Bureaucratic Integration and Regional Specialization in China*

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Abstract

Fiscal decentralization introduced as part of China's economic reform since 1979 has unleashed strong incentives for China's local governments to pursue economic development, but the same incentives have also led to local protectionist policies inhibiting the process of regional specialization. This paper focuses on the constraints or freedom with which local governments can implement their protectionist policies. Using a panel data of 29 China's regions over the time period of 1985-1997, we find that China's political system of bureaucratic integration (specifically, concurrent appointment of local government officials in the central government) imposes constraints on the local governments from practicing protectionism. We also find that the effectiveness of local protectionist policies is limited by market competition, specifically, competition from foreign-invested firms operating in China and foreign imports. Our results on the role of local protectionism remain robust to controls for the regional variations in the size of the economy and the stage of economic development.

Key words: Local protectionism; regional specialization; bureaucratic integration; foreign competition; stage of development

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1. Introduction

One of the earliest and most influential ideas in economics is that of the division of labor and specialization (Adam Smith, 1776). With uninhibited trade of goods and services across regions and countries, there are gains from the division of labor, which subsequently leads to regional and international specialization of economic activities. The benefits of specialization have been well articulated in the literature of international economics and regional studies. The challenge is to elucidate the forces for such specialization.

Earlier studies focused on the differences in resource endowment across regions or countries to account for patterns of regional or international specialization (Ohlin, 1935). In the 1980s and 1990s, research emphasis was shifted toward the possibility of increasing returns to scale and its implications. A region or country with significant demand for certain goods or services in its own locality or neighboring ones could overcome the fixed costs for producing those goods or services, and subsequently enjoy concentrated production with the increasing return to scale (Davis and Weinstein, 1999 and 2003). Meanwhile, the theory of external economies, the history of which dates back to at least Marshall (1920), was revived with the success stories of U.S. clusters such as Silicon Valley in information technology and Hollywood in entertainment businesses (Krugman, 1991).

Recent studies have uncovered more complicated patterns of specialization. Using cross-country data, Imbs and Wacziarg (2003) find that as per capita income increases, countries first have sectoral diversification and then shift to concentrated production. Specifically, sectoral diversification may arise when the diverse demand associated with increasing per

capita income cannot be met by imports from other regions or countries due to trading costs. Meanwhile, without effective risk-sharing arrangements, regions would be prone to industry-specific shocks if they were to specialize in only a few industries (Kalemli-Ozcan, Sorensen, and Yosha, 2003).

All of the above market forces for regional and international specialization, however, could work only if the relevant regional and national governments refrain from market intervention in the uninhibited trade of goods and services, the freedom to locate production activities, and the establishment of inter-regional or international risk sharing arrangements. Indeed, as long as the gains from the division of labor and specialization are difficult to re-distribute across regions and countries, the primary concern of both regional and national governments is the financial performance of firms and industries under their jurisdictions. The regional and national governments may thus have incentives to protect their firms and industries by erecting barriers for inter-regional and international trade. Protests by people from all over the world at virtually every World Trade Organization/International Monetary Fund meeting are a vivid remainder of the pressures and incentive for local protectionism. The focus of this paper is to empirically examine the impacts of local protectionism on regional specialization using a panel data of 29 China's regions over the period of 1985 to 1997.

The case of China offers an ideal setting in which the impacts of local protectionism against regional specialization versus those of the market forces for regional specialization can be jointly assessed. Until 1979, the Chinese economy was a centrally planned economy, with virtually every aspect of the economy carried out according to plans and material incentives completely suppressed. Regional governments collected all the surpluses from firms under their jurisdictions and handed them over to the central government. The central government

then allocated budgets to the regional governments, but there was no obvious correlation between the surpluses handed over and the budgets allocated back. Under this system, there was no incentive for firms and industries to perform and nor was there any incentive for the regional governments to protect local firms or industries. However, the situation has changed significantly, generally due to the economic reform initiated in 1979 and specifically as a result of the fiscal decentralization policy introduced by the reform. Using aggregated data, Young (2000) finds increasing similarity in the structure of economic activities among China's regions, implying a rise of local protectionism. On the other hand, using input-output tables in 1987 and 1992, Naughton (2003) finds evidence consistent with increasing regional specialization. Using China's industry data from 1985 to 1997, Bai et al. (2004) show the degree of industrial agglomeration first decreased and then increased during the sample period, and find evidence suggesting that both the market forces for specialization and forces of local protectionism against specialization were at play.[1]

Direct and comparable measures for the extent of local protectionism across regions are difficult to establish. In this paper, we use some indirect measures related to the constraints or freedom with which the local governments can implement protectionist policies. Our key measure is developed based on some salient features of China's political system that places constraints on regional leaders from practicing local protectionism. All of China's regional leaders (administrative and party) are appointed by the central government in consultation with the opinions of the local people. Some of the regional leaders may have concurrent appointments in the central government (say, membership in the central politburo without specific portfolios), while others do not. Given that regional specialization is good for the national economy but not necessarily for the local economy, regional leaders with concurrent

