

Fiscal Decentralization, Endogenous Policies, and Foreign Direct Investment*

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ABSTRACT

A political-economy model is developed to explain why fiscal decentralization may have a non-monotonic impact on FDI inflows via endogenous policies. Too much fiscal decentralization hurts incentives of the central government while too little fiscal decentralization renders the local governments captured by the protectionist special interest group. Moreover, the local government's preference for FDI can be endogenously polarized, so a small change in fiscal decentralization may **sometimes** lead to dramatic difference in equilibrium FDI inflows. Calibration and counterfactual experiments support that fiscal decentralization difference is an important reason for China and India's nine-fold difference in FDI per capita.

Key Words: Fiscal Decentralization, FDI, Sequential Lobby, Technology Adoption, Growth and Development

JEL Codes: D78, F23, H77, O33

1 Introduction

Foreign direct investment (FDI) in general helps facilitate economic growth in developing countries as it not only brings more physical capital but also embodies foreign better technology.¹ This paper studies how fiscal decentralization affects FDI inflows.² Conventional wisdom is that decentralization would foster a more intensive regional competition for mobile production factors and hence would increase FDI inflows, *ceteris paribus* (the so-called Tiebout effect). In fact, it is also one of the leading explanations in the literature why the local governments have been competing ferociously for FDI in China, the largest recipient of FDI among all the developing countries (see, for example, Qian and Roland, 1998; Cheng and Kwan, 2000; Xu, 2010).

Surprisingly, however, there exists no strong cross-country empirical evidence supporting this monotonic relationship between fiscal decentralization and FDI inflows (see, for example, Jensen (2005, 2006), Bardhan and Mookherjee (2006)). Instead, empirical evidence suggests the existence of a hump-shaped relation between fiscal decentralization and FDI. For example, Kessing, et al (2007) have documented the non-monotonic relation between FDI and fiscal decentralization and provided the following figure:

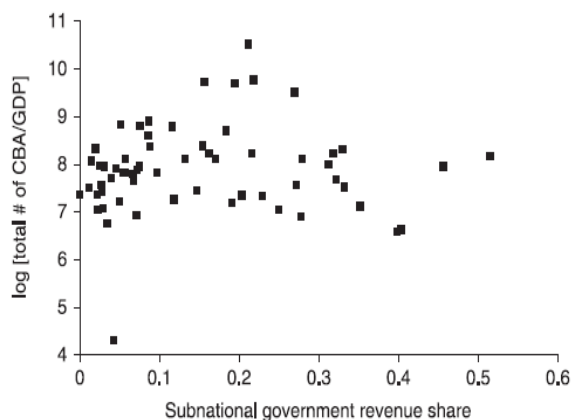


Figure 1. Average (1980-1995) Revenue Decentralization and Log of Number of Cross Border Mergers and Acquisitions (CBAs) over GDP

This figure demonstrates the existence of a hump-shape correlation between fiscal decentralization and FDI inflows. Here, fiscal decentralization is measured by the share of sub-national

¹See, for example, Rodriguez-Clare (1996), Javorcik (2004), and Borensztein, Gregorio, and Lee (1998), and McGratten and Prescott (2009).

²There are many alternative measures for fiscal decentralization in the literature. In this paper we adopt the most popular measure for fiscal decentralization, namely, the share of subnational government revenues in the total non-tariff government revenues. A larger share means more fiscal decentralization.

government revenues in the total government revenues. FDI is measured by the total number of cross-border acquisitions (CBAs), which comes from the SDC platinum database of Thomson Financial. It contains the information on CBAs from 64 source countries to 147 host countries. The hump shape still remains true when decentralization is measured by the sub-national government expenditure share.

This paper attempts to develop a theoretical model that can explain this non-monotonic empirical relation between FDI and fiscal decentralization. We will argue that main channel is through the endogenous policies. Empirical evidences suggest that the government policies toward FDI are very different across countries. A case in point is the contrast between China and India. The local governments in China compete harshly for FDI and the government attitudes translate into the favorable policies toward FDI including long tax holidays, low rent for land, and tariff reduction on imported input, provision of more public goods and services (infrastructure), *etc.* By stark contrast, until very recently India did not see such enthusiasm for FDI at the local or the central government level although India is more fiscally decentralized.³ For example, the corporate income tax rate on foreign-invested firms in 2004 was 41% in India but well below 33% in China.⁴ Table 1 demonstrates that the institutional barriers confronting foreign investors are much higher in India than China.⁵

Table 1: Measures of the Ease of Doing Business in China and India (2005)

| Country | Starting a Business | | Enforcing Contract | | Registering Property | |
|---------|---------------------|--------------|------------------------|----------------|------------------------|----------------|
| | Time (Days) | Cost* (%) | Procedures (Number) | Time (Days) | Procedures (Number) | Time (Days) |
| China | 48 | 13.6 | 35 | 406 | 4 | 29 |
| India | 71 | 62.0 | 46 | 1420 | 6 | 62 |

Source: World Bank, 2006, 2007

Notes: * as a percentage of Income per capita

According to the UNCTAD, China's aggregate FDI inflow was more than US\$ 72 billion in 2005, about twelve times that of India; its per capita FDI was nine times greater. Apart from the difference in their economic fundamentals, their dramatically different government attitude and FDI policies also plays a very important role.⁶ The government attitude difference could

³Chinese central government received 60% of the total tax revenue while its Indian counterpart received 38% in 2004.

⁴This is based on PricewaterhouseCoopers (2006). The *de facto* difference is much larger when the whole tax package is taken into consideration. The special economic zones and the open cities in China enjoy a much lower corporate income tax rate (15% to 20%), see, Cheng and Kwan (2000), Prasad and Wei (2005) for more discussion.

⁵This table is based on the data for domestic firms. It implies an even more pronounced difference in institutional barriers to FDI between China and India because foreign-invested firms in China receive much better treatment than domestic firms, while the general institutional barriers to FDI in India is at least as high as the barriers for domestic firms, as argued in the above-mentioned literature.

⁶Bosworth and Collins (2007) find that many aspects of the macroeconomic performance are quite comparable in the two countries, but their difference in FDI (and trade) is surprisingly huge given their differences in the

also at least partly explain why India's infrastructure is not as good as China's and why its *de facto* institutional barriers to FDI are also higher (see Singh, 2005; Bosworth and Susan, 2007).

Consequently, a successful model should not only be able to explain the hump-shaped relationship between fiscal decentralization and FDI, but also should explain how the endogenous policy differences can sometimes translate into dramatically different levels of FDI inflows in the equilibrium, as suggested by the case of China and India.⁷ To this end, we construct a general political-macroeconomic model with a hierarchical government structure. In the model, policies are endogenously determined through the political game between central and local governments, which are sequentially lobbied by the special interest group, and the standard economic activities are coordinated by the market-clearing prices. The interaction between the political sector and the market sector determines the political equilibrium. The analysis is meant to be general and applicable to economies beyond China and India. We will focus on those developing economies with a powerful government where the relevant policy choices mainly depend on the governmental preference, not its capability.

The main finding is that fiscal decentralization may have a non-monotonic and *sometimes* dramatic impact on the policies and FDI inflows. Too much fiscal decentralization may hurt the incentive of the central government to attract FDI, hence the central government would choose a profile of the tariff rate and the profit tax rate to induce the local governments to block FDI. Too little fiscal decentralization may render the local government captured by the protectionist special interest group. Therefore, the policies toward FDI would be sufficiently favorable only when fiscal decentralization is in some endogenous medium range. Moreover, the equilibrium might bifurcate, that is, a small change in fiscal decentralization might *sometimes* lead to policy changes that move the economy from the null-FDI equilibrium to the high-FDI equilibrium. The amplification is due to that the local government's induced preference for FDI can be endogenously polarized, so when fiscal decentralization moves across some endogenous cutoff value, albeit a small change, it may ultimately result in a diametrical attitude shift in the local government, which would in turn impose very different institutional entry costs on FDI. However, such a swing of the equilibrium does not occur if fiscal decentralization changes within the "inaction region".

Backward induction is used to characterize the political equilibrium. First, we show how the decreasing negative pecuniary externality of FDI can lead to the polarization of a local

fundamentals. Srinivasan (2006) points out "although India has attracted far less FDI [than China], it is not because of the lack of potential opportunities in India, but largely because of policy hurdles and other constraints on investment." Panagariya (2006) emphasizes that India's under-performance, FDI included, is due to the "stupid domestic policies" such as the poor infrastructure (especially the unstable supply of electricity). Rodrik and Subramanian (2005) argue that India's policy toward FDI largely reflects the reluctant "attitude" of the government.

⁷At a deeper level, differences in the economic fundamentals may be also, at least partly, due to the policy or institutional differences.

government's preference for FDI, which translates into a sharply different FDI policy that in turn causes the equilibrium FDI to be either null or full (*i.e.*, all investors choose FDI). The local government's endogenous attitude toward FDI depends on whether the tax-base expansion effect (*i.e.*, more FDI implies more foreign firms to collect tax from) can dominate the profit-reduction effect (*i.e.*, the greater the FDI, the more intensive is the competition and hence the lower average profit tax revenue from each firm). Which effect dominates is in turn determined by the profit tax rate and the tariff rate that are chosen by the central government. These policy variables also affect the potential foreign investors' binary choice of FDI versus export. Hence when the fiscal decentralization moves across some endogenous threshold value, it can be amplified into a stark difference in the equilibrium FDI inflow. Second, we show how the central government, which is also lobbied by the special interest group and foresees the bimodal outcome of FDI due to local government behaviors, will then implement its favorable equilibrium by choosing an incentive-compatible policy profile to induce the provincial government(s) to either compete for, or block, FDI. The full-FDI equilibrium is implemented only when the degree of fiscal decentralization provides sufficient incentives at both levels of government to attract FDI despite the lobby of the special interest group. The balance of interests for these political players generates the non-monotonicity result. Later we show that the two main results (*i.e.*, non-monotonic impact of fiscal decentralization and FDI bifurcation) remain valid regardless of how many horizontal sub-national localities (say, provinces) exist in the economy.

This paper is closely related to Grossman and Helpman (1994, 1996). Grossman and Helpman (1996) examine how FDI is affected by the politically-determined tariff rate. Our model extends their paper in several important ways. First, we introduce one or more local governments into their single-layer government setting. The hierarchical government structure enables us to explore both vertical interaction between the two layers of government and the horizontal interaction between different local governments. These interactions are crucial for understanding FDI bifurcation, non-monotonic impact of fiscal decentralization, as well as regional allocations of FDI. None of these can be addressed in their model. Second, our model allows us to explore the sequential lobbying in a hierarchic government, which has received insufficient attention in the literature (See Grossman and Helpman, 2001; Becker, 1983). Third, we propose a mechanism for FDI bifurcation when FDI exhibits strategic substitutability while in their model FDI exhibits strategic complementarity. Branstetter and Feenstra (2002) modify Grossman and Helpman (1996) by introducing the profit tax rate as a second policy variable and then they estimate the structural parameters using China's province-level data. Our 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 newly introduced endogenous policy variable, namely, the institutional entry cost, which is taken as exogenous in the previous papers. The provincial government in Branstetter and Feenstra (2002) is not a decision-maker, and hence its framework is the same as the single-layer government model, with no vertical or horizontal

governmental interactions.

In the fiscal federalism literature, our paper is not the first one that finds the non-monotonic impact of fiscal decentralization on economic efficiency. For example, Bardhan and Mookherjee (2000) argue that some intermediate level of fiscal decentralization could be optimal because local governments have better information as to how to allocate resources more efficiently, but they are also more likely to be affected by the local vested interests. Our paper supports the non-monotonicity result, but the mechanism is very different. Instead of emphasizing the information advantage of local governments, our perfect-information model places more emphases on the compatibility of incentives of the different levels of government. Moreover, the special interest group in our model is a national-level organized group while their model mainly considers the small regional special interest groups competing for regional favors. Cai and Treisman (2005) argue that Tiebout effect may not always improve economic efficiency for all the heterogeneous regions because the poorly-endowed regions may lose hope. Our paper shows that asymmetric equilibria may arise even if the provinces or countries are perfectly identical *ex ante*. Within our knowledge, our paper is also the first "Grossman-Helpman" style political economic model on FDI in the fiscal federalism literature.⁸

The third pertinent strand is the macro and development literature concerning purposeful technology adoption, as FDI is modeled as foreign better technology in our paper. Prescott and Parente (1999) argue that some poor countries may resist adopting better technology because incumbent firm owners fear that they would lose their monopoly rent. Acemoglu and Robinson (2000) argue that superior technology is blocked mainly because the incumbent fear their political power will be jeopardized and thus unable to benefit from the new technology. Our paper contributes to this literature by explicitly examining the importance of fiscal decentralization and the roles played by the different layers of the hierarchical governments in the adoption of new technology. we show that the policies toward foreign technology can still be diametrically different even if the monopoly rents of the incumbent firms are always harmed by new technology and even if the incumbent is always politically secure. Acemoglu, Helpman and Antras (2007) show that countries with exogenously weaker contracting institutions tend to adopt less-advanced technologies. Our model goes somewhat further by showing how the quality of contracting institutions, as partly reflected in institutional entry cost, is endogenously affected by the rational choices of the governments. Moreover, unlike the literature cited above, we also provide a nontrivial supply analysis of technology because it explicitly models the foreign potential investors' choice of export versus FDI.⁹

⁸Kessing, et al (2007) are among the few who examine the relationship between decentralization and FDI empirically with cross-country data. They find that vertical decentralization may hamper FDI inflows mainly because the red tape cost increases as there are more layers of government.

⁹The FDI supply analysis here is compatible with an important branch of the recent FDI-versus-trade literature which focuses on heterogeneous firms. After the realization of the productivities, the most productive firms make FDI, the less productive firms export, while the most unproductive firms serve only the domestic market (see Helpman, Melitz, and Yeaple, 2004).

The contribution of this paper is mainly theoretical, but a simple calibration exercise is also conducted to confront the model to the real data of China and India. Calibration results turn out to closely match China and India's macro and policy data such as GDP, FDI, labor allocation across different sectors, profits in each sector as well as the tariff rate and profit tax rates. Counterfactual experiments suggest that their difference in fiscal decentralization can help explain their differences in several key policy variables and also help explain why China's FDI per capita is nine times larger than that of India. We argue that Chinese central government received 60% of the total tax revenue hence its fiscal decentralization falls onto the endogenous "medium range" for China, while its Indian counterpart received 38%, which is too fiscal decentralized controlling for the other factors in India.

The paper is organized as follows. The next section presents the theoretical model. The quantitative exploration is in Section 3. The last section concludes with discussions about possible avenues for future research.

2 Formal Model

The model extends Grossman and Helpman (1994, 1996) by introducing two layers of governments (central and local) and making the institutional entry cost for FDI endogenous. FDI originates from a developed country and the host economy is a developing country. There are a policy-determining political sector and a price-coordinating market sector. The market sector essentially replicates that of Grossman and Helpman (1996) while the political sector has three players: a central government, a local government and a special interest group.

2.1 Market Sector

2.1.1 Environment

Preference The host economy is populated by a unit-mass continuum of households with the identical quasi-linear utility function:

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

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 . Define

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

where $x(j)$ denotes the consumption 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 with measure n_m , denote the set of foreign brands that are produced by the foreign-invested firms located in the host country. Here following Helpman (1994), FDI is modeled as the establishment of a plant by the headquarter of a multinational firm in the host economy, so n_m measures the magnitude of FDI. The complementary subset N_f/N_m is the set of the imported foreign brands with a measure $n_f - n_m$. $\varepsilon > \theta$ is assumed to ensure a positive cross price elasticity of the demand. Denote $N \equiv N_h \cup N_f$ for future reference.

Technology Labor is the only production factor. All the technologies are constant returns to scale. One unit of labor produces one unit of numeraire good thus the wage is one. To produce one unit of each differentiated domestic good $j \in N_h$ requires c_h units of labor. Any imported good $j \in N_f/N_m$ is produced abroad and the unit cost is c_f in terms of foreign labor. Let $w^* \geq 1$ denote the foreign wage. One unit of each multinational good $j \in N_m$ also requires c_f units of domestic labor. That is, FDI fully transfers the foreign technology to the host country.¹⁰ Assume $c_f < c_h$, thus inward FDI can be also interpreted as adopting foreign better technology in the sense that it not only expands the set of the goods that can be produced in the host economy but also reduces the production cost of symmetric goods.

Endowment Each household is endowed with L units of labor, which are inelastically supplied. To exclude the collusive pricing, the owners of the domestic firms are assumed to be of a zero measure and 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, which is set to one.

Market Structure Labor is freely mobile across different sectors within a country but not across different countries. The labor market is perfectly competitive. The numeraire good market is perfectly competitive both domestically and internationally. Each differentiated commodity $j \in N$ can be produced only by a single firm, so all these $(n_h + n_f)$ firms are engaged in monopolistic competition.

¹⁰Grossman and Helpman (1996) assume 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 among international investors, although they did not point it out explicitly. However, we obtain strategic substitutability, which makes our FDI bifurcation result less obvious.

