department of Commerce, Bureau of Economics Analysis. There is no discrepancy between the FDI data reported by US BEA and by OECD and UNCTD. The BEA database is used because it covers more US FDI-recipient countries.
[32] United Kingdom is not chosen as a source country since UK's FDI outflow data is incomplete (it do not include FDI outflows by "public corporations and in property"). (World Investment Directory, 2005).

### 4.3.2. Data on Political Stability

Political instability produces incentives for round-tripping. On the one hand, political instability leads to weak governance. In a less stable political environment, the government usually has less ability to protect investors' property rights. On the other hand, political instability creates uncertainty regarding future protection of property rights. Other things being equal, this uncertainty may provide an incentive for domestic investors to round trip their funds in order to reduce the investment risk due to future policy changes.

We use a political stability index for 2000 compiled by the World Bank (2004). The World Bank (WB) index is based on "several hundred individual variables drawn from 37 separate data sources constructed by 31 different organizations" (World Bank, 2004). This index is scaled from -2.500 to 2.500, with higher values corresponding to more stable political environments. As shown in Table 4.3, the ratings of the 50 countries in our sample range from –1.353 to 1.737.

### 4.3.3. Indicators of Property Rights Protection

We use two measures of property rights protection. Since neither index includes the ratings of Armenia, Azerbaijan, Cambodia and Kazakhstan, there are only 46 countries in our sample when we analyze the effect of property rights protection on the FDI reporting difference. The first measure is the Fraser Institute (2005) rating of Legal Structure and Security of Property Rights for 2000. This Fraser Institute (FI) index is based on measures of the following five factors: judicial independence, impartial courts, protection

of intellectual property, military in politics, and law and order. The FI index is scaled from 2.636 (very low protection) to 9.625 (very high protection) in our sample. The second measure is the property rights index of the World Economic Forum (2003). Since the World Economic Forum (WEF) index for 2000 only includes 38 of the countries in our sample, we use the WEF index for 2003. The ratings of the 47 countries in our sample range from 2.1 to 6.5 with higher values corresponding to better protection of property rights. Table 4.2 provides the ratings from both indexes.

### 4.3.4. Preferential Fiscal Incentives to Foreign Investment

We use a dummy variable on preferential fiscal incentives available to foreign investment to analyze the relationship between preferential tax incentives and FDI reporting differences. Information on preferential fiscal incentives to foreigners is scant. In many cases, tax incentives for FDI in some countries are not preferential tax incentives since these incentives are also available to domestic investment. Basically, we use information from the following four sources to decide whether there are preferential fiscal incentives for foreign investment: the U. S. Department of Commerce's Country Commercial Guide (various years), Price Waterhouse's Corporate Taxes Worldwide Summaries (2000), the World Wide Corporate Tax Guide 2000 published by Ernst & Young International Ltd, and the Inter-American Development Bank's report (2001) on legislation for foreign investment statutes in countries in the Americas. See Appendix 1 for clear statements related to 50 host countries' preferential fiscal incentives. Based on available information, preferential fiscal incentives for foreign investment exist in the following 11

countries/regions: Armenia, Azerbaijan, Belgium-Luxembourg Economic Union (BLEU), Cambodia, China, Korea, Lithuania, Macedonia, Russia, Tunisia and Uganda.

#### 4.3.5. Other Control Variables

In addition to the data discussed above, we use three other dummy variables. These three dummies take the value of 1 if a common language is spoken by at least 9% of the population in both host and source countries, if both countries have ever had a colonial link, and if the two countries are contiguous, respectively, Centre d'Etudes Prospectives et d'Informations Internationales (CPII, 2004) provides data on all three variables.

## 4.4. Aggregate Reporting Discrepancies and Round-Tripping Incentives

We calculate the difference between the FDI inflows from 10 source regions reported by 50 host countries and FDI outflows reported by these 10 source regions in 2000. That is,

$\text{Reporting Difference}_i$ = Total FDI inflows from 10 source countries reported by host country i – Total FDI outflows to country i reported by 10 source countries.

We use two measures for FDI reporting difference. First, we use a ratio of the reporting difference to total inflows reported by the host country.

$$(\text{Diff} / \text{Total})_i = \frac{\text{Difference}_i}{\text{Total FDI inflows from 10 source countries reported by the host country i}}$$

Table 4.1 provides FDI reporting discrepancies and other related statistics for our sample. Second, following Fisman and Wei (2004), we also use the logarithm of the ratio of

inflows reported by host countries and outflows reported by source countries as a dependent variable.

$$\log(\frac{inflows}{outflows}) = \log(inflows) - \log(outflows)$$

Both above measures can reflect the scales of the reporting difference across countries. When $(\text{Diff} / \text{Total})_i > 0$ or $\log(\frac{inflows}{outflows}) > 0$, total inflows reported by country i are greater than the corresponding outflows reported by source countries.

In addition to round-tripping FDI, measurement errors may contribute to the FDI reporting discrepancies. The UNCTD's report (World Investment Director, 2004) argued that the FDI reporting discrepancies could be induced by differences in the data collection and accounting methods across countries. Moreover, some discrepancies may result from the fact that some countries' definitions of FDI depart from international conventions recommended by the IMF and OECD. However, the UNCTD's report also finds that "the discrepancy of home and host country statistics is also pointing towards the existence of round-tripping" (World Investment Directory, 2004, p46). For instance, this UNCTD's study reports that a large part of Russian FDI flows is not reflected in developed countries' statistics.

As shown in Table 4.1, two countries where substantial round-tripping of FDI is suspected, China and Russia, have high positive Diff/Total values (0.572 and 0.945), even though the source countries in our sample do not include Hong Kong and Cyprus,

regions that are the most important locations for round-tripping for China and Russia, respectively. Table 4.2 provides disaggregate bilateral Diff/Total reporting difference for China and Russia. Among the total of 14 observations in our sample (9 for China and 5 for Russia), only the reporting difference between China and Spain is negative. These calculations are consistent with the existence of round-tripping in these two countries.

Therefore, the reporting discrepancies have two underlying sources: round-tripping FDI and measurement errors. That is, it is reasonable to assume that

Reporting difference = Round-tripping FDI (PR, T, STA) + measurement errors

where round-tripping is a function of PR (the property rights protection variable), T (the tax incentive variable), and STA (the political stability variable).

In the absence of round-tripping and measurement error, the reporting difference should be equal to zero. If the reporting discrepancies were only caused by measurement errors, those reporting differences will not be related to the factors such as property rights protection, tax incentives and political stability. Therefore, this implies a possible approach for testing the existence of round-tripping and measuring the effects of property rights protection and fiscal incentives on the scale of round-tripping.

The aggregate data suggest a strong correlation between the reporting difference and round-tripping incentives. Figures 4.1-4.4 show the relationships between FDI reporting discrepancies and our indicators of property rights and tax incentives. In these figures, $(\text{Diff} / \text{Total})_i$ measures the scale of reporting difference. Trend lines in these

figures show that FDI reporting discrepancies are positively related to preferential tax incentives and negatively related to political stability and property rights protection in the FDI host counties. Basic OLS models are used to test whether these relationships are statistically significant. In addition to $(\text{Diff} / \text{Total})_i$, $\log(\frac{inflows}{outflows})$ is also used as alternative dependent variables. However, when we use $\log(\frac{inflows}{outflows})$ to measure the scale of reporting difference, 8 observations are dropped since non-positive inflows or outflows are reported in these 8 host countries. Using aggregate data, we estimate the correlation between reporting difference and four key independent variables individually. As shown in Table 4.4, the coefficients on four independent variables are all statistically significant at 1% or 5% levels.[33]

## 4.5. Empirical Results

For our sample of countries, the measures of political stability and protection of property rights are highly correlated. As discussed, political instability not only leads to weak protection of property rights but also increases the uncertainty of future property rights protection. In this sense, political stability can be considered as an indirect indicator of property rights protection. As shown in Table 4.3, the correlation coefficients between political stability and the two property rights indexes are 0.881 and 0.782, respectively. Therefore, we will regress these three property rights indictors individually with other

[33] The Breusch-Pagan tests are used to test for heteroskedasticity. When the hypothesis of homoscedasticity is rejected at 10% level, the tables report the heteroskedasticity-consistent covariance matrix estimators.

independent variables since a regression on highly correlated independent variables can produce less precise estimates.

