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From One to Many Central Plans: Drug Advertising Inspections and Intra-National Protectionism in China

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Abstract

This paper provides the first micro-level evidence for the existence and patterns of intra-national protectionism in China. We demonstrate that drug advertising inspections are used by provincial governments to discriminate against firms from outside the province and document how the degree of discrimination varies across firms: manufacturers with closer ties to rival provinces, from provinces with lower presence in the market, and smaller firms are more likely to be targeted. Our findings confirm that giving local governments strong incentives to compete with each other exacerbates the market distortions inherent in a partially reformed economy.

JEL-Code: F150, P260, L250.

Keywords: intra-national protectionism, drug advertising, China.

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> *"Although the central government has released control over prices, outputs, and enterprise budgets, these functions have been taken up, albeit in a less systematic fashion, by local governments. Thus, China has moved from having one central plan to having many, mutually competitive, central plans."* Young (2000, p. 1129)

The analysis of barriers to trade within countries has received growing attention in the recent literature (e.g. Ramondo *et al.*, 2012; Atkin and Donaldson, 2013; Coşar and Fajgelbaum, 2013; Coughlin and Novy, 2013; Agnosteva *et al.*, 2014). Barriers to domestic economic activity are to a large extent created by intra-national protectionism, preventing the efficient allocation of resources and attenuating the benefits of scale economies and spatial spillovers. Such protective behaviour therefore not merely harms domestic market efficiency, but also offsets potential gains from a more liberal international trade policy regime. This argument is particularly relevant for China as it made a strong commitment to further cut international trade barriers and open up domestic markets upon joining the WTO in 2001, while existing macro-evidence suggests limited or even worsening domestic market integration (Poncet, 2003, 2005; World Bank, 2005, 2006).

In a broader context, economists over the past two decades have followed the development of China with great interest, typically siding with one of two views on the sources and prospects of the Middle Kingdom's growth: one camp argues for the existence of a "China model", variously defined but typically representing state control over key industries and at least an implicit acknowledgment that growth may need to precede social and democratic change, although the latter aspect is frequently ignored. The essence of this view is that China's example has created a rival development paradigm to a market-led approach distinct from the failed state-led planned economies of the Soviet Union and pre-reform China. A second camp, although not necessarily diametrically opposed to the former in all aspects, views China on a clear trajectory from planned to socialist market to free market economy and emphasises the progress made along this path so far.

In this paper we inform this debate by focusing narrowly on market integration, one aspect of a potential transition to a market-led system. While our analysis will not provide insights into the sustainability of a distinctly state-led approach, we will nevertheless be able to determine whether the empirical evidence in our data supports the notion of market integration or fragmentation. Specifically, we present a setting where it is shown that the imposition of regulation at the local level can be used for protectionist purposes against outside competition and thus create intra-national barriers. To the best of our knowledge, this study provides the first micro-level evidence for the presence and patterns of provincial protectionism in China, going beyond the existing analysis at the province or industry level (Young, 2000; Naughton,

2003; Bai *et al.*, 2004; Poncet, 2005; Amiti and Javorcik, 2008; Holz, 2009; Herrmann-Pillatha *et al.*, forthcoming).[1] We do so through the investigation of a unique case — the public disclosure of "illegal" drug advertisements by provincial Food and Drug Administrations (FDAs) as a penalty for violation of advertising regulations. We show that the enforcement of ambiguous advertisement rules through selective inspection and disclosure is employed to engage in local protectionism, motivated by an institutional setup which aligns the interests of provincial governments and FDAs.

A second set of results provides evidence for the heterogeneity in the targets for disclosure: firms with smaller market shares and firms from provinces with a weaker presence in the drug market are more likely to be disclosed. This finding is rationalised by the fact that while regional competition is rife in China, local governments may strategically target weaker rivals to avoid future retaliation from strong opponents ("tit-for-tat"). We also investigate the impact of government affiliation of firms (*lishu*) on their propensity of being disclosed. We establish that nonlocal firms with province-level affiliation are more likely to be disclosed than those with no or other levels of government affiliation.

In summary, our study confirms the presence of provincial protectionism but crucially provides the first direct evidence for the specific form these barriers can take as well as the politico-economic patterns of discrimination at the firm-level. The conclusive message is that giving provincial governments strong incentives to compete with each other leads to rent-seeking behaviour, echoing the conclusion drawn by Young (2000, p. 1091) that in a partially reformed economy "distortions beget distortions".

This paper is closely linked to the literature on inter-provincial barriers to trade in China. Intra-national protectionism is difficult to detect or quantify since unlike policy barriers to international trade which are quantifiable through tariffs or measures for non-tariff barriers (NTB), within-country protectionism can take various forms, implicit or hidden, and is not publicly announced by the authorities. Young (2000) presents various empirical evidence to show that trade barriers between Chinese provinces increased during the reform period starting from the late 1970s. This finding has however been challenged by Holz (2009) who uses the same data to show that Young's empirical results are not robust and if anything suggest internal trade barriers on a par with those in a developed economy like the United States. Despite this disagreement, both authors seem to support the notion that trade barriers in China are to a large extent created by local "fiefdoms". How these "fiefdoms" actually erect trade barriers is however not investigated and in the present study we try to provide evidence to answer this

[1] By revealing that provinces are increasingly similar in industrial structure these studies provide evidence consistent with inter-provincial trade barriers. A recent challenge to these aggregate-level studies by Holz (2009) builds a strong case for *direct* (rather than implicit) evidence for protectionism such as that provided in this study.

question. We collect detailed information on those drug manufacturers that have fallen foul of ambiguous advertising rules, which we show are exploited by local governments to discriminate against nonlocal competitors. This case study thus provides the first direct, firm-level evidence for local protectionism and market fragmentation in China. While focusing on the specific case of the pharmaceutical industry, implications from our study arguably have wider validity beyond this sector as the patterns revealed are indicative of more generic institutional roots of regional protectionism in China today.

Our study also adds value to the currently heated discussion on "regulatory protectionism" that appears to have emerged as a new, predominant "hidden threat" to free trade in the developed world after the consolidation of the WTO and some regional trade agreements (e.g. Baldwin, 2000; Chen and Novy, 2011; Bao and Qiu, 2012; Watson and James, 2013). In an era when tariffs and other conventional trade barriers have been reduced significantly, protectionism through or in the guise of technical regulations represents a persistent force against globalisation, continuing to shelter domestic producers against foreign competition. In this paper we reveal politico-economic forces as the key causes for such protectionism and these forces could be much more powerful and resilient than previously thought in resisting trade liberalisation.

The remainder of the paper proceeds as follows: Section 1 sets out the institutional background, Section 2 proposes the conceptual framework, Section 3 describes the data, Section 4 contains the empirical analysis, and Section 5 concludes.

1 Institutional Background

Drugs account for around half of total health spending in China (Sun *et al.*, 2008), three times the share in OECD countries and twice that in other middle-income countries (Meng *et al.*, 2005). It is however widely observed that the large domestic market for drugs is severely fragmented by various forms of local protectionism. For example, according to a nationwide survey conducted by a national pharmaceutical newspaper, *Yiyao Jingji Bao*, in 2010 over 90% of corporate respondents reported having been adversely affected by local protectionism in drug procurement where institutional buyers strongly favoured local producers. Such experiences are however not unique to institutional procurement, but also exist in the retail market. The notorious difficulty of opening cross-regional drug chain stores is reported to be mainly caused by the common practice of local authorities to deliberately over-complicate bureaucratic procedures to deter applications from nonlocal retailers (Xinhua News, 2001). Directly relevant to the present study, reports of local governments' reluctance to inspect and disclose local produc-

ers are also frequently seen in the media (e.g. People's Daily Online, 2013). These phenomena were so common and widely acknowledged that in 2000 the State FDA issued a prohibition notice to all local FDAs explicitly forbidding any form of protectionist behaviour against drug sales by nonlocal firms, with warnings of severe punishment for local FDA officials upon violation (State FDA, 2000).

The difficulty of promoting sales in a nonlocal market, together with the fierce competition from a large number of small and medium-size enterprises producing generic over-the-counter drugs (Clark, 2007; Sun *et al.*, 2008), represent major motivations for firms to engage in advertising (Xinhua News, 2004). Apart from the mandatory procedures required to start a business and to monitor the quality and security of production, drug producers in China are required to obtain licenses before they are able to advertise their products in any official media outlet — including TV, radio and newspapers, as well as billboards, on public transport and in taxi cabs.

This study argues that the institutional setup and role of FDAs within China's political system provides both scope and strong incentives for provincial protectionism. As is shown in Figure 1, different levels of FDAs form a vertical hierarchical structure in administration, while their daily activities, including the monitoring of pharmaceutical firms and their advertisement practices, are largely constrained by the horizontal links to local governments via budgetary and personnel controls: the provincial government not only determines and approves the provincial FDA's costing, but also appoints its senior officials. By taking hold of the most important human resources the local government has great influence over the organisation's daily business, enabling it to impose its preferences on the actions of the local FDA.

Of course regional protectionism is not limited to the drug industry. It exists widely across industries, and is as we argue at least in part enabled by the unique fiscal and political system in China. Introduced in 1994, fiscal decentralization specifies the division of tax revenues between central and local governments (Qian and Roland, 1998; Cai and Treisman, 2004; Jin *et al.*, 2005). In contrast to centrally planned tax collection and fiscal spending, this new system was intended to provide incentives to provincial governments to push for local development and thus boost their primary source of tax revenue. In addition, it has been widely acknowledged in the economic literature that political promotions of provincial governors in China are closely linked to local economic performance, including gross provincial products and tax revenue (Chen *et al.*, 2005; Li and Zhou, 2005; Jia, 2013).[2] These two forces combined further incentivise local governments to adopt policies which impose, explicitly or implicitly, additional costs on firms from other provinces.