[1] For more studies on China's local protectionism, see Poncet (2003), Li et al. (2004), Gong, Xu and Tan (2005), Li, Liu and Chen (2005), and Fan and Wei (2006).

appointments in the central government ("higher bureaucratic integration", see Huang, [1996]) should care more about regional specialization and practice less local protectionism than those who do not have the concurrent appointments. In addition to the measure of bureaucratic integration, we also have the ratio of local government expenditure to its GDP, which measures the ability of local governments to practice local protectionism and their propensity for obtaining revenue from local firms and industries, the share of GDP contributed by the primary industries, which measures resource endowment that could be kept by the regional governments for local use instead of being sold to other regions for further high value-added processing (Bhagwati, 1988), and variables about the extent of market competition, measuring the difficulty for the implementation of protectionist policies. Overall we find empirical evidence supporting some of these variables of local protectionism. While the main focus of the paper is about the impacts of local protectionism, we also control for the significant variations across China's regions in the size of the economy and the stage of development. We find support for the stage of diversification theory (Imbs and Wacziarg, 2003) and the impact of the size of regional economy on the extent of specialization, with our main results on local protectionism remaining robust to those controls.

The plan of the paper is as follows. Data and measurement are covered in Section 2, with discussions of the theories and hypotheses behind the key variables. Empirical results are reported in Section 3, and Section 4 concludes.

2. Data and Measurement

We first construct a measure of the regional specialization of industrial production – the dependent variable in our study. Next we describe a list of independent variables to be used

to test the main hypotheses about the determinants of regional specialization of industrial production. Summary statistics of key variables are then presented and discussed.

2.1. A measure of regional specialization

We measure a region's "degree of specialization in industrial production" by mapping out its composition of different industrial activities and normalizing it by the national total, using output data of 32 two-digit industries in 29 Chinese regions.[2] The measure is called the Hoover coefficient of localization (Hoover, 1936). It is calculated based on the location quotient with respect to output, which is defined as the following:

$$L_{ij} = \frac{OUTPUT_{ij} / OUTPUT_{j}}{OUTPUT_{i} / OUTPUT} \qquad (1)$$

where $OUTPUT_{ij}$ is industry i's output in region j, $OUTPUT_j$ is total output in region j, $OUTPUT_i$ is industry i's total output, and $OUTPUT$ is total industrial output of China. If L_{ij} is larger than 1, then industry i has a higher percentage in region j than its share in the total industrial output of China. Conversely, if L_{ij} is smaller than 1, then industry i has a lower percentage in region j than its share in the total industrial output of China.

Given the location quotients of region j for all industries, i=1, …, l, we rank industries by their location quotients in descending order and get a sequence of industries. Following that sequence, we can calculate the cumulative percentage of output in region j (y-axis) over the

[2] Region-by-industry output data for 1988 to 1994 and for 1997 are from China Statistical Yearbooks on Industrial Economy. Those for 1985 to 1987 are from China Statistical Yearbooks. Data for 1995 are from China Industrial Census and those for 1996 are from the National Bureau of Statistics of China.

industries (x-axis) and thus plot the localization curve for region *j*. If every industry in a region has the same percentage of output contribution as that of the industry to the country's total output, then the location quotient will be equal to one for all industries in the region, and the localization curve will be the 45° line. If a region's economic activities are concentrated in only a few industries, then the localization curve will be more concave. Analogous to the Gini coefficient for income distribution, the *Hoover coefficient of localization* is defined as the area between the 45° line and the localization curve divided by the entire triangular area in which the localization curve is contained. Thus the Hoover coefficient is between 0 and 1 by definition. The higher its value, the more skewed a region's economic activities to a few industries relative toward the national average.

2.2. Independent variables related to local protectionism

As pointed out in Section 1, our analysis is focused at the impacts of local protectionism on regional specialization. This focus is because uninhibited trade of goods and services across regions is a pre-condition for regional specialization. Measuring directly the extent of local protectionism is, however, difficult. This is because some protectionist policies are specific and quantifiable but others are subtle and indirect. For example, to protect the local automobile industry, some regions blatantly listed locally-made cars as the only choice for taxi service, while others gave a long list of technical specifications such as the size of engine and rate of emission that would effectively narrow down the choice set in favor of locally-made cars. We thus take an indirect approach toward measuring the extent of local protectionism.

In an earlier paper (Bai et al., 2004), we use the *benefits* from protecting local firms and industries as indirect measures for the extent of local protectionism. Local governments obtain more financial benefits from industries of higher profit-and-tax margins, and they derive more control benefits from state-owned enterprises (Shleifer and Vishny, 1994). Indeed, using the industry-level data, we find that geographic concentration of industrial activities is lower, presumably because of severer local protectionism, for industries with higher profit-and-tax margins and those with higher proportions of state-owned enterprises. In this paper, we focus on the *constraints or freedom* with which the regional leaders can implement protectionist policies.

