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Middle corridor - policy development and trade potential of the Trans-Caspian International Transport Route

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ADB Working Paper Series

MIDDLE CORRIDOR—POLICY DEVELOPMENT AND TRADE POTENTIAL OF THE TRANS-CASPIAN INTERNATIONAL TRANSPORT ROUTE

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Abstract

The Trans-Caspian International Transport Route (TITR), known as the Middle Corridor, is a multilateral institutional development linking the containerized rail freight transport networks of the People's Republic of China (PRC) and the European Union through the economies of Central Asia, the Caucasus, Turkey, and Eastern Europe. The multilateral, multimodal transport institution links Caspian and Black Sea ferry terminals with rail systems in the PRC, Kazakhstan, Azerbaijan, Georgia, Turkey, Ukraine, and Poland. Trans-Eurasian and intra-Eurasian rail freight development remains fundamentally policy- and subsidy-driven on the PRC side, yet dependent on European Union demand-side drivers to create traffic flow volumes. The development of the Middle Corridor, though, is institutionally independent and potentially transformative for the economies of Central Asia, the Caucasus, and Turkey. We explore the institutional development of transport infrastructure and economic potential from three macroregional angles: policy- and subsidy-driven development, the Central Asia–Caucasus–Turkey physical industrial geography and political institution limitations, and lack of demand-side fundamentals from European Union market agents. The PRC's supply-side-policy evidence suggests that growth in transcontinental containerized rail transport is politically feasible. However, demand-side factors suggest that trade development potential is largely limited to greater extraregional connectivity from the Middle Corridor economies with little economic rationale for increased PRC–Europe transcontinental freight flows.

Keywords: transport policy, economic geography, geointustrial policy, industrial policy, Eurasian economic integration

JEL Classification: B15, B27, B52, E02, E61, F1

Contents

1.	INTRODUCTION	1
2.	POLITICAL INSTITUTIONS AND ECONOMIC GEOGRAPHY	2
3.	INTERCONTINENTAL RAIL FREIGHT POLICY DEVELOPMENT	5
4.	INFRASTRUCTURE REALITIES OF THE MIDDLE CORRIDOR	8
5.	ASSESSING DEMAND-SIDE DEVELOPMENT FROM EUROPE	13
6.	POLICY RECOMMENDATIONS FOR INSTITUTIONAL DEVELOPMENT	20
6.1	Policy Recommendations for Middle Corridor States	20
6.2	Policy Recommendations for the PRC	21
6.3	Policy Recommendations for the European Union, Multilateral Development Banks, and Other Engaged Stakeholders	21
	REFERENCES	23

1. INTRODUCTION

The Trans-Caspian International Transport Route (TITR, Middle Corridor) is a rail freight corridor linking the People's Republic of China (PRC) and the European Union through Central Asia, the Caucasus, Turkey, and Eastern Europe. We examine the institutional development and trade potential of the Middle Corridor by weighing policy, statistical, and infrastructural evidence. We focus acutely on the institutional development of the Middle Corridor, arguing that the project is ultimately dependent on the PRC's foreign policy, domestic industrial policy, and geoeconomic and geosocial policies. The non-PRC Middle Corridor is composed of a coalition of port, logistics, and transport companies, many of them either state owned or with strong connections to state network monopoly industries. These institutions, their industries, and the states that they represent lie between the European Union and the PRC, forming a contiguous transport bloc from which it is possible to develop a new transport and trade macroregion. For the non-PRC, non-European states of the Middle Corridor, the project carries great economic development and trade facilitation promise. Yet the problems with development of the Middle Corridor containerized rail freight corridor are not within the non-China, non-Europe Middle Corridor states but rather with the incompatibilities in economic and political institutions on either side of the transcontinental rail system in the PRC and the European Union. For both the PRC and the European Union, with open ocean access, it makes little economic sense to engage in high levels of intercontinental rail trade. This leaves the economies in the middle of the transcontinental rail network with both the largest potential economic benefit and the highest risk of policy capture from the larger PRC and European Union institution-makers.

The PRC in particular uses the Middle Corridor to take domestic industrial bureaucratic competencies abroad as part of the wider Belt and Road program of geosocialization through the public administration and government-led economic development interventions that resulted in the PRC's domestic industrialization drive. Competent public administration systems are the principal institution behind Northeast Asia industrialized states' development history (Chang 2002). These national systems of economic development, though, create institutional path dependencies that shape the future of states' trade, industry, transport, and finance integration with regional, continental, and global economic institutions. The PRC remains a transition economy, with elements of both market economy and planned economy. For the PRC, partway through its transition economy experiment and still heavily dependent on public administration economic institutions, the Belt and Road, Iron Silk Road, and China Railway Express in Eurasia represent an attempt to effectively integrate with different economic macroregions without upgrading the PRC's domestic institutions that are responsible for trade, industry, and transport. Excepting Republic of Turkey, the Middle Corridor countries are all post-Soviet economies, and the development of a Middle Corridor institution ultimately connects the PRC through this post-Soviet economic geography to the advanced, developed markets of the European Union. It is thus important to consider the Middle Corridor from the perspective of the institutionalization of the three regions involved, the PRC, the European Union and the post-Soviet economies plus Turkey. A simple breakdown of the three regions that we examine presents the PRC as industrializing, the Middle Corridor economies as semi-industrialized, and Europe as post-industrial. Joining these three macroeconomic regions together by unifying the containerized rail transport system is as difficult from a political institutional perspective as it is from an economic institutional one. How these three macroregions institutionally dock with the Middle Corridor transport mechanisms,

political institutions, and trade functions will ultimately determine the success or failure of the project.

We contend that there are a number of impediments to the development of the Middle Corridor rail system and that these are both idiosyncratic to the institutional and physical geography of the countries that the rail system traverses and universal to all the corridors and lines on the PRC's CR Express intercontinental rail system. Private forwarding companies provide rail transport services, which means that these agents within the wider institutional network must be able to make economically rational decisions. The PRC's command economy institutions, with central and regional governments coordinating with private, semi-private, and pseudo-private enterprises to develop regional transport hubs, are able to artificially create traffic to fill the market that the central policy makers wish to create (Kenderdine and Bucsky 2021; Kenderdine 2018c). However, at the European terminus, neither the European Union nor the state governments directly intervene in the rail transport market, meaning that all international rail traffic must operate on market principles. For Central Asia, the Russian Federation, the Caucasus, Turkey, and Eastern European state economies, there is a policy incentive to organize domestic institutions and policy interventions to benefit from the PRC's expenditure, which drives network traffic; however, ultimately, the intercontinental rail network is entirely dependent on the PRC's policy, and fiscal, impetus.

The paper is organized into four substantive sections. We first explore and locate our study within the broader world of economic development, national industrialization strategies, and the role of public bureaucracies in executing industrial policy. We then examine the PRC's central and local government policy environment for establishing, developing, and spatially planning the CR Express intercontinental rail freight system. We follow this with an examination of some of the infrastructure and throughput realities of the Middle Corridor's built environment and natural geographies and identify firstly some institutional problems and secondly some major physical infrastructure bottlenecks in developing an economically viable transcontinental rail system to link the PRC and Europe via Turkey. Finally, we examine some European statistics and argue that the European Union side of the transport network is both the best indicator of the true container throughput and the potential for an intermodal shift to rail and the best indicator that the statistics do not justify the PRC's hype about the Eurasian rail project. We conclude with some policy recommendations for the Middle Corridor economies, for the PRC, and for third-party stakeholders, including multilateral development banks and the European Union.

2. POLITICAL INSTITUTIONS AND ECONOMIC GEOGRAPHY

We analyze the Middle Corridor from several different aspects. Firstly, as it is fundamentally a PRC-initiated transport corridor, we examine the policy background of the international rail freight corridors in the PRC following a public administration approach. State intervention in a catch-up economic development scenario (Gerschenkron 1962; Suehiro 2008; Puntigliano and Appelqvist 2011) is a well-accepted policy paradigm from the East Asian development model of industrialization (Johnson 1982; North 1989, 1990; Rodrik 2000; Chang 2002). The administrative arm of government is the principal policy agent in the PRC's domestic economy (Wübbeke et al. 2016; Heilman and Shih 2013). The methodology of working in such an analytical tradition is based on public administration theory which sees the administrative arm of