### 4.5.1. Political Stability, Preferential Tax Incentives and FDI Reporting Differences

The prediction that is examined in this section is that the difference between reported FDI statistics by the FDI host and by source countries is decreasing in the host countries' political stability because of round-tripping. We will use the following two specifications:

$$\frac{Diff_{ij}}{Total_i} = \lambda_1 Stability_i + \lambda_2 Tax_i + X_{ij}\beta + \varepsilon_{ij}, \quad (4.1)$$

$$\log(inflows_{ij}) - \log(outflows_{ij}) = \gamma_1 Stability_i + \gamma_2 Tax_i + X_{ij}\beta + \varepsilon_{ij} \quad (4.2)$$

where $Diff_{ij}$ = (FDI inflow from source country j reported by host country i - FDI outflow to host country i reported by source country j); $Total_i$ = total FDI inflows reported by host country i; $stability_i$ = the level of political stability in the host country i; $Tax_i$ is a dummy variable that equals one if the host country offers preferential tax incentives and X includes other variables such as political stability in source country and a possible geographic / linguistic / colonial connection between host and source countries.

We also use source country dummies to control for possible differences in data collection methodology, account methods and FDI definitions across source countries, and all other source country characteristics that may affect the reporting discrepancies. When we use the source country dummies, the source countries' political stability variable has to be

dropped from regressions due to perfect multicollinearity between source county dummies and source countries' political stability.

The left part of Table 4.5 (the OLS (1)-(7)) reports the regression results for specification 4.1.[34] As expected, the coefficients on the political-stability variable in the host country are always negative and statistically significant at 5%. The coefficients are around –0.15, which implies that a one-grade increase in the host country's political stability reduces FDI reporting-difference ratio by 0.15 or 15 percent. On the other hand, the coefficients on the tax dummy are all positive and statistically significant at least at 10% level. This implies that preferential tax policies provide incentives for round-tripping.

As shown in the right part of Table 4.5 (the OLS (8)-(14)), regression results for specification 4.2 also imply strong relationships between FDI reporting differences and both political stability and preferential fiscal incentives available in host countries. The coefficients on the measure of political stability in the host country are negative and generally statistically significant.[35] The coefficients on the preferential tax incentives available in the host country are all positive and statistically significant at 5% at least. Moreover, coefficients on colonial links between host and source countries are positive and statistically significant at 1% in the regressions with source country dummies. All these findings are consistent with the round-tripping theory. We use Ramsey RESET test to test for possible specification errors. Overall, the test results do not indicate any problems in either specification 4.1 or 4.2.

[34] The Breusch-Pagan tests are used to test for heteroskedasticity. When the hypothesis of homoscedasticity is rejected at 10% level, the tables report the heteroskedasticity-consistent covariance matrix estimators.
[35] One special case is the OLS 14 in table 5. The p-value is 0.126.

### 4.5.2. Protection of Property Rights and FDI Reporting Differences

We use a similar method to examine the relationships between property rights protection and the FDI reporting difference. Neither property rights index (the FI and WEF indexes) includes ratings for Armenia, Azerbaijan, Cambodia or Kazakhstan. Unfortunately, as shown in Table 4.1, three of these four countries, Armenia, Azerbaijan, and Cambodia, provide preferential tax incentives to foreign investment and highly over-report their FDI inflows. [36] Therefore, after deleting these countries, only 8 countries that provide preferential tax incentives remain in our sample. This may reduce the power to analyze the tax-incentive effects.

Similarly, we use the following two specifications.

$$\frac{Diff_{ij}}{Total_i} = \lambda_3 Propertyrights_i + \lambda_4 Tax_i + X_{ij}\beta + \varepsilon_{ij} \quad (4.3)$$

$$\log(inflows_{ij}) - \log(outflows_{ij}) = \gamma_3 Propertyrights_i + \gamma_4 Tax_i + X_{ij}\beta + \varepsilon_{ij} \quad (4.4)$$

where $propertyrights_i$ =the level of property rights protection in host county i.

Tables 4.6 and 4.7 report the regression results for specifications 4.3 and 4.4, respectively. Generally, the results are consistent with our expectations. The coefficients on two measures of property rights protection (the WEF index and the FI index) are always negative and statistically significant at 5%. On the other hand, in this sample with 46

[36] The $(Diff / Total)_i$ values for Armenia, Azerbaijan, and Cambodia are 3.282, 0.503, and 0.773.

countries, the coefficients on preferential tax incentives are always positive and generally statistically significant. [37]

Again, we use Ramsey RESET test to test for possible specification errors. While for all 11 regressions based on specification 4.4 we cannot reject the hypothesis of no specification error, 3 of our 11 regressions using specification 4.3 appear to have a misspecified functional form. We therefore focus on the results from regressions based on specification 4.4 with a dependent variable of $\log(\frac{inflows_{ij}}{outflows_{ij}})$. As expected, the coefficients on the FI and the WEF measures of protection are significant at 1% and 5% levels, respectively. On the other hand, the coefficients on the preferential tax incentive are all positive and significant at 5% or 10% levels, respectively. However, compared to the results from the sample with 50 countries, the P-values of the coefficients on the tax incentives increase. In addition, the results from the regressions with source country dummies show that colonial links between host and source countries have a positive and statistically significant effect on FDI reporting difference.

In summary, our results imply that the FDI reporting difference between FDI host and source countries is positively related to the host countries' preferential fiscal incentives, and negatively correlated with the FDI host country's property rights protection and political stability. Overall, these results are statistically significant and robust to different specifications.

[37] As shown in table 4.6 and 4.7, there are 10 regressions with a tax dummy variable in the sample of 46 countries. Eight coefficients on the tax dummy are significant at 5% and one is significant at 10%. One special case is the OLS 4 in table 7. Its p-value is 0.179.

## 4.6. Conclusion and Policy Implications

Our study has two findings. First, the FDI reporting discrepancies may be caused not purely by measurement errors but also by round-tripping. Second, the scale of round-tripping between countries is negatively correlated with FDI host countries' property rights protection and political stability and positively related to the host countries preferential tax incentives.

These finding help to put the growth of FDI in certain countries, such as China, and policies to promote FDI in perspective. On the one hand, our results support Xiao's (2004) arguments that FDI competition between countries may not be a zero-sum game. That is, the growth in FDI to one country may not be at the expense of other countries. Therefore, the recent high growth in FDI to some countries such as China could be considered not only as a threat but also as an engine of growth to other countries.

