Grain, Export, and Logistics in Ukraine

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Abstract

Ukraine is one of the world's leading grain producers and exporters, and the importance of agriculture, and agricultural exports, to the Ukrainian economy seems only likely to increase with increasing global food requirements and with the hoped-for increasing integration of Ukrainian agricultural products into the EU economy. However, this outcome may depend on the country overcoming a number of obstacles that are already beginning to act as constraints on growth. At the same time, these same obstacles, by increasing the logistics costs of selling agricultural products into world markets, also harm the population – and thus the support for economic reforms – by reducing both the amount and the share of export earnings that accrue to farmers. In this paper we examine the principal logistical limitations that appear likely to constrain the system, focusing on rail transport, water transport, and land ownership, and offer recommendations for the most promising reform paths to be pursued.

Key words: Ukraine, agriculture, logistics, railways, river transport, land reform

JEL codes: L92, Q15, Q17, Q18, R42

Introduction

Ukraine is one of the world's leading grain producers and exporters. Thanks largely to its fertile black earth region, the country is the world's leading exporter of sunflower oil, 2nd leading exporter of maize, 5th leading exporter of wheat, and 3rd to 5th leading exporter in the smaller volumes of oats, rye, and sorghum (USDA, 2017). More broadly, and with other agricultural sectors like dairy farming included, agriculture accounts for 12 percent of Ukrainian GDP, almost 16 percent of employment, and 42 percent of exports (FAO, 2012; Ministry of Infrastructure, 2017). As Table 1 shows, the agricultural sector is considerably more important to the overall economy in Ukraine than in neighboring countries.

COUNTRY	AGRICULTURE	INDUSTRY	SERVICES
Bulgaria	5.2	30.6	64.2
Czech Republic	1.6	38.1	60.3
Hungary	3.7	31.3	65
Poland	3.4	33.6	63
Romania	7.9	32.9	59.2
Russian Federation	4.5	36.9	58.6
Slovak Republic	3.8	35.5	60.7
Ukraine	9.4	34.4	56.2

Table 1. Share of Agriculture, Industry, and Services in GDP

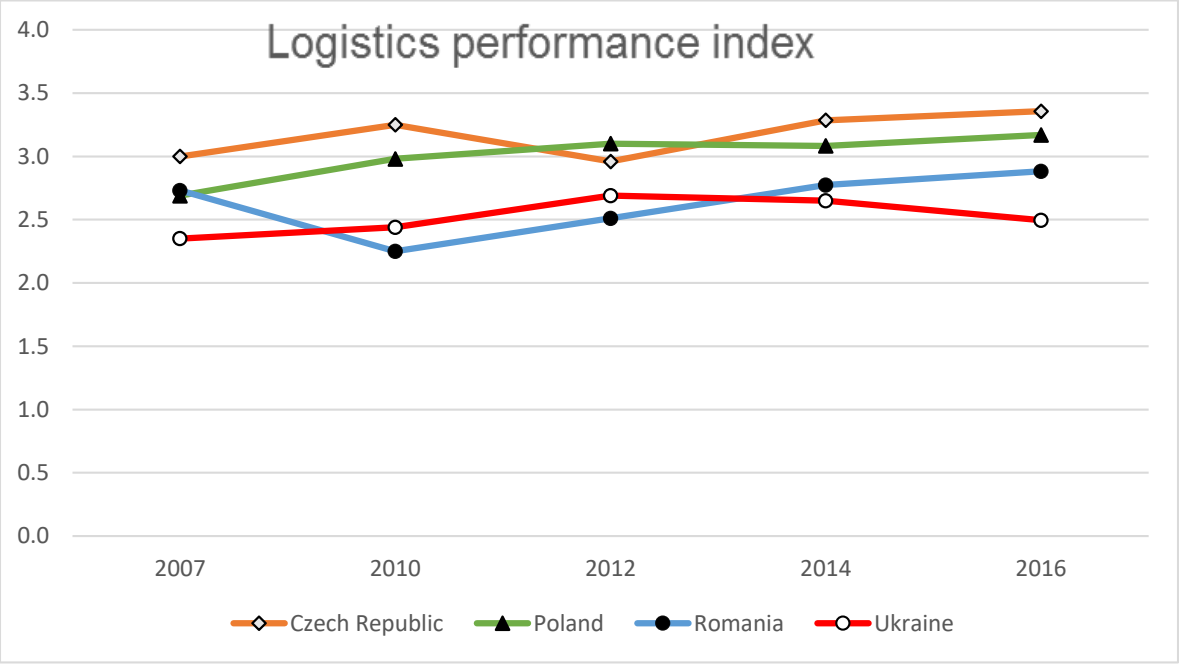
[1] Pittman: Antitrust Division, U.S. Department of Justice, and Kyiv School of Economics. Nekrasenko: Poltava State Agrarian Academy. The views expressed are not purported to reflect those of the Department of Justice.