2.1.2 Market Equilibrium

A tariff is imposed on each imported good $j \in N_f/N_m$. Let τ denote the gross *ad valorem* tariff rate, so the net tariff rate is $\tau - 1$. The quasilinear utility function (1) implies the absence of income effect on the demand for any good $j \in N$. The usual markup pricing rule gives the following equilibrium consumer prices:

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

The household utility maximization problem gives the market demand for each differentiated good:

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

where q is the price index for the aggregate good x :

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

Each firm takes q as exogenous as there are a continuum of firms. The profit of firm j is given by

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

which immediately implies

$$\frac{\partial \pi_m(n_m, \tau)}{\partial n_m} < 0, \quad \frac{\partial \pi_h(n_m, \tau)}{\partial n_m} < 0, \quad \frac{\partial \pi_f(n_m, \tau)}{\partial n_m} < 0. \quad (7)$$

The negative pecuniary externality caused by multinational firms is due to consumer's love for varieties and the increased intensity of cost competition among firms, because $p_m < p_f$ as the foreign-invested firms use cheaper local labor and avoids the tariff burden. However, the negative marginal impact of FDI on the profit is diminishing for any firm $j \in N_h \cup N_m$:

$$\frac{\partial^2 \pi_h(n_m, \tau)}{\partial n_m^2} > 0, \quad \frac{\partial^2 \pi_m(n_m, \tau)}{\partial n_m^2} > 0. \quad (8)$$

(6) also implies

$$\frac{\partial \pi_f(n_m, \tau)}{\partial \tau} < 0, \quad \frac{\partial \pi_m(n_m, \tau)}{\partial \tau} > 0, \quad \frac{\partial \pi_h(n_m, \tau)}{\partial \tau} > 0 \text{ for any } n_m \in [0, n_f), \quad (9)$$

because, as τ increases, imports become more expensive so the profit of each foreign exporting firm decreases, but the demand for the domestic goods and FDI goods both goes up due to the substitution effect, hence these firms will have higher profits, although the marginal impact diminishes:

$$\frac{\partial^2 \pi_f(n_m, \tau)}{\partial \tau^2} > 0, \quad \frac{\partial^2 \pi_m(n_m, \tau)}{\partial \tau^2} < 0, \quad \frac{\partial^2 \pi_h(n_m, \tau)}{\partial \tau^2} < 0 \text{ for any } n_m \in [0, n_f]. \quad (10)$$

To determine n_m in the equilibrium, we first look at the supply of FDI.

2.1.3 FDI versus Exporting

Following Grossman and Helpman (1996), FDI is assumed to horizontal, and fully foreign-owned.¹¹ All the output of the foreign-invested firms (or interchangeably, multinational firms) only serves the domestic market of the host economy.¹² The owners of the n_f foreign firms (or called potential foreign investors) simultaneously and non-cooperatively decide whether to make FDI or export to this developing country, depending on which option is more profitable. Besides tariff rate τ , two other policy variables also affect their entry decisions. One is the profit tax rate λ on the foreign-invested firms. The second one is the institutional entry cost ϕ for FDI, which captures the waiting cost to get a license, *etc.* So $\phi \geq 0$. Given the policy variables $\{\phi, \lambda, \tau\}$, a firm $j \in N_f$ makes FDI (denoted as $FDI_j = 1$) rather than exports ($FDI_j = 0$) if and only if the after-tax profit of making FDI net of the fixed entry cost is larger than the profit of exporting:

$$(1 - \lambda)\pi_m(n_m, \tau) - \phi \geq \pi_f(n_m, \tau). \quad (11)$$

Each investor takes n_m as unaffected by his own decision. The total FDI is $n_m = \int_{j \in N_f} FDI_j dj$.

The remaining $n_f - n_m$ foreign firms choose to export. A potential investor feels indifferent between making FDI and export when (11) holds as an equality, which determines n_m as a continuous function of the three policy variables denoted as $n_m(\phi, \lambda, \tau)$. This FDI supply function is shown in the following figure.¹³

¹¹Greenfield FDI is much more common in the developing economies than in the developed economies, see Wei (2006) and Prasad and Wei (2005).

¹²FDI comes into developing economies sometimes to use them as the production base for the outside international market, which is also true for China. In Wang (2009), I also explicitly examine this export effect on FDI and show that it does not change the qualitative mechanisms in this paper. Quantitatively, this export effect is also partly captured by the substitution elasticity parameter ε in the calibration exercises, as will be explained later. In addition, a larger and larger fraction of China's FDI is targeted to China's domestic market as the country becomes richer, especially after 2000, see Prasad and Wei (2005).

¹³The values for $\underline{\phi}$ and $\bar{\phi}$ are determined by the model later.

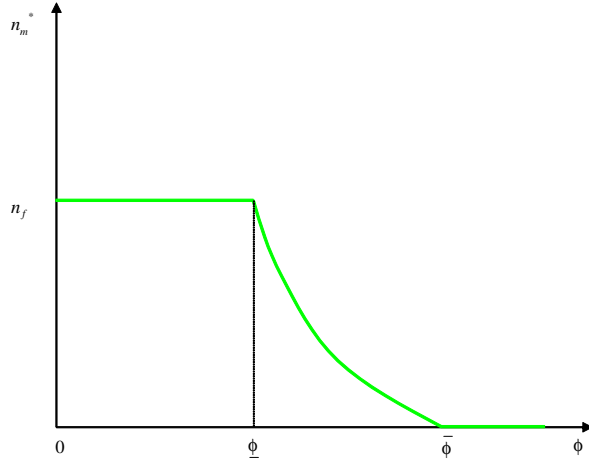


Figure 2. Equilibrium FDI as a Function of Entry Cost ϕ when λ is Sufficiently Small.

So $n_m(\phi, \lambda, \tau)$ equals n_f when ϕ and λ are both sufficiently small and equals 0 when ϕ is sufficiently large.

To analyze the governmental preference (demand) for FDI and how the three policy variables $\{\phi, \lambda, \tau\}$ are endogenously determined, we need to specify the setting for the political sector.

2.2 Political Sector

Consider the simplest case of a hierarchic government, in which there is only one province so that we can fully focus on the vertical interaction between the central and local governments. The main results are shown to remain robust with an arbitrary number of provinces, because whether different provincial governments want to compete for FDI shall first depend on the central government's policies, which is the key point of this paper. In addition to the central government and the provincial government, the third player in the policy-making process is the special interest group (SIG henceforth) formed by the owners of all the domestic firms, which can lobby both the central and the provincial governments to block FDI (recall (7)).¹⁴

2.3 Timing and Equilibrium Definition

In many developing countries like China, the central government often plays a predominantly leading role by either explicitly authorizing or implicitly permitting the local governments to take some actions and then the local governments respond strategically and not always cooperatively. India, for example, also shares the salient feature of central planning. In light of these institutional features, it is natural to assume that the national-level SIG would lobby

¹⁴Subsection 2.5 discusses what happens if the foreign firms can also lobby.

sequentially starting from the central government and then the local government. More specifically, the timing is the following. The SIG first lobbies the central government by providing a non-negative contribution menu $C(\lambda, \tau)$, which is a committed money transfer to the central government conditional on that the latter chooses the policy profile (λ, τ) . Next, the central government chooses (λ, τ) and receives the money. After this first stage lobby game, the SIG lobbies the provincial government by providing a non-negative contribution menu $D(\phi; \lambda, \tau)$. Then the provincial government chooses ϕ and gets paid by the SIG. After this second stage lobby game, all the policy variables $\{\phi, \lambda, \tau\}$ are chosen and publicly observed.¹⁵ Then all the foreign potential investors make binary decisions of FDI versus export simultaneously and non-cooperatively, followed by the standard market process (production, exchange, and consumption) and all the markets clear. The standard market equilibrium gives us equilibrium FDI n_m as well as the profit functions $\pi_f(n_m, \tau)$, $\pi_m(n_m, \tau)$ and $\pi_h(n_m, \tau)$. For simplicity, we assume perfect and complete information in the two-stage political game.

Definition. A Political Equilibrium (PE) in a single-province economy is a collection of the policy variables $\{\phi^*, \tau^*, \lambda^*\}$, the commodity prices $p^*(j)$ and quantities $x^*(j)$, for $j \in N$, the lobby schedule functions $C^*(\lambda, \tau)$ and $D^*(\phi; \lambda, \tau)$, and the investment decisions $FDI_j^* \in \{0, 1\}$, for all $j \in N_f$, such that

1. The SIG maximizes its net gain by sequentially lobbying the central and the local governments with lobby functions $C^*(\lambda, \tau)$ and $D^*(\phi; \lambda, \tau)$;
2. The central government maximizes its goal function by choosing τ^* and λ^* ;
3. Given τ^*, λ^* and $D^*(\phi; \lambda, \tau)$, the provincial government maximizes its payoff by choosing ϕ^* ;
4. Given policy variables $\{\phi^*, \tau^*, \lambda^*\}$, each potential investor $j \in N_f$ makes the investment decision FDI_j^* and pricing decision $p^*(j)$ and also output decision $x^*(j)$. FDI_j^* is a best response to all $FDI_{j'}^*, j' \in N_f, j' \neq j$;
5. Each domestic firm $j \in N_h$ maximizes the profit by choosing $p^*(j)$ and $x^*(j)$;
6. Each household maximizes the utility (1) by choosing the right consumption for numeraire goods and $x^*(j)$ for $j \in N$ subject to the corresponding budget constraint;

¹⁵In the reality, tariff rate τ is determined at the national government level in almost all the countries while the magnitude of the *de facto* institutional entry cost ϕ is largely at the discretion of the local government even if in some cases the rules are made by the central government. For example, in China, the FDI projects that exceed certain threshold value must get approved by the central government, but the local government can still affect ϕ through the provision of public goods and services. λ represents the overall basket of taxes but is interpreted as the non-distortive profit tax in order to simplify the analysis. In the reality, some taxes are levied exclusively by the local government or the central government, but others are co-charged by the two government levels including the corporate and individual income taxes and the value-added taxes. For simplicity, the policy instrument λ is assigned to the central government alone but the profit tax revenues will be shared according to the fiscal decentralization parameter γ to be introduced soon.

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

Backward induction is used to characterize the political equilibrium. We first need to analyze the supply of FDI for given policies, then we analyze the provincial government's preference (demand) for FDI at the second stage lobby game, in which we obtain the FDI bifurcation result. Then we move up to the first stage lobby game (at the central government level) and show how fiscal decentralization can have a non-monotonic impact on the equilibrium policies and FDI due to the balance of interests for both government levels.

The equilibrium of the market sector and the FDI supply decision for given policies have already been characterized in Subsection 3.1, so we are now ready to derive the bifurcation result at the second stage lobby game. It will be shown that bifurcation is mainly due to the endogenous polarization of the provincial government's preference for FDI.

2.4 FDI Bifurcation

Recall by this time the central government has already chosen λ and τ and has been paid $C(\lambda, \tau)$, all of which are determined in the first-stage lobby game. To simplify the analysis, we assume the provincial government only cares about its revenue, which is the sum of the total profit tax revenue and the lobby contribution $D(\phi; \lambda, \tau)$.¹⁶ The profit tax revenue has two parts. One part is from the foreign-invested firms and the other part is from the domestic firms, who pay the profit tax at the exogenous rate $\bar{\lambda}$.¹⁷ The goal function of the provincial government is therefore

$$V_p(\phi; \lambda, \tau) \equiv (1 - \gamma)[\lambda n_m \pi_m(n_m, \tau) + \bar{\lambda} n_h \pi_h(n_m, \tau)] + D(\phi; \lambda, \tau), \quad (12)$$

where γ denotes the share of the total profit tax revenues accruing to the central government, which is the key parameter of this paper. So fiscal decentralization is measured by $(1 - \gamma)$. We take $\gamma \in (0, 1)$ as exogenous.¹⁸

¹⁶See Wei (2000) for more justifications. I will show explicitly in subsection 2.5 that the main results are quite robust to various changes in the model specifications, including the case in which the local government also cares about the welfare, employment and GDP.

¹⁷It is innocuous to take $\bar{\lambda}$ as exogenous, because it turns out what really matters for the bifurcation result is the endogenous ratio $\frac{\lambda}{\bar{\lambda}}$ in the equilibrium rather than the absolute value of $\bar{\lambda}$, as will be clear after we derive the equilibrium value for λ (i.e., $\tilde{\lambda}$) obtained from (17) and Proposition 3.

¹⁸ γ may be determined by the relative bargaining power distribution between the central and local governments, which shall depend on the electoral modes and other aspects of the political institutions. For example, China's provincial officials are essentially appointed by the central government while the state government officials are elected by local voters in India. It may partly explain why China has a higher centralization parameter γ .

The SIG (the principal) lobbies the provincial government (the agent) to maximize its net return:

$$\max_{\widehat{\phi} \geq 0, D(\widehat{\phi}; \lambda, \tau) \geq 0} (1 - \bar{\lambda})n_h\pi_h(n_m(\widehat{\phi}, \lambda, \tau), \tau) - C(\lambda, \tau) - D(\widehat{\phi}; \lambda, \tau) \quad (13)$$

subject to the incentive compatibility constraint:

$$\widehat{\phi} \in \arg \max_{\phi \geq 0} V_p(\phi; \lambda, \tau), \quad (14)$$

and the participation constraint:

$$V_p(\widehat{\phi}; \lambda, \tau) \geq \max_{\phi \geq 0} [V_p(\phi; \lambda, \tau) - D(\phi; \lambda, \tau)], \quad (15)$$

where $V_p(\phi; \lambda, \tau) - D(\phi; \lambda, \tau)$ is the provincial government's return without being lobbied. As $D(\phi; \lambda, \tau) \geq 0$, (15) is guaranteed by (14).

We first examine the provincial government's preference for FDI and then back out the optimal $\widehat{\phi}$ from the known function $n_m(\phi, \lambda, \tau)$ obtained from (11). Due to the transferable utility, the SIG can extract all the surplus by making (15) exactly binding. Adding the two goal functions (12) and (13) together yields

$$\max_{n_m \in [0, n_f]} \lambda(1 - \gamma)n_m\pi_m(n_m, \tau) + (1 - \gamma\bar{\lambda})n_h\pi_h(n_m, \tau), \quad (16)$$

which determines the provincial government's preference (demand) for FDI. The first term in (16) is the provincial government's profit tax revenue from the multinational firms. The second term is the total profit of domestic firms net of the tax payment to the central government. The (virtual) coalition of the SIG and the provincial government tries to maximize the sum. Transferable utility ensures that the SIG and the government have the same ultimate demand for FDI as their coalition.

Using brutal force, we can show that, as n_m increases, the goal function in (16) first strictly decreases then strictly increases with n_m , thus the FDI demand is a corner solution:

$$n_m^d = \begin{cases} 0, & \text{when } \lambda < \widetilde{\lambda}^s(\tau) \\ 0 \text{ or } n_f, & \text{when } \lambda = \widetilde{\lambda}^s(\tau) \\ n_f, & \text{when } \lambda > \widetilde{\lambda}^s(\tau) \end{cases},$$

where $\widetilde{\lambda}^s(\tau) \equiv \frac{1 - \gamma\bar{\lambda}}{1 - \gamma} \left(\frac{n_h[\pi_h(0, \tau) - \pi_h(n_f, \tau)]}{n_f\pi_m(n_f, \tau)} \right)$, the superscript s denotes the case with the lobby of the SIG and superscript d means demand. That is, the provincial government's preference for FDI is polarized, either very hostile ($n_m^d = 0$), in which case the government will impose very high entry cost ϕ , or very friendly ($n_m^d = n_f$), in which case it will make ϕ small enough to

encourage full FDI.¹⁹

The intuition for this preference polarization is straightforward. FDI has two competing effects: more FDI implies more firms to collect tax from (i.e., the pro-FDI tax base expansion effect) but less profit revenue from each firm (i.e., the anti-FDI average profit-reduction effect due to (7)). The tax base expansion effect increases with n_m linearly but the profit-reduction effect increases with n_m only at a diminishing speed (due to (10)), so the profit-reduction effect may dominate the base-expansion effect when n_m is small but the opposite would be true when n_m gets sufficiently large, which makes the total profit tax revenue "convex" in n_m . Only when the profit tax rate on FDI λ is sufficiently large would the base-expansion effect dominate the profit-reduction effect so that the attitude is friendly.

