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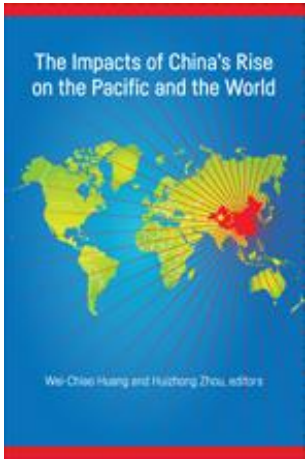

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The Impacts of China's Rise on the Pacific and the World

Wei-Chiao Huang
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7
Trade, Migration, and Growth

Evidence from China

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Citizens in rich countries such as the United States and those in the European Union have enjoyed two fundamental economic freedoms: free movement of goods and movement of people. This has not been the case, however, for citizens in many developing countries, where governments often impose significant restrictions on internal movements of both goods and people. Economists have argued that these restrictions create distortions that result in lower income and welfare for the citizens in these countries. Restrictions on free movement of goods shield inefficient producers from competition and therefore lower the average productivity of firms and raise the costs of goods faced by consumers. Restrictions on movement of people prevent workers from seeking more productive opportunities and households from moving to high-income regions, which leads to persistent labor misallocation and regional income inequality. Removing these restrictions can improve citizens' welfare in these countries by increasing product market competition and reducing labor misallocation, which leads to higher aggregate productivity.

In this chapter I use the period 2000–2005 in China as a case study of the benefits of reducing restrictions on movements of goods and people in an economy. In 2000, China had significant restrictions on internal trade, as well as severe restrictions on movement of people within the country because of a very stringent household registration system called *hukou*. Both restrictions were relaxed between 2000 and 2005. China also joined the World Trade Organization (WTO) at the end of 2001, which required China to reduce its international trade barriers, especially the import barriers.

During the same period, China's real GDP grew more than 11 percent per year. How much of the GDP growth can be attributed to the reductions in restrictions on movements of goods and people? I will provide a quantitative answer to this important question.

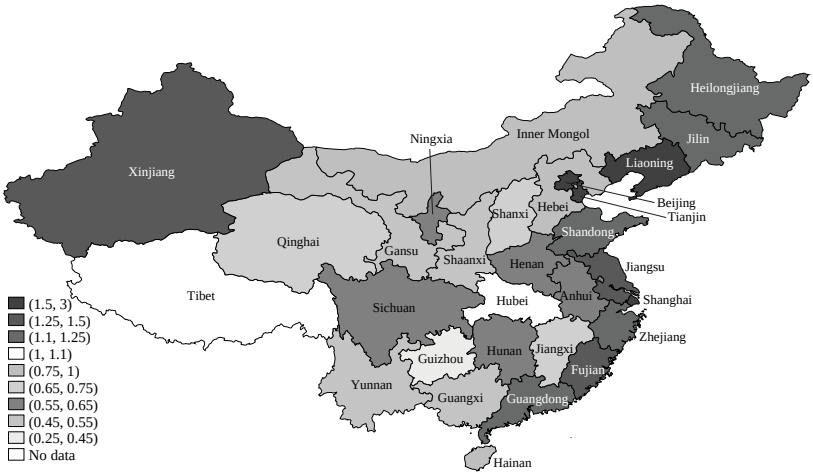
For background, I first discuss the state of the Chinese economy in year 2000 and some important changes that happened between 2000 and 2005. I focus my discussion on three aspects: 1) regional income inequality, 2) internal migration, and 3) trade.

SPATIAL DISTRIBUTION OF INCOMES AND INTERNAL MIGRATION

The cross-province differences in real income have been large in China. In 2000, the ratio of average real GDP per capita of the top five provinces to that of the bottom five was almost 4 to 1. Figure 7.1 plots the spatial distribution of real incomes across the Chinese provinces. The provinces of the coastal regions in the east generally had substantially higher levels of real income than provinces in the central and western regions.