Bureaucratic Integration

First, we would like to highlight some features of China's political system that constrain local leaders from practicing protectionism, and propose to use a variable called "bureaucratic integration" that is developed around these features (Huang, 1996). Unlike the U.S. political system, in which local government officials are elected directly by people under their jurisdiction, leaders of China's regional governments are appointed by the central government in consultation with the opinions of local people. The fact that China's local government officials are directly appointed by the central government seems to suggest that the interests of the local governments and those of the central government can be perfectly aligned thereby minimizing the extent of local protectionism. In reality, with the fiscal decentralization introduced in China's post-1979 economic reforms, the local governments have become increasingly interested in the success of their local firms and industries. Local government officials derive private benefits directly from firms and industries under their jurisdictions, and they also rely on the local firms and industries for building up support for

their reappointment, perfectly consistent with the predictions of the political patronage theory proposed by Shleifer and Vishny (1994). Thus, China's local government officials have become economic agents focusing on the development of the local economy and deriving private benefits accordingly, but they remain political subordinates to the central government in that they need permission from the central government for reappointment (Huang, 1996). In making the reappointment decision of a local government official, the central government does take into account the development of the local economy, through consultation with local people. However, the central government cares more about the contributions made by the concerned region to the success of the national economy. Hence there could be a conflict between the interests of the local governments and those of the central government, with the former in favor of but the latter against local protectionism.

The more aligned local government officials are with the interests of the central government, the less local protectionism will be practiced in the concerned regions. An interesting feature of China's political system is that some of the local government officials have concurrent appointments in the central government (say, membership in China's Politburo without specific portfolios). Those officials with concurrent appointments in the central government must put more weight on the development of the national economy and likely practice less protectionist policies than those who do not have the concurrent appointments in the central government. It is also possible that those local leaders with concurrent appointments in the central government are "rising stars", and they voluntarily put more weight on the success of the national economy so as to enhance their chance of being further promoted.

For each of the two key leaders of a given region, the party secretary and the governor, a variable called *Bureaucratic Integration* is constructed. The definition of *Bureaucratic Integration* follows directly from the work of Huang (1996). Specifically, the variable of *Bureaucratic Integration* is assigned a value of 4 if a regional leader holds a provincial post while also serving in a central government position. ("concurrent centralist"), a value of 3 if a regional leader has significant past service in central ministries ("centralist"), a value of 2 if a regional leader has significant service in other regions ("outsider"), and finally, a value of 1 if a regional leader has significant service within the concerned region ("insider"). The variable *Bureaucratic Integration* of the region is the simple average of the values of the two leaders. Following our discussion in the preceding paragraphs, we hypothesize that regions with higher *Bureaucratic Integration* care more about conforming with policies and economic interests of the central government, resulting in less protectionist behavior and more regional specialization.

Additional variables on local protectionism

With fiscal decentralization, China's local governments have strong incentives to protect firms and industries under their jurisdictions. However, their ability to do so depends on a number of factors, factors which we propose to use as additional independent variables of local protectionism. One of the factors is the size of local government expenditures relative to its GDP. Government spending is known for favoring local firms and industries. It could also be argued that those local governments with high ratios of expenditures to its GDP are under financial pressure to practice local protectionist policies and obtain fiscal revenue in order to maintain their large public sectors. Thus, it is expected that in regions with higher ratios of

local government expenditures to GDP, local protectionism more severe and the degree of regional specialization is lower.

The share of GDP from primary industries is another proxy for the severity of local protectionism. Like other planned economies, China had national policies for developing manufacturing industries at the expense of primary industries – specifically, artificially suppressed prices of the output from primary industries but artificially inflated prices of the outputs from manufacturing industries – before its economic reform in 1979 (the so-called "price-scissors problem", see, for example, Sah and Stiglitz, [1984]). In addition, due to central planning, those regions with high shares of GDP coming from primary industries may not have been the ones that further processed the outputs from primary industries and thus could not take full advantage of their resource endowments. Consequently the price-scissors problem led to severe misalignment of economic interests among China's regions. Since China initiated its economic reform in 1979, the prices of products from both primary industries and manufacturing industries have been increasingly determined by market forces, but it takes a much longer time to adjust the suboptimal geographic location of manufacturing activities. In general, manufacturing industries tend to have higher value added than primary industries do. As a result, it is expected that in those regions with higher shares of GDP from primary industries, local governments have more restrictions on the sales of the output from their primary industries to other regions, and consequently the degree of regional specialization is lower (Bhagwati, 1988).

The effectiveness of local protectionist policies, usually in the form of non-tariff barriers, is limited by the degree of market competition in the concerned regions. The more competition that comes from producers of other regions and countries, the lower the prices of the concerned goods and services, which in turn implies more difficulties for local governments

to protect firms and industries under their jurisdiction. With superior technology, management knowledge and financial resources, foreign-invested firms pose greater threats to local firms and industries than producers from other regions in China. For the same reasons, imports from other countries also pose greater threats to the local firms and industries than producers from other regions in China. We thus consider two proxies of the competition from foreign-invested firms operating in China and foreign imports respectively. One is the ratio of annual FDI inflows in a region relative to its GDP. The other variable is the average distance of a region's capital to China's major trading ports weighted by the percentage of China's trade coming through those ports.[3] It is expected that the degree of regional specialization is higher in regions with higher ratio of FDI inflows to its GDP and in those regions with a smaller distance to ports.