[2]On a number of occasions in 2013, China's new President Xi Jinping admitted publicly to the problems arising from the long-standing practice of basing political appraisal and promotion of government officials simply on local GDP and emphasised the Communist Party's intention to improve this system (Xinhua News, 2013).

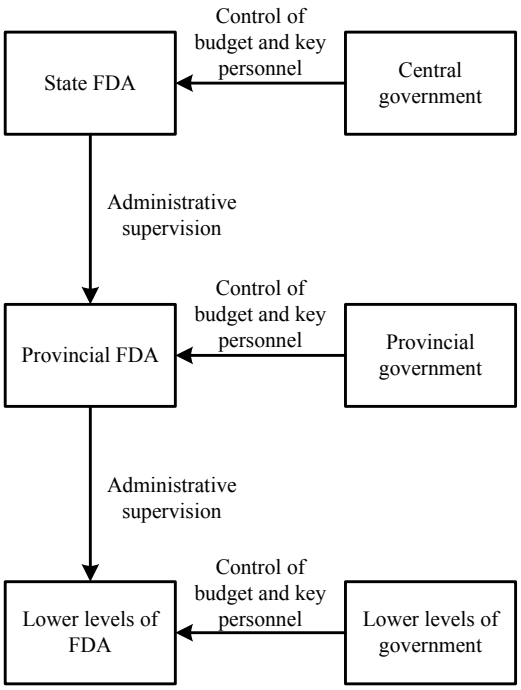


Fig. 1. *The Relations between FDAs and Governments*

For the specific case of the drug industry, as the governmental departments in charge of the practical regulation of drug advertisements, provincial FDAs regularly carry out investigations to spot "illegal" advertisements and, apart from levying fines, to suspend or in case of serious violation cancel advertising licenses outright. The violators are further subjected to nationwide disclosure — cases of violation are reported to the State FDA and publicised on the latter's website. Importantly, local FDAs are entirely autonomous in their decision to investigate a specific advertisement or firm and to judge the advertisement as "illegal". In contrast to the straightforward case of unlicensed advertising,[3] what actually constitutes an "illegal drug advertisement" by a licensed firm as stipulated by the State FDA's *Standards of Drug Advertisement Censorship* is quite ambiguous and clearly open to interpretation. Perhaps the most exceptional rule contained in the *Standards* stipulates that drug advertisements cannot carry any indication of a positive effect brought about by application of the drug. A 2004 report by China's State FDA revealed that strict application of the advertising guidelines would result in 62% of all advertisements broadcast on television and 95% of all newspaper advertisements to be classified as "illegal" (Xinhua News, 2004).

[3]Further discrimination could take place in form of failure to reprimand unlicensed local advertisers. We cannot investigate this form of protectionism in our empirical analysis as we do not have information on which firms (licensed or not) advertised and in which provinces.

2 Conceptual Framework

Given the institutional setup described above, investigations carried out by local FDAs clearly offer room for manipulation and rent-seeking in the determination of "illegal" advertisements. It is thus reasonable to suspect that FDA drug advertising investigations are biased toward protecting local firms, which under the Chinese practice of fiscal decentralisation contribute directly to tax revenue for the provincial government. The empirically equivalent question is to investigate whether the probability of a drug producer being publicly disclosed as a punishment for "illegal" advertising is significantly higher for nonlocal than local producers. A more generic channel for discrimination against nonlocal firms is that local firms, especially those having close ties with the provincial governments, might lobby local authorities to protect their local market share from nonlocal competition by selectively penalising nonlocal firms attempting to penetrate the local market. This is in line with the established theory of "protection for sale" (Grossman and Helpman, 1994) which shows how special interest groups lobby local governments to protect their domestic sales, thus endogenously influencing the structure of the policy barriers to trade elicited against foreign competitors. Taken together the "tax revenue" incentive and the "protection for sale" mechanism lead to the same empirically testable hypothesis: drug producers are more likely to be publicly disclosed for "illegal" advertising in a province other than their "home" province.

Two levels of heterogeneity may exist in protectionist discrimination. The first arises from differences in firms' *size or market power*. The fiscal and political incentives for local protection imply that a local government (and hence a local FDA) would try to keep as much market share as possible for local manufacturers since they contribute directly and substantially to local tax revenue as well as local GDP. A natural prediction, therefore, would be that "stronger" nonlocal manufacturers of more substantial nationwide market share are more likely to be victims of protectionism in other provinces because these individual firms are seen as more of a threat to the market.

The second level of heterogeneity is related to the argument of politico-economic competition among provinces. If such competition does exist, we should observe a pattern of discrimination that varies across firm *origin*: for a given provincial government, other provinces are not regarded as the same, with those provinces with a more substantial base of pharmaceutical firms more likely to be seen as a threat to local producers. A provincial government would therefore be more hostile towards firms from such "stronger" regions. By this reasoning, we would expect to find a more pronounced discrimination effect for nonlocal firms which are from provinces with more significant market presence.

However, the above arguments for both levels of heterogeneity ignore the fact that provincial FDAs may well be strategic players in a repeated symmetric discrimination game. A province hostile towards a "strong" firm or a firm from a "strong" province is likely to face future retaliation from competing provinces. In anticipation of retaliatory discriminative action, a provincial FDA may proceed in a strategic manner by targeting "weaker" firms or firms from "weaker" provinces. Based on these arguments we do not have any clear predictions as to which targeting strategy may dominate.

Another purpose of this study is to analyse the role of political connections in the phenomenon described above. More precisely, we are interested in determining to what extent, if any, firm affiliation with different levels of government (*lishu*, literally translated as "subordinate to" or "directly controlled by") mitigates or exacerbates the effect of provincial protectionism. It has been widely acknowledged that social networks play an important part in doing business in countries with weak legal system and contract enforcement such as China (Rauch, 2001). Of all forms of social networks, political connections are believed to be particularly important in regulated industries, such as pharmaceuticals, since these are administered by government bureaucrats and close ties with governments may allow firms to exploit regulatory loopholes. This may be particularly salient in the case of non-state enterprises, for whom government institutions may impose regulatory red tape (Guriev, 2004) or extralegal fees (Johnson *et al.*, 2000). Li *et al.* (2008) find that political connections enable private firms to gain better access to financial resources from state banks and to favorable tax treatments.

Measuring political connections is challenging in developing countries such as China since firms are typically unwilling to reveal their connections to the public. Fisman and Wang (2013) investigate the link between political connections of Chinese firms and workplace fatalities, finding that fatality rates are substantially higher in "connected" firms, which may be abusing these connections to circumvent safety oversight and regulations. Their sample is restricted to publicly listed firms which are required to provide detailed information on senior management, which they exploit to identify individuals who previously held high-level government positions. Such information is generally not available for unlisted firms. Studies by Li *et al.* (2008) and Guo *et al.* (2013) use Communist Party membership of private firm owners as a measure of political ties with the government and the ruling party. However, party membership information is only available in bespoke sample surveys created for either of these studies, but is not available in our census data for manufacturing. Instead, we resort to an alternative measure, the *lishu* affiliation, which should to some extent indicate a firm's *direct* connections with governments at different levels. A *lishu* relationship is distinct from ownership and entails both government control as well as subsidies and support. Tan *et al.* (2007) argue that the *lishu* affiliation system represents a uniquely Chinese institutional framework where the "iron fist" of the planned economy meets the "invisible hand" of the market. Although government

interference through *lishu* declined over time and many private firms in the 2000s opted not to enter into any formal relations, according to Xia *et al.* (2009, p. 1655) the Chinese "government never clearly or formally state[d] that non-public firms are free from *lishu*". Based on a small number of existing empirical studies the economic implications of *lishu* are somewhat unclear: investigating collectively-owned enterprises during the early 2000s Xia *et al.* (2009) find that abandoning *lishu* with local government enhanced firm performance. Tan *et al.* (2007), in a study of firms of all ownership types in the late 1990s, report a nonlinear relationship whereby firm productivity declines from top (central) to lower (prefecture-level) *lishu* affiliation but then dramatically increases for the bottom (township) category. Guariglia and Mateut (2013) find that over the 2000-2007 period higher level *lishu* affiliation is associated with better access to credit, to the extent that political affiliation can wipe out the historical advantage of state-owned over private firms.

In our case, local firms may benefit from such affiliations in at least two ways. If a firm is "local" to a province then political connections may enable it to persuade the local FDA to either let them off the hook when in danger of being disclosed for "illegal" advertising, or to lobby them to single out nonlocal competitors by using a deliberately broader interpretation of the regulations. Alternatively, if such political connections carry across provincial borders then nonlocal firms with higher affiliations may be able to influence or escape selective disclosure.

In our empirical analysis we investigate the impact of firms' self-reported *lishu* affiliation with central, provincial or lower level government. While the reasoning above suggests a protective role of provincial government affiliation in sheltering firms from discrimination in other regions, the politico-economic logic implies this type of affiliation may in effect expose the firm to discriminations in other provinces. Again, this is because competition among provinces and their governors for tax revenue and economic performance compels these regions to act hostile towards each other, in which case a direct affiliation to a provincial government would be beneficial locally but detrimental non-locally. The effect of a central-government affiliation is not *a priori* straightforward either. On the one hand, it may be beneficial in that this type of affiliation gives the firm political power from a higher authority, perhaps enabling it to overcome some regional policy barriers. On the other, it may be detrimental as this type of firm will typically contribute the majority of its taxes to the central government, thus making it less welcome by local government. The net effects of the goverment affliations as a whole are then subject to empirical validation.