The importance of agriculture, and agricultural exports, to the Ukrainian economy seems only likely to increase with increasing global food requirements and with the hoped-for increasing integration of Ukrainian agricultural products into the EU economy; the Ukrainian government has forecast a near doubling of grain exports by 2020 (Ministry of Infrastructure, 2015, 2017). As US ambassador to Ukraine Geoffrey Pyatt has remarked concerning the current situation, "Those numbers could easily be doubled…. Ukraine is already one of the world's great agricultural producers. But it should be an agricultural superpower."[2]

However, this clearly welfare-enhancing outcome may depend on the country overcoming a number of obstacles that are already beginning to act as constraints on growth. At the same time, these same obstacles, by increasing the logistics costs of selling agricultural products into world markets, also harm the population – and thus the support for economic reforms – by reducing both the amount and the share of export earnings that accrue to farmers both large and small (World Bank, 2015). We argue that it is useful to analyze these obstacles in the framework of the "growth diagnostics" framework of Hausman, *et al.* (2008; see also Rodrik, 2008, 2017), which seeks to identify which obstacles hindering growth in a particular country are the "binding constraints" whose easing is the most productive target for reform efforts. In this paper we examine the most costly of these obstacles and discuss the regional and world experience with addressing them.

Background

For a country with recent success in agricultural exports, Ukraine as a whole has a logistics sector with of decidedly mediocre quality by world standards; in fact it stands at exactly 80th place out of 160 countries in the Logistics Performance Index of the World Bank (Arvis, et al., 2016). Even by regional standards its overall performance has been middling and unimpressive, as shown in Figure 1.



[2] Ilya Timtchenko, "Cargill to investment $100 million into grain terminal at southern port," *Kyiv Post*, February 25, 2016.

Figure 1. Regional trends in World Bank Logistics Performance Index

The index is made up of six components: customs, infrastructure, international shipments, logistics quality and competence, tracking and tracing, and timeliness. The possible individual and overall scores range from a low of 1 to a high of 5; in overall 2016 rankings the lowest performer was Syria at 1.60, and the highest Germany at 4.23.

Broadly speaking, the principal constraints on Ukrainian grain exports seem to be the considerable expense and time required for the domestic transshipment and transportation of grains. According to one analyst, the current cost of moving grain from the line elevators near the farms to the ports of the Black Sea is about 40% higher than similar costs in France and Germany, and about 30% higher than similar costs in the United States. That is, export grain logistics and transportation are USD 20 more expensive per ton as compared to the same services in European countries. As a result, domestic grain producers lose, by this estimate, USD 600 million annually (Maslak, 2016).

Ukraine is not a small country, so the distances over which grain is shipped, for both domestic consumption and export, are sufficiently great that rail and water transport should have an economic advantage over motor transport. Currently only rail exercises that advantage, as the use of the Dneiper River and other inland waterways has dropped to almost negligible levels in recent years (an issue to which we return below). Motor carriage is significant, especially over short distances from farms to elevators. Figure 2 shows the modal shares, by weight, of agricultural products transported in recent years; the motor carrier figure is certainly understated because it does not include own-haulage by farmers.