2.3. Variables on regional differences in the stage of development and the size of economy

Recent studies have found that the relationship between a country's geographic concentration of economic activities and its level of economic growth have not always been monotonic as predicted by some of the traditional theories of regional specialization. In a cross-country study, Imbs and Wacziarg (2003) show that geographic concentration first decreases and then increases with respect to per capita GDP. They offer two possible explanations. First, consumers tend to demand a more diverse range of goods and services as their income increases, and this in turn implies a diversification of economic activities if the consumer demand could not be met with imports from other countries due to high trading costs. Second, in the absence of perfect risk-sharing arrangements, it is risky for countries to specialize in

[3] We include 18 major sea ports in China: Dalian and Yingkou in Liaoning Province; Qinhuangdao in Hebei Province; Tianjin; Yantai, Qingdao, Rizhao, Shijiu in Shandong Province; Lianyungang in Jiangsu Province; Shanghai; Ningbo in Zhejiang Province; Shantou, Guangzhou , Huangpu, and Zhanjiang in Guangdong Province; and Haikou, Basuo, and Sanya in Hainan Province.

producing a small set of goods and services as predicted by the traditional theories of regional specialization (Kalemli-Ozcan, Sorensen and Yosha, 2003).

In their cross-country study, Imbs and Wacziarg (2003) go to great lengths to make sure that the level of disaggregated data used for each of their sample countries is more or less at the same level and therefore comparable for regression analysis. While the focus of this paper is about the impacts of local protectionism on the degree of China's regional specialization, it is also important to control for the effects of the significant variations in the stage of development across China's regions. Our study has two advantages: the level of disaggregated data used for measuring regional specialization is the same across all regions, and more importantly, it avoids the difficulty of controlling for institutional differences across countries in cross-country studies (Davis et al., 1997; Bacchetta et al., 2001; O'Connell and Wei, 2002). To test the stages of development theory, we include two income-related variables: a region's per capita GDP and the square of a region's per capita GDP. It is expected that per capita GDP has a negative impact on the regional specialization while the square of per capita GDP has a positive impact on the regional specialization.

Besides the variations in the stage of development, China's regions also differ in their size of economy, which also has an impact on the degree of regional specialization and needs to be controlled for. It has been argued that larger regions tend to have lower levels of specialization (Kalemli-Ozcan, Sorensen and Yosha, 2003). Presumably, a larger region has more diverse consumer demand which could only be met through within-region diversification of economic activities due to border effects or trading costs. It is also possible that any scale economy in production is easier to be exhausted in a larger region. To control for the impacts of the significant regional variations in the size of economy, a region's total

population is included as an independent variable and is expected to have a negative impact on the degree of regional specialization.

The variables used in this study and their definitions are summarized in Box 1.[4]

Box 1: Definition of the key variables

Name	Definition
$HOOVER_{jt}$	Hoover coefficient of specialization of region *j* in year *t*
BI_{jt}	Bureaucratic integration of region *j* in year *t*
$rGOVT_GDP_{jt}$	The ratio of government expenditure to GDP of region *j* in year *t*
$\%PRIMARY_{jt}$	The share of GDP contributed by primary industries of region *j* in year *t*
$rFDI_GDP_{jt}$	Annual FDI flows to GDP ratio of region *j* in year *t*
$DIST_Port_{jt}$	Capacity-weighted average distance to main sea ports of region *j* in year *t*
$pcGDP_{jt}$	Per capita GDP of region *j* in year *t*
$pcGDP2_{jt}$	The square of $pcGDP_{jt}$
POP_{jt}	Population of region *j* in year *t*

2.4. Summary Statistics

In Section 2.1, we discussed the construction of the Hoover coefficient of regional specialization for each of the 29 regions in China using output data of 32 two-digit industries over the period of 1985-1997. By aggregating the Hoover coefficients across all regions and plotting them against time, we may observe the time trend of regional specialization in China's manufacturing industries. As shown in Figure 1, the simple average across all

[4] Statistical Yearbooks are the main sources of data used for constructing the independent variables. Most by-region statistics of 1990s, including GDP, value-added of primary industries, local government expenditures, annual FDI flows, per capita GDP by region, and population, are from *China Statistical Yearbooks*. Some of the data for the earlier years, from 1985 to the early 1990s, are not available and are obtained from *China Regional Economy: a profile of 17 years of reform and opening-up*. Information of port capacities are from *China Statistical Yearbooks on Transportation*.

regions was 0.308 in 1985. It remained at that level until the late 1980s and began to increase gradually but consistently from 1989 and reached 0.390 in 1997. The weighted (by regional industrial output) average across regions demonstrates a similar time trend. In 1985, the Hoover coefficient of localization was 0.268. It decreased slightly to 0.261 in 1988 and then began to rise from 1989 and reached 0.308 in 1997. From the time trend of aggregated coefficients over the 13-year period, it is evident that China's regions have become more specialized in industrial production. This is in clear contrast to the results obtained by Young (2000) in which aggregated data was used, but is consistent with the results reported by Naughton (2003), in which input-output data was used. What is even more interesting and important is that there are substantial variations in the degree of specialization across regions. Figure 2 shows the averages (across time) of the Hoover coefficients of specialization for different regions, ranging from 0.766 (Tibet Autonomous Region) to 0.20 (Sichuan Province). If we exclude the extreme case of Tibet, the ratio of the highest over the lowest Hoover coefficient of specialization is still sizeable at the value of 2.55.