3 Data

Our data for disclosed "illegal" drug advertisements (ADVERTS) for 2001-2005 are taken from the Chinese State FDA, which publicised the complete list of "illegal" advertisings merged from provincial FDA reports on its website. Criteria for public disclosure changed in 2006, after which only cases of the (subjectively) most serious violations of advertising regulations were publicised. The State FDA website provides details on all firms whose advertisements were found by provincial FDAs as having appeared "illegally" in the same media outlet on at least five occasions.[4] For each illegal advertisement, the information provided includes the name of the company and product, the media outlet, the dates of illegal advertising, the primary reason for "illegality", and the reporting provincial FDA.[5] On average, nearly 300 firms were disclosed each year as "illegal" advertisers.

Our second source of data is the Annual Surveys of Industrial Enterprises (ASIE) from China's National Bureau of Statistics which has been used in a number of recent studies on China (e.g. Cai and Liu, 2009; Hsieh and Klenow, 2009; Brandt *et al.*, 2012; Lu *et al.*, 2013; Yu, forthcoming). The surveys include all state-owned firms as well as firms of other ownership types with annual sales above 5 million Chinese yuan (around US$600,000 in year 2000 values). On average, more than 200,000 manufacturing firms are included each year, and these account for around 95% of total Chinese industrial output. For the purpose of our analysis we restrict the sample to ASIE firms whose primary industry of operation is reported as the pharmaceutical industry, amounting to 20,906 firm-year observations from 7,883 firms for our period of analysis — see Figure 2 for the geographical distribution of pharmaceutical firms by province.

We match the annualised ADVERTS data with the information from ASIE. Table A1 in Appendix A presents details of the sample and match. About 8% of all pharmaceutical firms in the ASIE data can be matched to the ADVERTS information, constituting the firms which were disclosed as having advertised "illegally". Unmatched firms in ASIE comprise (a) firms which did not advertise, and (b) firms which did advertise but were not disclosed. Unmatched firms

[4]Thus a firm would be disclosed if five separate "illegal" adverts for the same drug would appear in, say, the *Beijing Youth Daily* over the space of several weeks or months. The way this is recorded in the raw data differs across provinces and years: at times all five dates are provided in a single entry, alternatively these represent five separate entries. In creating our integrated dataset we aggregate these data into single entries for a specific firm.

[5]Lack of detailed information about where firms advertise their products prevents us from investigating the media outlet aspect of our disclosure data any further. This information is further missing for many disclosure cases. The limited information provided suggests that party-controlled newspapers and TV channels were completely ignored in the disclosure of local producers (zero cases), whereas about a quarter of the disclosed "illegal" advertisements by nonlocal firms were in these types of media outlets. Focusing on newspapers, it appears that disclosures of nonlocal firms were for adverts in province- and lower-level outlets (prefecture or city publications), whereas those of local firms were only in province-level outlets. This suggests additional efforts in searching more localised outlets for "illegal" adverts by nonlocal firms.

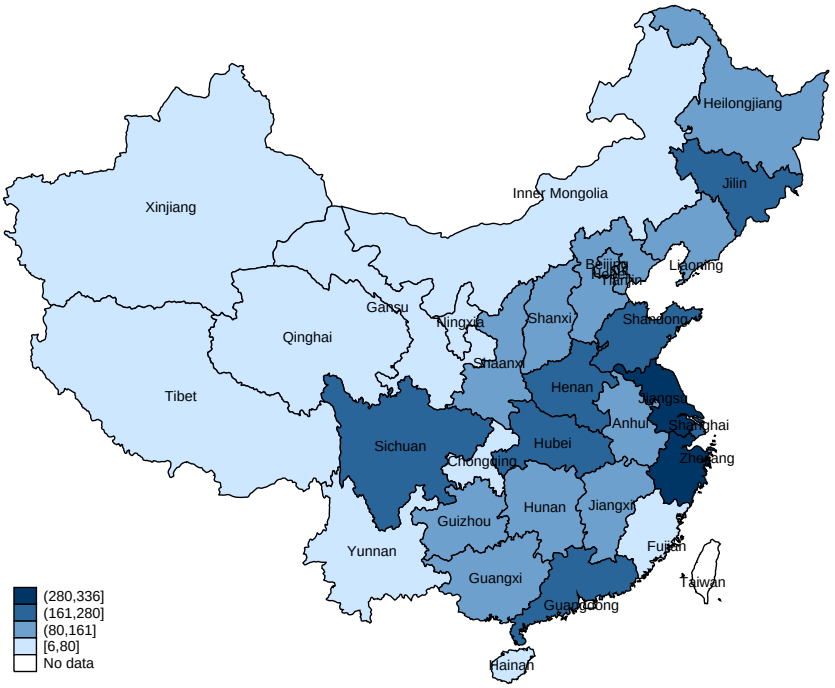


Fig. 2. *Numbers of Drug Producers by Province*

in ADVERTS, amounting to 143 (or 18% of full set of disclosed firms), represent (a) disclosed firms which were retailers, or (b) private firms which were too small to be included in ASIE.

Ideally our identification strategy would employ detailed information on who advertised where and when on top of information about disclosure. However, unlicensed advertising is not observed in our data unless the advertiser was caught and disclosed. As a compromise, two samples of the integrated data are used in our regression analysis. In the main part of the paper we use additional external sources of information about drug advertising licenses issued, taken from the FDA newsletters of those provinces where such data exist. These data are only available in three provinces, namely Jiangsu, Zhejiang and Inner Mongolia, amounting to 2,906 firm-market-year[6] observations from 569 firms. The former two represent provinces with the largest number of pharmaceutical firms in the country and fare among China's most developed regions on the Eastern Seaboard. Inner Mongolia on the other hand is a peripheral province characterised by mining and livestock breeding. The three provinces account for 24% of nationwide pharmaceutical sales, 18% of the number of drug producers, and 16% of employment in the country for the period of 2001-2005. This part of the regression analysis relies on recorded and observed advertising behaviour of firms using the three-province sample for which data are available on advertising licenses. In other words, the results are conditional on firms having been granted advertising licenses in the first place.

[6]"Market" here refers to one of the three provinces where firms advertised for their products with a license.

In a second part of analysis, which is mostly confined to Appendix B, we introduce the assumption that every firm in our dataset advertises in all provinces. This assumption may sound strong and unrealistic but allows us to expand our sample to make use of the full set of firm disclosures across all 31 provinces. We attempt to isolate some robust effects by countering the bias introduced by this unrealistic assumption.

4 Empirical Analysis

4.1 Descriptive results

We begin our analysis by investigating descriptive patterns across all provinces. Table 1 reports the number of matched firms by disclosure "type". Summed over time, there are less than 40 firms which were only disclosed by their home province's FDA, accounting for less than 4% of the total 1,059 disclosures. If we include firms which were disclosed both at home and elsewhere this proportion rises to 12%.

Table 1. *Numbers of Firms by Disclosure Type — 31 Provinces*

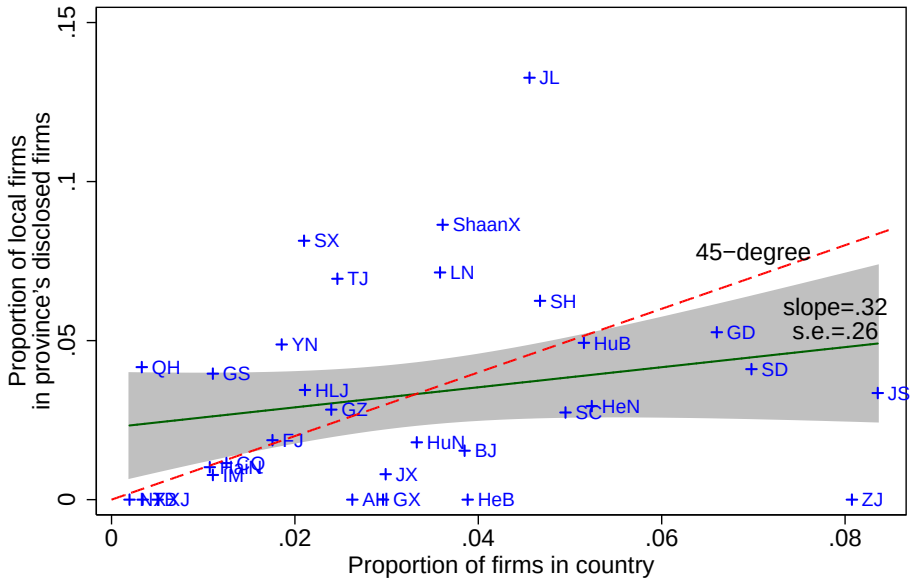
		Disclosed firms			
Year	Undisclosed firms	only in home province	only in other provinces	in home and other provinces	Total
2001	3,349	0	135	2	3,486
2002	3,364	23	283	10	3,680
2003	3,900	3	145	14	4,062
2004	4,535	4	145	25	4,709
2005	4,699	7	227	36	4,969
Total	7,770	35	606	68	7,883

Notes. We report the number of firms in all rows. Repeated disclosure for illegal advertising accounts for the discrepancy between the totals and column sums for disclosed firms, the unbalanced nature of the panel for the same discrepancy in the undisclosed firms.

These patterns should naturally be interpreted with caution. Firstly, the results could simply be driven by the fact that there are more firms from outside the province than from the local region in a market, which raises the relative likelihood of nonlocal disclosure. Secondly, there may be regional differences in the incentives for local FDAs to disclose nonlocal firms: for provinces with a more sizable pharmaceutical sector (and thus more tax revenue), local FDAs are more likely to take discriminatory action to protect local producers, whilst for provinces with a small pharmaceutical industry the incentive to do so is much weaker. In Table 2 we address these issues by contrasting the proportion of local firms in all disclosed firms with the number of local pharmaceutical firms as a share of the total firm count in the country

(employment share is presented as a robustness check). The table indicates that most, if not all, firms disclosed are nonlocal, with the ratio of local producers in all disclosed firms ranging from 0% to 13.3%. Averaged across all provinces, the proportion of local producers in disclosed firms is 3.3%. Next we compare the proportion of a province's local producers in disclosed firms against the proportion of its local pharmaceutical firms in the whole country. We find that in 19 out of 31 provinces, the first proportion is lower than the second. For the seven provinces with the largest numbers of pharmaceutical firms, which account for over 45% of firms in the country, the first proportions are all substantially smaller than the second.

