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Chapter 4

China's Trade and Opening since 1978: A Regional Perspective from the Northeast*

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Abstract

China's rapid growth has masked the fact that some of its regions have failed to keep up with the modernization and efficiency drive during the market transition. China's Northeast was once the most prosperous part of the country and a model for socialist industrialization efforts. But since the reforms and opening up, the region has struggled to turn its old industrial base into a vibrant economy. Trade represents a possible channel for stimulating economic growth, especially in border regions. Accordingly, this chapter explores the trade patterns of Heilongjiang, a border province in the Northeast, and uses a gravity model to estimate the trade costs vis-à-vis its major trading partners, and Russia in particular, over the period 1978–2017. The results indicate a profound change from a relatively isolated border region into a more open economy over the sample period. Moreover, Heilongjiang exhibits a home

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bias, trading with the rest of China more intensively than with any other country. The border effects with Russia are substantial, although they have declined somewhat over the past two decades. Other trading partners in Northeast Asia record lower trade costs than Russia overall, but the barriers seem to have been on the rise since the early 2000s. The discussion of the potential factors contributing to the high border effects of Heilongjiang points to the lacking infrastructure, especially the cross-border infrastructure with Russia and the costly access to seaports, as the main culprit.

4.1. Introduction

Over the past 40 years, China has experienced a fundamental economic transformation, turning into one of the largest manufacturing and trading nations in the world. In the process, attention has focused on the highly successful provinces along the coast, where vibrant regional economies and special economic zones have been busy producing export goods and trading them with the world. As the income gap between the coast and interior widened, policy makers and scholars rushed to explore options for a more balanced development strategy. In recent years, China's trade practices and global initiatives have garnered more scrutiny as the country's influence on the world stage grows, bringing it into conflict with other major powers. At the same time, border regions in China, and the Northeast in particular, have remained largely outside the scope of scholarly interest.

The main reason for this lack of attention lies in the fact that China's Northeast has struggled to modernize its economy since the introduction of market reforms in the late 1970s. Once considered the cradle of industrial development and among the wealthiest parts of China, the Northeast has relied on an industrial structure dominated by large state-owned enterprises (SOEs) engaged in mining and heavy industries. Promoted as a model of socialist industrialization since the 1950s, the region's economic structure made it a key target of state planning directives as well as the recipient of generous government subsidies. However, when the focus shifted to efficiency improvements and modernization during the early decades of market transition, SOEs in the Northeast missed the opportunity to restructure and benefit from the opening of the economy to foreign trade and investment.

This study examines the case of a Northeast province and its trade relationship with the world over the past 40 years. In particular, we employ a gravity model to estimate the extent and evolution of trade barriers between Heilongjiang province and its main trading partners over the period 1978–2017. Trade composition and patterns are investigated in detail, and potential hurdles impairing the cross-border exchange of goods are explored and discussed. To the best of our knowledge, this is the first trade-related empirical study of China's Northeast in general, and Heilongjiang province in particular. The relevant literature has focused largely on historical periods of economic development and trade in the 19th and early 20th centuries (Kung and Li, 2011) and the recent revitalization strategies for the Northeast (Huang, 2004; Izotov and Suslov, 2012; Hou *et al.*, 2019).

The trade relations of China's Northeast deserve a closer look for several reasons. The region was isolated from the world for decades, and by the time China opened up, the Northeast proved to be unprepared for the new economic challenges. This is a unique opportunity to study the response of an emerging economy to an outdated industrial model that carries a financial, social, and environmental burden. Trade as a channel for the revitalization of the region has not been the main focus of policy makers, although regional authorities have implemented various measures to stimulate cross-border exchange of goods (i.e. allowing Russian rubles to be accepted as payment in the border city of Suifenhe). As China and Russia have developed closer links over the past decade, trade might play an increasingly important role in the economy of Heilongjiang. However, mistrust, onerous bureaucratic hurdles, lack of cross-border infrastructure, and logistical challenges still create barriers that prevent the region from taking full advantage of its potential for regional integration with Northeast Asia. This study fills the gap in the literature by quantifying these trade costs and investigating their change over four decades of reforms and opening in China.