Table 1 summarizes the mean and rank of other variables across regions. Regarding the measure of bureaucratic integration, the mean value across regions is 1.63. The region with the highest degree of bureaucratic integration is Beijing (the capital city of China) and the region with the lowest score is Yunnan, the Southwestern province bordering Thailand and Vietnam. On the measure of per capita income, Shanghai is ranked top while Guizhou is ranked bottom. To some extent, per capita GDP is related to a region's share of GDP from primary industries, with a correlation coefficient of -0.64. Tibet, Sichuan, and Guizhou top the list on the share of GDP from primary industries. They are also among the poorest by the measure of per capita GDP. Table 1 also shows that there are substantial variations across regions with respect to the measures of market competition from foreign-invested firms and foreign imports. The FDI flows to GDP ratio ranges between 183 percent in Guangdong and

2 percent in Tibet; and the distance to ports varies from 600 kilometers (Shanghai) to 3000 kilometers (Xinjiang). Similarly, the ratio of government expenditures to GDP also varies greatly. Qinghai is the top, measured at 0.23, while Jiangsu is at the bottom with the figure of 0.06. The measure is negatively correlated with the population (correlation coefficient is -37 percent) and per capita income (correlation coefficient is -29 percent) of regions.

For details, see Table 2 for the pair-wise correlation of key variables used in this study.

3. Empirical results

Having constructed a panel data set of 29 regions over the time period of 1985 to 1997, we next examine how the degree of China's regional specialization is determined by the independent variables related to local protectionism, and regional variations in the stage of development and the size of economy. As the Hoover coefficient of regional specialization is defined to be between 0 and 1, we use its logistic transformation as the dependent variable in the model to be estimated; that is, we use

$$LogitHOOVER_{jt} = \ln\left(\frac{HOOVER_{jt}}{1 - HOOVER_{jt}}\right) \qquad (2)$$

In setting up the empirical model, we note that relocation of economic activities may take time, and as a result the degree of regional specialization may depend on its historical pattern as well as the factors discussed in Sections 2.2 and 2.3. To account for the possible influence of history, we consider the following dynamic panel structure:

$$
\begin{aligned}
LogitHOOVER_{jt} = {} & \delta_1 LogitHOOVER_{j,t-1} \\
& + \beta_0 + \beta_1 BI_{jt} + \beta_2 GOVT_GDP_{jt} + \beta_3 \%PRIMARY_{jt} \\
& + \beta_4 rFDI_GDP_{jt} + \beta_5 DIST_PORT_{jt} \\
& + \beta_6 pcGDP_{jt} + \beta_7 pcGDP2_{jt} \\
& + \beta_8 POP_{jt} + \gamma_t + \varepsilon_{jt}
\end{aligned} \tag{3}
$$

where γ_t is the time-specific effect, and ε_{jt} is the error term.

We use a procedure developed in Arellano and Bond (1991) to estimate equation (3), and Column 1 of Table 3 summarizes the estimation results.[5] Regarding the variables related to local protectionism, we note that the coefficient for *Bureaucratic Integration* is positive with a *p* value of 12%. This implies that the degree of regional specialization tends to be higher for regions whose top local leaders have more alignment of local interests with those of the central government, and offers support to our hypothesis that some of the features in China's political system do impose constraints on local government protectionist policies. The estimated coefficient for the ratio of local government expenditures to its GDP (*rGOVT_GDP*) is positive (opposite to our prediction) and statistically insignificant. One possible reason is that there are many types of government expenditures (for example, capital construction, agriculture production and administration, culture, education, science and health care, and others). The extent to which those expenditures can be used for protecting local firms and industries may vary from one type of government expenditures to another, and as a result the *aggregate* government expenditures relative to GDP may not be able to reflect the degree of freedom with which regional governments can implement their local protectionist policies. The coefficient for the share of GDP from primary industries (*%PRIMARY*) is negative as expected but statistically insignificant. This implies that the degree of regional specialization is lower in regions with a higher share of GDP from primary industries. However, as China

[5] Tibet is automatically dropped out of the regression analysis, as the time series of its FDI inflows to GDP are less than three years.

continues its economic reform, the prices of output from the primary industries have been increasingly determined by market forces and hence the extent of the price-scissors problem has been minimized, resulting in a diminished role of primary industries in the implementation of local protectionist policies. The coefficient for the ratio of annual FDI flows of a region to its GDP (*rFDI_GDP*) is positive and statistically significant at the 10% level, while the coefficient for the distance to ports (*InDIST_Port*) is negative and statistically significant at the 10% level. These results imply that the degree of regional specialization is higher in those regions that are subject to fiercer competition from foreign invested firms and foreign imports, revealing the effectiveness of local protectionist policies are limited by market competition. By entering into the World Trade Organization in late 2001, China has further committed to introducing competition into its domestic market, which will accelerate its process of regional specialization.