The above relationship is visualised in Figure 3 with the vertical axis representing the proportion of local producers in all disclosed firms and the horizontal axis the relative provincial industry size. If we assume that all firms sell their drugs in all 31 provinces, then, in the absence of protectionism, the share of local firms being disclosed should be in line with the relative size of the local pharmaceuticals industry (the 45° diagonal). We find that most of the provinces lie *below* the 45° line, indicating a reduced probability of disclosing local firms even when conditioning on the relative size of the province's pharmaceutical industry. A fitted regression line obtains a coefficient of 0.32, statistically significantly different from 1 at the 5% level.



Notes. The '+' signs represent provinces, the solid line represents the fitted line from an OLS regression, the dashed line is the 45−dgree diagonal, and the shaded area indicates 90% confidence intervals of the OLS regression.

Fig. 3. *Proportions of Local Firms Disclosed — 31 Provinces (2001-2005)*

So far our analysis assumes that each firm advertises in all provinces, clearly a very strong assumption. For the main part of the analysis we take information on advertising licenses into account and restrict our sample to the three provinces for which this information is available. Table 3 provides details on the patterns of disclosure.[7] We split the sample into disclosed and

[7]Table A4 in Appendix A gives the year-by-year details of the patterns and Table A3 contains the descriptive

Table 2. *Numbers of Local and Nonlocal Firms Disclosed for "Illegal" Advertising — 31 Provinces (2001-2005)*

	(1)			(2)	(3)	(4)	(5)
Province	Local	Non-local	All	% local firms in disclosed	% province's firms in country	% province's employment in country	Difference (2)-(3)
Ningxia	0	28	28	0.00	0.20	0.28	-0.20
Qinghai	2	46	48	4.17	0.33	0.29	3.84
Tibet	0	5	5	0.00	0.34	0.13	-0.34
Xinjiang	0	83	83	0.00	0.50	0.26	-0.50
Hainan	1	97	98	1.02	1.07	0.51	-0.05
Gansu	4	97	101	3.96	1.10	1.03	2.86
Inner Mongolia†	1	128	129	0.78	1.10	1.15	-0.33
Chongqing	1	86	87	1.15	1.25	1.91	-0.10
Fujian	2	105	107	1.87	1.76	1.55	0.11
Yunnan	4	78	82	4.88	1.86	1.39	3.02
Shanxi	7	79	86	8.14	2.10	2.14	6.04
Heilongjiang	5	140	145	3.45	2.11	3.85	1.34
Guizhou	3	103	106	2.83	2.40	1.66	0.43
Tianjin	5	67	72	6.94	2.46	3.36	4.48
Anhui	0	135	135	0.00	2.63	2.38	-2.63
Guangxi	0	93	93	0.00	2.96	2.59	-2.96
Jiangxi	1	124	125	0.80	2.99	3.48	-2.19
Hunan	2	109	111	1.80	3.33	2.29	-1.53
Liaoning	8	104	112	7.14	3.58	3.09	3.56
Shaanxi	7	74	81	8.64	3.61	3.09	5.03
Beijing	1	64	65	1.54	3.85	3.08	-2.31
Hebei	0	103	103	0.00	3.88	6.43	-3.88
Jilin	13	85	98	13.27	4.56	3.83	8.71
Shanghai	4	60	64	6.25	4.67	4.50	1.58
Sichuan	4	142	146	2.74	4.95	4.80	-2.21
Hubei	7	135	142	4.93	5.15	5.39	-0.22
Henan	2	66	68	2.94	5.24	6.26	-2.30
Guangdong	5	90	95	5.26	6.60	6.13	-1.34
Shandong	8	187	195	4.10	6.98	8.52	-2.88
Zhejiang†	0	134	134	0.00	8.07	6.87	-8.07
Jiangsu†	6	173	179	3.35	8.36	7.75	-5.00

Notes. Provinces are ordered by their proportions of pharmaceutical firms in the country. † indicates the three provinces contained in our regression sample.

undisclosed cohorts, which are then further broken down according to whether a firm had been granted a license or not as well as whether the firm was local or not. Two findings emerge. Firstly, it is notable that over our sample period only a single unlicensed local firm was disclosed (in Jiangsu). This suggests that provincial FDAs may have turned a blind eye on unlicensed local advertisers and thus discriminated against nonlocal firms. Secondly, among licensed firms, nonlocal firms are systematically far more likely to be disclosed than local firms. In all three provinces around 11% of nonlocal firms (243 out of 2,178) were disclosed, in stark contrast to a mere 1% (10 out of 728) of local firms.[8] Figure 4 gives a time-series view of this contrast by market as well as the three-province average. The notable divergence in disclosure patterns of nonlocal versus local firms indicates that nonlocal advertisers appear to be the increasingly preferred targets over time.

Table 3. *Numbers of Licensed and Unlicensed Firms Disclosed — Three Provinces (2001-2005)*

	Disclosed				Undisclosed	
	Licensed		Unlicensed		Licensed	
Province	Nonlocal	Local	Nonlocal	Local	Nonlocal	Local
Jiangsu	59	9	182	1	379	412
Zhejiang	80	0	87	0	988	212
Inner Mongolia	104	1	77	0	568	94
Total	243	10	346	1	1,935	718

Notes. The sample here is made up of all 569 licensed firms in the three provinces, comprising 2,906 observations.

4.2 Regression Results

4.2.1 Existence of Local Protectionism

The core of our empirical evidence is made up of results for a number of linear probability models. The baseline results in relation to the existence of local protectionism are presented in Table 4.[9] We restrict the sample to *licensed* firms in the three provinces since the deliberate targeting of *unlicensed* nonlocal firms cannot be verified in the data.[10] All models presented contain year and firm ownership effects;[11] standard errors are clustered at the firm-level. Our most basic model in Column (1) shows that the probability of being disclosed is 10 percentage points higher for nonlocal than for local firms. In Column (2) we further include lagged firm

statistics of the key variables.

[8] Alternatively, we can look at the ratio of the number of nonlocal firms to that of local firms and compare it between the disclosed and undisclosed cohorts. It is found that there are disproportionately more nonlocal firms in the disclosed cohort than in the undisclosed cohort.

[9] Average marginal effects from probit regressions provide similar patterns (not reported).

[10] Our basic results remain quite robust to the exclusion of Inner Mongolia which has less drug sales than Jiangsu and Zhejiang; see Table A5 in Appendix A.

[11] We generally find that foreign-invested firms (excluding investments from Hong Kong, Macao, or Taiwan) are significantly less likely to be disclosed than other ownership types.

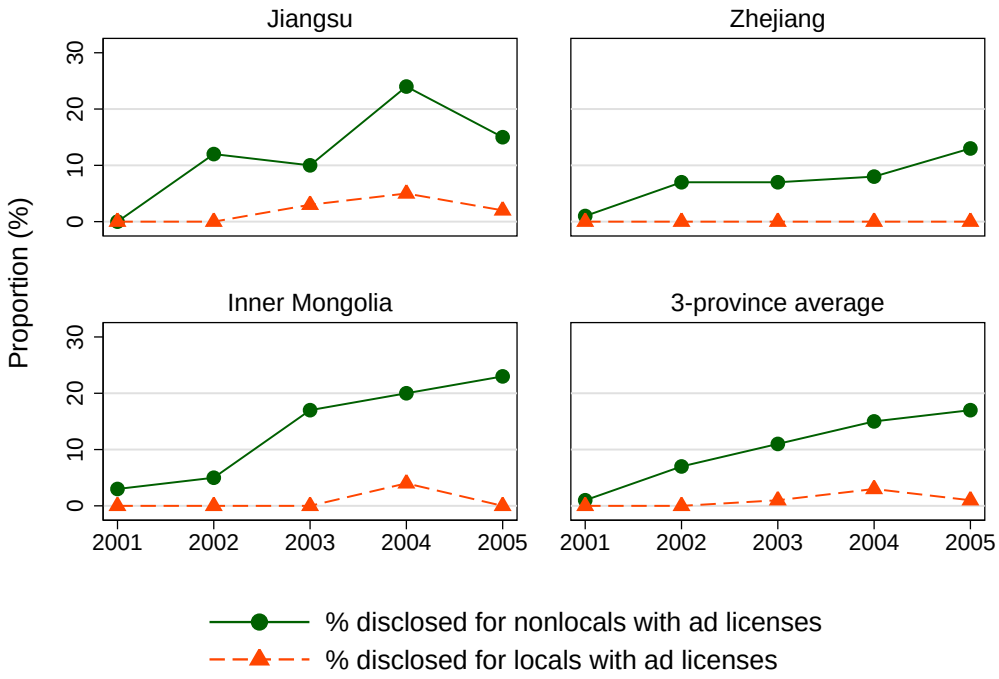


Fig. 4. *Proportions of Disclosed Firms for Licensed Local and Nonlocal advertisers — Three Provinces (2001-2005)*

sales (in logs) as a proxy for firm size and a dummy variable indicating whether a firm has previously been disclosed in the same province.[12] The reasoning here is that firms of different sizes or market influence may be targeted differentially in inspections,[13] and that once a firm has been disclosed it will be more likely to be targeted and disclosed again in later years (around 8% of firms in our sample have prior history of disclosure). We find that smaller firms are more likely to be disclosed and prior history explains a significant part (30 percentage points) of the probability of disclosure. The evidence for discrimination against nonlocal firms is now somewhat weaker — around 8% — but remains substantial. The revealed discrimination effect is somewhat more pronounced when we include market dummies in Column (3) to control for unobserved province-specific effects and in Column (4) where unobserved market-year specific effects are controlled for.

