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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. We further reveal how the degree of discrimination could be mitigated for nonlocal firms under certain circumstances: those from neighbouring areas, those without political ties to rival provincial governments, those from regions with more economic links to the destination province, and those from provinces with stronger presence in the market, are less likely to be targeted. Our findings highlight the unique politico-economic structure in China and confirm that giving local governments strong incentives to compete with each other may exacerbate the market distortions inherent in a partially reformed economy.

JEL Classification: F15, L25, P26

Keywords: Intra-national protectionism; Drug advertising; China

Outline:

"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)

"[A]ccording to Espicom, discrimination [by provincial governments] in favor of locally produced drugs is an accepted practice [in China]." Deloitte (2011, p. 23)

1 Introduction

The analysis of barriers to trade *within* countries has received growing attention in the recent literature (e.g. Atkin and Donaldson, 2013; Coşar and Fajgelbaum, 2013; Coughlin and Novy, 2013; Agnosteva *et al.*, 2014; Bartelme, 2014; Ramondo *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 within the economy. Such protective behavior 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 as well as open up domestic markets upon joining the WTO in 2001. Nevertheless, existing research suggests limited improvement in domestic market integration or even increased fragmentation (Poncet, 2003, 2005; World Bank, 2005, 2006) in China, which casts doubt and provokes debate on how well the Chinese market is and can be integrated into the global economy compared to what its government promised.

Our paper informs this debate by showing empirical evidence on how regulations combined with regional competition among provinces can be a possible cause for domestic market fragmentation in China. 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 the creation of 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.*, 2014).[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 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: while it is probably the case that in general nonlocal firms become easier targets when they are politically affiliated to their own provincial governments, those from adjacent areas, those from regions with more economic ties to the destination province, or those with a stronger presence in the drug market are less likely to be disclosed. This latter finding is rationalized by the fact that while regional competition is rife among provinces in China, local governments may strategically target weaker rivals to avoid future retaliation from strong opponents ("tit-for-tat") in a repeated game setting. An implied message of our study is that giving provincial governments strong incentives to compete with each other may lead to rent-seeking behavior, 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

[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 using direct (rather than implicit) evidence for protectionism, such as that provided in our study.

barriers to international trade which are quantifiable through tariffs or measures for non-tariff barriers, within-country protectionism can take various forms, implicit or hidden, and is not publicly announced or recorded. Young (2000) presents various empirical evidence 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 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 question. We collect detailed information on those drug manufacturers that have fallen foul of ambiguous advertising rules, which we show can be exploited by local governments to protect local firms from nonlocal competitors. This case study thus provides the first direct and firm-level evidence for local protectionism and market fragmentation in China, and further characterizes the patterns of discrimination at the firm-level. While we focus on the specific case of the pharmaceutical industry, implications from our study arguably have some wider validity beyond this sector as the patterns revealed are indicative of more generic institutional causes of regional protectionism in China today.

Our study also adds to the current debate 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 where tariffs and other conventional trade barriers have been reduced significantly, protectionism in the guise of technical regulations represents a persistent force against globalization, continuing to shelter domestic producers against foreign competition. In this paper we reveal politico-economic forces as a key cause for such protectionism and highlight that these forces could be much more powerful and resilient than previously

thought in resisting trade liberalization.

The remainder of the paper proceeds as follows: Section 2 sets out the institutional background, Section 3 proposes the conceptual framework, Section 4 describes the data, Section 5 contains the empirical analysis, and Section 6 concludes.

2 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 favored 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 producers 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 behavior 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), making the pharmaceuticals industry "one of the highest spenders on advertising in China" (Deloitte, 2011, p. 22). On a practical level, 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 from the respective provinces in order to advertise in any official media outlet in these regions — including TV, radio and newspapers, as well as billboards, on public transport and in taxi cabs (Deloitte, 2011).

This study argues that the institutional setup and the role of FDAs within China's political system provide both scope and incentives for provincial protectionism. For the period under study, budget and personnel of provincial FDAs were under the control of provincial governments in that the provincial government not only determined and approved the provincial FDA's costing but also appointed its most senior officials. In addition, provincial governments also exerted indirect control over lower-level FDAs because the latter were subordinate branches of provincial FDAs in a vertically hierarchical structure; see Fig. 1 for a graphical illustration of the relationships between different levels of FDAs and governments. Consequently, the daily activities of FDAs at all administrative levels within a province, including the monitoring of pharmaceutical firms and their advertising practices, were significantly constrained by the provincial government in a direct or indirect way. By taking hold of the most important human resources of FDAs, the provincial government had great influence over their daily business, enabling it to impose its preferences on the actions of the local FDAs.[2]

[Fig. 1 about here]

Of course regional protectionism is not limited to the drug industry. It exists widely

[2]This system was in place between 2000 and 2008, after which it shifted back to a previous setup where lower-level governments, instead of provincial FDAs, had direct control over lower-level FDAs via budget and personnel decisions. However, since this study focuses on provincial-level protectionism, this regime change would not affect the main analysis or implications even if the change happened during the sample period.

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 highly dependent on local economic performance, including gross provincial products and tax revenue (Chen *et al.*, 2005; Li and Zhou, 2005; Jia, 2014).[3] In a more formal way, Bai *et al.* (2014) recently constructed a theory to reconcile China's fast economic growth with the phenomenon of empowered local governors endogenously creating regional barriers to benefit their "crony" entrepreneurs for economic and political rewards. these forces together further incentivize local governments to adopt policies which impose, explicitly or implicitly, additional costs on firms from other provinces.