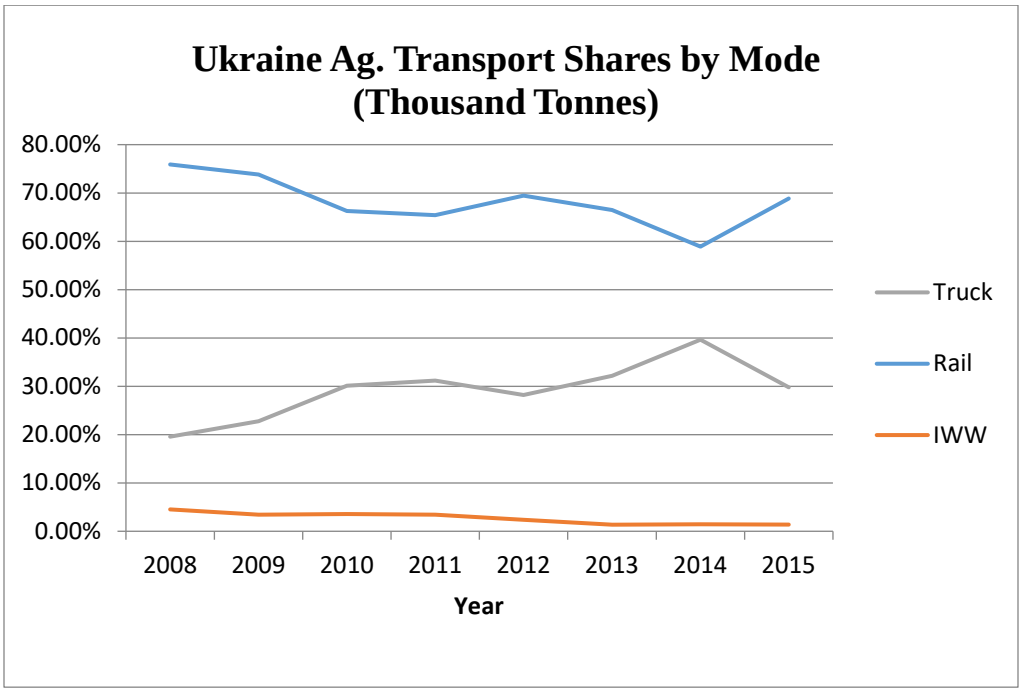


Figure 2. Modal share of agricultural transport.

Figures 3 and 4 show that Ukraine is unique among its western neighbors in the importance of rail in the transport of agricultural products, just as Romania is unique in the importance of the inland waterways.

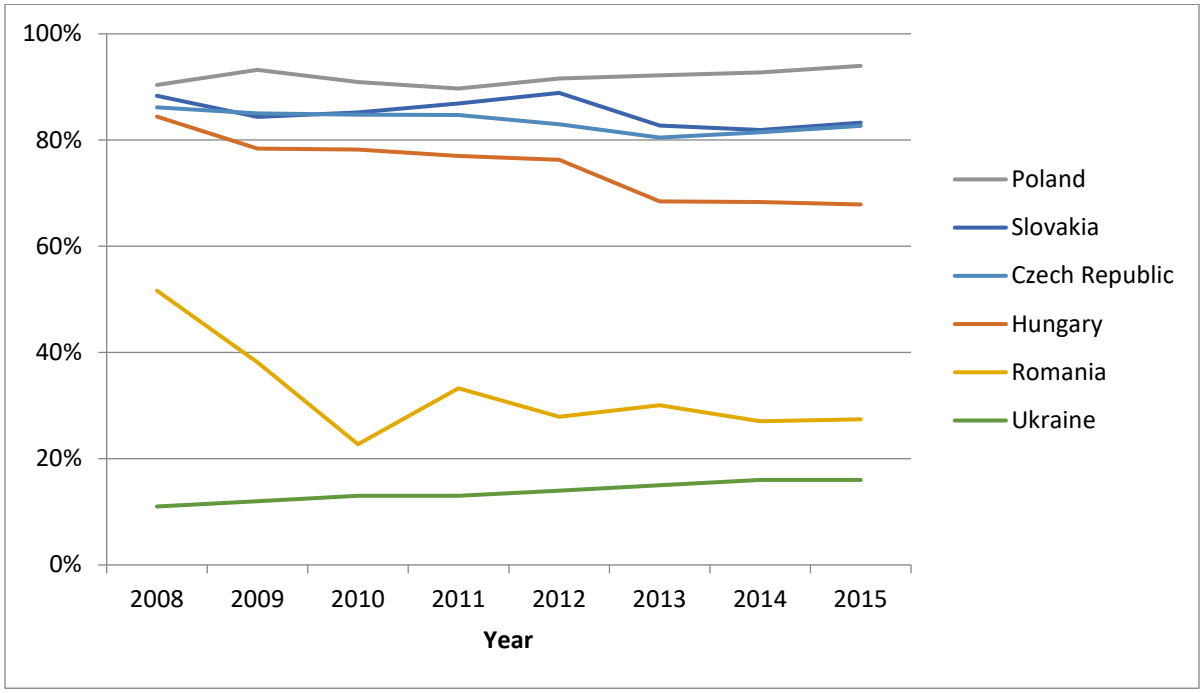


Figure 3. Motor carrier share of total agricultural transport, selected countries