A concern about the above results is that the degree of regional discrimination found could be affected by the influence of nonlocal sellers in the local market. This is because a stronger presence of nonlocal producers in the local market alone may increase the local government's intention to attack these outsiders. We can test this possibility explicitly. While we do not know how much (in value terms) nonlocal producers sell in the local market, we have information

[12] As a robustness check, results are qualitatively unchanged if we use past disclosure in *any* province.

[13] We will further explore the interaction between the firm size variable and the nonlocal dummy below when looking at the role of firm heterogeneity.

on the number of nonlocal licensed producers versus that of their local counterparts. We suggest that other things being equal the higher the ratio of the former to the latter, the higher the probability of a nonlocal firm being targeted. When this ratio (lagged one year) as well as its interaction with the nonlocal dummy are added to the model — Column (5) — the discrimination effect is marginally revised to 8% while the effect of these additional controls themselves is statistically insignificant.[14]

With regard to the debate over increasing (Young, 2000) as opposed to ("[i]f anything") decreasing (Holz, 2009) internal barriers to trade for China, results for our regression models augmented with time-varying "nonlocal" indicators (see Table A6 in Appendix A) suggest the degree of discrimination remained fairly stable in these more recent years (as opposed to the longer time horizons prior to 2002 investigated in their studies).[15] The sample also allows us to look at the market-specific discrimination effect by interacting the market dummies with the nonlocal dummies (see Table A7 in Appendix A). It appears that Zhejing is the most discriminating province among the three while Inner Mongolia is the least (although it is only marginally better than Jiangsu).[16]

4.2.2 Patterns of Local Protectionism

(A) Firm Size/Market Power

As detailed above we developed two rival arguments about how firm size or market power would affect a firm's destiny in advertising inspections. Nonlocal firms of larger size or market power could be more prone to protectionist attacks because these firms are regarded as posing a greater threat to the local market. The alternative argument suggests that these firms are less likely to fall victim to inspections because of the local governments' concern of retaliations from "strong" competitors. We investigate this question empirically interacting the nonlocal dummy with the firm size/market power measures, namely firm sales and employment. Columns (1) to (4) of Table 5 present consistent results whereby firms of larger size or bigger market share are less likely to be disclosed. For a 1 percentage-point increase in firm

[14]Market-year dummies cannot be included in this specification because the *ratio* measure is defined at the market-year level.

[15]In our simplest empirical model there is evidence of an increase in nonlocal disclosure over time, which is robust to the inclusion of lagged sales. Once disclosure history is included in the model the interactions between year dummies and the nonlocal indicator become insignificant. These patterns suggest that nonlocal disclosures and thus discrimination increased over time, but that this was achieved in practice through a targeted focus on previous offenders.

[16]This oder of ranking can be compared to that based on the company managers' percepertion of local protectionism from the World Bank Investment Climate Survey on China in 2004. The Survey was conducted at the company level but we calculated the province-average of the managers' perception of the severity of local protectionism ranging from 0 to 4 (with 0 indicating not severe at all and 4 very severe). The scores for the three provinces are: Inner Mongolia 0.59, Jiangsu 0.62, and Zhejiang 0.59. Hence Inner Mongolia appears to be the least discriminating in both studies.

Table 4. *Local Protectionism: Three-Province Sample*

	LHS: indicator of a firm being disclosed				
	(1)	(2)	(3)	(4)	(5)
Nonlocal	0.101***	0.084***	0.088***	0.088***	0.079***
	(0.011)	(0.011)	(0.012)	(0.012)	(0.020)
Sales lagged		-0.016***	-0.015***	-0.015***	-0.015***
		(0.005)	(0.005)	(0.005)	(0.005)
Disclosed before		0.303***	0.296***	0.295***	0.295***
		(0.044)	(0.044)	(0.044)	(0.044)
Ratio of nonlocal lagged					-0.012
					(0.016)
Nonlocal×					0.002
(Ratio of nonlocal lagged)					(0.003)
Ownership dummies	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	No	Yes
Market dummies	No	No	Yes	No	Yes
Market-year dummies	No	No	No	Yes	No
# Firms	569	531	531	531	531
# Observations	2,906	2,140	2,140	2,140	2,140
Adj. R^2	0.047	0.128	0.133	0.137	0.133

Notes. This Table reports regression results of the linear probability models on the determinants of disclosure in "illegal" drug advertising inspections for the sample of firms which held advertising licenses in Jiangsu, Zhejiang, and/or Inner Mongolia. The dependent variable takes on the value of one if a firm is disclosed in the province during the calendar year and zero otherwise. "Nonlocal" is the dummy for being nonlocal to the province where the firm advertises. "Sales lagged" is the value of the firm's logged total sales, one-year-lagged. "Disclosed before" is the indicator for the firm having been disclosed in the market before. "Ratio of nonlocal lagged" is the ratio of the number of nonlocal firms to that of local firms among advertising licensees in the provincial market, one-year-lagged. "Ownership dummies" are defined as private (omitted base), state-owned, Hong Kong/Macao/Taiwan and other foreign firms. "Market dummies" refer to the provinces for which firms held advertisement licenses (not the home province of the firm). Standard errors (in parentheses) are clustered at the firm-level. ***, **, and * indicate significance at the 1%, 5% and 10% levels respectively.

size, the risk of being caught reduces by more than 0.02 percentage points, amounting to a quarter of the average discrimination effect (0.08 in Table 4). The sign of the coefficient on sales switches from that observed in Table 4. However, this coefficient is only marginally significant and reverts to the same sign when employment is used as the measure for size.

Adopting value-added tax (VAT) paid by the firm to its home province government offers a more direct empirical equivalent of the inter-provincial competition story. We find in Columns (5) and (6) of Table 5 that nonlocal firms who made lower VAT contributions are under higher risk of being disclosed as "illegal" advertisers. The discrimination effect is very close to that found for sales or employment measures, partly explained by the high pairwise correlation (above 0.7) between these alternative measures. We conclude from this exercise that the strategic discrimination effect dominates if both forces are at work: other things equal, local governments tend to protect their own market and strengthen the position of local incumbents by discriminating against *weaker* competitors from other regions.

(B) Province of Origin

In a similar vein we argued that firms from provinces with different characteristics may also be treated differentially when facing advertisement inspections away from their "home" province. We use three variables — the number of pharmaceutical producers, the gross provincial product for the pharmaceutical industry, and the total value of VAT paid, all lagged one year — to measure province heterogeneity, all intended to capture the relative strength or "market power" of a nonlocal province. The estimates on the interaction terms are reported in Table 6 where we control for ownership and market-year fixed effects throughout. Column (1) tests the effect of geographical distance between provincial capital cities as a rough measure of inter-provincial competition. It appears that sellers from more remote provinces suffer more in inspections with the probability raised by 5% for a 1% increase in distance from the market. In the next set of specifications in Columns (2) to (4) we use some alternative measures of competition while the distance measure is included as additional control (coefficients not displayed) to account for potential neighbourhood effects on discrimination propensity in general. It turns out that all three coefficients are negative significant, although coefficient magnitudes differ substantially: the first measure (number of pharmaceutical firms) may not adequately capture origin "market power" as it produces a more than 6 times higher discrimination effect than the two alternatives.

In order to allow for geographical distance to directly affect inter-provincial competition in the next set of specifications in Columns (5) to (7) we weight the three market power variables by the reciprocal of the distance between province pairs. Coefficient estimates remain statistically significant but are now more in line across all three measures adopted. We find that if a rival province possesses 1 percentage points more "market power", its firms will be

Table 5. *Role of Firm Size/Market Power: Three-Province Sample*

	LHS: indicator of a firm being disclosed					
	(1)	(2)	(3)	(4)	(5)	(6)
Nonlocal	0.350***	0.353***	0.222***	0.222***	0.245***	0.240***
	(0.072)	(0.072)	(0.060)	(0.060)	(0.046)	(0.046)
Sales lagged	0.005*	0.005*				
	(0.003)	(0.003)				
Nonlocal×(Sales lagged)	-0.024***	-0.024***				
	(0.006)	(0.006)				
Employment lagged			-0.002	-0.002		
			(0.005)	(0.005)		
Nonlocal×(Empl lagged)			-0.024**	-0.024**		
			(0.010)	(0.010)		
VAT lagged					0.004	0.003
					(0.003)	(0.003)
Nonlocal×(VAT lagged)					-0.019***	-0.018***
					(0.005)	(0.005)
Disclosed before	0.295***	0.296***	0.296***	0.297***	0.291***	0.292***
	(0.044)	(0.044)	(0.044)	(0.044)	(0.044)	(0.044)
Ratio of nonlocal lagged	-0.009		-0.010		-0.010	
	(0.016)		(0.016)		(0.016)	
Ownership dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	No	Yes	No	Yes	No
Market dummies	Yes	No	Yes	No	Yes	No
Market-year dummies	No	Yes	No	Yes	No	Yes
# Firms	528	528	531	531	528	528
# Observations	2,140	2,140	2,143	2,143	2,106	2,106
Adj. R^2	0.135	0.139	0.134	0.138	0.134	0.139

Notes. This Table reports regression results of the linear probability models on role of firm size/market power in the determination of disclosure in "illegal" drug advertising inspections for the sample of firms which held advertising licenses in Jiangsu, Zhejiang, and/or Inner Mongolia. The dependent variable takes on the value of one if a firm is disclosed in the province during the calendar year and zero otherwise. "VAT lagged" is the value-added tax a firm paid to its own province, one-year lagged. "Sales lagged" is the value of the firm's logged total sales, one-year-lagged. "Empl lagged" is the number of employees of the firm, one-year lagged. Definitions of other variables are the same as in Table 4. Standard errors (in parentheses) are clustered at the firm-level. ***, **, and * indicate significance at the 1%, 5% and 10% levels respectively.

