Fiscal Decentralization, Endogenous Policies, and Technology Adoption: Theory and Evidence From China and India's FDI*

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Abstract

A political-economy model is developed to explain why two *developing* economies with the same endowment could have different de facto policies in adopting one important form of foreign better technology, namely inward FDI, and how a small policy difference leads to dramatically different amount of FDI inflows. The amplification results from the provincial government's endogenously polarized attitude toward FDI, which dictates the de facto entry cost on FDI. The attitudinal polarization arises because more FDI implies more firms to tax from (base-expansion effect) but less profit tax revenue from each firm (profit-reduction effect) due to the competition effect. As more foreign firms make FDI, the base-expansion effect is linearly enhanced but the profit-reduction effect is strengthened at a diminishing speed. Hence the tax revenue is maximized either at zero FDI or at full FDI, depending on the profit tax rate and the tariff rate, which are chosen by the central government. Foreseeing the FDI bifurcation, the central government prefers full FDI to zero FDI only when the fiscal decentralization is sufficiently small, i.e., the central government can claim a sufficiently large share of the total tax revenue, so that it fully offsets the lobbying from the protectionist special interest group(s). To implement the full-FDI equilibrium, the central government manipulates the policy profile such that not only the provincial governments are induced to compete for FDI but also the potential foreign investors are induced to make FDI rather than export. The null-FDI equilibrium is implemented otherwise. Calibration and simulation results for China and India closely match the data for the relevant policy variables and FDI, GDP, labor allocations, etc. Counterfactual quantitative experiments suggest that the stark contrast in the policies and FDI between China and India can be mainly due to that China is fiscally less decentralized than India.

Key Words: FDI, Technology Adoption, Special Interest Group, Fiscal Decentralization, Tax Structure, Economic Development

JEL Codes: D78, E61, F23, F43, H77, O11, O43, P26

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1 Introduction

One fundamental question in the growth and development literature is why some developing economies resist adopting better technology from abroad, which is well documented by Mokyr (1990) but first forcefully theorized by Parente and Prescott (1994). Foreign direct investment (FDI) is one important means of such cross-border technology transfer, as supported by numerous theoretical works and ample empirical evidence.[1] Then how can the per capita FDI inflow be so different across certain developing economies with similar economic fundamentals? One striking example is the comparison between China and India, the two largest developing economies in the world. In 2005 China's aggregate FDI inflow was more than 72 billion US dollars, about twelve times that of India according to the World Bank(2006). The difference in FDI per capita was nine-fold large. Such a huge FDI difference seems hardly explained solely by their difference in the economic endowments. At the same time, China witnessed a keen competition for FDI between the local governments, especially after China reformed its tax system by increasing the central government's share of tax revenues around 1994. India, however, didn't see such great enthusiasm for FDI in the local governments at least until two years ago, as partly reflected by the fact that India's infrastructure is not nearly as good as China (see Singh, 2005, Bosworth and Susan, 2007). These observations suggest that the *de facto* policies matter a lot.

The primary goal of this paper is therefore to develop a theoretical model to explain why the *de facto* policies toward FDI can be so diametrically different for two developing economies at the same development stage, which consequently leads to a dramatically different amount of FDI inflows in the equilibrium. I will not only examine how the explicit policies such as the tariff rate and the profit tax rate are endogenously determined, but more importantly, I will also explore what derives the attitudes of both the central and local governments toward FDI. This is because different government attitudes would often imply tremendously different *de facto* entry cost for FDI for many developing economies lacking rule of law, as contrasted with many developed economies. For example, if the local government wants to block FDI, it can impose extra cost on the foreign investment by complicating and delaying the license applications, by imposing overly harsh criterion in their product quality, by intervening the legal process whenever the foreign-invested firms are in trouble, by under-investing in the infrastructure such as roads and the electricity supply, or even by directly confiscating the foreign investment, *etc.* Such implicit government practices are rampant in many developing economies. Unfortunately, however, the *de facto* cost is often taken as exogenous in the theoretical models for tractability. In most empirical investigations for FDI, due to the limited availability of data, the de facto cost is typically measured with very coarse index such as the property right protection for general firms without taking into account the government's endogenous and different attitudes toward domestic firms and foreign firms, especially in the cross-country regression analysis.

To address these issues, I construct a political-macroeconomic model with a hierarchical government structure, in which the policies are endogenously determined in the interaction between the central government, the local governments and the special interest groups while the economic activities by the households, the firms and potential foreign investors are all coordinated by the market clearing prices. I will confine the analysis to those developing

[1] See, for example, Rodriguez-Clare(1996), Javorcik(2004), and Borensztein, Gregorio, and Lee(1998), McGratten and Prescott (2007), to just name a few.

economies with a sufficiently powerful government, where the above-mentioned institutional cost mainly depends on the government's willingness, not its capability, of providing effective public services to assist FDI. Numerical simulations/calibrations, instead of regressions, will be conducted to evaluate the theoretical model and to draw quantitative implications for China and India. Therefore, we can circumvent the difficulty in measuring the endogenous institutional variables to the best we can.

The main result highlights the important role of fiscal decentralization, defined as the central government's share in the total tax revenue relative to the share for the provincial governments. I show that a small exogenous decrease in the fiscal centralization may result in a dramatic shift of the local (provincial) governments' attitude toward FDI from extreme hospitality to hostility, and consequently the economy is shifted from the full-FDI equilibrium to the null-FDI equilibrium. This result is diametrically different from the conventional belief that more fiscal decentralization will lead to more FDI inflows.

The main intuition for the theoretical result is actually quite simple but is best explained in two steps. The first step is to understand why a small difference in the central government choice of the tariff rate and the profit tax rate on the foreign-invested firms can be amplified to a diametrically different attitude of the provincial government toward FDI, which in turns implies very different de facto institutional entry cost it will impose on FDI and consequently leads to dramatically different amount of FDI. The second step is to understand why a small increase in the fiscal decentralization can induce the central government to choose a different policy profile that can completely shift the equilibrium. For the first step, the provincial government's attitude is polarized because FDI has two competing effects: the pro-FDI tax-base expansion effect (more FDI implies more firms to tax from) and the anti-FDI profit-reduction effect due to the competition (more FDI implies less profit tax revenue from each firm). As FDI increases, the base-expansion effect is linearly enhanced but the profit-reduction effect is increasing at a diminishing speed, therefore the total profit tax revenue must be maximized at the corner solution: either full FDI or zero FDI, depending on which effect dominates. For given tariff rate, an increase in the profit tax rate on FDI will enhance the base-expansion effect, therefore the provincial government's attitude will shift from hostility to hospitality if the profit tax rate exceeds certain threshold value. On the supply side, the potential foreign investors will make FDI instead of exporting so long as the profit tax rate and the de facto entry cost are sufficiently small for given tariff rate. Therefore, the equilibrium has either full FDI or null FDI, depending on the tariff rate and the profit tax rate chosen by the central government. A small policy change around the threshold value might completely shift the equilibrium.

For the second step, the central government foresees the FDI bifurcation and hence chooses an incentive-compatible policy profile to implement its favored equilibrium. The central government cares about both welfare and revenues. More FDI implies higher welfare for the households and more profit tax revenue from the foreign-invested firms, but it also implies less tariff revenue, less contributions from the protectionist special interest group, and less profit tax revenue from the domestic firms, therefore the central government will prefer the high-FDI equilibrium to null-FDI equilibrium if and only if it can obtain a sufficiently large share from the total profit tax revenue.

Two other nontrivial results are also worth mentioning. One is that on certain range an increase in the weight on the households' welfare in the central government's goal function might actually shift the equilibrium from full-FDI to null-FDI. It's because a higher welfare

weight implies a lower tariff rate and a lower profit tax rate, therefore it will decrease the tariff revenue and the profit tax revenue obtained by the central government. When this revenue decrease too much, the central government would rather implement the null-FDI equilibrium. The second result is that ex ante identical provinces might end up with different amount of FDI when the pool of potential foreign investors is not large enough. This is because each province finds it optimal to attract FDI only when its expected FDI inflow is large enough so that the tax-base expansion effect can dominate the profit-reduction effect, otherwise it would rather prefer zero FDI.

I calibrate and simulate the model with China and India's data separately and the results are robustly supportive to the model. For China, the simulation results not only closely match the ratio of FDI to GDP, the tariff rate, and the profit tax rate, but also match the labor allocation across different sectors as well as the profit ratio across different types of firms. The FDI to GDP ratio is robust to the variation of some "free" parameters. For India, the simulation results also closely match the FDI to GDP ratio and the implied *de facto* entry cost, but the tariff rate and profit tax rate could be better matched when augmented by the taxation enforceability constraint proposed by Gordan and Li (2005). Counterfactual quantitative experiments are conducted and the results suggest that the stark contrast in the policies and FDI between China and India can be mainly explained by their difference in the fiscal decentralization: China's central government got 60% of the total tax revenue while its India counterpart only had 38%.

Four strands of literature are most closely related with this paper. One is the political-economic FDI literature, among which Grossman and Helpman (1994, 1996) are most relevant. More specifically, Grossman and Helpman (1996) examine how FDI is affected by the politically determined tariff rate, which is motivated by Japan's FDI into the US in the car industry in the1980s.[2] My model extends Grossman and Helpman (1996) in several important directions. First, I introduce one or more provincial governments into their single-layer central government structure. The hierarchic government structure enables us to explore both vertical interaction between the two-layers of governments and the horizontal interaction between different provincial governments. These interactions are crucial for us to understand the policy amplification, the FDI bifurcation as well as the regional allocations of FDI. However, these important issues can't be addressed within their framework. Second, I adapt their implicit developed-economy environment to one more suitable for a developing economy. Third, I propose a mechanism for FDI bifurcation when FDI exhibits strategic substitutability while in their model FDI exhibits strategic complementarity. Bransetter and Feenstra (2002) slightly modify Grossman and Helpman (1996) by introducing the profit tax rate as a second policy variable other than the tariff rate, but their primary goal is to estimate the structural parameters using China's 1984-1995 province-level panel data. My model has both the tariff rate and the profit tax rate as endogenous policy variables, but the FDI bifurcation mainly results from the third and new endogenous policy variable, namely, the *de facto* entry cost imposed by the provincial government. However, the entry cost is set as an exogenous in both of these two papers. In

[2] An early analysis of the special interest group's impact on the government is Becker (1993). Later, some authors build on the common agency model of Berheim and Whinston(1986) or explore how different sepecial interest groups compete for the favors from the government and affect the policy-making process, see for example, Dixit, Grossman and Helpman (1997), Grossman and Helpman (2001), Breton and Salanie(2003). Bergemann and Valimaki (2003) extend the analysis into a dynamic setting. We will adopt this policy-making mechanism because it works both for the democracy and non-democracy where voting is not the most important policy-generating scheme.

addition, I also examine whether the central government's policy profile is incentive compatible with the provincial government's behavior. Note that the provincial government in Bransetter and Feenstra (2002) is not a decision maker and hence its framework is essentially same as the single-layer government model with no vertical or horizontal government interactions. Apart from these important differences in the goals and the theoretical models, this paper also differs from Bransetter and Feenstra (2002) in the quantitative strategies. I conduct the calibration and simulation exercise for China and India separately while they perform the regression analysis.

The second strand is the macro and development literature about purposeful technology adoption as mentioned at the very beginning of the paper. Following their 1994 paper, Prescott and Parente (1999) continue to argue that some poor countries resist adopting better technology because the incumbent will lose their monopoly rent if they allow the new technology to come in, however, the policy generating process is not explicitly studied. Krusell and Rios-Rull (1996) examine how the incumbent workers might choose to block the better technology through voting to prevent their accumulated skills or human capital from getting obsolete. Bellettini and Ottaviano(2005) employ the dynamic common agency framework to address the policies toward technology adoption in the presence of two rival special interest groups. Acemoglu and Robinson (2000) argue that the incumbent resist the better technology because their political power will be undermined so that they won't be able to benefit from the new technology, otherwise the incumbent can benefit more by letting people adopt the most advanced technology and then taxing them. My paper adds to this literature by explicitly examining the different roles of the different layers of the hierarchic governments for the technology adoption policies. I show how a small difference in the fiscal decentralization might ultimately lead to starkly different government attitudes and de facto policies toward foreign better technologies (FDI). Antras and Helpman(2007) show that countries with exogenously worse contracting institutions tend to adopt the less advanced technologies because the more advanced technology requires more contracting- intensive intermediate goods. My model goes somewhat further by addressing how the quality of contracting institutions, as partly reflected in the *de facto* institutional cost, is endogenously affected by the government's rational choice. Moreover, I also provide a nontrivial supply analysis of technology(FDI) because I not only examine the foreign potential investor's optimal decision of export versus FDI but also look at the strategic interactions and their location choices.[3]

The third brand is the literature of federalism and the burgeoning literature on state capacity. The impact of government decentralization on economic performance is still an unsettled issue. The results are very context-specific and inconclusive both empirically and theoretically, as is well surveyed by Bardhan and Mookherjee(2006). Qian and Roland (1998) models the foreign investment as the capital in the joint venture with the provincial governments and their main purpose is to show how the fiscal federalism in China helps harden the soft budget constraints for the state-owned enterprises. In their paper, the total foreign investment absorbed by the country is exogenous and unaffected by any government policies or regional competitions. By contrast, my model addresses how the aggregate level of FDI are endogenously determined

[3] An important branch of the recent FDI versus trade literature focuses on the heterogenous firms. After the realization of the productivities, the most productive firms make FDI, the less productive firms export, while the most unproductive firms only serve the domestic market (see Helpman, Melitz, and Yeaple, 2004, Chaney, 2008). .

and, more importantly, why it's bifurcating. The same comment also applies to Cai and Treisman(2005), which argues that capital liberalization might amplify the capital inflow difference between countries/provinces with heterogenous endowments because the poorly endowed region would lose hope and therefore invest even less in building the infrastructure complementary to capital inflow as compared with the case of capital control, hence the capital liberalization implied by the decentralization doesn't necessarily discipline the governments. My paper shows that asymmetric equilibrium may arise even between the provinces or countries with perfectly identical endowments. Myerson(2006) argues that federalism boosts democracy because the provincial leaders will have more incentives to behave well in order to raise their odds of success in contending for federal leadership. But Blanchard and Shleifer (2000), later further developed by Verdier(), argues that political centralization is crucial for the success of China's economic decentralization with fiscal federalism whereas the federalism in Russia didn't achieve the desirable performance due to the lack of political centralization. Acemoglu(2005) and Besley and Persson(2008) also argue that the economic efficiency is hurt when the central government is too weak to function effectively such as maintaining social stability, as is not unusual in the developing world. The results of my paper are more consistent with their broad views, although based on different arguments, because my calibration and simulation exercises do indicate that less fiscal decentralization in China (measured by its tax revenue share) leads to the de facto policies that facilitate the FDI (technology) absorption while more decentralization in India leads to less adoption of the efficiency-enhancing FDI. Weingast (1995) points out several necessary conditions for the fiscal federalism to be market-preserving. Bardhan and Mookherjee(200) also argue that there might exist some optimal degree of decentralization because of one trade-off: local governments have better information about how to allocate resources more efficiently but they are also more prone to be captured by the local vested interested groups. Another distinctive feature of my model is that it has an explicit general-equilibrium-type microfoundation for the decentralized market behaviors together with the interactive endogenous policy determinations between the hierarchical governments and the special interested groups. In contrast, many of the above papers suppress the market decisions and start directly with ad hoc utility levels, cost, or aggregate production functions, are thus more suitable for regression analysis rather than the calibrations/simulations with micro-foundation parameters for the household preference, technology and endowment.