For the specific case of the drug industry, as the government departments in charge of the implementation of the advertisement regulation, provincial FDAs regularly carry out investigations to spot "illegal" advertisements, send the advertisers a notice of violation, suspend or in case of serious violation cancel their advertising licenses outright, and report the "illegal" cases to other government authorities (mainly the Bureau for Industry and Commerce) for further administrative and legal actions (e.g. levying fines and suspension or prohibition of sales). In addition, the violators are subjected to nationwide disclosure — cases of violation are reported by provincial FDAs to the State FDA, then publicized on the latter's website, and in due course reported in the local and national press.[4]

[3]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 emphasized the Communist Party's intention to improve this system (Xinhua News, 2013).

[4]In 2007, for instance, "Fei Xiao Tong Chang" cough syrup was disclosed for exaggerated advertisements in the city of Suzhou. The Bureau for Industry and Commerce in Suzhou forced its manufacturer to stop the advertisement immediately as well as to pay a fine of 7,500 yuan (at the time around US$1,000); see `http://www.bsqgsj.gov.cn/baweb/show/shiju/bawebFile/3411.html`. In a more serious case in 2013, an advertiser in Zhejiang Province was fined 122,679 yuan (at the time

Importantly, local FDAs are entirely independent 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,[5] 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. It is then not surprising that a report by China's State FDA in 2004 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). The blurred boundaries in the definition of "illegality" in practice empower local FDAs with legitimate discretion to selectively shield or punish some producers by using a variant and broad interpretation of the rules. It was estimated by the state media *People's Daily Online* that 85% to 95% of drug advertisements in Nanjing, the capital city of a coastal province Jiangsu, were "illegal" by the national standards, and protection from the local government was blamed for being one of the top reasons why the majority of these advertisements were left undealt with (People's Daily Online, 2005). In a more recent survey conducted by a regional newspaper in Shandong Province, nearly half of the respondents regarded local protectionism as a major obstacle for battling with illegal advertising (Qingnian Jizhe (Youth Journalists), 2012).

around US$20,000) for "misleading content in advertisement" of its drug to treat arthritis-related diseases; see http://news.xinhuanet.com/health/2013-04/25/c_124630444.htm. It should be noted that fines for illegal advertisement in China never appear to have been set under a nationwide standard and that in practice different local FDAs and related authorities enjoy a great degree of discretion when it comes to specific cases; see, for instance, the recent rules set by Sichuan Province, http://opinion.chengdu.cn/topic/2014-10/14/content_1563916.htm?node=12023.

[5]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.

3 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 decentralization 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 producers than for their local counterparts. 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 penalizing 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 the politico-economic competition among provinces. If inter-provincial competition does exist (in the form of, among other characterizations, Li and Zhou, 2005, and Bai *et al.*, 2014), we should observe a pattern of discrimination that varies by region of origin of the advertiser: "illegal" advertising by sellers from economically closely related provinces are perhaps more likely to be tolerated. At the same time, firms from provinces with a more substantial base of pharmaceutical industry are perhaps seen as a threat to local producers and thus more likely to be targeted. As such, we would expect to find a more

pronounced discrimination effect for nonlocal firms which are from provinces with fewer economic ties to the location and from those provinces with more significant market presence.

The above reasoning, however, ignores the fact that provincial FDAs may well be strategic players in a repeated game of symmetric discrimination. A province hostile towards firms from an economically "strong" region is likely to face future retaliation from competing local governments. In anticipation of retaliatory discriminative action, a provincial FDA may proceed in a strategic manner by targeting advertisers from economically "weaker" provinces. Based on these arguments, the net effects of inter-provincial relationship on protectionist discrimination is theoretically unclear, and thus ultimately a question that is to be answered by empirical exploration.

The second level of heterogeneity is related to the role of political connections in intranational protectionism. 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 additional regulatory red tape (Guriev, 2004) or extralegal fees (Johnson *et al.*, 2000). Indeed 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, however, 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 the authors exploit to identify individuals who previously held high-level government positions. Such information is generally not available for unlisted firms such as those in our sample. 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 collected in bespoke sample surveys created for either of these studies and is not available in our data for pharmaceutical firms.

We resort to an alternative measure, the *lishu* affiliation, which indicates 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) describe the *lishu* affiliation system as 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 (forthcoming) 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, both local and nonlocal firms may benefit from such affiliations. On the one hand, 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. On the other, nonlocal firms may also benefit from a political affiliation with their own provincial government because of the environment of inter-provincial competition described above: being politically connected to a provincial government (or even the central government) could serve as a shelter from discrimination in other regions as local governments may fear that targeting firms directly controlled by other provincial governments would increase the risk of triggering retaliation.

In our empirical analysis we investigate the impact of firms' self-reported *lishu* affiliation with central, provincial or lower level government. Given the very small number of firms in our sample with central government affiliation, our focus will be primarily on isolating the effect of provincial versus lower level affiliation. The reasoning above suggests a protective role of provincial government affiliation in sheltering firms from discrimination which we will subject to empirical validation.

To summarize, from the above conceptual framework we draw the following testable hypotheses. First, other things equal, it is more likely for a "nonlocal" producer to be penalized as advertising "illegally" than for a local producer. Second, the level of protectionist discrimination might depend on (a) the firm's political affiliation to the provincial government and (b) the economic relationship between the local province and the firm's province of origin. By testing the above hypotheses, we aim to provide direct evidence on the existence of local protectionism in China, and to reveal some of the underlying channels that may shed light on the institutional causes of such protectionist barriers within China.