The chapter is organized as follows. In Section 4.2, the historical development of Heilongjiang's economy is traced. Section 4.3 describes the gravity model and the dataset used in the estimation, while Section 4.4 presents the results of the empirical investigation. Section 4.5 summarizes the findings and discusses their implications for further expansion of trade in China's Northeast.

4.2. Historical Overview

Heilongjiang is nowadays a Chinese province in the Northeast, but historically, it was part of Manchuria, which played a key role in East Asian history. The territory of today's Heilongjiang became a border region after the signing of the Treaty of Aigun in 1859 and the Treaty of Peking in 1860, sealing the annexation by the Russian Empire of the lands north of the Amur River and east of the Ussuri River. Rich in natural resources, sparsely populated, and with a strategic location at the crossroads of Northeast Asia, the region attracted the attention of Russia and Japan, turning into a conflict zone between the two powerful neighbors at a time when the central government in China was too weak to assert sovereignty over its northeastern territories.

Initially, the Qing emperors of China wanted to protect their Manchurian homeland from Chinese migration, but since the late 19th century, the restrictions were gradually lifted, and the region experienced a large influx of ethnic Chinese who took advantage of the fertile black soil of the region, boosting agricultural development. In a period of only 50 years, this process resulted in a net migration of over 8 million people into Manchuria (Gottschang, 1987). Soy emerged as the primary crop for cultivation, mainly because it proved to be a valuable export. At the time, China was producing 80% of the world output of soy, and the majority of it was grown and processed in Manchuria (Perkins, 1969). The exports of soy from the region increased continuously and experienced a major surge after WWI in response to growing world demand (Kung and Li, 2011).

The commercialization and exports of agricultural products were facilitated by two major infrastructure developments. A new treaty port in Niuzhuang (now called Yingkou) opened Manchuria up for foreign trade as a consequence of the Treaty of Tianjin (1859). Moreover, Russia, which was the dominant imperialistic power in the region at the time, built a key network of railroads, providing a straight link between its own Trans-Siberian rail and its seaport in Vladivostok and expanding later a connection to the seaport of Dalian in the south (Urbansky, 2008). The new Chinese Eastern Railway turned Harbin from a small village into a major international transportation hub and the administrative center of Heilongjiang, which it remains to this day. More importantly, it boosted the

transportation links and the trade relations of the region with the rest of the world. The railway freight tonnage in Manchuria increased from 2 million tons in 1901 to 36 million in 1931 (Gottschang, 1987).

After the defeat of Russia in the Russo–Japanese War of 1905, Japan expanded its influence in the region, culminating in a Japanese invasion and subsequent creation of a quasi-colonial state in Manchuria in 1932. The economic policies of Japan emphasized a rapid government-led expansion of mining and the industrial sector at the expense of agriculture, leading to a modernization of Manchuria's economy and infrastructure (Murakami, 2012). At the same time, the region continued its strong export orientation, with exports making up around 17% of GDP and imports around 22% in 1934 (Eckstein *et al.*, 1974). More importantly, the population in Manchuria became more prosperous, whereby farmers who were involved in the cultivation of soybeans destined for exports were the major beneficiaries (Kung and Li, 2011). The industrialization drive during the Japanese occupation led to a divergence in economic development between Manchuria and the rest of China, with the former recording rapid economic growth, while the latter stagnated (Eckstein *et al.*, 1974).

The Soviet Union occupied Manchuria after the defeat of Japan in WWII and again took control of the Chinese Eastern Railway, turning it over to China only at the end of 1952 (Urbansky, 2008). The re-integration of Manchuria (now Northeast China) into China proper marked a new phase in the economic development of the region. Helped by the existing industrial infrastructure, the Chinese government invested heavily into developing the Northeast into a model of industrial progress under the newly established Soviet-style planned economy with an emphasis on heavy industries and mining. Oil was discovered around Daqing in the late 1950s, making the town famous around the country and turning it into a model socialist enterprise (Hou, 2018). The GDP per capita of Heilongjiang in 1952 was twice as high as the Chinese average (238 Yuan vs. 119 Yuan), and this gap disappeared only in the mid-2000s (National Bureau of Statistics, 2010).

