Market Access and Individual Wages: Evidence from China

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Abstract

We consider the effect of geography, and in particular market access, on wages using individual data from 56 Chinese cities in 11 different provinces. By applying New Economic Geography theories to individual-level survey data, we contribute to the analysis of growing wage disparities within China, and even within provinces. We evaluate the extent to which market proximity can explain inter-individual wage heterogeneity and growing wage inequality within Chinese provinces.

We present a simple New Economic Geography model that links wages to individual characteristics and market access. The latter is calculated as a transport cost weighted sum of surrounding locations' market capacity. Based on 1995 data on around 6,000 Chinese workers, and after controlling for individual skills and local factor endowments, we find that a significant fraction of the inter-individual differences in returns to labor can be explained by the geography of market access. We further check whether the relationship between market access and wages holds equally for all worker types. We find greater wage sensitivity to market access for high-skilled workers and for workers in private, and particularly foreign-owned, firms.

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1. Introduction

Since the establishment of the People's Republic of China in 1949, income inequality has always been an important and sensitive political issue. However, even though the country is still influenced by Maoist egalitarian ideology, unprecedented income growth over the last two decades has come accompanied by large and still-rising income inequality within China (Meng et al., 2005). Coastal provinces are known for their wealth and development, and inland regions for their backwardness and poverty. A core-periphery structure of the income gradient across regions, whereby regions with low per capita income are predominantly located at the economic periphery and those with the highest income at the economic center, has long been observed in many different countries; this same structure is also becoming apparent in China (Lin, 2005). Most analysis and policies regarding spatial inequality in China have concentrated on the gap between the Eastern and Western provinces. The literature on heterogeneity within these regions has focused on the contrast between rural and urban areas (Wei and Wu, 2002). However, the ongoing growth of intra-provincial disparities has led researchers and policy-makers to become increasingly interested in the origins of this new phenomenon (Ravaillon and Chen, 2007).

A number of reasons may lie behind the failure of income levels to converge. Combes et al. (2007) note that three broad sets of explanations are frequently invoked to explain persistent spatial wage disparities: spatial differences in the skill composition of the work force; differences in non-human endowments; and differences in interactions between workers or firms. While controlling for the first two factors, our paper aims to explain intra-national and intra-provincial disparities through the lens of New Economic Geography (NEG), applied to individual data. NEG literature explains the emergence of a heterogeneous economic space by appealing to transport costs and increasing returns to scale (Krugman, 1991, and Krugman and Venables, 1995). One of its central tenets is the importance of proximity to consumers, as represented by the region's "market access" which is typically defined as the distance-weighted sum of the market capacity of surrounding locations (Fujita et al., 1999). The NEG "wage equation" then models nominal wages as a function of the region's market access. Wages are predicted to be higher at the economic center, and lower at the periphery. Since locations which are closer to consumer markets enjoy lower transport costs, firms based in these locations can afford to pay higher wages and still break even.

Both theoretical developments and growing empirical evidence in the field of NEG have confirmed the impact of proximity to markets on nominal wages (Head and Mayer, 2004;

Redding and Venables, 2003 and 2004; Hanson, 2005). One prerequisite of any analysis of the determinants of regional wages is sufficient controls for individual characteristics like skill or gender which are among the main determinants of inter-individual wage heterogeneity (Mincer, 1974; Willis, 1986; Combes et al., 2007).[1]

Mion and Naticchioni (2005) and Combes et al. (2007) use individual data to estimate the impact of market proximity on wages, emphasizing the importance of the spatial sorting of skills in explaining wage disparities. These analyses appeal to a fairly crude measure of market access, based on Harris (1954)[2], which is not directly derived from NEG theory and may for this reason overestimate the role of surrounding markets on local wages (Head and Mayer, 2006).

A structural derivation of market access was first offered by Redding and Venables (2004), who estimated the impact of market access on the cross-country variation in 1996 per capita income. Head and Mayer (2006) showed that educational differences have to be taken into account in their analysis of regional wages across the European Union, since not controlling for education runs the risk of wrongly attributing wage disparities to economic geography factors.[3] They propose a human-capital augmented version of the wage equation, which has now become the standard approach (see Breinlich, 2006, for an application to the European Union, and Lin, 2005, and Ma, 2006, with respect to China).

Other articles have applied cruder measures of market access to aggregate data to explain the impact of market proximity on income: Mion (2004) for Italy; De Bruyne (2003) for Belgium; Brakman et al. (2004) for Germany; and Amiti and Cameron (2007) for Indonesia. Only the last two of these papers control for differences in education levels.

Most of the papers cited above which include a human capital indicator, do so via a measure of the average education level. Even though this is a substantial improvement, these indicators fail to account for the distribution of education within the labor force. Moreover, this approach does not capture other worker characteristics (such as work experience or gender), whose importance has been emphasized by labor economists (Mincer, 1974; Willis, 1986).

[1] The importance of controlling for differences in worker quality is underlined in Bernard et al. (2005), who derive a general test of relative factor price equality across the US that is robust to unobservable regional factor quality differences.

[2] See section 4.1 for the definition of the Harris market potential.

[3] Because workers with better unobservable characteristics are more likely to be located in more central areas, wage disparities across areas may be wrongly attributed to agglomeration economies. This would induce an upward bias in the estimated coefficient on market access. In addition, beside the direct effect, remoteness may hamper the accumulation of human capital, aggravating the wage disadvantage of peripheral regions (Redding and Schott, 2003). As argued by Breinlich (2006), this will be the case if intermediate and transport cost-intensive goods use relatively more skilled labor. More central locations will then offer higher wages for skilled labor, which increases the incentives for human capital accumulation.

To our knowledge, our paper is one out of only two, together with Paillacar (2006)[4], combining these different strands of literature to estimate a structural model of wages with individual data. Micro-level data allow us to control for skill composition, other individual features and firm characteristics, before we investigate whether wages respond to the economic geography of their location. A further advantage of this approach is that it can alleviate the potential problem of endogeneity of market access since it is less likely that a shock to an individual wage translates into any change in local market access.[5]

Most of the empirical work applying NEG theory has covered developed countries. However, the agglomeration forces studied by NEG are of particular interest in developing countries. In China, due to increasing integration into the world economy, these forces are expected to have a major impact on the spatial structure of economic activity, influencing factor localization and therefore factor prices within the country. Recent empirical work on NEG in China includes Amiti and Javorcik (2007), who use firm-level data to analyze the determinants of foreign-firm entry across Chinese provinces within a NEG framework and underline the importance of supplier and market access.

China is an especially interesting country in which to test the wage equation. According to economic theory, migration leads to factor-price equalization. In China, migration is officially restricted and the urban labor market is strictly segmented between urban and rural workers.[6] Any change in demand for local goods is therefore much more likely to lead to wage adjustment than to adjustment in the number of workers. Hence a city facing an increase in its demand would not necessarily be able to adjust employment, and would therefore experience a rise in wages.[7] Consequently, variations in market access across Chinese cities are likely to be reflected in wage differentials. Lin (2005) was the first to examine the influence of proximity to demand and supply in China. She finds, based on aggregate data, that greater proximity is associated with higher average provincial real wages. A similar analysis is found in Ma (2006), who concentrates on the impact of market and supplier access on wages in foreign-invested firms. However, the empirical analysis of both Lin and Ma is limited to

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[4] Paillacar (2006) uses Brazilian data.

[5] Hanson (2005) argues that when the dependent variable is at the finest possible level, shocks in the error term will be less likely to affect the independent variable. Moreover, if the explanatory variables are aggregated to a higher level, endogeneity will again be less likely, since shocks to individual variables do not substantially affect regional variables.

[6] See Banister (2005) for more details on the Chinese labor market.

[7] Even though the lack of jobs in the countryside forces millions of people each year to abandon agriculture and migrate to richer parts of the country, mainly to towns, to find work in urban industries (Ping and Pieke, 2003), their impact on urban wages might be negligible: the labor market is strictly segmented and prevents migrants from obtaining access to urban jobs or social security (Banister, 2005).

international markets, and does not take into account local demand.

Our paper contributes to a better understanding of the relationship between market access and spatial inequality in China, as we also integrate domestic trade flows into our calculation of market access. In addition, the calculation of city-level market access allows us to analyze inequalities within provinces. Further, the use of a household survey means that we can control for individual- and firm-level characteristics, as well as alternative explanations of spatial wage disparities, such as scale economies and factor endowments. Last, we analyze whether the impact of market access depends on worker or firm characteristics.

Our results are based on a 1995 survey conducted by the Chinese Academy of Social Sciences. Our data set covers around 6,000 Chinese workers from 56 cities in 11 provinces. We confirm that individual skills account for a large fraction of existing spatial wage disparities in China. We also find that a significant fraction of inter-individual differences in wages can be explained by the geography of access to markets. After controlling for worker heterogeneity, factor endowments and industry and provincial characteristics, our estimate of the elasticity of individual wages to market access is 0.14. This figure lies between that of 0.1 obtained by Head and Mayer (2006) and the coefficient of around 0.3 found by Redding and Venables (2004), both estimated using aggregate data. Growing differences in trade costs or market size between Chinese cities can therefore lead to increasing wage disparities within provinces. On average, a one standard deviation increase in the market access of a city leads to a rise in individual wages of 29%.

In the public debate, China is often presented as a country with quasi-infinite labor supply to the manufacturing sector. Were this to be the case, wages in China would respond only little to both international and local markets. One implication of our results is that wages in China actually respond to market access in a strikingly similar manner to that which is observed in industrialized countries. The Chinese labor market, from this specific point of view, does not seem fundamentally different.