4 Data

Our data for disclosed "illegal" drug advertisements (ADVERTS) for 2001-2005 are taken from the Chinese State FDA which publicized the complete lists of "illegal" advertisings merged from provincial FDA reports on its website. We do not use data after 2005 as the State FDA's criteria for public disclosure changed in 2006, after which only a small number of cases of the (subjectively) most serious violations of advertising regulations were publicized. The State FDA website provides details on all firms that "illegally" advertised at least five times in any media outlet.[6] For each disclosed firm 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.[7] On average, nearly 300 firms were disclosed each year as "illegal" advertisers. We do not know the size of the penalties meted out to disclosed firm, except that these were all sent a notice of violation and reported to a separate government authority for further administrative and legal action. We also do not have information on the decision to inspect a firm, which prevents us from exploiting any systematic patterns of discrimination in this choice.[8]

[6] We do not believe that firms (whether with good or bad intent) acted strategically and only advertised four times to avoid sanction: based on our nationwide sample of 31 provinces, only 9% of disclosed firms had advertised *exactly* five times, while the overwhelming majority (91%) of disclosed firms had advertised many more times: the mean (median) is 37 (15) advertisements and the standard deviation is 60. We do not have data on the number of advertisements taken out by firms which were not disclosed, but as suggested above fierce competition in a market with many firms and small margins made public relations activities a necessity for drug producers and widespread advertising campaigns appear to be the norm.

[7] Lack of detailed information about where firms advertise their products prevents us from investigating the media outlet aspect of our disclosure data. Further, this information is missing for many disclosure cases. The limited information provided suggests that among all *disclosed* cases, 27% were found on television and radio broadcasts, 72% in newspapers, and less than 2% in other types of media outlets. A further breakdown shows that party-controlled newspapers and television and radio channels were completely ignored in the disclosure of local producers (zero cases), whereas nearly one third of the disclosed "illegal" advertisements by nonlocal firms were in these types of media outlets. A possible explanation is that disclosing "illegal" advertisements of local producers in party-controlled media may cause embarrassment that local FDAs want to avoid. Focusing on newspapers as medium for disclosed advertisements, it appears that disclosures of nonlocal firms were for advertisements 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 localized outlets for "illegal" adverts by nonlocal firms.

[8] Similarly, while we exploit information on advertising licenses as discussed below, we do not have information on whether firms actually engaged in advertising their products.

Our second source of data is the Annual Surveys of Industrial Enterprises (ASIE) from China's National Bureau of Statistics (NBS) which has been used in a number of recent studies (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 yuan (around US$600,000 in year 2000 values). On average, more than 200,000 manufacturing firms were included each year, and these accounted 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 Fig. 2 for the geographical distribution of pharmaceutical firms by province.

[Fig. 2 about here]

We match the annualized ADVERTS data with the information from ASIE. Table A1, 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 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 estimation strategy would employ detailed information on who advertised where and when on top of information about disclosure. However, 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[9] 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 characterized 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 behavior 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. In 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.

5 Empirical Analysis

5.1 Descriptive results

We first investigate 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 about here]

[9]The term "market" here refers to one of the three provinces where firms advertised for their products with a license.

Nevertheless, these patterns may have been driven by regional differences in local FDAs' incentives to disclose nonlocal firms. Specifically, 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. This concern can be addressed by taking out the effect of the size of the provincial pharmaceutical industry. Accordingly, in Fig. 3 we use the vertical axis to represent the proportion of local producers in all disclosed firms, and the horizontal axis to represent the relative size of the provincial industry in the country. 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). However, 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. See Table A2, Appendix A, for the provincial data underlying the graph.

[Fig. 3 about here]

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 A3, Appendix A, provides details on the patterns of disclosure.[10] We split the sample into disclosed and 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. First, 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. Second, among licensed firms, nonlocal firms are systematically more likely to be disclosed than

[10]Table A4 contains the descriptive statistics of the key variables.

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.[11] Fig. 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.

[Fig. 4 about here]

5.2 Regression Results

5.2.1 Existence of Local Protectionism

The core of our empirical evidence is made up of results from a number of linear probability models. The baseline results in relation to the existence of local protectionism are presented in Table 2.[12] 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.[13] All models presented contain year and firm ownership effects;[14] standard errors are clustered at the firm-level. Our baseline model in column 1 shows that the probability of being disclosed is 10% higher for nonlocal than for local firms. To further exclude confounding factors at the firm level, in column 2 and onwards we include lagged firm sales (in logs) as a proxy for firm size and an indicator of whether a firm has previously been disclosed in the same province.[15] The estimated discrimination effect is now somewhat

[11] 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.

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

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

[14] We do not include firm fixed effects to explore within-firm across-province variation as only very few firms happen to have licenses both in the local province (any one of the three provinces) and in a nonlocal province (any of the three provinces too). With regard to the ownership effects, we find that in general foreign-invested firms (excluding investments from Hong Kong, Macao, or Taiwan) are significantly less likely to be disclosed than other ownership types. We also investigated the possibility of a link between nonlocal disclosure and ownership type but this did not yield any significant empirical results, a finding in line with Bai *et al.* (2004) who observe that private firms are no longer at a disadvantage compared to their state-owned counterparts since private businesses can well be "cronies" of local governors both politically and economically.

[15] The estimates on these two controls are rather stable throughout the study: smaller firms are more likely to be disclosed (with the firm size coefficient being between 1 and 2 percentage points) and prior

weaker — around 8% — but remains substantial. It gets slightly more pronounced in column 3 where we include market dummies to control for unobserved market-specific effects and in column 4 where unobserved market-year specific effects are controlled for.[16]

[Table 2 about here]

A concern about the above results is that the degree of discrimination established 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 control for this possibility explicitly in our data. While we do not know how much (in value terms) nonlocal producers sell in the local market, we have information on the number of nonlocal versus local licensed producers. We suggest that, other things 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 in column 5, the discrimination effect is only marginally revised while these additional controls themselves statistically have no effect on the disclosure propensity.[17]

With regard to the debate over increasing (Young, 2000) as opposed to ("[i]f anything") decreasing (Holz, 2009) internal barriers to trade for China, our regression models augmented with time-varying "nonlocal" indicators (see Table A6, Appendix A) suggest the degree of discrimination remained fairly stable over this relatively short time period. The sample also allows us to look at the market-specific discrimination effect by including market-varying nonlocal dummies (see Table A7, Appendix A). It appears that Inner Mongolia is the most discriminatory province among this trio (though only marginally

history explains a significant part (around 30 percentage points) of the probability of disclosure.

