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## Trade and foreign direct investment in China: a political economy approach

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### Abstract

We view the political process in China as trading off the social benefits of increased trade and foreign direct investment against the losses incurred by state-owned enterprises due to such liberalization. A model drawing on Grossman and Helpman [Am. Econ. Rev. 84 (1994) 833; *The Political Economy of Trade Policy: Papers in Honor of Jagdish Bhagwati*, MIT Press, Cambridge (1996) 199] is used to derive an empirically estimable government objective function. The key structural parameters of this model are estimated using province-level data on foreign direct investment and trade flows in China, over the years 1984–1995. We find that the weight applied to consumer welfare is between *one-seventh* and *one-quarter* of the weight applied to the output of state-owned enterprises.  
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### 1. Introduction

In recent years, few developments in international economics have elicited more interest or stirred more controversy than the sudden emergence of China as a

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trading nation and manufacturing center.<sup>1</sup> China's high rate of economic growth since the adoption of more liberal economic policies under Deng Xiao-Ping in the late 1970s, while perhaps exaggerated by the official statistics, is nevertheless a stunning accomplishment.<sup>2</sup> In the space of less than a generation, China has transformed itself from a poor nation almost completely cut off from the global economy to one of the world's most important suppliers of labor-intensive manufactures. Its arrival into the ranks of trading nations will be complete when it has implemented the conditions for joining the World Trading Organization (WTO).

Nevertheless, a number of economists have recently called into question the sustainability of China's current rates of GDP and export growth. These observers have tended to point out the shortcomings of China's socialist market economy, focusing on the inability of the government to raise revenue by taxing the new private economy, the problems the government has encountered in reforming state owned enterprises, the distortions created by China's dualistic trade regime, and the mounting non-performing loans problem in the Chinese banking sector.<sup>3</sup> The reality of important distortions in the Chinese economy, and particularly in its international trade and foreign direct investment regime, is increasingly evident. We offer, in this paper, a theoretical and empirical application of the political economy models pioneered by Grossman and Helpman (1994) to analyze these distortions. We view the political process in China as trading off the social benefits of increased trade and foreign direct investment against the losses incurred by state-owned enterprises due to such liberalization. We write down an explicit theoretical model of the policy formulation process which, we argue, captures important features of Chinese institutional reality. We then use this model to derive an empirically estimable governmental objective function. The key structural parameters of this model are estimated using province-level data on foreign direct investment and trade flows in China in the years 1984–1995.

This paper falls within a growing empirical analysis of endogenous political economy, based on a Grossman–Helpman style political economy model. The first paper of which we are aware that attempts this kind of analysis is Goldberg and Maggi (1999), and there are now several more, including Gawande and Bandyopadhyay (2000), Grether et al. (2002), Mitra et al. (2002), and McCalman (2000). Our paper differs from these in focusing on FDI rather than tariffs as the policy variable used to 'reveal' political preferences. In addition, the Goldberg and Maggi paper and the work of Gawande and Bandyopadhyay are set in a very

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<sup>1</sup>For an excellent overview of this emergence, see Naughton (1996).

<sup>2</sup>See Sachs and Woo (1997) for a discussion with some reference to the problems of official Chinese statistics.

<sup>3</sup>Again, Naughton (1996) provides an excellent overview of these issues.

different institutional context—the United States. McCalman examines Australia, while Grether et al. and Mitra et al. examine Mexico and Turkey, two developing countries which underwent well-documented trade and investment liberalizations over the course of the 1980s. In contrast, our paper explicitly models key features of China's trade and FDI regime—a regime which remains much less liberal despite two decades of reform.

Our empirical estimates allow us to quantify the relative weights placed on 'special interests' and general economic welfare. In striking contrast to Goldberg and Maggi's (1999) results with US data, we find quantitative evidence that Chinese provincial and central governments have given significantly greater weight to the special interests of state-owned enterprises than to consumer welfare—between *four* and *seven* times greater weight in our point estimates. Our framework allows us to estimate the impact on governmental utility of proposed changes in China's trade regime. As an experiment, we estimate the impact of the tariff reductions China has promised under its plan to join the WTO. The implications of these findings for the political economy literature and for the debate over economic reform in China are discussed in the conclusion. Additional details on the model and data sources are described in our working paper (Branstetter and Feenstra, 1999).

## 2. Foreign direct investment in China

A comprehensive description of Chinese economic reform, even one focused solely on the evolution of China's FDI regime, is well beyond the scope of this paper. The reader is directed to Lardy (1992, 1998) and Naughton (1995) for three well-regarded studies.<sup>4</sup> Here, we quickly summarize some of the most important policies related to FDI, and introduce the data that will be used in later estimation.<sup>5</sup>

The first column in Table 1 illustrates the cumulative stock of FDI into China's 30 provinces (not counting the Hong Kong Special Administrative Region) in 1995, and this is graphed in Fig. 1. The variation across regions is quite striking, with Guangdong province and neighboring Fujian together maintaining a dominant position as the most important site of FDI activity. These two provinces are the sites of the 'special economic zones' (SEZ), established in 1979 and giving preferential tax and administrative treatment to foreign firms locating there.<sup>6</sup> These zones charged a reduced tax of 15% on business income of foreign affiliated firms

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<sup>4</sup>The material in this section also draws on Grub and Lin (1991) and Pomfret (1991).

<sup>5</sup>The sources for data in Table 1 are described in a data Appendix available on request.

<sup>6</sup>These SEZs consisted of three in Guangdong: Shenzhen (across the border from Hong Kong), Zhuhai (across the border from Macau), Shantou (on the Guangdong coast facing Taiwan), and also Xiamen in Fujian (directly across the Taiwan Straits from Taiwan).

Table 1  
Selected data in 1995

	FDI (\$ bill)	Multinational share	State-owned share	Import share	Wage premium	Tariffs
Beijing	5.30	0.215	0.555	0.075	0.366	0.413
Tianjin	3.75	0.240	0.284	0.043	0.522	0.306
Coastal provinces						
Liaoning	5.38	0.042	0.389	0.022	0.475	0.227
Hebei	2.02	0.066	0.327	0.007	0.36	0.289
Shandong	8.51	0.054	0.274	0.007	0.308	0.282
Jiangsu	14.01	0.102	0.176	0.008	0.353	0.223
Shanghai	11.61	0.290	0.294	0.080	0.452	0.163
Zhejiang	4.01	0.075	0.082	0.010	0.27	0.240
Fujian	13.73	0.270	0.068	0.035	0.387	0.298
Guangdong	39.02	0.271	0.000	0.075	0.33	0.215
Guangxi	2.79	0.065	0.357	0.014	0.357	0.252
Hainan	4.00	0.204	0.054	0.348	0.436	0.172
Average	10.51	0.144	0.202	0.061	0.373	0.236
Inland provinces						
Heilongjiang	1.26	0.026	0.648	0.011	0.582	0.264
Jilin	1.07	0.062	0.576	0.054	0.367	0.174
Inner Mongolia	0	0.048	0.606	0.021	0.232	0.320
Shanxi	0.24	0.017	0.433	0.005	0.399	0.216
Henan	1.53	0.041	0.323	0.006	0.352	0.294
Anhui	1.2	0.032	0.292	0.005	0.578	0.241
Hubei	2.1	0.037	0.354	0.013	0.35	0.195
Jiangxi	0.91	0.041	0.495	0.008	0.468	0.257
Hunan	1.46	0.034	0.385	0.009	0.437	0.209
Guizhou	0.21	0.032	0.641	0.015	0.43	0.139
Yunnan	0.57	0.028	0.644	0.038	0.27	0.234
Sichuan	2.35	0.034	0.374	0.012	0.453	0.186
Tibet	0	0.000	0.725	0.250	0.621	0.321
Qinghai	0.02	0.006	0.827	0.005	0.463	0.157
Shaanxi	1.25	0.045	0.563	0.018	0.533	0.234
Gansu	0.22	0.040	0.645	0.013	0.396	0.146
Ningxia	0.1	0.093	0.665	0.006	0.352	0.170
Xinjiang	0.23	0.020	0.715	0.009	0.245	0.092
Average	0.82	0.035	0.551	0.028	0.418	0.214

FDI is the cumulated stock of foreign investment. The shares of provincial spending on multinationals, state-owned enterprises, imports and town and village enterprises (TVE) are measured relative to provincial apparent consumption. The tariff variable equals a weighted average of the 1996 ad valorem tariffs in each province.