Despite the large cross-province income differences, the percentage of workers who moved between provinces was very low because of a hukou registration system, which was introduced by the Chinese government in 1958 to control population mobility and urbanization. Under this system, each Chinese citizen is assigned a hukou (registration status), classified as "agricultural" (rural) or "nonagricultural" (urban) in a specific administrative unit that is at or lower than the county/city level. Approvals from local governments are needed for an individual to change the category (agricultural or nonagricultural) or location of hukou registration, and it is extremely difficult to obtain such approvals. Before the economic reform started in 1978, working outside one's hukou registration location/occupation category was prohibited. This prohibition was relaxed in the 1980s, and China started to have migrant workers who worked outside their hukou registration locations. However, prior to 2003 migrant workers were required to apply for a temporary residence permit, which was difficult to obtain. As a result, many migrant workers were without a permit and faced the dire consequence

Figure 7.1 Real GDP per Capita (relative to mean), 2000



SOURCE: National Bureau of Statistics of China.

of being arrested and deported by the local authorities. Even with a temporary residence permit, migrant workers without local hukou had very limited access to local public services and faced much higher costs for health care and for their children's education. As the demand for migrant workers in manufacturing, construction, and labor-intensive service industries increased, many provinces, especially the coastal provinces, eliminated the requirement of a temporary residence permit for migrant workers, and by 2003 all provinces had eliminated the requirement. This policy change helped ease migration, but migrant workers still face the costs of having only very limited access to local public services. More importantly, migrant workers always face these costs as long as they do not have local hukou. Because of these costs, most migrant workers are young and without children, and their migration is temporary. In 2000, for example, 70 percent of migrant workers were without children, and 70 percent of them moved within the last four years. Most of them had agricultural hukou but were working in the nonagricultural sector.

As Table 7.1 shows, in 2000, there were 26.5 million migrant workers who worked outside the province of their hukou registration provinces. As the restrictions on migrant workers relaxed, the number

Table 7.1 Stock of Migrant Workers in China

	Interprovincial		Intraprovincial	
	2000	2005	2000	2005
Total stock (millions)	26.5	49.0	90.1	120.4
Share of total employment (%)	4.2	7.2	14.3	17.7

NOTE: Migrants are defined based on their hukou registration location. Interprovincial migrants are workers registered in another province from where they are employed. Intraprovincial migrants are workers registered in the same province where they are employed, but are either nonagricultural workers holding agricultural hukou or vice versa.

SOURCE: Author's calculations.

increased to 49 million in 2005. These are enormous numbers; however, they only represent 4.2 and 7.2 percent of China's total employment in 2000 and 2005, respectively. The majority of migrant workers in China are those who move within a province. The numbers of within-province migrant workers were around 90 million in 2000 and 120 million in 2005, representing 14.3 and 17.7 percent of China's total employment in 2000 and 2005, respectively.

INTERNAL AND EXTERNAL TRADE

It has been well documented that internal trade costs in China in the 1990s were high (Poncet 2005; Young 2000). It has also been documented that the degree of local market protection in a province was directly related to the size of the state sector in that province (Bai et al. 2004). Since 2000, these trade barriers have been reduced significantly. Some of the reduction was a result of the deliberate policy reforms undertaken by the government. For example, the state council under the then premier Zhu Rongji issued a directive in 2001 that prohibits local government from engaging in local market protections. More importantly, as a result of various state-owned enterprise reforms, the size of the state sector has declined significantly and consequently lowered local government incentives to engage in local market protections. Improved transport infrastructure and logistics also helped lower internal trade cost.

The province-level trade data, both between province pairs and internationally, are taken from the regional input-output tables for 2002 and 2007. Table 7.2 reports the aggregate bilateral flows between the eight regions and each other and the rest of the world. To ease comparisons, we normalize all flows by the importing region's total expenditures. In addition to the bilateral trade flows, we also report in the last column the share of a region's expenditures that are spent on goods from all other regions within China. A useful measure of a region's trade openness is the fraction of its expenditures allocated to its own producers—that is, its "home share." The diagonal elements in Table 7.2 provide these values for each region. Interior regions of China have a much higher home share than coastal regions. In 2002, the central region's home share is 0.88 compared to only 0.72 for the south coast and 0.63 for Beijing and Tianjin.

While regions in China generally import more from abroad than from any particular region within China, the total imports from the rest of China are still higher than imports from abroad for most of the regions. The Central Coast and South Coast regions are the exceptions. In 2002, their imports from abroad were significantly higher than imports from the rest of China; they also had substantial international exports.

TRADE AND MIGRATION COSTS IN CHINA

Tombe and Zhu (2015) use a structural model combined with the data on trade and migration flows to estimate costs of trade and migration. The model generates gravity equations that relate the trade flow between two regions to the real GDP of the two regions and the trade cost between the two regions, and the migration flow between two regions to the real incomes of the two regions and the cost of migration between two regions.