0.04 percentage points less likely to be disclosed, which is a sizable effect considering the average discrimination effect is 0.08. Our findings are thus unambiguous: firms are indeed treated differently depending on which province they come from, with those from weaker or less competitive ones more likely to be singled out for discrimination.

(C) Political Affiliation

Political affiliation varies across firms in the sample, creating variation in firms' political connection to governments at different levels; see Table A2 in Appendix A for sample descriptives. To see how political affiliation affects the degree of discrimination we include dummies variables for *lishu* affiliation type in our regressions and further interact these dummies with the nonlocal indicator. Column (1) of Table 7 shows the differences in the discrimination effect across affiliation types, with unaffiliated firms as the omitted reference category. We find that while "other affiliation" types (below province-level) are not significantly different from the reference group, affiliation with a provincial government exposes the firm to an 8 percentage points higher probability of disclosure, thus twice the average probability we found earlier.[17] Next, in Column (2), we contrast provincial affiliation with all other affiliation types by redefining our reference group accordingly. The result shows the probability of disclosure is 7 percentage points higher for provincial affiliation than all other affiliation types.

Since these result may simply reflect the effect of other firm- and province-level characteristics correlated with provincial affiliation, we expand the list of interaction terms to include those pertaining to firm size and provincial competition measures in Columns (3) and (4). We observe that the differential effect found for provincial affiliation remains in the range of 6 to 8 percentage points while the additional controls yield coefficient signs in accordance with our previous results. The interpretation of this finding is that the potential benefit accruing from provincial affiliation does *not* travel across provincial borders, and on the contrary seems to make affiliated firms a preferred target for disclosure.

4.2.3 Results from the Full 31-Province Sample

The fact that we do not have data on which firms advertised, with or without licenses, in markets other than the noted three provinces restricts us from applying the above estimation strategies to other regions without making further assumptions. To use data from all provinces in our estimations, we have to rely on the strong assumption that every firm advertised in every provinces, which obviously substantially exaggerates the number of firms — especially nonlocal ones — who genuinely advertised. This would lead to a downward bias in the estimated

[17] The central affiliation interaction term with the nonlocal indicator is of similar magnitude but statistically insignificant — the number of firms in this category is very small so that we cannot draw any meaningful conclusions from this result.

Table 6. *Role of Province of Origin: Three-Province Sample*

	LHS: indicator of a firm being disclosed						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Nonlocal× (Provincial distance)	0.054*** (0.017)						
Nonlocal× (# Origin pharma firms lagged)		-0.420*** (0.157)					
Nonlocal× (Origin pharma GDP lagged)			-0.062*** (0.021)				
Nonlocal× (Origin pharma VAT lagged)				-0.057*** (0.021)			
Nonlocal× (# Origin firms wg lagged)					-0.039*** (0.012)		
Nonlocal× (Origin pharma GDP wg lagged)						-0.034*** (0.011)	
Nonlocal× (Origin pharma VAT wg lagged)							-0.033*** (0.011)
Other controls not displayed: nonlocal, origin measures, firm size, disclosure history							
Provincial distance	Yes	Yes	Yes	Yes	No	No	No
Ownership dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market-year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# Firms	522	522	522	522	522	522	522
# Observations	2,106	2,106	2,106	2,106	2,106	2,106	2,106
Adj. R^2	0.139	0.142	0.150	0.149	0.147	0.147	0.147

Notes. This Table reports regression results of the linear probability models on the role of province of origin in the determination of disclosure in "illegal" drug advertising inspections for the sample of firms which held advertising licenses in Jiangsu, Zhejiang, and/or Inner Mongolia. The dependent variable takes on the value of one if a firm is disclosed during the calendar year and zero otherwise. "Provincial distance" is the log geographical distance between the capital cities of province pairs. "# Origin firms lagged" is the log number of drug producers in the province of origin, one-year lagged. "Origin pharma GDP lagged" is the log value of pharmaceutical GDP in the province of origin, one-year lagged. "Origin pharma VAT lagged" is the log value of pharmaceutical VAT revenue in the province of origin, one-year lagged. "wg" indicates the variable is weighted by the reciprocal of the geographical distance between the capital cities of province pairs. Definitions of other variables are the same as in the previous tables. Full results are available from the author upon request. Standard errors (in parentheses) are clustered at the firm-level. ***, **, and * indicate significance at the 1%, 5% and 10% levels respectively.

Table 7. *Role of Political Affiliation: Three-Province Sample*

	LHS: indicator of a firm being disclosed			
	(1)	(2)	(3)	(4)
Nonlocal×Lower_aff	0.018			
	(0.028)			
Nonlocal×Prov_aff	0.083*			
	(0.043)			
Nonlocal×Cent_aff	0.071			
	(0.078)			
Nonlocal×Prov_aff2		0.066*	0.078**	0.063*
		(0.036)	(0.036)	(0.032)
Nonlocal×			-0.026***	-0.020***
(Sales lagged)			(0.007)	(0.007)
Nonlocal×				-0.029***
(Orig pharma GDP wg lagged)				(0.011)
Other controls not displayed: nonlocal, affiliation types, sales lagged, orig pharma GDP wg lagged, disclosure history				
Ownership dummies	Yes	Yes	Yes	Yes
Market-year dummies	Yes	Yes	Yes	Yes
# Firms	531	531	531	522
# Observations	2,140	2,140	2,140	2,106
Adj. R^2	0.141	0.140	0.142	0.148

Notes. This Table reports regression results of the linear probability models on the role of political affiliation of firms in the determination of disclosure in "illegal" drug advertising inspections for the sample of firms which held advertising licenses in Jiangsu, Zhejiang, and/or Inner Mongolia. The dependent variable takes on the value of one if a firm is disclosed during the calendar year and zero otherwise. "Central_aff", "Prov_ aff", and "Lower_aff" are dummies for affiliation with the central, provincial, and lower levels of government respectively, with the reference group being no government affiliation. "Prov_aff2" is a dummy taking the value of one for affiliation with a provincial government and zero otherwise. Definitions of other variables are the same as in the previous tables. Full results are available from the author upon request. Standard errors (in parentheses) are clustered at the firm-level. ***, **, and * indicate significance at the 1%, 5% and 10% levels respectively.

discrimination effect. This bias is confirmed in Appendix B where we further explore the full sample of 31 provinces by imposing this assumption.

The full sample data also allows us to see how local protectionism varies across provinces of differing characteristics. Specifically, we look at the effect of the share of the pharmaceutical GDP in a province on discrimination. We find with some robustness that provinces which have a more substantial pharmaceutical base have a higher propensity to discriminate nonlocal firms, consistent with the fiscal incentive hypothesis arguing that governments have a stronger incentive to protect those sectors which make a higher economic contribution. Still, the estimate that backs up this finding rests upon the above-mentioned assumption. However, this fiscal incentive effect is more credible than the discrimination effect if the bias caused by the assumption for nonlocal firms remains constant across provinces. This is because the fiscal incentive effect is estimated from the *interaction* between the nonlocal dummy and the share of pharmaceutical GDP, and by essentially comparing nonlocals with nonlocals, the bias should be differenced out. If the bias *does* vary across provinces, then this argument breaks down and the interaction term is also biased. In an attempt to at least partly exclude this second type of bias, we conduct a permutation exercise where we randomly draw 500 subsets of the 31 provinces and each time obtain the nonlocal discrimination estimate. The results provide evidence in support of the fiscal incentive hypothesis. See Appendix B for details.

5 Concluding Remarks

This study offers direct micro-level evidence for the existence and patterns of provincial protectionism in China. We show that drug advertising regulations and inspections are used as a protectionist tool by provincial administrations to shelter local firms from extra-provincial competition. Furthermore, nonlocal firms are not targeted indiscriminately: "weaker" firms and firms from "weaker" provinces in terms of pharmaceutical industry prowess are preferred targets of discrimination in provinces other than their own. Consistent with theories on the politico-economic competition among Chinese provinces, nonlocal firms with province-level affiliation are also more likely to be targeted as "illegal" advertisers.

Our findings point to some specific areas where efforts could be made to reduce internal trade barriers in China. First, tighter screening of "local regulations" may be useful to reduce the scope for rent-seeking behavior in the form of abuse of regulations by local authorities. Second, political ties between local regulatory authorities and local governments should be reduced or cut to counteract the resulting incentives for discriminatory behavior in the narrow interest of local governments and producers. Third, while political affiliations with regional

governments may be beneficial to a firm's business in the local market, it may also be detrimental to its sales in other regions. This calls for a further de-politicisation of the economy — withdrawal of governmental power from the realm of market — which should be taken as a pressing task in the gradual economic reform in China.

Our study suffers from several data limitations. First, we are unable to identify licensed firms except in a small subset of provinces, which limits our ability to link the discrimination pattern to provincial characteristics. Second, since firm sales data are not available by province, we cannot quantify the effect of discrimination on firm performance in each specific market. We believe that the makeup of our three-province sample, including advanced and backward provinces, suggests its representativeness for the country at large.