We check whether the relationship between market access and wages holds for all types of workers equally, or whether this relationship is valid only for certain firm types or skill profiles. We find that high-skilled workers benefit more from greater market access than do unskilled workers. These results are very consistent with the NEG model, which predicts that the relationship between market access and wages will be weaker as migration is stronger. The literature on migration in China has shown that migrants are in the majority low-skilled.

Also, the sensitivity of wages to market access varies across firms according to their ownership type. We might expect private, recently-created firms to be more flexible in terms of wages and to react more to market shocks than do state-owned firms. We find that while wages in private, and particularly in foreign, firms react strongly, wages in state-owned enterprises are largely insensitive to the city's market access.

The remainder of the paper is organized as follows. The next section outlines the theoretical framework from which the econometric specifications used in the subsequent sections are derived, and presents the two key relationships that are estimated in this paper, namely the "trade equation" and the "wage equation". Section 3 describes the data and calculates market access measures for Chinese cities. Section 4 investigates the extent to which wages in China respond to these measures, and carries out a number of robustness checks. Section 5 concludes.

2. Theoretical framework

The theoretical framework underlying the empirical analysis is a reduced version of a standard New Economic Geography model of monopolistic competition based on Dixit and Stiglitz (1977), similar to that used by Fujita et al. (1999) and Redding and Venables (2004).

We consider a world with R locations, composed of firms operating under increasing returns to scale and producing differentiated manufactured products. Consumers' utility increases with the number of varieties. The demand for differentiated products is modeled in the usual symmetric constant elasticity of substitution way, with σ ($\sigma > 1$) being the elasticity of substitution between any pair of products.

The final demand for goods in location j is derived from the maximization of the representative consumer's CES utility function.[8] Country j's demand for a variety produced in r is:

$$demand_{rj} = p_{rj}^{-\sigma} \frac{E_j}{G_j^{1-\sigma}} \tag{1}$$

where E_j is location j's total expenditure on manufactured goods and p_{rj} is the price of varieties from location r sold in j (consisting of the mill price p_r and iceberg transportation

[8] See Fujita et al. (1999) for a complete statement of the underlying model.

costs T_{rj} between the two locations: $p_{rj} = p_r T_{rj}$). G_j is the aggregate price index for manufactured goods, $G_j = \left[\sum_{r=1}^{R} n_r p_{rj}^{1-\sigma}\right]^{1/1-\sigma}$, with n_r being the number of firms in r. Taking into account that T_{rj} units must be shipped in order for one unit to arrive, we obtain the effective demand x_{rj} faced by a firm in r from location j:

$$x_{rj} = T_{rj} p_{rj}^{-\sigma} G_j^{\sigma-1} E_j = T_{rj}^{1-\sigma} p_r^{-\sigma} G_j^{\sigma-1} E_j \tag{2}$$

As demonstrated by Redding and Venables (2004), the own price elasticity of demand is σ, and the term $G_j^{\sigma-1} E_j$ shows the position of the demand curve faced by each firm in market j. This latter is referred to as the "market capacity" of country j. It corresponds to local expenditure E_j adjusted for the "market crowding" effect G_j, which summarizes the number of competing firms and the prices they charge. Intuitively, a greater number of competitors and thus a lower value of G_j will reduce the attractiveness of j for any firm exporting there.

Equation (2) underlines that trade costs influence demand more when the elasticity of substitution is high. We follow the literature in referring to $\phi_{rj} = T_{rj}^{1-\sigma}$ as the "phi-ness" of trade (see Baldwin et al., 2003). This can take a value between 0 (when trade costs are prohibitive) and 1 (when trade costs are negligible). Summing over all products produced in location r, we obtain the "trade equation" (Redding and Venables, 2004).

The total value of exports of region r to region j is therefore:

$$n_r p_r x_{rj} = n_r p_r^{1-\sigma} \phi_{rj} G_j^{\sigma-1} E_j \tag{3}$$

As emphasized by Redding and Venables (2003), this equation for bilateral trade flows provides a basis for the estimation of a gravity trade model. While the last term on the right-hand side of equation (3) reflects the "market capacity" of region j, $m_j = G_j^{\sigma-1} E_j$, the first term, $n_r p_r^{1-\sigma}$, measures what is referred to as the "supply capacity" of the exporting region, $s_r = n_r p_r^{1-\sigma}$. This corresponds to the product of the number of varieties and their price competitiveness.[9]

The bilateral trade flows in equation (3), which will serve as the basis of the gravity equation estimated in Section 4, can therefore be rewritten as:

$$n_r p_r x_{rj} = s_r \phi_{rj} m_j \tag{4}$$

[9] Redding and Venables (2003) discuss the concepts of market and supply capacity in greater depth.

Turning to supply, we follow the standard assumptions of the Dixit-Stiglitz-Krugman (DSK) model. The differentiation costs of varieties are supposed to be so small that each variety is produced by only one firm.

Increasing returns at the firm level come from the combination of a plant-specific fixed cost, f_r, and a marginal cost of production, c_r, which is region-specific (Head and Mayer, 2004). The cost of producing q_r in each region is assumed to take the form $c_r q_r + f_r$. Each firm maximizes gross profit. The gross profit function of region r on each market j is therefore: $\pi_{rj} = (p_r - c_r) T_{rj} q_{rj}$. The resulting mill price for each origin r is a simple mark-up over marginal costs:

$$p_r = \frac{c_r \sigma}{\sigma - 1} \tag{5}$$

All varieties produced in a given region r are thus valued at the same price (before transport costs). The gross profit earned in each market j for a variety produced in region r is given by $\pi_{rj} = p_r x_{rj} / \sigma$.

Substituting in equation (5), summing up the profits earned in each market and subtracting the fixed costs, f_r, we obtain the net profit in each potential location r:

$$\Pi_r = \sum_j p_r x_{rj} / \sigma - f_r = \frac{1}{\sigma} c_r^{1-\sigma} \sum_j \left[\phi_{rj} G_j^{\sigma-1} E_j \right] - f_r \tag{6}$$

Following the literature we write

$$\sum_j \phi_{rj} G_j^{\sigma-1} E_j = \sum_j \phi_{rj} m_j = MA_r \tag{7}$$

where MA_r is the "market access" of region r. This is simply the sum of the market capacities of all destinations j, m_j, weighted by the measure of bilateral trade costs, ϕ_{rj}, between r and j. This summarizes how well a location is endowed with access to markets for the goods it produces. The New Economic Geography literature highlights that firms in locations with higher market access incur lower overall transportation costs and are thus able to pay higher wages (Fujita et al., 1999).[10]

We follow Head and Mayer (2006) in introducing worker heterogeneity into the standard

[10] As pointed out by Head and Mayer (2006), market access bears a close resemblance to Harris (1954)'s market potential. The difference lies in the fact that Harris' market potential implicitly treats G_r, the price index, as a constant and ϕ_{rj} is approximated by $1/dist_{rj}$. In this sense, the MA_r is real, not nominal, since it incorporates the notion that large markets that are extremely well-served by existing firms might offer considerably less potential for profits than smaller markets with fewer competitors around them.

Krugman (1980) model, assuming that labor is the only production factor, and positing both a fixed, α, and a variable, β, component of firm-level labor requirements. Apart from notation and the inclusion of individual characteristics, we obtain what Fujita et al. (1999) call the "wage equation".[11] This wage equation is the second key relationship that will be estimated in the next section:

$$w_i = \left[\sum_j \phi_{rj} G_j^{\sigma-1} E_j \frac{\beta^{1-\sigma}}{\sigma\alpha} \right]^{1/\sigma} \exp(\rho z_i) = \left[MA_r \frac{\beta^{1-\sigma}}{\sigma\alpha} \right]^{1/\sigma} \qquad (8)$$

with z corresponding to worker *i* characteristics and ρ to their returns in terms of wages.[12] This equation illustrates the two different ways in which a region r can adjust to a shock, for example an increase in its local demand, E_r. First, the number of firms and workers may increase, which produces a change in the price index, G_j, (quantity adjustment). In this case, the adjustment takes place inside MA_r since G_r compensates for the change in E_r and total market access does not change. Alternatively, we see price adjustment, where the number of firms and workers remains unchanged and MA_r therefore increases. Higher demand drives prices up and is compensated by an increase in wages to ensure that the zero-profit condition is maintained.

3. The Data

The aim of the empirical part of this paper is to see whether this wage equation applies in the context of China. We evaluate the extent to which proximity to markets can explain inter-individual wage heterogeneity and growing wage disparities within Chinese provinces. In section 3.1 we describe the data sources for the explained variable, hourly wages at the individual level, as well as most of the independent variables in our model; section 3.2 details how our main variable of interest, market access, is constructed.

[11] See Head and Mayer (2006) for details of this derivation.

[12] In the empirical section, we will proxy z_i with information on gender, age, education level and years of experience at the individual level *i*. In this latter case, ρ will show the percentage increase in wage from an extra year of experience.

3.1. Individual data

Our data comes from the 1995 survey of the China Household Income Project (CHIP). The data set was collected by a team headed by the Institute of Economics, at the Chinese Academy of Social Sciences (Riskin, Zhao and Li, 2000 and 2001).[13] This survey covers 6,931 households and 21,694 individuals in urban China in 11 provinces.[14] We appeal to the theoretical model which was developed in the framework of manufactured goods, and apply it to a variety of non-agricultural tradable good sectors (industry, transport & communication, and commerce & trade).

Our empirical work covers 6,958 wage earners from 56 cities[15] in the 11 provinces, aged between 16 and 60, and for whom the basic characteristics of gender, age, work activity, years of schooling and years of work experience are not missing.

Hourly wages, w, are calculated using information provided directly by the survey. Our annual wage variable, expressed in Yuan, is defined as the sum of the basic salary, bonuses, subsidies (housing, medical, child care and regional subsidies) and other wages (overtime wages and wages for special circumstances).[16] To obtain hourly wages, we use the information on the number of declared hours worked per week and average number of days worked per week, as well as the number of days unemployed per year. Table A2 (Appendix A) reports descriptive statistics of wages by province.