On the other hand, the "success" of some countries' FDI preferential policy may have a cost in terms of social equity and long-term economic growth. First, preferential policies impose different effective tax treatment on round-tripping and non-round-tripping domestic firms. In particular, these preferential policies would impose higher effective tax rates on small domestic firms, which have fewer channels and less incentive for round-tripping. Second, round-tripping imposes real costs on firms. Xiao (2004) argues that "the costs of becoming a disguised private enterprise wearing a FIE (foreign invested enterprise) hat are also high in many cases" since domestic investors have to channel their capital abroad and bring them back. Third, while preferential-policy makers

intended to attract FDI that brings new technologies and much needed capital, these policies lead to bogus FDI at the expense of tax-revenue losses.

In addition, as round-tripping and bogus FDI cannot bring new technologies from multinational corporations, it may not be able to generate productivity spillovers. This phenomenon may partially explain the empirical puzzle of FDI spillover effects. As described by Javorcik (2004), most studies on FDI spillovers "cast doubt on the existence of spillovers from FDI in developing countries. The researchers either fail to find a significant effect or produce evidence of negative horizontal spillovers...." This issue may be left for future investigation.

Our study implies possible options for government to reduce round-tripping FDI and then lower the costs it induces. First, governments can reduce the scale of round-tripping by improving property rights protection for domestic firms. However, in some cases, this improvement may be at the expense of technology spillovers since domestic firms would be less likely to copy freely. Second, the dual tax treatment on domestic and foreign firms may be a very costly and in effective way of promoting FDI. Our results consistent with the conclusion of an OECD report (2003) that any attempt to unify the dual tax system "might have far larger consequences than would ordinarily be the case, because the 'foreigners' involved are not all foreign" (OECD, 2003, p179). This policy implication needs to be further investigated in the future.

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Figure 4.1. Reporting differences and political stability (aggregate data)

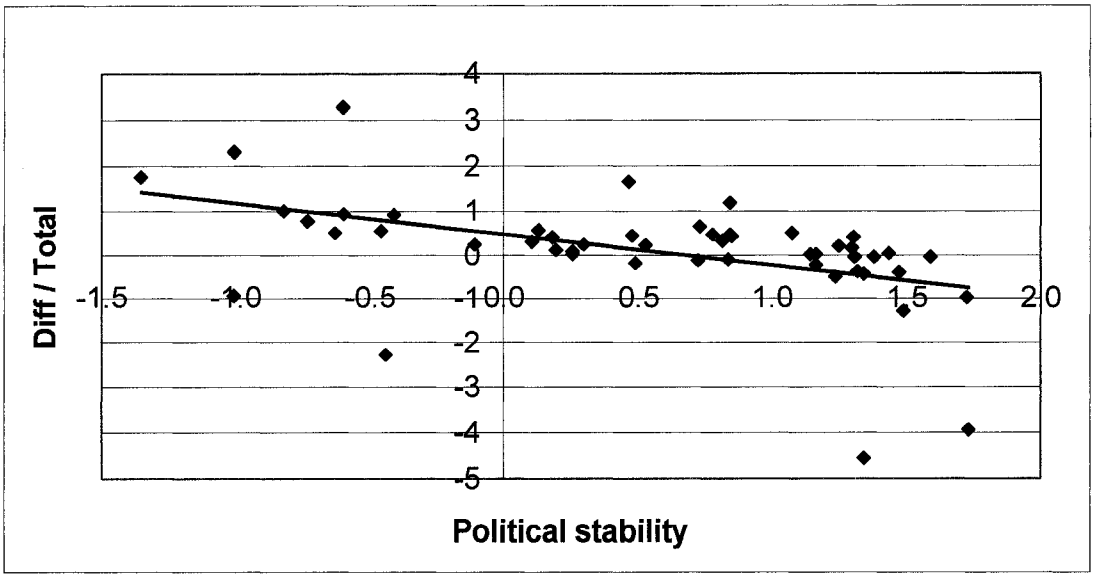


Figure 4.2. Reporting differences and preferential tax incentives (aggregate data)

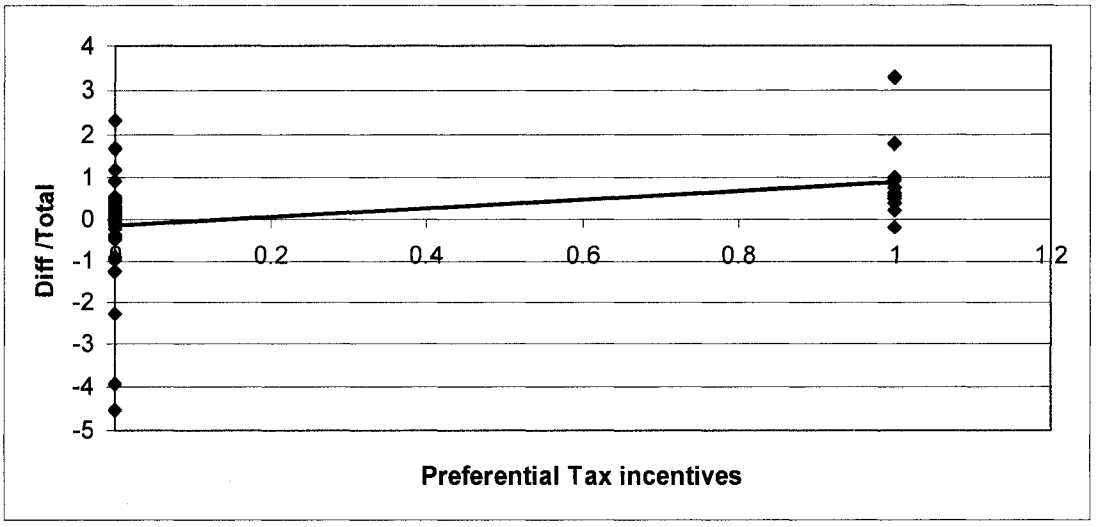

Figure 4.3. Reporting differences and property rights protection (WEF index, aggregate data)

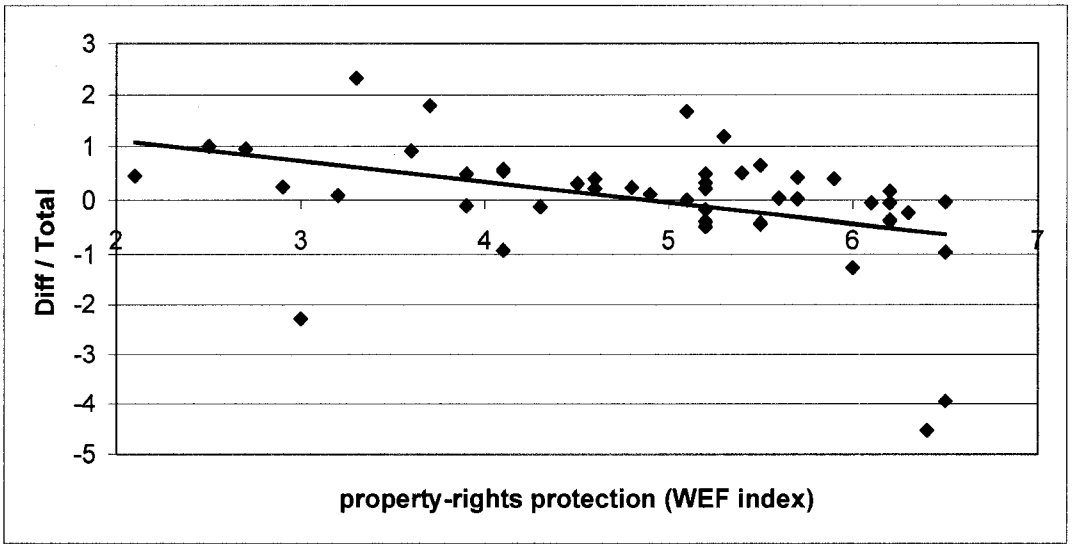


Figure 4.4. Reporting differences and property rights protection (FI index, aggregate data)