Next we examine the impacts of the regional differences in the stage of development and the size of economy on the degree of regional specialization. The coefficient for per capita GDP (*pcGDP*) is negative and statistically significant at the 5% level, while that for per capita GDP square (*pcGDP2*) is positive with a *p* value of 13%. These results show that as the per capita GDP increases, the degree of regional specialization first decreases and then increases, lending strong support to the stage of development theory. It should be noted that, in contrast to the cross-country study by Imbs and Wacziarg (2003), our results are obtained from national data on China's regions, which is more comparable and free from the impacts of institutional differences. Together the two studies suggest that the relationship between regional specialization and the level of economic development is more complicated than what is predicted by the traditional theories of regional specialization. Finally, the coefficient for a

region's population (*POP*) is negative and statistically significant at the 5% level, implying that larger regions have lower degrees of specialization. A leading explanation for the negative relationship between the size of a region and its degree of specialization is that the more diverse demand associated with larger regions could not be met entirely by imports from other regions/countries because of trading costs. However, in the case of China, the costs of trading across regions are expected to decrease due to the massive investments in infrastructures, and consequently the negative effect of the size of economy on regional specialization may diminish over time.

To test the robustness of our results, we use the stepwise backward-selection method (namely, eliminating the variable of the lowest significance level of the preceding regression), and carry out two more regressions, with the results summarized in columns 2 and 3 of Table 3. Throughout the process, the signs of coefficients for all the remaining independent variables do not change, while their statistical significance is generally retained. In particular, the coefficient for bureaucratic integration is positive and statistically significant at the 5% level, lending stronger support to the role of local protectionism from the previous regression of equation (3) (i.e., column 1 of Table 3). Meanwhile, the coefficient for the per capita GDP square remains positive but becomes statistically less significant, indicating the dominance of regional specialization in China as its per capita GDP increases. Overall, we have found supporting evidence for both the role of local protectionism and the impacts of the stage of economic development and the size of economy.

4. Concluding remarks

The issue of local protectionism in China has attracted much attention in recent years. Fiscal decentralization, one of the centerpiece reform policies introduced since 1979, has unleashed strong incentives on the part of the local governments to pursue economic development. However, without proper mechanisms to redistribute the gains from specialization and trade across regions, the same incentives for economic development may lead to protectionist policies favoring the local firms and industries. Using aggregated data, Young (2000) show that China's regions have become increasingly similar in the structure of economic activities, suggesting a rise of local protectionism accompanying what he calls China's piecemeal economic reform. Subsequent studies, however, have found increasing regional specialization in more recent years (Naughton, 2003; Bai et al., 2004).

Given that the interests of the local governments may clash with the process of regional specialization, it is important to understand the determinants of local protectionism. This paper focuses on the constraints or freedom with which the local governments can implement their protectionist policies. Using a panel data of 29 China's regions over the time period of 1985-1997, we find that China's political system of bureaucratic integration (specifically, concurrent appointment of the local government officials in the central government) imposes political constraints on the local governments from practicing local protectionism. We also find that the effectiveness of local protectionist policies is limited by market competition, specifically, competition from foreign-invested firms operating in China and foreign imports. Finally, our results on the constraints or freedom with which the local protectionism can be

practiced are robust to controls for the regional variations in both the stage of economic development and the size of economy.

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Fig. 1. Time trend of average (across all regions) Hoover coefficient of specialization