3.2. Independent variable: Market access

In our analysis, the key explanatory variable is market access. As shown in equation (7), for each city c, market access is defined as $MA_c = \sum_j \phi_{cj} G_j^{\sigma-1} E_j$. Since neither market access itself nor its components, market capacity ($G_j^{\sigma-1} E_j$) and freeness of trade (ϕ_{cj}), are directly observable, we rely on the two-step procedure that was pioneered by Redding and Venables

[13] The Chinese Household Income Project is a joint research effort sponsored by the Institute of Economics, at the Chinese Academy of Social Sciences, the Asian Development Bank and the Ford Foundation. Additional support was provided by the East Asian Institute, Columbia University (Riskin, Zhao and Li, 2000).

[14] The sample includes the following provinces: Beijing, Shanxi, Liaoning, Jiangsu, Anhui, Henan, Guangdong, Yunnan, Sichuan, Gansu and Hubei (See Map A1 in Appendix A).

[15] See Table A1 in Appendix A for the complete list of cities.

[16] To address the concern that our empirical results in section 4 may be driven by differences in the sources of compensation, we run estimations with different wage definitions. The results (available on request) do not change according to the inclusion or exclusion of subsidies and other income from the work unit.

(2004). In this approach, the market capacities, m, of international and national trading partners, as well as transport costs, ϕ, can be estimated using a gravity equation.

Taking natural logarithms in equation (4) yields the basic econometric specification used for the trade equation, so the total value of exports to region j from all firms based in region r is given by:

$$\ln(X_{rj} = n_r p_r x_{ij}) = \ln s_r + \ln \phi_{rj} + \ln m_j = FX_r + \ln \phi_{rj} + FM_j \quad (9)$$

The empirical estimation of equation (9) provides us with estimates of the two components of market access, freeness of trade and market capacity. Importer fixed effects correspond to the log of the unobserved market capacity of the importer region j, $FM_j = \ln m_j = \ln(G_j^{\sigma-1} E_j)$, while exporter fixed effects (FX_r) capture the log of the exporter's supply capacity, s_r.

In the next subsection (3.2.1) we estimate the gravity equation; the parameter estimates from this regression are then used to compute market access for each Chinese city in subsection 3.2.2.

3.2.1 Estimation of the trade equation

For the estimation of the trade equation, we rely on a number of different data sources to construct our bilateral trade flows data set covering intra-provincial, inter-provincial, international and intra-national trade flows.[17]

Since the most disaggregated level of bilateral trade data is at the provincial level, we will first estimate the trade equation on the international and domestic trade flows of Chinese provinces and international countries to predict their respective market capacities.

All trade flows are merged into a bilateral trade flows data set covering 29 Chinese provinces and around 200 countries of the rest of the world (ROW). The estimate of equation (9) based on this complete data set allows us to compute the market capacities of Chinese provinces and foreign countries based on their exports to all destinations (domestic and international).

Following previous work on border effects in Chinese provinces, we allow for impediments to domestic trade to be different from impediments to international trade (Poncet, 2003).[18] Transport costs, ϕ, in our gravity equation are therefore assumed to depend on bilateral

[17] See Appendix B for details of the data sources for the trade flows and production indicators for Chinese provinces and international countries used to estimate the trade equation.

[18] This article finds domestic and international border effects of Chinese provinces to be around 27=[exp(3.30)] and 400=[exp(6)] respectively in 1997. The figure of 27 means that individuals in a given province consume 27 times more local products than products emanating from other Chinese provinces. See Poncet (2003 and 2005),

distances, and a series of dummy variables indicating what type of border is crossed.

Allowing border effects to vary according to trading partners, equation (9) yields the following trade regression, where B denotes dummies:

$$\ln X_{rj} = FX_r + FM_j + \delta \ln dist_{rj} + \varphi B^{\text{foreign}}_{rj,r\ or\ j\in China} + \varphi^* B^{\text{foreign}}_{rj,r\&j\in ROW} + \psi contig_{rj} + \vartheta B^{\text{provincial}}_{rj,r\neq j,r\&j\in China} + \xi B^{\text{intranational}}_{rj,r=j\in ROW} + \varsigma_{rj} \quad (10)$$

This equation demonstrates the different types of transport costs according to whether trade occurs between a Chinese province and foreign countries ($\delta \ln dist_{rj} + \varphi + \psi Contig_{rj}$), between two foreign countries ($\delta \ln dist_{rj} + \varphi^* + \psi Contig_{rj}$), between a Chinese province and the rest of China ($\delta \ln dist_{rj} + \vartheta$), within foreign countries ($\delta \ln dist_{rj} + \xi$) or within Chinese provinces ($\delta \ln dist_{rj}$).[19] In these last two cases, only the internal distance affects the freeness of trade. The accessibility of a Chinese province or a foreign country to itself is modeled as the average distance between producers and consumers in a stylized representation of regional geography, which gives $\phi_{rr} = dist_{rr}^{\delta} = \left(\frac{2}{3}\sqrt{area/\pi}\right)^{\delta}$, where δ is the estimate on distance in the trade equation.

Being neighbors dampens the border effect (*contig*$_{rj}$=1 for pairs of partners that are contiguous).

Equation (10) is estimated for 1997[20], yielding country/region-specific estimates to construct Chinese provinces' market access. The results are shown in Table A3 of Appendix A.[21] Our estimated distance coefficient is similar to those found in the related literature, as is the impact of contiguity. We confirm the finding in Poncet (2003) that the border effect inside China is important. We furthermore find impediments to trade to be greater between China and the rest of the world than between countries included in our sample (which are mostly members of the WTO, and are therefore much more integrated in the world economy in the

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for more on the existence, level and evolution of impediments to inter-provincial trade flows in China.

[19] Where $dist_{rj}$ denotes the great circle distance between *r* and *j*.

[20] As explained in Appendix B, the data on inter-provincial trade flows is limited to 1997. For the sake of consistency, we decided to also rely on trade flows for a single year, 1997, to calculate the estimates used to compute provincial market access. Section 4 will regress individual wages for 1995 on market access for 1997. We argue that the associated time discrepancy should not be a problem because of the relative persistence over time of market access. The potential problem of reverse causation between wages in 1995 and market access in 1997 will be addressed in the empirical section.

[21] Importer and exporter fixed effects are included in the regression, so that the border effect within foreign countries $\left(\delta \ln dist_{rj} + \xi\right)$ is captured by their fixed effects. The reference category in the regression is within-

1990s than was China). Map A1 (Appendix A) shows the distribution of the estimated provincial market capacities.

3.2.2. Calculating Market Access

The data set on wages gives the location of each individual by reporting his/her province and city of registration.[22] To compute the market access of cities, we apply Head and Mayer's (2006) allocation rule. Following this rule, the estimated market capacity $m_j = G_j^{\sigma-1}E_j$ of province *j* is allocated to sub-units (cities) *c* according to their shares in province *j*'s economic activity. This allocation rule relies on two hypotheses. The first is the assumption of homotheticity, so that the expenditure of city *c* is given by $E_c = \left({y_c}/{y_j} \right) E_j$, where y_c/y_j is city *c*'s share of provincial GDP. The second is that G_j, the supply index, is approximately constant within provinces, i.e. $G_c=G_j$, for all cities inside *j*. The combination of these assumptions yields the market capacity of each city $m_c = \left({y_c}/{y_j} \right) m_j$.

The province-level market capacity ($m_j = G_j^{\sigma-1}E_j = \exp(FM_j)$) is then allocated to cities inside province *j* according to the GDP share[23] of each constituent city *c*:

$$m_c = G_c^{\sigma-1}E_c = {y_c}/{y_j}\, m_j = {y_c}/{y_j}\, G_j^{\sigma-1}E_j = {y_c}/{y_j} \exp(FM_j) \qquad (11)$$

Note that while the lack of sub-provincial trade data forces us to choose an allocation rule for provincial competition-weighted expenditure *m*, the other component of market access, ϕ, uses genuine city-level information.[24]

Finally, we can compute each city's market access which consists of four components, corresponding to the four sums in equation (12): local market access; provincial market access (from all other cities *k* in the same province); national market access (from all other Chinese provinces); and rest of the world (ROW) market access.

China provincial trade.

[22] The entire country is divided into 27 provinces plus four "supercities" with province-status – Beijing, Chongqing, Shanghai and Tianjin. The urban population is further divided into prefecture level and county level cities. Our data set consists of information on individuals in prefecture level cities or county cities.

[23] The GDP shares are obtained from the China's State Statistical Bureau.

[24] In the empirical section, we will check that our results do not significantly change according to the choice of the indicator (GDP, population or living expenses) used to apportion provincial market capacity, and that they also hold after controlling for local price differences directly in the regression.

Formally, the market access of city *c* to all regions/countries *j* (including itself) is given by:

$$MA_c = \phi_{cc} G_c^{\sigma-1} E_c + \sum_{k \in province} \phi_{ck} \frac{y_k}{\sum y_k} G_j^{\sigma-1} E_j + \sum_{j \in China} \phi_{cj} G_j^{\sigma-1} E_j + \sum_{j \in ROW} \phi_{cj} G_j^{\sigma-1} E_j$$

$$= dist_{cc}^{\delta} (y_c / y_j) \exp(FM_j) + \sum_{k \in province} dist_{ck}^{\delta} \frac{y_k}{\sum y_k} \exp(FM_j) \tag{12}$$

$$+ \sum_{j \in China} dist_{cj}^{\delta} \exp(\vartheta) \exp(FM_j) + \sum_{j \in ROW} dist_{cj}^{\delta} \exp(\varphi + \psi Contig_{rj}) \exp(FM_j)$$

where FM_j and the parameters δ, ϑ, φ and ψ are estimated in the trade equation.