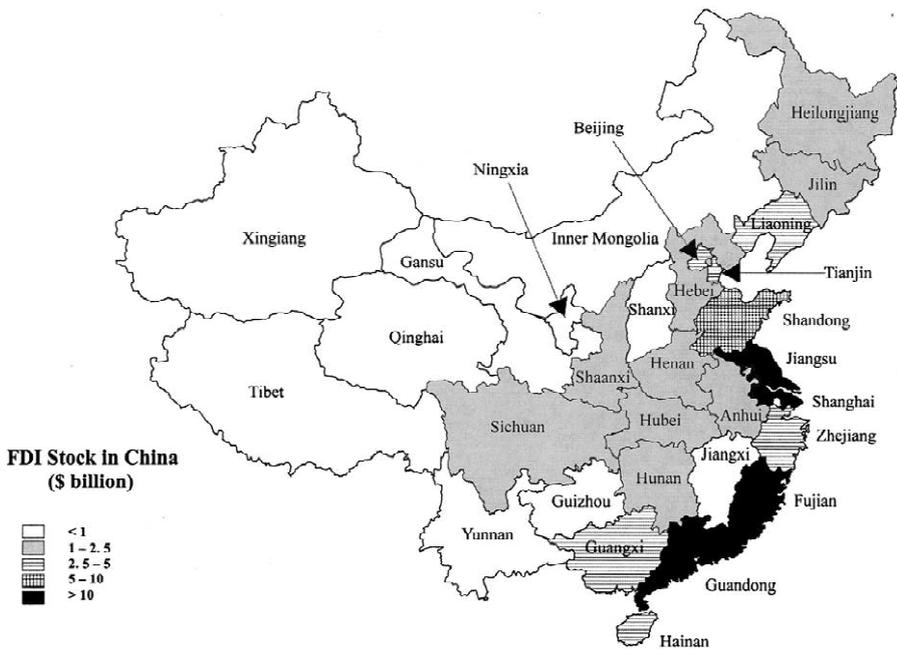


Fig. 1. FDI stock in China (\$ billion).

(as compared to 33% for domestic firms), though these taxes were not levied during the first 2 years of operation and charged at one-half of the full rate in the third through fifth years.<sup>7</sup> In addition, wholly foreign owned enterprises were permitted for the first time.

It is noteworthy that none of the original special economic zones were developed industrial centers in 1979. In fact, these zones were established outside the state's industrial centers to prevent 'contamination' of Chinese heavy industry by outside influences. These 'experiments' in attracting foreign direct investment were quite successful. In 1984, 14 additional areas known as 'open coastal cities', were granted similar exemptions from taxes and administrative procedures in a bid to attract FDI.<sup>8</sup> These cities levied a tax rate of 24% on foreign affiliated firms, and were granted local authority to approve foreign investment for projects under \$30 million (now \$50 million). All of the coastal provinces listed at the top of Table 1 included 'open coastal cities' or SEZs, and these average over \$10 billion in

<sup>7</sup>Naughton (1996, p. 301). The discrepancy between the corporate tax for foreign-affiliated and domestic firms has led many Chinese firms to seek foreign partners, sometimes through setting up corporations in Hong Kong. This so-called 'round tripping' accounts for some (unknown) fraction of the foreign investment into China.

<sup>8</sup>The entire island of Hainan was declared a special economic zone in 1988.

foreign investment by 1995. Shanghai and neighboring Jiangsu have received very substantial inflows starting from a very low base in the late 1980s, such that they have collectively become the next-largest recipient area by 1995, after Guangdong and Fujian.

The next major regulatory change in FDI came in 1986, with the implementation of the so-called ‘Twenty-two Regulations’. These changes represented a major liberalization which applied throughout China. Foreign invested enterprises (FIE) were made eligible for reduced tax rates regardless of location, and were given increased managerial autonomy. The establishment of an FIE was still subject to the approval of local and central agencies, and in practice, there continues to be a considerable degree of local autonomy in regulating FIEs. Their presence in the inland provinces still lags considerably behind the coast, with an average FDI stock of less than \$1 billion in 1995. The inland provinces with the highest levels of FDI are those in the far north (Heilongjiang and Jilin), or that border the coastal provinces (such as Henan, Anhui, Hubei and Hunan, as well as Sichuan which contains the industrial city of Chongqing).

Much of the foreign investment, especially that in the SEZs, has been for the purpose of ‘processing trade’ rather than ‘ordinary trade’. Under the former activity, intermediate inputs are imported, incorporated into other products, and are then exported again.<sup>9</sup> While this processing activity is important, it is not the focus of our paper. Rather, we will be interested in foreign investment for the purpose of selling products in China. To measure this activity, we isolate the sales of foreign firms that are made to the domestic market. Let  $Output_{jit}$  denote the sales of firm-type  $j$  in province  $i$  in year  $t$ , where  $j = d$  for domestic state-owned firms, and  $j = m$  for multinational FIEs. In addition, let  $Export_{jit}$  denote the exports of these firms. We measure apparent consumption in province  $i$  and year  $t$  by  $Total\ Output_{it} - Exports_{it} + Ordinary\ Imports_{it}$ . Note that imports for processing are excluded from provincial apparent consumption. Then the share of state-owned firms ( $j = d$ ), multinational firms ( $j = m$ ) and imports ( $j = f$ ) in apparent consumption are given by:

$$s_{jit} = \begin{cases} \frac{Output_{jit} - Exports_{jit}}{Total\ Output_{it} - Exports_{it} + Ordinary\ Imports_{it}} & \text{for } j = d, m, \\ \frac{Ordinary\ Imports_{it}}{Total\ Output_{it} - Exports_{it} + Ordinary\ Imports_{it}} & \text{for } j = f. \end{cases}$$

The multinational share of provincial apparent consumption is shown in the second column of Table 1. It has a correlation of 0.67 with the FDI stock in the first column. This high correlation reflects the fact that provinces with a large

<sup>9</sup>Borrowing from the Chinese terminology, Naughton (1996) refers to the two trade regimes as the ‘export processing’ and ‘ordinary trade’ regimes, respectively, and he provides an excellent discussion of them.

amount of FDI for processing trade will also have foreign firms selling locally. But it is also the case that provinces with high FDI have a *smaller* share of state-owned firms. Thus, the correlation between the FDI stock and the state-owned share (shown in the third column) is  $-0.63$ , and between the multinational and state-owned shares is  $-0.59$ . The most extreme example of this is Guangdong, which has the highest FDI stock, a multinational share of 27%, and virtually no presence of state-owned firms. As we have already mentioned, this province was chosen as a site for SEZ precisely because the foreign firms would not compete with any local state-owned firms, as well as for its proximity to Hong Kong, of course.