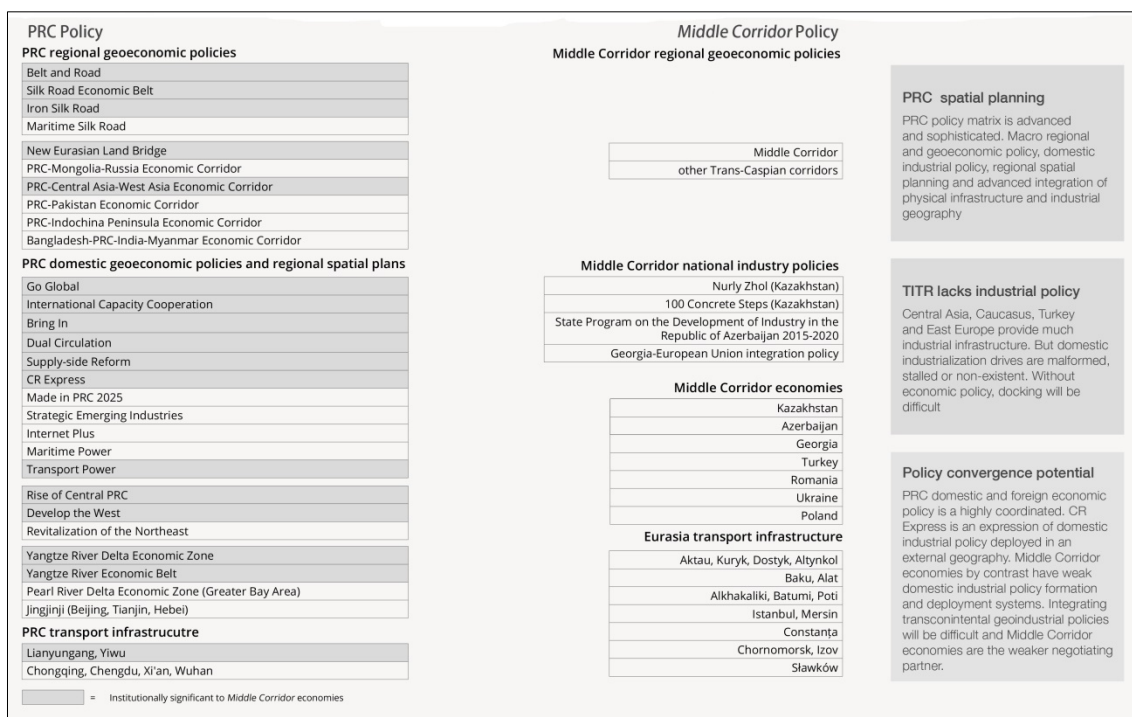
government as an extant institution of state governance alongside the legislative, executive and judicial arms of government (Wilson 1887). Taking this administrative governance institution as the basic unit of economic analysis, we obtain data on economic aspects of the PRC's public administration by collecting policy documents at the central ministerial and subnational levels and examine the motivations of agents within the bureaucratic system. We abstract and translate PRC external industrial policy documents into our database, which we analyze from an institutional perspective. (Kenderdine and Bucsky 2021a; Bucsky and Kenderdine 2020a; Kenderdine and Lan 2019; Kenderdine and Han 2018; Kenderdine 2018a; Kenderdine 2017a).

We created an historical institutional policy record to assess the discourse that the PRC state has established on the development of the Middle Corridor rail system to differentiate the trans-continental rail freight system from other forms of PRC domestic spatial policy and command economy policy functions. This policy analysis base focuses on qualitative methods of analyzing the PRC's public administration and policy apparatus. The qualitative approach assumes that a Listian national system of economic development process holds true for both the PRC and the Central Asian economies and then deploys historical institutionalist and institutional economic approaches to the PRC's public policy system (List 1856; Veblen 1915; Skocpol 1979). Ministerial policy analysis of the PRC as a semi-industrialized state with universalizable variables akin to European and Northeast Asian industrial states, combined with known path dependencies in structural economic development, means that we can understand the policy process and policy risk reasonably well through textual analysis of the PRC's extant policy documents. For this project, we examine policy documents from the Ministry of Commerce, Ministry of Transport, National Development and Reform Commission, and Ministry of Industry and Information Technology. Limitations exist, and a deeper analysis would require subnational policy analysis amongst the cities developing the actual CR Express rail lines and higher-level political party policy.

Our research also integrates statistical analysis from datasets from the European side of the PRC–Europe intercontinental rail governance institutions. This statistical analysis is necessary due to the overwhelmingly positive position that Chinese policy makers and statistics manipulation have taken, which invariably do not align with reality on the European side. For example, the number of trains and volume of TEU boxes that the PRC has reported as leaving the PRC for Europe do not match the number of trains and volume of TEUs arriving in the European Union (Bucsky 2020; Li, Bolton, and Westphal 2018). Given that the policy record in the PRC includes state media that are prone to propaganda and statistical manipulation, independent statistical cross-referencing is essential to any analysis of the efficacy of a trans-continental rail system. Our analysis combines statistical analysis with structural economic geography and a deep knowledge of rail freight capacity and the physical geography choke points of the Eurasian and European rail infrastructure (Bucsky, 2020; Bucsky and Kenderdine 2020a; Bucsky 2018; Vinokurov et al. 2018). This combination makes identifying physical bottlenecks and insincere statistical reporting obvious. Even ignoring policy misreporting and hard statistical anomalies, there remains a fundamental policy bottleneck in developing a two-way PRC–Europe Eurasian rail link as supply–demand dynamics govern the European Union economic agents, while the PRC side pursues a command economy approach to developing new markets, infrastructure, institutions, and ultimately services. This leaves the Central Asia, Caucasus, and Turkey state economic strategies for integrating transport connections with both the PRC and the European Union on unsure institutional footing.

By triangulating European Union statistics, extant physical economic geography between the PRC, Eurasia, and Europe, and policy developments that demonstrate future path-dependent behaviors of the PRC in developing the economic institutions surrounding the Middle Corridor, CR Express, and Belt and Road policies, we can gain quite a clear picture of future trade potential of the trans-continental PRC–Europe rail freight system. For example, a PRC policy from the central ministry to a subnational government to increase trade throughput via Istanbul is likely to lead to deployment on the PRC side and yet meet a physical geographic bottleneck on the shores of the Bosphorus and a freight-forwarding industry in Poland with little incentive to ship containers back to the PRC via rail. The PRC's CR Express policy is thus caught between multiple policy frictions. Serious problems remain in analyzing the policy actions of the disparate actors of the non-PRC Middle Corridor economies. We consider the states in three macroregional categories: the PRC, the European Union as a whole and as an acute that Poland represents, and the Middle Corridor agent economies of Kazakhstan, Azerbaijan, Georgia, Turkey, and Ukraine.

Figure 1: Vertical Integration of the PRC's Macroeconomic Industrial and Geoindustrial Policies and Horizontal Institutional Docking with the TITR Middle Corridor State Economic Policy



Source: Authors' database.

Most Eurasian economic integration and development is PRC policy-driven, while most institutional, economic, and market inertia stems from the European Union. We can see a lack of institutional engagement or development from the remaining agent economies along the Middle Corridor either as individual states or as a contiguous economic unit. The organization of the Middle Corridor primarily takes place through the railroad and port institutions of the constituent economies. This means that little national-level state development of the economic corridors accompanies the rail freight development plans of the railroads, which are mostly state owned. We argue that this lack of transport and trade integration is a disadvantage to regional economic development when the PRC

side is command-economy coordinated, the European Union is operating on market principles, and the third states have neither well-marketized institutions nor an effective state industrial policy.

There remains a persistent erroneous narrative that the PRC is investing in railroad infrastructure in the Central Asia and Caucasus region, when the reality is that the CR Express system is simply a subsidized scheme to generate a greater containerized rail traffic flow between the PRC and Europe along the existing physical infrastructure corridors (Bucsky and Kenderdine 2021). The policy benefit to the PRC of opening these trade channels is extant, and the policy-making apparatus in Beijing has deemed the trade routes to have sufficient strategic value to subsidize them directly. However, the structurally transformative potential of the PRC's policy and fiscal intervention to create new markets of traffic flow faces the inertia of existing physical geography, political institutions, and real-world economic costs, which could slow or halt entirely the growth of such a system. Progressive PRC state interventions in regional economic development policy and real-world economic use of the rail freight lines are the two frictions at play in the development of all the PRC's CR Express intercontinental rail freight lines and the Middle Corridor in acute. For the transport channels to genuinely benefit the local economies, the Middle Corridor would need major infrastructure investments to overcome rail freight bottlenecks, long-term subsidized support from the PRC, and gains in efficiency and lowering of transit costs that still seem unrealizable. The benefit to the Eurasian economies is clear so long as the PRC subsidies create traffic volumes, but the value to the PRC is strategic, not economic, and there is virtually no long-term benefit to the European stakeholders.

3. INTERCONTINENTAL RAIL FREIGHT POLICY DEVELOPMENT

Connecting the PRC and the European Union overland with containerized rail freight transport via the Belt and Road and CR Express is an ambitious prospect (Kenderdine 2018c). In the period 2015–2020 most of the PRC's economy underwent Supply-side Reform to restructure the economy via decapacity in the industrial economy and deleveraging in the financial economy. However in rail freight development, transport policy, and intercontinental rail freight policy, the PRC increased subsidization for the expansion of rail freight infrastructure, services, and institutions (Kenderdine 2017b; Kenderdine 2017d; Kenderdine 2018b).

In September 2019, the Communist Party of China Central Committee released the *Outline for the Construction of a Transport Power* (Central Committee of the Communist Party of China 2019). The Transport Power policy is a standard PRC mid-to-long-term economic planning and governance instrument. It lays out policy guidance for developing national and international rail, road, intermodal, and logistics goals for two periods: 2021 to 2035 and 2035 to 2050. It intersects with other major planning documents, such as the joint *Layout and Construction Plan of National Logistics Hubs* from the National Development and Reform Commission (NDRC 2018). The PRC's supply-side policy development of the domestic Middle Corridor enabling transport infrastructure is built on an institutionalized spatial planning legacy. The ability to construct this transport network is not so much connected to the PRC's newer deployment of techno-industrial policy but far more complementary to the heavy industry planning policies of the past. The prospects of the Middle Corridor depend inherently on the PRC's domestic transport and industrial policy making, and that is

dependent on the PRC's national and subnational transport and industrial policy institutions, political–economic systems, and spatial planning policy.