The fourth strand of literature is related with property rights, institutions, and capital flows into poor countries. Velasco and Tornell (1992) show that the poor property rights protection due to the "tragedy of commons" can partly explain why the capital doesn't flow to the poor countries from the rich, which was initially raised by Lucas (1990). Ju and Wei (2007) propose a model of two-way capital flows in which the developing economy with intermediate property rights protection and low efficiency in financial institutions will export financial capital but simultaneously import FDI. Sonin (2003) proposes that the rich oligarchs might favor poor public protection of property rights because they can charge the poor people by offering a private protection of property rights. In contrast to these papers, my paper focuses on the endogenous public protection of property rights on FDI instead of exogenous public protection or endogenous private protection by the investors or a few oligarchies. Thomas and Worrall (1994) and numerous followed papers analyze the endogenous expropriation risk of FDI in a dynamic setting to show how the government's short-run incentive to confiscate the FDI can be offset by its long-run incentive to attract more FDI in the future. My model shows that the government might want to block FDI even if foreign investors want to invest. Acemoglu and Robinson (2006) as well as Braguinsky and Myerson (2007) show that more foreign capital investment will

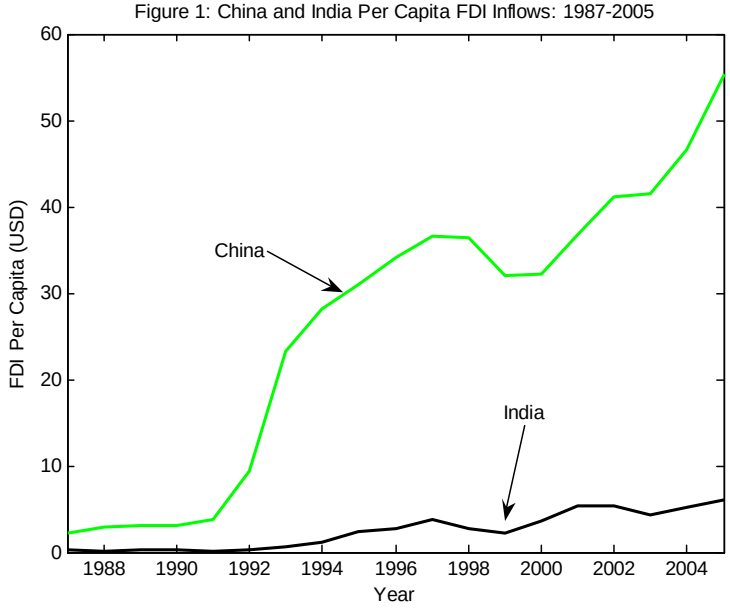
drive up the domestic wage and hence hurt the incumbent employers, thus the FDI encounters resistance. This is certainly true for many economies but might not be that important for the big developing countries with what Nobel laureate Lewis called "infinite supply of surplus labor" such as China and India. In my model, the negative pecuniary externality between foreign and domestic firms solely come from the monopolistic competition in the consumption good markets. Also, I model FDI as technology adoption instead of physical capital inflow.

The paper is organized as follows. The next section briefly summarizes some important facts about China and India's economic development, FDI , and some relevant policies, which are one of the most important empirical motivations for this paper. These facts also guide the way how the model is set up. Section 3 presents and analyzes the formal model. Section 3 draws the quantitative implications from China and India. The last section concludes by providing some avenues for future work.

2 Some Facts About China and India

China and India draw unprecedented attentions among the macro and international economists, presumably because of their big size and remarkable economic accelerations in the past three decades. Nevertheless, these two countries have very different amount of per capita FDI inflows as illustrated in Figure 1. As we can see, the gap was dramatically enlarged around 1992 and kept expanding afterwards. In 2005, China's FDI per capita was nine times as large as that of India. In terms of the aggregate level, China's total FDI inflow was more than 72 billion US dollars according to the World Bank(2006), about twelve times that of India in 2005.

Figure 1: China and India Per Capita FDI Inflows: 1987-2005



Source: World Development Report 2006, UNCTAD

An alternative measure for FDI is the total number of foreign affiliates in the two countries, which is demonstrated in Table 1. Some scholars cast doubt on the consistency and compatibility of the statistical method and data quality, but the difference remains enormous even after the adjustments.[4] What caused this huge difference in the FDI per capita?

Table 1. Number of Foreign Affiliates in Host Economies: 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
China	50 200	44 347	43 826	n.a.	26 837	28 445	31 423	34 466	38 581
India	241	268	284	321	334	447	465	490	508

Source: UNCTAD (2006)

A full-fledged comparison between China and India is beyond the scope of this paper, [5] but it's helpful to learn some basic facts about these countries in order to seek the best answer. China and India both have more than one billion citizens and jointly account for about 40% of the world population. Despite some difference in certain aspects, these two Asian countries have demonstrated a marvelous similarity in their development experience over the past sixty years. The People's Republic of China was founded in 1949 while India declared its independence in 1947. Starting with very similar levels of GDP per capita, both countries adopted a development strategy giving priority to the heavy industries , which resulted in enormous government regulations and dreadful economic performance from 1950s to 1970s(See Lin, 2007). Both countries experienced a devastating famine and a major domestic political turmoil from the 1960s to the1970s. The liberalization reforms in China were initiated in 1978 while the deregulation reforms in India got started in the early 1980s, both of which ignited the productivity increases and economic accelerations till today. From 1978 to 2004, the annual GDP growth rates were 9.7% and 6.5% for China and India respectively. In 1978, their real GDP per capita were 323.97USD and 603.79USD, which increased all the way to $5600 and $3100 in 2005. However, the two countries are still ranked below the world's top 100 economies in terms of GDP per capita.

All these striking similarities in their development process make their huge FDI difference more puzzling and theoretically interesting. Economic theory suggests that cheap labor, huge domestic market, and relative political stability all help attract FDI, but these features are shared by both China and India. Moreover, India is more democratic than China and more people in India speak English. These facts are conventionally believed to favor India in terms of FDI absorptions. Some might argue that it can be simply a time lag story because India opened its economy in the early 1990s, about eight years later than China. However, this timing effect alone can hardly explain why India's FDI didn't increase too much afterwards. In fact, their FDI diverged dramatically instead of converging around early 1990s, as shown in Figure 1. Some might argue that FDI in China is so big because it has special economic zones, but the truth is that it's India, not China, that first created and implemented the idea of special economic zones. Why are the economic zones in China more successful in terms of attracting

[4] An alternative measure is the total number of foreign affiliates in the two countries, which is demonstrated in Table A2 in the appendix. See Singh(2005) for more discussions on India's FDI. Bajpai and Dasgupta (2004) compared China and India's FDI difference. More discussions on data are postponed until the calibration part in Section 4.

[5] Table A1 in the appendix shows the growth rates of output and various source factors in these two countries from 1978 to 2004. Please see Bosworth and Collins (2007), Rodrik and Subramanian(2004), etc., for more discussions.

FDI? Some might argue that a large fraction of FDI into Mainland China comes from Hong Kong and oversea ethnic Chinese while India has no such counterpart, in addition, a large fraction of these FDI are actually "round-tripping" capital originating from Mainland China but just to take advantage of the "Super National Treatment" enjoyed by FDI. True, but even after subtracting all the FDI from Hong Kong, China's FDI still accounts for about 20% of all the emerging economies, which is still much larger than that of India, see Prasad and Wei (2005).[6]

Presumably there are multiple forces that jointly account for this remarkable FDI difference, but what seems fundamentally important is the difference in the government's attitude and policies toward FDI as opposed to the difference in the economic fundamentals or the above mentioned factors. China's FDI surged immediately after Deng Xiaoping's South-Tour speech in 1992, which emphasized the government's decisions to continue the market-orientated reform and open-door policy. This speech effectively pulled China's economy out of the 1989 Tianan Men Square political shadow and many restrictions on FDI were effectively eradicated.[7] In 2004, the profit tax rate on foreign invested firms was 41% in India but it's far below 30% in China. For a long time, India's government assumed the so-called "pro-business" deregulation policy primarily to enhance incumbent domestic firms' performance while restricting the entry of foreign investment(Rodrik and Subramanian, 2005). While in China, by stark contrast, the government offered much more favorable conditions to the foreign-invested firms including extended tax holidays, tax concessions, and low rent for land usage, *etc.* Moreover, it's widely observed that the competition for FDI between the local governments is much more fierce in China than in India(see Singh, 2005, Bosworth and Susan, 2007). Table 2 provides more such evidence showing that the institutional barriers confronting foreign investors are much higher in India than China. What has caused such an big difference in the government's attitude and economic policies toward FDI in China and India? This is the main theoretical question this paper tries to answer.

Table 2: Measures of the Ease of Doing Business in China and India (2005)

Country	Overall	Starting a Business		Enforcing Contract		Registering Property	
	Ease (Rank[b])	Time (Days)	Cost[a] (%)	Procedures (Number)	Time (Days)	Procedures (Number)	Time (Days)
China	91	48	13.6	35	406	4	29
India	116	71	62.0	46	1420	6	62

Source: World Bank, 2006, 2007

Notes: a. as a percentage of Income per capita; b. among all the economies in the world

[6] There is no accurate measure on the magnitude of round-tripping because of its clandestine nature. The most pessimistic estimate was by Huang (2003), who reported that before 1998 about one-fourth of the total FDI was the round-tripping capital. But the importance of round-tripping capital is declining as the percentage of FDI from Hong Kong has been decreasing steadily in recent years, see Table 1a in the appendix.

[7] In Wang (2008), I develop a global game model to explain from the information point of view why China's FDI surged immediately after Deng Xiaoping's speech in 1992 and why a disproportionately large fraction of the FDI into mainland China is from Hongkong and/or invested by ethnic oversea Chinese.

3 Formal Model

The basic model environment is similar to Grossman and Helpman (1996). The main deviation is that now there will be two layers of governments: central and provincial. In addition, the institutional entry cost for FDI will be endogenously determined. I will make the same simplification assumption as before: FDI is modeled as the establishment of a plant by the headquarter of a multinational firm in the host economy; All FDI is greenfield and horizontal;[8] The output only serves the domestic market of the host economy;[9] All the multinational firms are wholly foreign-owned.[10]

3.1 One-Province Model

3.1.1 Preference

The province is populated by a continuum of households with a unit mass. They have the same quasi-linear utility function as follows

$$U = \ x_0 + \frac{\theta}{\theta-1} x^{\frac{\theta-1}{\theta}}, \quad \theta > 1 \ , \tag{1}$$

where x_0 is the consumption of the numeraire good and x is the Dixit-Stiglitz aggregate of the differentiated goods with the price elasticity equal to θ:

$$x = \left[\int_{j \in N_h \cup N_f} x(j)^{\frac{\varepsilon-1}{\varepsilon}} dj \right]^{\frac{\varepsilon}{\varepsilon-1}}, \quad \varepsilon > 1, \tag{2}$$

where $x(j)$ denotes the commodity of brand j, N_h and N_f are the sets of the domestic and foreign brands with measures n_h and n_f, respectively. Let N_m, a subset of N_f , denote the set of foreign brands that are produced by the foreign-invested firms located in the host country. Hence, the measure of N_m, denoted by n_m, quantifies the magnitude of FDI. The complementary subset, N_f/N_m , is therefore the set of the imported foreign brands with measure $n_f - n_m$. Let $N \equiv N_h \cup N_f$ for future reference.

3.1.2 Technology

[8] Greenfield FDI is much more common than merge and acquisions in the deveoping economies, but the opposite is true for developed economies.

[9] FDI is often made in the developing economy to mainly serve as the production and export base for the whole international market, which can be an important motive for the FDI in China. Wang and Hu(2008) explicitly examine this export effect on FDI and find that it doesn't change the qualitative results of this paper. Qualitatively, this export effect is partly captured by the susbstution elasticity parameter ε in our calibration/simulation exercises, as we will explain later. In addition, a larger and larger fraction of China's FDI is targeted mainly toward China's market as the country becomes richer and richer, especially after year 2000.

[10] Another related and burgeoning literature explores how the contract incompleteness and property rights affect the form of the corporate governance of a multinational firm and the optimal choice of outsourcing versus FDI, see Antras and Helpman (2004), Feenstra and Hansen (2005), *etc.*

Labor is the only production factor. [11] All the technologies are constant return to scale. The numeraire good is produced in the perfectly competitive firms. One unit of labor produces one unit of numeraire. I normalize the domestic wage rate to be one. One unit of each differentiated domestic good $j \in N_h$ requires c_h units of labor. One unit of each imported good $j \in N_f/N_m$ requires c_f units of foreign labor. Let w denote the exogenous foreign wage rate. One unit of each multinational good $j \in N_m$ also requires c_f units of domestic labor. That is, FDI can fully transfer the foreign technology to the host country.[12] The foreign technology is more advanced, thus $c_f < c_h$.

3.1.3 Endowment

Each household is endowed with L units of labor, which are inelastically supplied. To exclude the collusive pricing and to simplify the public welfare analysis, I assume that the owners of the domestic firms have a zero measure and are scattered in the population. The after-tax net profit of the multinationals will be repatriated to the source country. L is sufficiently large so that the trade account is balanced by exporting the numeraire goods to the international market at the competitive world price equal to one.

3.1.4 Commodity Prices and Profits

The labor market is perfectly competitive. Labor is freely mobile across different sectors. Each differentiated commodity is produced by a single monopolist. Let τ denote one plus the *ad valorem* tariff rate. The usual mark-up pricing rule implies

$$p(j) = \begin{cases} p_h \equiv \frac{\varepsilon}{\varepsilon-1} c_h, & \text{if} \quad j \in N_h \\ p_m \equiv \frac{\varepsilon}{\varepsilon-1} c_f, & \text{if} \quad j \in N_m \\ p_f \equiv \frac{\varepsilon}{\varepsilon-1} c_f w\tau, & \text{if} \quad j \in N_f/N_m \end{cases}, \tag{3}$$

where w denotes the exogenous wage rate in the foreign country, $w \geq 1$. The household maximization problem gives the market demand for each differentiated good

$$x(j) = \begin{cases} x_h \equiv p_h^{-\varepsilon} q^{\varepsilon-\theta}, & \text{if} \quad j \in N_h \\ x_m \equiv p_m^{-\varepsilon} q^{\varepsilon-\theta}, & \text{if} \quad j \in N_m \\ x_f \equiv p_f^{-\varepsilon} q^{\varepsilon-\theta}, & \text{if} \quad j \in N_f/N_m \end{cases}, \tag{4}$$

[11] There are several reasons why we don't introduce physical capital. Borensztein, Gregorio, and Lee (1998) provide empirical evidence showing that FDI is more important as a device of technology diffusion instead of capital investment for the developing economies. The evidence from China and India seems also quite supportive of the view. First, the FDI inflow accounts for less than 10% of China's gross fixed investment and is only about 5% of total GDP. The fraction for India is also small. Second, Bosworth and Collins (2007) show that, for the post-1994 period, the manufacturing sector has the highest TFP and output growth in China while in India the service sector experiences the highest TFP and output growth. Interestingly, FDI is most concentrated in the manufacturing sector in China while the largest proportion of India's FDI is allocated in the service sector(Singh, 2005). This seems to suggest that FDI is highly correlated with TFP growth and it motivates us to see FDI mainly as technology adoption.

[12] Grossman and Helpman(1996) assumes that the unit cost of the multinational good is c_h rather than c_f for each $j \in N_m$ and $w = 1$, which results in strategic complementarity for international investors, although they didn't point it out explicitly. However, we obtain strategic substitutability here, which makes our main point even more pronounced, as we will show soon.

where I assume $\varepsilon > \theta$ to ensure a positive cross-elasticity of demand and q is the price index for x :

$$q = \left[{n_h p_h}^{1-\varepsilon} + {n_m p_m}^{1-\varepsilon} + (n_f - n_m) {p_f}^{1-\varepsilon} \right]^{\frac{1}{1-\varepsilon}}. \tag{5}$$

Each firm takes q as exogenous when making production decisions. The profit of the numeraire sector is zero. For any $j \in N$, the profit is

$$\pi(j) = \begin{cases} \pi_h \equiv \frac{1}{\varepsilon} p_h^{1-\varepsilon} q^{\varepsilon-\theta}, & \text{if} \quad j \in N_h \\ \pi_m \equiv \frac{1}{\varepsilon} p_m^{1-\varepsilon} q^{\varepsilon-\theta}, & \text{if} \quad j \in N_m \\ \pi_f \equiv \frac{1}{\varepsilon\tau} p_f^{1-\varepsilon} q^{\varepsilon-\theta}, & \text{if} \quad j \in N_f / N_m \end{cases}. \tag{6}$$

3.1.5 Labor Allocation and GDP

The total labor employed in the domestic firms that produce the differentiated goods is $l_h \equiv n_h x_h c_h$. $l_m \equiv n_m x_m c_f$ denotes the employment in the multinational sector. The rest, $l_n \equiv L - n_h x_h c_h - n_m x_m c_f$, are employed in the numeraire sector. The per capita GDP is equal to the total GDP, which is the total output from the numeraire sector, the domestic sector, and the foreign-invested sector:

$$\begin{aligned} GDP &= (L - n_h x_h c_h - n_m x_m c_f) + n_h p_h x_h + n_m p_m x_m \\ &= L + n_h \pi_h + n_m \pi_m. \end{aligned} \tag{7}$$

Later, I will exploit this information to calibrate the model.

3.1.6 FDI Decision

For now, the tariff rate τ and profit tax rate on the multinational firmsλ are exogenous. A potential foreign investor $j \in N_f$ decides to make FDI ($D_j^* = 1$) rather than produce in her home country and export ($D_j^* = 0$) if and only if the net profit of making FDI is larger than that of exporting:

$$(1 - \lambda)\pi_m - \phi \geq \pi_f, \tag{8}$$

where ϕ is up-front fixed cost associated with FDI. It denotes the de facto entry cost determined by the provincial government. If the provincial government wants to block FDI, it can make ϕ very high by, for example, making the application procedures very complicated and time-consuming, independent of the size of the investment. When $\phi = 0$, (8) requires

$$1 - \lambda - \tau^{-\varepsilon} w^{1-\varepsilon} \geq 0, \tag{9}$$

which reminds us of the simple fact that a higher profit tax λ hampers FDI while a higher tariff rate τ and a higher foreign wage w would facilitate FDI because the investors will have a stronger incentive to circumvent the trade barrier and take advantage of the low labor cost.