The market transition in China in the 1980s and 1990s turned the once proud industrial homeland of China into a rust belt. While the coastal areas of East and South China boomed thanks to the rapid emergence of export-oriented manufacturing and an influx of foreign direct investment, China's Northeast with its large SOEs was

struggling to respond to the new market signals and efficiency drives. Stagnation, unemployment, and environmental pollution plagued the region. In response, the central government implemented three major drives (in 2003, 2009, and 2016) to revitalize the "Old Industrial Base" of the Northeast, which had a positive effect (Chung *et al.*, 2009; Wang *et al.*, 2014; Hou *et al.*, 2019). A key part of these strategies has been the regional integration and trade cooperation with Russia and other neighboring countries in Northeast Asia. This aspect received a major boost from the One Belt One Road initiative of the Chinese government since the mid-2010s, which has focused on expanding the infrastructure and promoting trade between China and other parts of Eurasia and the world.

4.3. Methodology and Data

4.3.1. *Gravity model*

Investigating trade flows and their determinants requires an empirical model that takes into account the characteristics of both trading partners as well as factors that might facilitate or impair the exchange of goods. The most popular model that has been used in the literature is based on Newton's universal law of gravitation, which, in general terms, states that the gravitational force is directly proportional to the product of their masses and inversely proportional to the square of the distance between their centers. Applied to international economics, this relationship defines the strength of the trade link between two entities (customs unions, countries, regions, firms, etc.) as a function of the product of their size and the physical distance between them. The gravity model was introduced in economics by Tinbergen (1962) and was initially considered as purely empirical until Anderson (1979) developed a formal theoretical foundation.

In line with Anderson and van Wincoop (2003), the basic gravity framework can be expressed as

$$x_{ij} = \frac{y_i y_j}{y^W} \left(\frac{t_{ij}}{P_i P_j} \right)^{1-\sigma}, \tag{4.1}$$

where the left-hand side variable denotes the exports of country i to country j, y is the country's nominal income, y^W is the world

income, t denotes the bilateral trade costs, and σ is the elasticity of substitution. The price levels, P, represent the average trade barriers of a country vis-à-vis all of its trading partners. Once Eq. (4.1) is linearized and trade costs are broken down into various components, the gravity equation transforms into

$$lnx_{ij} = ln(y_i y_j) - lny^W + (1-\sigma)lnb(1-\delta_{ij}) + (1-\sigma)\rho lnd_{ij} + (1-\sigma)\tau_{ij} - (1-\sigma)lnP_i - (1-\sigma)P_j, \quad (4.2)$$

where b is defined as the border effect, δ_{ij} is a categorical variable that takes the value of one for intranational trade and zero otherwise, d is bilateral distance, and τ_{ij} includes all remaining trade costs. Equation (4.2) is transformed into a stochastic model given by

$$ln\left(\frac{x_{ij}}{y_{it}y_{jt}}\right) = \beta_0 + \alpha_i\lambda_i + \alpha_j\lambda_j + \beta_1 lnd_{ijj} + \beta_2\,(RUS) + \beta_3\,(NEA) + \beta_4\,(ROW) + \varepsilon_{ij}. \quad (4.3)$$

The dependent variable is the log of exports that has been adjusted for the size of the two involved countries. The main focus of the analysis is on the coefficients of the variables for trade with Russia (RUS), Northeast Asia (NEA), and the rest of the world (ROW). These dummy variables take the value of 1 for trade between Heilongjiang and each of the listed countries or regions and zero otherwise. The zero in this case represents the control group, which is defined as the trade between Heilongjiang and the rest of China. Accordingly, the coefficients represent the corresponding bilateral trade costs relative to those involved in intranational trade. Equation (4.3) takes into account factors that vary across countries but not across time via exporter and importer fixed effects. Similarly, factors that vary across time but not across countries are controlled for by including time fixed effects (η_t).

We estimate the border effects for each of the three entities trading with Heilongjiang over the period 1978–2017 and convert the resulting coefficients into *ad valorem* tariff equivalents (expressed in %) to facilitate their interpretation. To gain more detailed insights into the border effects for each country and their changes over time, we employ a different methodology developed by Novy (2013), which allows the calculation (rather than estimation) of bilateral trade costs

in a given year. In line with this approach, trade costs between countries i and j can be expressed as

$$\tau_{ij} = \left(\frac{x_{ii} x_{jj}}{x_{ij} x_{ji}} \right)^{1/(2(\sigma-1))} - 1. \tag{4.4}$$

Equation (4.4) uses a similar logic as the border effect variables in Eq. (4.3), calculating the ratio of intranational trade to cross-border trade. The main advantage is that it allows the calculation of bilateral trade costs for a given year and pair of trading partners. At the same time, it is worth mentioning that the trade costs resulting from Eq. (4.4) are not identical to the ones generated by the regression model in Eq. (4.3).