[16]The fact that there are only 16 (out of 569) firms in the sample who advertised both locally and nonlocally makes it impossible to get precise estimates based on within-firm variation. Therefore we do not include firm-fixed effects in any of our specifications.

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

so compared with Jiangsu) while Zhejiang is the least.[18]

Admittedly, the above empirical models cannot entirely rule out some biases arising from the endogeneity of nonlocal disclosure, and the results presented do not completely preclude alternative interpretations. For instance, local firms may be intrinsically less likely to be disclosed because of better "local knowledge": local sellers may have a better understanding of how advertisement rules are actually interpreted and implemented at the local level and thus would ensure that their advertisement practices were within the locally-defined realms of the acceptable. A further possible explanation is related to strategic behavior: firms may simply be more aggressive in their advertisements by, for example, including exaggerated claims on the functions of their drugs, when competing in nonlocal markets. While both arguments appear to have some *prima facie* validity, the ambiguity of the advertising regulation as well as the stark figures revealed in the media reports quoted above clearly illustrate that *any* firm, local or nonlocal, could be disclosed as having advertised illegally, and after exhaustive background searches we fail to find any evidence which shows that the functions of drugs are systematically more exaggerated when the advertisements are delivered nonlocally.

5.2.2 Heterogeneity in Local Protectionism

(A) Inter-Provincial Relationships

We argued that firms from provinces with different characteristics may be treated differentially when facing advertisement inspections away from their "home" province. As suggested, one argument here is that provinces are less likely to discriminate against "partners" with whom they have closer economic relations. To test this hypothesis, we adopt a measure of economic interdependence between provinces as defined in Eq. (1):

[18]This order of ranking can be compared to that based on company managers' perception of local protectionism using data from the World Bank Investment Climate Survey on China in 2004. The Survey was conducted at the company level, but we calculated the province-averages of managers' perception of the severity of local protectionism which ranges 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 Zhejiang appears to be the least discriminating province in both studies.

$$\text{Province interdependence}_{i,j} \equiv \frac{\text{flow}_{i,j} + \text{flow}_{j,i}}{\text{output}_i + \text{output}_j}, \tag{1}$$

where the interdependence between provinces i and j depends on the ratio of the sum of bilateral trade flows ($\text{flow}_{i,j} + \text{flow}_{j,i}$) to their sum of output ($\text{output}_i + \text{output}_j$).

A higher value of this measure implies a higher degree of bilateral dependence between the two provinces. To account for a province's dependence on itself, we define a province's trade flow with itself as output minus shipments to other provinces and countries, as in Wei (1996) and Head and Mayer (2000). Using inter-provincial bilateral trade flow data from the NBS, we find the value of the interdependence measure ranging from 0.02 percent to 5 percent (with an average of 0.7 percent) for two different provinces, and consistently above 50 percent (with an average of 75 percent) for a province's self-dependence.[19] To ease interpretation of the coefficient, we standardize the province interdependence measure so that it has mean of zero and a standard deviation of one. The results are reported in Table 3, where the interaction terms capture the differential effect of the above inter-provincial relationships between two different provinces relative to the baseline case of producers advertising in their own market. According to the estimation in column 1, a one standard deviation increase in the interdependence measure leads to a 1.5 percentage point decrease in the likelihood of disclosure, meaning that a closer economic relationship between provinces does help reduce discrimination as provinces tend to be less hostile to producers from "allied" regions.

[Table 3 about here]

Competition also shapes relationships between provinces. Since it is not easy to measure the degree of competition directly, we use geographical distance between provincial

[19]The bilateral trade flow data for provinces is only available for 2002, but we believe it is reasonable to assume the stability of the relative ranking of inter-dependence relations between provinces in our six-year period.

capital cities as well as three other variables — the natural logarithms of the total number of producers, the gross provincial product, and the total value-added tax (VAT) revenue, all for the pharmaceutical sector in the province a firm comes from and lagged one year — to capture the different aspects of the influence from the market presence of a province in the pharmaceutical sector. Internal distance of a province is approximated as an average distance between consumers and the center of a disk of the same size of the province (see Head and Mayer, 2000). As shown in column 2, distance raises the chance of being disclosed by 6 percent, meaning that other things equal advertisers from geographically remoter regions are in a more disadvantageous position. In columns 3-5, it turns out the other measures of provincial market presence all have significantly negative coefficients, although the magnitudes differ substantially: the first measure (number of pharmaceutical firms) may not adequately capture the "market power" of the origin province as the model produces an eight times higher discrimination effect than the two alternatives.

To allow for geographical distance to affect inter-provincial competition together with provincial market power, in columns 6-8 we weight the last three provincial market presence variables by the reciprocal of the distance between province pairs. Coefficients remain statistically significant but are now much more similar. Take the distance-weighted GDP measure for example, we find that if a rival province increases its pharmaceutical output by one percent, its firms will be 4 percent less likely to be disclosed. Considering the average discrimination effect is 8 percentage points, inter-provincial relationships have a sizable impact and could easily switch the sign of the net effect. Our findings are thus clear: firms are indeed treated differently depending on the type of province they come from, with those from a "partner" province more likely to be in a safe position while those from a weaker or less competitive province more likely to be singled out for discrimination.[20]

[20]We also investigated the patterns of discrimination in the full 31-province sample of the data, which requires us to assume that each firm advertised in every province. In order to counteract the downward bias in the discrimination effect introduced by this implausible assumption we further conducted a permutation exercise where we randomly draw 500 subsets of the 31 provinces. In either case our results support the findings described in this section. See Appendix B for details.