The Belt and Road is already a domestic and international hyperpolicy that lays out Eurasian hyperconnectivity as an institutionalized economic good. Connection of the PRC and Russia's pan-Eurasian geoeconomic policies is referred to as the 'Grand Eurasian Partnership' on the Russia side and as the 'One Belt, One Union' on the PRC side (Fang, 2020). This hyperpolicy aims to cover the PRC's other umbrella macro policies that guide infrastructure investment, capacity transfers, and policy bank investment. These include International Capacity Cooperation, Go Global, Bring In, and the technology and capacity transfers under Made in China 2025 and Strategic Emerging Industries (Kenderdine 2017a; Kenderdine and Lan 2019). These macro industrial policies acutely intersect with the rail sector and with state-owned rail enterprises through national and international rail industrial policy development strategies (Pepermans 2019).

However, much of the PRC's Eurasian policy agenda has only weak alignment with that of the Russian Federation, and many Eurasian transport policies are simply codifications of existing multilateral development projects. For example, the key seaport for Middle Corridor development is Lianyungang in far northern Jiangsu. This is the designated terminus of the CAREC Central Asia connectivity corridor, which CAREC established long before the PRC's Belt and Road policy. Central PRC policy designates this as the key strategic port to open to Central Asia, offering the Kazakhstan government, and by extension the Middle Corridor partner economies, access to the Pacific Ocean via this port (Blanchard and Flint 2017). The transport corridor uses the Longhai railroad from Lanzhou (*Long*) to Lianyungang (*Hai*), one of the oldest and most important rail transport corridors in the PRC. Lianyungang is strategic for multiple agents for multiple reasons. Situated in Jiangsu province, it is at the extreme edge of the Yangtze River Delta cluster and its integrated transport plan, which pulls the Lianyungang port infrastructure into line with rail freight and intermodal services extending outwards from the *Yangtze River Delta Economic Corridor*. Jiangsu is also part of the *Yangtze River Economic Belt*, and Lianyungang is a northern port, in close proximity to the Rizhao and Qingdao port infrastructure cluster and therefore also closer to the *Jingjinji* Beijing area consumer and import market cluster and the advanced transport network infrastructure in the northeast of the PRC. Jiangsu, along with Zhejiang and Fujian, is also a primary designated province for *Maritime Silk Road* policy development. Lianyungang is thus located on a spatial planning policy pivot comprising the Middle Corridor, the Yangtze River Economic Belt, the Yangtze Delta Economic Zone, and the Maritime Silk Road. Its physical location at the terminus of the Longhai railroad makes Lianyungang an important geoeconomic hub in the PRC's spatially planned international transport system, with a large container capacity but without being as busy and potentially overloaded as nearby ports like Tianjin or Qingdao.

Table 1: CR Express Europe, CR Express Central Asia and Extant ex-Europe Containerized Rail Lines in Operation in 2020

Major Intercontinental Containerized Rail Freight Lines in Operation in 2020			
CR Express Europe		CR Express Central Asia	Extant European–Eurasian Lines
Yiwu–Madrid	Guangzhou–Moscow	Yiwu–Tehran	Varma–Minsk–Klaipeda “Viking”
Yiwu–London	Dongguan–Duisburg	Yiwu–Almaty	Talinn–Riga–Minsk–Ukraine Ports–Oknitsa “ZUBR”
Xiamen–Łódź	Suzhou–Warsaw	Lianyungang–Almaty–Tashkent	Duisburg–Brest–Moscow “Moscovite”
Wuhan–Dubice	Kunming–Rotterdam	Tianjin–Ulaanbaatar	Kaliningrad/Drageste–Moscow “Merkury”
Wuhan–Lyon	Harbin–Ekaterinburg	Qingzhou–Almaty	Brest–Kaluga–Nizhny Novgorod “Volkswagen Group RUSS”
Zhengzhou–Hamburg	Harbin–Hamburg	Linyi–Almaty	Vessel–Brest–Vorotynsk “Peugeot–Citroen–Mitsubishi”
Changsha–Duisburg	Changchun–Schwarzheide	Binzhou–Tashkent	Mlada–Boleslav–Brest–Zaschita “SKODA”
Chongqing–Duisburg	Shenyang–Hamburg	Qingdao–Almaty, Bishkek	Zhilina–Brest–Zaschita “KIA”
Chengdu–Łódź	Yingkou–Warsaw	Hefei–Almaty–Central Asia	Malaszewicze–Brest–Yelabuga/Tikhonovo “FORD”
Lanzhou–Hamburg	Yingkou–Dobra	Kuytun–Tbilisi	Alashankou–Kena–Motskava “Saule”
Urumqi–Moscow	Yingkou–Lida	Xi’an–Almaty	Brest–Aktobe–Alashankou “Kazakhstan Vector”
Urumqi–Chelyabinsk	Yingkou–Moscow	Xi’an–Zhem, Kazakhstan	Panerial–Kostanai “Baltic Wind”
Urumqi–Duisburg	Yingkou–Kaluga	Wuwei–Almaty	Brest–Ulaanbaatar–Erenhot “Mongolian Vector”
Yining–Kupavna	Yingkou–Khovrino (Moscow)	Lanzhou–Almaty	Berlin–Moscow “Eastern Wind”
Shihezi–Chelyabinsk	Dalian–Hamburg		Leipzig–Shenyang “BMW”
Korla–Duisburg	Shijiazhuang–Minsk		

Source: Authors' database.

The development of the intercontinental rail system depends heavily on individual provinces and prefectures forging their own freight lines towards Eurasia. The principal terminals of the Central PRC provinces—Wuhan, Chengdu, Chongqing, Xi'an, and Zhengzhou—all had their own intercontinental railroads in operation that predated both the Belt and Road and the CR Express. The PRC–Europe rail freight volumes were also higher before, not after, the introduction of the Belt and Road policy (Bucsky and Kenderdine 2020a). The central-level policy CR Express system gathered together these different provincial and prefectural rail lines to Europe and Central Asia, which the provinces and municipalities had developed and subsidized, and created a national centralized plan under the coordination of the National Development and Reform Commission with new central subsidies. The CR Express trans-continental rail system is really the centralized marshaling of existing disparate city-level PRC–Europe and PRC–Central Asia rail freight services into a unified national system.

4. INFRASTRUCTURE REALITIES OF THE MIDDLE CORRIDOR

Compared with other transport modes, rail transport along the Middle Corridor has historically played a minimal role. However, even before the PRC's Iron Silk Road and Belt and Road policies, there had been long-term multilateral institutional transport integration development programs, the most prominent being the Transport Corridor Europe–Caucasus–Asia (TRACECA). The European Union initiated the TRACECA, and the EU, the five Central Asian republics, the three South Caucasus republics, Turkey, and Moldova signed multilateral agreements in 1993, with Iran and Ukraine subsequently joining. The development and use of the Central Asian and Caucasus transport corridors under TRACECA, though, has been underwhelming. The TRACECA Caucasus and Black Sea corridor is still slower and more expensive than routes connecting Central Asia and the PRC through Kazakhstan and the Russian Federation to Europe. High costs and slower transit times make it practically uneconomical for commercial use (United Nations Economic Commission for Europe UNECE 2017). The main problem with the corridor is that it involves slow and costly ferry legs to cross first the Caspian Sea and then the Black Sea from Georgia to the ports of Romania or Bulgaria or else utilizes an underdeveloped rail route through Turkey. Even though the EU has funded 14 transport projects in the region since 1995, they have had no significant impact on the development of regional corridors.

The rail transport corridors from the PRC to Central Asia via Kazakhstan to the Caspian Sea ports along the TRACECA corridors are well established, while a proposed new corridor via the Kyrgyz Republic does not seem feasible (Bucsky and Kenderdine 2020b; Kenderdine 2017c). The most important development of the past 25 years was the finalization of the Baku–Tbilisi–Kars railroad in 2017, which reopened direct rail transport between the Caucasus region and Turkey after the closure of the railroad between Armenia and Turkey due to the Armenia–Azerbaijan conflict in the early 1990s. Another major achievement was the finalization of the Trans-Kazakhstan railroad in 2014, a 988 km Zhezkazgan–Saksaulskaya–Shalkar–Beyneu line that cut the east–west transport route between the PRC border and the Caspian Sea port of Aktau by around 1,000 km (Rodemann and Templar 2014). This became important after the opening of the second Kazakhstan–PRC rail border crossing at Khorgos/Altynkol in 2011; however, this Khorgos crossing is still highly underutilized in normal economic operation and has also suffered from politicized bottlenecks (Ruehl 2019; Bucsky and Kenderdine 2020a; Kenderdine and Bucsky 2021b).