4.3.2. *Data*

The main variable in the analysis, trade flows, is measured as exports and imports of Heilongjiang expressed in current US dollars (USD). The annual observations were obtained from publications of the Heilongjiang Statistical Office, which in turn relies on data from China's General Administration of Customs. The sample period covering the period 1978–2017 is determined by the availability of data, whereby statistics for 1979 and 1984 are missing. We selected 45 trading partners of Heilongjiang, which represent more than 90% of the province's exports and more than 87% of imports. These include 18 Asian countries (Bangladesh, Hong Kong, India, Indonesia, Japan, Kazakhstan, North Korea, South Korea, Malaysia, Mongolia, Pakistan, Philippines, Singapore, Taiwan, Thailand, Turkey, UAE, and Vietnam) with a share of around 32% of exports and 13% of imports; 11 countries in Europe (Belgium, Denmark, Germany, France, Italy, Netherlands, Poland, Russia, Spain, Sweden, and the UK) with a share of 50% of exports and 67% of imports; six countries in Africa (Algeria, Egypt, Morocco, Nigeria, South Africa, and Sudan) claiming around 4% of exports and 5% of imports; six countries in Latin America (Brazil, Chile, Ecuador, Mexico, Panama, and Peru) with a share of 3% of exports and 5% of imports; and four countries in North America and Oceania (Canada, USA, Australia, and New Zealand) absorbing around 9% of exports and sending 8% of imports.

The data on GDP (in current USD) were obtained from the World Bank's World Development Indicators for all countries and from the

CEIC database for Heilongjiang.[1] The distance between the province and its trading partners was calculated as the great circle distance between Harbin, the provincial capital of Heilongjiang, and the capital of each country.

The benchmark for the border effects estimation requires observations on the intranational trade between Heilongjiang and the rest of China. In the absence of such data, we follow the literature and calculate it as the provincial gross value of industrial and agricultural production net of aggregate consumption and international exports. The resulting number represents the value of the goods produced in Heilongjiang that are "exported" to other parts of China. The trading partner in this case is defined as China as a whole and the corresponding national GDP of China is used.

4.4. Results

4.4.1. *Descriptive statistics*

First, we explore the trade patterns of Heilongjiang based on descriptive statistics. Over the entire sample period, the province exported mostly to Europe (50%) and Asia (32%). Imports were predominantly from Europe (67%) and to a lesser extent from Asia (13%). As Table 4.1 indicates, the large share of Europe is due to Russia, which has an international border with Heilongjiang. In 1978, when the Sino-Soviet relations were still frosty, there was barely any trade between China's Northeast and Russia, making North Korea a key trading partner. As the diplomatic ties improved over the 1980s, Russia quickly emerged as the main destination for Heilongjiang's production, absorbing more than a third of its exports. This share surged in the 2000s, reaching a peak of 67% in 2007, before gradually declining again to around 30% in recent years. Hong Kong (as an entrepôt) and Japan used to play a prominent role but were replaced by the US and India over the past two decades. In terms of imports, the dynamics are similar, although Russia has grown in importance as the source of purchased foreign goods, reaching a share of almost

[1]Taiwan's GDP was obtained from the Statistical Office of Taiwan, while North Korea's GDP is an estimate by South Korea's Central Bank (Bank of Korea).

Table 4.1. Top trade partners of Heilongjiang (% of exports/imports).