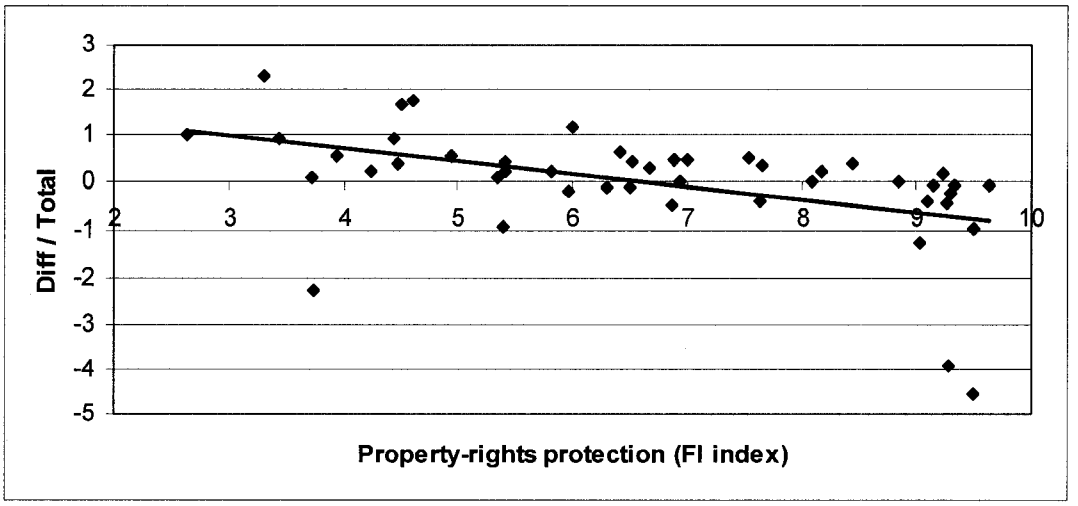

Table 4.1. Aggregate reporting difference and related statistics for 50 countries

| Host countries | Diffi / Total | Log (In/Out) | WEF index | FI index) | WB index | Tax Incentives |
|---|---|---|---|---|---|---|
| Argentina | 0.443 | 0.585 | 2.1 | 5.413 | 0.476 | No |
| Armenia | 3.282 | - | - | - | -0.600 | Yes |
| Australia | -4.541 | - | 6.4 | 9.495 | 1.344 | No |
| Austria | -0.047 | -0.046 | 6.5 | 9.338 | 1.383 | No |
| Azerbaijan | 0.503 | 0.699 | - | - | -0.631 | Yes |
| BLEU | 0.400 | 0.511 | 5.9 | 8.443 | 1.307 | Yes |
| Bolivia | 0.914 | 2.454 | 3.6 | 3.432 | -0.410 | No |
| Brazil | 0.107 | 0.114 | 4.9 | 5.355 | 0.196 | No |
| Bulgarian | 0.243 | 0.279 | 2.9 | 5.407 | 0.296 | No |
| Cambodia | 0.773 | 1.482 | - | - | -0.733 | Yes |
| Canada | -0.431 | -0.358 | 5.5 | 9.271 | 1.342 | No |
| Chile | 0.415 | 0.536 | 5.7 | 6.525 | 0.852 | No |
| China | 0.572 | 0.875 | 4.1 | 4.948 | 0.130 | Yes |
| Costa Rica | -0.491 | -0.399 | 5.2 | 6.872 | 1.235 | No |
| Czech Republic | 0.476 | 0.646 | 3.9 | 6.888 | 0.845 | No |
| Dominican Republic | 0.396 | 0.505 | 4.6 | 4.472 | 0.183 | No |
| Ecuador | 2.310 | - | 3.3 | 3.299 | -1.006 | No |
| El Salvador | 1.666 | - | 5.1 | 4.514 | 0.466 | No |
| Estonia | 1.181 | - | 5.3 | 5.995 | 0.844 | No |
| Finland | -0.980 | -0.683 | 6.5 | 9.491 | 1.724 | No |
| France | 0.010 | 0.010 | 5.7 | 8.086 | 1.145 | No |
| Germany | -0.052 | -0.051 | 6.2 | 9.141 | 1.307 | No |
| Honduras | 0.081 | 0.084 | 3.2 | 3.723 | 0.258 | No |
| Hungary | 0.475 | 0.644 | 5.2 | 7.012 | 0.779 | No |
| Italy | 0.330 | 0.401 | 5.2 | 7.665 | 0.817 | No |
| Japan | 0.207 | 0.232 | 5.2 | 8.183 | 1.252 | No |
| Kazakhstan | 0.020 | 0.020 | - | - | 0.255 | No |
| Korea | -0.184 | -0.169 | 5.2 | 5.971 | 0.491 | Yes |
| Lithuania | 0.213 | 0.239 | 4.6 | 5.815 | 0.528 | Yes |
| Macedonia | 1.000 | - | 2.5 | 2.636 | -0.824 | Yes |
| Mauritius | 0.004 | 0.004 | 5.1 | 6.939 | 1.165 | No |
| Mexico | 0.233 | 0.265 | 4.8 | 4.247 | -0.107 | No |
| Morocco | 0.297 | 0.352 | 4.5 | 6.675 | 0.105 | No |
| Netherlands | -0.052 | -0.050 | 6.1 | 9.625 | 1.592 | No |
| New Zealand | -0.378 | -0.321 | 6.2 | 9.104 | 1.320 | No |
| Norway | 0.028 | - | 5.6 | 8.847 | 1.436 | No |
| Peru | 0.543 | 0.783 | 4.1 | 3.935 | -0.457 | No |
| Poland | -0.108 | -0.103 | 3.9 | 6.498 | 0.838 | No |
| Portugal | -0.395 | -0.333 | 5.2 | 7.636 | 1.474 | No |
| Russia | 0.945 | 2.905 | 2.7 | 4.447 | -0.601 | Yes |
| Slovak Republic | -0.122 | -0.115 | 4.3 | 6.304 | 0.725 | No |
| Spain | 0.503 | 0.698 | 5.4 | 7.536 | 1.076 | No |
| Sweden | -1.271 | -0.820 | 6.0 | 9.024 | 1.492 | No |
| Switzerland | -3.941 | -1.598 | 6.5 | 9.274 | 1.733 | No |

| | | | | | | |
|---|---|---|---|---|---|---|
| Tunisia | 0.643 | 1.029 | 5.5 | 6.425 | 0.732 | Yes |
| Turkey | -0.930 | -0.658 | 4.1 | 5.392 | -1.009 | No |
| Uganda | 1.769 | - | 3.7 | 4.605 | -1.353 | Yes |
| United Kingdom | -0.231 | -0.207 | 6.3 | 9.294 | 1.165 | No |
| United States | 0.162 | 0.176 | 6.2 | 9.227 | 1.300 | No |
| Venezuela | -2.281 | -1.188 | 3.0 | 3.749 | -0.442 | No |

Source: Diffi / Totali: author's calculation; Political Stability (the WB index): World Bank (2004); Property Rights (the FI index): Fraser Institute (2005); Property Rights (the WEF index): World Economic Forum (2003).