The preference polarization result also holds in the absence of lobby. To see it, observe that in this case the desired level of FDI for the provincial government is given by

$$\max_{n_m \in [0, n_f]} (1 - \gamma)[\lambda n_m \pi_m(n_m, \tau) + \bar{\lambda} n_h \pi_h(n_m, \tau)], \quad (17)$$

which is still "convex" in n_m , therefore its demand for FDI, denoted by \hat{n}_m^d , is given by

$$\hat{n}_m^d = \begin{cases} 0, & \text{when } \lambda < \tilde{\lambda} \\ 0 \text{ or } n_f, & \text{when } \lambda = \tilde{\lambda} \\ n_f, & \text{when } \lambda > \tilde{\lambda} \end{cases},$$

where $\tilde{\lambda} \equiv \left(\frac{n_h [\pi_h(0, \tau) - \pi_h(n_f, \tau)]}{n_f \pi_m(n_f, \tau)} \right) \bar{\lambda}$. Observe that $\tilde{\lambda}^s = \frac{1 - \gamma \bar{\lambda}}{\bar{\lambda}(1 - \gamma)} \tilde{\lambda} > \tilde{\lambda}$ because the provincial government must be compensated with a higher profit tax rate on FDI in order to offset the lobbying influence against FDI.²⁰

¹⁹More precisely, given τ and λ , the implied equilibrium entry cost ϕ is given by

$$\phi^* = \begin{cases} \text{any } \phi \leq \underline{\phi}, & \text{if } \lambda \geq \tilde{\lambda}^s(\tau), \lambda < 1 - \tau^{-\varepsilon} w^{1-\varepsilon} \\ 0, & \text{if } \lambda \geq \tilde{\lambda}^s(\tau), \lambda = 1 - \tau^{-\varepsilon} w^{1-\varepsilon} \\ \text{any } \phi \geq \bar{\phi}, & \text{if } \lambda < \tilde{\lambda}^s(\tau), \lambda < 1 - \tau^{-\varepsilon} w^{1-\varepsilon} \\ \text{any } \phi > 0, & \text{if } \lambda < \tilde{\lambda}^s(\tau), \lambda = 1 - \tau^{-\varepsilon} w^{1-\varepsilon} \\ \text{any } \phi \geq 0, & \text{if } \lambda > 1 - \tau^{-\varepsilon} w^{1-\varepsilon} \end{cases},$$

where

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

and

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

²⁰Observe that $\frac{\partial \tilde{\lambda}^s}{\partial \lambda} < 0$ while $\frac{\partial \bar{\lambda}}{\partial \lambda} > 0$. The reasons are as follows. With the lobby, the bargaining power of the SIG in the virtual coalition decreases with $\bar{\lambda}$, therefore a welcoming attitude toward FDI requires a lower tax barrier $\tilde{\lambda}^s$. Without the lobby, to induce a friendly attitude of the provincial government toward FDI it requires a higher profit tax rate on foreign-invested firms when the rival domestic firms pay the profit tax at a higher

When the provincial government prefers more FDI, it can set ϕ to zero, so (11) is reduced to $\lambda \leq 1 - \frac{\pi_f(n_m, \tau)}{\pi_m(n_m, \tau)} = 1 - w^{1-\varepsilon}\tau^{-\varepsilon}$ by using (6). Observe $w^{1-\varepsilon}\tau^{-\varepsilon} < 1$. Combining the supply and demand of FDI, we have the following "FDI Bifurcation" result:

Proposition 1 (*FDI Bifurcation*) *In the one-province economy, the equilibrium FDI is either null or full:*

$$n_m^* = \begin{cases} n_f, & \text{if } \tilde{\lambda}^s(\tau) \leq \lambda \leq 1 - w^{1-\varepsilon}\tau^{-\varepsilon} \\ 0, & \text{otherwise} \end{cases}. \quad (18)$$

The proposition states that the equilibrium FDI is full ($n_m^* = n_f$) only when λ is large enough to induce a positive demand of FDI from the provincial government and at the same time λ is also small enough to encourage a positive supply of FDI from foreign potential investors, for any given τ . It is important to emphasize that "bifurcation" only occurs when λ moves across one of the two threshold values, $\tilde{\lambda}^s(\tau)$ or $1 - w^{1-\varepsilon}\tau^{-\varepsilon}$. It does not mean that the FDI swings whenever λ changes holding other things constant.

For future use, let us derive the lobby function $D(\phi; \lambda, \tau)$. $D(\phi; \lambda, \tau) > 0$ if and only if the provincial government prefers the full-FDI equilibrium without being lobbied but the lobby changes its attitude. $D(\phi; \lambda, \tau)$ therefore can be derived from the binding participation constraint (15). For any other cases, $D(\phi; \lambda, \tau) = 0$ either because it's unnecessary to lobby (when $\lambda > 1 - w^{1-\varepsilon}\tau^{-\varepsilon}$ or when $\lambda < \tilde{\lambda}$ or both) or because it's too costly to lobby (when $\tilde{\lambda}^s \leq \lambda \leq 1 - w^{1-\varepsilon}\tau^{-\varepsilon}$). We can therefore infer that $D(\phi; \lambda, \tau) = 0$ whenever $n_m^* > 0$ but $D(\phi; \lambda, \tau)$ could be positive if $n_m^* = 0$.²¹ To summarize, we have

Lemma 2 *The optimal solution to the second stage lobby game (13) is the following: $\hat{\phi}^*(\lambda, \tau)$ can be any value larger than $(1 - \lambda)\pi_m(0, \tau) - \pi_f(0, \tau)$ when $\tilde{\lambda}(\tau) \leq \lambda \leq 1 - w^{1-\varepsilon}\tau^{-\varepsilon}$ and $\lambda < \tilde{\lambda}^s(\tau)$; $\hat{\phi}^*(\lambda, \tau) = 0$ when $\tilde{\lambda}^s(\tau) \leq \lambda \leq 1 - w^{1-\varepsilon}\tau^{-\varepsilon}$. $D^*(\phi; \lambda, \tau) = (1 - \gamma)[\lambda n_f \pi_m(n_f, \tau) + \bar{\lambda} n_h \pi_h(n_f, \tau) - \bar{\lambda} n_h \pi_h(0, \tau)]$ when $\tilde{\lambda}(\tau) \leq \lambda \leq 1 - w^{1-\varepsilon}\tau^{-\varepsilon}$, $\lambda < \tilde{\lambda}^s(\tau)$ and $\phi = \hat{\phi}^*$; $D^*(\phi; \lambda, \tau) = 0$ otherwise.*

Since FDI Bifurcation is one of the two key theoretical results for this paper, it is helpful to discuss its robustness to alternative model specifications.

rate. That's why $\frac{\partial \tilde{\lambda}}{\partial \lambda} > 0$. Also observe that $\frac{\partial \tilde{\lambda}^s}{\partial \gamma} > 0$ while $\frac{\partial \tilde{\lambda}}{\partial \gamma} = 0$. With the lobby, the bargaining power of the provincial government decreases with γ , therefore the tax barrier to FDI is more determined by the SIG, hence $\frac{\partial \tilde{\lambda}^s}{\partial \gamma} > 0$. Without the lobby, γ is neutral for domestic firms and foreign-invested firms, see (17). It means that we will lose the Non-monotonicity results, one of the two key results in this paper, if the SIG is not introduced into the model.

²¹It is different from the more restrictive concept of the truthful equilibrium in Grossman and Helpman (1994) and Dixit, Grossman and Helpman (1997).

2.5 Robustness of FDI Bifurcation

The key economic force behind the FDI bifurcation is the endogenous polarization of the provincial government's preference for FDI. It will be shown that this result of attitudinal polarization remains valid for quite a few relevant changes in model specifications.

First, what if the foreign-invested firms can also form a special interest group and lobby the provincial government?²² In this case, the two SIGs are engaged in a menu auction. Due to the quasilinear preferences, the ultimate virtual goal function is again a linear sum of $n_m\pi_m(n_m, \tau)$ and $n_h\pi_h(n_m, \tau)$ with a higher weight on the former. Therefore, the polarization result still holds,²³ although the threshold value changes and a larger proportion of surplus moves from the SIGs to the government.²⁴

Second, what if a larger set of policy instruments (other than ϕ) is introduced explicitly into the model for the provincial government? More specifically, suppose the provincial government can also levy consumption tax at a gross *ad valorem* rate ζ on all goods $j \in N$. In this case, the new profit for each firm $j \in N_x$ becomes $\zeta^{-\theta}\pi_x(n_m, \tau)$ for any $x \in \{f, m, h\}$. The total consumption tax revenue from domestic firms and foreign-invested firms turns out to be $(\zeta - 1)\zeta^{-\theta}\varepsilon [n_h\pi_h(n_m, \tau) + n_m\pi_m(n_m, \tau)]$. The consumption tax revenue from all the imported goods is given by $(n_f - n_m)(\zeta - 1)\zeta^{-\theta}\varepsilon w^{1-\varepsilon}\tau^{-\varepsilon}\pi_m(n_m, \tau)$. So the ultimate virtual goal function that determines the preference for FDI is again a linear sum of $n_m\pi_m(n_m, \tau)$ and $n_h\pi_h(n_m, \tau)$, hence the bifurcation result remains true.

Third, what if the provincial government not only cares about its tax revenue, but also cares about other things such as GDP, employment, welfare, *etc.*? To address this question, observe that the total labor employed by the domestic-brand firms, denoted by l_h , is $n_hx_hc_h$. Total employment in the multinational sector (denoted by l_m) is given by n_mx_mcf . The rest of the labor, $L - n_hx_hc_h - n_mx_mcf$, are employed in the numeraire sector, denoted by l_n . GDP is the total output from all these three sectors:

$$\begin{aligned} GDP &= (L - n_hx_hc_h - n_mx_mcf) + n_hp_hx_h + n_m p_m x_m \\ &= L + n_h\pi_h + n_m\pi_m. \end{aligned}$$

If domestic firms and foreign-invested firms are subject to a uniform profit tax rate ($\lambda = \bar{\lambda}$),

²² ϕ in this case may be modeled as the payment to the government instead of the deadweight loss.

²³The verification process, by using (6), is straightforward but tedious. However, the proof can be tremendously simplified if we restrict the range of exogenous parameters further such that (10) is strengthened to $-\frac{n_m\pi_m''(n_m, \tau)}{\pi_m'(n_m, \tau)} > 2$, meaning one percentage increase in the total FDI will lead to more than two percentage decrease in the marginal negative impact of FDI on multinational firms' profits.

²⁴For more formal discussions on the difference between one lobby group and multiple lobby groups, please refer to Grossman and Helpman (2001).

then (17) is equivalent to the GDP maximization and $\widehat{n}_m^d = n_f$. Suppose the goal function (12) is modified to maximize

$$(1 - \gamma)[\lambda n_m \pi_m(n_m, \tau) + \bar{\lambda} n_h \pi_h(n_m, \tau)] + D(\phi; \lambda, \tau) + \xi \cdot GDP,$$

where ξ is the weight on the GDP. Then the virtual goal function of the coalition (16) becomes

$$\max_{n_m \in [0, n_f]} [\lambda(1 - \gamma) + \xi] n_m \pi_m(n_m, \tau) + [(1 - \gamma \bar{\lambda}) + \xi] n_h \pi_h(n_m, \tau),$$

which is still a linear sum of $n_m \pi_m(n_m, \tau)$ and $n_h \pi_h(n_m, \tau)$ so the preference polarization result remains valid although the threshold value $\widetilde{\lambda}^s(\tau)$ is changed.

Now in this economy with full employment, suppose the provincial government *also* wants to reallocate the labor force to sectors with a higher value-added (for example, from the numeraire sector to the sectors that produce the differentiated goods), incorporating this goal into (12) again does not affect the polarization result because l_h is proportional to $n_h \pi_h(n_m, \tau)$ and l_m is proportion to $n_m \pi_m$ according to (4) and (6).

What if the provincial government *also* cares about the public welfare? By solving the household problem, we obtain the welfare function for an average household

$$W(n_m, \tau) = L + (1 - \bar{\lambda}) n_h \pi_h(n_m, \tau) + \frac{q(n_m)^{1-\theta}}{\theta - 1}, \quad (19)$$

where L is the wage income, $(1 - \bar{\lambda}) n_h \pi_h$ is the after-tax profit of the domestic firms, and $\frac{q^{1-\theta}}{\theta-1}$ is the utility derived from the consumption of the Dixit-Stiglitz aggregate. The profits of the domestic firms decrease with FDI n_m by (7), but $\frac{q(n_m)^{1-\theta}}{\theta-1}$ increases in n_m because consumers prefer that all the foreign goods are produced by the foreign-invested firms instead of being imported since the import price is higher. It turns out $\frac{\partial W(n_m, \tau)}{\partial n_m} > 0$ for any $n_m \in [0, n_f]$.²⁵ Therefore, if the government is sufficiently benevolent in the sense that it gives a sufficiently large weight to the welfare in its goal function, then the demand for FDI is again a corner solution $n_m^d = n_f$.

Needless to say, however, no result can be expected to always hold in all circumstances. For example, if the welfare weight in the last example is sufficiently small but not too small, we may lose the polarization result. The welfare weight will be discussed further in the first-stage lobby game, where we can show that in some circumstances an increase in the weight on $W(n_m, \tau)$ in the central government's goal function might decrease the equilibrium FDI although $\frac{\partial W(n_m, \tau)}{\partial n_m} > 0$.

Recall Proposition 1 shows that whether the equilibrium has full FDI or null FDI depends on λ and τ , which are determined in the first-stage lobby game between the SIG and the central

²⁵Two other properties employed later are $\frac{\partial W(n_m, \tau)}{\partial \tau} < 0$ for any $n_m < n_f$ and $\frac{\partial W(n_f, \tau)}{\partial \tau} = 0$.

government. This is addressed in the next subsection.

2.6 Fiscal Decentralization

The central government maximizes the weighted sum of its total revenues and the public welfare by choosing the profit tax rate on the foreign-invested firms λ and tariff rate τ . The revenue has three parts. One is the tariff revenue given by

$$A(n_m, \tau) = (\tau - 1) \varepsilon w^{1-\varepsilon} \tau^{-\varepsilon} (n_f - n_m) \pi_m(n_m, \tau), \quad (20)$$

which implies

$$\frac{\partial A(n_m, \tau)}{\partial n_m} < 0. \quad (21)$$

This is not only because more FDI implies fewer imported foreign brands but also because the demand for each imported brand decreases as n_m increases by revoking (4) and (5). The second part of the central government's revenue is its share of the total profit tax $\gamma[\lambda n_m \pi_m(n_m, \tau) + \bar{\lambda} n_h \pi_h(n_m, \tau)]$. The third part is the political contribution $C(\lambda, \tau)$. Since the SIG hates FDI, $C(\lambda, \tau)$ is non-decreasing in λ . By suppressing $n_m(\phi, \lambda, \tau)$ to n_m , we can write the central government's problem as

$$\max_{\lambda \in [0, 1], \tau \in [1, \infty)} V_c(\lambda, \tau) \equiv A(n_m, \tau) + \gamma[\lambda n_m \pi_m(n_m, \tau) + \bar{\lambda} n_h \pi_h(n_m, \tau)] + C(\lambda, \tau) + aW(n_m, \tau) \quad (22)$$

where $a \in [0, \infty)$ is the welfare weight. For the central government, more FDI implies less tariff revenue $A(n_m, \tau)$ due to (21), less profit tax revenues from the domestic firms $\bar{\lambda} n_h \pi_h(n_m, \tau)$ due to (7) and less political contribution $C(\lambda, \tau)$, but it also implies more profit tax revenues from the multinational firms $\lambda n_m \pi_m(n_m, \tau)$ and a higher public welfare $W(n_m, \tau)$. Without the lobby, the central government has the reservation value

$$B_c \equiv \max_{\lambda, \tau} A(n_m, \tau) + \gamma[\lambda n_m \pi_m(n_m, \tau) + \bar{\lambda} n_h \pi_h(n_m, \tau)] + aW(n_m, \tau).$$

Now foreseeing the optimal response functions $\hat{\phi}^*(\lambda, \tau)$ and $D^*(\phi; \lambda, \tau)$ in the second-stage lobby game, the SIG recommends profit tax rate $\hat{\lambda}$, gross tariff rate $\hat{\tau}$ and also chooses the lobby function $C(\lambda, \tau)$ to maximize the net gain

$$\max_{\hat{\lambda} \in [0, 1], \hat{\tau} \in [1, \infty), C(\lambda, \tau) \geq 0} (1 - \bar{\lambda}) n_h \pi_h(n_m(\hat{\phi}^*, \hat{\lambda}, \hat{\tau}), \hat{\tau}) - C(\hat{\lambda}, \hat{\tau}) - D^*(\hat{\phi}^*; \hat{\lambda}, \hat{\tau}), \quad (23)$$

subject to the incentive compatibility constraint $(\hat{\lambda}, \hat{\tau}) \in \arg \max_{\lambda, \tau} V_c(\lambda, \tau)$ and the participation constraint $V_c(\hat{\lambda}, \hat{\tau}) \geq B_c$. Again, thanks to the transferable utility, (22) and (23) can be

combined to

$$\begin{aligned} & \max_{\widehat{\lambda} \in [0,1], \widehat{\tau} \in [1,\infty)} A(n_m, \widehat{\tau}) + \gamma[\widehat{\lambda}n_m\pi_m(n_m, \widehat{\tau}) + \bar{\lambda}n_h\pi_h(n_m, \widehat{\tau})] \\ & + (1 - \bar{\lambda})n_h\pi_h(n_m, \widehat{\tau}) + aW(n_m, \widehat{\tau}) - D^*(\widehat{\phi}^*; \widehat{\lambda}, \widehat{\tau}), \end{aligned} \quad (24)$$

where $n_m = n_m(\widehat{\phi}^*, \widehat{\lambda}, \widehat{\tau})$ derived from (11) and $D^*(\widehat{\phi}^*; \widehat{\lambda}, \widehat{\tau})$ is given by Lemma 2.

The central government knows that ultimately n_m will be either zero or n_f , as predicted in Proposition 1, therefore it only compares the coalition's largest value at $n_m = 0$, denoted by R_1 , and its largest value at $n_m = n_f$, denoted by R_2 . It will choose to implement the full-FDI equilibrium if and only if $R_2 \geq R_1$. The following analysis first characterizes R_1 and R_2 respectively, and then provides the necessary and sufficient condition for $R_2 \geq R_1$, which points to the importance of fiscal decentralization as summarized in Proposition 8. To simplify the notations, we will from now on write ϕ, λ, τ instead of $\widehat{\phi}^*, \widehat{\lambda}, \widehat{\tau}$ whenever no confusion arises.