The reverse situation applies in the inland provinces, most of which have multinational shares less than 5% and state-owned shares exceeding 30%. The presence of state-owned firms in the inland is no accident: Mao Zedong selected these as the sites for heavy industries in the 1960s, as a protection against possible military invasion.<sup>10</sup> Our thesis will be that the continuing presence of inefficient state-owned industries creates a local political force that may resist the entry of competing, foreign firms. In some industries, foreign-invested enterprises have already obtained a dominant market position, such that the state-owned enterprises have been confined to the less profitable end of the market.<sup>11</sup> A number of studies suggest that the Chinese government, both national and local, is acutely aware of this competition, and has taken steps to impede the ability of foreign firms to compete in the Chinese market (e.g. Rosen, 1998). For example, multinationals regularly confront a nexus of restrictions on their operations, including export requirements, localization requirements, requirements for technology transfer, and restrictions on domestic market access. Provincial and even local governments also regularly attempt to extract funds from foreign firms through both legal and illegal surcharges and taxes. While on paper foreign firms get favorable tax and import treatment, in practice it is clear that foreign firms are often operating with a government-engineered disadvantage.

The reader may notice that the shares of multinationals, state-owned firms and imports do not sum to unity in Table 1. This is because a large share of output in most provinces is supplied by 'town and village enterprises' (TVE), which are not classified as state-owned; a small amount of output now also comes from privately-owned enterprises. The TVEs were initiated as part of the agricultural reforms of 1979, with the Chinese leadership granting rural municipalities considerable freedom to set up manufacturing enterprises whose output and production decisions would not be subject to the dictates of central planning.

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<sup>10</sup>As described by Naughton (1988), the provinces selected for this (economically disastrous) 'third front' construction included all of Sichuan, Yunnan, Guizhou, Gansu, Qinghai and Ningxia, a portion of Shaanxi and the western regions of Henan, Hubei and Hunan.

<sup>11</sup>This view was strongly confirmed from our interviews with expatriate managers conducted in China in December, 1998.

These enterprises were quite successful, and by the end of the 1980s, the TVE share exceeded the state-owned enterprise (SOE) share in most provinces.

There is an interesting time-series pattern of growth in TVE activity, and therefore in the state-owned share. This is illustrated in Fig. 2 for Hebei province, which surrounds metropolitan Beijing and the industrial center of Tianjin. The patterns in Hebei are fairly typical of what we find in other eastern provinces. One sees a clear trend break in the early 1980s, as the rural reforms which gave birth to the township and village enterprises have their effect. The downturn in SOE output share is literally the mirror image of the increase in the TVE output share. This does not principally reflect a ‘crowding out’ of SOE production but rather a growth in light ‘rural’ industry, which produces commodities and serves customers who were underserved by the planned economy.<sup>12</sup> The mid-1980s are marked by an impressive rise in TVE output share, which comes to a halt at precisely the time a ‘retrenchment’ in economic policy, following the protests at Tiananmen Square, was phased in. During this period, economic policymakers deliberately steered capital to the SOEs and deliberately set out to cut off access to capital for non-state enterprises. This period of retrenchment was not sustained. In the 1990s,

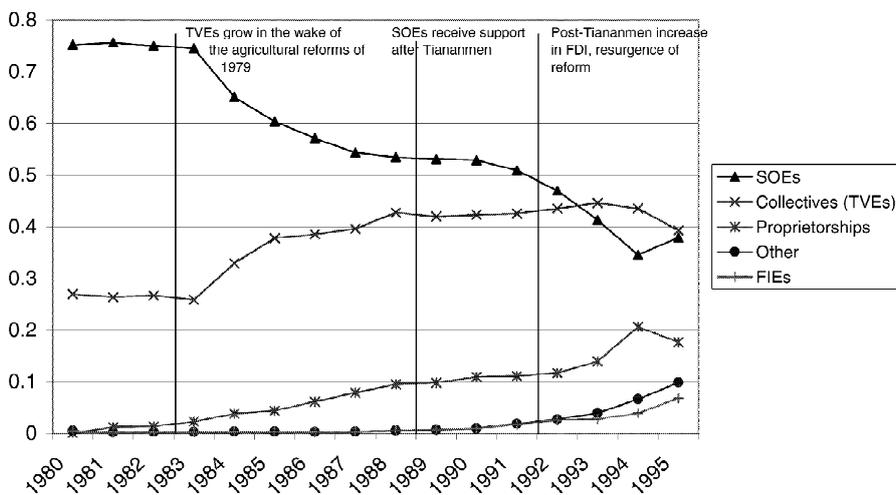


Fig. 2. Changes in industrial output in Hebei Province, 1980–1995.

<sup>12</sup>As Naughton (1995) has suggested, TVE activity was actually ‘suburban’ rather than ‘rural’ in character. It has concentrated in rural zones near large industrial centers, such as Hebei Province (which envelops Beijing and the industrial center of Tianjin) and the provinces of Jiangsu and Zhejiang (which border metropolitan Shanghai). This geographic distribution suggests that TVEs were complementary to SOEs, rather than being direct competitors.

while there is some continued rise in the TVEs' output share, the continuing decline in SOE output share now largely reflects a striking rise in the output share of proprietorships. It is also in this period that the FIEs' output share increases the most—but it remains small relative to the output shares of the other major categories of non-state producers. The bottom line of this exercise is that the policy record and our data strongly suggest that there is significant *time-series* variation in the output of state-owned enterprises relative to total regional industrial activity (in addition to the cross-sectional variation), and this is what we will ultimately rely on in the estimation.

We conclude this section with a note on the level of *intranational*, as opposed to international, economic integration in China, which is the subject of much current debate among experts on the Chinese economy. On the one hand, Young (2000) has argued on the basis of data on provincial production structure that economic integration among Chinese provinces is limited and declining—that China has become, 'a fragmented internal market with fiefdoms controlled by local officials'. At the other extreme, Naughton (1999) has argued that data on inter-provincial flows of goods, taken from the input–output tables, suggests that the level of interprovincial trade is relatively high and increasing. For reasons of modeling convenience, we shall take a position similar to that of Young, although our results will go through under the weaker assumption that interprovincial trade *in goods manufactured by FIEs* (and the competing SOE-manufactured goods) is limited. This view received surprisingly strong support from discussions with expatriate managers and native Chinese executives. While the extent of local protectionism varies across industries, it is seen as a barrier to growth and economic efficiency by nearly every firm we interviewed. As one Shanghai-based advisor to American firms put it, 'There is no China market. There are several China markets, and none of them are as big as you think'.<sup>13</sup>

### 3. The model

The model we develop draws heavily from Grossman and Helpman (1996), who apply the political-economy framework developed in their 1994 paper to the issue of multinationals. Specifically, they investigate whether the entry of multinationals will affect the level of protection, and conversely, in a model where the domestic industry is making campaign contributions. In our model, we will suppose instead

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<sup>13</sup>Naughton (1999) cites evidence that local governments have used discrimination in legal proceedings, allocation of bank credit, and regulatory certification to prevent 'outside' firms based in other provinces from succeeding in local markets. Another avenue of control has been local influence over state-run wholesalers, who, until recently, played a large role in many commodity flows. Local governments were able to block access of 'outside' goods to distribution channels.

that the domestic industry is owned by the government, which gives extra weight to industry profits in its objective function.<sup>14</sup> The presence of multinationals presents a potential threat to the state-owned enterprises through product market competition. Li and Chen (1998) use a framework like this to examine the government's ability to *extract rents* from the multinationals, and we will use policy instruments similar to theirs.