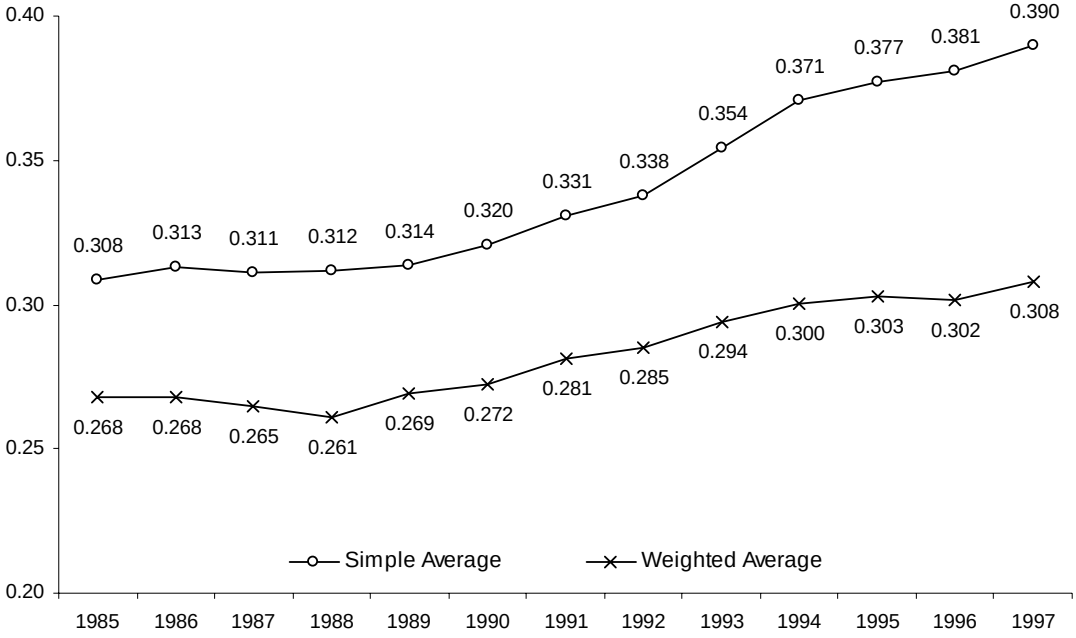

Fig 2. Average (across time) Hoover coefficient of specialization by region

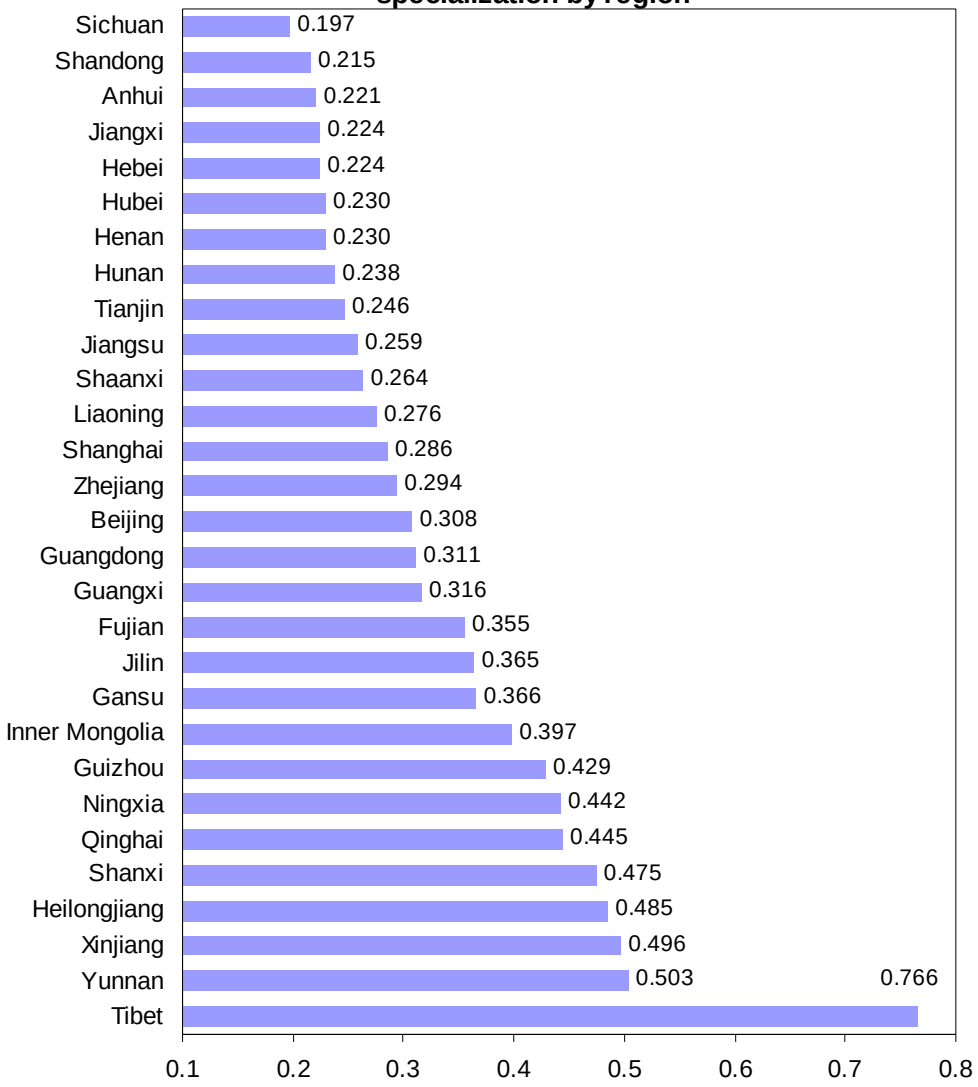

Table1. Mean value and rank of main variables

Regions	Hoover	Rank	BI	Rank	rGovt_GDP	Rank	%PRIMARY	Rank	rFDI_GDP	Rank	DIST_port	Rank	pcGDP	Rank	POP	Rank
Beijing	0.31	15	3.08	1	12%	14	7%	28	82.75	5	940	19	0.69	2	1107	25
Tianjin	0.25	21	2.19	3	13%	13	8%	27	106.82	3	838	24	0.56	3	890	26
Hebei	0.22	25	1.77	8	9%	26	23%	20	13.60	20	912	20	0.25	13	6106	7
Shanxi	0.47	5	1.77	8	13%	12	16%	25	6.79	26	1023	17	0.21	16	2904	19
Inner Mongolia	0.40	9	1.50	15	18%	4	31%	10	6.98	24	1223	13	0.22	15	2175	22
Liaoning	0.28	18	1.23	24	11%	18	14%	26	45.82	7	1073	15	0.41	6	3947	12
Jilin	0.36	11	1.35	21	15%	8	26%	15	18.96	14	1326	11	0.26	12	2478	20
Heilongjiang	0.48	4	1.38	20	12%	16	19%	24	14.93	17	1559	8	0.31	9	3559	15
Shanghai	0.29	17	2.54	2	10%	20	3%	29	96.01	4	600	29	1.00	1	1327	24
Jiangsu	0.26	20	1.35	21	6%	29	22%	22	48.22	6	633	28	0.39	7	6741	5
Zhejiang	0.29	16	1.50	15	7%	27	21%	23	24.98	11	671	27	0.42	5	4220	11
Anhui	0.22	27	1.19	25	9%	25	33%	7	14.08	19	704	26	0.18	20	5681	8
Fujian	0.36	12	1.73	11	12%	17	27%	13	131.21	2	978	18	0.34	8	3027	18
Jiangxi	0.22	26	1.58	13	12%	15	35%	5	16.25	16	886	22	0.18	23	3824	13
Shandong	0.22	28	1.77	8	7%	28	26%	14	32.21	9	732	25	0.31	10	8374	3
Henan	0.23	23	2.04	4	9%	24	30%	11	10.77	22	879	23	0.18	21	8583	2
Hubei	0.23	24	1.50	15	10%	23	30%	12	19.67	13	889	21	0.24	14	5453	9
Hunan	0.24	22	1.12	27	10%	19	35%	6	18.50	15	1051	16	0.19	19	6120	6
Guangdong	0.31	14	1.58	13	10%	21	23%	21	183.83	1	1309	12	0.42	4	7030	4
Guangxi	0.32	13	1.27	23	14%	10	37%	4	37.29	8	1644	6	0.17	24	4288	10
Sichuan	0.20	29	1.96	6	14%	9	42%	2	20.31	12	1621	7	0.14	28	10884	1