4. Empirical Results for the wage equation

4.1. Wage equation - baseline specification

Having calculated market access at the city level, MA_c, we can now run the regressions of our human-capital augmented version of the wage equation. Table A4 (in Appendix A) shows the summary statistics of all variables used in this section.

Taking the natural logarithm of equation (8), and denoting individuals by *i* and cities by *c*, the econometric baseline specification becomes:

$$\ln w_{ic} = a + b \ln MA_c + \rho z_{ic} + \varepsilon_{ic} \tag{13}$$

where $a = -\left(\frac{1}{\sigma}\right) \ln\left[\alpha\sigma\beta^{\sigma-1}\right]$ and b=1/σ.

As discussed by Head and Mayer (2006), the intercept, *a*, depends on the input requirement coefficients *α* and *β*. These are likely to vary across sectors, in part because of variations in capital intensity. As such, we estimate equation (13) with industry and later also industry-province specific constants. Our benchmark estimates are obtained by OLS.

Out of the 6,958[25] individuals included in our sample, 857 do not report current wages or working hours. To ensure that our wage results are not affected by selection bias, we use a Heckman procedure to see whether the probability of reporting non-zero wages is

[25] In the original sample, 8523 individuals work in the three non-agricultural tradable sectors we consider. Of these, the exact location of 909 individuals is unknown, and 191 have missing data on schooling or work experience. We further limit our sample to individuals aged between 16 and 60, thereby excluding 465 additional observations. In addition, 857 of the 6958 remaining individuals do not provide information on wages or working hours or declare zero wages. We further exclude nine individuals who say that they are self-employed (in single-person enterprises), since profits and wages cannot be properly distinguished in this case. Finally, to ensure that our estimation results are not driven by outliers, we rely on Hadi's (1994) method in all regressions to identify multiple outliers; this procedure excludes 13 observations in the wage data.

exogenous.[26] The results do not reject the absence of selection bias, so we resort to OLS.
The structure of our data raises the problem of clustering of errors. We suspect that the observable and unobservable characteristics of the various wage earners within the same location and industry may be correlated. Moulton (1986, 1990) emphasizes that the typical OLS measures of variance could understate errors by a potentially large factor, leading to poor inference. In this paper we correct for the correlation of errors between individuals within a specific province and industry, using Rogers' (1993) correction.
A final econometric problem arises from the two-step calculation of market access. This variable is calculated from parameters that are themselves estimated with standard errors in an initial regression. We correct for biased standard errors by applying the "bootstrap" procedure to each of our regressions.
Our estimated specification can be thought of as a Mincer equation augmented to include NEG market access. It is thus worth checking that our results on the basic determinants of wages (years of school, age, work experience, gender and communist party membership), are consistent with the correlations found in the existing literature.
The first column of Table 1 reports the results of a wage regression using these variables and industry dummies. All of the variables have a very significant impact on wages, explaining 15% of the difference in wages between individuals.
This specification corresponds to Mincerian (hourly) earnings functions (Mincer, 1974). Our results are very consistent with the vast labor economics literature applied to China. Specifically, our estimates confirm the very low wage returns to education in China. Our estimated rate of return to education is 3.4% which falls in the 2-5% range obtained by Chen et al. (2005) and Zhao (2002), among others. These estimated returns are considerably lower than both the 10.1% world average and the 9.6% Asian average, as well as the 11.2-11.7% range for low- and middle-income countries (Psacharopoulos, 1994). Our empirical results on gender-wage differentials (to the detriment of women) and on returns to experience also correspond to those found in the literature (Chen et al., 2007). We furthermore confirm the significant impact of belonging to the Communist party (Li, 2003). Communist party membership raises wages by about 9%.
Adding market access as an independent variable in Column 2 leads to an increase of 7

[26] This selection issue actually covers two separate phenomena: those who are currently working but who do not provide a figure for wages, and those who report a sector and work experience but who are not currently working. We appeal to three variables (marital status, number of household members and household wealth) that we imagine affect the probability of reporting a wage figure, but do not impact on the actual level of wages. For space reasons we do not report the results here, but will provide them on request.

percentage points in the R^2, so that market access contributes significantly to the explanation of wage differentials. The estimated coefficients on the other variables remain similar to those in the first column.

Our aim is to determine whether these results also apply to cities within the same province.[27] Therefore, the regressions from Column 3 in Table 1 on are all performed with province-industry fixed effects. We also control for the clustering of error terms at this level. China being a country with significant differences between provinces in terms of policies, endowments and development, the province-industry fixed effects will take into account this heterogeneity and purge the market access impact of any specific effects of provinces or industries on individual wages.

We find that, even after introducing province-industry fixed effects, market access remains statistically significant at the 1% level and has a coefficient of around 0.14. On average, a one standard deviation increase in the market access of a city would lead to an average increase in individual wages of 29%.

In columns 4 and 5 of Table 1, we introduce fixed effects to control for firm ownership[28] and workers' occupational category.[29] The coefficients on the dummies for firm ownership in Column 4 reproduce the results found in earlier work, in particular Chen et al. (2005), who use the same data set as we do. Chen et al. show that both foreign-invested firms (including both foreign- and Sino-foreign owned enterprises) and state-owned firms (SOEs) pay higher wages than do firms with other owners[30], while SOEs provide the highest levels of bonuses and subsidies.[31]

The impact of additional control variables on the estimate of our market access variable in Column 4 and 5 is negligible. However, the introduction of dummies for occupational category leads to a logical decrease in the size of our estimated returns to schooling, which is now purged by the wage premium obtained in a better work positions. In the following, we will refer to the estimated wage elasticity to market access of 0.14 found in Column 5 of Table 1 as our benchmark figure.

[27] Up to this stage, no province dummies have been introduced, so that the estimations focus on differences between the 56 cities, whatever their province of location.

[28] Ownership types cover state-owned enterprises at the central or provincial level (central SOEs), local publicly-owned enterprises (local SOEs), urban collective enterprises, private enterprises, foreign-invested enterprises, Sino-foreign joint ventures and others.

[29] The categories here are owner of private or individual enterprise, owner and manager of private enterprise, professional or technical worker, head of institution, division head in institution, office worker, skilled worker, unskilled worker and others.

[30] The omitted category in Columns 4 and 5 is private firms.

[31] Zhao (2002) highlights the higher non-wage benefits provided by SOEs (e.g. pensions, housing and health care) as a key explanation for the immobility across different ownership enterprises in China.

The structural derivation of our market access variable from theory provides us with a theoretical interpretation of its coefficient. Theoretically, this figure corresponds to 1/σ, with σ being a measure of product differentiation, increasing returns to scale and the degree of competition on the market (Head and Mayer, 2004). Our estimate of 0.14 corresponds to σ=7.1, which is in line with the results in the literature. Empirical estimates of σ lie typically between 5 and 10, depending on the estimation methodology (Erkel-Rousse and Mirza, 2002, and Head and Ries, 2001).

So far, our results have not addressed the potential simultaneity problem. Market access, on the right-hand side of the estimated equation, is a weighted sum of all potential expenditures, including local ones. Those expenditures depend on income, and therefore on wages, raising the concern of reverse causality in the estimation. Since a positive shock to w_i will raise E_c and consequently increase MA_c, we rely on a two-fold approach to ensure the reliability of our estimates. First, we follow Head and Mayer (2006), and instrument our market access variable by two measures of "centrality". We compute "Chinese centrality" and "international centrality", at the city-level, as the sum of the inverted distances of each city in our sample to the center of every inhabited 1° by 1° cell in the Chinese and in the world population grid, respectively.[32]

The coefficient of market access based on the IV estimates is shown in Row 2 of Table 2, which compares our benchmark figure (Column 5 in Table 3, reported in Row 1 in Table 2) with estimates obtained from different specifications. Hansen's J-test of overidentifying restrictions does not significantly reject the validity of our instruments.[33] We find that the IV estimate is not significantly different from the benchmark figure obtained with OLS.[34]

Our second focus is on the potential bias induced by our ad-hoc allocation rule. We therefore recompute market access to check the appropriateness of using GDP shares to calculate the local and provincial component of market access. Rows 3 and 4 display the results when population or living expenditures instead of GDP are used to apportion provincial market capacity. These results are similar to that obtained before and strengthen our confidence in the results of the benchmark estimation.

Row 5 replaces market access by the Harris (1954) measure of market potential, defined as $\sum_j E_c / dist_{cj}$. This indicator, which has frequently been used in empirical work because of its

[32] For more details on the instruments see Head and Mayer (2006).
[33] Significance is judged at the 10% confidence level.
[34] The Wu-Hausman test does not reject the null hypothesis of exogeneity of our market access variable at the 10% confidence level.

ease of calculation, is typically found to have a larger coefficient than structural estimates of MA. Our finding of a higher wage elasticity with Harris market potential than our market access measure is thus consistent with the existing literature (Head and Mayer, 2006).

In the last row we report our estimates using total annual wages as the dependent variable. The results remain the same, suggesting that controlling for working hours does not alter the estimated impact of market access on wages.

All of the estimates in Table 2 correspond to a value of σ between 5 (the value typically used in Krugman's illustrations of NEG) and 10. The only exception is found for the Harris measure, which does not however retain the structural interpretation of the coefficient on log market potential.

Having found a theoretically consistent, positive and significant impact of market access on hourly wages, we can conclude that the wage disparities within provinces partly reflect differences in cities' market access. Growing differences in trade costs or market sizes between cities can therefore increase intra-provincial wage disparities.