Findings from this study arguably have wider validity beyond the pharmaceutical industry and the Chinese context as the patterns revealed are indicative of more generic institutional roots of regional protectionism that exist in many other developing countries. Such protectionism within countries is one of the most important causes of domestic trade barriers which are comparatively undervalued or ignored as current policy debates about globalisation are mainly focused on barriers to international trade. While a growing literature shows that excessive regulations are used in developed countries against foreign imports causing sizable welfare losses,[18] our findings add valuable insights to this literature by providing evidence that "regulatory protectionism" also exists within developing countries and how it impedes market integration. Two policy implications arise from this research. First, in a time of rapid globalisation in the form of reduced *international* trade costs, we should also look beyond the international dimension to remove further institutional barriers within countries, especially in large developing economies with substantial internal heterogeneity such as China. Second, in countries where the rule of law is weak and regulations are subject to abuse, domestic institutional reforms should be prioritised to safeguard economic development as a whole.

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[18] As an example, the Food, Conservation, and Energy Act of 2008 in the United States required the mandatory country of origin labeling (COOL) for certain agricultural commodities, which added additonal costs to the production of those goods especially when they are imported. Using general equilibrium modelling techniques, Jones *et al.* (2009) studied the effect of this regulation and found a decrease in imports as a result of it and the estimated welfare loss amounted to over US$ 200 million per year for the United States.

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Appendix A Additional Tables

Table A1. *Numbers of Firms 31-Province Sample*

Year	ASIE	ADVERTS	Matched ASIE-ADVERTS
2001	3,486	175	137
2002	3,680	449	316
2003	4,062	221	162
2004	4,709	214	174
2005	4,969	328	270
Total	7,883	796	653

Table A2. *Numbers of Firms by Location and Affiliation Type: Three-Province Sample*

	Government affiliation				
Location	None	Lower	Province	Central	Total
Baseline sample:					
Local	101	523	28	10	662
Nonlocal	250	1,495	449	50	2,244
Total	351	2,018	477	60	2,906
Reduced sample:					
Local	59	401	22	8	490
Nonlocal	162	1,110	338	40	1,650
Totall	221	1,511	360	48	2,140

Notes. This Table reports the number of firms in all rows. "Baseline sample" indicates the statistics for the models where lagged values are not included, while "Reduced sample" indicates the statistics for the models estimatedf where lagged values are included.

Table A3. *Descriptive Statistics: 31-Province Sample versus Three-Province Sample*

	31-province sample			Three-province sample		
Variable	Mean	SD	N	Mean	SD	N
Firm size:						
Log sales	9.96	1.44	20,489	10.82	1.47	2,206
Lagged log sales	10.07	1.37	12,526	10.85	1.44	1,622
Log employment	4.90	1.10	20,715	5.58	0.99	2,210
Affiliation type:						
Affiliation to central government			377			40
Affiliation to provincial government			1,865			345
Other affiliation types			18,664			1,830
License type:						
Licensed for advertising in Jiangsu						859
Licensed for advertising in Zhejiang						1,280
Licensed for advertising in Inner Mongolia						767
Disclosure type:						
Not disclosed			19,847			2,017
Disclosed in local province			37			10
Disclosed in nonlocal province			935			188
Disclosed in both local and nonlocal province			87			0
Disclosed in any province before			1,090			166

Notes. This Table presents summary statistics of the full sample and the three-province sample (Jiangsu, Zhejiang, and Inner Mongolia). "Mean", "SD", and "N" indicate mean value, standard deviation, and number of observations.

Table A4. *Numbers of Licensed and Unlicensed Firms Disclosed: Three-Province Sample*

	Jiangsu disclosed				Jiangsu undisclosed	
	Licensed		Unlicensed		Licensed	
Year	Nonlocal	Local	Nonlocal	Local	Nonlocal	Local
2001	0	0	6	0	68	65
2002	9	0	28	0	66	71
2003	9	2	24	0	79	75
2004	26	5	58	0	81	99
2005	15	2	66	1	85	102
Totals	59	9	182	1	379	412

	Zhejiang disclosed				Zhejiang undisclosed	
	Licensed		Unlicensed		Licensed	
Year	Nonlocal	Local	Nonlocal	Local	Nonlocal	Local
2001	1	0	7	0	169	40
2002	13	0	16	0	178	40
2003	16	0	10	0	208	41
2004	19	0	14	0	220	47
2005	31	0	40	0	213	44
Totals	80	0	87	0	988	212

	Inner Mongolia disclosed				Inner Mongolia undisclosed	
	Licensed		Unlicensed		Licensed	
Year	Nonlocal	Local	Nonlocal	Local	Nonlocal	Local
2001	3	0	14	0	91	14
2002	6	0	15	0	105	14
2003	23	0	18	0	110	18
2004	34	1	18	0	135	23
2005	38	0	12	0	127	25
Totals	104	1	77	0	568	94

	Three provinces disclosed				Three provinces undisclosed	
	Licensed		Unlicensed		Licensed	
	Nonlocal	Local	Nonlocal	Local	Nonlocal	Local
Totals	243	10	346	1	1,935	718

Notes. The sample here is made up of all 569 licensed firms in the three provinces, comprising 2,906 observations.

Table A5. *Local Protectionism: Two-Province Sample*

	LHS: indicator of a firm being disclosed				
	(1)	(2)	(3)	(4)	(5)
Nonlocal	0.082***	0.070***	0.083***	0.082***	0.109***
	(0.012)	(0.011)	(0.013)	(0.013)	(0.026)
Sales lagged		-0.013***	-0.014***	-0.014***	-0.014***
		(0.005)	(0.005)	(0.005)	(0.005)
Disclosed before		0.283***	0.276***	0.277***	0.275***
		(0.052)	(0.052)	(0.052)	(0.052)
Ratio of nonlocal lagged					-0.032
					(0.028)
Nonlocal×(Ratio of nonlocal lagged)					-0.008
					(0.005)
Ownership dummies	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	No	Yes
Market dummies	No	No	Yes	No	Yes
Market-year dummies	No	No	No	Yes	No
# Firms	472	443	443	443	443
# Observations	2,139	1,586	1,586	1,586	1,586
Adj. R^2	0.043	0.118	0.121	0.125	0.122

Notes. This Table reports regression results of the linear probability models on the determinants of disclosure in "illegal" drug advertising inspections for the sample of firms which held advertising licenses in Jiangsu and/or Zhejiang. The dependent variable takes on the value of one if a firm is disclosed in the province during the calendar year and zero otherwise. Definitions of the variables are the same as before. Standard errors (in parentheses) are clustered at the firm-level. ***, **, and * indicate significance at the 1%, 5% and 10% levels respectively.

Table A6. *Time-Varying Dicrimination Effect: Three-Province Sample*

	LHS: indicator of a firm being disclosed					
	(1)	(2)	(3)	(4)	(5)	(6)
Nonlocal	0.013**	0.084***	0.081***	0.084***	0.099***	0.075***
	(0.006)	(0.018)	(0.018)	(0.019)	(0.023)	(0.023)
2002	0.002*	-0.014	-0.014	-0.013	-0.113***	-0.017
	(0.001)	(0.009)	(0.009)	(0.009)	(0.039)	(0.011)
2003	0.009					
	(0.008)					
2004	0.022**	0.008	0.006	0.005	-0.012	0.006
	(0.011)	(0.008)	(0.009)	(0.009)	(0.033)	(0.009)
2005	0.009	-0.003	-0.008	-0.011*	-0.070**	-0.011**
	(0.007)	(0.003)	(0.005)	(0.005)	(0.029)	(0.006)
Nonlocal×2002	0.059***					
	(0.016)					
Nonlocal×2003	0.085***	0.006	-0.014	-0.014	-0.044	-0.010
	(0.018)	(0.019)	(0.022)	(0.022)	(0.028)	(0.023)
Nonlocal×2004	0.120***	0.061**	0.023	0.025	0.025	0.025
	(0.023)	(0.027)	(0.028)	(0.028)	(0.032)	(0.029)
Nonlocal×2005	0.140***	0.062***	0.002	0.005	-0.026	0.005
	(0.021)	(0.024)	(0.025)	(0.025)	(0.028)	(0.025)
Sales lagged		-0.014**	-0.016***	-0.015***	-0.015***	-0.015***
		(0.007)	(0.005)	(0.005)	(0.005)	(0.005)
Disclosed before			0.302***	0.295***	0.296***	0.294***
			(0.044)	(0.044)	(0.044)	(0.044)
Ratio of nonlocal lagged						-0.011
						(0.016)
Nonlocal×						0.002
(Ratio of nonlocal lagged)						(0.003)
Ownership dummies	Yes	Yes	Yes	Yes	Yes	Yes
Market dummies	No	No	No	Yes	No	Yes
Market-year dummies	No	No	No	No	Yes	No
# Firms	569	531	531	531	531	531
# Observations	2,906	2,140	2,140	2,140	2,140	2,140
Adj. R^2	0.051	0.045	0.127	0.133	0.137	0.132

Notes. This Table reports regression results of the linear probability models on the determinants of disclosure in "illegal" drug advertising inspections for the sample of firms which held advertising licenses in Jiangsu, Zhejiang, and/or Inner Mongolia. The dependent variable takes on the value of one if a firm is disclosed in the province during the calendar year and zero otherwise. Definitions of the variables are the same as before, except the introduction of the interactions between year dummies (with 2001 as the ommited base) and the nonlocal dummy. Standard errors (in parentheses) are clustered at the firm-level. ***, **, and * indicate significance at the 1%, 5% and 10% levels respectively.