Because some features of our model are familiar, we will try to present it as concisely as possible. The following points summarize the main components.

*Regions:* we will treat the regions within the country as distinct, following Young's (2000) thesis that the provinces within China have only limited trade with each other. Thus, the model below describes *each* region, which will differ in terms of their products, the number of domestic (state-owned) firms found in each, and in the size of their labor force  $L$ .<sup>15</sup>

*Products:* each regional economy produces a numeraire good denoted by  $x_0$ , and a differentiated product which is a CES aggregate of the various varieties. There are three sources for the products:  $n_d$  varieties are produced by *domestic* firms;  $n_f$  varieties are produced by *foreign* firms, where  $m$  of these are produced locally by *multinationals*, and the remaining  $(n_f - m)$  are *imported* into the country. We will be treating  $n_d$  and  $n_f$  as *exogenous* variables, whereas the number of multinationals  $m$  is the key *endogenous* variable.

*Consumers:* consumer preferences are given by

$$U = x_0 + \left( \frac{\theta}{\theta - 1} \right) x^{(\theta-1)/\theta}, \quad \theta > 0, \theta \neq 1, \quad (1)$$

where the CES aggregate is,

$$x = \left[ n_d x_d^{(\varepsilon-1)/\varepsilon} + (n_f - m) x_f^{(\varepsilon-1)/\varepsilon} + m x_m^{(\varepsilon-1)/\varepsilon} \right]^{\varepsilon/(\varepsilon-1)}, \quad \varepsilon > 1. \quad (2)$$

The values  $x_j$  denote consumption of the differentiated varieties from source  $j = d$  (domestic firms),  $f$  (imported), and  $m$  (multinationals). The parameter  $\varepsilon$  is the elasticity of demand for individual varieties, while  $\theta$  is the elasticity of demand for the aggregate good  $x$ ; we add the standard restriction that  $\varepsilon > \theta$ .

*Factors:* we will suppose that labor is the only factor of production, and one

<sup>14</sup>As Naughton (1996) and several other authors have noted, the Chinese government still relies on remittances from state-owned enterprises for about two-thirds of its revenue. This is also true at the provincial level. The provincial government of Yunnan is rumored to obtain nearly *all* of its revenue from the provincial tobacco monopoly.

<sup>15</sup>Since our model focuses on the tradeoff between state-owned enterprises and FIEs, we will abstract from consideration of non-state domestic enterprises. FIEs pose a competitive threat to the relatively capital-intensive SOEs, while the labor-intensive inexpensive manufactures of the TVE sector (and proprietorships) tend to have limited overlap with the set of goods FIEs market in China for domestic consumption.

unit of the numeraire is produced with one unit of labor, so wages are *unity*. We shall assume, however, that the multinational firms pay a *wage premium* of  $(w - 1) > 0$ .<sup>16</sup> The wage premium is meant to proxy for a wide array of possible benefits that multinationals bring, but which are not captured in our model.

*Firms:* costs for the locally produced products are  $c_j$ ,  $j = d, m$ . Costs for products produced abroad are  $c_f$ , but also face a specific tariff of  $\tau$ , so that marginal costs become  $c_f + \tau$ . Prices are a standard markup over these marginal costs, using the elasticity  $\varepsilon$ . We make the key assumption that:

$$c_m < c_f + \tau. \quad (3)$$

This assumption will ensure that prices charged by multinationals,  $p_m$ , are less than those for imports,  $p_f$ . It follows that as more multinationals enter ( $m$  increases) and these products are sold for  $p_m < p_f$ , the demand for products of the domestic firms ( $x_d$ ) will decline due to substitution away from these products. This is how product market competition between the multinationals and domestic firms is captured in the model.

*Policy towards multinationals:* each foreign firm faces the decision of whether to supply locally through imports, or through setting up a local plant which requires a fixed cost of  $F > 0$ . We suppose that the government also charges the multinational a profit tax of  $\lambda \geq 0$ . This instrument is supposed to reflect the vast range of actual policies used in China to extract rents from multinationals, and not just the corporate tax on multinationals.<sup>17</sup> By modeling these policies as a tax on profits, we are abstracting from the inefficiencies caused by actual policies (such as local content restrictions, for example).

The multinational net profits earned locally are thus  $(1 - \lambda)\pi_m - F$ , where  $\pi_m = p_m x_m / \varepsilon$  is profits under the standard CES markup-pricing rule. Alternately, the multinational could just export from the home country, and earn  $\pi_f = p_f x_f / \varepsilon$ . Thus, entry will occur if and only if  $(1 - \lambda)\pi_m - F \geq \pi_f$ . This condition is written as:

$$(1 - \lambda) \frac{p_m x_m}{\varepsilon} - F \geq \frac{p_f x_f}{\varepsilon}. \quad (4)$$

<sup>16</sup>The existence of this wage premium is strongly confirmed in our data and in our interviews with multinational managers.

<sup>17</sup>In fact, foreign firms are often taxed at zero or reduced rates for the first years of operation. Despite this, there are many ways that local and national agencies extract rents from the multinationals. For example, the fact that most multinationals have had to use local partners reflects an implicit tax on their profits, which are shared with the partner; similarly, the land-use fees that are commonly charged reduce the multinationals' profits, as do conditions of technology transfer and export requirements. Of course, bribes paid to allow multinationals to enter are another example of the profit tax. Wei (1998) argues that corruption in China, which includes the need for 'questionable payments', acts as a significant deterrent to foreign direct investment.

We will assume that when  $m = \lambda = 0$  then (4) holds as a strict inequality. This means that for some positive  $\lambda$ , entry of multinationals will occur.

*Government objective function:* we can define the government's objective function over the various interest groups, beginning with consumer/worker utility  $U$ , which receives a weight of  $\alpha$ . We will suppose that the domestic firms are state-owned, so these profits accrue to the regional and national government. Profits of the domestic firms are  $n_d \pi_d = n_d p_d x_d / \varepsilon$ . We give revenue from state-owned firms a weight  $\beta$  in the objective function. The government extracts rents  $m \lambda \pi_m$  from the multinationals, and also collects tariff revenue of  $\tau(n_f - m)x_f$ . These two sources of revenue are each given weights of unity. The objective function for each region is then defined by

$$G(m, \lambda, \tau) \equiv \alpha U + \beta n_d \pi_d + m \lambda \pi_m + \tau(n_f - m)x_f. \quad (5)$$

We do not suppose that the government directly controls entry of multinationals. Instead, entry is influenced through the tax rate  $\lambda$  and the tariff rate  $\tau$ , so the number of multinational firms is written as a function  $m(\lambda, \tau)$ . Multinationals react in the expected manner to changes in these policies: when (4) holds as an equality, then  $dm/d\lambda < 0$  and  $dm/d\tau > 0$ .