East–west from the PRC to Europe, the crossing of the Caspian Sea is a major bottleneck as ferry and port services are insufficient to balance rail throughput capacity on either side (Badambaeva and Ussembay 2018). The rail ferry to Baku has been operational for more than three decades, but it only introduced container services in 2019 (PortsEurope 2019). The roll-on–roll-off (RoRo) vessel fleet has expanded in recent years, and there are now 13 servicing the Baku–Aktau and Baku–Turkmenbashi routes (Azerbaijan Caspian Shipping Company [ASCO] 2019). Azerbaijan has built a new port in Alat, with a first-phase capacity of 10–11.5 million tonnes of general cargo and 40,000–50,000 TEU containers, with plans for further expansion. On the Caucasus rail side, the Baku–Tbilisi–Poti/Batumi main line is an electrified, mainly double-tracked line with heavy freight traffic capacity. Both Georgia and Azerbaijan have invested in rail track development over the past decade, meaning that this segment of the corridor is now in good condition. From Azerbaijan to the Georgian Black Sea ports, the line currently carries mostly hydrocarbon products, but container transport has become much more significant on the return route. A total of 45% of Georgian Railways' traffic

volume has consisted of oil products, while 38% has been transit—almost entirely to and from Azerbaijan (Georgian Railways 2019). 2021 was the scheduled completion date for the development of a new deep-water port in Anaklia with a projected capacity of 100 million tons per year, but Georgia pulled out of the contract in 2020 (Lomsadze 2020). From western Georgia, two routes are available, one by ferry across the Black Sea and one overland through Turkey. In both cases, reaching the targeted Central European markets is challenging due to the fact that the routes lead through either Ukraine or Romania, where the rail infrastructure is in a fairly poor state (Popa and Schmidt 2013; Miecznikowski and Radzikowski 2017).

Across the Black Sea by ferry to Varna in Bulgaria, the onward rail corridors pass through Serbia, which is not an EU member, meaning that crossing the border is much more time consuming due to customs procedures. The state of the Serbian transport infrastructure is also insufficient, the speed limits are sometimes as low as 20–40 km/h, and the network overwhelmingly consists of a single track. However, there is currently ongoing upgrading work along the whole of the rail corridor from the Bulgarian border to the Hungarian border, both to rehabilitate existing lines and to expand most lines to double tracks. Black Sea rail ferry services between Romania and Bulgaria to Georgia first ran in 1978. The Bulgarian state-designated shipping company Navibulgar provides services from Georgia to both Bulgaria and Ukraine. Navibulgar operates under a special intergovernmental triple agreement between the governments of Bulgaria, Ukraine, and Georgia regarding the operation of direct rail ferry services between the ports of Varna (Bulgaria), Chornomorsk (Ukraine), and Poti and Batumi (Georgia). According to the timetable, there are monthly ferries between Poti and Varna. Navibulgar is the only company serving the Black Sea region with rail ferry services between Georgia and the European Union, and it has two vessels for this purpose, both built in 1978 (Navibulgar 2019b). The route of the ships forms a triangle between Varna, Poti, and Chornomorsk (Navibulgar 2019a). The rail ferry connection to the Romanian port of Constanța was already operational before 1990 and the infrastructure for rail ferries exists, but none currently operate. In 2003, there was a plan to start a new rail RoRo ferry from Constanța to the Georgian port of Poti, but this never transpired (United Nations Economic and Social Commission for Asia and the Pacific UNESCAP 2003). Despite this limitation, container transport between the two ports is currently available, but there is a need for transshipment at both ports. As the rail gauge systems are different anyway, this is not such a great problem as cheaper and faster loading is possible for containers than for rail wagons. The capacity for rail wagons on RoRo ferries is very limited though, with ships having a capacity of 50–106 wagons, which translates into one to two full trains (Viking Rail 2015).

Ukraine's Chornomorsk port has operational Black Sea rail ferry connections to Varna (Bulgaria), Batumi and Poti (Georgia), and Samsun (Turkey). There are, however, only four ships to service all the routes, so the frequency is around two to four per week. The costs are also high at \$1,500–\$2,000 per container (Viking Rail 2019). On routes connecting wide-gauge tracks, rail ferries can be more viable as they cut transshipment costs. It is notable, however, that, in practice, rail RoRo ferries transport special cargo, for instance tank wagons and dangerous goods, for which transshipment would be more costly. The turnover has been 6–8000 wagons per year in recent years on these routes (Ukrferry 2014). It is interesting to note that Ukrferry's fleet consists of ferry ships (the Greifswald, Kaunas, and Vilnius) that East Germany built between 1987 and 1989 for the Soviet Union–German Democratic Republic rail ferry between Mukran and Klaipeda (Retzlaff and Wingeß 2006). These ferry connections not only seldom run but are also slow. According to the timetable, the approximately 1,100 km Varna–Poti route takes 4 days, which means an average speed of 11.5 km/h or 275 km a day. This is much slower than the approximately 1,000 km per day by rail. Overland transport on

the Poti–Varna route via Turkey by rail became possible in 2017, but there are major limitations. Firstly, the railroad from Georgia to Istanbul is single track, and it is not electrified between the Georgian border and Ankara. Second, freight trains cannot use the direct Kars–Ankara–Istanbul line but have had to make a detour through Konya since 2016 due to the high traffic load of the Ankara suburban trains (Uysal 2019a). Only the first flagship PRC–Czech Republic train gained permission to use this direct corridor, demonstrating that, while the policy hype of the PRC–Europe rail connection can sometimes make media headlines, actual throughput capacities limit future upscaling potential.

From Ankara to Istanbul, there is a single-track conventional, mixed traffic line and a high-speed line (HSL). Although research has analyzed the possibility of using the HSL, freight trains still use conventional lines (Ertem and Özcan 2016). The major bottleneck, however, is the Greater Istanbul area: the rail lines from Gezbe on the Asian side to Halkalı were closed in part for reconstruction from 2004 to 2019. This meant that trains from Europe had to terminate in Halkalı, and from there the only option for crossing to the Asian side was to travel by road. The capacities of both Halkalı and Gezbe stations are limited. This is a highly constricting factor for the use of the Marmaray tunnel at night for regular freight traffic, and a portion of European container trains has to use Çerkezköy station due to insufficient space in Halkalı (UNECE 2017). Therefore, it is not realistic for more than two to four trains per night per direction to use the tunnel. Until 2017, Halkalı station, the busiest intermodal terminal in Turkey, could receive only two trains daily. Even after the completion of the upgrade in 2019, the suburban Marmaray trains still heavily use Halkalı. Their interval is every 8 minutes in peak hours, with the first trains departing at 6:00 a.m. and the last trains arriving at 00:12 a.m. at the terminus stations. Therefore, it is only possible to run freight trains at night. The first freight train to use the Marmaray tunnel was a magnesite train from Çukurhisar in Turkey to Austria in October 2019 (Uysal 2019b). However, the Railway Gazette (2019b) erroneously published that the first PRC–Europe train was the first train to be able to use it in November 2019. These, though, were both exceptional cases. For non-exceptional trains, transport is much more complicated. As the Marmaray tunnel is generally not open to freight trains, the possibility for rail transport between the Asian and the European side of the Turkish rail network only arose again after 2013 with the Tekirdağ–Derince rail ferry (Uluslararası Taşımacılık ve Lojistik Hizmet Üretenleri Derneği [UTİKAD] 2013).

However, this still serves as a bottleneck: in September 2019, the ferry closed for maintenance for 15 days, blocking all rail traffic between the two sides of Turkey completely (Uysal 2019c). There is also a proposal for a new project to start cross–Marmaray ferry services from Bandırma port, but the development has not yet commenced. The Tekirdağ–Derince rail ferry travel time is 8 hours, with an additional 2 hours for loading and unloading, and the cost is high: starting at €13.6/tonne, which means €300–400 per TEU or around €1,000 for a standard rail wagon. As the costs of PRC–Europe transport start at €5,000 per TEU, the Istanbul section becomes a particularly important cost element. Moreover, the ports and ships have since undergone privatization, and no usage statistics are available now.

Turkish State Railways (Türkiye Cumhuriyeti Devlet Demiryolları, TCDD) only kept the Haydarpaşa–Sikerci terminal and Lake Van ferries. The first only plays a marginal role in special transport and mainly serves TCDD's internal needs—it only transported 1.3 million tons in 2018 (TCDD 2019a, 2019b). The Lake Van ferry though is crucial as it is the only means of transport from Turkey to Iran and beyond to Pakistan. Two ferries serviced traffic for the non-electrified single-track rail line, but the capacity of 15,000 wagons was a severe bottleneck. Therefore, new ships began operating in

2018, which increased the capacity to 115,000 wagons per year (TCDD 2018). This still only means a capacity increase from one train to seven to eight trains per day, which, while being a substantial increase, nevertheless considerably limits the cargo volumes and therefore potential international throughput capacity. 11,216 rail wagons used the Lake Van ferry in 2017 and 19,856 in 2018, which shows that the utilization of the Turkey–Iran line is still low. This all means that, even in the coming decade, there is no realistic chance for a rail freight connection between the Asian and the European side of Turkey. Furthermore, the Istanbul–Bulgaria border section, which is single track and non-electrified, began an upgrade in the second half of 2019 using EU co-funding of €1.2 billion (Railway Gazette 2019a). This will extend the already electrified line to a double-track line with modern signaling for mixed-use traffic, which will more than double capacity. However, the work is not likely to finish until 2022.

This all demonstrates that from Georgia to Europe neither overland transport through Turkey nor RoRo Black Sea ferries can be economically competitive on time and cost. It is more realistic to assume that in the future only one to two trains daily will be able to use the Black Sea route. Major physical infrastructure development is necessary along substantial segments of the Turkey rail system if Middle Corridor transport volume is to grow significantly. However, in the short to medium term, we cannot expect new investments to overcome these physical geography limitations. Therefore, the full transcontinental throughput capacity of the Middle Corridor will remain limited mainly due to the physical bottlenecks around the two Turkish metropolises of Istanbul and Ankara and the limited ferry crossing capacities on the Black Sea and the Caspian Sea.