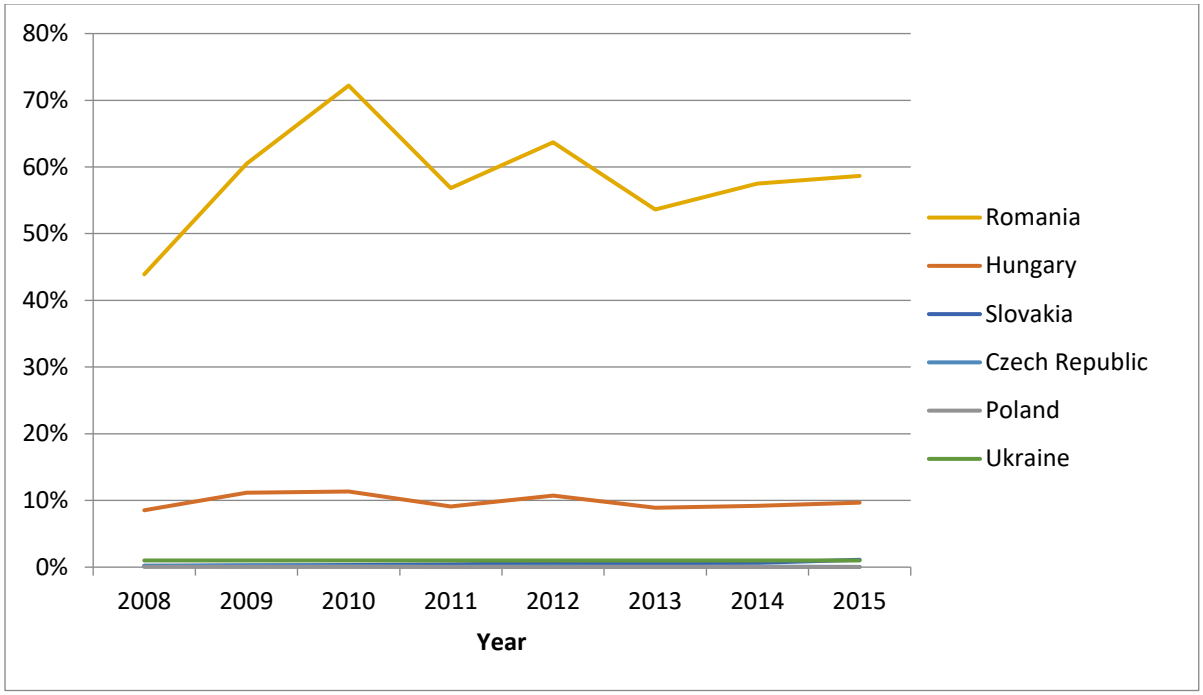


Figure 4. Inland waterways share of total agricultural transport, selected countries

On the other hand, rail seems quite unimportant as a mode of transport for agricultural goods as they actually leave the country; here, as they have for decades, Odessa and the other Black Sea ports are dominant. Exports carried by rail across the Ukrainian border are dominated by iron ore, followed by other minerals and chemicals, as shown in Table 2.

COMMODITY	DESTINATION COUNTRY	METRIC TONS EXPORTED, 2010
Iron ore	Poland	5,040,087
Other stone earths and minerals	Poland	852,807
Wood and cork	Poland	482,770
Chemical fertilizers	Hungary	386,303
Gaseous hydrocarbons liquid or compressed	Hungary	341,241
Sand, gravel, clay, and slag	Poland	289,356
Other stone earths and minerals	Lithuania	276,921
Other manufactured building materials	Poland	252,427
Wood and cork	Estonia	239,708
Fuel derivatives	Hungary	207,326

Table 2. Top 10 commodities exported by rail from Ukraine, 2010.

Source: ETISplus (European Transport Policy Information System)

Grains make their first appearance quite far down on the list: Cereals to Latvia, 47,160 tons.

We surveyed twenty grain processing companies in the Poltava region of Ukraine to learn more about the importance of transportation and transportation charges for such companies. The companies we interviewed ranged in volume of transport use from less than 15 thousand to over 4 million ton-kilometers, and in spending on transportation from a little over USD 1 million to a little over USD 1 billion. With a wide range of both magnitudes and cost shares, they reported an average of 2.57 percent of revenues spent on goods transport; see Figure 5.