4.2. Market Access, the size effect and other controls

According to the above estimates, we might conclude that the spatial variation of wages in China is consistent with our NEG model. However, since our only variable at the city-level is market access, its impact could also capture features consistent with urban agglomeration theories. Hanson (2003) distinguishes three additional mechanisms apart from market access linking agglomeration and wages: (1) non-human factor endowments; (2) increasing returns external to firms; and (3) human capital externalities.

With respect to the first mechanism, as explained above, we continue to assume that differences in institutions and technology are more likely to occur at the provincial and industry level and do not control for local differences.

The second and third mechanisms correspond to two main competing dynamics relating to agglomeration. On the one hand, the larger and/or denser is an agglomeration (in terms of labor), the more knowledge spillovers there are between firms and workers. This leads to higher worker productivity and therefore higher wages. On the other hand, large agglomerations often exert downward pressure on prices because of tougher competition between a greater number of producers. A lower price level drives down wages. Big cities are therefore exposed to these two contradictory forces.

So far, we have only insufficiently controlled for these aspects. It is thus possible that our significant market access result captures the size effect caused by spillovers between firms or human capital externalities. The regression in Column 1 of Table 3 introduces the natural logarithm of the local population as a proxy for city size. The impact of MA_c stays unchanged, whereas population is insignificant. This might be due to the fact that the two competing forces presented above cancel each other out.

In the second column, we introduce a proxy for the city's human capital stock. This indicator, *skill intensity*, is computed as the city's share of individuals in the survey having completed at least nine years of schooling (which corresponds in general to the end of lower middle school). Its coefficient is positive but insignificant, while the coefficient of MA_c remains unaffected.

In Column 3 of Table 3, we let the market access variable compete with an indicator of human capital externalities with spatial decay.[35] The indicator *spatial decay* for each city is constructed as the distance-weighted sum of the population share enrolled in middle school over all cities of the same province, including itself.[36] While the indicator enters with a positive and significant sign, attesting to the presence of positive human capital externalities on individual wages, it does not alter our original results. We conclude that our results confirm the validity of NEG theory, in China even after scale and human capital effects have been accounted for.

Finally, we investigate the possibility that the impact of MA_c on nominal wages is due to the provision by firms of greater subsidies for housing and other living costs (required by workers to accommodate higher living costs due to agglomeration effects) instead higher salaries reflecting the increase in profits due to lower transportation costs.

Besides the effect emphasized by the NEG (firms in locations with higher market access incur lower overall transportation costs and thus are able to pay higher wages), Dekle and Eaton (2002) propose an alternative mechanism relying on agglomeration economics that might explain the positive impact of market access on wages. It could be the case that greater demand pushes up the price of land (or other immobile inputs) and thus induces firms to raise nominal wages to maintain workers' purchasing power. While theoretically both effects are combined in our model, since labor is the only immobile factor, it is empirically important to

[35] We thank an anonymous referee for this suggestion.

[36] The indicator for city c equals $\sum_{j \in province} \frac{Enrollment\ ratio_j}{dist_{cj}}$. Data come from the Urban Statistical Yearbook published by China's State Statistical Bureau.

account for this channel. We include in Column 4 a proxy for city-level living costs, *living costs*, calculated as the average of the values reported in the survey on the monthly cost of maintaining a minimum standard of living for the household.

This indicator enters positively and significantly, leading to a reduction in the size and significance of our market access variable. However, this does not change the flavor of our results. The coefficient of 0.016 indicates that an increase of one standard deviation in living costs[37] leads to an increase of 12% in wages. This corresponds to an increase of 55 Yuan over the average monthly wage of 465 Yuan.

In the last column, we combine the impact of all four variables. Here also, the coefficient on MA_c remains significant, although only at the 10% level.

4.3. The heterogeneous influence of market access

One novel contribution of our paper is to investigate the possibility that the relationship between market access and wages depends on workers' skills and firm ownership types.

4.3.1. Market access impact: skills matter

In Table 4, we run separate regressions for high-skilled and low-skilled workers. An individual is considered as high skilled if he or she has completed at least nine years of schooling; otherwise the individual is classified as a low-skilled worker. Comparing Columns 1 and 2, the impact of market access does not seem to be significantly different between these two groups, even though the coefficient is lower and significant only at the 5% level for low-skilled wage earners. In the next four columns we introduce living costs and the city's percentage of skilled workers. We see that, once we control for living costs, the wages of high-skilled workers rise significantly with market access, whereas the coefficient of MA_c for low-skilled workers becomes insignificant. This indicates that even though nominal wages increase with market access for all workers, as seen in Columns 1 and 2, the increase for low-skilled workers corresponds mainly to the increase in living costs. Thus, these results suggest that a rise in market access leads to an increase in wages in real terms only for high-skilled workers.

[37] An increase of one standard deviation corresponds to a rise in the living cost index of 72 Yuan per month.

The comparison of columns 1 and 2 indicates that the determinants of wages differ between the two groups. Notably there seems to be no return to schooling and no wage premium from Communist party membership for unskilled workers. Furthermore, the gender wage gap seems to be reduced for the high skilled.

We argue that high-skilled workers are likely to benefit differentially from market access because they are less at risk from migrants who are in the majority low skilled. Surveys on migrants[38] to cities in China stress that the segregation of workers according to their residence permit (hukou) makes it difficult for rural residents to find formal employment in urban areas. Park et al. (2006) find a strong effect of hukou status on the occupational choice of non-agricultural workers. Most of these can only find jobs that are temporary and physically demanding (Cai and Wang, 2003).

The finding of a larger effect of market access on wages for skilled workers is thus very consistent with the NEG model, which predicts that the relationship between market access and wages will be weaker as migration is stronger. This relates to the two different mechanisms by which the local economy can adjust to a change in the demand for its goods: either quantitative adjustment with new workers filling in positions to answer the additional demand, or, in the case of insufficient labor mobility, adjustment achieved via a change in prices, which means that wages will rise with market access.

Our results suggest that the first mechanism is stronger in the case of low-skilled jobs and a highly competitive labor market. Regulations such as governmental prohibition of enterprises from hiring migrants in certain jobs and posts may protect skilled workers to a greater extent.

4.3.2. Market access impact: the influence of firm ownership

In 1995, while the number of private firms started to grow rapidly, a very high percentage of registered employment was still in publicly-owned enterprises.[39] When looking at the interaction between MA_c and firm ownership, we would expect different impacts for different types of ownership: private, recently-created firms should be more flexible in terms of wages and react more to market shocks than state-owned firms. This intuition is confirmed by the results reported in Table 5. Here, we interact MA_c with firm-ownership dummies in order to

[38] A full description of labor market conditions and migration patterns within China (across and within provinces) is beyond the scope of this paper. Interested readers should refer to Cai et al. (2007) and Du et al. (2005). Data from the 1995 population census indicates that intra-provincial migration to cities is a major component of migration across China: 17.3 million people engaged in intra-provincial migration to cities between 1990 and 1995. This corresponds to 52% of total migration flows recorded within and between provinces over the period.

see whether the impact of market access varies across different firm types.

We find that on the one hand wages in foreign-owned firms react more strongly to changes in market access than do those in other firm types. On the other hand, there is a significantly lower than average impact of MA_c on wages for SOEs, whether they are owned at the central or the local level. The extremely high sensitivity of wages to market access in the case of foreign-owned firms should be handled with care, since the number of observations in this group is very small.

When introducing living costs into the regression, nearly all market access coefficients fall and the estimates for central SOEs and "others" become insignificant, indicating that in these firms nominal wages increase only to keep workers' purchasing power constant. These results are robust to the introduction of other control variables. The tests at the bottom of the table highlight the existence of a significant difference between firm ownership types.

Wages in foreign firms react the most strongly to variations in demand, followed by private, Sino-foreign, urban collective, "others" and publicly-owned enterprises. This hierarchy is consistent with work on the structure of the Chinese economy, which emphasizes the coexistence of enterprises facing very different institutional and economic environments. While employment and wage-setting in non-state enterprises are mainly driven by market forces, SOEs still operate according to the central administration plan and are characterized by overstaffing (Lin et al., 2001). The lower impact of market access on wages in these enterprises might be explained by their worker surplus, as in the event of a rise in demand they can resort to their underemployed workers. The adjustment is internal to the firm, and occurs without recurring to new employment or paying high overtime wages (Knight and Song, 2005).

5. Conclusion

This article has examined the impact of economic geography on the spatial structure of wages in China. It has attempted to explain inter-individual wage differences by the individual's location proximity to markets. We control for gender and age as well as individual skills in terms of experience and education, which are expected to explain an important part of spatial wage variations. Following the literature pointing out the importance of factor endowments in

[39] 4611 out of our 6079 individuals work either in central or local SOEs.

spatial wage disparities, province and sector fixed effects, and proxies for living costs and human capital externalities are introduced. Even after controlling for these factors, the relationship between the city's market access, calculated using a gravity equation, and individual Chinese wages is positive and significant.

The finding of a significant impact of market access on individual wage data validates the pioneering results of Redding and Venables (2004) on aggregate data and justifies the inclusion of this variable in research on wage differentials.

Our results also highlight that the impact of MA_c cannot be generalized, since the relationship between market access and wages holds only for high-profile workers and for certain firm types. Wages earned in foreign firms, and to a lesser extent in private and Sino-foreign firms, react strongly to changes in MA_c, while wages in central SOEs seem to be largely insensitive to them, when controlling for living costs. This means that, probably due to the remnants of central economic planning, the impact of market access is limited in the Chinese economy.

We conclude that inter-regional and intra-provincial wage disparities likely partly reflect differences in market access. Considering that market access also has a significant international component, it is likely that, with further integration into the world economy, these disparities will grow, if access to new markets is not evenly distributed across the country. Our results here suggest that any further opening of the country, without increasing liberalization of internal migration, may worsen the already pervasive spatial wage disparities.