Table 2: 2019 Freight Tariff Rates from Lianyungang, PRC, to Turkey and the Caucasus via the TITR Middle Corridor on Block Trains and as Single Carriages

Tariff Rate for Transport as Part of a **Block Train** on the Lianyungang–Altynkol–Aktau–Baku–Tbilisi/Poti/Istanbul/Izmir Route. SOC (Shipper's Own Container)

Departure	Destination	(<24 t)	(>24 t, ≤28 t)	(≤28 t)	Delivery Time
		20'	40'	45'	
Lianyungang	Baku (Azerbaijan)	\$4,455	\$2,760	\$3,005	15–17 days
Lianyungang	Tbilisi (Georgia)	\$4,515	\$2,900	\$3,145	16–18 days
Lianyungang	Poti (Georgia)	\$4,615	\$3,075	\$3,320	18–20 days
Lianyungang	Istanbul (Turkey)	\$5,485	\$3,440	\$3,685	21–23 days
Lianyungang	Izmir (Turkey)	\$5,565	\$3,470	\$3,715	24–26 days

Tariff Rate for Transport of **Single Containers** on the Lianyungang–Altynkol–Aktau–Baku–Tbilisi/Poti/Istanbul/Izmir Route. SOC (Shipper's Own Container)

Departure	Destination	(<24 t)	(>24 t, ≤28 t)	(≤28 t)	Delivery Time
		20'	40'	45'	
Lianyungang	Baku (Azerbaijan)	\$4,445	\$2,920	\$3,165	15–17 days
Lianyungang	Tbilisi (Georgia)	\$4,875	\$3,270	\$3,515	16–18 days
Lianyungang	Poti (Georgia)	\$4,975	\$3,350	\$3,595	18–20 days
Lianyungang	Istanbul (Turkey)	\$5,895	\$3,790	\$4,035	21–23 days
Lianyungang	Izmir (Turkey)	\$5,940	\$3,820	\$4,065	24–26 days

Source: Middle Corridor—direct translation.

Table 3: TITR Freight Rates for Transit through Kazakhstan from the PRC to the Caucasus and Turkey via Aktau Sea Port¹

Transit through the Republic of Kazakhstan from the PRC. SOC (Shipper's Own Container)					
	20'	20'	40' DV/HC	Delivery Days	
	(<24 t)	(>24 t, ≤ 28t)	(≤28 t)	Block	Single
ex Altynkol (Korghos)	to Turkey				
Mersin	\$2,129	\$2,129	\$3,324	15	22
Istanbul	\$2,363	\$2,363	\$3,634	16	23
Izmit (Kosekoi)	\$2,358	\$2,358	\$3,627	16	23
Izmir (Alsandzhak)	\$2,375	\$2,375	\$3,650	16	23
ex Altynkol (Korghos)	To Azerbaijan				
Port Baku (Alyat)	\$1,358	\$1,358	\$2,333	9	16
Zibat	\$1,358	\$1,358	\$2,333	9	16
Kyshli	\$1,358	\$1,358	\$2,333	9	16
ex Altynkol (Korghos)	To Georgia				
Tbilisi	\$1,540	\$1,540	\$2,580	10	17
Port Poti	\$1,584	\$1,584	\$2,656	10	17
Port Batumi	\$1,591	\$1,591	\$2,661	10	17

Source: Middle Corridor—direct translation.

Table 4: TITR Freight Rates from Kazakhstan to Turkey

Exports from the Republic of Kazakhstan to Turkey. FOR Kazakhstan, FOR Mersin, COC (Carrier's Own Container) or SOC (Shipper's Own Container)					
	20'	20'	40' DV/HC	Delivery Days	
	(<24 t)	(>24 t, ≤28 t)	(≤28 t)	Block	Single
Zaayatskaya	\$2,031	—	\$3,179	—	17
Anar	\$2,008	—	\$3,136	—	18
Taincha	\$2,043	—	\$3,198	—	18
Culye	\$2,052	—	\$3,218	—	18
Novoichimskaya	\$2,033	—	\$3,183	—	17
Kostanay	\$2,019	—	\$3,155	—	17
Kokshetau	\$2,028	—	\$3,170	—	18
Kzyl-Tu	\$2,072	—	\$3,202	—	19
Kurort-Borovoe	\$2,029	—	\$3,170	—	18
Kairankule	\$2,036	—	\$3,186	—	18
Karagai	\$2,036	—	\$3,187	—	18
Pavlodar	\$2,075	—	\$3,257	—	20
Nur-Sultan	\$2,025	—	\$3,169	—	18

Source: Middle Corridor—direct translation.

¹ FOR stands for free on road, a variation of the more standard maritime free on board (FOB). COC stands for carrier's own container, while SCO means shipper's own container and SU stands for set up (ready for the next operation). The delivery times quoted are either for dedicated block trains, meaning quicker times, or for single TEU containers on mixed cargo trains, meaning slower times.

5. ASSESSING DEMAND-SIDE DEVELOPMENT FROM EUROPE

In 2018, the EU published a new policy on Europe–Asia connectivity, with rail transport a central element (European Commission 2018). The EU has invested heavily in regional connectivity: between 2014 and 2020, it allocated €1.1 billion to the Central Asian Development Cooperation Instrument. The European Investment Bank and the European Bank for Reconstruction and Development have also invested €11.3 billion in the region, an amount orders of magnitude higher than Chinese regional infrastructure investment (Russell 2019). Container traffic between Europe and each of the Middle Corridor countries by rail, though, is currently negligible (see Figure 4). In 2019, there were only 216 registered TEU transports to Kazakhstan and 32 TEUs to Uzbekistan. These country-specific statistics are available from the International Union for Road-Rail Combined Transport (UIRR)—the major intermodal transport association in Europe—with members that include one-third of total EU containerized transport (UIRR 2019). In 2018, the EU–Middle Corridor value of goods transported by rail had only a 2.3% modal share by value and 1.4% by volume (Figure 4). The largest Middle Corridor state share was that of double-landlocked Uzbekistan.

Table 5: 2019 TITR Freight Rates from Kazakhstan to Turkey and Georgia via Aktau Sea Port SOC (Shipper's Own Container)

	FOR Akhalkalaki (Georgia), FOR Kazakhstan			Days*
	20'	20'	40' DV/HC	
	(<24 t)	(>24 t, ≤28 t)	(≤28 t)	
Kazakhstan	\$1,511	\$1,578	\$2,461	13
Mangystau	\$1,160	\$1,180	\$1,815	18
Almaty-1	\$1,612	\$1,716	\$2,619	17
Aktobe-2	\$1,427	\$1,483	\$2,307	12
Nur-Sultan	\$1,647	\$1,739	\$2,702	16
Atyrau	\$1,347	\$1,392	\$2,157	11
Balkash-1	\$1,612	\$1,704	\$2,632	15
Taraz	\$1,571	\$1,659	\$2,555	15
Karaganda	\$1,597	\$1,682	\$2,610	15
Kokshetau-1	\$1,650	\$1,738	\$2,713	15
Kostanay	\$1,580	\$1,657	\$2,587	14
Kulsari	\$1,300	\$1,338	\$2,072	10
Kyzlorda	\$1,513	\$1,580	\$2,464	13
Pavlodar-Yzhnyi	\$1,720	\$1,827	\$2,832	17
Semey-Gruzovoy	\$1,742	\$1,858	\$2,864	18
Shymkent	\$1,555	\$1,638	\$2,531	15
Taldykorgan	\$1,691	\$1,808	\$2,762	18
Zhylaev	\$1,535	\$1,606	\$2,503	13
Oskemen-1	\$1,897	\$2,048	\$3,072	18
Sairam	\$1,556	\$1,638	\$2,532	14
Shetpe	\$1,180	\$1,203	\$1,853	8
Kapshagay	\$1,626	\$1,733	\$2,643	17
Temirtau	\$1,614	\$1,702	\$2,640	15
Turkesten	\$1,539	\$1,616	\$2,505	14
Medeu	\$1,612	\$1,716	\$2,620	17
Zhezkazgan	\$1,541	\$1,612	\$2,516	13