Lemma 1. (a) *$\pi(j)$ decreases with n_m for all $j \in N$.* **(b)** *When (9) holds as a strict inequality, the binary entry decisions of the potential investors exhibit strategic substitutability.*

The proof is straightforward and the intuition is the following. Since the multinational good price p_m is smaller than the import price p_f according to (3), the aggregate price index q decreases when n_m increases, therefore the positive cross-price elasticity implies that the

demand for each differentiated commodity also decreases, resulting in the profit drop of each firm $j \in N$. In other words, the negative pecuniary externality is ultimately attributed to two joint forces. One is the host country's trade barrier and/or cheaper labor (which gives $p_m < p_f$), and the other is that the substitutability between differentiated goods exceeds the price elasticity for the aggregate (which gives the positive cross elasticity). Consequently, when n_m increases, the entry condition (8) becomes less likely to hold for any positive ϕ, *ceteris paribus.*

3.1.7 Provincial Government

All the domestic firms also need to turn in the profit tax at the exogenous rate $\overline{\lambda}$. Only a fraction $1-\gamma$ of the profit tax revenue is accruing to the provincial government. $\gamma \in (0,1)$ denotes the fraction obtained by the central government introduced later. The provincial government wants to maximize its tax revenue by choosing the institutional cost $\phi \in [0,\infty)$, thus its "attitude" toward FDI is determined by

$$\max_{n_m \in [0,n_f]} (1-\gamma)[\lambda n_m \pi_m(n_m) + \overline{\lambda} n_h \pi_h(n_m)] \tag{10}$$

If $\lambda = \overline{\lambda}$, then the goal is equivalent to maximizing GDP as indicated by (7). For simplicity, ϕ is assumed to be the deadweight loss.[13] FDI has two competing effects from the provincial government's point of view. One is the tax-base expansion effect, which favors more FDI because more FDI implies more firms to tax from. This effect is linearly enhanced with FDI n_m. The other is the average-profit reduction effect, which discourages FDI because the profit of each firm will decrease according to Lemma 1. This effect increases with FDI n_m but at a diminishing speed. Consequently, the total taxable profit might not be monotonic in the total FDI. There are three possibilities how the provincial government's revenue might change with FDI n_m on the pertinent range $[0, n_f]$, as shown in Figure 2:

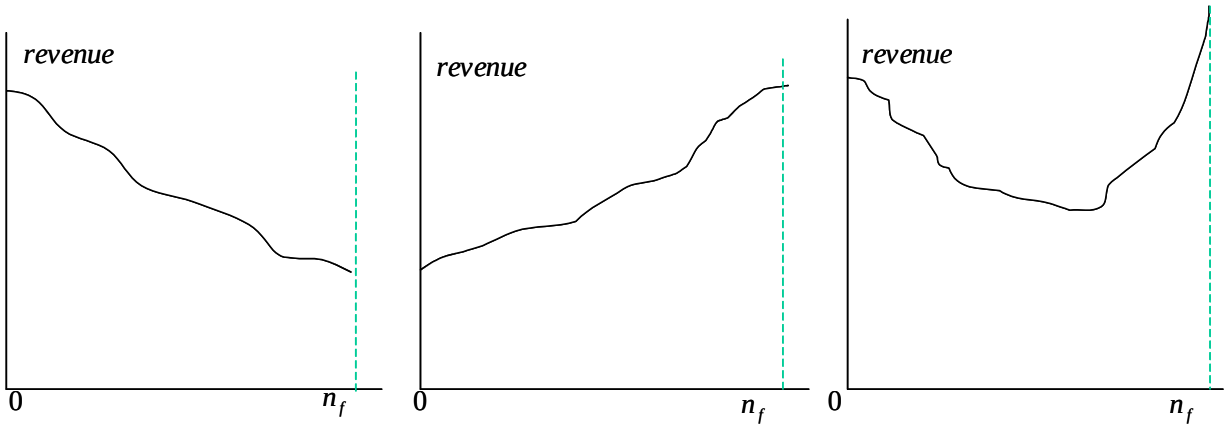


Figure 2: Total Tax Revenue as a Function of FDI n_m

[13] An interesting extension is to examine the bribery and corruption explicitly by taking ϕ into the goal function of the corrupt local official.

If the expansion effect is always dominated by the reduction effect, the equilibrium FDI is zero (illustrated by the left panel in Figure 2). If the expansion effect always dominates the reduction effect, the equilibrium FDI is zero (illustrated by the middle panel in Figure 2). The third possibility is that the dominant effect changes with the amount of FDI, in which case the average-profit reduction effect dominates when the total FDI is small but the tax-base expansion effect will eventually dominate as the FDI increases since the negative pecuniary externality is decreasing (because $\frac{\partial^2 \pi_x}{\partial n_m^2} > 0$, for any $x = h, m, f$). This leads to a corner solution (illustrated by the right panel in Figure 2). Therefore, the provincial government's demand for FDI, denoted by n_m^d, must be very "extreme".[14] More precisely, we obtain

$$n_m^d = \begin{cases} 0, & if \quad \lambda \leq \widetilde{\lambda}(\tau) \\ n_f, & if \quad \lambda > \widetilde{\lambda}(\tau) \end{cases}, \tag{11}$$

where

$$\widetilde{\lambda}(\tau) \equiv \frac{\left[1 - \left[\frac{n_h {c_h}^{1-\varepsilon} + n_f {c_f}^{1-\varepsilon}}{n_h {c_h}^{1-\varepsilon} + n_f (\tau w c_f)^{1-\varepsilon}}\right]^{\frac{\varepsilon-\theta}{1-\varepsilon}}\right] \overline{\lambda}}{\frac{n_f}{n_h}\left(\frac{c_f}{c_h}\right)^{1-\varepsilon}\left[\frac{n_h {c_h}^{1-\varepsilon} + n_f {c_f}^{1-\varepsilon}}{n_h {c_h}^{1-\varepsilon} + n_f (\tau w c_f)^{1-\varepsilon}}\right]^{\frac{\varepsilon-\theta}{1-\varepsilon}}}.$$

When the profit tax rate λ exceeds the threshold value $\widetilde{\lambda}(\tau)$, the effect of tax base expansion dominates the effect of profit reduction, hence the highest revenue is reached at full FDI, $n_m^d = n_f$. If λ is smaller than $\widetilde{\lambda}(\tau)$, the provincial government would block any FDI. In summary, bifurcation in the government's demand is mainly due to the fact that the base-expansion effect is linearly increasing with FDI but the profit-reduction effect increases at a diminishing speed as FDI increases.

$\widetilde{\lambda}'(\tau) > 0$ intuitively because a higher tariff rate drives up the aggregate price q hence increases the profit for each domestic firm, so the profit tax rate on FDI must be increased in order to induce the revenue-maximizing provincial government to prefer FDI over the domestic firms. We can also show $\widetilde{\lambda}(\infty) < \frac{\varepsilon-\theta}{\varepsilon-1}\overline{\lambda}$, which means that the provincial government would prefer full FDI under the uniform tax rates ($i.e. \overline{\lambda} = \lambda$). In addition, $\widetilde{\lambda}(\tau)$ decreases with domestic production cost, c_h, because a larger c_h implies a lower profit for each domestic firm, which provides more incentives to the provincial government to attract more FDI. So the threshold tax rate will be lowered.[15] This extreme attitude n_m^d dictates its choice of ϕ, which

[14] The attitudinal polarization result remains valid if the provincial government also cares about the contribution from the special interest group formed by the owners of the local domestic firms. Nothing will change except that the threshold value for the profit tax rate is increased to

$$\widetilde{\lambda}(\tau)^{new} \equiv \frac{\frac{1-\overline{\lambda}\gamma}{1-\gamma}\left[1 - \left[\frac{n_h {c_h}^{1-\varepsilon} + n_f {c_f}^{1-\varepsilon}}{n_h {c_h}^{1-\varepsilon} + n_f (\tau w c_f)^{1-\varepsilon}}\right]^{\frac{\varepsilon-\theta}{1-\varepsilon}}\right]}{\frac{n_f}{n_h}\left(\frac{c_f}{c_h}\right)^{1-\varepsilon}\left[\frac{n_h {c_h}^{1-\varepsilon} + n_f {c_f}^{1-\varepsilon}}{n_h {c_h}^{1-\varepsilon} + n_f (\tau w c_f)^{1-\varepsilon}}\right]^{\frac{\varepsilon-\theta}{1-\varepsilon}}}.$$

[15] In Wang and Hu(2008), we exploit this result to explain why Zhejiang Province attracted much less FDI than Jiangsu Province in China. This is because Zhejiang has a more active and profitable domestic private sector while Jiangsu has a larger but much less profitable sector of state-owned enterprises. So Jiangsu Provincial government is more likely to attract FDI. In fact, we do observe that Jiangsu government is more enthusiastic in attracting FDI by establishing more special economic zones than the counterpart in Zhejiang Province. We also examine its effect on the trade pattern.

shall be precisely characterized soon.

3.1.8 Timing and Equilibrium

For given τ, λ and $\overline{\lambda}$, the provincial government decides ϕ by solving (10). Next, after observing all those policy variables, all the potential investors make their entry decisions simultaneously. After that, labor market opens, output is produced, commodity market opens, trade occurs, and consumption is realized.

Definition 1. *An equilibrium with one province is a collection of the fixed cost ϕ^*, the commodity prices $p^*(j)$, $j \in N$, and the investment decisions D_j^*, for all $j \in N_f$, such that:*

1. *The provincial government maximizes its fiscal revenue(10), the solution to which is ϕ^*, given τ and λ.*
2. *Each potential investor $j \in N_f$ makes the investment decision (8) by solving D_j^*,and it also makes pricing decision $p^*(j)$, given ϕ^*. D_j^* is a best response to D_{-j}^*.*
3. *Each domestic firm $j \in N_h$ maximizes its profit, the solution to which is $p^*(j)$.*
4. *Each household maximizes the utility by choosing the right consumption subject to the budget constraint.*
5. *Markets clear for domestic labor, each domestically produced and consumed commodity, and the international payment is balanced for the domestic economy.*

Obviously, $p^*(j)$, $j \in N$,is given by (3). Backward induction is used to characterize the equilibrium. Let's first examine an investor's choice. When (8) holds as an equality, an investor is indifferent between FDI and export, from which we can derive n_m as a function of ϕ, denoted by $H(\phi)$:

$$H(\phi) = \frac{\left[\frac{\phi\varepsilon}{\left(\frac{\varepsilon}{\varepsilon-1}c_f\right)^{1-\varepsilon}(1-\lambda-\tau^{-\varepsilon}w^{1-\varepsilon})}\right]^{\frac{1-\varepsilon}{\varepsilon-\theta}} - n_h p_h^{1-\varepsilon} - n_f p_f^{1-\varepsilon}}{p_m^{1-\varepsilon} - p_f^{1-\varepsilon}}.$$

The optimal entry decision, D_j^*, for any investor $j \in N_f$ is given by

$$D_j^* = \begin{cases} 1, & if \quad \lambda < 1-\tau^{-\varepsilon}w^{1-\varepsilon},\ \int_{j\prime\in N_f\ ,\ j\prime\neq j} D_{j\prime}^* dj\prime < H(\phi) \\ 0 \text{ or } 1, & if \quad \lambda < 1-\tau^{-\varepsilon}w^{1-\varepsilon},\ \int_{j\prime\in N_f\ ,\ j\prime\neq j} D_{j\prime}^* dj\prime = H(\phi) \\ & \qquad \text{or } \lambda = 1-\tau^{-\varepsilon}w^{1-\varepsilon}, \phi = 0 \\ 0, & if \quad \text{otherwise} \end{cases}. \tag{12}$$

It says that an investor would choose to make FDI if she expects that the total amount of FDI, $\int_{j\prime\in N_f\ ,\ j\prime\neq j} D_{j\prime}^* dj\prime$, is less than the threshold value $H(\phi)$, provided that the profit tax rate is sufficiently low so that (9) holds as a strict inequality. When the total amount of FDI is exactly equal to $H(\phi)$ or when (9) holds as an equality with $\phi = 0$, the investor obtains the same net

profit for FDI and export, and therefore becomes indifferent. In summary, when(9) holds as a strict inequality, the aggregate FDI can be uniquely pinned down as a function of ϕ:

$$n_m = \begin{cases} n_f, & if \quad \phi \leq \underline{\phi} \\ H(\phi), & if \quad \underline{\phi} < \phi < \overline{\phi} \\ 0, & if \quad \phi \geq \overline{\phi} \end{cases},$$

where

$$\underline{\phi} \equiv \frac{1}{\varepsilon}(n_h p_h^{1-\varepsilon} + n_f p_m^{1-\varepsilon})^{\frac{\varepsilon-\theta}{1-\varepsilon}} \left(\frac{\varepsilon}{\varepsilon-1} c_f\right)^{1-\varepsilon} \left(1 - \lambda - \tau^{-\varepsilon} w^{1-\varepsilon}\right), \tag{13}$$

and

$$\overline{\phi} \equiv \frac{1}{\varepsilon}(n_h p_h^{1-\varepsilon} + n_f p_f^{1-\varepsilon})^{\frac{\varepsilon-\theta}{1-\varepsilon}} \left(\frac{\varepsilon}{\varepsilon-1} c_f\right)^{1-\varepsilon} \left(1 - \lambda - \tau^{-\varepsilon} w^{1-\varepsilon}\right). \tag{14}$$

The supply of FDI as a function of *de facto* entry cost ϕ is depicted in Figure 3.

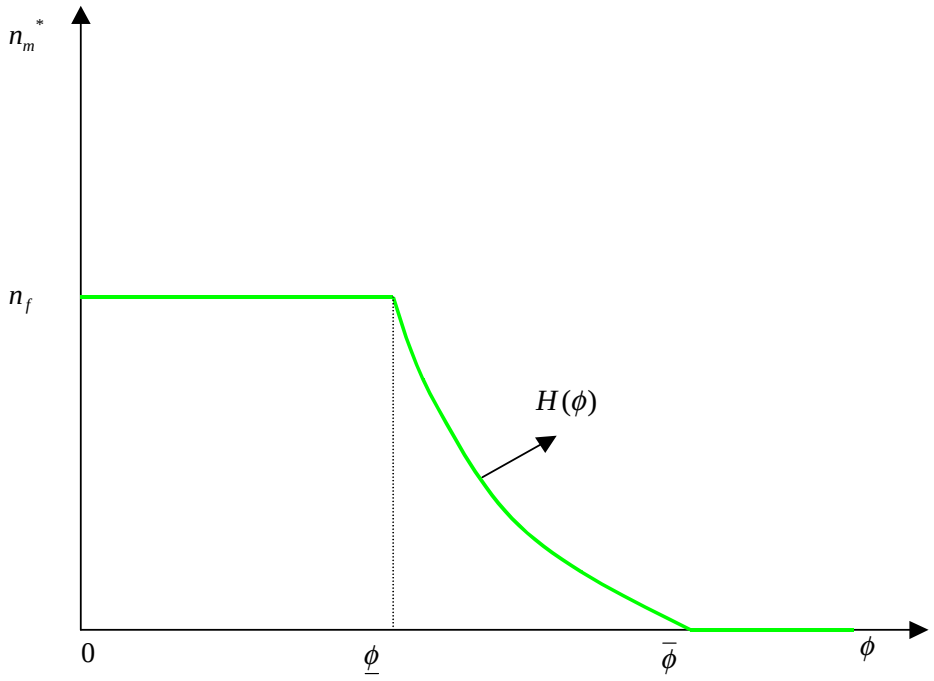


Figure 3: FDI Supply as Function of ϕ when $\lambda < 1 - \tau^{-\varepsilon} w^{1-\varepsilon}$

Given the investor's decision rule, we can obtain the optimal choice of the provincial government from (11):

$$\phi^* = \begin{cases} \text{any } \phi \leq \underline{\phi}, & \text{if} \quad \lambda \geq \widetilde{\lambda}(\tau) \ , \lambda < 1 - \tau^{-\varepsilon} w^{1-\varepsilon} \\ 0, & \text{if} \quad \lambda \geq \widetilde{\lambda}(\tau) \ , \lambda = 1 - \tau^{-\varepsilon} w^{1-\varepsilon} \\ \text{any } \phi \geq \overline{\phi}, & \text{if} \quad \lambda < \widetilde{\lambda}(\tau) \ , \lambda < 1 - \tau^{-\varepsilon} w^{1-\varepsilon} \\ \text{any } \phi > 0, & \text{if} \quad \lambda < \widetilde{\lambda}(\tau) \ , \lambda = 1 - \tau^{-\varepsilon} w^{1-\varepsilon} \\ \text{any } \phi \geq 0, & \text{if} \quad \lambda > 1 - \tau^{-\varepsilon} w^{1-\varepsilon} \end{cases}. \tag{15}$$

It says that, when the profit tax rate is large enough to lure a positive FDI demand from the provincial government ($\lambda \geq \widetilde{\lambda}(\tau)$) and also small enough to admit a positive FDI supply from potential investors($\lambda < 1 - \tau^{-\varepsilon} w^{1-\varepsilon}$), the provincial government would choose a sufficiently small cost $\phi \leq \underline{\phi}$ to ensure that all the foreign investors will choose FDI. An equilibrium with positive FDI requires the following necessary condition:

$$1 - \widetilde{\lambda}(\tau) - \tau^{-\varepsilon} w^{1-\varepsilon} \geq 0. \tag{16}$$

In particular, when $\lambda = 1 - \tau^{-\varepsilon} w^{1-\varepsilon} > \widetilde{\lambda}(\tau)$, the provincial government strictly prefers full FDI to none while the investors strictly prefer exporting to making FDI whenever $\phi > 0$ and they become indifferent if $\phi = 0$. So if the provincial government chooses $\phi = 0$, any $n_m \in [0, n_f]$ can be a Nash equilibrium among the investors. In particular, if $\lambda \geq \frac{\varepsilon-\theta}{\varepsilon-1} \left(\frac{\overline{\lambda} {n_h} {c_h}^{1-\varepsilon}}{{c_f}^{1-\varepsilon}} \right) \left(\frac{{c_f}^{1-\varepsilon} - (\tau w c_f)^{1-\varepsilon}}{n_h {c_h}^{1-\varepsilon} + n_f (\tau w c_f)^{1-\varepsilon}} \right)$, then the provincial government's goal function is strictly increasing in n_m on the whole interval of $[0, n_f]$, hence it's optimal to choose $\phi = 0$. Otherwise, the provincial government might strictly prefer $n_m = 0$ to some $n_m \in (0, n_f)$. I break the tie by assuming that the provincial government could write a recommendation to all the investors by coordinating them to its most favorable Nash equilibrium. Hence when the provincial government chooses $\phi = 0$, all the investors will make FDI. All the other cases are straightforward.