Trade flow between regions A and B = F(GDP of region A, GDP of region B, distance, *trade cost*)

Migration flow from regions A to B = G(income of region A, income of region B, distance, *migration cost*)

Table 7.2 Internal and External Trade Shares of China

	Exporter									
Importer	Northeast	Beijing/ Tianjin	North Coast	Central Coast	South Coast	Central Region	Northwest	Southwest	Abroad	Total other prov.
Year 2002										
Northeast	87.9	0.7	1.0	0.8	1.3	1.1	0.8	0.9	5.5	6.6
Beijing/Tianjin	3.9	63.4	9.4	3.0	2.6	3.3	1.4	1.2	11.9	24.8
North Coast	1.8	3.3	79.8	3.4	1.8	3.8	0.9	0.8	4.4	15.8
Central Coast	0.2	0.2	0.6	81.0	1.5	2.4	0.5	0.5	13.3	5.7
South Coast	0.5	0.4	0.5	2.6	72.3	1.9	0.4	1.5	19.8	7.9
Central Region	0.6	0.3	1.1	4.8	2.3	87.8	0.7	0.7	1.8	10.4
Northwest	2.0	0.8	2.1	3.3	4.5	3.6	77.4	3.8	2.6	20.0
Southwest	0.9	0.3	0.4	1.8	4.3	1.4	0.9	88.0	2.0	10.0
Abroad	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	99.6	–
Year 2007										
Northeast	78.7	2.0	2.0	0.9	2.7	1.0	1.4	0.9	10.4	10.9
Beijing/Tianjin	3.8	62.3	10.1	1.5	2.4	1.8	2.1	0.7	15.5	22.2
North Coast	2.1	5.8	76.8	1.5	1.5	3.7	2.3	0.8	5.5	17.7
Central Coast	1.1	0.7	1.4	76.8	1.8	4.8	1.7	0.9	10.8	12.4
South Coast	1.5	0.9	1.7	5.2	68.5	3.6	1.8	2.8	14.1	17.4
Central Region	1.7	1.4	4.5	4.9	4.0	73.0	2.9	1.8	5.9	21.1
Northwest	2.3	2.2	4.8	2.7	5.5	3.6	65.6	3.6	9.8	24.6
Southwest	1.6	1.2	1.7	1.7	8.4	1.9	3.2	73.8	6.6	19.6
Abroad	0.0	0.1	0.1	0.4	0.2	0.0	0.0	0.0	99.1	–

NOTE: The table displays the share of each importing region's total spending allocated to each source region. See Tombe and Zhu (2015, Appendix A) for the mapping of provinces to regions. The column "Total other prov." reports the total spending share of each importing region allocated to producers in other provinces of China. The diagonal elements (the "home share" of spending"), the share imported from abroad, and the share imported from other provinces will together sum to 100%.

SOURCE: Author's calculations.

With data on GDP, income, distance, and trade and migration flows, the trade and migration costs can be estimated as residuals.

Migration Costs

We measure the migration cost as a factor that deflates a migrant's real income so that she is indifferent between migrating or staying in her hukou location. The cost may vary across the sector-location pairs. For example, if the cost of migrating to a destination is 3, then an individual will migrate to the destination if and only if the real income in the destination is at least three times as high as the real income the individual can earn by staying at her hukou location. We summarize these costs, their changes, and the initial migration flows in Table 7.3. Overall, migration costs are largest for migrants switching both sectors and provinces, with an average initial cost of nearly 38. In contrast, switching sectors within one's home province incurs average migration costs of 2.9. When estimating the migration costs by migrant worker's age, the costs are much higher for older workers. These patterns of migration costs are consistent with our discussion earlier that the most important source of the migration costs is the lack of access to local public services at the migration destination. This is clearly more important for older migrant workers and workers who are farther away from their hukou location.

Table 7.3 also reports the change in average migration costs between 2000 and 2005 in the last column. Overall, migration costs declined to 84 percent of their initial level. Costs to switch provinces fell the most, from 32.6 to 19.8. Sectoral switches within a worker's home region also fell, from 2.9 to 2.4.