Table 4.2. Reporting difference for China and Russia (Millions US$)

| Host countries | Source countries | Reported by Hosts | Reported by S. C. | Reporting Difference |
|---|---|---|---|---|
| China | Australia | 308.880 | 99.044 | 209.836 |
| China | BLEU | 79.600 | 9.216 | 70.384 |
| China | France | 853.160 | 324.394 | 528.766 |
| China | Germany | 1041.490 | 776.887 | 264.603 |
| China | Italy | 209.510 | 64.510 | 145.000 |
| China | Japan | 2915.850 | 1019.102 | 1896.748 |
| China | Spain | 34.000 | 55.294 | -21.294 |
| China | Switzerland | 194.030 | 125.592 | 68.438 |
| China | USA | 4383.890 | 1817.000 | 2566.890 |
| Russia | France | 97.000 | 68.196 | 28.804 |
| Russia | Germany | 341.000 | 209.197 | 131.803 |
| Russia | Japan | 107.000 | 1.855 | 105.145 |
| Russia | Switzerland | 115.000 | -4.147 | 119.147 |
| Russia | USA | 1241.000 | -171.000 | 1412.000 |

Source: Author's calculation by using data from UNCTD database, OECD International Direct Investment Statistics Yearbooks (2002, 2003), and Statistical Yearbook of China, (2001).

Table 4.3. Summary Statistics for aggregate data

| NAME | N | MEAN | ST. DEV | VARIANCE | MINIMUM | MAXIMUM |
|---|---|---|---|---|---|---|
| Diff/Total | 50 | 0.094 | 1.238 | 1.531 | -4.541 | 3.282 |
| Log (imports/exports) | 42 | 0.224 | 0.806 | 0.650 | -1.598 | 2.905 |
| Political stability | 50 | 0.549 | 0.831 | 0.690 | -1.353 | 1.733 |
| Tax dummy | 50 | 0.220 | 0.418 | 0.175 | 0.000 | 1.000 |
| The FI index | 46 | 6.656 | 2.056 | 4.228 | 2.636 | 9.625 |
| The WEF index | 46 | 4.863 | 1.186 | 1.407 | 2.100 | 6.500 |

Correlation Matrix of variables (Based on 46 common observations)

| | | | | |
|---|---|---|---|---|
| Political stability | 1.000 | | | |
| TAX | -0.336 | 1.000 | | |
| FI index | 0.881 | -0.281 | 1.000 | |
| The WEF index | 0.782 | -0.230 | 0.841 | 1.000 |
| | Political stability | TAX | FI index | The WEF index |

Table 4.4. Estimations by using aggregate FDI reporting differences

| | Dependent variable = Diff i / Total i | | | | Dependent variable = log (inflows)-log (outflows) | | | |
|---|---|---|---|---|---|---|---|---|
| Independent Variables | OLS (1) | OLS (2) | OLS (3) | OLS (4) | OLS (5) | OLS (6) | OLS (7) | OLS (8) |
| Political stability | -0.708* | | | | -0.530** | | | |
| | (0.189) | | | | (0.231) | | | |
| Tax dummy | | 1.035* | | | | 0.892* | | |
| | | (0.400) | | | | (0.288) | | |
| The WEF index | | | -0.391* | | | | -0.294** | |
| | | | (0.140) | | | | (0.144) | |
| The FI index | | | | -0.275* | | | | -0.190** |
| | | | | (0.096) | | | | (0.080) |
| Constant | 0.483* | -0.134 | 1.903* | 1.831* | 0.567** | 0.055 | 1.629** | 1.488** |
| | (0.187) | (0.188) | (0.698) | (0.619) | (0.231) | (0.126) | (0.779) | (0.622) |
| R square | 0.226 | 0.122 | 0.151 | 0.225 | 0.239 | 0.193 | 0.176 | 0.204 |
| Breusch-Pagan Test (P-values) | 0.718 | 0.287 | 0.112 | 0.100 | 0.000 | 0.271 | 0.000 | 0.000 |
| Ramsey RESET test (P-value) | 0.172 | N/A | 0.021 | 0.214 | 0.148 | N/A | 0.547 | 0.839 |
| Observations | 50 | 50 | 46 | 46 | 42 | 42 | 39 | 39 |

Note: (1) * and ** denote significant at the 1% and 5%.

(2) Standard errors are in parentheses

(3) We use heteroskedasticity-consistent covariance matrix in regressions 4, 5, 7, and 8.

(4) N/A means that result is unreliable because matrix inversion failed.

Table 4.5. Bilateral reporting difference, political stability and preferential tax incentives

| | Dependent variable = Diff ij / Total i | | | | | | | Dependent variable = log (inflows ij)-log (outflows ij) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Independent Variables | OLS(1) | OLS(2) | OLS(3) | OLS(4) | OLS(5) | OLS(6) | OLS(7) | OLS(8) | OLS(9) | OLS(10) | OLS(11) | OLS(12) | OLS(13) | OLS(14) |
| Political stability (host country) | -0.171* | | -0.153* | | -0.162* | | -0.139** | -0.298** | | -0.258*** | | -0.286** | | -0.217# |
| | (0.060) | | (0.056) | | (0.059) | | (0.059) | (0.153) | | (0.142) | | (0.146) | | (0.142) |
| Tax dummy | | 0.251* | | 0.236* | | 0.232* | 0.149*** | | 0.646* | | 0.598* | | 0.621* | 0.527** |
| | | (0.085) | | (0.083) | | (0.083) | (0.059) | | (0.259) | | (0.229) | | (0.234) | (0.234) |
| Political stability (source country) | 0.033 | | | | | | | -0.261 | | | | | | |
| | (0.058) | | | | | | | (0.470) | | | | | | |
| Contiguous | 0.128 | 0.048 | | | 0.177 | 0.099 | 0.173 | 0.167 | 0.093 | | | 0.353 | 0.262 | 0.359 |
| | (0.131) | (0.127) | | | (0.130) | (0.123) | (0.129) | (0.270) | (0.332) | | | (0.279) | (0.276) | (0.279) |
| Linguistic tie | -0.089 | -0.069 | | | -0.154 | -0.137 | -0.147 | 0.051 | 0.009 | | | -0.087 | -0.104 | -0.093 |
| | (0.185) | (0.189) | | | (0.179) | (0.185) | (0.179) | (0.257) | (0.286) | | | (0.289) | (0.295) | (0.291) |
| Colonial link | 0.129 | 0.128 | | | 0.166 | 0.169 | 0.162 | 0.468 | 0.532 | | | 0.796* | 0.826* | 0.817* |
| | (0.120) | (0.122) | | | (0.111) | (0.116) | (0.111) | (0.289) | (0.383) | | | (0.296) | (0.326) | (0.316) |
| Constant | 0.098 | -0.022 | 0.245*** | 0.114 | 0.292** | 0.154 | 0.247*** | 0.470 | -0.169 | 0.584* | 0.320 | 0.534** | 0.259 | 0.392 |
| | (0.099) | (0.028) | (0.138) | (0.148) | (0.127) | (0.132) | (0.136) | (0.590) | (0.116) | (0.220) | (0.207) | (0.239) | (0.229) | (0.241) |
| Source country dummies | No | No | Yes | Yes | Yes | Yes | Yes | No | No | Yes | Yes | Yes | Yes | Yes |
| R square | 0.058 | 0.033 | 0.064 | 0.046 | 0.077 | 0.055 | 0.085 | 0.033 | 0.040 | 0.091 | 0.100 | 0.115 | 0.123 | 0.133 |
| Breusch-Pagan test (P-value) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.139 | 0.323 | 0.000 | 0.000 | 0.001 | 0.000 | 0.001 |
| Ramsey RESET test (P-value) | 0.006 | 0.312 | 0.101 | 0.240 | 0.280 | 0.242 | 0.606 | 0.143 | 0.326 | 0.998 | 0.999 | 0.612 | 0.242 | 0.510 |
| Observations | 276 | 276 | 276 | 276 | 276 | 276 | 276 | 207 | 207 | 207 | 207 | 207 | 207 | 207 |

Note: (1) *, ** and *** denote significant at the 1%, 5% and 10%; and # denotes P-values equal 0.126.