Nevertheless, the impact of market access could change over time. More research with data spanning a number of years is needed to ascertain the evolution of wages in response to changing market access. An important issue is whether the relaxation of restrictions on internal migration will eventually mitigate the segmentation of the labor market and dampen the impact of market access, promoting the equalization of wages across the Chinese territory for given skills and factor endowments.

References

Amiti, Mary, and Lisa Cameron,“Economic Geography and Wages”, *Review of Economics and Statistics* 89:1 (2007), 15-29.

Amiti, Mary, and Beata S. Javorcik,“Trade Costs and Location of Foreign Firms in China”, *Journal of Development Economics.* Forthcoming, 2007).

Baldwin, Richard, Rikard Forslid, Philippe Martin, Gianmarco Ottaviano, and Frederic Robert-Nicoud, *Economic Geography and Public Policy* (Princeton: Princeton University Press, 2003).

Banister, Judith, “Manufacturing Employment and Compensation in China”, Consultant’s report to US Department of Labor, Bureau of Labor Statistics (2005).

Bernard, Andrew B., Steven J. Redding, and Peter K. Schott, “Factor Price Equality and the Economies of the United States, *CEPR Discussion Paper* 5111 (2005).

Breinlich, Holger, “The Spatial Income Structure in the European Union - What Role for Economic Geography?”, *Journal of Economic Geography* 6:5 (2006), 593-617.

Brakman, Steven, Harry Garretsen, and Marc Schramm, “The Spatial Distribution of Wages and Employment: Estimating the Helpman-Hanson Model for Germany”, *Journal of Regional Science* 44:3 (2004), 437-466.

Cai, Fang, Albert Park, and Yaohui Zhao, “The Chinese Labor market in the reform Era”, in Loren Brandt and Thomas Rawski (Eds.), *China’s Great Economic Transformation* (Cambridge: Cambridge University Press. Forthcoming, 2007).

Cai, Fang and D. Wang, “Impacts of internal migration on economic growth and urban development in China”, *CASS working paper* (2003).

Combes, Pierre-Philippe, Gilles Duranton, and Laurent Gobillon, “Spatial Wage Disparities: Sorting Matters!”, *Journal of Urban Economics.* Forthcoming, 2007).

Chen, Yi, Sylvie Démurger, and Martin Fournier, "Earnings Differentials and Ownership Structure in Chinese Enterprises", *Economic Development and Cultural Change* 53:4 (2005), 933-958.

Chen, Yi, Sylvie Démurger, and Martin Fournier, "The Evolution of Gender Earnings Gaps and Discrimination in Urban China, 1988-95", *The Developing Economies* 54:1 (2007), 97-121.

De Bruyne, Karolien, "The Location of Economic Activity: Is there a Spatial Employment Structure in Belgium?", mimeo, K. U. Leuven (2003).

Dekle, Robert, and Jonathan Eaton, "Agglomeration and Land rents: Evidence from the prefectures", *Journal of Urban Economics* 46:2 (2002), 200-214.

Dixit, Avinash K., and Joseph E. Stiglitz, "Monopolistic Competition and Optimum Product Diversity", *American Economic Review* 67:3 (1977), 297-308.

Du, Yang, Albert Park, and Sangui Wang, "Migration and rural poverty in China", *Journal of Comparative Economics* 33:4 (2005), 688-709.

Erkel-Rousse, Hélène, and Daniel Mirza, "Import elasticities: reconsidering the evidence", *Canadian Journal of Economics* 35:2 (2002), 282-306.

Feenstra, Robert C., Wen Hai, Wing T. Woo, and Shunli Yao, "The U.S.-China Bilateral Trade Balance: Its Size and Determinants", NBER Working Paper No. W6598 (1998) with Short version published in the *American Economic Review* 89:2 (1999), 338-343.

Fujita, Masahisa, Paul Krugman, and Anthony J. Venables, *The Spatial Economy: Cities, Regions and International Trade* (MIT Press, Cambridge MA, 1999).

Hadi, Ali S., "A Modification of a Method for the Detection of Outliers in Multivariate Samples", *Journal of the Royal Statistics Society* 56:B (1994), 393-396.

Hanson, Gordon H., "Firms, Workers, and the Geographic Concentration of Economic Activity", in Gordon L. Clark, Meric S. Gertler and Maryann P. Feldman (Eds) *The Oxford Handbook of Economic Geography* (Oxford: Oxford University Press, 2003).

Hanson, Gordon H., “Market Potential, Increasing Returns, and Geographic Concentration”, *Journal of International Economics* 67:1 (2005), 1-24.

Harris, Chauncy D., “The Market as a Factor in the Localization of Industry in the United States”, *Annals of the Association of American Geographers* 64 (1954), 315-348.

Head, Keith, and John Ries, “Increasing Returns Versus National Product Differentiation as an Explanation for the Pattern of US-Canada Trade”, *American Economic Review* 91:4 (2001), 858-876.

Head, Keith, and Thierry Mayer, “The Empirics of Agglomeration and Trade”, in J. Vernon Henderson and Jacques-François Thisse (Eds.), *Handbook of Regional and Urban Economics Volume* 4, (Amsterdam: Elsevier, 2004).

Head, Keith, and Thierry Mayer, “Regional Wage and Employment Responses to Market Potential in the EU”, *Regional Science and Urban Economics* 36:5 (2006), 573-594.

Heckman, James J. “The Common Structure of Statistical Models of Truncation, Sample Selection, and Limited Dependent Variables and a Simple Estimator for such Models”. *Annals of Economic and Social Measurement* 5 (1976), 475-492.

Knight, John, and Lina Song, *Towards a Labour Market in China* (Oxford: Oxford University Press, 2005).

Krugman, Paul, “Scale Economies, Product Differentiation and the Pattern of Trade”, *American Economic Review* 70:5 (1980), 950-959.

Krugman, Paul, “Increasing Returns and Economic Geography”, *Journal of Political Economy* 99:3 (1991), 483-499.

Krugman, Paul, and Anthony J. Venables, “Globalization and the Inequality of Nations”, *Quarterly Journal of Economics* 110:4 (1995), 857-880.

Li, Haizheng, “Economic Transition and Returns to Education in China”, *Economics of Education Review* 22:3 (2003), 317-28.

Lin, Songhua, "Geographic Location, Trade and Income Inequality in China", in Ravi Kanbur and Anthony J. Venables (Eds.) *Spatial Inequality and Development* (Oxford: Oxford University Press, 2005).

Lin, Justin Y. Fang Cai, and Zhou Li, *State-owned Enterprise Reform in China* (Hong Kong: Chinese University Press, 2001).

Meng, Xin, Robert Gregory, and Youjuan Wang, "Poverty, Inequality and Growth in Urban China, 1986-2000", *Journal of Comparative Economics* 33:4 (2005), 710-729.

Ma, Alyson C., "Geographical Location of Foreign Direct Investment and Wage Inequality in China", *World Economy* 29:8 (2006), 1031-1055.

Mincer, Jacob, *Schooling, Experience and Earnings* (New York: Columbia University Press, 1974).

Mion, Giordano, "Spatial Externalities and Empirical Analysis: The Case of Italy", *Journal of Urban Economics* 56:1 (2004), 97-118.

Mion, Giordano, and Paolo Naticchioni, "Urbanization Externalities, Market Potential and Spatial Sorting of Skills and Firms", *CEPR Discussion Paper* 5172 (2005).

Moulton, Brent R., "Random Group Effects and the Precision of Regression Estimates", *Journal of Econometrics* 32:3 (1986), 385-397.

Moulton, Brent R., "An Illustration of a Pitfall in Estimating the Effects of Aggregate Variables on Micro Units", *Review of Economics and Statistics* 72:2 (1990), 334-338.

Paillacar, Rodrigo, "Market Potential and Worker Heterogeneity as Determinants of Brazilian Wages", mimeo, University of Paris 1 (2006).

Park, Albert, Yaohui Zhao, and Guofang Huang, "Migrant workers and labor market segmentation in urban China", unpublished manuscript (2006).

Ping, Huang, and Frank N. Pieke, "China Migration Country Study", paper presented at the DFID/ RMMRU Conference on Migration Development Pro-poor policy Choices in Asia, Dhaka, 22-24 June (2003).

Poncet, Sandra, "Measuring Chinese Domestic and International Integration?", *China Economic Review* 14:1 (2003), 1-22.

Poncet, Sandra, "A Fragmented China: Measure and Determinants of China's Domestic Market Disintegration", *Review of International Economics* 13:3 (2005), 409-430.

Psacharopoulos, George, "Returns to Investment in Education: a Global Update". *World Development* 22:9 (1994), 1325-1343.

Ravallion, Martin, and Shaohua Chen, "China's (Uneven) Progress Against Poverty", *Journal of Development Economics* 82:1 (2007), 1-42.

Redding, Stephen J., and Peter K. Schott, "Distance, Skill Deepening and Development: Will Peripheral Countries Ever Get Rich?", *Journal of Development Economics* 72:2 (2003), 515-541.

Redding, Stephen J., and Anthony J. Venables, "South-East Asian Export Performance: External Market Access And Internal Supply Capacity", *Journal of the Japanese and International Economies* 17:4 (2003), 404-441.

Redding, Stephen J., and Anthony J. Venables, "Economic Geography and International Inequality", *Journal of International Economics* 62:1 (2004), 53-82.

Riskin, Carl, Renwei Zhao, and Shi Li, Chinese Household Income Project, 1995 [Computer file]. ICPSR version. Amherst, MA: University of Massachusetts, Political Economy Research Institute [producer], 2000. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor](2000).