Trade Costs

The trade cost we estimate is a comprehensive measure of barriers to trade that includes tariffs, transportation costs, and other nontariff barriers, such as local protection policies. It is represented as an iceberg cost. For example, if the export cost is 3, then for one unit of good to reach the export destination, it will cost the exporter three units of goods. For a typical province in China in 2002, the average trade cost was 3 in agriculture and 2 in nonagriculture, and the magnitudes of

Table 7.3 Migration Rates and Average Costs, by Sector and Province

		Migration costs		
	Initial share of employment	Level in 2000	Level in 2005	Relative change
Agriculture to nonagriculture migration cost changes				
Overall	0.16	3.4	2.9	0.84
Within province	0.13	2.9	2.4	0.84
Between province	0.03	37.8	23.2	0.61
Between provinces migration cost changes				
Overall	0.04	32.6	19.8	0.61
Within agriculture	0.003	71.9	63.7	0.89
Within nonagriculture	0.01	21.3	12.4	0.58
Overall	0.174	3.6	3.0	0.84

NOTE: Displays migration-weighted harmonic means of migration costs in 2000 and 2005. We use initial (year 2000) weights to average the 2005 costs to ensure the displayed change reflects changes in costs and not migration patterns.
SOURCE: Author's calculations.

internal and external trade costs are similar. So, trade costs were quite high in 2002. Overall, we find that poor regions face the highest export costs—consistent with existing cross-country evidence.

Table 7.4 presents the relative change in the nonagricultural trade costs for eight regions in China between 2002 and 2007. Some notable patterns emerge. Within China, trade costs were largely decreasing, with trade-weighted change in trade costs within China of −11 percent. For trade between China and the world, the average change in trade costs was −8 percent. Poor regions such as Central, Northwest, and Southwest experienced much larger reductions in export costs than rich regions did. Also, the reductions in China's costs of importing from the rest of the world were much larger than the reductions in China's costs of exporting to the rest of the world. These numbers suggest that around the time when China joined the WTO, there were significant reductions in China's internal trade costs and import costs and only modest reductions in China's export costs.

Table 7.4 Percent Change in Trade Costs, 2002–2007

	Exporter								
Importer	North-east	Beijing/ Tianjin	North Coast	Central Coast	South Coast	Central Region	North-west	South-west	World
Northeast		−11.8	−16.7	−23.5	−24.7	−23.0	−18.0	−18.5	−27.7
Beijing/Tianjin	−14.2		−15.0	−15.5	−13.8	−23.9	−25.7	−18.5	−26.9
North Coast	−5.7	−1.0		−1.0	−11.2	−20.7	−22.6	−20.7	−20.3
Central Coast	−16.4	−5.2	−4.5		−11.2	−15.9	−17.9	−12.4	−19.1
South Coast	−18.4	−4.0	−15.1	−12.0		−20.7	−24.7	−20.8	−10.6
Central Region	−6.6	−5.2	−15.1	−6.7	−11.2		−19.1	−16.8	−27.9
Northwest	−4.0	−10.6	−20.0	−12.0	−18.6	−21.9		−17.8	−37.8
Southwest	−3.8	−1.2	−17.5	−5.4	−13.8	−19.1	−17.2		−27.7
World	−3.8	−0.2	−6.5	−1.6	9.7	−21.0	−29.4	−18.5	

SOURCE: Author's calculations.

THE EFFECT OF MEASURED COSTS CHANGES

In Tombe and Zhu (2015) we use a general equilibrium model to quantify the effect of the changes in trade and migration costs. In the quantitative analysis, we fit the initial equilibrium of our model to the Chinese data in 2002 and then quantify the impacts on aggregate productivity and welfare of various changes in trade and migration costs. I summarize the main results here.

The Effect of Lower Trade Costs

Table 7.5 displays the change in trade and migration flows, aggregate productivity, and welfare, and various other outcomes as a result of the changes in trade costs. Changes in trade shares are expenditure-weighted average changes across all provinces and sectors. Lower internal trade costs, not surprisingly, decrease the amount of international trade as households and firms reorient their purchase decisions toward domestic suppliers. The share of expenditures allocated to producers in another province typically increases by over 9 percentage points, while the share allocated to international producers falls by almost 1 percentage point. Lower external trade costs reveal the opposite pattern. In both cases, home shares fall.

Table 7.5 Effects of Trade Cost Changes

	Percentage point change in		Migrant stock (%)			
	Internal trade	External trade	Within province	Between province	Real GDP (%)	Aggregate welfare (%)
Internal trade	9.2	−0.7	0.8	−2.0	10.7	10.7
External trade	−0.7	3.9	1.8	2.4	3.8	2.6
All trade	8.2	2.9	2.5	0.3	14.4	13.2

NOTE: Displays aggregate response to various trade cost changes. All use trade cost changes as measured. The migrant stock is the number of workers living outside their hukou registration location or sector.
SOURCE: Author's calculations.