(2) Standard errors are in parentheses

(3) We use heteroskedasticity-consistent covariance matrix in regressions 1-7 and 10-14.

Table 4.6. Bilateral reporting difference and property rights protection (the WEF index)

| | Dependent variable = Diff ij / Total i | | | | | | | Dependent variable = log(inflows ij)-log(outflows ij) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Independent Variables | OLS(1) | OLS(2) | OLS(3) | OLS(4) | OLS(5) | OLS(6) | OLS(7) | OLS(8) | OLS(9) | OLS(10) | OLS(11) | OLS(12) | OLS(13) | OLS(14) |
| Property rights (host country) | -0.074** | | -0.067** | | -0.072** | | -0.065** | -0.191** | | -0.179** | | -0.201* | | -0.189* |
| | (0.032) | | (0.031) | | (0.033) | | (0.032) | (0.088) | | (0.075) | | (0.075) | | (0.070) |
| Tax dummy | | 0.169** | | 0.160** | | 0.162** | 0.125** | | 0.584** | | 0.562** | | 0.581** | 0.525** |
| | | (0.071) | | (0.066) | | (0.068) | (0.063) | | (0.271) | | (0.237) | | (0.241) | (0.230) |
| Property rights (source country) | 0.073*** | | | | | | | -0.093 | | | | | | |
| | (0.042) | | | | | | | (0.223) | | | | | | |
| contiguous | 0.098 | 0.050 | | | 0.156 | 0.110 | 0.159 | 0.180 | 0.098 | | | 0.399 | 0.283 | 0.425 |
| | (0.134) | (0.118) | | | (0.134) | (0.123) | (0.133) | (0.341) | (0.334) | | | (0.283) | (0.274) | (0.283) |
| Linguistic tie | -0.075 | -0.056 | | | -0.138 | -0.140 | -0.138 | 0.075 | 0.019 | | | -0.097 | -0.122 | -0.113 |
| | (0.189) | (0.192) | | | (0.184) | (0.187) | (0.183) | (0.295) | (0.289) | | | (0.298) | (0.298) | (0.297) |
| Colonial link | 0.148 | 0.127 | | | 0.186 | 0.184 | 0.186 | 0.506 | 0.538 | | | 0.859* | 0.847* | 0.873* |
| | (0.128) | (0.129) | | | (0.120) | (0.122) | (0.120) | (0.390) | (0.386) | | | (0.303) | (0.327) | (0.320) |
| Constant | -0.059 | -0.025 | 0.477* | 0.127 | 0.540* | 0.170*** | 0.486** | 1.396 | -0.174 | 1.312* | 0.367*** | 1.361* | 0.305 | 1.208* |
| | (0.265) | (0.028) | (0.186) | (0.158) | (0.197) | (0.143) | (0.200) | (1.360) | (0.117) | (0.420) | (0.223) | (0.422) | (0.251) | (0.405) |
| Source country dummies | No | No | Yes | Yes | Yes | Yes | Yes | No | No | Yes | Yes | Yes | Yes | Yes |
| R square | 0.033 | 0.016 | 0.042 | 0.032 | 0.054 | 0.042 | 0.060 | 0.035 | 0.034 | 0.097 | 0.098 | 0.126 | 0.122 | 0.144 |
| Breusch-Pagan test (P-value) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.172 | 0.312 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ramsey RESET test (P-value) | 0.012 | 0.244 | 0.582 | 0.277 | 0.072 | 0.107 | 0.181 | 0.455 | 0.336 | 0.999 | 0.826 | 0.644 | 0.289 | 0.801 |
| Observations | 268 | 268 | 268 | 268 | 268 | 268 | 268 | 202 | 202 | 202 | 202 | 202 | 202 | 202 |

Note: (1) *, ** and *** denote significant at the 1%, 5% and 10%.

(2) Standard errors are in parentheses

(3) We use heteroskedasticity-consistent covariance matrix in regressions 1-7 and 10-14.

Table 4.7. Bilateral reporting difference and property rights protection (the FI index)

| | Dependent variable = Diff ij / Total i | | | | Dependent variable = log(inflows ij)-log(outflows ij) | | | |
|---|---|---|---|---|---|---|---|---|
| Independent Variables | OLS(1) | OLS(2) | OLS(3) | OLS(4) | OLS(5) | OLS(6) | OLS(7) | OLS(8) |
| Property rights in the host country | -0.053* | -0.057* | -0.056* | -0.051** | -0.134* | -0.143* | -0.143* | -0.122** |
| | (0.020) | (0.021) | (0.022) | (0.022) | (0.053) | (0.055) | (0.049) | (0.049) |
| Tax dummy | | | | 0.091## | | | | 0.440*** |
| | | | | (0.067) | | | | (0.244) |
| Property rights in the source country | 0.049 | 0.064*** | | | 0.033 | 0.048 | | |
| | (0.041) | (0.037) | | | (0.142) | (0.147) | | |
| contiguous | | 0.137 | 0.187 | 0.186 | | 0.264 | 0.445 | 0.447 |
| | | (0.135) | (0.135) | (0.134) | | (0.343) | (0.277) | (0.277) |
| Linguistic tie | | -0.102 | -0.154 | -0.153 | | -0.003 | -0.130 | -0.139 |
| | | (0.188) | (0.183) | (0.183) | | (0.295) | (0.294) | (0.293) |
| Colonial link | | 0.157 | 0.181 | 0.182 | | 0.535 | 0.834* | 0.847* |
| | | (0.127) | (0.127) | (0.119) | | (0.388) | (0.297) | (0.314) |
| Constant | -0.041 | -0.149 | 0.568* | 0.523* | 0.638 | 0.510 | 1.339* | 1.137* |
| | (0.364) | (0.321) | (0.190) | (0.201) | (1.280) | (1.308) | (0.400) | (0.408) |
| Source country dummies | No | No | Yes | Yes | No | No | Yes | Yes |
| R square | 0.043 | 0.052 | 0.069 | 0.072 | 0.031 | 0.045 | 0.133 | 0.144 |
| Breusch-Pagan test (P-value) | 0.000 | 0.000 | 0.000 | 0.000 | 0.486 | 0.403 | 0.000 | 0.000 |
| Ramsey RESET test (P-value) | 0.382 | 0.040 | 0.549 | 0.577 | 0.752 | 0.459 | 0.975 | 0.824 |
| Observations | 268 | 268 | 268 | 268 | 202 | 202 | 202 | 202 |

Note: (1) *, ** and *** denote significant at the 1%, 5% and 10%; ## denotes P-values equal 0.179.

(2) Standard errors are in parentheses

(3) We use heteroskedasticity-consistent covariance matrix in regressions 1-4 and 7-8.

# Appendix 4.1. Country profiles: preferential tax incentives to foreign investment.

1. Argentina
"Foreign and Argentine firms face the same tax liabilities ..... Government incentives apply to foreign and domestic firms" (Country Commercial Guide, Chapter 7, 2000).