continued on next page

Table 5 *continued*

SU Port Poti (Georgia), FOR Kazakhstan				
	20'	20'	40' DV/HC	
	(<24 t)	(>24 t, ≤28 t)	(≤28 t)	Days*
Kazakhstan	\$1,450	\$1,517	\$2,495	11
Mangystau	\$1,099	\$1,119	\$1,849	7
Almaty-1	\$1,551	\$1,655	\$2,653	15
Aktobe-2	\$1,366	\$1,422	\$2,341	10
Nur-Sultan	\$1,586	\$1,678	\$2,736	14
Atyrau	\$1,286	\$1,331	\$2,191	9
Balkash-1	\$1,551	\$1,643	\$2,666	14
Taraz	\$1,510	\$1,598	\$2,589	14
Karaganda	\$1,536	\$1,621	\$2,644	13
Kokshetau-1	\$1,589	\$1,677	\$2,747	14
Kostanay	\$1,519	\$1,596	\$2,621	12
Kulsari	\$1,239	\$1,277	\$2,106	9
Kyzlorda	\$1,452	\$1,519	\$2,498	11
Pavlodar-Yzhnyi	\$1,659	\$1,766	\$2,866	15
Semey-Gruzovoy	\$1,681	\$1,797	\$2,898	16
Shymkent	\$1,494	\$1,577	\$2,565	13
Taldykorgan	\$1,630	\$1,747	\$2,796	16
Zhylaev	\$1,474	\$1,545	\$2,537	12
Oskemen-1	\$1,836	\$1,987	\$3,106	17
Sairam	\$1,495	\$1,577	\$2,566	13
Shetpe	\$1,119	\$1,142	\$1,887	7
Kapshagay	\$1,565	\$1,672	\$2,677	15
Temirtau	\$1,553	\$1,641	\$2,674	13
Turkesten	\$1,478	\$1,555	\$2,539	12
Medeu	\$1,551	\$1,655	\$2,654	15
Zhezkazgan	\$1,480	\$1,551	\$2,550	12
SU Port Batumi (Georgia), FOR Kazakhstan				
	20'	20'	40' DV/HC	
	(<24 t)	(>24 t, ≤28 t)	(≤28 t)	Days*
Kazakhstan	\$1,450	\$1,517	\$2,495	11
Mangystau	\$1,099	\$1,119	\$1,849	7
Almaty-1	\$1,551	\$1,655	\$2,653	15
Aktobe-2	\$1,366	\$1,422	\$2,341	10
Nur-Sultan	\$1,586	\$1,678	\$2,736	14
Atyrau	\$1,286	\$1,331	\$2,191	9
Balkash-1	\$1,551	\$1,643	\$2,666	14
Taraz	\$1,510	\$1,598	\$2,589	14
Karaganda	\$1,536	\$1,621	\$2,644	13
Kokshetau-1	\$1,589	\$1,677	\$2,747	14
Kostanay	\$1,519	\$1,596	\$2,621	12
Kulsari	\$1,239	\$1,277	\$2,106	9
Kyzlorda	\$1,452	\$1,519	\$2,498	11
Pavlodar-Yzhnyi	\$1,659	\$1,766	\$2,866	15
Semey-Gruzovoy	\$1,681	\$1,797	\$2,898	16
Shymkent	\$1,494	\$1,577	\$2,565	13
Taldykorgan	\$1,630	\$1,747	\$2,796	16
Zhylaev	\$1,474	\$1,545	\$2,537	12
Oskemen-1	\$1,836	\$1,987	\$3,106	17
Sairam	\$1,495	\$1,577	\$2,566	13
Shetpe	\$1,119	\$1,142	\$1,887	7
Kapshagay	\$1,565	\$1,672	\$2,677	15
Temirtau	\$1,553	\$1,641	\$2,674	13
Turkesten	\$1,478	\$1,555	\$2,539	12
Medeu	\$1,551	\$1,655	\$2,654	15
Zhezkazgan	\$1,480	\$1,551	\$2,550	12

* There are no block trains on these services; all the quoted delivery days are for single-unit transport.

Source: Middle Corridor—direct translation.

Table 6: Major Trade Partners of the Countries in the Area of the Middle Corridor (2018)

Country/Partner	PRC	EU	Russian Federation	Turkey	US	Major Partner's Share	Trade Total (Million USD)
Armenia	9%	23%	31%	2%	0%	65%	6,195
Azerbaijan	3%	53%	8%	3%	6%	73%	31,390
Georgia	10%	27%	13%	6%	13%	69%	12,039
Kazakhstan	22%	35%	20%	2%	2%	82%	88,900
Kyrgyz Republic	52%	10%	17%	0%	4%	83%	10,882
Tajikistan	29%	5%	17%	0%	7%	58%	5,293
Turkey	6%	47%	7%	5%	0%	65%	383,980
Turkmenistan	68%	7%	4%	0%	6%	85%	12,365
Uzbekistan	23%	11%	16%	1%	7%	58%	26,776
Total	11%	41%	10%	4%	2%	68%	577,821
Total (without Turkey)	23%	30%	16%	2%	5%	76%	193,841
Total (without Turkey)	23%	30%	16%	2%	5%	76%	193,841

Source: IMF Direction of Trade Statistics.

Table 7: PRC–Middle Corridor Port Capacity Comparison (Unit: '000 TEU)

PRC Port Throughput				Central Asia and Caucasus Port Throughput		
Shanghai	40,233	Dongguan	3,910	Turkey	Ambarli (Istanbul)	3,132
Shenzhen	25,209	Rizhao	3,238		Mersin	1,592
Ningbo-Zhoushan	24,607	Nanjing	3,170	Georgia	Poti	173
Hong Kong, China	20,770	Fuzhou	3,007		Batumi	90
Guangzhou	20,370	Yantai	2,702	Azerbaijan	Baku	35
Qingdao	18,262	Tangshan	2,530	Turkmenistan	Turkmenbashi	19
Tianjin	15,040	Quanzhou	2,303	Kazakhstan	Aktau	16
Xiamen	10,380	Zhuhai	2,270			
Dalian	9,707	Dandong	1,866			
Yingkou	6,278	Haikou	1,640			
Taicang	4,514					

Note: Port container traffic measures the flow of containers from land to sea transport modes, and vice versa, in twenty-foot equivalent units (TEUs), standard-size containers. The data refer to coastal shipping as well as international journeys. We count transshipment traffic as two lifts at the intermediate port (once to off-load and again as an outbound lift), and it includes empty units.

Source: Lloyds List (2018); Port Aktau (2018a, 2018b); PortsEurope (2018); Port News (2020).

Due to the lack of any other data, only EU data has sufficient detail to be able to calculate a theoretical shift in traffic mode to rail. As Table 8 shows, we calculate a potential shift to rail traffic for EU–Middle Corridor transport. It is not easy to estimate the potential of current trade flows that could shift to rail, but the most important factors for transport mode choices are cost, travel time, and value of goods. If the rail connectivity improvements were to result in sufficient capacity and similar transport times to those in the EU and the Russian Federation, then rail transport would be competitive. That is, for rail to increase its intermodal share, the value by volume of goods must be lower than some other forms of transport that it could replace. To this end, we create an estimate based on the major product categories and the mode of transport: in all cases in which the value per volume (€/tons) is currently higher by sea than by rail, we assume that conversion to rail is possible (these figures do not include the PRC) (Table 8). In those cases in which products traveling by sea have a lower

value per volume than rail, we assume that the amount of difference is the same amount that could shift to rail.

In 2018, 124.4 million tons traveled between the EU and the countries along the Middle Corridor, but only 2.2 million tons traveled by rail. However, the maximum potential for conversion to rail is 84.4 million tons. This is a rather theoretical calculation, though, as a wide range of other factors influence transport mode selection; for example, from port region to port region, maritime transport will still be more efficient than rail by default. However, this analysis shows that a substantial portion of the current trade flows could in theory shift to rail. A principal goal of the development of the Middle Corridor is to encourage transit route traffic from the Russian Federation to transfer to this new corridor. It is therefore interesting to investigate the traffic volume development between the Middle Corridor economies in recent years. Table 10 shows that the traffic is almost non-existent: there is negligible potential to attract these volumes (we exclude Kazakhstan as transport to and from the PRC is already direct). The case of Turkey is interesting as it is the closest country to the EU, yet rail has a very small modal share due to the particularly underdeveloped rail freight infrastructure and services in the country. Turkey's political connections to the EU have also worsened over the past decade, but the two remain strongly economically interlinked: the EU is responsible for 47% of Turkey's trade, while, in the opposite direction, Turkey is responsible for 3.9% of the EU's trade.

Table 8: EU Trade with Middle Corridor Region Countries and the Potential of Trade to Shift to Rail

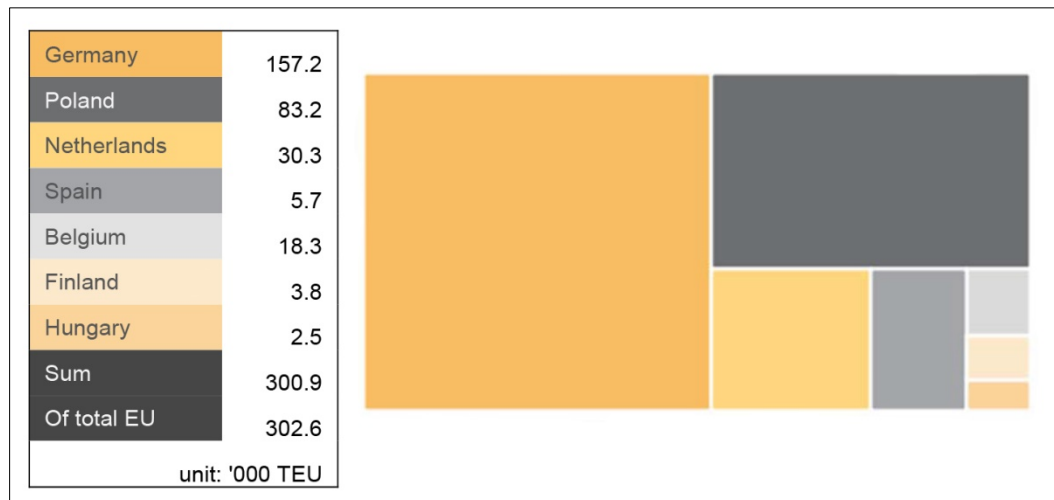
	Rail		Sea		Rail	
	EUR/Tons		EUR/Tons		Tons (1,000)	
	Imports	Exports	Imports	Exports	Imports	Exports
Agricultural products and live animals	596	292	961	554	5.4	41
Foodstuffs and animal fodder	874	472	1,177	828	64.6	184
Solid mineral fuels	80	259	86	226	105.8	18
Petroleum products	429	1,431	462	525	256.7	26
Ores and metal waste	75	256	674	243	18.7	31
Metal products	2,081	850	738	881	40.3	145
Crude and manufactured minerals, building materials	144	171	90	253	217	209
Fertilizers	232	741	208	296	0.3	3
Chemicals	1,488	1,390	532	1,011	128.9	228
Machinery, transport equipment, manufactured articles, and miscellaneous articles	2,919	5,296	4,641	4,044	156.9	286
Total	953	1,817	738	852	997.3	1,181
	Sea		Potential To Shift to Rail in %		Potential To Shift to Rail in Tons	
	Tons (1,000)					
	Imports	Exports	Imports	Exports	Imports	Exports
Agricultural products and live animals	784	1,297	100%	100%	784	1,297
Foodstuffs and animal fodder	1,479	1,558	100%	100%	1,479	1,558
Solid mineral fuels	1,159	125	100%	87%	1,159	109
Petroleum products	52,653	6,807	100%	37%	52,653	2,499
Ores and metal waste	1,253	14,372	100%	95%	1,253	13,642
Metal products	7,631	3,751	35%	100%	2,704	3,751
Crude and manufactured minerals, building materials	9,495	1,049	62%	100%	5,930	1,049
Fertilizers	546	348	89%	40%	488	139
Chemicals	3,871	5,866	36%	73%	1,385	4,267
Machinery, transport equipment, manufactured articles, and miscellaneous articles	5,618	3,511	100%	76%	5,618	2,681
Total	85,590	38,810	77%	47%	66,240	18,191