	Exports			Imports		
	#1	#2	#3	#1	#2	#3
1978	N Korea (58.9)	Hong Kong (34.4)	Russia (1.6)			
1985	Russia (36.5)	Hong Kong (18.8)	Japan (16.1)			
1990	Russia (33.0)	Hong Kong (16.1)	Japan (15.8)			
1995	Russia (18.4)	Japan (16.0)	Hong Kong (14.0)	Russia (40.4)	S. Korea (11.1)	Japan (9.4)
2000	Russia (31.9)	Japan (14.7)	S. Korea (14.0)	Russia (59.2)	S. Korea (8.3)	USA (5.1)
2005	Russia (63.2)	S. Korea (5.8)	Japan (4.4)	Russia (52.6)	USA (9.2)	Japan (9.1)
2010	Russia (26.3)	USA (8.2)	India (4.9)	Russia (34.6)	USA (9.9)	Brazil (6.0)
2015	Russia (29.3)	USA (6.2)	India (5.1)	Russia (65.6)	USA (7.7)	Brazil (5.5)
2017	Russia (30.6)	USA (14.9)	Belgium (6.8)	Russia (68.6)	Brazil (5.4)	USA (4.6)

70% in 2017. Brazil and the US have replaced Japan and South Korea as the main importers in Heilongjiang after Russia.

As with China, the foreign trade of Heilongjiang developed slowly. As can be seen from the first panel of Figure 4.1, the province had very low levels of cross-border exchange until the late 1990s, when it began to intensify, reaching a peak of roughly $15 billion worth of exports per year between 2007 and 2014. Imports increased with a delay, recording their highest level of $23 billion in 2012. Since 2011, Heilongjiang has been running a trade deficit, averaging $6 billion per year and exceeding $8 billion in 2017. Given the dominant role of Russia in the province's trade, the patterns in the second panel of Figure 4.1 are similar. In 2011, the imports from Russia quintupled from the previous year, pushing Heilongjiang into a trade deficit. The surge was caused by the completion of the Eastern Siberia–Pacific Ocean oil pipeline, which linked the Siberian oilfields with the oil town of Daqing in Heilongjiang.

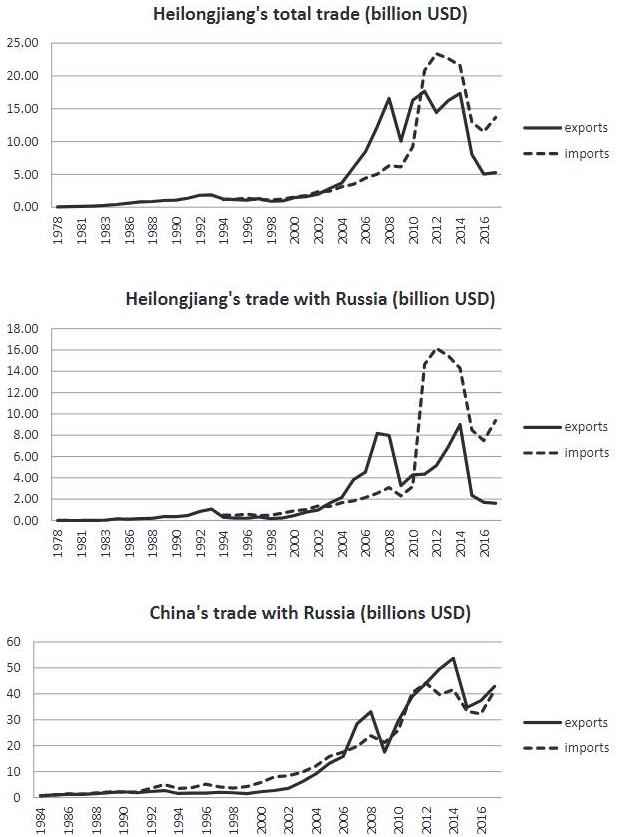

Fig. 4.1. Heilongjiang's exports and imports, 1978–2017 (in billion USD).

In contrast, China has been running trade surpluses vis-à-vis Russia since the mid-2000s, as the third panel in Figure 4.1 illustrates. Furthermore, China's trade with Russia does not seem to pass through the Northeast provinces. Figure 4.2 shows that Heilongjiang's exports to Russia represented less than a third of total Chinese exports to Russia, and this share has been declining rapidly