2.6.1 Null-FDI Outcome

Substituting $n_m = 0$ into (24) yields $R_1 = \max_{\lambda, \tau} A(0, \tau) + (\gamma\bar{\lambda} + 1 - \bar{\lambda})n_h\pi_h(0, \tau) + aW(0, \tau) - D^*(\phi; \lambda, \tau)$, subject to that λ and τ are such that $n_m = 0$ will be implemented. There

are two possibilities: either the SIG pays nothing to the provincial government because it is unnecessary to lobby, or the SIG pays and the lobby successfully reverses the attitude of the provincial government toward FDI. Let R_{11} and R_{12} denote the values for the virtual coalition in these two scenarios respectively.

$$R_{11} \equiv \max_{\lambda, \tau} A(0, \tau) + (\gamma\bar{\lambda} + 1 - \bar{\lambda})n_h\pi_h(0, \tau) + aW(0, \tau)$$

subject to $\lambda > 1 - w^{1-\varepsilon}\tau^{-\varepsilon}$, or $\lambda < \widetilde{\lambda}(\tau)$. The optimal tariff rate τ^* is therefore given by

$$\tau^* \in \arg \max_{\tau \in [1,\infty)} A(0, \tau) + (\gamma\bar{\lambda} + 1 - \bar{\lambda})n_h\pi_h(0, \tau) + aW(0, \tau), \quad (25)$$

which implies the generic uniqueness of τ^* and $\frac{\partial \tau^*(\gamma)}{\partial \gamma} > 0$ because of (9). The optimal profit tax rate is indeterminate:

$$\lambda^* \in (1 - w^{1-\varepsilon}\tau^{*-\varepsilon}, 1] \cup [0, \widetilde{\lambda}(\tau^*)), \quad (26)$$

which is easy to understand by revoking Proposition 1.

R_{12} is obtained only when $D(\phi; \lambda, \tau) > 0$, that is, the effective lobby occurs. By Lemma 2,

(24) can be rewritten as

$$R_{12} \equiv \max_{\lambda, \tau} A(0, \tau) + aW(0, \tau) + n_h \pi_h(0, \tau) - (1 - \gamma)[\lambda n_f \pi_m(n_f, \tau) + \bar{\lambda} n_h \pi_h(n_f, \tau)]$$

subject to

$$\tilde{\lambda} \leq \lambda \leq 1 - w^{1-\varepsilon} \tau^{-\varepsilon} \text{ and } \lambda < \tilde{\lambda}^s. \quad (27)$$

Thus $\lambda^* = \tilde{\lambda}$ and $R_{12} = \max_{\tau \in [1, \infty)} A(0, \tau) + aW(0, \tau) + n_h \pi_h(0, \tau)[1 - (1 - \gamma)\bar{\lambda}]$ subject to $\bar{\lambda} \leq \eta(\tau)$, where

$$\eta(\tau) \equiv \frac{n_f [\pi_m(n_f, \tau) - \pi_f(n_f, \tau)]}{n_h [\pi_h(0, \tau) - \pi_h(n_f, \tau)]}. \quad (28)$$

$R_1 = \max\{R_{11}, R_{12}\}$. Observe that the same goal function is maximized but the constraint in the first case is weakly less restrictive, so $R_1 = R_{11}$. In addition, since $D(\phi; \lambda, \tau) = 0$ whenever $n_m = n_f$, it immediately implies the following important result.

Proposition 3 *For any equilibrium policy profile $(\phi^*, \lambda^*, \tau^*)$ and lobby functions $C^*(\lambda, \tau)$ and $D^*(\phi; \lambda, \tau)$, whenever $D^*(\phi^*; \lambda^*, \tau^*) > 0$, there always exists another equilibrium policy profile $(\phi^{**}, \lambda^{**}, \tau^{**})$ with the same lobby functions such that the same market allocation is achieved and $D^*(\phi^{**}; \lambda^{**}, \tau^{**}) = 0$.*

This proposition implies that, without loss of generality, we can assume that the SIG only "effectively" lobbies the central government by setting $D(\phi; \lambda, \tau) = 0$. Observe that $D(\phi; \lambda, \tau) > 0$ holds only when the provincial government wants to encourage FDI before the lobby but its attitude swings after being lobbied, in which case the equilibrium FDI is zero. However, the SIG could have chosen to withdraw all the lobby contribution to the provincial government. Instead, it can slightly increase its lobby contribution to the central government and only ask the latter to adopt the same τ but a restrictively high λ (for example, let $\lambda = 1$). The equilibrium FDI, tariff rate, profit tax revenues would all be the same as before, so the central government would accept the new lobby suggestion.

The two government levels have asymmetric abilities to affect the equilibrium FDI. This is the fundamental reason why in this model the SIG can harmlessly restrict its own choice of the lobby functions such that the local government is never paid in the equilibrium. The central government can effectively block FDI without any cooperation from the local government because the local government has limited ability to encourage FDI as we restrict $\phi \geq 0$. When λ is set high enough, the provincial government actually wants to have as much FDI as possible, but the best it can do is to set $\phi = 0$, which is still not enough to encourage any FDI supply. If the provincial government is allowed to subsidize FDI (let $\phi < 0$), then the SIG may have to pay some money to the provincial government in order to fully block FDI. However, even in this case, the local government has to find it worthwhile to sacrifice some of its fiscal resources to act against the central government and the SIG. This is quite rare in the reality, especially

when the central government is strong as in China and India.

This proposition highlights a distinctive feature of the sequential lobbying within a multi-level government, that is, the lobby strategy of the SIG has to take into account the strategic interaction between the different levels of government. For example, in this model the SIG would be naive if it only tries to lobby the provincial government although the latter seems to be able to block FDI single-handedly by choosing a prohibitively high ϕ . It is sometimes more efficient for the SIG to lobby the provincial government "indirectly" by lobbying the central government, because the latter can manipulate the incentive of the local government. This proposition also greatly simplifies the calibration exercise in Section 4.

To summarize, we have

Lemma 4 *In any null-FDI equilibrium, the coalition of the central government and the special interest group obtains $R_1 = \max_{\tau \in [1, \infty)} A(0, \tau) + (\gamma\bar{\lambda} + 1 - \bar{\lambda})n_h\pi_h(0, \tau) + aW(0, \tau)$, the optimal tariff rate is given by (25) and the optimal profit tax rate is indeterminate, given by (26).*

Proposition 3 does not mean, however, that the second-stage lobby game is unimportant. The fact that the SIG has the ability to lobby the provincial government always imposes a potential "threat" to the central government. In particular, when the central government wants FDI, it has to induce the cooperation of the local government. We turn to this case now.

2.6.2 Full-FDI Outcome

First observe that, in any full-FDI equilibrium, no foreign brand is imported hence the tariff revenue is zero ($A(n_f, \tau) = 0$). In addition, the SIG has rational expectation so it does not waste money lobbying the provincial government either ($D(\phi; \lambda, \tau) = 0$). Therefore the goal function (24) is reduced to

$$R_2 = \max_{\lambda, \tau} \gamma[\lambda n_f \pi_m(n_f, \tau) + \bar{\lambda} n_h \pi_h(n_f, \tau)] + (1 - \bar{\lambda})n_h \pi_h(n_f, \tau) + aW(n_f, \tau)$$

subject to $\tilde{\lambda}^s(\tau) \leq \lambda \leq 1 - w^{1-\varepsilon}\tau^{-\varepsilon}$ as implied by (18) in Proposition 1. This immediately determines the equilibrium profit tax rate $\lambda^* = 1 - w^{1-\varepsilon}\tau^{-\varepsilon}$. Substituting it back yields

$$R_2 = \max_{\tau \geq 1} \gamma n_f [\pi_m(n_f, \tau) - \pi_f(n_f, \tau)] + (1 - \bar{\lambda} + \gamma\bar{\lambda})n_h \pi_h(n_f, \tau) + aW(n_f, \tau). \quad (29)$$

subject to

$$\frac{1 - \gamma\bar{\lambda}}{1 - \gamma} \leq \eta(\tau), \quad (30)$$

where $\eta(\tau)$ is defined in (28). (30) combines the incentive-compatibility constraints both for the provincial government and for the foreign firms, so it is the implementability constraint for the full-FDI equilibrium.

Observe that $\pi_m(n_f, \tau)$, $\pi_h(n_f, \tau)$ and $W(n_f, \tau)$ are all independent of τ , because the tariff rate matters only when exporting firms exist. Nevertheless, the shadow profit for a "potential" exporting firm $\pi_f(n_f, \tau)$ is still decreasing in τ due to the law of demand. Consequently, the optimal tariff rate must be the largest possible value that satisfies the implementability constraint (30):

$$\tau^* = \sup\{\tau \mid \tau \in [1, \infty) \text{ and } \frac{1 - \gamma\bar{\lambda}}{1 - \gamma} \leq \eta(\tau) \text{ is satisfied}\}. \quad (31)$$

To characterize τ^* more sharply, we need to know more properties about function $\eta(\tau)$.

Claim: $\eta(\tau)$ has the following properties:

[1] $\eta(\tau)$ is strictly positive and continuously differentiable for any $\tau \in [1, \infty)$.

[2] $\eta'(\tau) < 0$ when $\tau \geq \hat{\tau}$, where $\hat{\tau} \equiv \frac{\varepsilon}{\varepsilon - \theta} \frac{1 - \left[1 + \frac{n_f}{n_h} \left(\frac{c_f}{c_h}\right)^{1-\varepsilon}\right]^{\frac{\varepsilon - \theta}{1-\varepsilon}}}{\frac{n_f}{n_h} \left(\frac{c_f}{c_h}\right)^{1-\varepsilon}} > 0$.²⁶

[3] $1 < \eta(\infty) < \infty$ and $0 \leq \eta(1) < \infty$.²⁷

[4] When $\tau \in [1, \hat{\tau}]$, $\eta''(\tau) < 0$ if and only if τ is larger than some critical value and $\eta''(\tau) > 0$ when τ is smaller than that critical value.²⁸

This claim can be proved by brutal force. These properties immediately imply that there exists a finite maximum value for $\eta(\tau)$, denoted by M , which can be obtained at some $\tau \in (1, \hat{\tau})$. For the future reference, define $\tau^M \equiv \max\{\arg \max \eta(\tau)\}$, $\bar{\gamma} \equiv \frac{M-1}{M-\lambda}$ and $\tilde{\gamma} \equiv \frac{\eta(\infty)-1}{\eta(\infty)-\lambda}$. We must have $M > \eta(\infty)$. These are illustrated in Figure 3.

²⁶ $\eta'(\tau) < 0$ is equivalent to $\frac{-\pi'_{f2}(n_f, \tau)}{\pi'_{h2}(0, \tau)} < \frac{\pi_m(n_f, \tau) - \pi_f(n_f, \tau)}{\pi_h(0, \tau) - \pi_h(n_f, \tau)}$ for any $\tau \geq \hat{\tau}$, (with "=" only when $\tau = \hat{\tau}$). It means that when the trade barrier is sufficiently large ($\tau > \hat{\tau}$) and FDI is full, the ratio of each investor's profit gain by shifting from exporting to FDI, $\pi_m(n_f, \tau) - \pi_f(n_f, \tau)$, to each domestic firm's profit loss due to full FDI, $\pi_h(0, \tau) - \pi_h(n_f, \tau)$, is larger than the ratio of the marginal decrease in each exporting firm's profit due to a tariff increase ($-\pi'_{f2}(n_f, \tau)$) to the marginal increase in each domestic firm's profit due to a tariff increase ($\pi'_{h2}(0, \tau)$). Or roughly, the right hand side measures the gain of an investor relative to the loss of a domestic firm while the left hand side measures the marginal loss in an exporter's profit relative to the marginal gain in a domestic producer's profit as the tariff rate changes.

²⁷ $\eta(\infty) > 1$ is equivalent to $n_f \pi_m(n_f, \infty) > n_h [\pi_h(0, \infty) - \pi_h(n_f, \infty)]$, which can be verified by revoking (6). It means that the total profit of all the foreign-invested firms with full FDI exceeds the total profit loss of all the domestic firms with full FDI.

²⁸ More precisely, when $\tau \in [1, \hat{\tau}]$, we can show $\eta''(\tau) < 0$ if and only if $(\varepsilon - \theta)\tau^\varepsilon + (\varepsilon - \theta)(2\varepsilon - \theta)w^{1-\varepsilon} \frac{n_f}{n_h} \left(\frac{c_f}{c_h}\right)^{1-\varepsilon} \tau - (2\varepsilon - \theta - 1)\varepsilon w^{1-\varepsilon} > 0$, thus the cutoff value can be uniquely determined. In particular, $\eta''(\tau) < 0$ for any $\tau \in [1, \hat{\tau}]$ when $\frac{n_f}{n_h} \left(\frac{c_f}{c_h}\right)^{1-\varepsilon} > \frac{w^{1-\varepsilon} \varepsilon (2\varepsilon - \theta - 1) - (\varepsilon - \theta)}{w^{1-\varepsilon} (\varepsilon - \theta) (2\varepsilon - \theta)}$.

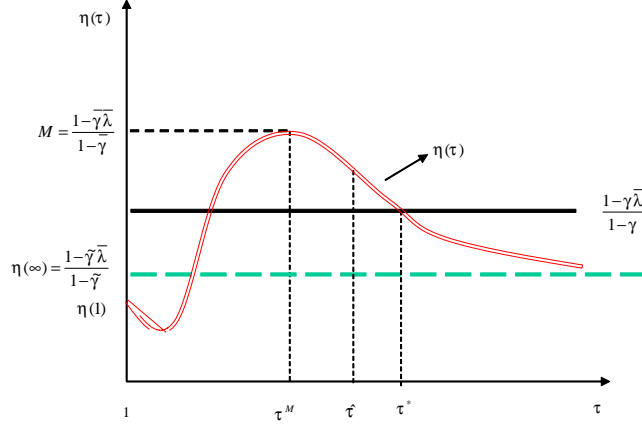


Figure 3. Properties of $\eta(\tau)$ and Determination of Tariff Rate τ

Geometrically, (30) means that the curve $\eta(\tau)$ on Figure 3 must be above the straight line $\frac{1-\gamma\bar{\lambda}}{1-\gamma}$ for that specific τ . (30) also implies that the full-FDI equilibrium is possible only when the fiscal centralization $\gamma \leq \bar{\gamma}$, otherwise the SIG can fully capture the provincial government in the sense that the minimum profit tax rate to induce a positive government demand for FDI is larger than the maximum profit tax rate that any potential investor would tolerate.

To determine the optimal tariff rate from (31), observe that when $\tau = \infty$ (i.e., import is prohibited), $\eta(\infty) > \frac{1-\gamma\bar{\lambda}}{1-\gamma}$ holds so long as the fiscal decentralization is strong enough ($\gamma < \tilde{\gamma}$). In other words, there exists a full-FDI equilibrium with complete import embargo when $\gamma < \tilde{\gamma}$. Correspondingly,

$$R_2 = \gamma n_f \pi_m(n_f, \infty) + (1 - \bar{\lambda} + \gamma \bar{\lambda}) n_h \pi_h(n_f, \infty) + aW(n_f, \infty). \quad (32)$$

The other possibility to have a full-FDI equilibrium is when $\gamma \in (\tilde{\gamma}, \bar{\gamma}]$, so (30) must be binding and the optimal tariff rate is

$$\tau^*(\gamma) = \max \left\{ \tau \mid \eta(\tau) = \frac{1 - \gamma \bar{\lambda}}{1 - \gamma} \right\}. \quad (33)$$

Geometrically, it means that the equilibrium tariff τ^* must be the rightmost crossing point of curve $\eta(\tau)$ and the straight solid line, as shown in Figure 3. Moreover, an increase in γ will move up the straight solid line, hence the crossing point τ^* will move leftward, so $\frac{\partial \tau^*(\gamma)}{\partial \gamma} < 0$. Once τ^* is determined, the equilibrium profit tax rate is also pinned down $\lambda^* = 1 - w^{1-\varepsilon} \tau^{*-\varepsilon}$. Substituting λ^* and $\tau^*(\gamma)$ back into (29) yields

$$R_2 = \frac{\gamma(1 - \gamma \bar{\lambda})}{1 - \gamma} n_h [\pi_h(0, \tau^*(\gamma)) - \pi_h(n_f, \tau^*(\gamma))] + (1 - \bar{\lambda} + \gamma \bar{\lambda}) n_h \pi_h(n_f, \tau^*(\gamma)) + aW(n_f, \tau^*(\gamma)). \quad (34)$$

In summary, we have

Lemma 5 *The full-FDI equilibrium is possible only when fiscal decentralization is sufficiently strong ($\gamma \leq \bar{\gamma}$). In addition, if fiscal decentralization satisfies $\gamma < \tilde{\gamma}$, the total surplus of the central government and the SIG R_2 is given by (32), the optimal tariff rate is infinity, and the optimal profit tax rate is one (full taxation). If fiscal decentralization is "moderately" strong ($\gamma \in (\tilde{\gamma}, \bar{\gamma}]$), R_2 is given by (34), the optimal tariff rate is given by (33) and the profit tax rate is $\lambda^* = 1 - w^{1-\varepsilon}\tau^{*\varepsilon}$.*

2.6.3 Equilibrium Outcome

The full-FDI equilibrium will be implemented if and only if $R_2 \geq R_1$. From Lemma 4 and Lemma 5, we have

$$R_2 - R_1 = \frac{\gamma(1 - \gamma\bar{\lambda})}{1 - \gamma} n_h [\pi_h(0, \tau_2^*) - \pi_h(n_f, \tau_2^*)] + (1 - \bar{\lambda} + \gamma\bar{\lambda}) n_h [\pi_h(n_f, \tau_1^*) - \pi_h(0, \tau_1^*)] + a [W(n_f, \tau_1^*) - W(0, \tau_1^*)] - A(0, \tau_1^*), \quad (35)$$

where τ_1^* and τ_2^* denote the optimal tariff rate for R_1 and R_2 , respectively. When $\gamma > \bar{\gamma}$, we already know that the null-FDI equilibrium will be implemented because (30) is violated, so let us focus on the case when $\gamma \leq \bar{\gamma}$. First consider the benchmark case when the welfare weight a is sufficiently large. A benevolent central government maximizes the welfare only, which means $R_2 > R_1$ will always hold because $W(n_f, \tau_1^*) - W(0, \tau_1^*) > 0$. Furthermore, the properties of the welfare function (19) imply the following:

Proposition 6 *When the central government is fully benevolent ($a \rightarrow \infty$), there will be no trade barrier (the gross tariff rate $\tau^* = 1$), the equilibrium profit tax rate is $\lambda^* = 1 - w^{1-\varepsilon}$. The equilibrium institutional entry cost is $\phi^* = 0$, and the equilibrium FDI (technology adoption) is full ($n_m^* = n_f$).*

This proposition characterizes the first best, in which both the welfare and GDP are maximized (Please also refer to Section 3.5). The positive profit tax rate is to induce the provincial government to be friendly toward FDI. Next, consider the other extreme case when $a = 0$. Define $\Delta(\gamma) \equiv R_2 - R_1$ for all $\gamma \in [0, \bar{\gamma}]$ when $a = 0$.