Guizhou	0.43	8	1.85	7	17%	5	38%	3	11.19	21	1540	9	0.11	29	3294	17
Yunnan	0.50	2	1.08	29	22%	3	31%	9	5.37	27	1949	3	0.18	22	3764	14
Tibet	0.77	1	1.50	15	10%	22	46%	1	1.93	29	2776	2	0.16	26	224	29
Shaanxi	0.26	19	1.42	19	13%	11	25%	17	28.18	19	1196	19	0.17	19	3315	19
Gansu	0.37	10	1.15	26	17%	6	25%	16	6.96	25	1652	5	0.15	27	2270	21
Qinghai	0.44	6	1.12	27	23%	1	24%	19	2.57	28	1793	4	0.21	17	453	28
Ningxia	0.44	7	2.04	4	22%	2	24%	18	8.15	23	1487	10	0.19	18	475	27
Xinjiang	0.50	3	1.65	12	17%	7	32%	8	14.64	18	3028	1	0.28	11	1540	23
Mean	0.34		1.63		13%		26%		37.02		1273		0.29		3933	
No of Obs.	377		369		377		377		360		348		377		377	

Table 2. Pairwise correlations between key variables

	BI	rGovt_GDP	%PRIMARY	rFDI_GDP	DIST_port	pcGDP	pcGDP2
POP	-0.0782 13% 369	-0.3709 *** 377	0.2507 *** 377	-0.0003 360	-0.3418 *** 348	-0.1062 ** 377	-0.1182 ** 377
pcGDP2	0.2276 *** 369	-0.1571 *** 377	-0.4643 *** 377	0.46 *** 360	-0.214 *** 348	0.9018 *** 377	
pcGDP	0.2577 *** 369	-0.2859 *** 377	-0.6379 *** 377	0.5773 *** 360	-0.2604 *** 348		
DIST_port	-0.1561 *** 341	0.3885 *** 348	0.4667 *** 348	-0.2335 *** 332			
rFDI_GDP	0.2107 *** 359	-0.2976 *** 360	-0.4442 *** 360				
%PRIMARY	-0.3036 *** 369	0.1599 *** 377					
rGovt_GDP	-0.0526 369						

Table 3 Estimation Results

Dependent variable: LogitHoover

	1	2	3
Logit Hoover			
Lag 1	0.0971 49%	0.097 50%	0.0975 51%
BI	0.011 12%	0.0108 12%	0.0129 **
rGOVT_GDP	0.0865 90%	0.0929 89%	
%Primary	-0.0196 96%		
rFDI_GDP	0.0005 *	0.0005 11%	0.0005 11%
lnDIST_Port	-0.6412 *	-0.6413 *	-0.6747 *
pcGDP	-0.5704 **	-0.5695 *	-0.5375 *
pcGDP2	0.121 13%	0.1205 15%	0.1138 18%
POP	-0.0004 **	-0.0004 ***	-0.0004 **
Year dummies	yes	yes	yes
No. of Obs	298	298	298