On the demand side, the provincial government can always implement zero FDI by setting

ϕ sufficiently high whenever it dislikes FDI ($\lambda < \widetilde{\lambda}(\tau)$). On the supply side, the investors won't invest for sure when (9) is violated. Whenever (16) is violated, either the demand or the supply of FDI must be zero.

Proposition 1. *In the equilibrium with one province, the equilibrium FDI is either null or full:*

$$\begin{aligned} n_m^* &= \int_{j \in N_f} D_j^* dj \\ &= \begin{cases} n_f, & \text{if } \widetilde{\lambda}(\tau) < \lambda \leq 1 - \tau^{-\varepsilon} w^{1-\varepsilon} \\ 0, & \text{if otherwise} \end{cases}, \end{aligned}$$

moreover, the provincial government's strategy is given by (15), the optimal entry decision of any $j \in N_f$,D_j^*, is given by (12), the equilibrium prices $p^*(j)$, $j \in N$, are given by (3).

This proposition establishes the crucial result that the unique equilibrium FDI is a corner solution. The underlying logic for this bifurcation lies in the fact that there exists endogenously decreasing negative pecuniary externality between the domestic and multinational firms. If the negative pecuniary externality is increasing, we could have an interior solution because the revenue as a function of the entry cost might exhibit a hump shape instead of the U shape. Proposition 1 shows that which extremity is reached shall depend on the exogenous policy profile of the profit tax rate and tariff rate. A small difference in this policy profile near the threshold values might be amplified to diametrically different government attitude toward FDI. Before we examine how the profit tax rate and tariff rate are determined, let's first explore whether the horizontal interactions between different provinces can change the above bifurcation result.

3.2 Multiple-Province Economy

3.2.1 Economic Environment

Let's first consider the two-province economy and then generalize it to the N-province economy. The two provinces are indexed by $k \in \{1, 2\}$. Each province is a replicate of the economy described in the last subsection. The two provinces face the same pool of the foreign investors N_f with measure n_f. For analytical parsimony, we assume no inter-provincial trade is allowed.[16] The central government determines the nation-wide uniform tariff rate τ and the profit tax rates on foreign invested firms in the two provinces, denoted by λ_k, for $k \in \{1, 2\}$. No household can own a firm that is located in the other province. Again, all the domestic firms need to turn in the profit tax with the exogenous rate$\overline{\lambda}$ and each provincial government obtains$1-\gamma$ of the tax revenue in that province. The rest of the profit tax revenue accrues to the central government introduced later.

The timing is that after observing the public information about τ and λ_k, for $k \in \{1, 2\}$, both provincial governments decide their own entry cost ϕ_k simultaneously and non-cooperatively. Then all the investors make investment decisions simultaneously. The rest is exactly the same as before.

The government of province k solves

$$\max_{\phi_k \geq 0} (1-\gamma)[\lambda_k \pi_m(k) n_m(k) + \overline{\lambda} n_h \pi_h(k)], \tag{17}$$

where $n_m(k), \pi_m(k)$ and $\pi_h(k)$ denote, respectively, the amount of FDI, the profit of a multinational firm, and the profit of a domestic firm in province k.

To avoid the trivial case with no provincial competition, I assume each foreign investor can invest in at most one province. One possible justification is that the investor might be financially constrained to set multiple plants in one country. I also assume that the foreign-invested firms can only serve the provincial market while the other province can be only accessed through export directly from the plant in the foreign country, so I exclude the possibility that a foreign firm makes FDI in one province and then "export abroad and re-import to the other province". Each investor has the same choice set denoted by $\{A, B(1), B(2)\}$, where A refers to exporting to both provinces, in which case the total profit is

$$\Pi^A = \sum_{k=1}^{2} \pi_f(k), \tag{18}$$

$B(1)$ refers to making FDI in province 1 while exporting to province 2:

$$\Pi^{B(1)} = [(1-\lambda_1)\pi_m(1) - \phi_1] + \pi_f(2), \tag{19}$$

[16] Relaxing this assumption would not affect the validity of the main result but would make the comparison with the one-province model more difficult. Young(2000) argued with ample empirical evidence that China's gradual reform strategy resulted in enormous distortions in the economy, one of which is the extremely strong regional protectionism. The domestic market is segregated across different provinces. Regional protectionism is also strong in India(see Singh, 2005).

and $B(2)$ refers to making FDI in province 2 while exporting to province 1:

$$\Pi^{B(2)} = [(1-\lambda_2)\pi_m(2) - \phi_2] + \pi_f(1). \tag{20}$$

Therefore, for any potential investor $j \in N_f$, she chooses

$$D_j^* \in \arg \max_{D \in \{A, B(1), B(2)\}} \{\Pi^A, \Pi^{B(1)}, \Pi^{B(2)}\}. \tag{21}$$

Definition 2. *An equilibrium with two provinces is a collection of the fixed cost* $\{\phi_k^*\}_{k=1}^2$, *the commodity prices* $p^*(j,k)$, $j \in N, k = 1,2$, *and the investment decisions* D_j^*, *for all* $j \in N_f$, *such that:*

1. *Each provincial government* $k = 1,2$ *maximizes its fiscal revenue(17) by choosing* ϕ_k^*, *which is a best response to* ϕ_{-k}^*.
2. *Each potential investor* $j \in N_f$ *makes the investment (and location choice) decision* D_j^* *in (21) and the pricing decision* $p^*(j,k)$, *given* $\{\phi_k^*\}_{k=1}^2$. D_j^* is a best response to D_{-j}^*.
3. *Each domestic firm* $j \in N_h$ *in province* k *maximizes its profit, the solution to which is* $p^*(j,k)$.
4. *Each household maximizes the utility by choosing the right consumption subject to the budget constraint.*
5. *Markets clear for the domestic labor, each domestically produced and consumed commodity, and the international payment is balanced for the domestic economy.*

3.2.2 Symmetric Equilibrium

$p^*(j,k)$, $j \in N, k = 1,2$,is still given by (3) ignoring index k. Consider the simple case with identical exogenous profit tax rates on the multinational firms for the two procinces:

$$\lambda_1 = \lambda_2 = \lambda. \tag{22}$$

Let's characterize the symmetric two-province equilibrium with the following two properties:

$$\phi_1^* = \phi_2^*, \tag{23}$$

and

$$n_m^*(1) = n_m^*(2). \tag{24}$$

Observe first that (24) alone implies equal profit for each type of firms across the two provinces:

$\pi_x^*(1) = \pi_x^*(2)$ for any $x \in \{h, m, f\}$. Second, (23) together with the previous result implies that each investor must be indifferent between the two provinces as their investment destinations in the symmetric equilibrium, if such an equilibrium exists. Third, the investment decision problem can be reduced to (8) at each province in the symmetric equilibrium. Obviously, (9)

remains as a necessary condition to attract positive FDI. Suppose it always holds. Now that the largest possible FDI for each province in the symmetric equilibrium is $\frac{n_f}{2}$ instead of n_f, I define

$$\widehat{\lambda}(\tau) \equiv \frac{n_h {c_h}^{1-\varepsilon}\left\{\left(n_h {c_h}^{1-\varepsilon}+n_f(\tau w c_f)^{1-\varepsilon}\right)^{\frac{\varepsilon-\theta}{1-\varepsilon}}-\left(n_h {c_h}^{1-\varepsilon}+\frac{n_f((\tau w c_f)^{1-\varepsilon}+{c_f}^{1-\varepsilon})}{2}\right)^{\frac{\varepsilon-\theta}{1-\varepsilon}}\right\}\overline{\lambda}}{{c_f}^{1-\varepsilon}\frac{n_f}{2}\left(n_h {c_h}^{1-\varepsilon}+\frac{n_f((\tau w c_f)^{1-\varepsilon}+{c_f}^{1-\varepsilon})}{2}\right)^{\frac{\varepsilon-\theta}{1-\varepsilon}}},$$

which is the lowest possible profit tax rate that can induce the provincial government to strictly prefer $n_m(k)=\frac{n_f}{2}$ to zero FDI. $\widehat{\lambda}(\tau)$ is strictly increasing in τ and smaller than $\frac{\varepsilon-\theta}{\varepsilon-1}\overline{\lambda}$. In addition, $\widehat{\lambda}(\tau)>\widetilde{\lambda}(\tau)$, for any $\tau\geq 1$. When $\lambda=\widetilde{\lambda}(\tau)$, the provincial governments impose a prohibitively high entry cost because they each know that they can't both achieve full FDI simultaneously. When (9) holds as an equality with zero fixed cost, any $n_m^*(1)=n_m^*(2)\in[0,\frac{n_f}{2}]$ can be realized as a result of the simultaneous investment decisions, in which case I assume that provincial government's most favorable equilibrium $n_m^*(1)=n_m^*(2)=\frac{n_f}{2}$ will be realized for the similar argument as before. When (9) is violated, no FDI will be supplied hence the entry cost is irrelevant and $n_m^*(1)=n_m^*(2)=0$. More precisely, we have the following proposition.

Proposition 2. *When $\lambda\in(\widetilde{\lambda}(\tau),\widehat{\lambda}(\tau))$, there exists no symmetric equilibrium in the economy with two ex ante identical provinces, however, there exists an asymmetric equilibrium in which one province absorbs full FDI while the other has no FDI. When $\lambda\notin(\widetilde{\lambda}(\tau),\widehat{\lambda}(\tau))$, the symmetric equilibrium does exist, in which the equilibrium FDI still bifurcates:*

$$n_m^*(1)=n_m^*(2)=\begin{cases}0, & if \quad \lambda\leq\widetilde{\lambda}(\tau), 1-\lambda-\tau^{-\varepsilon}w^{1-\varepsilon}\geq 0 \text{ or} \\ & \quad 1-\lambda-\tau^{-\varepsilon}w^{1-\varepsilon}<0 \\ \frac{n_f}{2}, & if \quad \lambda\geq\widehat{\lambda}(\tau), 1-\lambda-\tau^{-\varepsilon}w^{1-\varepsilon}\geq 0\end{cases}. \tag{25}$$

When $\lambda<\widetilde{\lambda}(\tau)$, the provincial government in province k would make ϕ_k^* sufficiently large to deter any FDI. When $\widetilde{\lambda}(\tau)<\lambda<\widehat{\lambda}(\tau)$, no symmetric equilibrium exists because each provincial government strictly prefers zero FDI to any $n_m(k)\in(0,\frac{n_f}{2}]$, but would strictly prefer $n_m(k)=n_f$ to zero FDI. Therefore there exists one and only one pure-strategy asymmetric equilibrium, in which one provincial government completely blocks any FDI by setting its ϕ sufficiently large while the other provincial government sets ϕ equal to zero and attracts full FDI. If $\lambda\geq\widehat{\lambda}(\tau)$, then the government k has a higher revenue at $n_m(k)=\frac{n_f}{2}$ than at zero FDI. In addition, the revenue is strictly increasing in $n_m(k)$ on $[\frac{n_f}{2},n_f]$, so the symmetric equilibrium exists, in which $n_m^*(1)=n_m^*(2)=\frac{n_f}{2}$ and $\phi_1^*=\phi_2^*=0$. Half of the foreign investors will export to Province 2 and make FDI in Province 1 while the other half will export to Province 1 and make FDI in Province 2. The optimal decisions for the provincial governments are given by

$$\phi_1^*=\phi_2^*=\begin{cases}\text{any value on } [\overline{\phi},\infty), & if \quad \lambda\leq\widetilde{\lambda}(\tau), 1-\lambda-\tau^{-\varepsilon}w^{1-\varepsilon}\geq 0 \\ 0, & if \quad \lambda\geq\widehat{\lambda}(\tau), 1-\lambda-\tau^{-\varepsilon}w^{1-\varepsilon}\geq 0 \\ \text{any value on } [0,\infty), & if \quad 1-\lambda-\tau^{-\varepsilon}w^{1-\varepsilon}<0\end{cases}, \tag{26}$$

and, for any investor $j \in N_f$, the optimal entry decision is

$$D_j^* = \begin{cases} B(1) \text{ or } B(2), & if \quad \lambda < 1 - \tau^{-\varepsilon} w^{1-\varepsilon},\ \phi_1 = \phi_2 = 0 \\ A, & if \quad \lambda < 1 - \tau^{-\varepsilon} w^{1-\varepsilon},\ \phi_1 = \phi_2 \geq \overline{\phi} \text{ or } 1 - \lambda - \tau^{-\varepsilon} w^{1-\varepsilon} < 0 \\ A, \text{or } B(1),\ \text{or } B(2), & if \quad \lambda = 1 - \tau^{-\varepsilon} w^{1-\varepsilon}, \phi_1 = \phi_2 = 0, \end{cases} . \tag{27}$$

Hence, the FDI bifurcation obtained in the single-province equilibrium remains valid in the two-province equilibrium. Their main difference is that the entry cost might be positive in the single-province equilibrium with positive FDI while in the two-province equilibrium, symmetric or not, the potential regional competition drives the entry cost down to zero for sure in the province with positive FDI. In this very sense, introducing another province won't affect the equilibrium FDI at the national level for any given profit tax rate and tariff rate. However, the equilibrium attitude of any particular provincial government might change as there are more competing provinces. This occurs only when the total investor pool n_f is sufficiently small such that it can support positive FDI in some but not all the provinces in the equilibrium.

This result holds for more than two provinces. Define

$$\Lambda(z, \tau) \equiv \frac{\overline{\lambda} {n_h c_h}^{1-\varepsilon} \left\{ \left[\frac{{n_h c_h}^{1-\varepsilon} + n_f (\tau w c_f)^{1-\varepsilon}}{{n_h c_h}^{1-\varepsilon} + (n_f - z)(\tau w c_f)^{1-\varepsilon} + z {c_f}^{1-\varepsilon}} \right]^{\frac{\varepsilon-\theta}{1-\varepsilon}} - 1 \right\}}{z {c_f}^{1-\varepsilon}}, \tag{28}$$

where $z \in [0, n_f]$. Using L'Hospital Rule, we obtain $\Lambda(0, \tau) = \frac{\varepsilon-\theta}{\varepsilon-1} \left(\frac{\overline{\lambda} {n_h c_h}^{1-\varepsilon}}{{c_f}^{1-\varepsilon}} \right) \left(\frac{{c_f}^{1-\varepsilon} - (\tau w c_f)^{1-\varepsilon}}{{n_h c_h}^{1-\varepsilon} + n_f (\tau w c_f)^{1-\varepsilon}} \right)$. Note $\widehat{\lambda}(\tau) = \Lambda(\frac{n_f}{2}, \tau)$ and $\widetilde{\lambda}(\tau) = \Lambda(n_f, \tau)$. We can show that $\Lambda_1 < 0$, meaning that the higher the expected amount of FDI that the provincial government k can attract, the lower the threshold value of the profit tax rate. .