Lemma 7 $\Delta(\gamma)$ *is continuous and strictly increasing on $[0, \bar{\gamma}]$.*

Proof. See Appendix I(a). ■

Notice $\Delta(0) < 0$, so the central government would fully block FDI when it obtains no profit tax revenue. When $\Delta(\bar{\gamma}) \leq 0$, the null-FDI equilibrium will be sustained for any γ . To avoid

this trivial case, let us restrict the parameter space such that

$$\Delta(\bar{\gamma}) > 0. \quad (36)$$

Thus the mean value theorem implies the existence of a unique cutoff value $\hat{\gamma} \in (0, \bar{\gamma})$ such that $R_2 - R_1 > 0$ when $\gamma \in (\hat{\gamma}, \bar{\gamma})$ and $R_2 - R_1 < 0$ when $\gamma \in [0, \hat{\gamma})$. In particular, if $\Delta(\tilde{\gamma}) \geq 0$, or equivalently,

$$\tilde{\gamma} n_f \pi_m(n_f, \infty) + (1 - \bar{\lambda} + \tilde{\gamma} \bar{\lambda}) n_h [\pi_h(n_f, \infty) - \pi_h(0, \tau_1^*(\tilde{\gamma}))] - A(0, \tau_1^*(\tilde{\gamma})) \geq 0, \quad (37)$$

where $\tau_1^*(\tilde{\gamma})$ is given by (25) at $a = 0$ and $\gamma = \tilde{\gamma}$, then $\hat{\gamma} = \underline{\gamma} \in (0, \tilde{\gamma}]$ where $\underline{\gamma}$ is uniquely determined by $\Delta(\underline{\gamma}) = 0$. When (37) is not satisfied, $\hat{\gamma} = \underline{\gamma} \in (\tilde{\gamma}, \bar{\gamma}]$, where $\underline{\gamma}$ is uniquely pinned down by $\Delta(\underline{\gamma}) = 0$. To summarize, we have:

Proposition 8 (*Non Monotonicity*) *Suppose the welfare weight a is zero and (36) holds. The equilibrium policies are sufficiently favorable and the equilibrium FDI (technology adoption) is full ($n_m^* = n_f$) if and only if the fiscal decentralization is on the medium range ($\gamma \in [\hat{\gamma}, \bar{\gamma}]$), as summarized in Lemma 5. Otherwise, the equilibrium policies discourage FDI and the equilibrium FDI is zero, as summarized in Lemma 4.*

This proposition demonstrates the non-monotonic relationship between the degree of the fiscal decentralization and the equilibrium FDI due to the endogenous policy changes. Too much fiscal decentralization will hurt the central government's incentives to attract FDI hence the central government will choose policies to induce the provincial government to block FDI instead of competing for it. This is precisely the reason why the Tiebout effect may not work even if there are multiple provinces with a high degree of fiscal decentralization. Too little fiscal decentralization will render the provincial government captured by the anti-FDI SIG. Therefore, the economy reaches the full-FDI equilibrium if and only if the fiscal decentralization is within some medium range. The two endogenous cutoff values, $\hat{\gamma}$ and $\bar{\gamma}$, will depend on the economic fundamentals and thus may vary across different countries. In particular, this proposition implies that when γ moves across $\hat{\gamma}$ from above, even if the change is tiny, it could dramatically shift the equilibrium from full FDI to null FDI. Both the GDP and public welfare would also decrease. This would seem at odd with the traditional Tiebout effect, although the latter is nothing but a special case in our model.

When $a \in (0, \infty)$, the bifurcation result still holds as it is due to the behaviors of the provincial government. Whether the full-FDI equilibrium or the null-FDI equilibrium is realized will depend on the value of a . Unfortunately, however, the computation is too complicated to generate a closed-form analytical result in this general case, so we will have to resort to the

numerical method. Perhaps surprisingly, as will be shown in Section 3, an increase in a may sometimes shift the economy from the full-FDI equilibrium to the null-FDI equilibrium although welfare function (19) strictly increases in FDI. The explanation will be deferred to that section.

For the rest of this subsection, we maintain the assumptions in Proposition 8. There are two types of political equilibria, depending on whether (37) holds or not, but the equilibrium FDI is unique once the exogenous parameters are given. Figure 4a-4c plot the case when (37) holds.²⁹

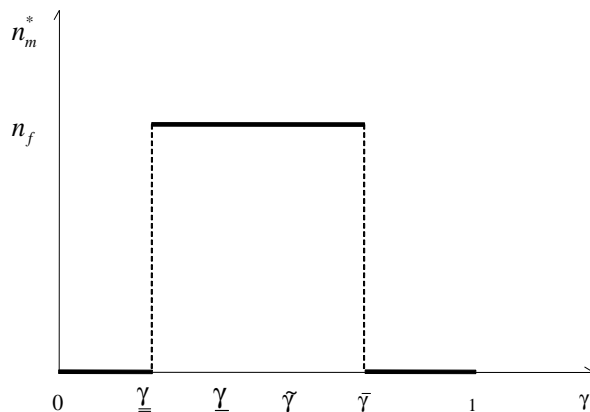


Figure 4a. Equilibrium FDI vs. Fiscal Centralization When $\Delta(\tilde{\gamma}) \geq 0$

Figure 4a plots the equilibrium FDI n_m^* as a function of the fiscal centralization parameter γ . The intuition for this non-monotonicity has just been explained. This graph clearly suggests that the equilibrium FDI does not change at all when γ moves within some "inaction interval". This may explain why the 1994 fiscal reform in China did not change the FDI inflows sharply, as is raised in the introduction. The equilibrium FDI will "jump" only when fiscal decentralization crosses one of the two endogenous threshold values ($\underline{\gamma}$ or $\bar{\gamma}$). In terms of the equilibrium policies, the entry cost ϕ^* can be any value satisfying $\phi^* > (1 - \lambda^*)\pi_m(0, \tau^*) - \pi_f(0, \tau^*)$ whenever n_m^* is zero. ϕ^* must be zero when $n_m^* = n_f$, which is implied by footnote 26 together with Lemma 2 and Lemma 5.

²⁹When (37) is not satisfied, the tariff revenue is sufficiently large so the tariff rate must be finite in any full-FDI equilibrium. See Figures A2(a)-A2(c) in Appendix I(b).

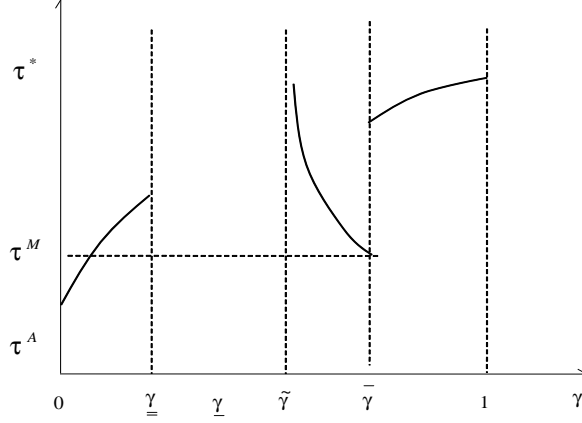


Figure 4b. Equilibrium Tariff Rate vs. Fiscal Centralization When $\Delta(\tilde{\gamma}) \geq 0$

Figure 4b shows how the equilibrium tariff rate changes with fiscal centralization. When $\gamma \notin [\underline{\gamma}, \bar{\gamma}]$, the equilibrium tariff rate is determined by (25) so τ^* is strictly increasing in γ due to the following reason: An increase in γ would make the profit tax revenue from the domestic firms become more attractive to the central government versus its tariff revenue, therefore, the central government would raise the tariff rate in order to increase the domestic firms' profits, which the SIG also prefers, although the tariff revenue will decrease. When $\gamma \in [\underline{\gamma}, \tilde{\gamma}]$, the optimal tariff rate is infinity, which drives the tariff revenue down to zero, but the central government will be able to increase its profit tax revenues from the domestic firms and also obtains more lobby revenue. Condition (37) ensures that the increase in the profit tax revenue and the lobby revenue will dominate the decrease in the tariff revenue. When $\gamma \in (\tilde{\gamma}, \bar{\gamma}]$, the optimal tariff rate decreases with fiscal centralization because the provincial government becomes more vulnerable to the lobby of SIG as γ increases, therefore in order to implement the full-FDI equilibrium, the central government will have to lower the threshold value $\tilde{\lambda}^s(\tau)$ to induce the provincial government to encourage FDI. This can be achieved by reducing the tariff rate, hence lowering the profits of the domestic firms so that the lobbying power of the SIG is weakened. Furthermore, the profit tax revenue from the domestic firms also becomes less attractive. Recall from Figure 3 τ^M is a tariff rate that can accommodate the largest possible γ for a full-FDI equilibrium. At the extreme decentralization ($\gamma = 0$), the optimal tariff rate is above τ^A , which is defined as the tariff rate that maximizes tariff revenue $A(0, \tau)$. The tariff rate jumps both at $\gamma = \underline{\gamma}$ and $\gamma = \bar{\gamma}$ because the central government changes the target equilibrium it wants to implement.

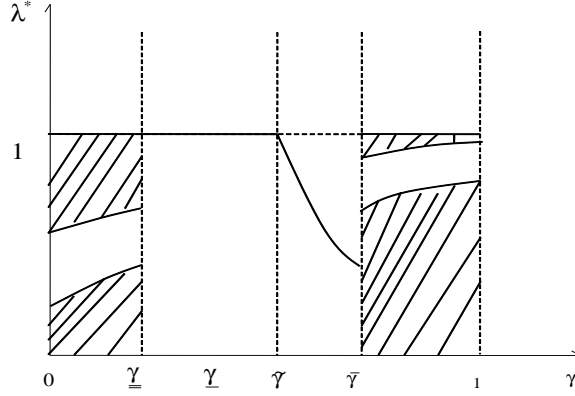


Figure 4c. Equilibrium Profit Tax Rate vs. Fiscal Centralization When $\Delta(\tilde{\gamma}) \geq 0$

Figure 4c shows how the equilibrium profit tax rate changes with fiscal centralization. The equilibrium FDI is zero when $\gamma \notin [\underline{\gamma}, \bar{\gamma}]$, in which case λ^* is indeterminate (denoted by the shaded regions). This is because the null-FDI equilibrium occurs either when the provincial government blocks FDI (when λ^* is too small) or when no investor makes FDI (when λ^* is too large). When $\gamma \in [\underline{\gamma}, \tilde{\gamma}]$, there is an import embargo and all the profits of the multinational firms are fully taxed away ($\lambda^* = 1$) so that each potential foreign investor is also indifferent between making FDI and exporting. When $\gamma \in (\tilde{\gamma}, \bar{\gamma}]$, τ^* strictly decreases with γ , therefore λ^* has to decrease, otherwise the option of exporting becomes more attractive for the potential investors.

2.7 Further Discussion on Robustness of Results

Multiple-Province Economy The two main results, FDI bifurcation and Non-Monotonicity, will remain valid when the economy has multiple provinces. This is because the main economic forces that deliver these two results are not changed in a multiple-province economy. The Tiebout effect works only when at least two provincial governments want more FDI and when the central government also encourages FDI inflows. This happens only when fiscal decentralization is in the "proper" middle range so that both levels of the governments can benefit enough from FDI to resist the lobby from domestic firms. The full specification and analytical characterization for the multiple-province model are quite similar to the one-province model in most aspects but the argument becomes much more complicated, and thus the discussion is relegated to Appendix II due to the space limit. One advantage of the multiple-province setting is that it enables us to analyze and quantify the regional distribution of FDI within a country, which seems interesting although it is not the main focus of this paper.³⁰

³⁰The multiple province setting gives several other interesting results. For example, as the number of provinces increases, the interval for the fiscal centralization that supports the full-FDI equilibrium would shift downward because of the intensified inter-regional competition. Moreover, ex ante identical provinces may end up with different amounts of FDI when the pool of total potential foreign investors is not large enough. This is because each province finds it optimal to attract FDI only when the expected FDI inflow is large enough for the tax-base

Alternative Timing of the Political Game Apart from the better conformance to the reality and better tractability, the sequential lobbying game delivers another important benefit: the uniqueness of the equilibrium *outcome* for FDI.³¹ For technical curiosity, suppose nothing is changed except that the political game is reformulated with a normal-form representation, in which lobbying occurs simultaneously at both the central and local government levels. Then the equilibrium outcome derived in the previous extensive-form game continues to be a Nash equilibrium outcome in the new game. However, there may exist multiple Nash equilibrium outcomes, in which case the model prediction becomes less sharpened. Also observe that this model excludes the possibility of direct fiscal transfers between the central and local governments, therefore, even if a grand coalition is formed comprising of the SIG and both levels of governments, the exogenous fiscal centralization parameter γ still affects the equilibrium through the incentive constraints for both levels of the government. However, it may be an interesting way to endogenize fiscal decentralization γ in the future by allowing for the governmental transfer together with the simultaneous multilateral coalition.

Assignment of Policy Instruments Although τ, λ and ϕ are among the most important policy variables that affect the supply and demand of FDI, a more realistic and complete specification about the fiscal structure should of course describe a much larger set of policy instruments available to each different government level together with a detailed description of the government expenditure (Please also refer to Subsection 2.5). In particular, governmental transfers across different levels need to be allowed if we want to highlight the nontrivial distinction between expenditure share and revenue share, especially when dealing with issues of public good provision (see Bardhan and Mookherjee, 2000). The current model is agnostic about those details and it implicitly assumes that expenditure share is proportional to the revenue share. It turns out, however, the quantitative outcome for the equilibrium FDI remains unchanged for both China and India when the expenditure share is used to measure γ , as shown in the next section.

3 Quantitative Investigation

The theoretical model is constructed to illustrate the key *mechanism*, thus the equilibrium *outcomes* (especially the FDI bifurcation) should not be interpreted too literally for a fully quantitative purpose. To quantitatively evaluate the model, we conduct a simple calibration exercise for China and India separately. One advantage of calibration is that it can help trace out the possibly different economic mechanisms for each different individual country in a structural way without relying on various aggregate data for *de facto* institutions and policies that are often severely plagued by measurement errors. Most importantly, the "medium range" of the

expansion effect to dominate the profit-reduction effect; otherwise it would rather prefer zero FDI.

³¹The equilibrium policies might be indeterminate, as demonstrated before.

fiscal decentralization that admits large FDI is endogenously determined in our model and may vary across countries, depending on many exogenous parameters (such as labor size and productivity, welfare weight in governments' goal functions, substitution elasticities between domestic and foreign goods, *etc.*) in a general equilibrium fashion. Recall the theory predicts a non-monotonic relationship between FDI and fiscal decentralization, thus an increase in the degree of fiscal decentralization in the same country may increase, or decrease, or in most cases does not affect the equilibrium FDI.³² This would require a sophisticated treatment if we adopt the regression approach (e.g., using a Probit model).³³ All these concerns warrant the calibration and simulation as an easier "smell" test on the model.

The simulation is based on a *two-province* economy model which also allows for strategic interaction across different provinces. The main results support the theoretical model quite strongly. Robustness check has been conducted with respect to all the parameters that are likely subject to sizeable measurement errors, which are put into the Appendix III. The counterfactual experiment results also highlight the importance of "often-ignored" fiscal decentralization in explaining the FDI difference between China and India.³⁴

3.1 Data and Benchmark Calibration For China

We 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). The parameter choices are summarized in Table 2. Please refer to Appendix III for more details about how

³²This may explain why Jensen (2005) finds fiscal federalism has no clear impact on inflows of foreign direct investment because he simply regresses FDI inflows on a linear term of fiscal decentralization together with other independent variables.

³³The availability of quality panel data, or even a simple cross-country data set, on fiscal decentralization for developing economies is very limited. Better data are available for the OECD countries, see Kessing et al. (2007) for more discussions.

³⁴Of course, we do not claim that fiscal decentralization alone can explain all the policy and FDI differences between China and India. For example, India's labor market regulation and political economic issues of infrastructure undersupply could also discourage FDI inflows, which are interesting but beyond the scope of this paper.

these parameters are chosen.

