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Resource allocation and productivity across provinces in China

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ABSTRACT

The rapid economic development in China has been characterized by levels of productivity very heterogeneous across local areas. This work investigates a previously unexplored aspect of such heterogeneity by assessing the degree of within-industry allocative efficiency across provinces over the period 1998–2007. Using firm-level data on the Chinese manufacturing firms, we measure resource misallocation by computing the within-industry covariance between size and productivity at the provincial level. The results suggest that allocative efficiency varies considerably across areas and that some place-based factors strongly influence the distribution of resources across firms.

1. Introduction

In the context of heterogeneous production units, aggregate productivity depends on both the efficiency of the individual firms and on how inputs are allocated across them. A recent body of empirical studies has tried to ascertain to what extent cross-country differences in aggregate productivity depend on the misallocation of factors of production across firms.¹ In a seminal paper, Hsieh and Klenow (2009) assess the role of misallocation in accounting for cross-sectional gaps in Total Factor Productivity (TFP) between China, India and the United States. They find a large dispersion in factors' wedges and TFP levels across the Chinese enterprises and conclude that in China there must exist large barriers to a productivity-enhancing reallocation of resources. The removal of such hindrances, they claim, could lead to sizeable collective gains in terms of efficiency and income.

Following Hsieh and Klenow (2009), several papers have investigated the role of factors misallocation in China.² Although informative about various aspects of allocative efficiency, these works have not tackled the heterogeneous degree of within-industry allocative efficiency (and its possible determinants) across the Chinese provinces, notwithstanding the fact that the rapid economic development in China has been characterized by levels of income and productivity very heterogeneous across local areas. Indeed, regional disparities in China have been widely documented in terms of economic growth (e.g., Fan, Zhang, & Robinson, 2003; Meng, Gregory, & Wang, 2005), income and consumption inequality (e.g., Bin & Fracasso, 2017; Cheong & Wu, 2013; Du, Park, & Wang, 2005;

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¹ Among the emerging literature emphasizing the role of misallocation of resources see Banerjee and Duflo (2005); Bartelsman, Haltiwanger, and Scarpetta (2009, 2013), among others.

² See Brandt et al. (2012) and Ding et al. (2016), among others.

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Kanbur & Zhang, 2005; Westerlund, Edgerton, & Opper, 2010) and productivity level (Rizov & Zhang, 2014), but not in terms of resource misallocation. This is somehow surprising given that improving within-industry allocative efficiency at the province level is conceivably easier than either modifying the industry composition in each province or reallocating resources across provinces.

As previous works have left a relevant dimension of productivity to be explored, this work aims to fill this gap by measuring the degree of heterogeneity in the resource misallocation across provinces. It also contributes to the literature by investigating how local factors correlate with the provincial degree of within-industry allocative efficiency across the firms operating in the manufacturing sectors in China. Among the local determinants of factor mobility and resource allocation, the analysis considers the role played by agglomeration economies, innovation and knowledge spillovers, the quality of human capital, the internationalization of the economic system, the availability of infrastructures supporting work-related commuting.

The empirical analysis exploits firm-level data from the annual surveys conducted by the National Bureau of Statistics (NBS) on the Chinese firms operating in the manufacturing sectors over the period 1998–2007.³ In short, the adopted empirical methodology consists of three main consecutive steps: first, the estimation of firm-level total factor productivity for the Chinese manufacturing enterprises; second, the calculation of the Olley and Pakes (1996)'s decomposition at the industry-province level so as to derive a measure of within-industry allocative efficiency at the provincial level; finally, the estimation of the empirical relationship between within-industry measures of allocative efficiency and a range of place-based factors.