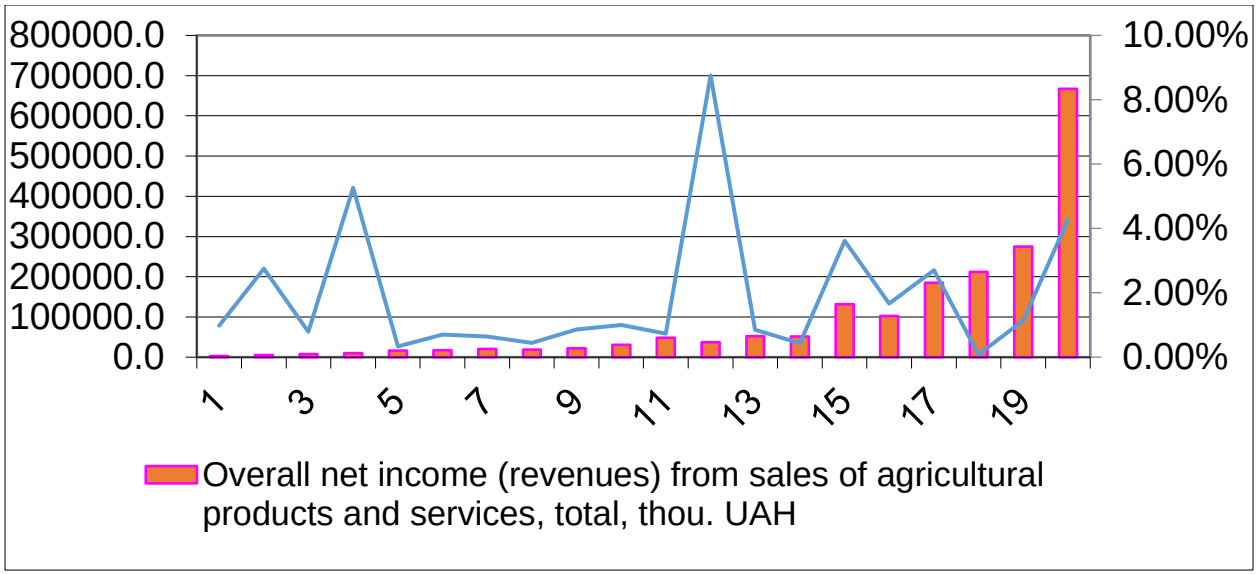


Figure 5. Transport costs as a share of revenues for twenty agricultural processing companies in the Poltava region. Source: Authors' survey and interviews.

The list of challenges facing Ukraine as it seeks to improve its infrastructure to support future growth of agricultural production and exports is a long one, and it is not easy to identify which of a number of problems might serve as a, or the, "binding constraint". Nevertheless the experience of neighboring countries suggests a number of strategies that might be pursued by Ukrainian reformers in this context going forward.

Step 1. Rail sector support and reform

Step 1a. Government subsidies to the railway

Ukraine's railway infrastructure is generally old and in poor repair, and capacity bottlenecks act to slow and disrupt agricultural and other freight shipments in multiple locations (Pittman, 2015, 2017).[3] Most countries in Europe provide government subsidies to their railways (ECMT, 2005; Arrigo and Di Foggia, 2014). Generally these subsidies are provided to infrastructure construction, infrastructure maintenance, and passenger operations, and may originate with a variety of levels of government. Ukraine, like many countries, both provides government subsidies to passenger operations and requires the freight operations of the national railway company Ukrzhaliznytsia to cross-subsidize the passenger operations. However, almost uniquely in Europe, the Ukrainian government provides no infrastructure subsidies to Ukrzhaliznytsia, requiring the company to fund capital improvements from current operations and borrowing.

Table 2 shows the most recent data available for government subsidies to Central and Eastern European infrastructure and passenger operations, along with two indexes to place the Euro amounts in context: total subsidies per train unit and total subsidies per population.[4]

[3] See Bukovskiy and Kvartal'na (2012): "The priority of 'Ukrzaliznytsya' should become the liquidation of 2300 km of bottlenecks on the most heavy traffic lines."

[4] "Train units" are a standard statistical measure used by analysts to aggregate the levels of passenger and freight rail operations in a particular country. Train units = passenger-kilometers + freight-ton-kilometers.

COUNTRY	SUBS: PASS (million Euro)	SUBS: INFRA (million Euro)	SUBS: TOTAL (million Euro)	SUBS/TRAIN UNITS (TU in thousands)	SUBS/POPULATION (pop. in millions)
BULGARIA	100	84	184	34.7	25.9
CZECH REP.	516	0	516	27.0	49.1
HUNGARY	544	738	1282	92.8	130.8
POLAND	753	591	1344	29.0	35.0
ROMANIA	329	211	540	35.4	27.3
RUSSIA	769	9787	10556	5.2	71.9
SLOVAK REP.	218	411	629	68.0	116.5
UKRAINE	583	0	583	2.4	15.3

Table 2. Total government support for railway infrastructure and passenger operations.

Note that Ukraine ranks last in both indexes of government support for the railway: far below even the Russian Federation in total subsidies per train unit, far below even Bulgaria, Romania, and Poland in total subsidies per population.