(B) Political Affiliation

Political affiliation varies across firms in the sample, creating variation in firms' political connection to governments at different levels; see Table A8, Appendix A for sample statistics. Naturally, we would first like to see if nonlocal producers are more disliked by local FDAs when these producers are politically connected to their own governments. To do so, we augment the baseline specifications in Table 2 by introducing interactions between the dummies for affiliation types and a dummy for being a nonlocal firm. The results are presented in Table 4.

Interestingly, provincial government affiliation seems to play a different role for nonlocal firms than for local counterparts. Column 1 shows that being affiliated to a provincial government as opposed to not having any affiliation exposes a firm to disclosure in a "foreign" province by 8 percent. The implication 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 away from home, probably a result of hostile competition among regional governments. In column 2 we simplify the affiliation dummy by contrasting provincial government affiliation with all other types, and the "local protectionism" effect associated with provincial government connection reduces to just below 7%. This effect drops further down to 6% in column 3 where we group provincial and central government affiliation together to contrast with other affiliation types. All together, it seems that provincial government affiliation is the only type of political connection that stands out here, that is, being directly connected to a provincial government exposes a firm as a target in the advertising inspections in other regions. The statistically insignificant effect of affiliation to the central government probably reflects the fact that these firms have effective protection from Beijing and thus enjoy a safe position in inspections.

[Table 4 about here]

To further check how political connections and inter-provincial relationships work together in affecting disclosure propensity, we include a full set of interaction terms of the nonlocal dummy, the dummies for affiliation types, and the above measure of inter-provincial relationships. The estimates of the triple interaction terms are displayed in Table 5. In columns 1-5, again we only distinguish two affiliation types — affiliation to provincial governments and others. On the one hand, in comparison to Table 3, the significantly negative signs of the triple interaction terms show that the previously found effects of the inter-provincial relationships are more pronounced for firms with provincial affiliations than other firms, suggesting that being formally connected to its own provincial government makes a firm more protected when it is in an "allied" province or when its own province has a stronger presence in the industry, but meanwhile also makes it more vulnerable in a distant market. On the other hand, in contrast with Table 4, it seems that the disadvantageous situation of nonlocal firms could be mitigated or even turned around if they were from neighboring areas, from regions with many economic links to the destination province, or from provinces with a strong presence in the drug market. The point estimates are robust to an alternative definition of the affiliation dummy in columns 6-10, where provincial and central government affiliations are again contrasted with other affiliation types. In brief, the overall indication is that while political affiliation may expose a firm to attacks in other regions, the risks could be offset by good inter-provincial relations and by the home province's market power, and the relatively small sizes of the estimates indicate a good chance of escaping the doom of (conditionally) unequal treatment. This finding synthesizes the two levels of heterogeneity in regional discrimination in an integrated way.

[Table 5 about here]

6 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. Although on average political affiliation with a provincial government may expose a firm to discrimination in the territories of other provinces, the actual effect of the affiliation is rather heterogeneous: while firms from "weaker" provinces in terms of pharmaceutical industry prowess are preferred targets, sellers from economic "partner" provinces find themselves experiencing less unequal treatment. These findings are consistent with the observations and theories on the politico-economic competition among regions in China, and the overall pattern we depict accords closely with the recent characterization of China's growth model as "crony capitalism" with fierce inter-regional competition (Bai *et al.*, 2014).

Our findings point to some specific areas where efforts could be made to reduce internal trade barriers in China. First, tighter screening of the local application of national 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 be detrimental to its sales in other regions. This calls for a further de-politicization of the economy — withdrawal of governmental power from the realm of market, 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 protectionism pattern to the characteristics of the implementing provinces. Second,

since firm sales data are not available by province, we cannot quantify the effect of discrimination on firm performance in each market. We believe, however, the makeup of our three-province sample, including advanced and backward provinces, suggests some representativeness for the country at large.

Findings from this study arguably have validity beyond the pharmaceutical industry in China as the patterns revealed are indicative of more generic institutional roots of regional protectionism that are widely believed to exist in China. While a growing literature shows that excessive regulations are used in developed countries against foreign imports and cause sizable welfare losses (e.g. Jones *et al.*, 2009, for the US), our findings enrich this literature by showing that "regulatory protectionism" also exists and is perhaps more salient within developing countries in terms of its negative impact on market integration. Two policy implications arise from this research. First, in a time of reduced international trade costs, we should look beyond the international dimension to remove further institutional barriers *within* countries, especially in large developing economies with substantial internal heterogeneity. Second, in countries where the rule of law is weak and regulations are subject to abuse, domestic institutional reforms should be prioritized to safeguard economic development as a whole.

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Tables

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

Year	Undisclosed firms	Disclosed firms: only in home province	Disclosed firms: only in other provinces	Disclosed firms: in both 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

Note. 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.

Table 2. Disclosure Patterns — 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)
Ratio of nonlocal-to-local firms (lagged)					-0.012
					(0.016)
Nonlocal×Ratio of nonlocal-to-local firms (lagged)					0.002
					(0.003)
Sales (lagged)	No	Yes	Yes	Yes	Yes
Previously disclosed	No	Yes	Yes	Yes	Yes
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

Note. 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. "Ratio of nonlocal-to-local firms (lagged)" is the ratio of the number of nonlocal firms to that of local firms among advertising licensees in the provincial market, lagged one year. "Sales (lagged)" is the value of the firm's total sales, in logs and lagged one year. "Previously disclosed" is the indicator for the firm having been disclosed in the same market before. "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 advertising 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.

