



The impact of economic geography on wages: Disentangling the channels of influence

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ABSTRACT

This paper evaluates the role of economic geography in explaining regional wages in China. It investigates the extent to which market proximity can explain the evolution of wages, and through which channels. We construct a complete indicator of market access at the provincial level from data on domestic and international trade flows; this is introduced in a simultaneous-equations system to identify the direct and indirect effect of market access on wages. The estimation results for 29 Chinese provinces over 1995–2002 suggest that access to sources of demand is indeed an important factor shaping regional wage dynamics in China. We investigate three channels through which market access might influence wages beside direct transport-cost savings: export performance, and human and physical capital accumulation. A fair share of benefits seems to come from enhanced export performance and greater accumulation of physical capital. The main source of influence of market access remains direct transport costs.

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1. Introduction

In New Economic Geography (NEG) models, the spatial distribution of demand is a key determinant of economic outcomes. Theoretical developments and growing empirical evidence regarding these models (Hanson, 2005; Head & Mayer, 2004; Redding & Venables, 2003, 2004) appeal to increasing returns to scale and transport costs to explain the emergence of a heterogeneous economic space¹ (Krugman, 1991, Krugman & Venables, 1995). While a number of pieces of work have shown the relevance of market access in the determination of per capita income levels, we understand much less about the precise mechanisms through which this operates.

One central proposition of NEG theory, which is found in the so-called “wage equation”, is the importance of proximity to consumers: here nominal wages are modeled as a function of a region’s “market access”, usually defined as the distance-weighted sum of the market capacity of surrounding locations (Fujita, Krugman, & Venables, 1999). The underlying idea is that firms located

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¹ These trade costs include not only the expense of physically moving products between locations but also all information costs and tariffs associated with transacting at a distance (Redding & Schott, 2003).

in remoter locations pay higher trade costs on both their sales to final markets and their purchases of intermediate inputs. As such, they earn lower net revenues from export sales.² Redding and Venables (2003) carry out theoretical and empirical work at the international level to confirm that external geography is an important determinant of export performance.

Both trade-cost effects consequently imply that remote firms produce less value added with which to remunerate domestic factors of production. Redding and Venables (2004) predict that wages will be higher at the economic center of production, while the periphery will suffer from lower wages. Major recent contributions showing the positive impact of market access on nominal wages include Hanson (2005) for US counties, Mion (2004) for Italy, De Bruyne (2003) for Belgium, Brakman, Garretsen, and Schramm (2004) in 114 German districts, and Head and Mayer (2006) and Breinlich (2006) using European Union data.

Besides this direct effect, proximity to markets may impact wages also through various indirect channels. To capture potential indirect effects of economic geography on wages of EU regions, Breinlich (2006) includes control variables for human and physical capital accumulation. The impact of proximity to markets on the accumulation of human capital, reinforcing the wage premium for skilled workers in central regions has been shown by Redding and Schott (2003). This effect will occur if intermediate and transport cost-intensive goods use relatively more skilled labor. More central locations where the production of these goods is concentrated will then offer higher wages for skilled labor, which increases the incentives for human capital accumulation. The empirical findings of Breinlich (2006) and Faiña and López-Rodríguez (2006) confirm the theoretical importance of economic geography in explaining the spatial structure of educational attainment levels in the EU. Breinlich (2006) and López-Rodríguez and Faiña (2006) suggest that an analogous result should hold for capital-intensive goods, and find that capital accumulation is also affected by spatial proximity and geographic centrality.

However, no work to date analyzing the indirect channels of economic geography has computed a proper theory-based measure of market access³, leaving much room for future work to improve upon the approach before a final verdict can be announced. Data limitations due to the unavailability of intranational trade flows data have often precluded the construction of a structural version of market access.

Chinese provinces are a fortunate exception, with the decomposition of trade flows between international and domestic partners being available at the provincial level, allowing us to construct a very complete measure of market access. This article derives an econometric specification directly from a NEG model to investigate the relevance of market access in China. Recent work on Chinese data (Cui, 2006; De Sousa & Poncet, 2007; Hering & Poncet, 2008; Lin, 2005; Ma, 2006) has confirmed the validity of the NEG “wage equation”: locations closer to consumer markets (i.e. with greater “market access”) experience lower transport costs and enjoy higher income (Fujita et al., 1999). Most of the work on China cited above relies on province-level market access and income data, although the positive relationship between market access and wages has also been confirmed at the micro level (Hering & Poncet, 2008).

While this work has concluded that market access is an important determinant of wages, the various channels of influence have not been disentangled in order to provide an explanation of the result.

We employ a fully-specified empirical model to evaluate the channels through which market access might affect wages. Moving away from single-equation estimates, our results based on a simultaneous-equation system capture the different channels via which economic geography impacts on wages. Variables proxying these various channels (export performance, physical and human capital accumulation) are included in a wage regression. The indirect contribution of market access through the different channels is calculated as the joint effect of market access on the channel and of the channel on wages.

We construct market access indicators at the provincial level from data on domestic and international trade flows, and control for provincial fixed effects so as to focus on the impact of market access on provincial wages over time.

The estimations on 29 Chinese provinces over the 1995–2002 period suggest that access to sources of demand is indeed an important factor in shaping regional wages in China. A fair share of the benefits seem to come from increased incentives to export and accumulate physical capital. On the contrary, the accumulation of human capital does not seem to play a major role. Direct transport costs remain the main source of market access influence.

The paper is organized as follows. The following section outlines a theoretical framework for the direct and indirect impact of market access on wages from which the econometric specifications used in the subsequent sections are derived. Section 3 describes the data sources and variable construction. Section 4 investigates the direct and indirect effects of market access on wages in China, and attempts to disentangle the different channels through which market access affects wages. Section 5 concludes.

2. Theoretical framework

2.1. Theoretical model: geography and wages

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).

² Note that an additional access penalty will apply if production uses intermediate inputs which have to be imported over long distances.

³ López-Rodríguez and Faiña (2006) rely on the Harris (1954) formula of the distance-weighted sum of regional GDPs, while Breinlich (2006) proxies regional expenditures by gross value added.

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