To preview the main findings, the estimation results suggest that within-industry allocative efficiency varies considerably across provinces and over time, confirming a high degree of local heterogeneity also in terms of resource misallocation. The paper shows that place-based determinants of factor mobility are associated with the degree of allocative efficiency. These findings shed some light on the mechanisms at play in the distribution of resources in China and inform the authorities on the efficiency-related effects of localized policy measures. This is all the more important in the light of the current emphasis put by the Chinese authorities on supply-side reforms directed to improve the allocation of resources. Understanding how local factors influence the degree of within-industry allocative efficiency is important for the political debate on what interventions could enhance efficiency and reduce regional inequality. This appears particularly important in the light of the recent literature showing that the allocation of resources across heterogeneous firms is a key determinant of the marked productivity differentials across countries (see, among others, Restuccia & Rogerson, 2013; Bartelsman, Haltiwanger, & Scarpetta, 2013), and in consideration of the key role that productivity gains may play in the preservation of a high-growth trajectory in China (Ding & Knight, 2011).

Our paper relates to the literature on resource allocation in China, relatively recent but already rich. Using aggregate provincial data for all non-agricultural sectors, Brandt, Tombe, and Zhu (2013) find evidence on the evolution of the within-industry misallocation of TFP across provinces, as well as between State and non-State sectors. Focusing on output and input wedges, they find constant TFP losses due to persistent between-province resource misallocation and to within-province misallocation between State Owned Enterprises (SOEs) and non-State Owned Enterprises.⁴ Due to their use of aggregate regional data, Brandt and co-authors cannot assess the extent of within-industry allocative efficiency, notwithstanding their results on the differences between SOE and non-SOE do suggest to explore the within-industry dimension. Chen, Jefferson, and Zhang (2011) analyze data aggregated at the industry level over the period 1980–2008 and measure the changes in TFP due to the reallocation of factors of production across industries in the whole country. They find that the contribution to growth of such process of structural change has been substantial, though decreasing after 2001. Also in this work, the degree of within-industry allocative efficiency is not addressed.

Turning to the published evidence based on microeconomic firm-level data, Hsieh and Klenow (2009) are among the first to analyze the static allocation problem in manufacturing sectors in China. Focusing on the difference between the value marginal product and the cost of inputs, they find a large dispersion in factors' wedges and TFP levels across the enterprises operating in China. They conclude that the reduction of within-industry misallocation to the levels observed in the U.S. economy would increase productivity by 30–50 percent in China. Analyzing firm-level productivity growth, Brandt, Van Biesebroeck, and Zhang (2012) find that within-industry reallocation of resources between the firms located across the entire country could have a positive impact on aggregate growth. Despite an improvement in the efficiency of allocation over time, the reallocation across existing firms has been limited and changes at the extensive margin account for most of TFP growth. It is worth noting that both Hsieh and Klenow (2009) and Brandt et al. (2012) focus on nationwide measures of misallocation and neglect the geographic dimension of allocative efficiency.

The existence of regional differences in allocative efficiency has been addressed by Rizov and Zhang (2014), who examine the differences in average productivity levels for three regional typologies of provinces by performing a shift-share decomposition of firm-level productivity averaged at the industry level for each regional typology. As they find that dense, coastal and highly urbanized regions exhibit the highest average productivity (regardless of the industry composition), the authors conclude that there exist very small differences in allocative efficiency across industries within each regional typology. Two issues are worth noting: first, given their interest on average values of productivity at the industry level, these authors overlook within-industry allocative efficiency; second, they focus on three typologies of provinces and do not analyze the variability across all the individual provinces. Another recent contribution is that by Ding, Guariglia, and Harris (2016), who discuss the determinants of China's productivity growth using firm-level data and applying the Haltiwanger approach (Foster, Haltiwanger, & Krizan, 2001) to decompose productivity growth. They conclude that a resource reallocation across industries could conduct to greater improvements in TFP growth than reallocation across provinces. Although based on growth rates rather than levels of productivity, also this result suggests that within-industry resource allocation at the provincial level

³ The NBS firm-level data has been used extensively to study key aspects of industrial dynamics in China. To obtain reliable information, we clean the data following the steps described in the pioneering work by Brandt et al. (2014).

⁴ A large misallocation between SOE and non-SOE has been found also by Song, Storesletten, and Zilibotti (2011).

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