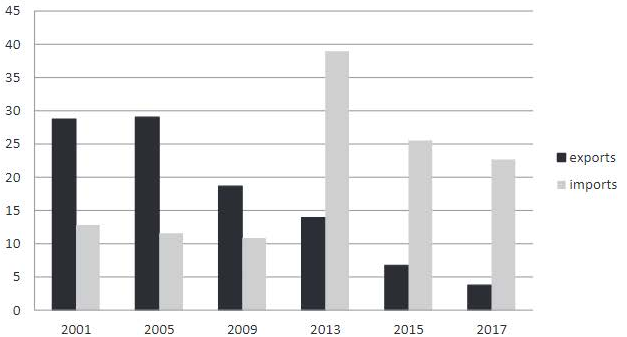

Fig. 4.2. Heilongjiang's share in China's trade with Russia (%).

to reach a low of 4% in 2017. Imports from Russia have been lingering at around 10% of the national level before surging in early 2010s thanks to the oil imports through the Northeast. But the share has been declining as well. This pattern is explained by the fact that China prefers to ship its exports to the larger market of Western Russia via the maritime route rather than via the Northeast, which would require the use of the relatively costly and logistically inefficient Trans-Siberian Railway.

4.4.2. *Border effects*

The empirical analysis begins with the estimation of the border effects between Heilongjiang and its main trading partners. The results from the gravity model are displayed in Table 4.2. The benchmark for evaluating the trade costs is Heilongjiang's intranational trade. The negative signs of all coefficients suggest that the province has a home bias because exports and imports are lower than with the rest of China. For the entire sample period, the province's Northeast-Asian neighbors exhibit the lowest border costs amounting to a tariff equivalent of 145%. We split the sample into two subperiods of equal length, which, by chance, correspond to the years of relatively low levels of foreign interaction and the surge since the late 1990s, respectively (see Figure 4.1). The border effects with Northeast Asia appear to decline in the second subperiod, indicating the increasing

Table 4.2. Border effects of Heilongjiang, 1978–2017.

	1978–2017		1978–1998		1999–2017	
Russia	−4.527***	**210.11**	−0.542	**14.51**	−3.360***	**131.64**
	(0.509)		(2.545)		(0.603)	
NE Asia	−3.581***	**144.79**	−4.850***	**236.19**	−2.643***	**93.62**
	(0.359)		(0.423)		(0.442)	
ROW	−7.026***	**479.21**	−3.403***	**134.14**	−6.193***	**370.32**
	(0.445)		(0.321)		(0.528)	
ln(*Distance*)	−1.273***		−2.580*		−0.564***	
	(0.084)		(1.459)		(0.096)	
Constant	−33.698***		−9.514		−37.371***	
	(1.786)		(10.180)		(1.758)	
Obs.	2,289		708		1,581	
R^2	0.56		0.79		0.48	

Note: Robust standard errors are in parentheses. Exporter/Importer and year fixed effects included. The tariff equivalent of the border effects (in %) is shown in bold assuming an elasticity of substitution $\sigma = 5$. $^{*}p < 0.10$; $^{***}p < 0.01$.

intensity of cross-border exchange of goods with countries like Japan and South Korea.

In contrast, Heilongjiang faces higher trade costs vis-à-vis Russia, which have increased over time. In the years before 1998, the border effect is negative but not significantly different from intranational trade. In the recent decade, the average tariff equivalent reaches 132%, suggesting that despite the closer links between China and Russia, Heilongjiang still faces major trade hurdles with its northern neighbor. The rest of the world has the highest border effects, which have almost tripled between the first and second subperiods.

For robustness purposes, we also conduct the estimation using PPML, an alternative methodology, which allows us to include zero trade flows. The estimates, presented in Table 4.3, are somewhat lower in magnitude than in the OLS estimation, but the ranking is similar, with Northeast Asia having the lowest trade costs followed by Russia. However, a comparison between the first and second subperiods reveals a major difference. Russia's border effects drop from 195% to 43%, which is the opposite of the pattern observed in Table 4.2. This confirms that omitting zero trade flows might introduce a bias in the model.

Table 4.3. Results of the PPML estimation.