Table 3. Role of Inter-Provincial Relationships — Three-Province Sample

	LHS: indicator of a firm being disclosed							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Nonlocal× Province interdependence	-0.015*							
	(0.008)							
Nonlocal× Distance		0.061***						
		(0.020)						
Nonlocal× Num of orig firms (lagged)			-0.479***					
			(0.164)					
Nonlocal× Orig pharma GDP (lagged)				-0.062***				
				(0.021)				
Nonlocal× Orig pharma VAT (lagged)					-0.060***			
					(0.021)			
Nonlocal× Num of orig firms (wg, lagged)						-0.049***		
						(0.014)		
Nonlocal× Orig pharma GDP (wg, lagged)							-0.043***	
							(0.012)	
Nonlocal× Orig pharma VAT (wg, lagged)								-0.043***
								(0.012)
Other controls not displayed: sales (lagged), previously disclosed, ownership dummies, market-year dummies								
# Firms	526	522	531	531	531	522	522	522
# Observations	2,126	2,106	2,140	2,140	2,140	2,106	2,106	2,106
Adj. R^2	0.139	0.139	0.142	0.148	0.148	0.148	0.149	0.149

Note. This Table reports regression results of the linear probability models on the effect of inter-provincial relations on the propensity 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 interdependence" is a measure of the degree of economic interdependence between provinces, defined in Eq. (1). "Distance" is the log geographical distance between the capital cities of province pairs. "Num of orig firms" is the log number of drug producers in the province of origin. "Orig pharma GDP" is the log value of pharmaceutical GDP in the province of origin. "Orig pharma VAT" is the log value of pharmaceutical VAT revenue in the province of origin. "lagged" indicates the value of the variable is lagged by one year, and "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. Standard errors (in parentheses) are clustered at the firm-level. ***, **, and * indicate significance at the 1%, 5% and 10% levels respectively.

Table 4. Role of Political Affiliation — Three-Province Sample

	LHS: indicator of a firm being disclosed		
	(1)	(2)	(3)
Nonlocal	0.059**	0.077***	0.075***
	(0.025)	(0.012)	(0.013)
Lower level affiliation	0.006		
	(0.013)		
Provincial affiliation	-0.007	-0.016	
	(0.019)	(0.014)	
Central affiliation	0.047		
	(0.043)		
Nonlocal×Lower affiliation	0.018		
	(0.028)		
Nonlocal×Provincial affiliation	0.083*	0.066*	
	(0.043)	(0.036)	
Nonlocal×Central affiliation	0.071		
	(0.078)		
(Provincial + central) affiliation			-0.000
			(0.020)
Nonlocal×(Provincial + central) affiliation			0.059*
			(0.031)
Other controls not displayed: sales (lagged), previously disclosed, ownership dummies, market-year dummies			
# Firms	531	531	531
# Observations	2,140	2,140	2,140
Adj. R^2	0.141	0.140	0.141

Note. This Table reports regression results of the linear probability models on the interacted effect of political affiliation and inter-provincial relations on the propensity 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. "Provincial affiliation" is a dummy which takes on the value of one for provincial government affiliation and zero otherwise. "Central affiliation" is a dummy which takes on the value of one for central government affiliation and zero otherwise. "Lower affiliation" is a dummy which takes on the value of one for below-province level government affiliation and zero otherwise. "(Provincial + central) affiliation" is a dummy which takes on the value of one for provincial or central government affiliation and zero otherwise. Definitions of all other variables are the same as in the previous tables. Standard errors (in parentheses) are clustered at the firm-level. ***, **, and * indicate significance at the 1%, 5% and 10% levels respectively.

Table 5. Interacted Effects of Political Affiliation and Inter-Provincial Relations on Disclosure — Three-Province Sample

	LHS: indicator of a firm being disclosed									
	Affiliation dummy: provincial (1) vs others (0)					Affiliation dummy: provincial + central (1) vs others (0)				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Nonlocal×Affiliation× (Province interdependence)	-0.057* (0.031)					-0.043** (0.025)				
Nonlocal×Affiliation× Distance		0.041*** (0.014)					0.042*** (0.013)			
Nonlocal×Affiliation× (Num of orig firms, wg, lagged)			-0.022** (0.010)					-0.023** (0.010)		
Nonlocal×Affiliation× (Orig pharma GDP, wg, lagged)				-0.043*** (0.014)					-0.045** (0.013)	
Nonlocal×Affiliation× (Orig pharma VAT, wg, lagged)					-0.019* (0.010)					-0.017* (0.010)
Other controls not displayed: sales lagged, inter-provincial relations measures, disclosure history										
# Firms	526	522	522	522	522	526	522	522	522	522
# Observations	2,126	2,106	2,106	2,106	2,106	2,126	2,106	2,106	2,106	2,106
Adj. R^2	0.141	0.142	0.146	0.153	0.141	0.140	0.143	0.147	0.154	0.142

Note. 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. "Affiliation" is the dummy for affiliation type. Columns 1-5 report results where provincial government affiliation is contrasted with other types of affiliation, and columns 6-10 report results where provincial and central government affiliations are grouped together and contrasted with other types of affiliation. 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.

Figures

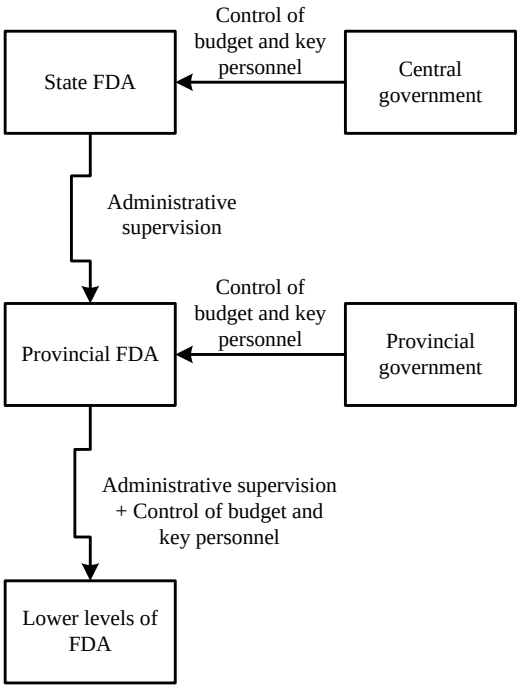

Fig. 1. **The Relationships between FDAs and Governments in China, 2000-2008.** This chart shows the relations between FDAs of different levels as well their relations with governments of different levels. This structure was in place between 2000 and 2008 and indicates the channels through which provincial governments could exert influence over local FDAs at both the provincial and lower levels.