Table A7. *Market-Varying Dicrimination Effect: Three-Province Sample*

	LHS: indicator of a firm being disclosed			
	(1)	(2)	(3)	(4)
Nonlocal	0.156***	0.185***	0.135***	0.065
	(0.017)	(0.021)	(0.016)	(0.157)
Jiangsu	0.026***	0.034***	0.024**	-0.118
	(0.010)	(0.013)	(0.010)	(0.104)
Zhejiang	0.011**	0.014**	0.010	-0.072
	(0.004)	(0.007)	(0.007)	(0.059)
Nonlocal×Jiangsu	-0.038	-0.045	-0.039*	0.022
	(0.024)	(0.029)	(0.023)	(0.141)
Nonlocal×Zhejiang	-0.082***	-0.095***	-0.072***	-0.037
	(0.016)	(0.020)	(0.016)	(0.081)
Sales lagged		-0.013**	-0.015***	-0.015***
		(0.007)	(0.005)	(0.005)
Disclosed before			0.294***	0.294***
			(0.044)	(0.044)
Ratio of nonlocal lagged				-0.016
				(0.012)
Nonlocal×(Ratio of nonlocal lagged)				0.007
				(0.015)
Ownership dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
# Firms	569	531	531	531
# Observations	2,906	2,140	2,140	2,140
Adj. R^2	0.057	0.055	0.134	0.133

Notes. This Table reports regression results of the linear probability models on the determinants of disclosure in "illegal" drug advertising inspections for the sample of firms which held advertising licenses in Jiangsu, Zhejiang, and/or Inner Mongolia. The dependent variable takes on the value of one if a firm is disclosed in the province during the calendar year and zero otherwise. Definitions of the variables are the same as before, except the introduction of the interactions between market dummies (with Inner Monglia as the ommited base) and the nonlocal dummy. Standard errors (in parentheses) are clustered at the firm-level. ***, **, and * indicate significance at the 1%, 5% and 10% levels respectively.

Appendix B Exploration of the Full 31-Province Sample

We use the sample for all 31 provinces to examine the nature of discriminative behaviour in some more detail, providing evidence for a fiscal incentive motive behind local protectionism. The expectation is that the discrimination effect should be stronger in provinces with a more substantial base of local drug producers, thus incentivising local government to discriminate against nonlocal competition. To analyse this channel, we adopt the share of pharmaceuticals in manufacturing output (in value terms) as a proxy for a province's fiscal incentive to engage in protectionism. A higher value of this share implies a more dominant local pharmaceutical industry, hence a stronger fiscal incentive for local protectionism to safeguard tax revenue. If our hypothesis is correct, we should observe a positive association between this fiscal incentive measure and the propensity of nonlocal firms being disclosed in advertising inspections. We implement this empirical test using an interaction term between the nonlocal dummy and the measure of pharmaceutical share in total manufacturing output. A caveat using the three-province sample for this test is the lack of variation for our fiscal incentive measure *within* provinces. We therefore return to the full sample for all 31 provinces, but at the price of having to rely on the strong assumption that every firm advertised in all provinces. We should expect a much smaller, likely insignificant, discrimination effect because of the vastly overstated number of firms engaging in advertising. However, if the degree of discrimination depends on the level of fiscal incentives for local protection, the relationship will be stronger for nonlocal than for local firms, even if the propensity of disclosure is underestimated in both cohorts.

Results for these models are contained in Table B1. In the baseline model of Column (1), the discrimination effect is positive significant but economically very small. In other models where more explanatory variables are added, we find that the effect turns negative but in most cases statistically insignificant. The positive signs of the coefficient on pharmaceutical share as well as on that of its interaction with the nonlocal dummy imply that (i) a bigger local pharmaceutical industry leads to a higher propensity for the local FDA to disclose *any* advertisers, and (ii) disproportionally so for nonlocal firms. The first finding indicates that provinces with next to insignificant pharmaceutical base (including Ningxia, Qinghai, Tibet and Xinjiang) do not engage in selective disclosure, whereas those with substantial pharmaceutical base (including Zhejiang, Jiangsu, Shandong and Guangdong) clearly use selective disclosure for strategic discrimination. The second finding shows that regardless of this heterogeneity across provinces selective disclosure is disproportionally targeting nonlocal firms. The magnitudes of the estimates indicate that the fiscal incentive effect in the disclosure propensity is 10 percentage points higher for nonlocal manufacturers than for local counterparts. Given that the pharmaceutical share measure ranges from 0 to 1, the estimates imply that a ten percentage points increase in the pharmaceutical share leads to a one percentage point increase in the discrimination effect, which is sizable given that the average discrimination effect is significantly underestimated in the present models.

A concern about the results based on the full sample data is that the strong assumption of every firm advertising in every provinces may have led to biased estimates for some key parameters of interest. This issue is difficult to tackle satisfactorily given the data at our disposal. However, a "permutation

Table B1. *Fiscal Incentive and Discriminative Disclosure — 31-Province Sample*

	LHS: indicator of a firm being disclosed				
	(1)	(2)	(3)	(4)	(5)
Nonlocal	0.002***	-0.002*	-0.002	-0.002	-0.002
	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
Share of pharma GDP		0.049**	0.096***	0.049**	0.088***
		(0.020)	(0.030)	(0.021)	(0.030)
Nonlocal×(Share of pharma GDP)		0.118***	0.101**	0.117***	0.109**
		(0.040)	(0.044)	(0.040)	(0.044)
Sales lagged	0.001***	0.001***		0.001***	
	(0.000)	(0.000)		(0.000)	
Disclosed before	0.235***	0.233***		0.233***	
	(0.020)	(0.020)		(0.020)	
Ownership dummies	Yes	Yes	Yes	Yes	Yes
Year dummies	No	Yes	Yes	No	No
Market dummies	No	Yes	Yes	No	No
Market-year dummies	Yes	No	No	Yes	Yes
# Firms	5,531	7,883	5,531	7,883	5,531
# Observations	388,306	648,086	388,306	648,086	388,306
Adj. R^2	0.066	0.005	0.067	0.006	0.068

Notes. This Table reports regression results of the linear probability models on the determinants of disclosure in "illegal" drug advertising inspections for the 31-province sample of firms. The dependent variable takes on the value of one if a firm is disclosed during the calendar year and zero otherwise. "Share of pharma GDP" is the share of pharmaceuticals in manufacturing output in the destination ('market') province as a proxy for the fiscal incentive motive of local protectionism. Definitions of other variables are the same as in previous tables. Standard errors (in parentheses) are clustered at the firm-level. ***, **, and * indicate significance at the 1%, 5% and 10% levels respectively.

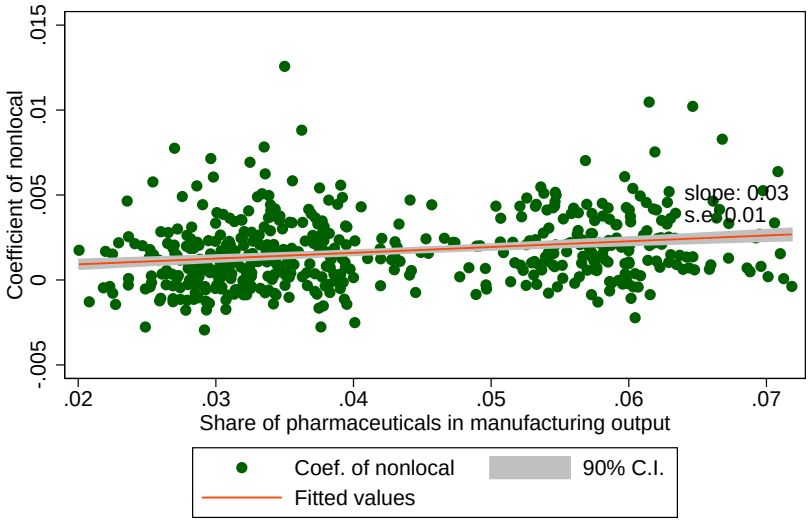
exercise" may be helpful to check whether the assumption itself could be driving some of the key relations we find in the data. Specifically, by repeatedly drawing a subset of provinces from the full 31 province sample, we artificially expand the variation of province characteristics, which then allows us to investigate whether those characteristics identified as crucial in our analysis are sensitive to the particular sample of provinces selected. We know that the disclosure propensity for nonlocal firms is significantly underestimated in the full sample by the assumption that all firms advertise in all provinces. Our test of the 'fiscal incentive' hypothesis in these permutations is only biased if the underestimated disclosure propensity were to differ systematically with different levels of pharmaceuticals-to-total manufacturing output across provinces. The implementation of our permutation exercise proceeds as follows:

(i) We randomly draw 10 of the 31 Chinese provinces;

(ii) We compute the average share of pharmaceuticals in manufacturing output for this subsample;

(iii) We estimate a linear probability model of disclosure (including the nonlocal dummy, lagged sales, the dummy for prior disclosure, ownership and market-year dummies) for these 10 markets and record the estimated coefficient on the nonlocal dummy and the average pharmaceutical share from (ii);

(iv) We repeat (i)-(iii) 500 times to obtain a dataset of discrimination coefficients and the fiscal incentive proxy.



Note: data points represent discrimination coefficients and average shares of pharmaceuticals in manufacturing output, from regressions based on 500 random draws of 10 provinces from the entire sample of 31 provinces.

Fig. B1. *Fiscal Incentive and Discrimination Effect — Simulated Result from 31-Province Sample (2001-2005)*

We plot these data in Figure B1, where the discrimination effect is measured on the vertical axis – the coefficient on the nonlocal dummy – while the fiscal incentive is measured on the horizontal axis (pharmaceutical share in manufacturing output). The resulting positive slope of the regression line (statistically significant at the 1% level) is consistent with our argument that a province's "economic interest" is a fundamental force behind the local FDA's discriminative action towards nonlocal producers.

More specifically, a 10% increase in the share of pharmaceuticals in manufacturing output is associated with a 0.3% increase in the estimated discrimination effect, supporting the finding of the fiscal incentive motive in Table B1.