Source: Own calculations based on the Eurostat database.

Table 9: 2020 Comprehensive Tariff Rates for Universal Container Transport with Ferry Use on the TITR, USD per container

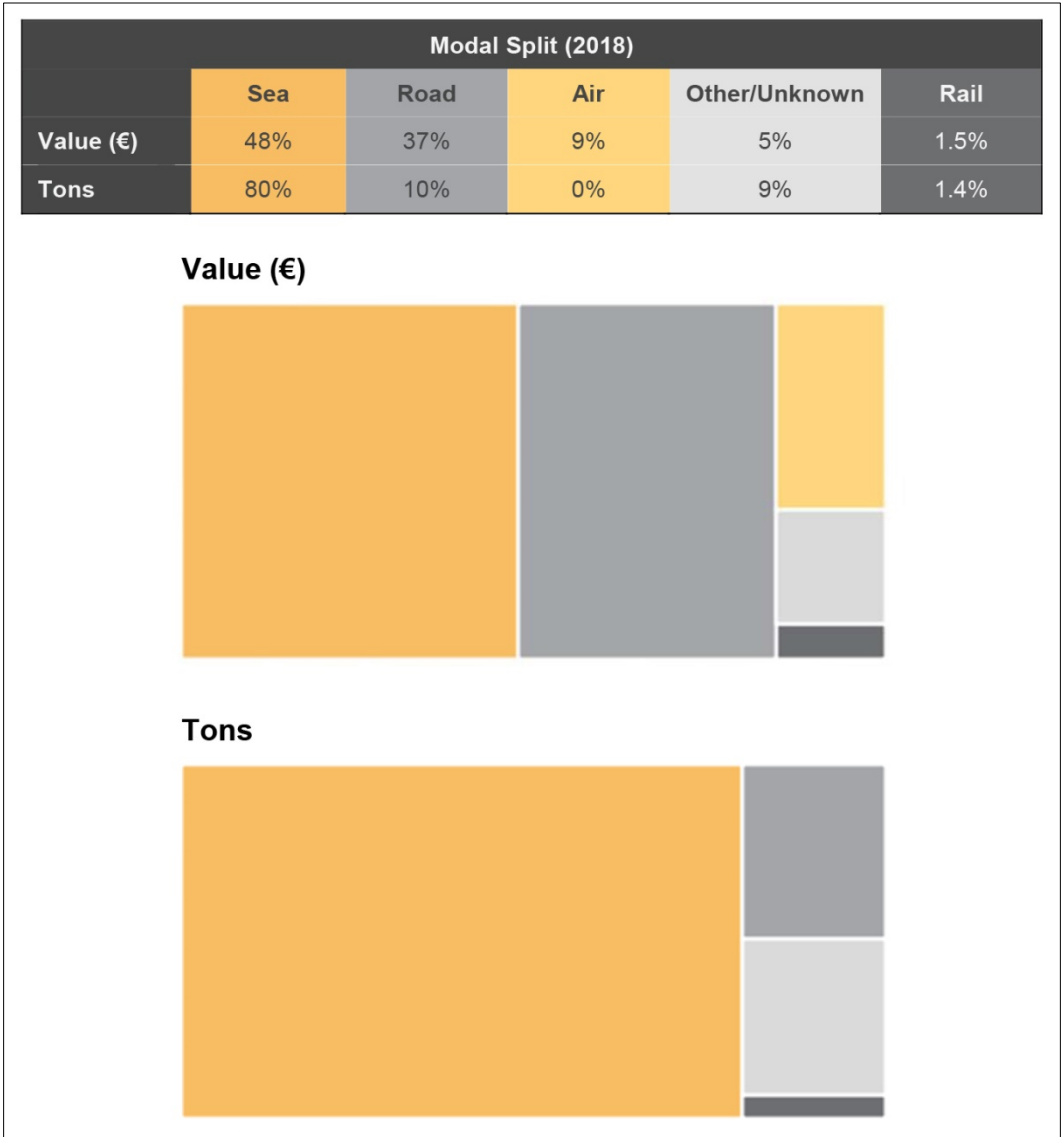
Route	Distance (km)	TEU	FEU	TEU	FEU
		SOC/ COC	SOC/ COC	SOC/ SOC	SOC/ SOC
Altynkol–Aktau/Kuryk–Batumi/Poti–Istanbul and reverse direction (via Caspian Sea ferry; from Batumi to Istanbul by truck)	5,714	2,962	4,007	2,823	3,724
Altynkol–Aktau/Kuryk–Baku (Alat)–Kars–Istanbul and reverse direction	6,382	2,144	3,337	1,981	3,011
Altynkol–Izov–Ślasków (Poland via Ukraine) and reverse direction	6,893	3,082	4,857	2,897	4,488
Altynkol–Vadul-Siret/Mostyska (Romania/Poland via Ukraine) and reverse direction	6,333	2,897	4,621	2,714	4,255
Altynkol–Chop (Hungary via Ukraine) and reverse direction	6,569	2,922	4,657	2,736	4,284
Altynkol–Uzhhorod (Slovakia via Ukraine) and reverse direction	6,597	2,840	4,578	2,653	4,204
Batumi–Saryagash (expedited) (Uzbekistan) and reverse direction	3,509	1,539	2,487	1,592	2,581
Kokshetau–Kars (Turkey) and reverse direction	4,851	1,719	2,514	1,621	2,515
Altynkol–Kars–Mersin (Turkey) and reverse direction	5,644	1,909	3,033	1,746	2,707
Karaganda (marshaling)–Batumi/Poti (ferrosilicon)	3,518	1,163	1,959	1,083	1,826

Source: Middle Corridor.

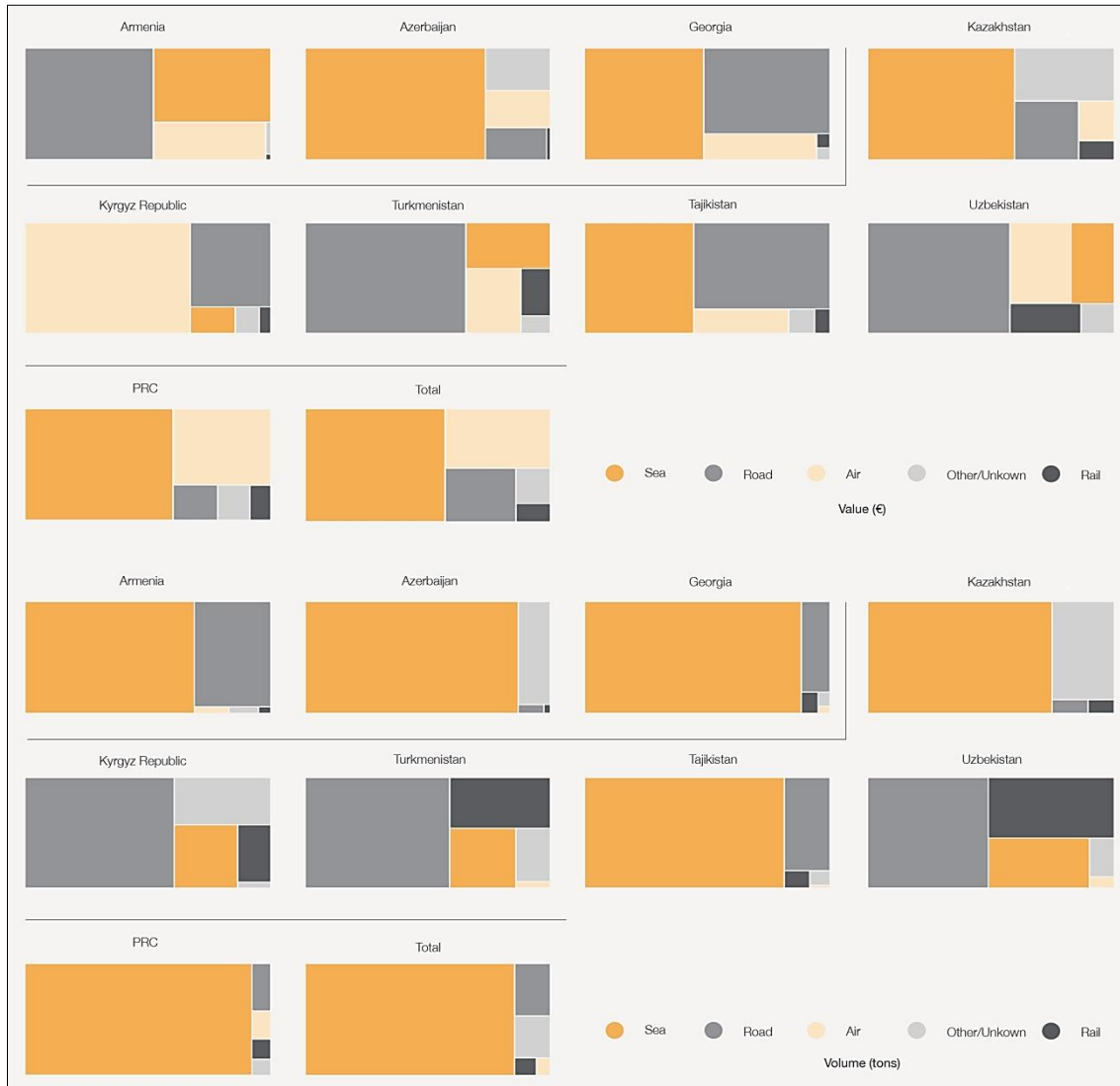
Figure 2: PRC–Europe Rail Freight Distribution in Europe ('000 TEUs, Both Directions)