We are now in a position to set up and solve the governments' problem. We suppose that the central and the regional governments jointly determine the rents appropriated from the multinationals in each region, taking as given the import tariffs.<sup>18</sup> While the tariff schedule is common across regions, the fact that different outputs are produced means that the tariffs effectively differ across regions. Denoting regions by the subscript  $i$ , we let  $G_i[m_i(\lambda_i, \tau_i), \lambda_i, \tau_i]$  denote the objective function for each region. Then the profit taxes are chosen to solve:

$$\max_{\lambda_i} \sum_i G_i[m_i(\lambda_i, \tau_i), \lambda_i, \tau_i] \quad (6)$$

subject to  $m_i(\lambda_i, \tau_i) \leq n_f$ , which is the maximum number of foreign firms willing to enter any region. Our strong assumption in writing the objective function as in (6) is that the tax rate  $\lambda_i$  for one region is *separable* from that in another region. This is an extreme version of Young's (2000) thesis that the provinces in China have only limited trade with each other. It follows that they will not be in competition with one another for foreign investment, because multinationals can only serve the market where they locate. While this case does not literally apply in China, it is certainly true that foreign firms face restrictions on their ability to market outside their immediate area. By assuming

<sup>18</sup>The tariffs themselves are chosen by the central government, in a problem more complex than (6) that would include export gains from WTO membership. The impact of changing tariffs is discussed in Section 6.

an extreme form of these restrictions, we greatly simplify the governmental decision problem.

Differentiating (6), the first-order condition is that  $\partial G_i / \partial m_i = -m_i \pi_{mi} / (\partial m_i / \partial \lambda_i)$ . This means that the gain from attracting one more multinational ( $\partial G_i / \partial m_i$ ) is just balanced against the *fall* in the revenue  $\lambda_i m_i \pi_{mi}$  when the tax rate is lowered to attract another multinational. The first-order condition for (6) over the choice of  $\lambda_i$  is used to obtain an estimating equation.<sup>19</sup> We denote all other variables in region  $i$  with that subscript, though for simplicity we suppose this does not apply to the foreign price  $p_f$ , or the number of foreign firms  $n_f$ . We also add a time subscript to all relevant variables. Then directly from the first-order condition, we obtain the following equation for the share of spending on products of multinationals in region  $i$  and year  $t$ :

$$\begin{aligned}
 s_{mit} = & -\beta s_{dit} + \eta \left( \frac{w_{it} - 1}{w_{it}} \right) + \alpha(\varepsilon - 1) \left( \frac{w_{it} - 1}{w_{it}} \right) (s_{dit} + s_{fit}) \\
 & - \varepsilon \left( \frac{\tau_i}{p_f} \right) s_{fit} + \left( \frac{m_{it}}{n_f - m_{it}} \right) s_{fit} \\
 & + \frac{\alpha \varepsilon}{(\varepsilon - \theta)} + \left\{ \frac{(\varepsilon - 1) \lambda_{it} \pi_{mit}}{(\varepsilon - \theta)(F_{it} + \lambda_{it} \pi_{mit})} + \left[ \frac{\alpha(\varepsilon - 1)^2}{(\varepsilon - \theta)} \left( \frac{w_{it} - 1}{w_{it}} \right) \right. \right. \\
 & \left. \left. - \varepsilon \left( \frac{\tau_i}{p_f} \right) \right] \frac{\pi_{fit}}{(F_{it} + \lambda_{it} \pi_{mit})} \right\} \quad (7)
 \end{aligned}$$

where  $s_{jit}$ ,  $j = d, f, m$  denotes the share of provincial apparent consumption on domestic, imported or multinational products. The first term on the right of (7) is the share of provincial consumption accounted for by state-owned firms, which enters with the coefficient  $-\beta$ . Thus, the weight on state-owned firms in the regional objective function is simply obtained as the coefficient on their share in the regression (7). A high weight on the state-owned firms indicates that in regions where these firms are more prevalent, the share of multinational firms will be correspondingly reduced.

The next term on the right of (7) is the wage premium paid by multinationals, which has the coefficient  $\eta \equiv \alpha(\varepsilon - 1)(\theta - 1)/(\varepsilon - \theta)$ , which is of ambiguous sign. Following this is the wage premium times the share of spending on state-owned firms plus imports. When the wage premium is higher, we expect that regions would be more willing to accept multinationals, and this is confirmed by having a positive coefficient  $\alpha(\varepsilon - 1)$  on that variable. The estimate of  $\varepsilon$  itself comes from the next term, which is the ad valorem tariff rate times the share of spending on imports. This term reflects the loss in tariff

<sup>19</sup>See our working paper for the derivation, where we also discuss the second-order conditions.

revenue as multinationals enter (as in Brecher and Diaz-Alejandro, 1977), and the coefficient is  $-\varepsilon$ . Thus, combined with the former coefficient we can recover an estimate of  $\alpha$ . The final term on the second line of (7) reflects the number of multinationals times the share of imports. For simplicity we treat  $n_f$ , which is the number of foreign firms wanting to export or invest in China, as constant over regions and time, and estimate it as a coefficient.

The terms on the last two lines of (7) are rather complex expressions of the profit earned by importing into or producing in China, entering themselves and interacted with the wage premium and tariffs. If profits are low, these terms will be correspondingly small. We have no way of measuring these terms, but it seems likely that they will vary systematically across regions, and possibly also over time. Thus, we will model the terms on the last two lines of (7) as:

$$\left\{ \frac{(\varepsilon - 1)\lambda_{it}\pi_{mit}}{(\varepsilon - \theta)(F_{it} + \lambda_{it}\pi_{mit})} + \left[ \frac{\alpha(\varepsilon - 1)^2}{(\varepsilon - \theta)} \left( \frac{w_{it} - 1}{w_{it}} \right) - \varepsilon \left( \frac{\tau_i}{P_f} \right) \right] \frac{\pi_{fi}}{(F_{it} + \lambda_{it}\pi_{mit})} \right\} = \gamma_i + \delta_i + u_{it}, \quad (8)$$

where  $\gamma_i$  and  $\delta_i$  are province and year fixed-effects, and  $u_{it}$  is a random error assumed to be uncorrelated with the variables on the first line of (7). Gathering all these terms into fixed-effects plus an error is a strong assumption, but we have no other way of dealing with them. With this assumption, we will be able to estimate (7) with two-stage least squares (TSLS) applied to panel data.

#### 4. Data and estimation issues

The data used to estimate (7) was already introduced in Section 2 and Table 1, and is a panel of 30 provinces or autonomous regions, over the years 1984–1995.<sup>20</sup> The wage data was available for workers in multinationals, state-owned enterprises, and urban collectives, with that in multinationals usually being the highest and that in urban collectives usually the lowest. The wage premium is measured as the wages paid by multinationals minus that in urban collectives, divided by that in multinationals.

Two other variables are needed in the estimation. As a proxy for the number of multinational firms  $m_{it}$  in a province in a given year, we use the cumulated stock of foreign direct investment actually utilized (in billions of US\$), shown in Table

<sup>20</sup>Sources for data are described in our working paper and a data Appendix, available on request. The principal sources are the Xinjiang Statistical Bureau (1998) and trade data from the Customs General Administration in China.

1.<sup>21</sup> It is interacted with the share of ordinary imports  $s_{fit}$  on the right of (7), and the coefficient is then  $1/(n_f - m_{it})$ . For simplicity, we suppose that  $n_f$  is large enough so that this coefficient can be treated as constant over time and regions, and re-write it as  $1/n_f$  when estimating (7). The tariff variable is computed for province  $i$  as a weighted average of ad valorem tariffs, based on the provincial imports of different goods multiplied by the 1996 tariff rate assessed on those goods.<sup>22</sup> Unfortunately, we did not have access to any earlier years of tariff data, so the tariff rate  $\tau_i/p_f$  in (7) does not vary over time. All these variables are shown in Table 1 for 1995.