Table 2: Parameter Choices for China (2004)

| Parameters | Description | Values |
|-----------------|--------------------------------------|--------|
| γ | central government's tax share | 0.6 |
| $\bar{\lambda}$ | profit tax rate on domestic firms | 0.33 |
| $n_f : n_h$ | # foreign firms vs. # domestic firms | 1 : 6 |
| $c_h : c_f$ | unit labor cost 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 |

The key parameter γ is directly computed from the data and welfare weight a is based on Branstetter and Feenstra (2002). All these benchmark parameters in Table 2 are plugged into the two-province model to compute the political equilibrium. The simulation results predicted by the model are summarized in Table 3 together with the real data:

Table 3: Data and Calibration Result for China

| | $n_{m,k}^* : n_h$ | λ^* | τ^* | $l_h : l_m$ | $GDP : n_h \pi_h$ |
|-------|-------------------|--------------|----------|-------------|-------------------|
| Data | 1: 12 | (0.15, 0.30) | 1.104 | 2.4: 1 | 21.0: 2.4 |
| Model | 1: 12 | 0.2382 | 1.155 | 2.4: 1 | 25.8: 2.4 |

Note: $n_{m,k}^*$ denotes the equilibrium FDI in province k . Aggregate FDI in this two-province economy is thus $2n_{m,k}^*$ in the symmetric equilibrium.

Although none of the parameters in Table 2 are chosen to directly match any of these target endogenous variables in Table 3, we can see that the simulation results with the calibrated parameters can match the macro and policy data amazingly well. Most importantly, the computed equilibrium FDI is indeed full: $n_{m,k}^* : n_h$ is 1:12 instead of zero (recall our bifurcation result). In addition, our model predicts $\frac{l_h}{l_m} = \frac{n_h \pi_h}{n_{m,k}^* \pi_m}$, which is consistent with the real data because both $l_h : l_m$ and $n_h \pi_h : n_{m,k}^* \pi_m$ are indeed both about 2.4:1. The predicted τ^* is higher than the data. Besides the possible measurement errors, this upward bias is partly due to the following two reasons. One is that the real tariff rate is also subject to the 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.

3.2 Data and Benchmark Calibration for India

We use the data of the 2003-2004 fiscal year for India. The parameter choices are summarized in the following Table 4.

Table 4: Parameter Choices for India (2004)

| Parameters | Description | Values |
|-----------------|--------------------------------------|---------|
| γ | central government's tax share | 0.38 |
| $\bar{\lambda}$ | profit tax rate on domestic firms | 0.36 |
| $n_f : n_h$ | # foreign firms vs. # domestic firms | 1 : 6 |
| $c_h : c_f$ | unit labor cost 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 |

A more detailed description about the data set and parameter choice is in the Appendix III, but several issues deserve special attention. First, the value of substitution elasticity ε was much higher in India than China, capturing some facts that are not explicitly modelled here. For example, a non-negligible portion of China's FDI goods serve the international market rather than China's domestic market. Also, the positive spillover by FDI (perhaps due to the vertical FDI) may be more significant in China than in India, *etc.* More robustness check with ε is provided in the Appendix. Second, within our knowledge there exists no empirical estimation for India's value of a in line with Grossman and Helpman (1996), so we set it equal to China's value in the benchmark calibration as a counterfactual experiment to help quantify the potential importance of fiscal decentralization absent all the other heterogeneities. A more careful discussions on a is provided below. Third, fiscal revenues and state capacity are key issues in our model, so we must carefully adjust for the different efficiencies in the tax system, as suggested by Besley and Persson (2009) and the other aforementioned literature on FDI. Thus we introduce a new parameter s in the calibration, which is multiplied to the tariff revenue term in the goal function (22) of the central government. This is to capture the fact that tariff revenue is a more favored tax option in many developing economies because of the enforceability constraint in the informal sector, as emphasized by Gordon and Li (2009). India has a very large informal sector (or called disorganized sector in the official statistical books) and studies show that its tax system relies too much on the indirect tax and hence not very efficient. By contrast, China's tax structure has a well-developed standard VAT system, especially after the tax reform around the mid-1990s. Thus s is normalized to unity for China and set to 1.6 for India to match India's tariff revenue/GDP ratio in 2003-2004. No employment or good profit

data in the foreign-invested firms is available for India in 2003-2004, so l_h : l_m : l_n and profits are not simulated. The results are presented in Table 5.

Table 5: 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 | ≥ 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. Point predictions for λ_k^* can not be made, consistent with the model: when the central government wants to block FDI, it can either charge a very high profit tax rate to discourage the supply of FDI or to stipulate an extremely low profit tax rate to induce resistance by the provincial governments. Given $\lambda_k^* > \bar{\lambda}$ in the real data, the first case is the relevant one. So the supply of FDI is effectively discouraged by the high tax rate, and the provincial governments no longer have any incentive to improve the investment environment for FDI, which deters FDI even further.

To test the model further, the same empirical strategies can be directly applied to any other years for China and India, or any other countries, so long as the data is available.

3.3 Counterfactual Experiments

Suppose we set all the exogenous parameters identical for the two countries except that let γ match the real data for the two economies: 0.6 for China and 0.38 for India. Again the model predicts that China still has full FDI while India has null FDI. This is true no matter $a = 1.302$ as we choose in Table 2 or $a = 0.434$ according to Branstetter and Feentra's estimation. By contrast, if we only focus on the heterogeneity in any other parameter listed in Table 2 or Table 4 while holding all the other parameters identical, we can not obtain a better fit than the one with fiscal decentralization difference. This suggests that the difference in fiscal decentralization is at least one of the important institutional sources for the big FDI differences for that particular fiscal year.

The next experiment suggests that the large China-India FDI difference seems unlikely to be generated by their difference in the welfare weight a in the government's goal function. For each sufficiently small a , there exists a unique lower bound value for threshold value $\gamma^*(a) \in (0, 1)$ such that the equilibrium FDI is full only if $\gamma \geq \gamma^*(a)$. The following figure depicts function $\gamma^*(a)$ over the domain $[0, 1.62]$ when all the other parameters are set to the benchmark values for China as in Table 2. Function $\gamma^*(a)$ first decreases and then increases in a for the following reasons. When a increases from a sufficiently small value, the increase in household welfare becomes more important for the central government relative to the decrease in the

profit tax revenue. But the FDI bifurcation implies that the central government's value is not a continuous function, so when a becomes sufficiently big, the implied tariff rate and profit tax rate become so small that γ^* has to be increased in order to offset the decrease in the tariff revenue and profit tax revenue.

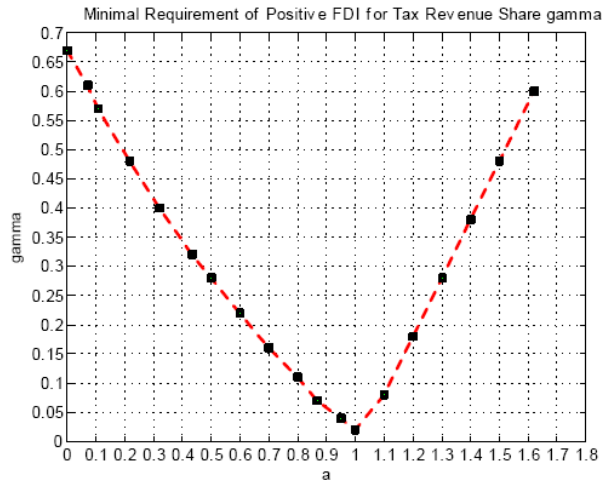


Figure 5. Increase in Welfare Weight a Might Decrease Equilibrium FDI

This non-monotonicity of $\gamma^*(a)$ has a very important implication. Suppose China and India are perfectly identical except that China's (a, γ) is $(1.302, 0.6)$ while India's (a, γ) is $(a_{India}, 0.38)$. Suppose a_{India} exceeds 1.4, larger than China's a , the equilibrium FDI in India would be still zero. In other words, for some given level of fiscal decentralization, an increase in a may shift the economy from a full-FDI equilibrium to a null-FDI equilibrium, although the public welfare function $W(n_m, \tau)$ unambiguously increases with FDI n_m . This is mainly because of the FDI bifurcation and that the central government also cares about its revenues.

4 Conclusion

This paper develops a theoretical model to show how two developing economies with identical economic fundamentals could have very different policies toward inward FDI (or, foreign better technology), and how these endogenous policies can translate into a tremendous difference in the equilibrium FDI inflows. We argue that fiscal decentralization can have a non-monotonic and sometimes large impact on the policies and FDI. Too much fiscal decentralization may hurt the central government's incentives, so the central government will choose the policies that induce local governments to block FDI. Too little fiscal decentralization, on the other hand, may force the local governments to succumb to pressures from the protectionist special

interest group. Consequently, policies toward FDI are sufficiently favorable only when fiscal decentralization is on some endogenous medium range. In addition, the equilibrium FDI may bifurcate as a result of the endogenous attitudinal polarization of the local government toward FDI. The model also predicts that a small change in fiscal decentralization generically does not significantly change the equilibrium policies and FDI, however, when crossing some endogenous country-specific cutoff value, a small deviation in fiscal decentralization would shift the local government attitude diametrically and result in dramatically different amounts of FDI in the equilibrium. Simulations and calibrations using data from China and India support these theoretical findings.

It seems very interesting in the future to extend this one-period dynamic model into multiple periods, which will enable us to explore the dynamics of endogenous policies and the macro economy. Another direction worth exploring is to formalize how the degree of fiscal decentralization is endogenously determined in the political and economic institutions. Further promising areas of inquiry also include explicitly introducing firm heterogeneity or other forms of FDI (such as vertical FDI, export-oriented FDI, joint ventures) into the model. On the empirical side, as mentioned in Section 3, it is desirable to conduct more sophisticated empirical tests, regression or calibration, based on a larger sample of countries or different regions in the same country.

References

- [1] Acemoglu, Daron, Elhanan Helpman and Pol Antras. 2007. "Contracts and Technology Adoption." *American Economic Review*, 97(3), 916-943.
- [2] ———, and James Robinson. 2000. "Political Losers as a Barrier to Economic Development." *American Economic Review*, 90: 126-130.
- [3] Bardhan, Pranab and Dilip Mookherjee. 2000. "Capture and Governance at Local and National Levels." *American Economic Review*, 90(2): 135-139.
- [4] ———. 2006. "Decentralization, Corruption and Government Accountability: An Overview", for *International Handbook of the Economic Corruption*, edited by Susan Rose-Ackerman, Edward Elgar Publishing House
- [5] Becker, Gary. 1983. "A Theory of Competition Among Pressure Groups for Political Influence." *Quarterly Journal of Economics*, 98(3): 371-400.
- [6] Besley, Timothy and Torsten Persson. 2009. "The Origins of State Capacity: Property Rights, Taxation, and Politics." *American Economic Review*, 99(4): 1218 - 44.
- [7] Blanchard, Olivier and Andrei Shleifer. 2000. "Federalism with and without Political Centralization: China versus Russia", working paper
- [8] Borensztein E., J. De Gregorio, and J-W Lee. 1998. "How Does FDI Affect Economic Growth?" *Journal of International Economics*, 45: 115–135.
- [9] Bosworth, Barry and Susan Collins. 2007. "Accounting for Growth: Comparing China and India." *NBER Working Paper 12934*
- [10] Branstetter, Lee and Robert Feenstra. 2002. "Trade and Foreign Direct Investment in China: A Political Economy Approach." *Journal of International Economics*, 58, 335-358.
- [11] 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.
- [12] Cheng, Leonard K. and Yum K. Kwan. 2000. "What are the Determinants of the Location of Foreign Direct Investment? The Chinese Experience", *Journal of International Economics*, 51(2): 379-400
- [13] 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.

- [14] Fan, Joseph, Randall Morck, Lixin Colin Xu and Bernard Yeung. 2007. "Institutions and Foreign Investment: China Versue the World", *NBER Working Paper* 13435
- [15] 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.
- [16] Gordon, Roger. 2009. "Taxes and Development: Experiences of India vs. China, and Lessons for other Developing Countries." In *Taxation in Developing Countries: Six Case Studies and Policy Implications*, edited by Roger Gordon, Columbia University Press, forthcoming.
- [17] ——— and Wei Li. 2009. "Tax Structures in Developing Countries: Many Puzzles and A Possible Explanation." *Journal of Public Economics*, 93: 855-866
- [18] Grossman, Gene and Elhanan Helpman. 1994. "Protection for Sale." *American Economic Review*, 84: 833-850.
- [19] ———. 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.
- [20] ———. 2001. *Special Interest Politics*, Cambridge: MIT Press.
- [21] Helpman, Elhanan, Marc Melitz, and Stephen Yeaple. 2004. "Export Versus FDI with Heterogeneous Firms." *American Economic Review*, 94(1): 300-316.
- [22] Huang, Yasheng. 2003. *Selling China-Foreign Direct Investment During the Reform Era*, Cambridge University Press, Cambridge, UK.
- [23] Hsieh, Chang-Tai and Peter Klenow. 2009. "Misallocation and Manufacturing TFP in China and India", *Quarterly Journal of Economics*, 124: 1403-1448
- [24] Javorcik, Beata Smarzynska. 2004. "Does Foreign Direct Investment Increase the Productivities of Domestic Firms? In Search of Spillovers Through Backward Linkages", *American Economic Review*, 93(4): 605-627.
- [25] Jensen, Nathan M., 2005. "Fiscal Federalism and International Capital". *Swiss Political Science Review*. (Special Issue from the Economics and Politics Conference in Lugano, Switzerland) Volume 11(4): 77-95.
- [26] ———, 2006. *Nation-States and the Multinational Corporation: A Political Economy of Foreign Direct Investment*. Princeton University Press.
- [27] Kessing, Sebastian G., Kai A. Konrad and Christos Kotsogiannis. 2007. "FDI and the Dark Side of Decentralization", *Economic Policy*, 49: 5-70.

- [28] McGrattan, Ellen and Edward Prescott. 2009. "Openness, Technological Capital, and Development", *Journal of Economic Theory*, 144(6): 2454-2476
- [29] Mookherjee, Dilip. 2006. "Decentralization, Hierarchies and Incentives: A Mechanism Design Perspective." *Journal of Economic Literature*, 44(2): 367-390.
- [30] Panagariya, Arvind. 2006. "India and China: Trade and Foreign Investment," presented at the "Pan Asia 2006" Conference, Stanford Center for International Development, June 1-3, 2006
- [31] Prasad, Eswar and Shang-jin Wei. 2005. "The Chinese Approach to Capital Inflows: Patterns and Possible Explanations." *NBER working paper 11306*
- [32] Parente, Stephen L., and Edward Prescott. 1999. "Monopoly Rights: A Barrier to Riches.", *American Economic Review*, Vol.89(5): 1216-1233.
- [33] Qian, Yingyi, and Barry R. Weingast. 1997. "Federalism as a Commitment to Preserving Market Incentives", *Journal of Economic Perspectives*, 11: 83-92.
- [34] ———, and Gerard Roland. 1998. "Fiscal Federalism and Soft Budget Constraint." *American Economic Review*, Vol.88(5): 1143-1162.
- [35] 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.
- [36] Rodriguez-Clare, Andres. 1996. "Multinationals, Linkages, and Economic Development." *Journal of International Economics*, 86(4): 852-973.
- [37] Singh, Kulwindar. 2005. "Foreign Direct Investment in India: A Critical Analysis of FDI from 1991-2005." working paper, Center for Civil Society, New Delhi
- [38] Srinivasan, T. N.. 2006. "*China, India and the World Economy*", working paper, Yale University
- [39] Wang, Yong. 2009. *Essays on Political Economy, Foreign Direct Investment and Economic Growth*. Ph.D. Dissertation, University of Chicago.
- [40] Wei, Shang-jin. 2000, "Local Corruption and Global Capital Flows." *Brookings Papers on Economic Activity*, 2: 303-354.
- [41] Xu, Chenggang. 2010. "The Institutional Foundations of China's Reforms and Development." *Journal of Economic Literature*, forthcoming

APPENDICES

Appendix I (a): Proof of Lemma 7:

When $\gamma \in [0, \tilde{\gamma}]$, we have

$$\Delta(\gamma) = \frac{\gamma(1 - \gamma\bar{\lambda})}{1 - \gamma} n_h [\pi_h(0, \infty) - \pi_h(n_f, \infty)] + (1 - \bar{\lambda} + \gamma\bar{\lambda}) n_h [\pi_h(n_f, \tau_1^*) - \pi_h(0, \tau_1^*)] - A(0, \tau_1^*),$$

where τ_1^* obtained from (25) is obviously a continuous function of γ . When $\gamma \in (\tilde{\gamma}, \bar{\gamma}]$, we have

$$\Delta(\gamma) = \frac{\gamma(1 - \gamma\bar{\lambda})}{1 - \gamma} n_h [\pi_h(0, \tau_2^*) - \pi_h(n_f, \tau_2^*)] + (1 - \bar{\lambda} + \gamma\bar{\lambda}) n_h [\pi_h(n_f, \tau_1^*) - \pi_h(0, \tau_1^*)] - A(0, \tau_1^*).$$

We can show $\lim_{\gamma \rightarrow \tilde{\gamma}^+} \Delta(\gamma) = \Delta(\tilde{\gamma})$ because $\lim_{\gamma \rightarrow \tilde{\gamma}^+} \tau_2^*(\gamma) = \infty$. In addition, the property of function $\eta(\tau)$ ensures that τ_2^* obtained from (33) is also continuous in γ . Therefore $\Delta(\gamma)$ is a continuous function on $[0, \bar{\gamma}]$. When $\gamma \in [0, \tilde{\gamma}]$, $\Delta'(\gamma) = n_f [\pi_m(n_f, \infty)] + \bar{\lambda} n_h [\pi_h(n_f, \infty) - \pi_h(0, \tau_1^*)]$, where

we use $\pi_f(n_f, \infty) = 0$ and the first-order condition from (25) when $a = 0$. So $\Delta'(\gamma) > 0$ if and only if $n_f \pi_m(n_f, \infty) > \bar{\lambda} n_h [\pi_h(0, \infty) - \pi_h(n_f, \infty)]$, which must hold because $\eta(\infty) > 1$. When

$a = 0$ and $\gamma \in (\tilde{\gamma}, \bar{\gamma}]$, using brutal force we can show that $\Delta'(\gamma) > 0$ is equivalent to

$$\frac{(1 - \gamma\bar{\lambda})}{(1 - \gamma)\bar{\lambda}} > \frac{\left[\frac{1 + \frac{n_f}{n_h} \left(\frac{c_f}{c_h} \right)^{1-\varepsilon} (w\tau_1^*)^{1-\varepsilon}}{1 + \frac{n_f}{n_h} \left(\frac{c_f}{c_h} \right)^{1-\varepsilon}} \right]^{\frac{\varepsilon-\theta}{1-\varepsilon}} - 1}{\left[\frac{1 + \frac{n_f}{n_h} \left(\frac{c_f}{c_h} \right)^{1-\varepsilon} (w\tau_2^*)^{1-\varepsilon}}{1 + \frac{n_f}{n_h} \left(\frac{c_f}{c_h} \right)^{1-\varepsilon}} \right]^{\frac{\varepsilon-\theta}{1-\varepsilon}} - 1}. \quad (38)$$

Observe that $\gamma \in (\tilde{\gamma}, \bar{\gamma}]$ implies

$$\eta(\infty) < \frac{(1 - \gamma\bar{\lambda})}{(1 - \gamma)\bar{\lambda}} \leq M.$$

Observe that $\frac{\partial \tau_1^*}{\partial \gamma} > 0$ and $\frac{\partial \tau_2^*}{\partial \gamma} < 0$, so RHS of (38) decreases with γ while the LHS increases with γ , therefore it suffices to show that (38) holds when $\gamma = \tilde{\gamma}$ because of the continuity of the function $\Delta(\gamma)$ for the whole interval $[0, \bar{\gamma}]$. But we have already proved that $\Delta'(\tilde{\gamma}) > 0$.