Source: Eurostat (2020).

**Figure 3: Modal Share of EU Trade with Trans-Caspian Countries
(2018 in Value (€) and in Volume (Tons))**



Source: Eurostat (2020).

Figure 4: Aggregate Modal Share of EU Trade with Trans-Caspian Countries

Source: Eurostat (2020).

Table 10: Rail Transport between the PRC and Middle Corridor Countries via the Russian Federation (Thousand Tons)

Flow	Imports				Exports			
Year	2016	2017	2018	2019*	2016	2017	2018	2019*
EU	576.7	1,109.60	1,315.10	1,599.70	278.3	604.4	654.7	733.3
Azerbaijan	0.9	0.7	0.9	1.1	0.1	0.1	0.1	1.1
Georgia	0.6	0.1	0.1	0	0	0	0	0
Iran	0	0.2	0	0	0	0	0	0
Turkey	0	0	0	0	0	0	0	0

Source: Own calculations based on Cargo Report 2020. Remark: * indicates the December estimate.

The European Union has been developing transport corridors with Turkey, Central Asia, and the Caucasus for decades. Despite clear policy goals and concerted regional engagement, trade volumes between the European Union and the Middle Corridor economies remain low. The opportunity to increase rail share in the intermodal mix in these corridors is also limited due to structural economic geography limitations. Excepting landlocked economies that have no alternatives, we find only limited potential for increasing rail share in the regional intermodal mix. Trade overwhelmingly leaves the European economic zone by sea, later transferring to other forms of transport where necessary. Direct rail links for transcontinental containerized transport thus make little economic sense when regional trade between the European Union and the Middle Corridor economies by rail is negligible.

6. POLICY RECOMMENDATIONS FOR INSTITUTIONAL DEVELOPMENT

The PRC's regional economic development subsidization, initially for transport integration and ultimately for trade, industry, and investment integration in Middle Corridor economies through policy interventions and fiscal transfers, is plausible in economic theory. A major policy goal of the PRC's Belt and Road is the immeasurable market creation effects of broadening trade, investment, production, and investment networks which come with regional economic integration. The individual countries of the Middle Corridor project have already organized themselves, through effective policy measures, to act as a single economic unit for containerized rail freight transport, which has potential to facilitate this ambitious regional economic development project. Greater regional integration would benefit the individual states in the economic zone between the PRC and Europe and would also help to align the economically underdeveloped economies of the former Soviet Union with both the PRC's and the European Union's macroregional policies.

Institutional development of the Middle Corridor rail freight cooperation mechanism would seem to be an excellent mechanism for enhancing the effectiveness of both investment from the PRC and trade facilitation as a throughput between the PRC and the European Union. However, there remains a mismatch between expectation and reality. Regional cooperation for better transport corridors and economic corridor development is an economic, social, and political good. However, the PRC's subsidization of the Middle Corridor containerized rail freight channel alone will not facilitate intraregional trade between the Middle Corridor countries or extraregional trade from the region to the PRC or Europe. We propose some policy and institutional development recommendations for the three polities involved: the Middle Corridor states, the People's Republic of China, and third-party stakeholders, including the European Union and multilateral development banks and agencies.

6.1 Policy Recommendations for Middle Corridor States

- Liberalize trade to attract greater trade and transport volumes, and expand the Middle Corridor logistics grouping into a formal trade bloc.
- Develop a regional trade zone. A trans-Central Asia (excluding Turkmenistan)–Caucasus–Turkey trade area could engage more effectively with the PRC and European Union trade policy, practices, standards, and technical and legal developments.

- Develop stronger inter-governmental dialogue mechanisms. Practice inter-ministerial and cross-government engagement within domestic economies to develop integrated institutions for transport, trade, industry, and other economic forms of integration.
- Develop intraregional economic integration policies to harmonize industrial development in the Central Asia and Caucasus region.
- Develop extraregional economic integration policies to engage with both the European Union and the People's Republic of China in developing the Middle Corridor area economies into an attractive trade and investment environment.
- Focus policy on attracting freight volumes from the existing northern corridors connecting Europe and the PRC

6.2 Policy Recommendations for the PRC

- Communicate policy intentions more clearly and transparently.
- Engage local stakeholders more effectively.
- Become a more engaged stakeholder with the European Union and multilateral development banks in Central Asia and the Caucasus.
- Work more with existing multilateral stakeholders rather than practicing unilateral engagement policies.
- Transparently coordinate between central and local government and make clear to partner economy policy-makers which level of PRC government the partner economies should engage.
- Work within existing international systems, institutions, and paradigms to achieve world's best practice in institutional development across all Eurasian economic integration policies.

6.3 Policy Recommendations for the European Union, Multilateral Development Banks, and Other Engaged Stakeholders

- Pursue and foster greater operational transparency and policy communication with PRC central and local governments and the Middle Corridor states.
- Establish third-party institutions to better monitor development and coordinate policy responses to CR Express, Middle Corridor and wider transcontinental rail development
- Develop third-party institutions for setting and implementing trade and legal standards.
- Ensure that the European legal environment prevails in any trade and logistics disputes.
- Implement multilateral organization best practices for further Middle Corridor development.
- Engage more with provincial and prefectural-level governance stakeholders in the PRC.

- Clearly separate Belt and Road, Eurasian Economic Union, and Greater Eurasian Partnership policy from practical trade, transport, and logistics policy.
- Involve the European Union more as an engaged regional stakeholder and infrastructure investment leader.
- Engage multilateral development banks and local programs like CAREC and TRACECA to help implement best practice for the countries, economies, people, and institutions in the Middle Corridor states.

Middle Corridor is a voluntary initiative. The Middle Corridor states, excluding the PRC, are transparent, inclusive, expansionary, and progressive, and the Middle Corridor economically connects states that are not naturally economically integrated. Middle Corridor could have been the vanguard of a range of regional multilateral institutions representing a series of poles to uphold the Silk Road Economic Belt, the Iron Silk Road, the Greater Eurasian Partnership, and the CR Express Europe, and CR Express Central Asia class rail systems. For Belt and Road to have succeeded, it would have needed third-party independently evolved institutions to dock with these Middle Corridor host economies. If the PRC were policy-determined to support the land component of the Belt and Road program, then the intermodal Trans-Caspian International Transport Route could have been a lynchpin for possible future success.

However, against the PRC's supply-side development policy, we find serious limitations in both the economic geography structural capacity in Middle Corridor states and the Europe demand-side positions. The Central Asia and Caucasus Middle Corridor states' containerized rail freight infrastructure development exists in a vacuum in which the institutional agency is largely limited to reactionary policy emanating from the markets on either side of the region, in the PRC and the European Union. If the Eurasian states can only react to policy to create the most amenable conditions possible to facilitate investment and trade, though, the evidence to date indicates that these Middle Corridor states are coordinating institutions, governments, transport infrastructure, private enterprise, and both intraregional and extraregional cooperation well. However, against this positive institutional development, regarding economic utilization, we find that Middle Corridor states' economic policies will eventually face the development ceiling of demand-side factors from the European Union. For Middle Corridor economies, transparent pricing, openness to foreign investment, and transparent international agreements all point to a greater level of economic integration across the Middle Corridor economic area, with possibilities for future multilateral trade bloc integration. Creating a uniform transport bloc that could better facilitate trade with both Europe and the PRC is the best possible policy solution for these regional economies. However we ultimately find the prospects for continued economic development, transport expansion and institutionalized trade growth for the Central Asia, Caucasus and Turkey economies limited by lack of demand from the European side.

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