Turning to estimation issues, the dependent variable in (7) is the share of regional apparent consumption accounted for by products sold by multinationals, while the state-owned and import shares appear on the right. Taken together with the share of provincial spending on TVEs and individual proprietorships, these shares would sum to unity, so there is some obvious endogeneity between the multinational share on the right of (7), and the state-owned and import shares on the left. In our working paper, we attempted to correct for this by estimating (7) with instrumental variables, which were the same variables that appear on the right of (7) but measured as levels rather than shares. Because the exogeneity of the instruments could be questioned, here we take the approach of directly estimating (7) in levels rather than shares, and using other instruments.

That is, we now let  $s_{jt}$ ,  $j = d, f, m$  denote the nominal provincial *spending* on products of state-owned, imports or multinational firms, rather than *shares*. There can still be an endogeneity problem, of course, if multinational firms ‘crowd out’ imports or state-owned firms. Other explanatory variables in (7) might also be endogenous, such as the wage premia and import shares. Accordingly, we use instruments for all the explanatory variables, and estimate (7) with TSLS.<sup>23</sup> In the

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<sup>21</sup>This was computed by taking flows of foreign direct investment from the regional data and cumulating them using a depreciation rate of 4.5%. This depreciation rate was based on data drawn from the 1994 Benchmark Survey on US direct investment abroad conducted by the Bureau of Economic Analysis of the US Department of Commerce. We are grateful to Michael Ferrantino of the International Trade Commission for drawing our attention to this document, and performing the computation that produced this number.

<sup>22</sup>We included in this calculation an indicator variable, equal to one when that product is also exported by FIEs in the province, and zero otherwise. Thus, the weights used to compute the average tariff were the provincial imports of different goods *times* the indicator variable, indicating whether the good was also exported (and therefore produced) by FIEs.

<sup>23</sup>The instruments are: provincial electricity production (used as an instrument for expenditure on state-owned firms); indexes of urban, state and overall wages (used as instruments for the wage premium); provincial GDP, population, average rural and urban income (used as instruments for apparent consumption); provincial processing imports (used as an instrument for ordinary imports) and various interactions between these terms.

estimation we include provincial apparent consumption as a control variable, and also experiment with using provincial GDP as a weight.

Another estimation issue is that the multinational share can be zero for some provinces and years. This raises technical difficulties, however, because we also have fixed-effects as in (8), and some of the right-hand side variables are endogenous. There is no available estimator for a censored model with fixed effects and endogenous variables. However our sample does not start until 1984, and most provinces registered positive levels of FDI by or shortly after that date. The only province which did not have any foreign investment by the end of our sample period was Tibet, where political factors other than those we have modeled are surely important. For these various reasons, we restrict the dependent variable in (7) to positive values.<sup>24</sup>

## 5. Estimation results

Results from regressions based on (7)–(8), using data for 1984–1995, are presented in Table 2. Each of the four columns of results uses a different estimation technique, beginning with OLS, and moving to weighted TSLS. Standard errors are placed in parentheses below the respective parameter estimates, and we see that our key parameters are estimated with varying degrees of precision in these four columns. OLS estimates are largely uninformative, as we are unable to obtain reasonable estimates of  $\varepsilon$ . However, our estimates improve substantially when we move to two-stage least squares. The coefficients are affected somewhat as we weight by provincial GDP in the third and fourth regressions. Each regression includes a full set of provincial and year fixed effects.

An estimate of the parameter  $\beta$ , the weight of state-owned enterprise output in the government's objective function, can be taken from the regression coefficient on state-owned enterprise output, and ranges from 1.3 to 1.66 (ignoring the OLS estimate).<sup>25</sup> Estimates of  $\alpha$ , the weight on consumer welfare, can be derived from the regression coefficients shown in the second and third rows of Table 2. For our preferred specification, which is the weighted TSLS estimate in the third regression, we obtain  $\hat{\alpha} = 0.24$  as reported in Table 3. The difference between the state-owned and consumer weight is  $\hat{\beta} - \hat{\alpha} = 1.42$ , and the standard error of this difference is computed as 0.46. Thus, we find that the weight given to consumer welfare is *significantly lower* than that applied to the output of state-owned enterprises (at the 5% level), with their ratio being about *one-seventh* in our

<sup>24</sup>This restriction only impacts 11% of our observations.

<sup>25</sup>We note that the sign and magnitude of this estimate is contingent on including total provincial consumption as a control variable in the regression: controlling for total provincial spending, a decline in the spending on state-owned firms is associated with a rise in the spending on multinationals; but without this control variable, the sign of  $\beta$  is reversed.

Table 2  
Dependent variable—provincial spending on output of multinational enterprises

	Coefficient	Estimation method			
		OLS	TOLS	Weighted TOLS	Weighted TOLS
Independent variable:					
Provincial spending on state-owned	$-\beta$	-0.41 (0.12)	-1.30 (0.40)	-1.66 (0.48)	-1.60 (0.45)
Wage premium $\times$ (state + imports)	$\alpha(\varepsilon - 1)$	0.42 (0.23)	2.19 (0.87)	3.62 (1.16)	3.45 (1.16)
Tariff $\times$ imports	$-\varepsilon$	-0.15 (2.7)	-7.4 (3.3)	-15.9 (5.1)	-16.5 (4.8)
Wage premium	$\alpha(\varepsilon - 1)(\theta - 1)/(\varepsilon - \theta)$	-118 (64)	-967 (435)	-3333 (1085)	-3430 (1130)
FDI stock $\times$ imports	$1/n_f$	0.037 (0.022)	0.037 (0.017)	0.052 (0.013)	0.057 (0.012)
Provincial apparent consumption		0.11 (0.02)	0.15 (0.03)	0.15 (0.02)	0.22 (0.07)
Provincial spending on collectives					-0.12 (0.10)
$R^2, N$		0.85, 297	0.74, 280	0.76, 280	0.75, 280
Fixed effects		Yes	Yes	Yes	Yes

Notes: the sample consists of 29 provinces (excluding Tibet) over 1984–1995, using fixed effects for provinces and for time; only provinces with positive multinational output are included. All regressions except the first are estimated with TOLS. The weighted regressions use provincial GDP as a weight. White standard errors are reported in parentheses.

preferred estimates. Without using provincial GDP as weights, the TOLS estimates in the second regression gives  $\hat{\alpha} = 0.34$ , which is still *one-quarter* of the weight given to the state-owned enterprises.

Turning to other parameters, we obtain high estimates of the elasticity of substitution  $\varepsilon$  (from 7 to 16), though these are somewhat imprecise. In the

Table 3  
Coefficient estimates, by time period

Sample	Coefficient		
	$\alpha$	$\beta$	$\varepsilon$
1984–1995 ( $N = 280$ )	0.24 (0.07)	1.66 (0.48)	15.9 (5.1)
1988–1995 ( $N = 210$ )	0.24 (0.13)	1.32 (0.50)	11.5 (6.7)
1990–1995 ( $N = 132$ )	0.20 (0.15)	1.04 (0.49)	10.0 (7.6)

Notes: computed from the third regression reported in Table 2, but run over different samples. The estimation method is weighted TOLS. White standard errors are in parentheses.

regression shown in the last column of Table 2, we experiment with including the provincial spending on products from collectives (TVEs) as an additional regressor. The idea here is that if collectives command the same political power as state-owned enterprises (which we find unlikely), then the coefficient on provincial spending on collectives should be comparable to that on the state-owned industries. In fact, the coefficient on collectives is statistically insignificant, and its inclusion has little impact on the other coefficients.