In terms of migration, improved internal trade costs actually resulted in fewer workers living outside their home province. The total stock of migrants declined by over 2 percent (equivalent to approximately 0.5 million workers). Intuitively, declining internal trade costs disproportionately lower goods prices in poor, interior regions. This increase in real income means that fewer workers living in other provinces were willing to continue to do so. On the other hand, a greater fraction of workers switched sectors within their home province. With lower international trade costs, richer coastal regions disproportionately benefit, so more workers relocate there in addition to more workers switching sectors within their home province.

The change in income, goods and land prices, and workers' location decisions all have implications for aggregate welfare. We report the change in welfare and productivity (aggregate real GDP) in the last columns of Table 7.5. In response to lower internal trade costs, aggregate welfare dramatically increased by nearly 11 percent. In contrast, external trade cost reductions resulted in a much smaller gain of only 3.1 percent. As in our earlier analysis, internal trade costs reductions appear to be significantly more important for aggregate outcomes. The differential impacts are not due to any significant differences in the magnitude of cost reductions. The main reason for the larger welfare gains from internal cost reductions is that most provinces allocate a larger fraction of their spending to goods from other provinces than from abroad.

The Effect of Lower Migration Costs

Trade liberalization accounts for only a limited amount of migration. Not surprisingly, lower migration costs lead to substantially more workers living outside their home province-sector. As before, we simulate the effect of lower migration cost changes and report the effects in Table 7.6.

The stock of migrants increases dramatically when the cost of migration declines as measured. The number of interprovincial migrants increases by more than 80 percent. Within provinces, there are also substantial moves from agriculture to nonagriculture. The stock of workers with agricultural hukou that have nonagricultural employment within their home province increases by nearly 15 percent. Clearly, the measured changes in migration costs are extremely important determinants of worker location decisions. The large flows are also beneficial for China as a whole; real GDP and welfare rise 4.8 and 8.5 percent, respectively. Changes that facilitate the movement of workers from agriculture to nonagriculture sectors, whether within or between provinces, account for most of the increases in aggregate GDP and welfare.

While migration flows and real incomes respond greatly to the changes in migration costs, the effect on aggregate trade flows is muted. International and internal trade shares increase by only 0.2 and 0.1 percentage points, respectively.

Table 7.6 Effects of Various Migration Cost Changes

	Percentage point change		Migrant stock			
	Internal trade	External trade	Within province (%)	Between province (%)	Real GDP (%)	Aggregate welfare (%)
All	0.1	0.2	14.5	82.4	4.8	8.5
Agriculture to nonagriculture migration cost changes						
Overall	0.1	0.1	15.3	54.0	4.4	7.2
Within province	0.0	−0.1	22.8	−9.6	2.0	4.8
Between province	0.1	0.2	−7.0	71.0	2.9	2.7

NOTE: Displays aggregate response to various migration cost changes. All use migration cost changes as measured. The migrant stock is the number of workers living outside their hook registration location or sector.

SOURCE: Author's calculations.

Decomposing China's Growth between 2000 and 2005

While the results above show that the reductions in trade and migration costs have a large effect on the aggregate GDP growth, they cannot account for all the observed growth in China between 2000 and 2005. Other factors, such as technology improvements and reforms within each province and sector may also contribute to the aggregate GDP growth during that period. In Tombe and Zhu (2015), we summarize the contribution of these factors by a residual productivity growth term for each province and sector so that the combination of the productivity growth and the measured changes in trade and migration costs can generate a GDP growth rate in our quantitative model that matches the actual GDP growth rate in that province and sector. By construction, the quantitative model with the measured cost changes and the implied residual productivity growth also matches the aggregate GDP growth exactly. The model can then be used to decompose China's overall growth into one of four components: productivity growth, lower internal trade costs, lower international trade costs, and lower internal migration costs. The result of the decomposition is reported in Table 7.7.

Overall, reductions in trade and migration frictions account for about one-third of China's overall growth. Reductions in internal trade and migration costs contribute roughly one quarter (15.3 percent of the 57.1 percent). In stark contrast, international trade cost reductions account for only 7 percent of the overall growth (4.2 percent of the 57.1 percent).