	1978–2017		1978–1998		1999–2017	
Russia	−3.592***	**145.47**	−4.340***	**195.94**	−1.439***	**43.30**
	(0.256)		(3.335)		(0.342)	
NE Asia	−2.735***	**98.13**	−5.668***	**312.47**	−2.403***	**82.35**
	(0.208)		(0.821)		(0.284)	
ROW	−5.795***	**325.78**	−5.683	**314.02**	−4.952***	**244.87**
	(0.245)		(4.343)		(0.328)	
ln(*Distance*)	−0.014		−0.043		0.013	
	(0.088)		(1.927)		(0.113)	
Constant	−26.909***		−26.717		−30.049***	
	(0.651)		(13.418)		(0.824)	
Obs.	2,828		1,099		1,729	
R^2	0.88		0.93		0.69	

Note: Robust standard errors are in parentheses. Exporter/Importer and year fixed effects included. The tariff equivalent of the border effects (in %) is shown in bold assuming an elasticity of substitution $\sigma = 5$. $^{***}p < 0.01$.

Next, we calculate the border effects for the top 13 trading partners of Heilongjiang in each year between 1994 and 2017 using the approach described by Eq. (4.4).[2] The results in Figure 4.3 are not directly comparable to the ones in Table 4.3 due to the different methodologies and sample periods used, but the patterns and trends are similar. Russia is the trading partner with the lowest trade hurdles, which have decreased since the late 1990s, dipping below the tariff equivalent of 100%, although in recent years the levels have been again on the rise. Northeast Asia has also experienced larger border effects with Heilongjiang, which started increasing in the early 2000s and reached levels above 200%. By contrast, the rest of the trading partners were facing higher but decreasing trade costs with China's Northeast, although this trend seems to have reversed in 2010. Overall, Asian countries have recorded lower border effects than Europe or North America.

[2]The trading partners include Australia, Germany, Hong Kong, India, Indonesia, Japan, Malaysia, the Netherlands, Russia, Singapore, South Korea, UK, and the USA. These countries make up more than 70% of Heilongjiang's exports and imports.

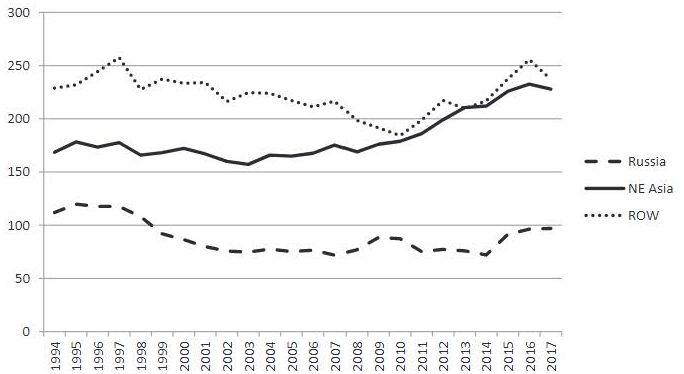

Fig. 4.3: Border effects by trading partner and year (in %).
Note: Annual border effects by year and trading partner calculated using Eq. (4.4) and assuming an elasticity of substitution $\sigma = 8$. Northeast Asia includes Japan and South Korea.

To test the robustness of our results, we conduct a regression analysis with the border effects as the dependent variable and a trade cost variable calculated by the World Bank as the independent variable. The data covers the period 1995–2013 and is reported by country pairs, which in our case means between China and each of the 13 main trading partners of Heilongjiang. The World Bank estimated the trade costs using the gravity framework, and we would expect a positive correlation between our and their measure. The results of the panel estimation with country and year fixed effects, presented in Table 4.4, confirm this prediction, suggesting that Heilongjiang's bilateral border effects and China's bilateral trade costs with the same set of trading partners are significantly correlated, although the magnitude of the coefficient is relatively low.

4.4.3. *Potential determinants of trade hurdles*

After quantifying the trade costs, we identify and discuss potential factors that could have contributed to the border effects between Heilongjiang and its main trade partners. One of the key determinants of trade flows is the geographical location. From a historical

Table 4.4. Panel estimation of relation between border effects and trade costs.

Trade costs	0.006***
	(0.002)
Constant	2.056***
	(0.236)
Obs.	237
R^2	0.83

Note: Robust standard errors are in parentheses. Country and year fixed effects included. Dependent variable is border effects between Heilongjiang and its trading partner. Main independent variable is bilateral trade costs as measured by the World Bank. $^{***}p < 0.01$.

perspective, Heilongjiang sits at the crossroads of Northeast Asia and could have emerged as a trade hub for neighboring countries like Korea, Japan, Russia, Mongolia, and the rest of China. Traditionally, Heilongjiang had a multi-ethnic population and colonial ties with Russia and Japan. Its infrastructure, especially the Chinese Eastern Railway network, has facilitated the movement of goods across the Northeast. Abundance of natural resources and heavy industrial development have created excellent conditions for the production of export-oriented commodities.