Few would dispute the statement that there are disadvantages and costs to government subsidization of railways, including reduced incentives for efficient operations, difficulty of segregating subsidies to infrastructure from subsidies to operations, controversies over the optimal level of government to provide different subsidies, welfare losses and economic distortions from taxes and fees, and the opportunity cost of government funds. Still, as a step short of more serious and difficult rail reorganization initiatives, the provision of some government subsidization in order for the worst rail infrastructure bottlenecks to be addressed would seem a pro-export and pro-farmer policy well worth considering.[5]

Step 1b. Private rolling stock

In addition to serious problems with the rail infrastructure, a widely noted problem regarding Ukrainian grain transport is the poor condition of the specialized rolling stock used for this purpose. Four-fifths of the rolling stock used to carry grain is owned by the government-owned monopoly railway company Ukrzhaliznytsia, and most of this is either fully depreciated (30+ years old, about one-third of the fleet) or will be within the next ten years (21-30 years old, over half the fleet) (Tovstopyat, 2013; Maslak, 2016).

Partly this is the result of the continued resistance to reform and restructuring of the railway (see next section), so that there is no competition within the railway sector. Partly it is a result of charges imposed by Ukrzhaliznytsia on the empty return trips of privately owned rolling stock that are not imposed on its own rolling stock, as well as alleged corruption in the allocation of Ukrzhaliznytsia-controlled rolling stock during periods of high demand. But even the Russian Federation, which has also resisted the restructuring of its government-owned monopoly railway company Rossiyskie Zheleznye Dorogi (RZhD), has allowed and encouraged private investment into rolling stock in response to widespread shortages of capacity regarding a variety of commodities (Pittman, 2013; Martsenyuk, 2014) – first by unbundling the wagon fee from the tariff in 2003, later by spinning off RZhD subsidiaries that

[5] See also the discussions of rail investment and financing in Lomtyeva, et al. (2012), Martsenyuk (2012), and Petrenko (2012).

owned rolling stock – to the degree that, according to the RZhD website, 80 percent of rolling stock is now owned by firms unrelated to RZhD.

An additional problem that compounds the overall shortage of rolling stock is the lack of price flexibility for use of the existing inventory (World Bank, 2015). Demand for grain hoppers is of course seasonal, and the absence of seasonal pricing means that marginal users have little incentive to moderate or reschedule their usage in periods of peak overall demand.

The government estimates that the replacement of aging freight cars and locomotives will require a total of USD 2 billion over the next few years (Ministry of Infrastructure, 2015), while the World Bank (2015) estimates that investments of USD 640 million would be required for the 8500 new grain hoppers required to relieve the current and forthcoming shortages of rolling stock for agricultural transport in Ukraine – though all three numbers could be reduced by improvements in incentives for allocating scarce cars during periods of peak demand.

Step 1c. Broader railways reform

Ukraine has the 14th largest railway system in the world, as measured by track-kilometers, and the 6th most densely operated, as measured by train unit per track-kilometer. (See Table 3.) Like the rolling stock park, the infrastructure is old, depreciated, and generally unable to keep up with demand. Unlike most of Europe – but like Russia, as well as China and India – Ukraine has a mostly unreformed and unrestructured railway system (Pittman, 2015, 2017). The long-standing state monopoly railway has been internally reorganized, and legislative proposals and initiatives for reorganization have been debated over the years, but so far the vertically integrated monopoly remains.

COUNTRY	KM TRACK	FREIGHT TON-KM (M)	PASSENGER-KM (M)	(FREIGHT + PASSENGER) /TRACK (MM)	KM TRACK/LAND KM^2
USA	227,058	2,788,230	9,935	12.3	0.0248 (Lower 48 0.0296)
RUSSIA	84,158	2,400,000	175,800	30.6	0.0049 (European Russia 0.138)
INDIA	63,327	521,371	769,956	20.4	0.0193
CHINA	60,809	2,511,804	772,834	54.0	0.0063
UKRAINE	21,676	196,188	48,327	11.3	0.0359

Figure 3. Ukrainian rail compared to largest world rail systems

There are a number of reform paths that have been chosen for railway reforms around the world. In Europe, most countries have chosen one of two related "models", both of which involve opening up train operations to competition while maintaining the track and signaling network as a

"natural monopoly". Under the *third-party access model*, the incumbent vertically integrated railway enterprise is required to open the network to independent, non-integrated train operating companies that will compete for traffic with the incumbent. This reform model preserves the economies of vertical integration of the incumbent but risks creating incentives for the vertically integrated incumbent to discriminate in favor of its own trains at the expense of the independent train-operating companies. Addressing such incentive issues, the *vertical separation model* requires the infrastructure operator – usually still a government-owned enterprise – to withdraw from train operations and act solely as a provider of network access and services (Pittman, 2007). In either case, the setting of access terms and conditions is an important and difficult part of the exercise (Pittman, 2004, 2018).

A third reform model, chosen by a number of countries in the Americas but not in Europe, calls for the division of the incumbent system into a small number of independent railway companies that maintain both vertical integration and the exclusive right to run trains on their own infrastructure, while competing with other railway companies over parallel routes as well as to and from common points – sometimes called the *horizontal separation model*. This is industry structure long favored by the US and Canada and selected by, among others, Argentina, Brazil, and Mexico in the 1990's.