Corollary. *In an economy with K ex ante identical provinces, where $K \geq 2$. Suppose the necessary condition for positive FDI supply (9) still holds. Provincial government k would prefer any $n_m(k) \in (0, n_f]$ to $n_m(k) = 0$ if and only if $\lambda \geq \Lambda(n_m(k), \tau)$. In addition, if $\lambda \geq \Lambda(\frac{n_f}{K}, \tau)$, there exists a unique symmetric equilibrium, in which $\phi_k^* = 0$ and $n_m^*(k) = \frac{n_f}{K}$, for all $k \in \{1, 2, ..., K\}$. If $\lambda \leq \Lambda(n_f, \tau)$, then there exist a continuum of symmetric equilibria, in which $\phi_k^* \geq \overline{\phi}$ and the FDI is uniquely zero: $n_m^*(k) = 0$, for all $k \in \{1, 2, ..., K\}$. If $\lambda \in (\Lambda(n_f, \tau), \Lambda(\frac{n_f}{K}, \tau))$, no symmetric equilibrium exists.*

We can also show that $\Lambda_2 > 0$ and $\Lambda(n_f, 1) \leq \Lambda(n_m(k), \tau) \leq \Lambda(0, \infty) = \left(\frac{\varepsilon-\theta}{\varepsilon-1} \right) \overline{\lambda} < \overline{\lambda}$. Therefore, when $\lambda < \Lambda(n_f, 1)$, all the provinces will block FDI and there will be zero FDI at any tariff rate τ. By contrast, when $\lambda > \left(\frac{\varepsilon-\theta}{\varepsilon-1} \right) \overline{\lambda}$, the equilibrium FDI at the national level will be always equal to n_f although the regional distribution of FDI might be different across ex ante identical provinces. Next I will characterize asymmetric equilibrium more systematically.

3.2.3 Asymmetric Equilibrium

First, I show that the FDI bifurcation the national level is a robust result, independent of the horizontal intereaction between the provinces.

Proposition 3. *In any equilibrium with K ex ante identical provinces ($K \geq 2$), symmetric or not, the aggregate FDI must be either zero or full.*

Proof. By contradiction. Suppose there exists an asymmetric equilibrium which satisfies

$$0 < \sum_{k=1}^{K} n_m^*(k) < n_f.$$

So $n_m^*(k) > 0$ for some $k \in \{1, 2, ..., K\}$. It implies that $\lambda_k^* \geq \Lambda(n_m^*(k), \tau) > \Lambda(n_m^*(k) + \Delta, \tau)$ for some small $\Delta > 0$ because $\Lambda_1 < 0$. Moreover, $n_m^*(k) + \Delta$ is feasible as $\sum_{k=1}^{2} n_m^*(k) < n_f$. This contradicts the optimality of $n_m^*(k)$ because any provincial government is assumed throughout to coordinate the investors' behavior to its most preferred Nash Equilibrium. **Q.E.D.**

Now let's consider the asymmetric equilibrium with full FDI for $K = 2$, namely,

$$\sum_{k=1}^{2} n_m^*(k) = n_f. \tag{29}$$

Proposition 4. *If two ex ante identical provinces both have positive FDI in the equilibrium, then the entry cost is zero in both provinces ($\phi^*(k) = 0, \forall\ k \in \{1, 2\}$) and the FDI allocation is given by*

$$\begin{cases} n_m^*(1) = F(\lambda_1, \lambda_2) \\ n_m^*(2) = F(\lambda_2, \lambda_1) \end{cases}, \tag{30}$$

where $F(x, y)$ is defined as

$$\frac{(1 - y - \tau^{-\varepsilon} w^{1-\varepsilon})^{\frac{1-\varepsilon}{\varepsilon-\theta}} \left[n_h {p_h}^{1-\varepsilon} + n_f\, {p_m}^{1-\varepsilon} \right] - (1 - x - \tau^{-\varepsilon} w^{1-\varepsilon})^{\frac{1-\varepsilon}{\varepsilon-\theta}} \left[n_h {p_h}^{1-\varepsilon} + n_f\, {p_f}^{1-\varepsilon} \right]}{\left[(1 - y - \tau^{-\varepsilon} w^{1-\varepsilon})^{\frac{1-\varepsilon}{\varepsilon-\theta}} + (1 - x - \tau^{-\varepsilon} w^{1-\varepsilon})^{\frac{1-\varepsilon}{\varepsilon-\theta}} \right] ({p_m}^{1-\varepsilon} - {p_f}^{1-\varepsilon})}.$$

Proof. Now $n_m^*(k) > 0$ for both $k \in \{1, 2\}$, but $n_m^*(1) \neq n_m^*(2)$.This means $\Pi^{B(1)} = \Pi^{B(2)} \geq \Pi^A$. Competition implies that $\phi^*(k) = 0$ for each $k \in \{1, 2\}$, so we must have

$$(1 - \lambda_1^*)\pi_m^*(1) + \pi_f^*(2) = (1 - \lambda_2^*)\pi_m^*(2) + \pi_f^*(1). \tag{31}$$

By solving (29) and (31), we uniquely obtain (30). Such an equilibrium exists if and only if the foreign investors have incentives to supply FDI, that is, $1 - \lambda_k - \tau^{-\varepsilon} w^{1-\varepsilon} \geq 0$, $\forall k \in \{1, 2\}$,and the provincial governments have incentives to acquire that amount of FDI, that is, $\lambda_k \geq \Lambda(n_m^*(k), \tau)$ for both $k \in \{1, 2\}$. **Q.E.D.**

$F(x, y)$ is strictly decreasing in x and increasing in y, consequently the province with a higher FDI profit tax attracts less FDI. In fact, $\lambda_1 = \lambda_2$ implies a symmetric equilibrium

$n_m^*(1) = n_m^*(2) = \frac{n_f}{2}$ according to (30), which is consistent with (25). Again in such an equilibrium, each province will produce those foreign brands which the other province imports from the foreign country. As a corollary to Proposition 4, if two ex ante identical provinces end up with unequal but positive FDI in the equilibrium, then the FDI profit tax rate must be strictly higher in the province with the smaller FDI.

In an economy with two ex ante identical provinces, if one province (say province 1) ends up with zero FDI while the other (Province 2) has positive FDI in the equilibrium, then first Proposition 3 implies Province 2 has full FDI, that is, $n_m^*(1) = 0$ and $n_m^*(2) = n_f$. This means $\Pi^{B(2)} \geq \Pi^A$ and $\Pi^{B(2)} \geq \Pi^{B(1)}$.Note $n_m^*(2) = n_f$ implies that $\lambda_2 \geq \widetilde{\lambda}(\tau)$ hence $\phi_2^* = 0$. Moreover, $\Pi^{B(2)} \geq \Pi^A$ means $1 - \lambda_2 - \tau^{-\varepsilon} w^{1-\varepsilon} \geq 0$. On the other hand, $\Pi^{B(2)} \geq \Pi^{B(1)}$implies $(1-\lambda_2)\pi_m^*(2)+\pi_f^*(1) \geq (1-\lambda_1)\pi_m^*(1)-\phi_1^*+\pi_f^*(2)$. There are four possible cases for $n_m^*(1) = 0$: (1) $\lambda_1 \leq \widetilde{\lambda}(\tau)$ so ϕ_1^* is big enough to deter any FDI, therefore $\lambda_1 \leq \lambda_2$ with equality holding only when $\lambda_1 = \lambda_2 = \widetilde{\lambda}(\tau)$,at which both provincial governments are indifferent between full FDI and zero FDI; (2) $\lambda_1 > \widetilde{\lambda}(\tau)$ but $1 - \lambda_1 - \tau^{-\varepsilon} w^{1-\varepsilon} < 0$, so $\lambda_2 < \lambda_1$;(3) $\widetilde{\lambda}(\tau) < \lambda_1 = \lambda_2 < \widehat{\lambda}(\tau)$ and $1 - \lambda_1 - \tau^{-\varepsilon} w^{1-\varepsilon} \geq 0$, so Province 2 has full FDI purely by luck; (4) $\lambda_1 \geq \widehat{\lambda}(\tau)$ and $1 - \lambda_1 - \tau^{-\varepsilon} w^{1-\varepsilon} \geq 0$ but $(1 - \lambda_2)\pi_m^*(2) + \pi_f^*(1) > (1 - \lambda_1)\pi_m^*(1) + \pi_f^*(2)$, or equivalently, $(1-\lambda_2-\tau^{-\varepsilon}w^{1-\varepsilon})\pi_m^*(2) > (1-\lambda_1-\tau^{-\varepsilon}w^{1-\varepsilon})\pi_m^*(1)$, which implies $\lambda_2 < \lambda_1$ as $\pi_m^*(2) < \pi_m^*(1)$;

Recall in the one-province economy, a potential investor chooses to make FDI if and only if the net profit of making FDI exceeds the profit of exporting to that province. However, this result might no longer hold in the two-province economy. For example, as shown in case (4), when the net profit of making FDI in Province 1 exceeds the profit of exporting to that province, a potential investor might still make no FDI in that province. This is solely because the net gain of FDI versus exporting is larger in Province 2 than in Province 1. So all the tariff revenue of that country comes from Province 1, where the provincial government can only collect the tax revenues from the domestic firms. Such a difference between the one-province economy and the multiple-province economy would disappear if we relax the constraint that each investor can invest in at most one province.

Lastly, consider the political equilibrium with $n_m^*(1) = n_m^*(2) = 0$. The equilibrium profit tax rate on FDI is either too low to induce the provincial governments to compete for FDI or too high to attract investors. More specifically, if the tariff rate τ is such that $1-\widetilde{\lambda}(\tau)-\tau^{-\varepsilon}w^{1-\varepsilon} < 0$, then the profit tax rates and the entry cost can be any value. If $1 - \widetilde{\lambda}(\tau) - \tau^{-\varepsilon} w^{1-\varepsilon} \geq 0$, then it must be $\lambda_k \leq \widetilde{\lambda}(\tau)$ for both $k \in \{1, 2\}$, hence the two provinces choose possibly different but very high entry cost such that FDI is blocked in both provinces.

The characterization of asymmetric equilibria not only helps us understand the regional allocation of FDI within a country but also proves helpful in understanding the aggregate FDI at the national level. In particular, it shows that for any given profit tax rates and tariff rate the non-cooperative horizontal interaction between the different provincial governments would not affect the aggregate FDI at the national level or the bifurcation result, although the entry cost might change because of the competition effect. All the analyses suggest that the tariff rate and FDI profit tax rates can solely determine the attitude of each provincial government toward FDI and the aggregate level and regional distribution of FDI. They also affect the equilibrium entry costs, depending on how many competing provinces there are in this economy. In the next subsection I will endogenize the tariff rate and profit tax rates on FDI.

3.3 Endogenous Policies

Now there exists a central government in the two-province economy described above. The central government holds all the tariff revenue as well as a fraction γ of the profit tax revenues in both provinces. Suppose all the owners of domestic firms in the country form one organized special interest group (SIG), which tries to persuade the central government to adopt the SIG's favorable policies by offering a non-negative contribution menu $C(\lambda_1, \lambda_2, \tau)$, which is the committed transfer to the central government if λ_1, λ_2 and τ are chosen. Assume there is no lobbying at the provincial level. The timing is as follows:

1. The special interest group lobbies the central government by providing $C(\lambda_1, \lambda_2, \tau)$;
2. The central government decides $\lambda_1, \lambda_2, \tau$;
3. The two provincial governments decide ϕ_1 and ϕ_2 simultaneously;
4. All the potential investors make FDI decisions simultaneously;
5. Labor market opens, output is produced, commodity market opens, taxation and transfer occur, and consumption is realized.

3.3.1 Special Interest Group and Central Government

The special interest group solves

$$\max_{C(\lambda_1,\lambda_2,\tau)} \sum_{k=1}^{2} (1-\overline{\lambda}) n_h \pi_h(k) - C(\lambda_1, \lambda_2, \tau) \tag{32}$$

subject to the participation constraint of the central government. A complete description should also specify how the cost is split among the members of the SIG, but it's irrelevant for our current purpose.[17]

The central government solves:

$$\begin{aligned} &\max_{\lambda_1,\lambda_2,\tau} C(\lambda_1, \lambda_2, \tau) + \sum_{k=1}^{2} \gamma[\overline{\lambda} n_h \pi_h(k) + \lambda_k n_m(k) \pi_m(k)] \\ &+ \sum_{k=1}^{2} \frac{\tau - 1}{\tau} (n_f - n_m(k)) p_f x_f(k) + a \sum_{k=1}^{2} W_k(\tau, n_m(k)), \end{aligned} \tag{33}$$

[17] The owners from different provinces might disagree with the FDI profit tax rates across the two provinces because they want to keep the tax rate rate high in their own province and low in the other province in order to deter FDI into their own province. We simplify our analysis by assuming that all the owners could reach an agreement within themselves and form a single contribution schedule as one interest group. If they form two separate interest groups competing for the favor of the central government, it constitutes a menu auction. The central government's optimal policy choice would remain unchanged because of the transferable utility, although the central government instead of the interest gruops will exploit all the surplus. Another extension is to bring the lobby analysis at the level of the provincial government as well. We will leave these issues for future exploration.

where the second term in (33) is the tax revenue from the profits of the domestic and multinational firms in the two provinces, the third term is the aggregate tariff revenue, and the central government also cares about the welfare of an average household in both provinces, denoted by $W_k(\tau, n_m(k)), k = 1, 2$, with a welfare weight a.[18] Solving the household problem in province k, we obtain

$$W_k(\tau, n_m(k)) = L + (1 - \overline{\lambda})n_h\pi_h(k) + \frac{q(k)^{1-\theta}}{\theta - 1}, \tag{34}$$

which is the sum of the total wage income, the after-tax profit, and the utilities from the consumption. Notice it's the welfare level without taking the lobby cost into account. It strictly decreases with τ and strictly increases with $n_m(k)$ because they prefer low consumption prices. It means that the average households are the anti-protectionists.

Hence (32) and (33) imply the following reduced policy decision problem:

$$\max_{\lambda_1,\lambda_2,\tau} \sum_{k=1}^{2} \left[(1 - \overline{\lambda})n_h\pi_h(k) + aW_k(\tau, n_m(k))\right] + \sum_{k=1}^{2} \gamma[\overline{\lambda}n_h\pi_h(k) \tag{35}$$

$$+\lambda_k n_m(k)\pi_m(k)] + \sum_{k=1}^{2} \frac{\tau - 1}{\tau}(n_f - n_m(k))p_f(k)x_f(k).$$

Let $C(\lambda_1, \lambda_2, \tau) \equiv 0$, the optimized value of (33) is the reservation value for the central government, denoted by $\underline{G}$. We only need to make sure that the central government can get at least $\underline{G}$ after taking some transfer $C(\lambda_1, \lambda_2, \tau)$.

3.3.2 Political Equilibrium

Definition 3. *A Political Equilibrium(PE) is a collection of the policy variables* $\tau^*, \{\phi_k^*, \lambda_k^*\}_{k\in\{1,2\}}$, *the commodity prices* $p^*(j), j \in N$, [19] *the lobby schedule function* $C^*(\lambda_1, \lambda_2, \tau)$, *and the investment decisions* D_j^*, *for all* $j \in N_f$, *such that:*

1. *The interest group of the domestic firm owners solves (32), the solution to which is* $C^*(\lambda_1, \lambda_2, \tau)$;
2. *The central government solves (33), the solution to which is* $\tau^*, \{\lambda_k^*\}_{k\in\{1,2\}}$;
3. *Each provincial government k maximizes its fiscal revenue by solving (17), the solution to which is* ϕ_k^*, *given* $\tau^*, \{\lambda_k^*\}_{k\in\{1,2\}}$,*and* ϕ_k^* is a best response to $\phi_{k'}^*, k' \neq k$, *for* $k, k' \in \{1, 2\}$;
4. *Each potential investor* $j \in N_f$ *makes the investment decision,* D_j^*, *and pricing decision* $p^*(j)$, *given* $\tau^*, \{\phi_k^*, \lambda_k^*\}_{k\in\{1,2\}}$. *It's a best response to all* $D_{j'}^*, j\prime \in N_f$, $j\prime \neq j$, *and all* $p^*(j'), j' \in N$, $j\prime \neq j$.
5. *Each domestic firm* $j \in N_h$ *maximizes profit, the solution to which is* $p^*(j)$.

[18] Breton and Salanie (2003) examine in a different environment the interest group formation and the lobbying behavior when the politicans have different types captured by the parameter a, which is privately informed.

[19] The prices must be the same across the two provinces as implied by (3).