A breakdown of the implied structural coefficients of interest is provided in Table 3 for later sub-samples of the data, the 1988–1995 period and the 1990–1995 period. As we confine our view to the later sub-samples, we lose observations and consequently precision in some of our estimates; sub-periods smaller than 1990–1995 do not yield many significant coefficients at all. In the later sub-periods, the estimated magnitudes of the weight on state-owned enterprises falls. This is consistent with the historical trend towards liberalization, of course. In the relatively liberal 1990–1995 sub-period, for example, we find that the weight on state-owned enterprises is *unity*, which is still considerably higher than the weight on consumer welfare (though the difference between these estimates is no longer significantly different from zero). These point estimates are consistent with the pessimism among some China scholars concerning the momentum of reform of restrictions on FDI and trade.

As a final evaluation of our model and estimates, we see how well they can reproduce correlations among key variables. Of special interest is the cross-provincial correlation between the multinational and state-owned shares, which is  $-0.59$  in 1995. This negative relationship led to our hypothesis of product-market competition between those firms: provinces with more state-owned firms appear to be less willing to accept foreign firms. At first glance, our estimate of  $\hat{\beta} = 1.66$  might appear ‘too high’ to be consistent with this correlation. To check this, we report in Table 4 various sample and predicted correlations between the multinational share,  $s_{mit}$ , and other variables for 1984–1995. Over the entire sample,  $s_{mit}$

Table 4  
Correlations with sample and predicted provincial share of spending on multinationals, 1984–1995

	Sample correlation	Correlation with predicted share			
		$\beta = 1.7, \varepsilon = 16$	1.7, 13	1.0, 8	0.50, 4.5
Correlation with:					
Multinational share	1.00	0.27	0.37	0.37	0.38
FDI	0.62	0.22	0.33	0.36	0.41
State-owned share	-0.58	-0.41	-0.59	-0.60	-0.60
Wage premium	0.35	0.91	0.87	0.86	0.84
Tariffs	0.13	0.00	0.05	0.05	0.05

Notes: the predicted provincial share of spending on multinationals is computed using the formula  $s_{mit} = -\beta s_{dit} + \alpha(\varepsilon - 1)(w_{it} - 1)/w_{it}(s_{dit} + s_{fit}) - \varepsilon(\tau_i/p_{fi})s_{fit} + (1/n_f)m_{it}s_{fit}$ , with parameters  $\alpha = 0.25$ ,  $1/n_f = 0.05$ , and  $\beta$  and  $\varepsilon$  as shown above. All correlations have  $N = 297$ .

has a correlation of 0.62 with provincial FDI,  $-0.58$  with the provincial share of spending on state-owned firms, 0.35 with provincial wage premia, and 0.13 with provincial tariffs. How well do these correlations match up with our estimates? Obviously, the fixed-effects included in (8) will raise the panel correlations, so let us ignore the fixed effects. We then compute the predicted spending on multinationals,  $\hat{s}_{mir}$ , using our parameter estimates for 1984–1995 and the terms on the first line of (7). Because the coefficient  $\hat{\eta}$  on the wage premium is estimated with such uncertainty, we omit this variable. The resulting correlations between  $\hat{s}_{mir}$  and other variables are shown in Table 4.

Using our TSLS estimates of  $\beta = 1.7$  and  $\varepsilon = 16$ , the correlation between the predicted multinationals share  $\hat{s}_{mir}$  and the other variables do not correspond very closely to the sample correlations. However, a modest change in the elasticity of substitution  $\varepsilon$ , from 16 to 13, leads to a much closer match for the correlation between multinational and state-owned firms. Thus, the predicted multinational shares  $\hat{s}_{mir}$  have a correlation of  $-0.59$  with actual state-owned shares, nearly the same as the sample correlation. The predicted correlation with FDI is still too low, while with the wage premium is too high (this may be due to the fact that we have left the wage premia out of the formula for  $\hat{s}_{mir}$  due to uncertainty about its coefficient). It turns out that as we reduce the values of  $(\beta, \varepsilon)$ , from (1.7, 16) to (1.0, 8) and then (0.5, 4.5) or even lower, the predicted correlations change very little. That is, we still obtain a good match between the sample and predicted state–multinational correlation, but this type of exercise *does not* identify the weight  $\beta$  given to state-owned firms: it could take on a whole range of values, depending on  $\varepsilon$ . We conclude that while our model can quite easily predict the cross-provincial correlation of state-owned and multinational firms, identification of  $\beta$  requires the full structural estimation, such as we have performed above.

## 6. Choosing the tariffs

At the beginning of the paper, we motivated our topic by the pending entry of China into the WTO, and suggested that the existing trade barriers would have to be reduced substantially to meet these commitments. To what extent does the presence of multinationals interact with that goal? The willingness of foreign firms to invest in China certainly reflects, in part, the difficulty of importing there directly. If tariffs are reduced substantially, this raises the distinct possibility that foreign firms who are not just involved in processing trade will *divest* of some of their holdings. This scenario was explicitly mentioned in some of our field interviews, and reflects the fact that for firms not involved in processing trade, investment in China is an attempt to access the huge domestic market; low wages play only a secondary role.

If we accept this characterization of foreign direct investment, it suggests that a reduction in tariffs may lead to an outflow of foreign direct investment. There is no

‘natural experiment’ that allows us to directly estimate this from data for China. However, we can use the estimates from the previous section to construct the outflow that is consistent with our theoretical model, in an attempt to judge the welfare impact. To this end, we compute the change in the objective function of a single region  $G_i[m_i(\lambda_i^*, \tau), \lambda_i^*, \tau_i]$ , when the multinational profit tax  $\lambda_i^*$  has been chosen optimally, as:

$$\begin{aligned} \frac{dG_i}{d\tau_i} &= \frac{\partial G_i}{\partial \tau_i} + \frac{\partial G_i}{\partial m_i} \frac{\partial m_i}{\partial \tau_i} \\ &= \frac{\partial G_i}{\partial \tau_i} - m_i \pi_{mi} \frac{\partial m_i / \partial \tau_i}{\partial m_i / \partial \lambda_i} = \frac{\partial G_i}{\partial \tau_i} + m_i \pi_{mi} \left. \frac{d\lambda_i}{d\tau} \right|_{m_i}. \end{aligned} \quad (9)$$

The first line of (9) uses the envelope theorem, whereby we can hold  $\lambda_i^*$  constant when computing the effect on  $G_i$  of changing  $\tau$ . The second line makes use of the first-order condition (7), and then the third line follows by computing  $d\lambda_i/d\tau|_{m_i} > 0$  as the slope of an iso-curve of the function  $m_i(\lambda_i, \tau_i)$ . Thus, the *total* impact of decreasing tariffs can be interpreted as: (i) the *direct* impact holding the profit tax and number of multinationals fixed; and (ii) the *indirect* effect through decreasing the profit tax itself so that multinationals *do not* exit the country. In other words, rather than computing the outflow of multinationals due to a tariff cut, we can (equivalently) compute in (ii) the drop in the profits tax imposed on the multinationals so that they do not leave following a tariff cut.

To determine the relevant tariff cut, we note that the unweighted average of the 1996 tariffs in China is 23.4%, and under its WTO entry plan the tariffs in 2005 would be reduced to 16.2%, or three-quarters of their 1996 value.<sup>26</sup> Applying this reduction to the 1996 tariffs used in our estimation, shown in the last column of Table 1, we obtain the proposed WTO tariffs shown in the third column of Table 5, at the provincial level. This drop in tariffs is used to evaluate effects (i) and (ii), computed using the functional forms of our model and the previously estimated parameters, with results shown in Table 5.