Q.E.D.

Appendix I (b): Equilibrium FDI and Policies when $\Delta(\tilde{\gamma}) < 0$.

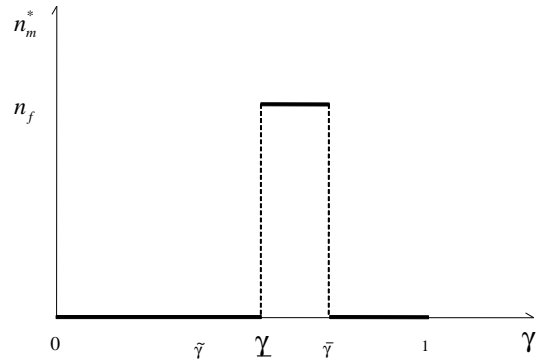


Figure A2(a). Equilibrium FDI vs. Fiscal Centralization when $\Delta(\tilde{\gamma}) < 0$

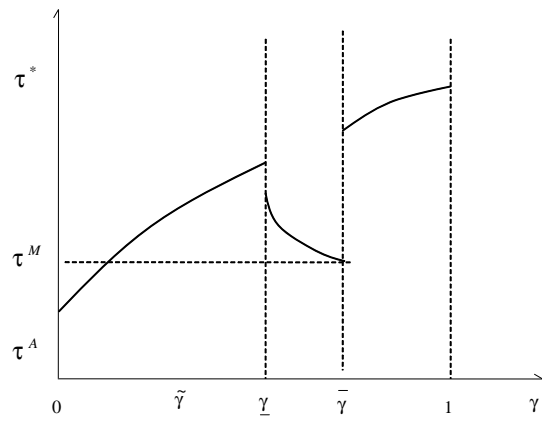


Figure A2(b). Equilibrium Tariff Rate vs. Fiscal Centralization When $\Delta(\tilde{\gamma}) < 0$

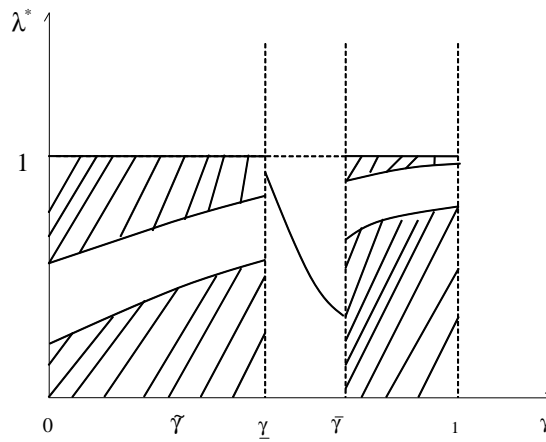


Figure A2(c). Equilibrium Profit Tax Rate vs. Fiscal Centralization When $\Delta(\tilde{\gamma}) < 0$

Appendix II: Multiple-Province Model

Let's first consider the two-province economy and then generalize it to the K -province economy for any $K \geq 2$. 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 share the same pool of the foreign investors N_f with measure n_f . The central government determines the nation-wide uniform tariff rate τ and the profit tax rates on the foreign-invested firms in the two provinces, denoted by λ_k , for $k \in \{1, 2\}$. Similarly, let $n_{m,k}$ denote FDI in province k . No household can own a firm that is located in the other province. The profit tax sharing rule is the same as before. In each province, all the domestic firms form a special interest group, so there are two special interest groups indexed by $k \in \{1, 2\}$. To avoid the trivial case with no provincial competition, we assume each foreign investor can invest in at most one province, perhaps due to the financial constraint, for example. To simplify the analysis, we also assume no inter-provincial trade is allowed, therefore the foreign-invested firms can only serve the provincial market while the other province can be only accessed through export directly from the foreign country.³⁵ We also exclude the possibility that a foreign firm makes FDI in one province and then exports abroad and re-imports to the other province.

The timing is as follows. The two special interest groups first jointly and cooperatively lobby the central government by providing a non-negative menu $C(\lambda_1, \lambda_2, \tau)$, then the central government decides λ_1, λ_2 and τ , and receives the lobby money. Next, given these policies, the two special interest groups simultaneously and non-cooperatively lobby its own provincial government by providing non-negative menus $D_1(\phi_1)$ and $D_2(\phi_2)$. Then the two provincial governments simultaneously and non-cooperatively decides ϕ_1 and ϕ_2 respectively and get the lobby revenues. After observing $\{\phi_1, \phi_2, \lambda_1, \lambda_2, \tau\}$, all the foreign potential investors simultaneously and non-cooperatively make the tertiary choice $FDI \in \{A, B(1), B(2)\}$, where A refers to exporting to both provinces, in which case the total profit is

$$\Pi^A = \sum_{k=1}^2 \pi_f(n_{m,k}, \tau),$$

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

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

³⁵Relaxing this assumption would not affect the validity of the main results 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 and exporting to province 1:

$$\Pi^{B(2)} = [(1 - \lambda_2)\pi_m(n_{m,2}, \tau) - \phi_2] + \pi_f(n_{m,1}, \tau).$$

Then in each province, the standard market equilibrium is achieved.

Again, we use backward induction to characterize the equilibrium. One main difference is that the two special interest groups are engaged in a static game in the second-stage lobby game. It's also true for the two provincial governments when they decide their own entry cost. Market equilibrium determines all the profit functions for each type of firms in both provinces. In terms of the investment choice, given all the five policy variables, a potential investor $j \in N_f$ takes other investors' choice as given and chooses

$$FDI_j \in \arg \max_{FDI_j \in \{A, B(1), B(2)\}} \{\Pi^A, \Pi^{B(1)}, \Pi^{B(2)}\}. \quad (39)$$

Then at the second-stage lobby game, $\lambda_1, \lambda_2, \tau, C(\lambda_1, \lambda_2, \tau)$, and how the two special interest groups split the lobby bill to the central government are all determined. Let θ_k denote the endogenous share of the lobby bill paid by the special interest group of province k to the central government, which is negotiated between the two special interest groups at the first-stage lobby game. Thus the special interest group k lobbies provincial government k by solving

$$\max_{\hat{\phi}_k, D_k(\phi_k, \lambda_1, \lambda_2, \tau) \geq 0} (1 - \bar{\lambda})n_h\pi_h(n_{m,k}, \tau) - \theta_k C(\lambda_1, \lambda_2, \tau) - D_k(\hat{\phi}_k, \lambda_1, \lambda_2, \tau), \quad (40)$$

subject to the provincial government k 's IC constraint $\hat{\phi}_k \in \arg \max_{\phi_k \geq 0} \hat{V}_{p,k}(\phi_k, \lambda_1, \lambda_2, \tau)$ and its participation constraint $\hat{V}_{p,k}(\hat{\phi}_k, \lambda_1, \lambda_2, \tau) \geq \hat{B}_{p,k}(\lambda_1, \lambda_2, \tau)$, where $\theta_k C(\lambda_1, \lambda_2, \tau)$ is a sunk cost, $\hat{V}_{p,k}(\phi_k, \lambda_1, \lambda_2, \tau)$ is provincial government k 's goal function after being lobbied:

$$\hat{V}_{p,k}(\phi_k, \lambda_1, \lambda_2, \tau) \equiv (1 - \gamma_k)[\lambda_k \pi_m(n_{m,k}, \tau)n_{m,k} + \bar{\lambda}n_h\pi_h(n_{m,k}, \tau)] + D_k(\phi_k, \lambda_1, \lambda_2, \tau), \quad (41)$$

where γ_k is the central government's profit tax revenue share with respect to province k . $n_{m,k} = n_{m,k}(\phi_1, \phi_2, \lambda_1, \lambda_2, \tau)$ and $\hat{B}_{p,k}(\lambda_1, \lambda_2, \tau)$ is government k 's reservation value given by

$$\max_{\phi_k \geq 0} (1 - \gamma_k)[\lambda_k \pi_m(n_{m,k}, \tau)n_{m,k} + \bar{\lambda}n_h\pi_h(n_{m,k}, \tau)].$$

From this lobby game, we can obtain $\hat{\phi}_k^*$ and $D_k^*(\phi_k, \lambda_1, \lambda_2, \tau)$ for $k \in \{1, 2\}$.

Finally we are back to the first lobby game, in which the two special interest groups coop-

eratively lobby the central government:

$$\max_{\hat{\lambda}_1, \hat{\lambda}_2, \hat{\tau}, C(\lambda_1, \lambda_2, \tau) \geq 0} \sum_{k=1}^2 (1 - \bar{\lambda}_k) n_h \pi_h(n_{m,k}, \hat{\tau}) - C(\hat{\lambda}_1, \hat{\lambda}_2, \hat{\tau}) - \sum_{k=1}^2 D_k^*(\hat{\phi}_k^*, \hat{\lambda}_1, \hat{\lambda}_2, \hat{\tau}) \quad (42)$$

subject to the central government's IC constraint

$$\left(\hat{\lambda}_1, \hat{\lambda}_2, \hat{\tau} \right) \in \arg \max_{\lambda_1, \lambda_2, \tau} \hat{V}_c(\lambda_1, \lambda_2, \tau),$$

and participation constraint

$$\hat{V}_c(\hat{\lambda}_1, \hat{\lambda}_2, \hat{\tau}) \geq \hat{B}_c,$$

where

$$\hat{V}_c(\lambda_1, \lambda_2, \tau) \equiv \sum_{k=1}^2 \left\{ \begin{array}{l} A_k(n_{m,k}, \tau) + \gamma_k [\bar{\lambda} n_h \pi_h(n_{m,k}, \tau) \\ + \lambda_k n_{m,k} \pi_m(n_{m,k}, \tau)] + a_k W_k(n_{m,k}, \tau) \end{array} \right\} + C(\lambda_1, \lambda_2, \tau), \quad (43)$$

and reservation value \hat{B}_c is given by

$$\hat{B}_c = \max_{\lambda_1, \lambda_2, \tau} \sum_{k=1}^2 \left\{ A_k(n_{m,k}, \tau) + \gamma_k [\bar{\lambda} n_h \pi_h(n_{m,k}, \tau) + \lambda_k n_{m,k} \pi_m(n_{m,k}, \tau)] + a_k W_k(n_{m,k}, \tau) \right\}.$$

The reduced problem at the central government level is therefore given by

$$\max_{\hat{\lambda}_1, \hat{\lambda}_2, \hat{\tau}} \sum_{k=1}^2 (1 - \bar{\lambda}_k) n_h \pi_h(n_{m,k}, \hat{\tau}) + \sum_{k=1}^2 \left\{ \begin{array}{l} A_k(n_{m,k}, \hat{\tau}) + \gamma_k [\bar{\lambda} n_h \pi_h(n_{m,k}, \hat{\tau}) \\ + \lambda_k n_{m,k} \pi_m(n_{m,k}, \hat{\tau})] + a_k W_k(n_{m,k}, \hat{\tau}) \end{array} \right\}, \quad (44)$$

where we also employ the result that $\sum_{k=1}^2 D_k^*(\hat{\phi}_k^*, \hat{\lambda}_1, \hat{\lambda}_2, \hat{\tau}) = 0$ at the equilibrium without loss of generality as suggested in Proposition 3. Again, from now on we will simplify the notations by getting rid of "hat" on those policy variables.

Definition (Political Equilibrium with Two Provinces). A Political Equilibrium (PE) for a two-province model is a collection of the policy variables $\tau^*, \{\phi_k^*, \lambda_k^*\}_{k \in \{1,2\}}$, the commodity prices $p^*(j, k), j \in N, k \in \{1,2\}$, the lobby schedule functions $C^*(\lambda_1, \lambda_2, \tau)$ and $D_k^*(\phi_k, \lambda_1, \lambda_2, \tau), k \in \{1,2\}$, lobby cost sharing rule θ_1^* and θ_2^* , and the investment decisions $FDI_j^* \in \{A, B(1), B(2)\}$, for all $j \in N_f$, such that:

1. The two special interest groups cooperatively maximize the net gain (42), the solution to which gives $C^*(\lambda_1, \lambda_2, \tau)$. They each non-cooperatively solve (40), and the solution to which is $D_k^*(\phi_k, \lambda_1, \lambda_2, \tau), k \in \{1,2\}$;
2. The central government maximizes (43) hence (44), the solution is $\tau^*, \{\lambda_k^*\}_{k \in \{1,2\}}$;

3. Each provincial government k maximizes its fiscal revenue by maximizing (41), the solution to which is ϕ_k^* , given τ^* , $\{\lambda_k^*\}_{k \in \{1,2\}}$, 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, FDI_j^* , and pricing decision $p^*(j, k)$, given τ^* , $\{\phi_k^*, \lambda_k^*\}_{k \in \{1,2\}}$. It's a best response to all $FDI_{j'}^*$, $j' \in N_f$, $j' \neq j$, and all $p^*(j', k)$, $j' \in N$, $j' \neq j$, $k \in \{1, 2\}$;
5. Each domestic firm $j \in N_h$ maximizes profit, the solution to which is $p^*(j, k)$, $k \in \{1, 2\}$;
6. Each household maximizes the utility by choosing the right consumption subject to the budget constraint;
7. Lobby cost sharing rule θ_1^* and θ_2^* are determined through the Nash Bargaining between the two special interest groups;
8. Markets clear for domestic labor, each domestically produced and consumed commodity, and the international payment is balanced for the domestic economy

The above notations allow us to explore the effects of the exogenous regional heterogeneity in several dimensions, but this paper mainly focuses on the national aggregate FDI instead of provincial distributions, so from now on we will simply set $a_k = a$, $\bar{\lambda}_k = \bar{\lambda}$, and $\gamma_k = \gamma$ for both $k = 1, 2$. In this case, θ_k^* can be determined using the fact that the ultimate net value for the two special interest groups are identical.³⁶

Symmetric Political Equilibrium

Consider the simplest case in which the equilibrium is symmetric in the two provinces, namely, both provinces have the same profit tax rates on the multinational firms

$$\lambda_1 = \lambda_2 = \lambda, \tag{45}$$

the same lobby functions

$$D_1(\phi_1, \lambda_1, \lambda_2, \tau) \equiv D_2(\phi_2, \lambda_1, \lambda_2, \tau),$$

the same entry cost

$$\phi_1^* = \phi_2^* = \phi, \tag{46}$$

³⁶In Section 2 of Chapter 3 in my dissertation, I explore the impact of the regional heterogeneity in domestic firms' productivities on FDI.

and consequently the same amount of FDI

$$n_{m,1}^* = n_{m,2}^*. \quad (47)$$

Observe that (47) alone implies the equal profit for each type of firms across the two provinces:

$\pi_{x,1}^* = \pi_{x,2}^*$ for any $x \in \{h, m, f\}$. We can immediately see that the induced preferences for FDI at each province is still polarized no matter with or without the lobby. However, the threshold value for the profit tax rate would change, depending on the expected amount of FDI inflows. Recall the largest possible FDI for each province in the symmetric equilibrium is $\frac{n_f}{2}$ instead of n_f . The provincial government k has the following demand for FDI after being lobbied:

$$\widehat{n}_{m,k}^{ds} = \begin{cases} 0, & \text{when } \lambda_k < \widehat{\lambda}^s(\tau) \\ 0 \text{ or } n_f, & \text{when } \lambda_k = \widehat{\lambda}^s(\tau) \\ n_f, & \text{when } \lambda_k > \widehat{\lambda}^s(\tau) \end{cases},$$

where $\widehat{\lambda}^s(\tau) \equiv \frac{1-\gamma\bar{\lambda}}{1-\gamma} \left(\frac{n_h [\pi_h(0,\tau) - \pi_h(\frac{n_f}{2},\tau)]}{\frac{n_f}{2} \pi_m(\frac{n_f}{2},\tau)} \right)$ and the threshold value before the lobby is still given by $\widehat{\lambda}(\tau) = \frac{\bar{\lambda}(1-\gamma)}{1-\gamma\bar{\lambda}} \widehat{\lambda}^s(\tau)$. Note $\widehat{\lambda}^s(\tau)$ differs from $\widetilde{\lambda}^s(\tau)$ only in that all n_f are replaced by $\frac{n_f}{2}$ in the expression. Therefore $\widehat{\lambda}^s(\tau) > \widetilde{\lambda}^s(\tau)$ due to (7) and (??). However, if a provincial government expects to have full FDI, its threshold value is still given by $\widetilde{\lambda}^s(\tau)$ instead of $\widehat{\lambda}^s(\tau)$ after the lobby.