Ukrainian reformers considered all three restructuring models in the 1990's and 2000's, and in 2015 the Ministry of Infrastructure introduced, and the Rada enacted, legislation that would open the system to entry by independent train-operating companies while also permitting Ukrzhaliznytsia to continue to operate trains – the third-party access model. However, to our knowledge there have to date been no concrete steps taken to implement this restructuring legislation.

The successes of other countries in implementing their reform legislation demonstrate what might be achieved in Ukraine. In the Americas, the choice of the horizontal separation model has resulted in the creation of vertically integrated railway companies – some owning their track infrastructure, others controlling it through long-term franchises – that have invested billions of dollars into maintenance and improvements in their networks. Ukraine's old and depreciated rail infrastructure, beset by bottlenecks caused in part by mounting deferred maintenance, could badly use such influxes of private investment (Zhelezniak, 2017).

In the formerly socialist countries of central and eastern Europe, implementation of vertical separation or third-party access regimes have resulted in the entry of numerous private train-operating companies competing for the business of freight shippers. Figure 6 shows the most recent information available for freight hauled by competing freight railway companies in the Czech Republic. (For a discussion of the earlier experience, see Pittman, *et al.* [2007].)

Company	**Train-km**	**Gross tonne-km**
ČD Cargo	63,98	64,81
Advanced World Transport	7,65	8,99
METRANS Rail	4,69	6,96
UNIPETROL DOPRAVA	3,41	3,73
IDS CARGO	3,38	3,38
Rail Cargo Carrier – Czech Republic	1,59	2,22
SD – Kolejová doprava	1,51	2,06
LTE Logistik and Transport Czechia	0,90	1,25

PKP CARGO SPÓŁKA AKCYJNA	0,90	1,11
BF Logistics	0,86	1,14
others	11,13	4,35

Figure 6: Percentage share of operators in freight transport performance in Czech Republic (2016)
Source: SŽDC (2016)