Riskin, Carl, Renwei Zhao and Shi Li, *China's Retreat from Equality Income Distribution and Economic Transition* (London: M.E. Sharpe, 2001).

Rogers, William, "Regression Standard Errors in Clustered Samples", *Stata technical bulletin* 13 (1993), 19-23.

State Statistical Bureau. *China Statistical Yearbook* (Beijing: China Statistical Bureau, various issues).

State Statistical Bureau. *Urban Statistical Yearbook* (Beijing: China Statistical Bureau, various issues).

Wei, Shang-Jin, "Intra-National Versus International Trade: How Stubborn Are Nations in Global Integration", *NBER Working Paper* 5531 (1996).

Wei, Shang-Jin, and Yi Wu, "Globalization and Inequality Without Differences in Data Definition, Legal System and Other Institutions", *International Monetary Fund Working Paper*, october (2002).

Willis, Robert J., "Wage determinants: A survey and reinterpretation of human capital earnings functions", Chapter 10, in Orley C. Ashenfelter and Richard Layard (Eds.), *Handbook of Labor Economics Volume* 1, (Amsterdam: North Holland, 1986).

Zhao, Yaohui, "Earnings Differentials between State and Non-state Enterprises in Urban China", *Pacific Economic Review* 7:1 (2002), 181-197.

TABLES

Table 1: Benchmark Wage equation estimations

		Explained variable: individual hourly wage				
		1	2	3	4	5
	Market Access		0.088	0.144	0.137	0.136
			(0.010)**	(0.044)***	(0.037)***	(0.037)***
Individual variables	Female	-0.114	-0.114	-0.115	-0.092	-0.091
		(0.016)**	(0.019)**	(0.019)***	(0.018)***	(0.017)***
	Years of schooling	0.034	0.030	0.030	0.025	0.019
		(0.003)***	(0.003)***	(0.003)***	(0.003)***	(0.003)***
	Experience	0.019	0.016	0.017	0.016	0.016
		(0.003)**	(0.001)***	(0.003)***	(0.003)***	(0.002)***
	Age	0.067	0.067	0.066	0.074	0.073
		(0.009)**	(0.009)**	(0.010)***	(0.008)***	(0.008)***
	Age^2	-0.001	-0.001	-0.001	-0.001	-0.001
		(0.000)**	(0.000)**	(0.000)***	(0.000)***	(0.000)***
	Communist	0.087	0.100	0.090	0.082	0.070
		(0.019)**	(0.020)**	(0.027)***	(0.028)***	(0.024)***
Firm ownership	Central SOE				0.495	0.504
					(0.149)***	(0.139)***
	Local SOE				0.286	0.294
					(0.147)*	(0.137)**
	Urban collective				0.146	0.159
					(0.153)	(0.142)
	Sino-foreign				0.471	0.479
					(0.137)***	(0.126)***
	Foreign				0.835	0.846
					(0.185)***	(0.175)***
	Others				0.395	0.404
					(0.177)**	(0.166)**
	Constant	-0.911	-0.450	-0.166	-0.627	-0.543
		(0.239)*	(0.189)	(0.189)	(0.208)***	(0.199)**
	Occupation dummies	No	No	No	No	Yes
	Fixed effects	Sector		Sector and province		
	Observations	6079	6079	6079	6079	6079
	R-squared	0.15	0.22	0.16	0.19	0.20
	Number of clusters	3	3	33	33	33

Heteroskedastic consistent standard errors in parentheses, with ***,** and * denoting significance at the 1, 5 and 10% levels respectively. Standard errors are corrected for clustering at the industry or province-industry level. The reported R-squared is the Within R-squared which indicates how much of the variation of wages within the group of sectors is explained by our regressors.

Table 2: Robustness Checks

	Market Access Variable	Elasticity	Standard deviation
1	Market Access (MA_c)	0.136***	0.037
2	IV: Centrality	0.158***	0.032
	Hansen Test-statistic: 0.13	Wu Hausman: 0.44	
3	MA_c(Living costs)	0.146***	0.032
4	MA_c(Population)	0.205***	0.062
5	Harris	0.793***	0.310
6	Annual earnings	0.126***	0.032

Heteroskedastic consistent standard errors in parentheses, with ***,** and * denoting significance at the 1, 5 and 10% levels respectively.

Table 3: Market Access versus Urban Agglomeration theory

		Explained variable: individual hourly wage				
		1	2	3	4	5
	Market Access	0.130	0.125	0.099	0.069	0.052
		(0.042)***	(0.037)***	(0.045)**	(0.026)**	(0.028)*
City variables	Population	0.010				-0.015
		(0.030)				(0.025)
	Skill intensity		0.185			-0.068
			(0.181)			(0.220)
	Spatial Decay			0.029		0.022
				(0.017)*		(0.014)
	Living Costs				0.016	0.017
					(0.002)***	(0.002)***
Individual variables	Female	-0.091	-0.091	-0.092	-0.090	-0.091
		(0.017)***	(0.017)***	(0.017)***	(0.018)***	(0.018)***
	Years of schooling	0.019	0.018	0.019	0.016	0.016
		(0.003)***	(0.003)***	(0.003)***	(0.003)***	(0.003)***
	Experience	0.016	0.016	0.016	0.015	0.015
		(0.002)***	(0.002)***	(0.002)***	(0.002)***	(0.002)***
	Age	0.073	0.072	0.074	0.073	0.073
		(0.008)***	(0.008)***	(0.008)***	(0.008)***	(0.008)***
	Age^2	-0.001	-0.001	-0.001	-0.001	-0.001
		(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
	Communist	0.070	0.070	0.070	0.069	0.069
		(0.024)***	(0.024)***	(0.024)***	(0.023)***	(0.023)***
	Constant	-0.615	-0.498	-0.711	-1.185	-1.236
		(0.337)*	(0.188)**	(0.200)***	(0.206)***	(0.270)***
	Ownership Dummies	Yes	Yes	Yes	Yes	Yes
	Occupation Dummies	Yes	Yes	Yes	Yes	Yes
	Fixed effects	Sector and province				
	Observations	6079	6079	6079	6079	6079
	R-squared	0.20	0.20	0.20	0.21	0.21
	Number of groups	33	33	33	33	33

Heteroskedastic consistent standard errors in parentheses, with ***,** and * denoting significance at the 1, 5 and 10% levels respectively. Standard errors are corrected for clustering at the industry or province-industry level. The reported R-squared is the Within R-squared which indicates how much of the variation of wages within the group of sectors is explained by our regressors.

Table 4: Market Access and Wages: The Effect of Education

		Explained variable: individual hourly wage					
		High skilled	Low skilled	High skilled	Low skilled	High skilled	Low skilled
		1	2	3	4	5	6
	Market Access	0.142	0.116	0.080	0.029	0.085	0.026
		(0.047)***	(0.046)**	(0.037)**	(0.042)	(0.038)**	(0.043)
City var.	Living Costs			0.016	0.021	0.017	0.02
				(0.002)***	(0.007)***	(0.002)***	(0.007)***
	Skill intensity					-0.175	0.110
						(0.177)	(0.229)
Individual variables	Female	-0.071	-0.151	-0.071	-0.152	-0.070	-0.151
		(0.016)***	(0.038)***	(0.017)***	(0.039)***	(0.017)***	(0.039)***
	Years of schooling	0.019	0.014	0.016	0.014	0.016	0.014
		(0.003)***	(0.010)	(0.003)***	(0.010)	(0.003)***	(0.010)
	Experience	0.012	0.021	0.011	0.021	0.011	0.021
		(0.003)***	(0.004)***	(0.003)***	(0.004)***	(0.003)***	(0.004)***
	Age	0.073	0.081	0.072	0.080	0.073	0.079
		(0.009)***	(0.021)***	(0.008)***	(0.019)***	(0.008)***	(0.018)***
	Age^2	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
		(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
	Communist	0.080	0.021	0.080	0.009	0.080	0.008
		(0.025)***	(0.057)	(0.024)***	(0.054)	(0.024)***	(0.054)
	Constant	-0.530	-0.634	-1.137	-1.536	-1.212	-1.463
		(0.225)**	(0.491)	(0.226)***	(0.550)***	(0.223)***	(0.494)***
	Ownership dummies	Yes	Yes	Yes	Yes	Yes	Yes
	Occupation dummies	Yes	Yes	Yes	Yes	Yes	Yes
	Fixed effects	Sector and province					
	Observations	4656	1423	4656	1423	4656	1423
	R-squared	0.21	0.17	0.22	0.19	0.22	0.19
	Number of groups	33	33	33	33	33	33

Heteroskedastic consistent standard errors in parentheses, with ***,** and * denoting significance at the 1, 5 and 10% levels respectively. Standard errors are corrected for clustering at the industry or province-industry level. The reported R-squared is the Within R-squared which indicates how much of the variation of wages within the group of sectors is explained by our regressors.