As our analysis shows, despite the potential for trade, relatively high border effects have impaired the cross-border exchange of goods. The Sino–Soviet conflict of the 1960s turned Heilongjiang into a region bordering an enemy state, which isolated the province and placed the emphasis on national security rather than on economic development and international exchange. The legacy of this conflict has repercussions to this day, illustrated by the fact that there is not a single permanent bridge over the Amur River or the Ussuri River connecting Russia and China. Interestingly, the freezing of the rivers for several months over the winter facilitates the transportation of goods because trucks and cars can cross the border driving on the ice. Relaxed visa rules on the Chinese side allow Russians to visit border towns in China, which certainly boosts petty trade across the border. At the same time, the region of the Russian Far East bordering

Heilongjiang is sparsely populated and economically underdeveloped, lowering the potential for major cross-border investment and trade.

Heilongjiang is a landlocked province, and although the border rivers represent key transportation routes, the fact is that the province has no easy access to the sea. The options are the Chinese port of Dalian and the Russian port of Vladivostok, which is less than 100 miles from the border crossing in Heilongjiang. The associated transportation costs are an additional hurdle to the province's trade. The tariffs for using the Russian railway network are considered high and port logistics are not very efficient. For instance, according to data from the World Bank's Logistics Performance Index Database, 50% of surveyed logistics professionals in 2018 ranked Russia's railway cargo tariffs as high or very high (as compared to 33% in the case of China). Similarly, only 9% of respondents opined that the quality of rail infrastructure in China was low or very low vs. 50% for Russia.

Differences in the track gauge also constitute a trade barrier. Russia's track is significantly wider than the one in China, requiring a costly and time-consuming bogie exchange at the border. Besides the spatial distances, time differences also have an adverse effect. China (and thus Heilongjiang) shares the same time zone only with Mongolia and two Russian border regions, which are not adjacent to Heilongjiang. The time difference increases the costs of communication and doing business, which, in turn, affect trade and investment flows (Tomasik, 2013).

4.5. Conclusion

China has achieved a successful transition to a dynamic manufacturing superpower since the start of market reforms four decades ago, but not all regions of the country benefited from the economic boom. The border province of Heilongjiang is a case study of how remote regions of the country have failed to restructure and modernize an economy that for decades served as the model of industrialization in China. This chapter focuses on cross-border exchange of goods between Heilongjiang and its major trade partners to study the potential of trade as a channel for economic growth. In particular, we quantify the trade costs between the province and the rest of

the world and discuss the potential factors that might have impaired the integration efforts of the region with the world.

Our results show that Heilongjiang's overall trade flows were very low until the late 1990s when they experienced rapid growth, especially with Russia, which emerged as the most important trade partner by far. Unlike the rest of China, Heilongjiang has been running trade deficits with Russia over the past decade, while the province's share in Chinese exports to Russia has steadily declined. The empirical analysis indicates that Heilongjiang exhibits a home bias, trading more with the rest of China than with any other country. The border effects with Russia are substantial, exceeding an average *ad valorem* tariff equivalent of 140% over the entire sample period, although they have declined somewhat over the past two decades. The other trading partners of Heilongjiang in Northeast Asia record lower trade costs than Russia overall, but the barriers seem to have been on the rise since the early 2000s. The discussion of the potential factors contributing to the high border effects of the province points to the lacking infrastructure, especially the cross-border infrastructure with Russia and the costly access to seaports, as the main culprit.

Our analysis suggests that there is still room for improvement that could allow Heilongjiang to take advantage of its potential for trade and regional integration within Northeast Asia. The One Belt One Road initiative of the Chinese government has focused on upgrading and expanding the existing infrastructure in order to stimulate the exports of Chinese goods. Heilongjiang is well placed to benefit from this strategy. At the same time, the closer ties between Russia and China and the deeper integration of China's economy in the global supply chains in Northeast Asia are likely to create additional incentives for Heilongjiang, and China's Northeast as a whole, to continue opening up to the world.

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