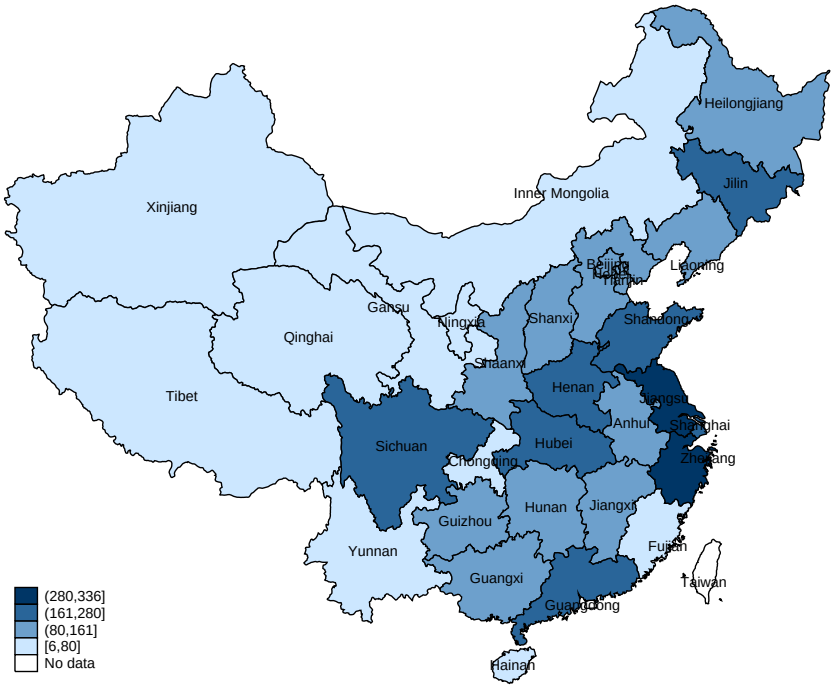

Fig. 2. **Numbers of Drug Producers by Province.** This map plots the number of drug firms (defined as those whose primary industry of operation is reported as the pharmaceutical industry in the ASIE database) by province in 2003.

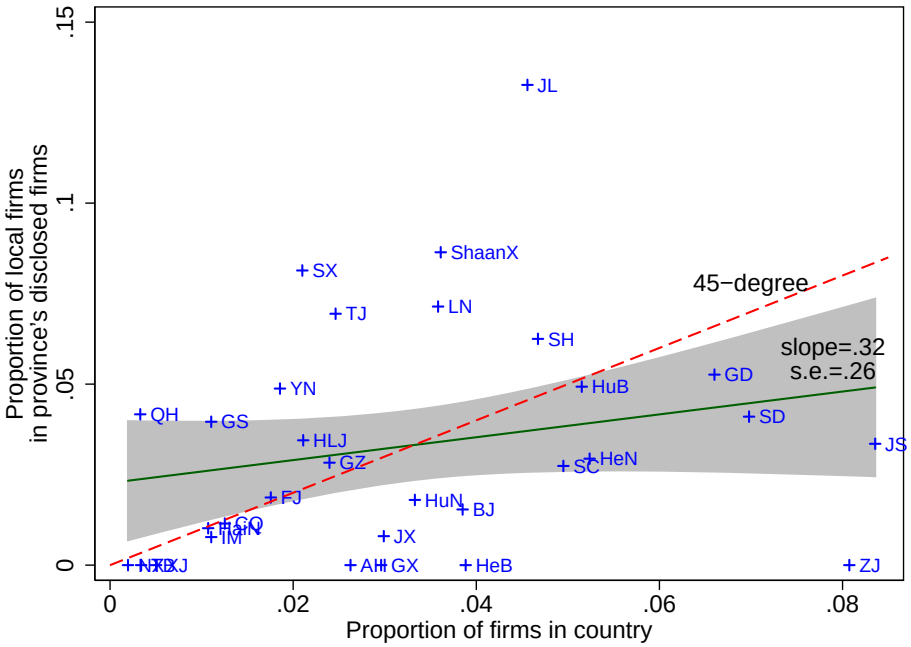

Fig. 3. Proportions of Local Firms Disclosed — 31-Province Sample. This figure shows the proportion of local firms disclosed in each province across all years (2001-2005) conditional on the relative size of the province's pharmaceutical industry in the country (measured by the proportion of drug firms in the country). The '+' signs represent provinces, the solid line represents the fitted line from an OLS regression, the dashed line is the 45° diagonal, and the shaded area indicates the 90% confidence interval of the OLS regression line.