6. *Each household maximizes the utility by choosing the right consumption subject to the budget constraint.*

7. *Markets clear for domestic labor, each domestically produced and consumed commodity, and the international payment is balanced for the domestic economy.*

Lemma. *There always exists at least one Political Equilibrium.*

Proof. First, notice $\lambda_k \in [0,1]$ for $k \in \{1,2\}$. Second, $\phi_k \in [0, \phi_{\max}]$, where $\phi_{\max} \equiv \frac{1}{\varepsilon} p_m^{1-\varepsilon} \overline{q}^{\varepsilon-\theta}$. $\overline{q} = n_h^{\frac{1}{1-\varepsilon}} p_h$ is the finite upper bound of (5). Third, we have $\tau \in [1, \tau_{\max}]$, where $\tau_{\max} < \infty$ because it's easy to show that $\tau_{\max} = \infty$ is not optimal for the continuous function(35). In addition, the entry decision(21) is a finite discrete choice, and every element of it is a continuous function. Thus, there must exist at least one solution for the optimization problems (35) and (17), because the goal function is continuous and the domains of the choice variables are compact. **Q.E.D.**

Let's mainly focus on the PE with the property of symmetry, because we have shown that the asymmetric political equilibrium doesn't affect the FDI at the national level.

3.3.3 Symmetric Political Equilibrium

As compared with the symmetric equilibrium in the last subsection, the only additional requirement for the symmetry is that the two provinces have the same endogenous profit tax rates on the multinational firms:

$$\lambda_1^* = \lambda_2^* = \lambda^*. \tag{36}$$

Definition 4. *A Symmetric Political Equilibrium (SPE) is a PE which satisfies (22), (23), and (24).*

Based on *(22)-(24),* and (26), it is feasible for the central government to induce an SPE with positive FDI if and only if D_τ is not empty, where $D_\tau \equiv \{\tau \in [1,\infty) |\ 1 - \widehat{\lambda}(\tau) - \tau^{-\varepsilon} w^{1-\varepsilon} \geq 0\}$. Since $\widehat{\lambda}(\infty) < 1$, D_τ is indeed non-empty.

Let's consider the choice of the SIG, which wants to block FDI as best as it can, thus it will prefer a high profit tax on FDI. A higher tariff rate encourages FDI but it also implies a higher profit for domestic firms given FDI, so the preference of SIG for the tariff rate is ambiguous. It's easy to show that the optimal contribution schedule, $C^*(\lambda_1, \lambda_2, \tau)$, whenever $\lambda_1 = \lambda_2 = \lambda$, must satisfy: (1) it's affordable by the lobby, (2) when $\tau \notin D_\tau$,it's strictly increasing with τ and doesn't change with λ , (3) for any given $\tau \in D_\tau$ and any $\lambda, \lambda' < 1 - \tau^{-\varepsilon} w^{1-\varepsilon}$, $C^*(\lambda, \lambda, \tau) < C^*(\lambda', \lambda', \tau)$ when $\lambda \geq \widehat{\lambda}(\tau) > \widetilde{\lambda}(\tau) > \lambda'$, but $C^*(\lambda, \lambda, \tau) = C^*(\lambda', \lambda', \tau)$ when $\lambda > \lambda' \geq \widehat{\lambda}(\tau)$ or $\widehat{\lambda}(\tau) > \lambda > \lambda'$, and (4) when $\lambda > 1 - \tau^{-\varepsilon} w^{1-\varepsilon}$ or $\widetilde{\lambda}(\tau) > \lambda$, $C^*(\lambda, \lambda, \tau)$ is strictly increasing in τ.

The central government's choice of the profit tax rate λ_k and tariff rate τ depends on the relative magnitude of each component in the goal function (33). In terms of the profit tax revenue, the central government's interest is perfectly aligned with the provincial government.

As to the tariff revenue, the central government wants to keep FDI as small as possible but needs to balance the trade-off between the tariff rate and the import demand.

I first characterize the optimal choice of a benevolent central government in an SPE. That is, $a \to \infty$, so (33) reduces to maximizing (34).

Proposition 5. *Suppose the central government is benevolent ($a \to \infty$). There exists only one SPE , which has a positive profit tax on FDI ($\lambda^* = 1 - w^{1-\varepsilon}$), zero net tariff rate ($\tau^* = 1$), full entry of FDI to the country ($n_m^*(1) = n_m^*(2) = \frac{n_f}{2}$), and zero fixed cost ($\phi_1^* = \phi_2^* = 0$), if $1 \in D_\tau$.*[20]

The proof is straightforward. It is the most efficient incentive-compatible SPE in the sense that it features full adoption of advanced foreign technology and no international trade barrier. However, the positive profit tax on multinationals is more than necessary to induce the provincial governments to impose zero fixed cost, because any profit tax rate on the interval $[\widehat{\lambda}(1), 1 - w^{1-\varepsilon}]$ can support the full FDI equilibrium but the central government obviously would choose the revenue-maximizing one. If there exist several such developing economies engaged in perfect competition for the potential investors, the equilibrium profit tax rate should be driven down to $\widehat{\lambda}(1)$.

Proposition 6. *Suppose the central government doesn't care about the welfare of the public at all ($a = 0$). If the share of tax revenue γ is sufficiently small, then in the SPE, we must have a high tariff rate ($\tau^* > \frac{\varepsilon}{\varepsilon - 1}$), sufficiently small profit tax on FDI ($\lambda^* \leq \widetilde{\lambda}(\tau^*)$), no FDI ($n_m^*(1) = n_m^*(2) = 0$), and high fixed cost ($\phi_1^* = \phi_2^* \geq \overline{\phi}$).*

Proof. By examining (35) together with *(23)-(36)*. Also notice that the fiscal revenue is strictly increasing with the tariff rate at least up to $\frac{\varepsilon}{\varepsilon - 1}$. **Q.E.D.**

The intuition is that when the fraction of profit tax revenues γ becomes sufficiently small, the central government cares more about the sum of the lobby contribution and the tariff revenue, both of which decrease with the amount of FDI. Moreover, the tax revenue from the domestic firms also decreases with the amount of FDI. The fiscal revenue also increases with the tariff rate as least up to $\frac{\varepsilon}{\varepsilon - 1}$. A small elasticity of substitution ε implies a high tariff rate because of the low demand elasticity for the imports. $a = 0$ implies the anti-protectionist average households are no longer part of the central government's concern, naturally making the central government more prone to increase tariff and block FDI.

Such an economy is inefficient in the sense that the general public's welfare is actually minimized as $\varepsilon \to 1$, due to the huge trade barrier and no FDI (technology adoption). When $\lambda_1^* = \lambda_2^* < \widetilde{\lambda}(\tau^*)$, FDI could be very profitable if the fixed cost is low, but the central government induces the provincial government to be hostile toward FDI by increasing the fixed cost to the point unacceptable for the potential investor. When $\lambda^* > 1 - \tau^{*-\varepsilon} w^{1-\varepsilon}$, in particular, if $\lambda_1^* = \lambda_2^* \geq \widehat{\lambda}(\tau^*)$, the provincial governments would compete for FDI, but the potential investors would not make FDI because the tax rate is just too high. This is one example how the "bad" political institution (a is too small) induces a high barrier to technology adoption and tremendous trade protection.

Between the two extreme points of the spectrum (a is finitely positive), the trade-off

[20] We exclude the possibility of any import subsidy or any wealth transfer from the central government to the households. Strictly speaking, the equilibrium profit tax rate should be slightly smaller than but infinitely closer to $1 - w^{1-\varepsilon}$.

between the different conflicting economic and political entities becomes more complicated, therefore it's harder to characterize the equilibrium policies analytically. Nevertheless, the extremity of the provincial government's attitude toward FDI remains unchanged hence the equilibrium FDI at the national level must be either 0 or n_f, even if no SPE exists. For the general case, we have the following proposition.

Proposition 7. *When the welfare weight a is sufficiently small, there exists a threshold value for the central government's share of the tax revenue, denoted by γ^*, such that the equilibrium FDI is full if and only if $\gamma \geq \gamma^*$.*

The intuition is most straightforward when $a = 0$ and $\tau = 1$, in which case an increase in γ will increase the relative importance of foreign-invested firm profits in the reduced policy determination goal function (35), and therefore it's more likely that the central government prefers full FDI to zero FDI. This would not be true if there exists no special interest group that represents domestic firms. Now if $a > 0$, when substituting (34) into (35), the conclusion obviously remains valid. Since the tariff revenue decreases with FDI n_m, the above argument

goes through when $\tau > 1$.

4 Quantitative Results

In this part, quantitative implications from the above model will be exploited using China and India's data. I will first simulate the model with China and India's data separately. Second,

I will conduct robustness check by varying those parameters that can not be directly obtained from the existing literature or the data available. The calibration procedure is almost the same for China and India. Quantitative comparison between the two countries, especially the choice of parameters, will be addressed simultaneously when calibrating with India's data. Third, some counterfactual experiments are conducted.

4.1 Data and Benchmark Calibration For China

I calibrate the model with China's data in 2004, the most recent year in which all the relevant data are available. The main data source is China Statistical Yearbook(2005).

This is how we get those values. $\gamma = 0.6$ is the calculated share of the corporate income tax revenue accruing to the central government. $\overline{\lambda} = 0.33$ is China's corporate tax rate on the domestic firms.n_f and n_h are set to match the fact that the ratio of the numbers of domestic firms versus foreign-invested firms in China's industrial sector is roughly 1:12. $c_h : c_f = 6$ is set to match the fact that the labor productivity(in PPP-based value) ratio of OECD versus China in 2004 is \$59658 to \$10168, or roughly, 6:1.[21] All the non-industrial sectors are assumed to be

[21] This comes from the report by Japan Productivity Center for Socio-Economic Development based on the statistics of OECD and World Bank. The report is on the website: www.jpc-sed.org.jp.

the numeraire sector. ε is computed from the following equation

$$\frac{\pi_h}{\pi_m} = \left(\frac{c_h}{c_f}\right)^{1-\varepsilon},$$

where $\frac{\pi_h}{\pi_m}$ is the average profit ratio of a domestic firm versus a foreign-invested firm in the industrial sector, which equals 0.20344 in the data. Branstetter and Feenstra(2002) estimate this structural parameter ε by using China's 1990-1995 cross-province panel data. The estimated value for ε was 2.05 and it became 3.31 if adjusted for the export data. θ by assumption needs to satisfy $1 < \theta < \varepsilon$.There's no sensible point estimation for it in Bransetter and Feenstra because it's negative, so it's a free parameter in our investigation. I choose $\theta = 1.8$, but will also experiment with other values. a measures, broadly speaking, the welfare weight on the anti-protectionist household in the central government goal function. Bransetter and Feenstra find that the welfare weight on the consumer's welfare was about one half of the weight on the profits of the domestic firms based on the 1990-1995 China's provincial data. That ratio was between one-fifth and one -twelfth when the data from 1985 to 1990 is also incorporated. It means that the ratio increased by more than 2.5 to 6 times in 1990-1995 as compared with the preceding five years. This weight ratio is $\frac{1-\overline{\lambda}+\gamma\overline{\lambda}}{a}$ in our model, which implies that $a = 0.434$ if the ratio was still one half. In the past 15 years, China's market-orientated policy change has been even more dramatic and a large fraction of the state-owned enterprises have gone bankrupt or been restructured into private firms, so it seems reasonable to expect a to be much larger than 0.434 in 2004. I choose $a = 1.302$ by setting the weight ratio equal to 1.5. I also experiment with other values for a including $a = 0.434$. L is set equal to 3, to make sure that the equilibrium $l_m : l_n$ is roughly 1: 21.6 given the other benchmark parameters. Recall w is the wage ratio of the foreign workers versus the domestic workers with the same productivity in the same industry. For the benchmark calibration, I simply set it equal to unity. The parameter choices are summarized in Table 3.

Table 3: Parameter Choices for China (2004)

Parameters	Description	Values
γ	central government's tax share	0.6
$\overline{\lambda}$	profit tax rate on domestic firms	0.33
$n_f : n_h$	# foreign firms vs. # domestic firms	1 : 6
$c_f : c_h$	labor productivity ratio	6 : 1
L	total population	3
ε	substitution elasticity	1.89
θ	price elasticity of CES aggregate	1.8
a	weight on average household welfare	1.302
w	foreign wage	1

The following describes the real data for the endogenous variables in the model. $n_m^*(k) : n_h$ is measured by the numbers of the industrial firms in 2004. There were 1269098 domestic firms in the industry and 106165 foreign-invested firms(including the investment from Hong Kong, Macao, and Taiwan). There are two provinces in the model thus $n_m^*(k) : n_h$ is roughly 1: 12. λ_k^* is the profit-tax rate on the foreign-invested firms. According to China's tax rule, the profit tax rate should be 30% for general coastal open regions but 15% for special economic zone. According to Pricewaterhouse Coopers(2006) World Tax Summaries, China's corporate

tax rate on foreign firms was 33.0%. Tariff rate τ^* is 1.104 because according to the *Import and Export Tariff Rules of the People's Republic of China(2004),* the general net tariff rate is 10.4%. Labor allocations $l_h : l_m : l_n$ are measured using the total employment in the industrial sector in 2004. The total employment was 752 million people in the whole economy, among which 29.9141 million were allocated in the foreign-invested industrial firms(including investment from Hong Kong, Macao, and Taiwan). The total employment in the domestic industrial firms was 73.1253 million. I assume that all the workers in the non-industrial sectors were in the numeraire sector. Thus $l_h : l_m : l_n$ is roughly 2.4: 1: 21.6. Provincial GDP is set to be half of the total GDP in 2004, which was $\frac{15987.83}{2}$, or roughly 8000 billion Yuan. $n_h\pi_h : n_m^*(k)\pi_m$ are measured by the total profit ratio between domestic industrial firms and the foreign-invested industrial firms, which was 925.839 billion Yuan versus 380.735 billion Yuan in 2004, or roughly 2.4:1.

The benchmark parameters listed in Table 3 are plugged into the theoretical model to compute the political equilibrium. All the calibration/simulation results from the model are summarized in Table 4 together with the real data:

Table 4: Data and Calibration Result for China

	$n_m^*(k) : n_h$	λ_k^*	τ^*	$l_h : l_m : l_n$	$GDP : n_h\pi_h : n_m^*(k)\pi_m$
Data	1: 12	(0.15, 0.30)	1.104	2.4: 1: 21.6	21.0: 2.4 : 1
Model	1: 12	0.2382	1.155	2.4: 1: 21.7	25.8: 2.4: 1

We can see that the calibration result matches the data quite well. Most importantly, the computed equilibrium FDI is full in the sense that $n_m^*(k) : n_h$ is 1:12 instead of zero (recall the bifurcation result in Theorem 3). According to our theoretical model, we have

$$\frac{l_h}{l_m} = \frac{n_h\pi_h}{n_m^*(k)\pi_m} = \frac{n_h}{n_m^*(k)}\left(\frac{c_h}{c_f}\right)^{1-\varepsilon}.$$

This is confirmed amazingly well by the real data because both $l_h : l_m$ and $n_h\pi_h : n_m^*(k)\pi_m$ are about 2.4:1. The predicted τ^* is higher than the data at least partly due to the following two reasons besides measurement errors: one is that the real tariff rate is also subject to the outside downward pressure from WTO after China's entry in 2001. Second, any real-life iceberg transaction cost in the international trade will be added to the predicted value for the tariff rate in the calibration.

4.2 Robustness Check for China

a and θ are two free parameters, thus I will conduct two sets of numerical experiments to check the sensitivity of our benchmark result. Table 5a presents the results of our experiment with

parameter θ.

Table 5a: Sensitivity Relative to θ

θ	$n_m^*(k) : n_h$	λ_k^*	τ^*	$l_h : l_m : l_n$	$GDP : n_h\pi_h : n_m^*(k)\pi_m$
Data	1: 12	(0.113, 0.33)	1.104	2.4: 1: 21.6	21.0: 2.4 : 1
Model	1: 12	0.2382	1.1550	2.4: 1: 21.7	25.8: 2.4: 1
1.88	1: 12	0.2192	1.1400	2.4: 1: 21.5	25.6: 2.4: 1
1.70	1: 12	0.2913	1.2000	2.4: 1: 22.0	26.0: 2.4 : 1
1.50	1: 12	0.3634	1.2700	2. 4: 1: 22.4	26. 4: 2. 4: 1
1.01	1: 12	0.5495	1.5250	2. 4: 1: 22.8	26. 8: 2. 4: 1

We see that the equilibrium FDI remains unchanged with the change of θ, which suggests that the government policies toward FDI are always sufficiently favorable. Both λ_k^* and τ^* increase as θ decreases. The intuition is straightforward: As the price elasticity for the composite good decreases, the demand for the imported goods becomes less elastic, hence the central government can obtain more tariff revenue by increasing the tariff rate. The profit of the multinationals must increase because the consumer price of the imported goods increases and the cross-price elasticity is positive. This would allow for an increase in the profit tax rate on the multinational firms without scaring them away. Mathematically, since $1 - \lambda_k^* - \tau^{*-\varepsilon} w^{1-\varepsilon} = 0$ holds whenever the equilibrium FDI is positive, the profit tax rate must change in the same direction with the tariff rate.