Potential Gains from Further Reform

Our decomposition shows that reductions in trade and migration frictions and the resulting reduction in misallocation of labor played a major role in China's growth between 2000 and 2005. How much additional scope is there for further reductions in trade and migration costs? In Tombe and Zhu (2015), we use the quantitative model to evaluate the effect of two potential reforms: 1) lowering the internal trade costs to the average level observed in Canada, and 2) lowering the internal migration costs so that the average interprovincial migration rate in China is the same as the interstate migration rate in the United States. The results are reported in Table 7.8 and show that China's real GDP and welfare could increase by a further 10.9 percent and 11.8 percent

Table 7.7 Decomposing China's Overall Real GDP Growth

	Marginal effects	
	Real GDP growth (%)	Share of growth
Overall (all changes)	57.1	—
Productivity changes	37.9	0.66
Internal trade cost changes	9.7	0.17
External trade cost changes	4.2	0.07
Migration cost changes	5.6	0.10

NOTE: Decomposes the change in real GDP into contribution from productivity, internal trade cost changes, external trade cost changes, and migration cost changes.
SOURCE: Author's calculations.

Table 7.8 Potential Gains of Further Trade and Migration Liberalization

	Relative to 2005	
	Change in Real GDP (%)	Aggregate welfare (%)
Average internal trade costs as in Canada	10.9	11.8
Between-province migration as in U.S.	22.8	15.0
Both changes together	37.0	30.5

NOTE: Reports the change in real GDP and welfare that result from changing China's internal trade and migration costs such that average internal costs equal Canada's (by sector) or such that the between-province migration flows match the U.S. Percentage changes are expressed relative to the Chinese economy in 2005.
SOURCE: Author's calculations.

if average internal trade costs fell to Canada's level, and an additional 22.8 percent and 15 percent if the average migration rate in China was the same as that in the United States. The scope for and gains from further policy reforms are therefore large. Both changes together would deliver real GDP gains of 37 percent and welfare gains of nearly 31 percent.

CONCLUSION

China experienced rapid GDP growth between 2000 and 2005, and many believe it is because of the external trade liberalization associ-

ated with China's joining the WTO in 2001. This resulted in export expansion supported by a large increase in the supply of cheap migrant workers, hence the growth. Internal policy reforms undertaken by the Chinese government during the same period have not received as much attention. However, their contribution to China's growth during that period is much more important than the contribution of the external trade liberalization. Reductions in internal trade and migration costs account for 27 percent of the aggregate GDP growth in China between 2000 and 2005. In contrast, reductions in external trade costs account for only 7 percent of the aggregate GDP growth during the same period. Despite the reductions, internal trade and migration costs in China are still much higher than those in developed countries such as Canada and the United States. Further reforms that lower these costs to developed country levels could yield substantial increases in China's aggregate GDP and welfare in the future.

Note

This chapter is largely based on my joint paper with Trevor Tombe (Tombe and Zhu 2015). I thank the Department of Economics at Western Michigan University for inviting me to present this paper at the 2015–2016 Werner Sichel Lecture Series.

The data on regional income are constructed based on the GDP and employment series provided by Brandt, Tombe, and Zhu (2013); the data on trade are from the Inter-Province Input-Output table provided by Li (2010) and the Inter-Regional Input-Output table provided by Zhang and Qi (2012); and the data on migration are from the 1 percent sample of the 2000 China Population Census and the 20 percent sample of the China 2005 1 Percent Population Survey.

There is no regional input-output table for 2000 in China, so we use trade shares from the 2002 China Regional Input-Output Tables to approximate trade shares in 2000.

References

Bai, Chong-en, Yingjuan Du, Zhigang Tao, and Sarah Tong. 2004. "Local Protectionism and Regional Specialization: Evidence from China's Industries." *Journal of International Economics* 63(2): 397–417.

Brandt, Loren, Trevor Tombe, and Xiadong Zhu. 2013. "Factor Market Distortions across Time, Space, and Sectors in China." *Review of Economic Dynamics* 16(1): 39–58.

Li, Shantong. 2010. *Nian Zhongguo Diqu Kuozhan Touru Chanchubiao (2002 China Extended Regional Input-Output Tables)*. Beijing: Economic Science Press.

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

Tombe, Trevor, and Xiaodong Zhu. 2015. "Trade, Migration and Productivity: A Quantitative Analysis of China." Working paper. Toronto, Ontario: University of Toronto.

Young, Alwyn. 2000. "The Razor's Edge: Distortions and Incremental Reform in the People's Republic of China." *Quarterly Journal of Economics* 115(4): 1091–1135.

Zhang, Yaxiong, and Shuchang Qi. 2012. *2002, 2007 Nian Zhongguo Qiqujian Touru Chanchubiao (2002 and 2007 China Inter-Regional Input-Output Tables).* Beijing: China Statistical Press.