Table 5: Market Access and Wages: The Effect of Firm Ownership

		Explained variable: individual wage per hour		
		1	2	3
Market access	MA*Foreign	0.511	0.539	0.539
		(0.075)***	(0.085)***	(0.082)***
	MA*Private	0.197	0.127	0.128
		(0.056)***	(0.051)**	(0.052)**
	MA*Sino-foreign	0.158	0.096	0.098
		(0.038)***	(0.032)***	(0.032)***
	MA*Urban Collective	0.151	0.086	0.088
		(0.030)***	(0.020)***	(0.021)***
	MA*Local SOE	0.137	0.068	0.071
		(0.034)***	(0.023)***	(0.024)***
	MA*Others	0.130	0.064	0.066
		(0.049)**	(0.041)	(0.042)
	MA*Central SOE	0.104	0.042	0.045
		(0.049)**	(0.035)	(0.035)
City var.	Living Costs		0.017	0.017
			(0.002)***	(0.002)***
	Skill intensity			-0.070
				(0.185)
Individual variables	Female	-0.091	-0.090	-0.090
		(0.017)***	(0.018)***	(0.018)***
	Years of schooling	0.018	0.016	0.016
		(0.003)***	(0.003)***	(0.003)***
	Experience	0.016	0.015	0.015
		(0.002)***	(0.002)***	(0.002)***
	Age	0.073	0.073	0.073
		(0.008)***	(0.008)***	(0.007)***
	Age^2	-0.001	-0.001	-0.001
		(0.000)***	(0.000)***	(0.000)***
	Communist	0.073	0.072	0.072
		(0.024)***	(0.023)***	(0.023)***
	Constant	-0.332	-0.987	-1.025
		(0.236)	(0.262)***	(0.232)***
	Ownership dummies	Yes	Yes	Yes
	Occupation dummies	Yes	Yes	Yes
	Fixed effects	Sector and province		
	Observations	6079	6079	6079
	R-squared	0.20	0.22	0.22
	Number of groups	33	33	33
	Private = Central SOE	3.98*	3.31*	3.35*
	Private = Foreign	14.22***	18.98***	19.66 ***
	Local SOE = Foreign	23.48***	27.97***	29.75***

Heteroskedastic consistent standard errors in parentheses, with ***,** and * denoting significance at the 1, 5 and 10% levels respectively. Standard errors are corrected for clustering at the industry or province-industry level. The reported R-squared is the Within R-squared which indicates how much of the variation of wages within the group of sectors is explained by our regressors.

Appendix A

Map A1: Provincial Market Capacities

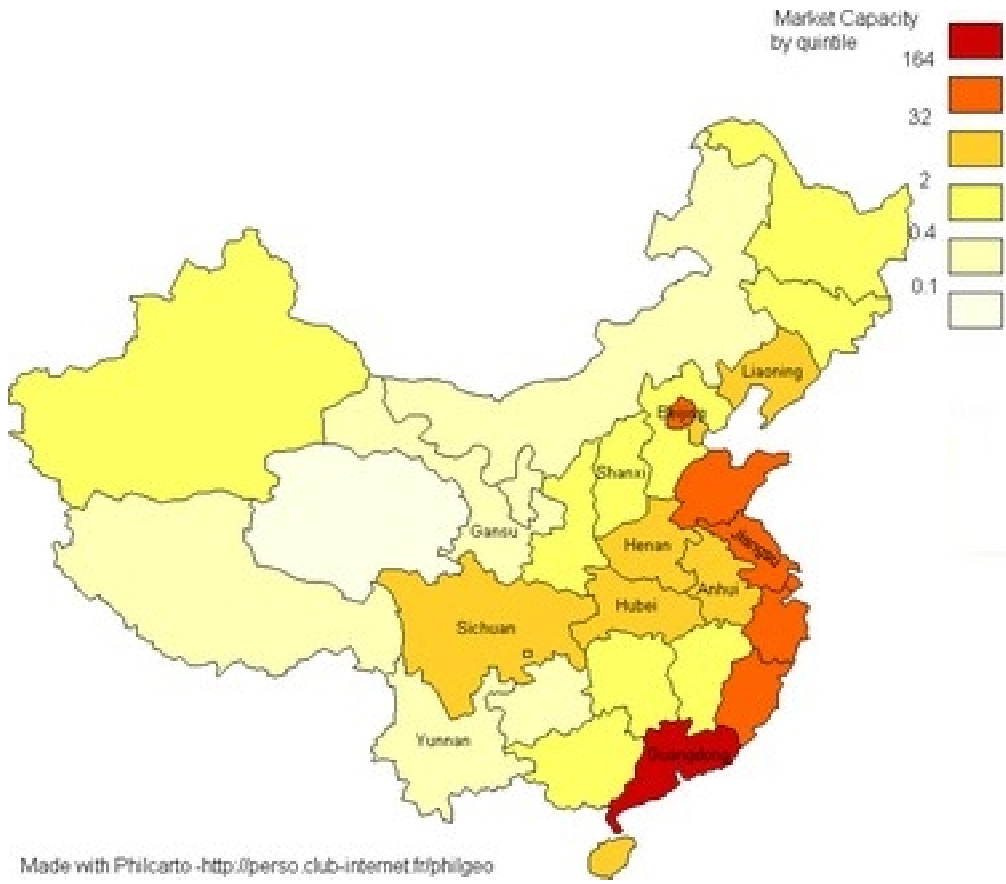

Table A1: Cities

Provinces	Cities
Beijing	Beijing
Shanxi	Changzhi, Datong, Fenyang, Taiyuan, Yangquan
Liaoning	Dalian, Jinzhou, Shenyang
Jiangsu	Changzhou, Dafeng, Nanjing, Nantong, Suqian, Taixing, Wuxi, Xuzhou, Yixing
Anhui	Bengbu, Bozhou, Hefei, Huainan, Tongcheng, Wuhu
Henan	Huixian, Kaifeng, Pingdingshan, Xiangcheng, Xinxiang, Zhengzhou
Hubei	Honghu, Huangshi, Macheng, Tianmen, Wuhan, Xiangfan
Guangdong	Foshan, Guangzhou, Huizhou, Puning, Shenzhen, Shunde, Zhanjiang, Zhaoqing
Sichuan	Chengdu, Guangyuan, Leshan, Luzhou, Zigong
Yunnan	Dali, Gejiu, Kunming, Xuanwei
Gansu	Lanzhou, Pingliang, Wuwei

Table A2: Descriptive Statistics for Hourly Wages (in Yuan) by Province

	All	Beijing	Shanxi	Liaoning	Jiangsu	Anhui
Obs.	6079	402	537	701	872	511
Mean	2.99	3.72	2.50	3.13	3.05	2.48
Standard Deviation	4.26	1.91	1.45	5.82	1.85	2.42
Median	2.5	3.55	2.21	2.48	2.72	2.07
	Henan	Hubei	Guangdong	Sichuan	Yunnan	Gansu
Obs.	495	601	558	710	396	296
Mean	2.22	2.76	5.13	2.76	2.62	1.97
Standard Deviation	2.15	1.75	10.90	2.06	1.08	1.54
Median	1.83	2.46	3.99	2.35	2.51	1.62

Table A3: Trade equation estimations

Dependent Variable: Ln (Exports) in 1997	
Ln Distance	-1.528 (0.024)***
Contiguity	1.162 (0.123)***
Inter-foreign country Border effect	-1.731 (0.320)***
China-foreign country Border effect	-3.681 (0.353)***
Intra China Border effect	-2.766 (0.780)***
Constant	19.488 (0.440)***
Fixed effects by exporter Fixed effects by importer	
Observations	22290
Number of importers	270
Within R-squared	0.59

Heteroskedastic consistent standard errors in parentheses, with *** denoting significance at the 1% level

Table A4: Summary statistics

Variables	Mean	Median	Std. Dev.
Market Access	0.072	0.006	0.15
Years of schooling	10.25	10	2.72
Experience	19.13	20	19.14
Age	35.95	39	9.26
Age^2	1526.08	1521	702.99
Female	0.47	0	0.50
Communist	0.1845	0	0.39

APPENDIX B : DATA

International trade flows are in current USD. These are obtained from the IMF Direction of Trade Statistics (DOTS).

Internal trade flows are in current USD and are calculated as the difference between domestic primary and secondary sector production minus exports. Production data for OECD countries come from the OECD STAN database. For other countries, ratios of industry and agriculture output in percentages of GDP are extracted from Datastream. They are then multiplied by the countries' GDP (in current USD) from World Development Indicators 2005.

Intra-provincial trade flows for China and intra-national trade flows for foreign countries are computed, following Wei (1996), as domestic production minus total exports. Total production for Chinese provinces is computed as the sum of industrial and agricultural output. Output in Yuan is converted into current USD using the annual exchange rate. All statistics come from the China Statistical Yearbooks.

Provincial input-output (IO) tables[1] provide the decomposition of provincial output, international and domestic trade of tradable goods. Domestic trade flows, that is trade between each province and the rest of China, were obtained for 1997.[2]

The rest of China, denoted by *roC*, is different for each province considered and can be thought of as a distinct country whose characteristics (distance to partners $dist_{r\text{-}roC}$) are generated from the characteristics of the provinces that make it up. See Poncet (2005) for more details.

The provincial foreign trade data are obtained from the Customs General Administration database, which records the value of all of the import or export transactions through customs.

[1] Most Chinese provinces produced square input-output tables for 1997. A few of them are published in provincial statistical yearbooks. We obtained access to the final-demand columns of these matrices from the input-output division in China's National Bureau of Statistics.

[2] IO tables are available for 28 provinces, as data are missing for Tibet, Hainan and Chongqing). Four provinces (Anhui, Heilongjiang, Shandong and Guizhou) list only net outflows and are thus not useful for studying inter-provincial trade. Nine provinces separate inflows and outflows into domestic and foreign sectors. Poncet (2005) deduced domestic trade flows for the other provinces using industry-level provincial import and export data from the General Administration of Customs. These data match the data reported as international trade by provinces that separate international and domestic transactions in their input-output tables. This finding gives us some confidence in the method used, as input-output tables and customs data seem to use consistent methodologies.

Provincial imports and exports are decomposed into up to 230 international partners. We rely on data for 1997. The database is discussed in Lin (2005) and Feenstra et al. (1998). Statistics on GDP, land area and population at the city and province level come mainly from two sources: (1) the Urban Statistical Yearbook, various issues, published by China's State Statistical Bureau; and (2) China City Statistics, data for County cities. This data is collected by China's State Statistical Bureau, but is downloadable (for a fee) at http://chinadataonline.org.