Table 5b shows that when the weight on the consumer welfare a is below 0.071, there will be no FDI in the equilibrium. This is because the central government now cares relatively more about the domestic firms' profits and its tariff revenue, hence it induces the provincial governments to block FDI. One way is to set the multinational profit tax rate equal to zero. But when a is more than 1/12 of the domestic firm profit's weight (that is, $a \geq 0.072$), the equilibrium FDI is always positive. Branstetter and Feenstra (2002) found $a = 0.434$ for China from 1990-1995. Even if we plug that value into the benchmark simulation, it also generates full FDI equilibrium, as shown in Table 5b. Since the value of a should be larger than 0.434 in 2004 as we argued earlier, we can thus conclude that China's policies toward FDI robustly

remained sufficiently favorable relative to the variation of the parameter a.

Table 5b: Sensitivity Relative to a

a	n_m^*:n_h	λ_k^*	τ^*	$l_h : l_m : l_n$	GDP: $n_h\pi_h$: $n_m^*\pi_m$
Data	1: 12	(0.15,0.30)	1.104	2.4: 1: 21.6	21.0: 2.4 :1
Model	1: 12	0.2382	1.155	2.4: 1: 21.7	25.8: 2.4:1
1.62	1: 12	0.0090	1.005	2. 4: 1: 22. 0	25. 9: 2. 4:1
1.50	1: 12	0.1121	1.065	2. 4: 1: 21. 8	25. 9: 2. 4:1
1.00	1: 12	0.4444	1.365	2. 4: 1: 21. 6	25. 8: 2. 4:1
0.868 ($\frac{1}{1}$)†	1: 12	0.5045	1.450	2. 4: 1: 21. 6	25. 7: 2. 4:1
0.434 ($\frac{1}{2}$)	1: 12	0.7127	1.935	2. 4: 1: 21. 5	25. 6: 2. 4:1
0.174 ($\frac{1}{5}$)	1: 12	0.8118	2.420	2. 4: 1: 21. 5	25. 6: 2. 4:1
0.072 ($\frac{1}{12}$)	1: 12	0.8458	2.690	2. 4: 1: 21. 4	25. 6: 2. 4:1
0.071	0: 12	0	2.060	0.3: 0: 2.7	3.3: 0.3: 0
0.062 ($\frac{1}{14}$)	0: 12	0	2.080	0.3: 0: 2.7	3.3: 0.3: 0
0	0: 12	0	2.235	0.3: 0: 2.7	3.3: 0.3: 0

Note: † The fraction in the parenthesis is the ratio of the weight on households versus that on the profits of the domestic firms in the goal function (33).

The above exercise of robustness check is an informative comparative statics experiment *per se*. When $a \in [0.072, 1.62]$, the tariff rate decreases with a because the households are the main anti-protection group, hence the profit tax on the multinationals must decrease in order to induce the potential foreign investors to make FDI instead of exporting. The decrease of the tariff rate reduces the market demand for the differentiated commodities produced by the domestic and foreign-invested firms, hence more labors move into the numeraire sector. The profit share of foreign-invested firms in the GDP of the economy decreases accordingly. When a decreases from 0.072 to 0.071, the equilibrium FDI immediately jumps down to zero. However, the tariff rate decreases a lot because the tariff revenue becomes more important for the central government with the absence of FDI and the tariff rate is "too big" as compared with the tariff revenue maximizing tariff rate when $a = 0.072$. The tariff rate increases again as a decreases further because the anti-protection household is cared less. [22]

4.3 Data and Benchmark Calibration for India

For India I use the data of the 2003-2004 fiscal year. Within my knowledge, there is no existent empirical estimation for India's value of a in line with Grossman and Helpman (1996). It's widely recognized that India is more democratic than China, but we need to be cautious before rushing to the conclusion that the value of a for India must be larger than that of China. This is because what matters is not the absolute value for a but rather the relative welfare weight on the domestic firms' profits versus that on the anti-protectionist group's welfare in the government's goal function (33), which is $\frac{1-\overline{\lambda}+\gamma\overline{\lambda}}{a}$. In the real world, India's domestic firms seem to have a

[22] When $a \in [1.63, \infty)$, since the anti-protection group is strong enough to keep the net tariff rate equal to zero, the potential investors will have no incentive to make any FDI as opposed to export even at zero profit tax rate because we set $w = 1$, let alone any positive tax rate. Moreover, zero profit tax rate will induce the local government to block FDI. However, if we set $w > 1$, then the potential investors will strictly prefer to make FDI for sufficiently low profit tax rate, as is proved in Proposition 2. For example, if $w = 1.2$, holding everything else same as the benchmark model, the equilibrium is full FDI with zero tariff and the profit tax rate equal to 0.1491.

larger bargaining power and work more against FDI than their Chinese counterparts actually because India is more democratic than China. In fact, all the India's domestic firms, private or public, might be more able to induce the government's protectionist policies through direct political channels like voting. While in China, by contrast, the effective lobby for protectionism policies is mainly attributed to the state-owned enterprises rather than the private firms, as argued by Bransetter and Feenstra(2002) and Huang (2003), *etc.*. In addition, more and more stated-owned enterprises of small and median sizes are being privatized in the market-oriented reform, so the aggregate number of lobbying firms is shrinking. The relatively low profitability of the state-owned enterprises also curbs their capability of advocating protectionism. Moreover, as contrasted with India, many Chinese domestic firms, private or collectively owned, might be less likely to be hostile toward FDI, especially when the FDI is more export-oriented or more complementary to the domestic production, for example, by easing the financial constraint of the domestic firms in the manufacturing industry and providing various kinds of intangible capital that exhibits positive externalities. When all these considerations are taken into account, it's absolutely possible that a for India is smaller than that of China although India is indeed more democratic. Given the estimate for a is unavailable for India in 2004, I will set it equal to China's value in the benchmark calibration merely for the convenience of comparison and also for highlighting the importance of the two country's difference in some other dimensions.

$\gamma = 0.38$ is calculated as the central government's net tax revenue minus the customs and then divided by the total non-tariff tax revenues of the central and state governments based on the Economic Survey data provided by India's Ministry of Finance (2006-2007). I don't use the profit tax share because the direct tax is far less important than indirect tax in India's tax system as well documented in the literature. $\overline{\lambda} = 0.36$ is taken from KPMG's international corporate tax rate survey data. Data for n_f and n_h are not available and hence set the same as China for the purpose of convenient comparison. w and c_f are still set equal to unity, same as China. $c_h = 7.4$ is calculated according to the ratio of China and India's output per worker in 2003 based on Penn World Table version 6.2. $L = 2.45$ is calculated based on the population ratio between the two countries. $\varepsilon = 3.05$ is calculated in the same way as before based on UNCTAD data for the number of foreign affiliates and the 2003-2004 Annual Survey of Industries data provided by India's Ministry of Statistics and Program Implementation for the profit of domestic firms. This is not ideal because India has a relatively larger and more profitable service sector than its industrial sector and its FDI is more concentrated in the service sector, therefore the calibration is potentially more vulnerable to measurement errors. However, this seems the best I can do given that the data for the profits and numbers of the domestic firms and the foreign-invested firms in the service industry in 2003-2004 fiscal year is unavailable. Fortunately, though, this measurement error would affect the main results only through the choice of parameter ε. Hence 3.05 can be seen as an upper-bound since the relative profits of the domestic firms are likely to be under-measured. Later, I will experiment with ε in the downward ranges. θ is chosen to be the largest possible value that can lead to zero FDI with all the other parameters set at the benchmark values.

When calibrating the model with taxes for the developing economies, we have to be very careful with the efficiency of the tax system. The new parameter s is multiplied to the tariff revenue term in the (33) to capture the fact that tariff revenue is a more favored tax option for the governments in many developing economies because of the enforceability constraint, as argued by Gordan and Li (2005). They argue that taxes with a narrower base(such as tariff) are chosen when the informal sector is large and the tax evasion is potentially rampant. Numerous

researches show that India has a very large informal sector (or called disorganized sector in the official statistical books) and a quite inefficient tax system, which relies too much on the indirect tax while the direct tax such as income tax is relatively unimportant as compared with the developed economies. India's reform to introduce the value-added tax system met with stiff resistance and was severely postponed , so VAT was not well developed at least until 2005. By contrast, China's tax structure has a well-developed VAT system, especially after the tax reform around the mid-1990s. Hence s is normalized to unity for China and set to 1.6 for India, this value is set to match India's tariff revenue/GDP ratio, which was about 1.6% in 2003-2004 (India's GDP was 2765491 Rupees Crore, or 588.4 billion USD, according to India Government's Economic Survey). These parameters are summarized in the following Table 6.

Table 6: Parameter Choices for India (2004)

Parameters	Description	Values
γ	central government's tax share	0.38
$\overline{\lambda}$	profit tax rate on domestic firms	0.36
$n_f : n_h$	# foreign firms vs. # domestic firms	$1 : 6$
$c_f : c_h$	labor productivity ratio	$7.4 : 1$
L	total population	2.45
ε	substitution elasticity	3.05
θ	price elasticity of CES aggregate	1.16
a	weight on average household welfare	1.302
w	foreign wage	1
s	tax enforceability constraint	1.6

$n_m^*(k) : n_h$ is calculated based on UNCTAD data, which is converted proportionally to China's Industrial data. $\lambda_k^* = 0.41$ is taken from PricewaterhouseCoopers(2006) Worldwide Tax Summaries. $\tau^* = 0.222$ is the simple average of tariff rate in 2003-2004 fiscal year based on World Bank(2004). No data for the employment in the foreign-invested firms in India for 2003-2004 is available for us, so l_h: l_m: l_n is not calibrated. Due to the unsatisfying quality of the profit data mentioned above, I will also omit the calibration for the the GDP and profit comparison. The calibration result is presented in Table 7.

Table 7: Data and Calibration Results for India

	$n_m^*(k)$: n_h	λ_k^*	τ^*
Data	0.06:12	0.410	1.222
Model	0:12	$\geq$0.475	1.235

The overall performance of the model also seems quite satisfying. The upward bias for the tariff rate can be justified as before. This model doesn't generate a very precise prediction for λ_k^* , which is exactly consistent with the model per se: when the central government wants to block FDI, it can either charge a very high profit tax rate to discourage the supply of FDI directly or to stipulate an extremely low profit tax rate to induce zero demand for FDI from the provincial government. Given $\lambda_k^* > \overline{\lambda}$ in the real data, our theoretical result predicts unambiguously that the second possibility can't apply. Since the supply of FDI is effectively discouraged for sure by the high tax rate, the provincial governments no longer have any incentive to improve the provincial investment environment, which deters FDI even further. A comparison between China and India's parameters immediately points to the difference in

the central government's share of the profit tax revenue. The more protectionist attitude of the central government is due to a lower share because it makes the lobby transfer and tariff revenue more attractive for the central government. The policy difference is also amplified by the provincial governments' horizontal interactions. This effect is further reinforced by the more stringent taxation enforceability constraint faced by India's government because of its more inefficient tax system. Mathematically, a more binding enforceability constraint (i.e. a higher s) is simply equivalent to a simultaneous reduction in the central government's profit tax share γ and in the welfare weight on the anti-protectionist household, a, in goal function (33). The policy implication of the latter has been precisely given by the propositions derived in Section 3.

4.4 Sensitivity Check for India

Table 8a presents the robustness check results for the substitution elasticity ε. It shows that the equilibrium FDI is always zero when ε is in the intermediate range $[1.94, 3.06]$, which I think is the most probable case because, compared with China, there was a smaller proportion of foreign-invested manufacturing firms in India that are export-oriented (hence ε should be larger than China's value $\varepsilon = 1.89$) and 3.05 is very likely to be an upper-bound as argued before. The robustness of the equilibrium FDI (and the implied policies) relative to ε supports the tax share argument.

Table 8a also shows that the attitude of the central government toward FDI shifts from hostility to friendliness when ε changes from 3.06 to 3.07. This is mainly because the tariff revenue becomes sufficiently small as the substitution elasticity becomes large enough, so it becomes more profitable for the central government to expand the tax base by encouraging more substitution from importing to FDI. This is achieved first by increasing the tariff rate and then mainly by reducing the tax rate on FDI (together with tariff reduction) as ε increases. When $\varepsilon \leq 1.93$, the equilibrium FDI also becomes positive because the marginal change in the domestic firms' profits and in the tariff revenue (due to the decrease in the negative pecuniary externality among different firms) would no longer warrant the exclusion of the more efficient foreign firms from the tax base.

Table 8a: Sensitivity Check with ε

ε	$n_m^*(k) : n_h$	λ_k^*	τ^*
Data	0.06: 12	0.41	1.222
Benchmark	0: 12	≥ 0.476	1.235
3.5	1: 12	0.303	1.210
3.07	1: 12	0.4895	1.245
3.06	0: 12	≥ 0.470	1.235
3.0	0: 12	≥ 0.476	1.240
2.7	0: 12	≥ 0.470	1.265
2.3	0: 12	≥ 0.463	1.310
2.0	0: 12	≥ 0.443	1.340
1.94	0: 12	≥ 0.442	1.345
1.93	1: 12	0.5245	1.470
1.89	1: 12	0.523	1.480

Table 8b demonstrates that the equilibrium FDI is uniquely zero as s is increased above the benchmark value. The equilibrium tariff rates increase because the tariff revenue is weighted more, which also drives up the lower-bound for the profit tax rate on FDI. When s is smaller than the benchmark value, in particular, if it's equal to unity, the value for China, the central government's attitude toward FDI will be reversed to friendliness. As explained earlier, from a policy determination point of view, a decrease in s is equivalent to a simultaneous increase in the household's welfare weight a and the central government's tax share γ. This can explain the comparative statics for τ^* and the lower-bound of λ_k^* with respect to s.

Table 8b: Sensitivity Check with s

s	$n_m^*(k) : n_h$	λ_k^*	τ^*
Data	0: 12	0.41	1.222
Model	0: 12	≥ 0.475	1.235
2.0	0: 12	≥ 0.653	1.415
1.8	0: 12	≥ 0.581	1.330
1.61	0: 12	≥ 0.481	1.240
1.59	1: 12	0.4935	1.250
1.0	1: 12	0.2092	1.0800

If we impose $s = 1$ for India, then by reverse engineering we need to set the welfare weight a down to at least 0.748 accompanied by the simultaneous adjustment of θ down to 1.01 in order to obtain zero FDI in the equilibrium.[23] After taking the relative bargaining power of the domestic firms into account, we think it still hard to believe that India's status of democracy in 2003-2004 would imply a welfare weight for the average household that's smaller than 57.3% of China's value in 2004. In other words, without resorting to the tax enforcement constraint, our original model seems insufficient to account for the particularly small amount of FDI in India with the other parameters set at the benchmark values, unless we could obtain a more accurate measure for a which can show that it's indeed very low. Another empirical possibility is that India's total number of domestic firms, n_h, is actually much larger, which can drive down the value for s that needs to generate the small amount of FDI, if such data can be obtained. To address these issues in a more satisfying manner, we will have to wait until the data are available.

4.5 More Counterfactual Experiments

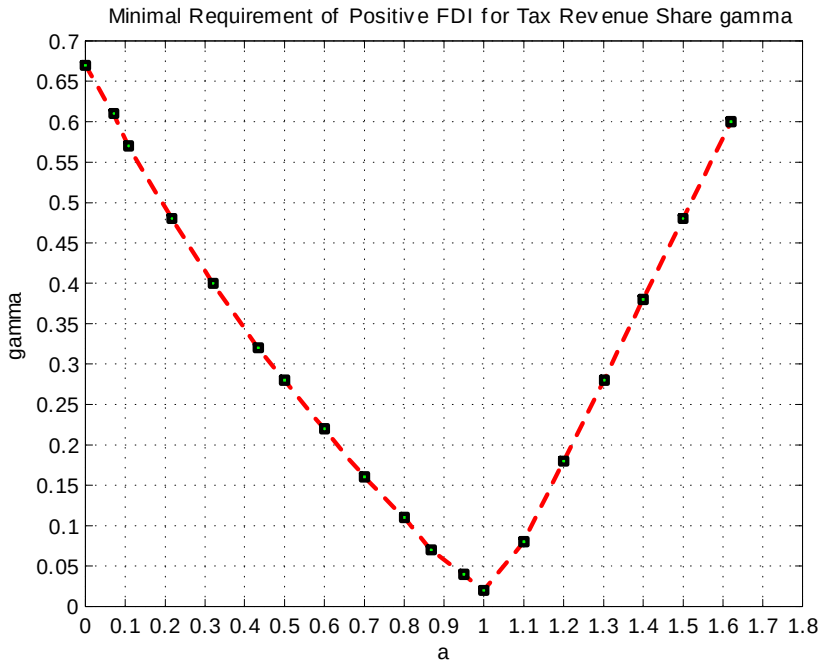
In the above calibration/simulation exercise, China and India have very different equilibrium FDI when they have identical welfare weights a , no matter $a = 1.302$ as we argued or a =0.434 according to Branstetter and Feentra's estimate for China from 1990-1995. In this subsection, by conducting a counterfactual numerical experiment, I will argue that our main explanation for China-India FDI difference, namely, their difference in γ, does not critically depend on the assumption that the two countries have the same a's.