FDI supply is now determined by (39), which is reduced to (11) in the symmetric equilibrium. So when $\phi = 0$, FDI is chosen only if

$$\lambda \leq 1 - \frac{\pi_f(\frac{n_f}{2}, \tau)}{\pi_m(\frac{n_f}{2}, \tau)}. \quad (48)$$

(6) implies

$$\frac{\pi_f(x, \tau)}{\pi_m(x, \tau)} \text{ is independent of } x, \text{ for any } x \in [0, n_f]. \quad (49)$$

Proposition 9 *Suppose the profit tax rate satisfies (48) so that it's small enough to admit positive FDI supply. When $\lambda \in (\widetilde{\lambda}^s(\tau), \widehat{\lambda}^s(\tau))$, there exists no symmetric equilibrium, however, there exists an asymmetric equilibrium in which one province absorbs full FDI while the other has no FDI. When $\lambda \notin (\widetilde{\lambda}^s(\tau), \widehat{\lambda}^s(\tau))$, the symmetric equilibrium does exist, in which the equilibrium FDI still bifurcates:*

$$n_{m,1}^* = n_{m,2}^* = \begin{cases} \frac{n_f}{2}, & \text{if } \widehat{\lambda}^s(\tau) \leq \lambda \leq 1 - \frac{\pi_f(\frac{n_f}{2}, \tau)}{\pi_m(\frac{n_f}{2}, \tau)} \\ 0, & \text{otherwise} \end{cases}. \quad (50)$$

When $\lambda \in (\tilde{\lambda}^s(\tau), \hat{\lambda}^s(\tau))$, no symmetric equilibrium exists because any provincial government k strictly would prefer 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 $\lambda \geq \hat{\lambda}^s(\tau)$, 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 in the symmetric equilibrium are therefore given by

$$\phi_1^* = \phi_2^* = \begin{cases} \text{any value sufficiently large to block FDI,} & \text{if } \lambda \leq \tilde{\lambda}^s(\tau) \\ 0, & \text{if } \hat{\lambda}^s(\tau) \leq \lambda \leq 1 - \frac{\pi_f(\frac{n_f}{2}, \tau)}{\pi_m(\frac{n_f}{2}, \tau)} \\ \text{any value on } [0, \infty), & \text{if } \lambda > 1 - \frac{\pi_f(\frac{n_f}{2}, \tau)}{\pi_m(\frac{n_f}{2}, \tau)} \end{cases},$$

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

$$FDI_j^* = \begin{cases} B(1) \text{ or } B(2), & \text{if } \lambda < 1 - \frac{\pi_f(\frac{n_f}{2}, \tau)}{\pi_m(\frac{n_f}{2}, \tau)}, \phi_1 = \phi_2 = 0 \\ A, & \text{if } \lambda \leq 1 - \frac{\pi_f(\frac{n_f}{2}, \tau)}{\pi_m(\frac{n_f}{2}, \tau)}, \phi \text{ is sufficiently large or} \\ & \lambda > 1 - \frac{\pi_f(\frac{n_f}{2}, \tau)}{\pi_m(\frac{n_f}{2}, \tau)} \\ A, \text{ or } B(1), \text{ or } B(2), & \text{if } \lambda = 1 - \frac{\pi_f(\frac{n_f}{2}, \tau)}{\pi_m(\frac{n_f}{2}, \tau)}, \phi_1 = \phi_2 = 0, \end{cases}. \quad (51)$$

Hence, the FDI bifurcation obtained in the single-province equilibrium remains valid in the two-province equilibrium. This result holds for more than two provinces. Define

$$\Lambda(z, \tau) \equiv \frac{1 - \gamma \bar{\lambda}}{1 - \gamma} \left(\frac{n_h [\pi_h(0, \tau) - \pi_h(z, \tau)]}{z \pi_m(z, \tau)} \right), \quad (52)$$

where $z \in [0, n_f]$. Note $\hat{\lambda}^s(\tau) = \Lambda(\frac{n_f}{2}, \tau)$ and $\tilde{\lambda}^s(\tau) = \Lambda(n_f, \tau)$. 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. More generally, in an economy with K ex ante identical provinces, where $K \geq 2$. Suppose the necessary condition for positive FDI supply $\lambda \leq 1 - \frac{\pi_f(\frac{n_f}{K}, \tau)}{\pi_m(\frac{n_f}{K}, \tau)}$ 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 $k \in \{1, 2, \dots, K\}$. If $\lambda \leq \Lambda(n_f, \tau)$, then the FDI is uniquely zero in each province: $n_{m,k}^* = 0$, for all $k \in \{1, 2, \dots, K\}$. If $\lambda \in$

$(\Lambda(n_f, \tau), \Lambda(\frac{n_f}{K}, \tau))$, no symmetric equilibrium exists. Next we will characterize asymmetric equilibrium more generally.

Asymmetric Equilibrium

The following proposition shows that the FDI bifurcation at the national level is a robust result, independent of the horizontal interaction between the provinces.

Proposition 10 *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 $k \in \{1, 2, \dots, K\}$. 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 $\sum_{k=1}^2 n_{m,k}^* < n_f$. In addition, (49) ensures that the potential foreign investors are willing to supply $n_{m,k}^* + \Delta$ because they are willing to supply $n_{m,k}^*$. 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.** ■

Again, the intuition is that each province's preference for FDI is still endogenously polarized. Therefore if the equilibrium FDI is positive, it must imply that at least one province wants as much FDI as possible. Moreover, (49) guarantees that the potential foreign investors are indeed willing to supply more FDI whenever the entry cost is set zero for any given profit tax rate and tariff rate. So positive FDI must imply full FDI. 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. We can show that in some cases even 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 profit 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 assumption that each investor can invest in at most one province.

Non-monotonic Impact of Fiscal Decentralization

It's easy to see that the non-monotonicity result remains valid because the economic trade-off forces stay unchanged qualitatively in the two-province economy. The analysis remains almost the same except that $\eta(\tau)$ is now replaced by

$$\widehat{\eta}(\tau) \equiv \frac{\frac{n_f}{2} [\pi_m(\frac{n_f}{2}, \tau) - \pi_f(\frac{n_f}{2}, \tau)]}{n_h [\pi_h(0, \tau) - \pi_h(\frac{n_f}{2}, \tau)],}$$

which is smaller than $\eta(\tau)$. Therefore the new upper bound for the fiscal centralization parameter $\bar{\gamma}$ will be smaller than before. The intuition is the following: since more provincial governments are competing for the same fixed pool of potential foreign investors, the provincial government's preference for FDI is dampened in general, making it more easily captured by the special interest group, therefore, the full-FDI equilibrium requires that the provincial government get a larger share of the profit tax revenue. On the other hand, the lower bound of the fiscal centralization $\widehat{\gamma}$ also goes down under some moderate conditions. This is because the central government can now always get strictly positive tariff revenues due to the model restriction that no foreign firms can make FDI in more than one provinces, hence the minimal profit tax share obtained by the central government can be lowered. These effects become stronger as the number of provinces increases. In general, we have

Proposition 11 *In an economy with $K \geq 2$ ex ante identical provinces, when the central government doesn't care about welfare ($a = 0$), the equilibrium FDI at the national level is full ($n_m^* = n_f$) when the fiscal decentralization is on some medium range ($\gamma \in [\widehat{\gamma}(K), \bar{\gamma}(K)]$). Otherwise, the equilibrium FDI is zero. In addition, both $\widehat{\gamma}(K)$ and $\bar{\gamma}(K)$ decrease with K .*

This proposition shows that both the FDI bifurcation and the non-monotonic impact of fiscal decentralization remain valid for an economy with arbitrarily many provinces. In particular, when the central government is benevolent ($a \rightarrow \infty$), there exists only one symmetric equilibrium in a two-province economy, which has a positive profit tax on FDI, 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 ($\phi_1^* = \phi_2^* = 0$).

Appendix III: Data Description, Parameter Choices and Robustness Checks for Simulations

Parameter Choices for Table 2 Fiscal centralization parameter $\gamma = 0.6$ is the calculated share of the corporate income tax revenue accruing to the central government. Using the expenditure share (obtained from China's Statistic Year Book) gives the similar quantitative result, because the new value still falls onto the "intermediate-region" that supports the full FDI equilibrium. Note that the computed lower bound for γ that admits the full FDI is 0.276 when all the other exogenous parameters take the values given in Table 2, see more discussions on this in Subsection 4.3. $\bar{\lambda} = 0.33$ is China's corporate tax rate on the domestic firms. n_f and n_h are set to match the ratio of the numbers of domestic firms versus foreign-invested firms (including the investment from Hong Kong, Macau and Taiwan) in China's industrial sector, which is roughly 1: 6. n_f is chosen by assuming the data is the full-FDI political equilibrium. $c_h : c_f$ is to match the labor productivity (output per worker in PPP-based value) ratio of OECD versus China in 2004, which is \$59658 to \$10168, or roughly 6:1. This is based on the statistics of OECD and World Bank. L is set to match that the equilibrium labor employment in all the foreign-invested firms versus that in the numeraire sector, $l_m : l_n$, is 1: 21.6. All the non-industrial sectors are assumed to be 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. Branstetter and Feenstra (2002) estimate this structural parameter ε by using China's 1990-1995 cross-province panel data. The estimated value for ε is 2.05 and it becomes 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 Branstetter and Feenstra, so it's a free parameter in our investigation. We choose $\theta = 1.8$ but will experiment with other values. Branstetter and Feenstra (2002) find that the welfare weight a is about one half of the weight on the profits of the domestic firms based on the 1990-1995 China's provincial data. That ratio is 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 compared with the previous five years. This weight ratio is $\frac{1-\bar{\lambda}+\gamma\bar{\lambda}}{a}$ 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's reasonable to expect a to be much larger than 0.434 in 2004. we assume a has increased at the same speed as before so we choose $a = 1.302$ by setting the weight ratio equal to 1.5. We also experiment with other values including $a = 0.434$. 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, we simply set it equal to unity.

Value Choices for Table 3 The following describes the real data for the endogenous

variables in the model. $n_{m,k}^* : n_h$ is the equilibrium number of foreign-invested firms in province $k \in \{1, 2\}$ versus the domestic firms in that province, measured by the numbers of the industrial firms in 2004. There are two provinces in the model thus $n_{m,k}^* : n_h$ is $\frac{n_f}{2} : n_h$ if the full-FDI symmetric political equilibrium is reached and zero otherwise. λ^* is the profit-tax rate on the foreign-invested firms in both provinces since the equilibrium is symmetric. According to China's tax rule, the profit tax rate should be 30% for general coastal open regions but 15% for special economic zones. According to Pricewaterhouse Coopers (2006) World Tax Summaries, China's corporate tax rate on foreign firms was 33.0%. There is no precise estimation for this variable. So we use subjective judgement and take the interval (0.15, 0.20) as the more reasonable range. Tariff rate τ^* is 1.104 according to the *Import and Export Tariff Rules of the People's Republic of China(2004)*. Labor allocations in domestic firms versus foreign-invested firms $l_h : l_m$ are measured using the total employment in the industrial sector in 2004. We 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. $n_h \pi_h : n_{m,k}^* \pi_m$ are measured by the total profit ratio between domestic industrial firms and the foreign-invested industrial firms.

Robustness Check for China Table A1 shows that when the welfare weight a is below 0.071 there will be no FDI in the equilibrium. This is because the central government now cares more about the domestic firms' profits and its tariff revenue, hence it induces the provincial governments to block FDI. One way to block FDI 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, which also generates the full-FDI equilibrium with our calibrated model, as shown in Table 4. Since a should be larger than 0.434 in 2004, we can thus conclude that China's policies toward FDI remained robustly favorable relative to the plausible variations of

a.

Table A1: Sensitivity Relative to a

| a | $n_m^* : n_h$ | λ^* | τ^* | $l_h : l_m : l_n$ | $GDP : n_h \pi_h : n_m^* \pi_m$ |
|--------------------------------------|---------------|-------------|----------|-------------------|---------------------------------|
| Data | 1: 6 | (0.15,0.30) | 1.104 | 2.4: 1: 21.6 | 21.0: 2.4 :1 |
| Model | 1: 6 | 0.2382 | 1.155 | 2.4: 1: 21.7 | 25.8: 2.4:1 |
| 1.62 | 1: 6 | 0.0090 | 1.005 | 2.4: 1: 22.0 | 25.9: 2.4:1 |
| 1.50 | 1: 6 | 0.1121 | 1.065 | 2.4: 1: 21.8 | 25.9: 2.4:1 |
| 1.00 | 1: 6 | 0.4444 | 1.365 | 2.4: 1: 21.6 | 25.8: 2.4:1 |
| 0.868 ($\frac{1}{1}$) [†] | 1: 6 | 0.5045 | 1.450 | 2.4: 1: 21.6 | 25.7: 2.4:1 |
| 0.434 ($\frac{1}{2}$) | 1: 6 | 0.7127 | 1.935 | 2.4: 1: 21.5 | 25.6: 2.4:1 |
| 0.174 ($\frac{1}{5}$) | 1: 6 | 0.8118 | 2.420 | 2.4: 1: 21.5 | 25.6: 2.4:1 |
| 0.072 ($\frac{1}{12}$) | 1: 6 | 0.8458 | 2.690 | 2.4: 1: 21.4 | 25.6: 2.4:1 |
| 0.071 | 0: 6 | 0 | 2.060 | 0.3: 0: 2.7 | 3.3: 0.3: 0 |
| 0.062 ($\frac{1}{14}$) | 0: 6 | 0 | 2.080 | 0.3: 0: 2.7 | 3.3: 0.3: 0 |
| 0 | 0: 6 | 0 | 2.235 | 0.3: 0: 2.7 | 3.3: 0.3: 0 |

Note: [†] The fraction in the parenthesis is the ratio of a versus the weight on the profits of the domestic firms in the reduced government goal function.

When $a \in [0.072, 1.62]$, the tariff rate decreases with a because the households are the anti-protection group, hence the profit tax on the multinationals must decrease in order to induce the potential foreign investors to make FDI. Tariff rate decrease reduces the market demand for all the differentiated commodities, hence more labors move into the numeraire sector. The total profit of foreign-invested firms as a share of GDP 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 and the tariff rate is "too big" as compared with τ^A at $a = 0.072$. The tariff rate increases again as a decreases further.

More Sensitivity Check with θ . Table A2 presents the results of our experiment with parameter θ . Recall we impose $\theta \in (0, \varepsilon)$ for our model.

Table A2: 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.

Parameter Choices for Table 4 The main data sources for India are the Economic Survey data provided by India's Ministry of Finance (2006-2007), the 2003-2004 Annual Survey of Industries data provided by India's Ministry of Statistics and Program Implementation, UNCTAD, PricewaterhouseCoopers (2006) and Penn World Table version 6.2. $\gamma = 0.38$ 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). We 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. Expenditure share is also used as an alternative measure for fiscal decentralization, but it again falls onto the "no FDI" interval. $\bar{\lambda} = 0.36$ 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 we 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, we 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.

Within our 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 central government's goal function, which is $\frac{1-\bar{\lambda}+\gamma\bar{\lambda}}{a}$. In the real world, India's domestic firms seem to have a 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, we 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.

As mentioned in the main text, the new parameter s is introduced 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 (2009). 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).

Robustness Check for India Table A3 presents the sensitivity check results for the

substitution elasticity ε . Equilibrium FDI is always zero when ε is in the intermediate range $[1.94, 3.06]$, which seems most plausible because a smaller proportion of the foreign-invested manufacturing firms in India are export-oriented than China (hence ε should be larger than China's value). 3.05 is presumably an upper bound as we argue earlier. The robustness of the equilibrium FDI (and the implied policies) relative to ε supports our fiscal decentralization argument. Table A3 also shows the equilibrium shifts from null FDI to full FDI 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 the central government has more incentives to encourage FDI in order to expand its profit tax base. 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 negative pecuniary externality is decreased hence the marginal change in the domestic firms' profits and the tariff revenue would no longer warrant the exclusion of the more efficient foreign firms from the tax base.

Table A3: 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 |