2. Armenia
"Specific privileges apply to corporate taxation if foreign investment in a company exceeds one million dollars. ... (Corporate) tax holidays: available for foreign investments over USD 1 million" (Country Commercial Guide, Chapter 7, 2002).

3. Australia
"Australia provides no direct federal tax incentives for investment in the country. Those incentives which are available apply equally to foreign and domestic investors" (Country Commercial Guide, Chapter 7, 2000).

4. Austria
"There no special tax incentives for encouraging inward investment" (Price Waterhouse's Corporate Taxes 1999-2000: Worldwide Summaries).

5. Azerbaijan
"Various tax advantages are available to a foreign legal entity that qualifies for taxation under one of the various production-sharing agreements" (Price Waterhouse's Corporate Taxes 1999-2000: Worldwide Summaries).

6. BLEU

a. Belgium
"Ireland and Belgium have preferential tax regimes targeted at foreigners. Ireland provides a reduced tax rate of 10% to foreign MNEs... Belgium grants near-complete tax relief to "centers de coordination"(making it a "headquarters tax haven"). (Avi-Yonah, Harvard Law Review, 2000).

b. Luxembourg
On the one hand, according to the Laws of 1923, 1972, and the Tax Reform Law of 1990, "No distinction is made between foreign or domestic investors" (Spitz's 2001 International Tax Havens Guide). On the other hand, "there are no formalized legal regimes aimed at foreign investment as such but on an ad hoc basis the government offers a variety of types of assistance including guarantees, cash, tax incentives, subsidized loans, assistance with development and construction projects etc" (on-line source form http://www.lowtax.net/lowtax/html/jlxcfir.html) (last accessed date: Nov.22, 2005).

7. Bolivia
"There are no registration requirements for foreign direct investors in Bolivia or any special incentives for domestic or foreign investment" (Country Commercial Guide, Chapter 7, 2002).

8. Brazil
"The Federal Government does not grant special incentives for foreign investment, on principle. The only exception to this rule, however, is the possible granting of a reduction of the customs duty levied on imports of capital goods to be used in establishing the industry which is the subject of the foreign direct investment in question." (Legislation for Foreign Investment Statutes in Countries in the Americas: Comparative Study, the Working Group on Investment (Free Trade Area of the Americas), the Inter-American Development Bank, 2001)

9. Bulgarian
Based on available information, no preferential incentives to foreign investment are found.

10. Cambodia
"The standard rate of corporate income tax is 20%. ..... Under the Cambodian investment law, a reduced corporate tax rate of 9% may be granted to foreign enterprises on a case-by-case basis." (World wide corporate tax guide 2000, Ernst & Young international Ltd, 2000)

11. Canada
"None of the federal incentives is specifically aimed at promoting or discouraging foreign investment in Canada" (Country Commercial Guide, Chapter 7, 2000).

12. Chile
"Chile does not subsidize or offer incentives specifically to attract foreign investment" (Country Commercial Guide, Chapter 7, 2000).

13. China
China provides preferential tax incentives to foreigners such as lower tax rates and tax holidays.

14. Costa Rica
No preferential incentives to foreign investment. "Special benefits (for investment) are afforded to foreigners who establish residence in Costa Rica, such as retirees and resident investors, as well as Costa Ricans...." (Country Commercial Guide, Chapter 7, 2000).

15. Czech Republic
"No tax incentives or tax holidays are currently available in the Czech Republic" (Price Waterhouse's Corporate Taxes 1999-2000: Worldwide Summaries).

16. Dominican Republic
"Foreign and Dominican firms are afforded the same investment opportunities (both by law and in practice)" (Country Commercial Guide, Chapter 7, 2000).

17. Ecuador
"There are no special incentives (for foreign investment); the same incentives for national investors apply. Neither is there any investment insurance." (Legislation for Foreign Investment Statutes in Countries in the Americas: Comparative Study, the Working Group on Investment (Free Trade Area of the Americas), the Inter-American Development Bank, 2001).

18. El Salvador
"As a general rule, the foreign investment regime in El Salvador does not provide any incentive that benefits foreign investment exclusively" (Legislation for Foreign Investment Statutes in Countries in the Americas: Comparative Study, the Working Group on Investment (Free Trade Area of the Americas), the Inter-American Development Bank, 2001).

19. Estonia
"Estonia has made a fundamental premise of its economic policy that foreign and domestic capitals are treated identically. To do otherwise would introduce distortions into the market. As a result, no special investment incentives are available to foreign investors, nor is any favored treatment accorded them" (Country Commercial Guide, Chapter 7, 2000).

20. Finland
"Foreign-owned companies are eligible for government incentives on an equal footing with Finnish-owned companies" (Country Commercial Guide, Chapter 7, 2000).

21. France
"No particular incentive is available to foreign investors in France" (Price Waterhouse's Corporate Taxes 1999-2000: Worldwide Summaries).

22. Germany
"German law treats foreign firms in the same way as it does German firms" (Country Commercial Guide, Chapter 7, 2000).

23. Honduras
"Equal treatment of foreign and local investors means that they both enjoy the same type of incentives. There are no special incentives for foreign investment" (Legislation for Foreign Investment Statutes in Countries in the Americas: Comparative Study, the Working Group on Investment, the Inter-American Development Bank, 2001).

24. Hungary
Hungary provided preferential incentives before 1994. "In 1994, Hungary replaced its blanket tax incentives for foreign investment with incentives open to all large investors, based on export promotion, reinvestment of profits, and job creation" (Country

Commercial Guide, Chapter 7, 2000). Based on available information, no preferential incentives in 2000 are found. "There are a number of tax benefits on certain investments (in Hungary). "These are usually investments of a minimum sum. The benefits are granted both to local investors and foreign residents." (Hungary foreign investments incentives, http://www.worldwide-tax.com/hungary/hun_invest.asp, last accessed date: Nov.22, 2005).

25. Italy
"The Italian government offers incentives designed to encourage private sector investment (by both Italian and foreign firms) in depressed areas" (Country Commercial Guide, Chapter 7, 2000).

26. Japan
Based on available information, there are generally no significant preferential tax incentives for foreign investors. "The calculations of taxable income and allowable deductions, and payments of the consumption tax (sales tax), are the same as those for domestic companies, with national treatment for foreign firms" (Country Commercial Guide, Chapter 7, 2000). However, "for certain designated inward investment enterprises, special rules for tax-loss carryforwards are provided (Price Waterhouse's Corporate Taxes 1999-2000: Worldwide Summaries).

27. Kazakhstan
Based on available information, there are generally no significant preferential tax incentives for foreign investors. "The Foreign Investment Law provides for, inter alia, guarantees for national treatment and non-discrimination among foreign investors" " (Country Commercial Guide, Chapter 6, 2000). However, there are some exceptions. On the one hand, "beginning in 1997, there has been a trend to grant preference to domestic investors over foreigners in most state contracts" (Country Commercial Guide, Chapter 6, 2000). On the other hand, some tax incentives are available through "negotiated foreign investment contracts" (Price Waterhouse's Corporate Taxes 1999-2000: Worldwide Summaries)

28. Korea
"The Korean government grants various privileges, incentives and guarantees to certain foreign investors under the Foreign Capital Inducement Law" (Price Waterhouse's Corporate Taxes 1999-2000: Worldwide Summaries).