Proposition 8 implies that for each a at a sufficiently small value, there exists a unique threshold value $\gamma^*(a) \in (0, 1)$ such that the equilibrium FDI is full if and only if $\gamma \geq \gamma^*(a)$. In fact, function $\gamma^*(a)$ might be first decreasing and then increasing in a for the following

[23] If we set $\varepsilon = 1.89$, same as China, then the upperbound for a becomes 0.76 instead of 0.748.

reasons. When a increases from a sufficiently small value, the household welfare becomes more important, thus the relative importance of the profit tax revenue from foreign-invested firm decreases. But when a becomes sufficiently big, the implied tariff rate and hence the profit tax rate become so small that γ^* has to be increased in order to offset the decrease in the tariff revenue and the decrease in the profit tax revenues from both the domestic and foreign-invested firms in (35). This non-monotonicity of $\gamma^*(a)$ has a very important implication for China-India comparison.

The following graph depicts function $\gamma^*(a)$ over the domain $[0, 1.62]$ when all the parameters are set to the benchmark values for China. Suppose China and India are perfectly identical except that China's (a, γ) is (1.302, 0.6) while India's (a, γ) is (a_{India}, 0.38). Then if a_{India} is larger than 1.4, which is larger than China's a, the equilibrium FDI in India is still zero. In other words, a more "benevolent" central government might prefer zero FDI. This is mainly because the central government also cares about its revenues.



5 Conclusion

This paper develops a political-macroeconomic model to help us understand why the governments of two similar developing economies could have very different *de facto* policies in adopting one form of foreign better technology, namely FDI, which result in a bifurcation in the technology adoption in terms of inward FDI. To this end, I adapt the model environment of Grossman and Helpman(1994, 1996) to a developing economy with a hierarchic government structure. First, I show that the provincial government's attitude toward FDI is endogenously polarized so it imposes diametrically different de facto entry cost on FDI. The polarization arises because more FDI implies more firms to tax from (base-expansion effect) but less profit tax revenue from

each firm (profit-reduction effect) since the domestic firms and the more productive foreign-invested firms are engaged in monopolistic competition. The marginal profit-reduction effect is initially large but diminishes as more foreign firms come in. Eventually the base-expansion effect might or might not dominate depending on the profit tax rate and tariff rate, which are chosen by the central government under the influence of the special interest group. Next, I show that the central government, foreseeing the FDI bifurcation at the provincial level, prefers full FDI to zero FDI only when it can claim a sufficiently large share of the total profit tax revenue, in which case it will manipulate the policy profile such that not only the provincial governments are induced to compete for FDI but also the potential foreign investors are induced to make FDI rather than export, therefore the full-FDI equilibrium is implemented. The null-FDI equilibrium is implemented when the share is small. Therefore, this model highlights the importance of the central government's share of the total tax revenue in determining the hierarchic governments' incentives to attract or block FDI, which consequently determine the profit tax rate, tariff rate, and the de facto entry cost such that FDI bifurcation occurs. Confronted with the data through calibration, simulation, and counterfactual numerical experiments, I find that India and China's different government policies and attitudes toward FDI (hence their difference in the level of FDI per capita) could be mainly due to the fact that China's central government is more powerful in the sense that it obtains a larger share on the total tax revenues from domestic and foreign-invested firms than that of India.

Although the theoretical model is largely motivated by China-India comparison and I only exploit the quantitative implications from these two countries, the same economic mechanism might be also applicable to other developing economies. Thus it's interesting to test various hypotheses derived from our model using cross-country panel data. Several other directions seem interesting to explore. First, our quantitative exercise suggests that Gordan and Li (2005)'s taxation enforcement constraint should be explicitly built into our theoretical model in order to better explain the tax structure that shapes the governments' incentives. Second, several other relevant policy variables should also be considered such as other forms of export-promoting policies and exchange-rate policies, for example, a significant part of China's FDI is export-oriented and facilitated by its low exchange rate. This might require us to separate industrial sector and service sector explicitly in the analysis because sectorial allocation of FDI is different for China and India. Third, it seems appealing to extend the current multi-stage one period model into a multi-period dynamic setting that allows us to characterize the dynamic path of the endogenous policies and institutional variables as well as FDI and other macro variables. The dynamic common agency framework developed by Bergemann and Valimaki (2003) seems to be natural starting point for policy dynamics if the domestic firms in different provinces are modelled as separate special interest groups. If we introduce productivity heterogeneity for potential investors, it might also generate some interesting FDI dynamics as the gradual reduction in the institutional entry cost makes FDI more desirable for those less productive firms.

References

[1] Acemoglu, Daron, 2005, "Politics and Economics in Weak and Strong States," *Journal of Monetary Economics*, 52: 1199-1226.

[2] _____, Elhanan Helpman and Pol Antras, 2007, "Contracts and Technology Adoption", *American Economic Review*, 97(3), 916-943

[3] ——, and James Robinson, 2000, " Political Losers as a Barrier to Economic Development", *American Economic Review,* 90: 126-130

[4] Bardhan, Pranab and Dilip Mookherjee, 2000, "Capture and Governance at Local and National Levels", *American Economic Review,* 90(2): 135-139

[5] ——, 2006, "Decentralization, Corruption and Government Accountability: An Overview", for *International Handbook of the Economic Corruption*, edited by Susan Rose-Ackerman, Edward Elgar Publishing House

[6] Becker, Gary, 1983, "A Theory of Competition Among Pressure Groups for Political Influence", *Quarterly Journal of Economics,* 98(3): 371-400;

[7] Bergemann, Dirk and Juuso Valimaki, 2003, "Dynamic Common Agency", *Journal of Economic Theory*, 111: 23-48

[8] Berheim, B. Douglas and Michael D. Whinston, 1986, "Common Agency", *Econometrica*, Vol.54(4): 923-942

[9] Besley, Timothy and Torsten Persson, 2008, "State Capacity, Conflict and Development", working paper

[10] Bellettini, Giorgio and Gianmarco I. P. Ottaviano, 2005, "Special Interests and Technological Change", *Review of Economic Studies,* Vol. 72(1): 43-56

[11] Bajpai, Nirupam and Nandita Dasgupta, 2004, "What Constitutes Foreign Direct Investment? Comparison of India and China", CGSD working paper, Columbia University

[12] Blanchard, Olivier and Andrei Shleifer, 2000, "Federalism with and without Political Centralization: China versus Russia", working paper

[13] Borensztein E., J. De Gregorio, and J-W Lee ,1998, "How Does FDI Affect Economic Growth?" *Journal of International Economics,* 45: 115–135

[14] Bosworth, Barry and Susan Collins, 2007, "Accounting for Growth: Comparing China and India", *NBER Working Paper 12934*

[15] Braguinsky, Serguey and Roger Myerson, 2007, "Capital and Growth with Oligarchic Property Rights", *Review of Economic Dynamics, forthcoming*

[16] Branstetter, Lee and Robert Feenstra, 2002, "Trade and Foreign Direct Investment in China: A Political Economy Approach", *Journal of International Economics,* 58, 335-358

[17] Breton, Mechel Le and Francois Salanie, 2003, "Lobbying Under Political Uncentainty", *Journal of Public Economics*, 87: 2589-2610

[18] Cai, Hongbin and Daniel Treisman, 2005, "Does Competition for Capital Discipline Governments? Decentralization, Globalization, and Public Policy", *American Economic Review,*Vol. 95(3):817-830

[19] Chaney, Thomas, 2008, "Distorted Gravity: the Intensive and Extensive Margins of International Trade", *American Economic Review, forthcoming*

[20] Dixit, Avinash, Gene M. Grossman, and Elhanan Helpman, 1997, "Common Agency and Coordination: General Theory and Application to Government Policy Making", *Journal of Political Economy,* Vol.105(4): 752-769

[21] Dixit, Avinash and Jorgen Weibull, 2007, "Political Polarization", working paper, Princeton University

[22] Do, Quy-Toan, and Andrei Levchenko, 2007, " Trade, Inequality, and the Political Economy of Institutions", working paper, Chicago GSB

[23] Fan, Joseph, Randall Morck, Lixin Colin Xu and Bernard Yeung, 2007, "Institutions and Foreign Investment: China Versue the World", *NBER Working Paper* 13435

[24] Feenstra, Robert and Gordon Hansen, 2005, "Ownership and Control in Outsourcing to China: Estimating the Property-Rights Theory of the Firms", *Quarterly Journal of Economics,* 120(2): 729-762;

[25] Gordan, Roger and Wei Li, 2005, "Tax Structures in Developing Countries: Many Puzzles and A Possible Explanation", working paper, UCSD

[26] Grossman, Gene and Elhanan Helpman, 1994, "Protection for Sale", *American Economic Review,* 84: 833-850

[27] ——— ,1996, "Foreign Investment with Endogenous Protection", In *The Political Economy of Trade Policy,* edited by Robert Feenstra, Gene Grossman, and Douglas A Irwin, Cambridge : MIT Press

[28] ———, 2001, *Special Interest Politics,* Cambridge: MIT Press

[29] Helpman, Elhanan, Marc Melitz, and Stephen Yeaple, 2004, "Export Versus FDI with Heterogeneous Firms", *American Economic Review,* 94(1): 300-316

[30] Huang, Yasheng, 2003, *Selling China-Foreign Direct Investment During the Reform Era,*Cambridge University Press, Cambridge, UK

[31] Hsieh, Chang-tai and Peter Klenow, 2007, "Misallocation and Manufacturing TFP in China and India", *NBER* Working Paper 132

[32] Javorcik, Beata Smarzynska, 2004, "Does Foreign Direct Investment Increase the Productivies of Domestic Firms? In Search of Spillovers Through Backward Linkages", *American Economic Review,* 93(4): 605-627

[33] Ju, Jiandong and Wei Shang-jin, 2007, "Domestic Institutions and By-pass Effect of Financial Globalization", *NBER* Working Paper 13148

[34] Krusell, Per and Victor Rios-Rull, 1996, "Vested Interests in a Positive Theory of Stagnation and Growth", *Review of Economic Studies,* 63: 301-329

[35] Laffont, Jean-Jacques, 2000, *Incentives and Political Economy,* Oxford University Press

[36] Lin, Justin Yifu, 2007, "Development and Transition: Idea, Strategy, and Viability", Marshall Lectures at Cambridge University, CCER Peking University

[37] Lucas, Robert, Jr., 1990, "Why Doesn't Capital Flow from Rich to Poor Countries?" *American Economic Review,* 80: 92-96

[38] ———,1993, "Making a Miracle", *Econometrica*, 61: 251-272

[39] McGrattan, Ellen and Edward Prescott, 2007, "Openness, Technological Capital, and Development", *NBER* working paper, #13515

[40] Mokyr, Joel, 1990, *The Lever of Riches: Technological Creativity and Economic Progress.* New York: Oxford University Press

[41] Mookherjee, Dilip, 2006, "Decentralization, Hierarchies and Incentives: A Mechanism Design Perspective", *Journal of Economic Literature*, 44(2): 367–390

[42] Myerson, Roger, 2006, "Federalism and Incentives for Success of Democracy", *Quartely Journal of Political Science*, Vol. 1: 3-23

[43] Prasad, Eswar and Shang-jin Wei, 2005, "The Chinese Approach to Capital Inflows: Patterns and Possible Explanations", *NBER working paper 11306*

[44] Parente, Stephen L., and Edward Prescott, 1994, "Barrier to Technology Adoption and Development", *Journal of Political Economy,* Vol. 102(2): 298-321

[45] ———, 1999, "Monopoly Rights: A Barrier to Riches", *American Economic Review*, Vol.89(5): 1216-1233

[46] Persson, Torsten and Guido Tabellini, 2002, *Political Economics: Explaining Economic Policy,* Cambridge : MIT Press

[47] Qian, Yingyi and Gerard Roland, 1998, "Fiscal Federalism and Soft Budget Constraint", *American Economic Review*, Vol.88(5): 1143-1162

[48] Rodrik, Dani, and Arvind Subramanian, 2005, "From 'Hindu Growth' to Productivity Surge: The Mystery of Indian Growth Transition", *IMF Staff Papers*, 52(2): 193-228

[49] Rodriguez-Clare, Andres, 1996, "*Multinationals, Linkages, and Economic Development*", 86(4): 852-973

[50] Singh, Kulwindar, 2005, *Foreign Direct Investment in India: A Critical Analysis of FDI from 1991-2005*, working paper, Center for Civil Society, New Delhi

[51] Stokey, Nancy, 1996, "Free Trade, Factor Returns, and Factor Accumulation," Journal of Economic Growth, 1: 421-447.

[52] Sonin, Konstantin, 2003, "Why the Rich May Favor Poor Protection of Property Rights?", *Journal of Comparative Economics,* 31:715-731

[53] Thomas, Jonathan, and Tim Worrall, 1994, " Foreign Direct Investment and the Risk of Expropriation", *Review of Economic Studies*, 61(1): 81-108

[54] Tornell, Aeron, and Andres Valesco, 1992, "The Tragedy of Commons and Economic Growth: Why Does Capital Flow From the poor to Rich Countries", *Journal of Political Economy,* Vol. 100(6):1208-1231

[55] Wang, Yong, 2008, " A Global-Game Model of FDI When the Entry Cost is Not Common Knowledge", manuscript, University of Chicago

[56] Wang, Yong and Weijun Hu, 2008, " Political Competition, Contract Incompleteness, Export Pattern, and FDI: Theory and Evidence from Two Chinese Provinces", working paper, University of Chicago

[57] Wei, Shang-jin, 2000, "How Taxing is Corruption on International Investors", *Review of Economics and Statistics,* 82(1): 1-11.

[58] Young, Alwyn, 2000, "The Razor's Edge: Distortions and Incremental Reform in the People's Republic of China", *Quarterly Journal of Economics,*115(4): 1091-1135

Appendix

Table A1. Sources of Growth in China and India: 1978-2004

Annual percentage rate of change

period		output	employment	output per worker	capital	eduction	TFP
1978-2004	China	9.3	2.0	7.3	3.2	0.2	3.8
	India	5.4	2.0	3.3	1.3	0.4	1.6
1978-1993	China	8.9	2.5	6.4	2.5	0.2	3.6
	India	4.5	2.1	2.4	1.0	0.3	1.1
1993-2004	China	9.7	1.2	8.5	4.2	0.2	4.0
	India	6.5	1.9	4.6	1.8	0.4	2.3

Source: Bosworth and Collins (2007)

Table A2. FDI into China By Countries or Regions (USD 10,000)

Country(Region)	2004	2005	Country(Region)	2004	2005
Total	6062998	6032459	France	65674	61506
Asia	3761986	3571889	Italy	28082	32201
Hong Kong, China	1899830	1794879	Netherlands	81056	104358
Japan	545457	652977	Switzerland	20312	20588
Macao, China	54639	60046	Latin America	904353	1129333
Malaysia	38504	36139	Cayman Islands	204258	194754
Philippines	23324	18890	Virgin Islands	673030	902167
Singapore	200814	220432	North America	497759	372996
Republic of Korea	624786	516834	Canada	61387	45413
Taiwan, China	311749	215171	United States	394095	306123
Africa	77568	107086	Bermuda	42277	21400
Mauritius	60232	90777	Oceanic and Pacific Islands	197437	199898
Europe	479830	564310	Australia	66263	40093
United Kingdom	79282	96475	Samoan	112885	135187
Germany	105848	153004	Others	144065	86947

Source: China Statistical Yearbook (2005)

Table A3. Top Ten Source Countries of FDI into India

Country	FDI Inflows: April-December 2006-2007	FDI Inflows: Agust 1991 -December 2006	Share, Agust 1991 -December 2006
	(Million Dollars)		(percent)
Mauritius	4,215	16,000	33
United States	607	5,645	12
United Kingdom	1,682	3,662	8
Netherlands	488	2,482	5
Japan	52	2,176	5
Singapore	533	1583	3
Germany	70	1652	3
France	80	858	2
South Korea	62	814	2
Switzerland	47	683	1
All others	1,434	12,617	26
Total	9,270	48,172	

Source: Office of Industries U.S International Trade Commission, 2007