We show results in Table 5 for two values of the elasticities: low values of  $(\varepsilon, \theta) = (5, 0.5)$ , and high values of  $(\varepsilon, \theta) = (15, 2)$ . We experiment with the weights  $(\alpha, \beta) = (0.25, 1.7)$ , as shown for the full sample in Table 3, or  $(\alpha, \beta) = (0.2, 1)$  as shown for the 1990–1995 period; the value  $1/n_f = 0.05$  is also used. The *direct* effect of lowering the tariffs, which depends on how the current level compares to the ‘optimal’ tariff, and the *indirect* effect through lowering the profit tax for multinationals, are both measured relative to import expenditure. For brevity, we report only the welfare effects for Beijing, Tianjin, and the averages of the coastal and inland provinces.

<sup>26</sup>These unweighted tariffs are reported in World Bank (1997, Annex Table A.1). If we take the longer period from 1992 to 2005, then unweighted tariffs are reduced by one-half. Thus, to evaluate this total change, the welfare effects in Table 3 should all be doubled.

Table 5  
Welfare effects of tariff reductions (expressed as percent of import value)

	Initial tariffs	WTO tariffs	Example 1 ( $\varepsilon = 5, \theta = 0.5$ )			Example 2 ( $\varepsilon = 15, \theta = 2$ )		
			Direct effect	Indirect effect	Total effect	Direct effect	Indirect effect	Total effect
Weights $(\alpha, \beta) = (0.25, 1.7)$								
Beijing	0.413	0.310	-1.9	-4.8	-6.7	32.8	-4.4	28.5
Tianjin	0.306	0.230	-0.7	-3.3	-4.1	17.4	-3.0	14.4
Coastal average	0.236	0.177	-0.7	-3.5	-4.2	11.0	-3.4	7.6
Inland average	0.214	0.170	-4.1	-0.4	-4.5	6.9	-0.4	6.5
Weights $(\alpha, \beta) = (0.2, 1)$								
Beijing	0.413	0.310	2.2	-4.8	-2.6	36.5	-4.4	32.2
Tianjin	0.306	0.230	0.7	-3.3	-2.6	19.0	-3.0	16.0
Coastal average	0.236	0.177	-0.1	-3.5	-3.6	11.7	-3.4	8.3
Inland average	0.214	0.170	-2.2	-0.4	-2.6	8.5	-0.4	8.2

Notes: other parameters used in both examples are  $1/n_f = 0.05$ . The values shown give the welfare effects of reducing tariffs from their 'initial' to 'WTO' levels, measured as a percentage of import expenditure. The direct effect is calculated as the first term in (9), and the indirect effect as the second term.

In the first case, with  $(\alpha, \beta) = (0.25, 1.7)$  and low elasticities, Beijing has a *direct* welfare loss of nearly 2% of its import expenditure, reflecting the fact that even its high initial tariff (41%) is below the 'optimum' given the high weight on state-owned enterprises and the low elasticities. Beijing also suffers a loss of nearly 5% of imports from lowering the rents extracted from multinational firms, for a total loss of nearly 7%. Losses of a smaller magnitude are found for the neighboring industrial region of Tianjin, and for the coastal and inland provinces on average. If instead we consider the weights  $(\alpha, \beta) = (0.2, 1)$ , then the direct losses turn to gains for Beijing and Tianjin, since their initial tariffs are above the 'optimum'. Nevertheless, the indirect losses created by the potential exit of multinational firms still leads to overall losses for these areas and the other provinces. Thus, this example with low elasticities gives us a pessimistic scenario, with losses due to trade liberalization. Of course, we have not factored into this calculation the gains due to tariff removal abroad, which are essential to the Chinese interest in WTO membership. Nevertheless, press reports from China at the time of the WTO deal emphasized that, at the provincial level, local officials and managers were focused more on the competition created with state-owned firms, especially in the inland provinces.

In the second example we consider higher elasticities,  $(\varepsilon, \theta) = (15, 2)$ , in which case the 'optimal' tariffs are lower. Regardless of which values for  $(\alpha, \beta)$  are used, we find that nearly all regions now have direct gains from tariff removal, which are substantially larger than the indirect losses. For example, Beijing has a direct gain of 33–37% of its import value, which is much larger than the 4% indirect loss due to potential exit of multinationals. Gains of a smaller magnitude

are observed for most other provinces. Thus, with high values for the elasticities, most provinces gain from the proposed reduction of tariffs under China's WTO commitments, but for low values of the elasticities this is not the case. Both these cases are within the range of elasticities that we have estimated. So while we are not able to make more definite conclusions about the potential losses due to multinational exit, and whether these offset the gains due to tariff removal, this possibility is certainly within the range of our estimates.

## 7. Conclusions

After two decades of substantial reform, China's current trade and foreign investment regime remains far from open. If ever we needed a theoretical framework to explain sharp deviations of policy away from that proscribed by *laissez faire* economics, we need it here. Our paper represents a first attempt to apply a theoretical model based on Grossman and Helpman (1994, 1996) to a policy context in which political economy considerations are essential for understanding and predicting the trajectory of economic reform, and then to obtain economically meaningful estimates of the model's parameters from Chinese economic data.

As in any ambitious attempt to marry a complicated structural model with imperfect data, we have been driven to make a number of compromises. Nevertheless, the results that we end with are quite striking. To summarize, using the estimates based on our full sample, we find that the weight applied to the output of state-owned enterprises is much larger (four to seven times in our point estimates) than the weight applied to consumer welfare. The evidence of a political premium on state-owned production diminishes over time, but the point estimates still indicate these firms are favored. Finally, we estimate the impact on regional governmental objective functions of the proposed changes in tariff structure that China has put forth as part of its bid for WTO accession. We find that these changes could potentially lower the regional objective function, due to the exit of multinationals. While this result is sensitive to the elasticities that are used, it provides some quantitative backing for skepticism that China, given the current political equilibrium, would actually follow through with the proposed liberalization.

On the surface, it might seem that our results are too pessimistic, given the fact that a WTO deal—one which included surprising concessions on the Chinese side—was successfully brokered at the end of 1999. However, we note that there is a difference between signing a trade treaty and fully implementing its provisions.<sup>27</sup> Already, in the fall of 2000, there were press accounts of attempts by

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<sup>27</sup>Unfortunately, China's past behavior gives one ample grounds for doubt on this point. For a fascinating examination of China's persistent failure to honor international copyright and trademark laws, see Behar (2000).

Chinese government officials to obviate or ignore promises of liberalization in key sectors, such as telecommunications.<sup>28</sup> Our interviews of expatriate managers in China strongly indicate that these individuals believe tariff cuts will be at least partially undone by the simultaneous construction of more subtle non-tariff barriers, and the view that government will continue to favor ‘local production’ in the post-WTO era is widespread.

As the focus of government development efforts shifts from the coast to the Western provinces, it is already clear that one of the barriers will be the deeply entrenched role of state-owned enterprises in this region of the country. Real liberalization, market-oriented development, and successful attraction of foreign direct investment would all bring about a decline in the state-owned sector of the economy—and we can expect this to be resisted, especially in the inland provinces. Unfortunately, we think that the political tradeoffs modeled in our framework—and the somewhat pessimistic view of the political equilibrium implied by our empirical results—may be quite relevant to the reality of the interior provinces for some time to come.

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<sup>28</sup>See, among many other contemporaneous press accounts, Silva (2000).

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