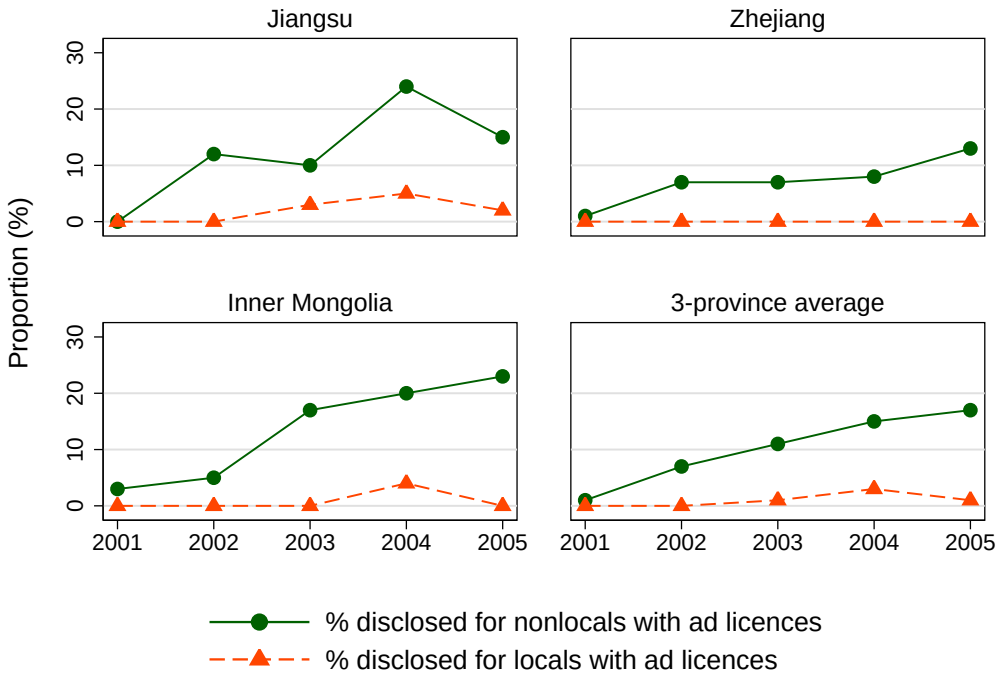

Fig. 4. Proportions of Disclosed Firms for Licensed Local and Nonlocal Advertisers — Three-Province Sample. This figure shows the proportions of licensed nonlocal firms which were disclosed as "illegal" advertisers and the proportions of licensed local firms which were disclosed as "illegal" advertisers for the three provinces of Jiangsu, Zhejiang and Inner Mongolia as well as the 3-province averages in each year from 2001 to 2005.

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 Local and Nonlocal Firms Disclosed for "Illegal" Advertising — 31-Province Sample

	(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

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

Table A3. 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
Total	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
Total	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
Total	104	1	77	0	568	94

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

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

Table A4. 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

Note. 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 A5. Disclosure Patterns — 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)
Ratio of nonlocal lagged					-0.032
					(0.028)
Nonlocal×(Ratio of nonlocal lagged)					-0.008
					(0.005)
Sales (lagged)	No	Yes	Yes	Yes	Yes
Previously disclosed	No	Yes	Yes	Yes	Yes
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

Note. 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 Disclosure Patterns — 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)
Ratio of nonlocal lagged						-0.011
						(0.016)
Nonlocal× (Ratio of nonlocal lagged)						0.002
						(0.003)
Sales (lagged)	No	Yes	Yes	Yes	Yes	Yes
Previously disclosed	No	No	Yes	Yes	Yes	Yes
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

Note. 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 Disclosure Patterns — 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)
Ratio of nonlocal lagged				-0.016
				(0.012)
Nonlocal×(Ratio of nonlocal lagged)				0.007
				(0.015)
Sales (lagged)	No	No	Yes	Yes
Previously disclosed	No	No	Yes	Yes
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

Note. 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.

Table A8. 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
Total	221	1,511	360	48	2,140

Note. 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 estimated where lagged values are included.

Appendix B Analysis Based on the Full 31-Province Sample

We use the sample for all 31 provinces to examine the nature of discriminative behavior in some more detail, providing evidence for a "tax revenue 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 incentivizing local government to discriminate against nonlocal competition. To analyze 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 in column 1, the discrimination effect is significantly positive 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) disproportionately 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 disproportionately targeting nonlocal firms. The magnitudes of the estimates indicate that the "tax revenue 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.

Table B1. Tax Revenue 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)	Yes	Yes	No	Yes	No
Previously disclosed	Yes	Yes	No	Yes	No
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

Note. 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.

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 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 "tax revenue 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.

We plot these data in Fig. 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 0.4% increase in the estimated discrimination effect, supporting the finding of the fiscal incentive motive in Table B1.

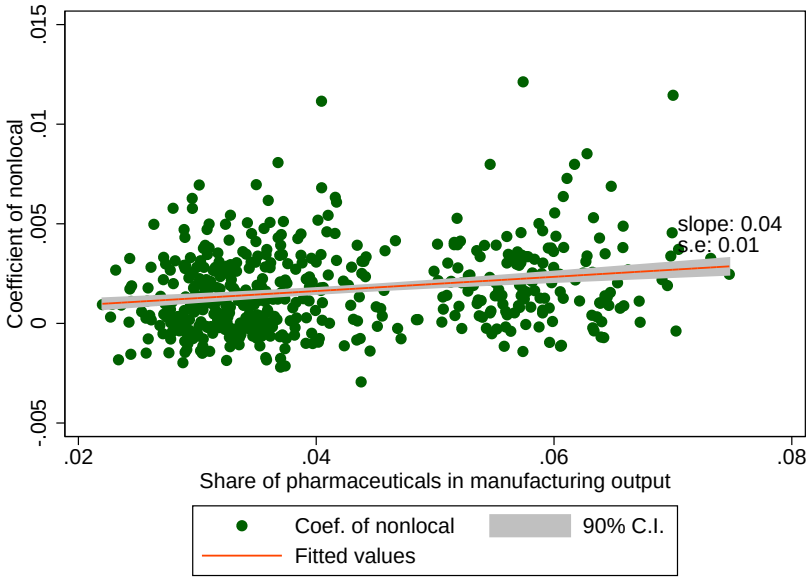

Fig. B1. Fiscal Incentive and Discrimination Effect — Simulated Result from 31-Province Sample, 2001-2005. This figure plots the simulated result from regressions based on 500 random draws of 10 provinces from the entire sample of 31 provinces. The data points represent discrimination coefficients (the coefficient on the nonlocal dummy) and average shares of pharmaceuticals in manufacturing output.