29. Lithuania
"Company profits are exempt from taxation for the first three years. Thereafter for the next three years the tax rate is rebated by up to 50 percents provided the level of foreign capital does not exceed 30 per cent of the company's capital and the foreign investment element exceeds $ 3.0 million" (Country Commercial Guide, Chapter 7, 2000). Some other special incentives for foreign investment can also be found in Price Waterhouse's Corporate Taxes 1999-2000: Worldwide Summaries.

30. Macedonia
"For the first three years of a foreign investment representing at least 20% of a company's share capital, the company's taxable income is reduced by the percentage of the share capital represented by foreign investment (World wide corporate tax guide 2000, Ernst & Young international Ltd, 2000).

31. Mauritius
"The government offers local and foreign investors the same incentives" (Country Commercial Guide, Chapter 7, 2002).

32. Mexico
Mexico provides the investment incentives for both nationals and foreigners (Legislation for Foreign Investment Statutes in Countries in the Americas: Comparative Study, the Working Group on Investment, the Inter-American Development Bank, 2001). Based on available information, no preferential incentives to foreign investment are found.

33. Morocco
"The October 1995 investment code applies equally to foreign and Moroccan investors, with the exception of foreign exchange provisions, which favor foreign investors" (Country Commercial Guide, Chapter 7, 2000).

34. Netherlands
"Subsidies and incentives are available to foreign and domestic firms alike" (Country Commercial Guide, Chapter 7, 2000).

35. New Zealand
"There are no specific tax incentives designed to encourage the flow of investment funds into New Zealand" (Price Waterhouse's Corporate Taxes 1999-2000: Worldwide Summaries).

36. Norway
In generally, there are no preferential incentives for foreign investment. Moreover, "While the Norwegian government officially endorses a level playing field for foreign investors, existing regulations, standards and practices often marginally favor Norwegian, Scandinavian and EEA investors, in that order" (Country Commercial Guide, Chapter 7, 2000).

37. Peru
In generally, there are no preferential incentives for foreign investment. "National and foreign investment are subject to the same terms"(Country Commercial Guide, Chapter 7, 2000).

38. Poland
Poland "provides generally equal treatment for domestic and foreign companies" (Country Commercial Guide, Chapter 7, 2000).

39. Portugal
Portugal provides many tax incentives for both resident and nonresident corporate entities. The Price Waterhouse's Corporate Taxes 1999-2000 Worldwide Summaries introduced these incentives in details.

40. Russia
"Throughout the 1990s, the Russian Government has placed high priority on the attraction of foreign direct investment, and 45 regions have also developed laws and programs to attract it" (Country Commercial Guide, Chapter 7, 2000). For example, "enterprises with foreign investment that are engaged in material production are eligible for a two-year tax holiday" under certain conditions (Price Waterhouse's Corporate Taxes 1999-2000: Worldwide Summaries).

41. Slovak Republic
Based on available information, while Slovak provided tax holidays for foreign investment before 1999, these incentives are available to both foreign and domestic investors after January 1 2000. In particular, in June 1999, Slovak "granted new foreign investors a five-year, 100 percent tax holiday for an investment of at least Euro 5 million, with a possible five-year extension...Parliament approved an amendment, effective January 1, 2000, which offered the tax holiday to any companies 'that manufacture goods that were on the territory of the Slovak Republic only imported or were not manufactured or (for) the manufacture of goods for export'" (Country Commercial Guide, Chapter 7, 2001).

42. Spain
"There are no tax incentives specifically for the foreign investor" (Price Waterhouse's Corporate Taxes 1999-2000: Worldwide Summaries).

43. Sweden
Based on available information, generally there are no significant preferential incentives to foreign investment.

44. Switzerland
"The government offers few large-scale incentives to prospective investors, and those that exist are open to foreign and domestic investors alike" (Country Commercial Guide, Chapter 7, 2000).

45. Tunisia
"Investment legislation and subsequent amendments provide a broad range of incentives for foreign investors, including: tax relief on reinvested revenues and profits; VAT limitation to 10 percent on many imported capital goods; and optional depreciation schedules for production equipment". "The preferential status (offshore, free trade zone) conferred upon some investments is linked to both foreign percentage of corporate ownership and limits on production for the domestic market. Moreover, foreign investors are "exempt from most exchange regulations" (Country Commercial Guide, Chapter 7, 2000).

46. Turkey
"Turkey provides a variety of investment incentives to both domestic and foreign investors" (Country Commercial Guide, Chapter 7, 2000).

47. Uganda
"Limited incentives in respect of first-arrival privileges are available to foreign investors" (Price Waterhouse's Corporate Taxes 1999-2000: Worldwide Summaries).

48. United Kingdom
"Once established in the U.K., foreign-owned companies are treated no differently than U.K. companies" (Country Commercial Guide, Chapter 7, 2000).

49. United States
Based on available information, there are generally no significant preferential tax incentives for foreign investors.

50. Venezuela
"Foreign investment enjoys the incentives common to all investments; therefore there are no incentives in Venezuela for foreign investment exclusively" (Legislation for Foreign Investment Statutes in Countries in the Americas: Comparative Study, the Working Group on Investment, the Inter-American Development Bank, 2001).

## Chapter 5. Conclusions

Over last two decades, global integration has led governments to offer more fiscal and regulatory incentives to attract FDI. Whether these FDI incentives are effective, and under what conditions, and how they affect domestic investment, are matters of ongoing debate.

This dissertation applied theoretical and empirical models to examine the impacts of fiscal incentives and regulatory environment on FDI. In the second chapter, we found the while regulatory cost reductions in heavily regulated countries could promote inward FDI, further reductions in low-cost countries might have no effect or even counter-productive. Also, we found that the marginal effects of taxes on FDI are not equal for countries with different business environments. In other words, tax incentives for inward FDI are less effective in heavily regulated countries than in countries with good business environment.

These results implies that although lowering regulatory costs for FDI could be effective in heavily regulated countries, unrestricted regulatory competitions could be harmful to countries with low regulatory costs as it is likely to end with an inefficient low regulatory level, For these low regulatory cost countries, other policy options such as tax reductions might be a more effective option to attract FDI inflows.

In the third and fourth chapters, we examined issues related to round-tripping FDI, a distortion generated by preferential incentives for FDI. We found that preferential fiscal incentives not only lead to government revenue losses; they also affect investment

decisions of both domestic and foreign investors. Moreover, we used numerical simulation techniques to illustrate the impact of China's upcoming corporate income tax reforms scheduled for 2008. The simulations results suggested that under the unified tax system, China's domestic investment could decrease along with foreign investment, although the tax rate on domestic firms falls.

Chapter 4 provided empirical evidence of that round-tripping exists not only in China, nut also in other countries. Using the data on FDI reporting discrepancies between host and source countries, we found that the reporting discrepancies between countries is negatively correlated with FDI host countries' property rights protection and political stability and positively related to the host countries preferential tax incentives. These results imply that FDI reporting discrepancies may be caused not purely by measurement errors but also by round-tripping.

On the one hand, these findings support the view that FDI competition between countries may not be a zero-sum game. That is, the growth in FDI to one country may not be at the expense of other countries. As a result, the recent high growth in FDI to some countries such as China could be considered not only as a threat but also as an engine of growth to other countries.

On the other hand, the "success" of some countries' FDI preferential policies may have a cost in terms of social equity and government revenue losses. First, the preferential tax polices essentially impose higher effective tax rates on small domestic firms, which have fewer channels and less incentive for round-tripping. Second, while preferential-

policy makers intended to attract FDI that brings new technologies and much needed capital, these policies lead to bogus FDI at the expense of tax-revenue losses.