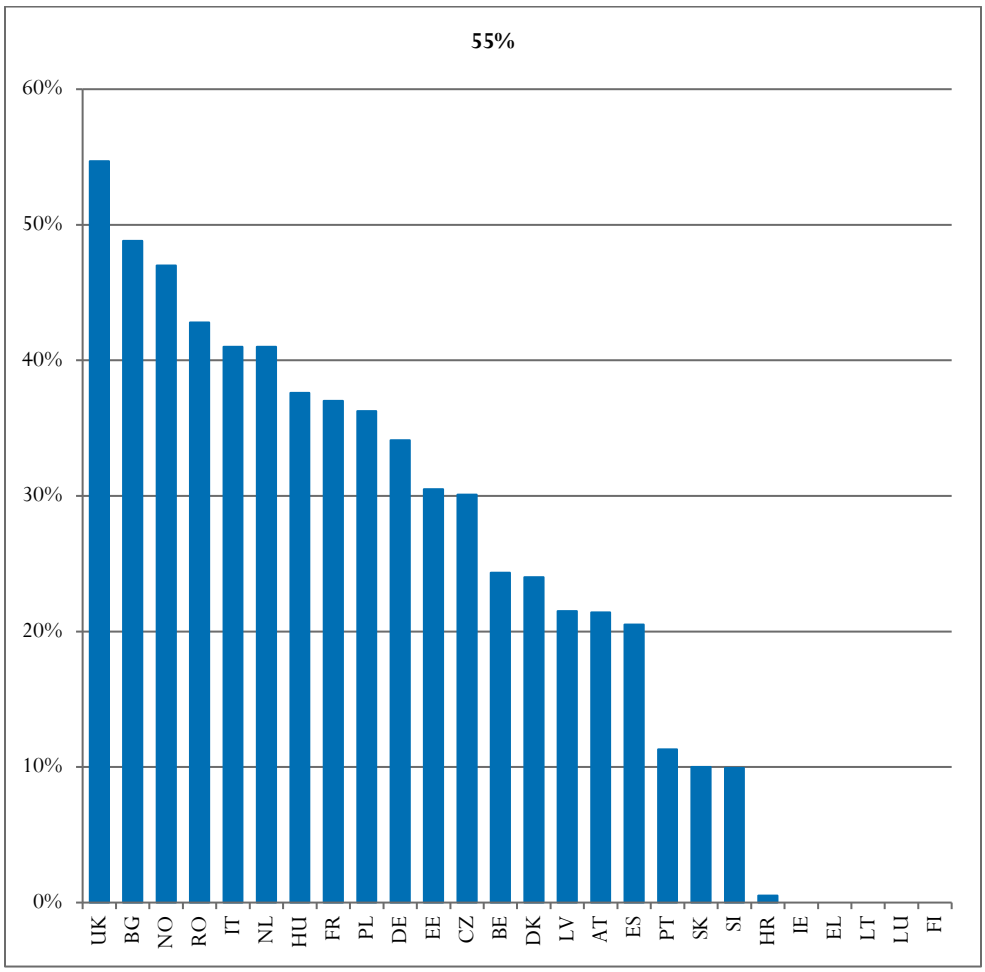


Figure 7. Share of rail freight carried by independent train operating companies in European countries.
Source: 5th RMMS, Figure 66.

Ukraine's freight shippers, very much including farmers and grain processors, must envy the competitive rail logistics services offered to their counterparts in other European countries.

Step 2. Water transport sector support and reform

Step 2a. Upgrading internal waterway transport

A good deal of the grain shipments that crowd Ukraine's railways and roads could be transported instead along the country's extensive river system, including not only the Dnieper and Southern Bug but also the Danube and Dniester. Remarkably, a domestic river system that carried almost 66 million tons of freight in 1990 carried just a little over 3 million in 2014. Pidlisny (2016) notes that the inland waterways' share of freight transport in Ukraine is miniscule at 0.25% and compares

unfavorably not only with Russia (1.4%) but also with the EU (3.5%), the US (7.7%), and China (15.4%). The proximate cause of the sudden drop after 1990 in Ukraine was the closure of gateways following the Chernobyl disaster, but there seems to have been no obvious reason beyond bureaucratic neglect, along with decisions to allot scarce investment resources to other uses, for the gradual deterioration since then of the conditions of commerce-supporting infrastructure such as locks and bridges as well as the failure to maintain the regular dredging operations required to restore and maintain navigability, especially along the length of the Dnieper that bisects the country.

The low-hanging fruit with regard to restoring the role of the inland waterways in Ukrainian grain logistics is probably the decision to reverse these decades of official fiscal neglect and devote significant resources to the restoration and improvement of the waterways, including but not limited to the repair and maintenance of locks and significant dredging operations, and the recent commitment of multimillion Euros to these projects by the European Bank for Reconstruction and Development and the European Investment Bank is good news in this regard.[6] With such improvements, the government may be willing and able to follow the advice of the World Bank and accept the urging of companies in this sector to extend the navigation period of the Dnieper into the early winter months, a time of peak demand for grain transport (World Bank, 2014). Similarly, although there have been concerns expressed regarding the deterioration of the barge fleet, companies like Nibulon and Ukrrichflot can be expected to expand their capacities significantly once the river conditions are supportive.

However, there is broad agreement among analysts and reformers that the inland waterways will achieve their potential in grain (and other freight) transport only with the implementation by the Rada of the laws "On Inland Waterway Transport" and "On the International Register of Ships in Ukraine" (World Bank, 2015; Pidlisny, 2016; Ilchenko and Oneshko, 2017). The first would both a) drastically reduce the number and the level of fees that must be paid by shippers and vessel operators to make use of the inland waterways and their related facilities and b) remove fee-related penalties for the use of specialized "river-sea" vessels; the latter would eliminate the requirement that foreign vessels go through the expensive and time-consuming process of applying for a permit each time they wish to access the Ukrainian inland waterways.[7]

The World Bank (2015) estimates that the improvements required to achieve fully operational inland waterways transport of grain in Ukraine would require public and private investments totaling USD 580 million: 10 million for river bed dredging, 270 million for improvements in river ports and terminals, and 300 million for new river barges and tugboats.

Step 2b. Seaport reform

Many of the same problems that plague internal waterway transport in Ukraine also plague the seaports on the Black and Azov Seas. A large number of tariffs and fees charged to shippers and carriers

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[6] "NL-UA Waterway Conference: Investors ready to support Dnipro river development," Kingdom of the Netherlands, June 23, 2017, https://www.netherlandsworldwide.nl/latest/news/2017/06/21/23, accessed 8 December 2017.

[7] Isobel Koshiw, "River transport revival will be key to Ukraine's logistical future," Kyiv Post, June 4, 2016, https://www.kyivpost.com/business/river-transport-revival-will-be-key-to-ukraines-logistical-future-415374.html, accessed 8 December 2017; "Ukraine: river transport could triple by 2020 if proper regulation in place," EU4Business, September 15, 2017, http://www.eu4business.eu/news/ukraine-river-transport-could-triple-2020-if-proper-regulation-place, accessed 8 December 2017.

combine to yield port user costs that are two to five times as high as those charged by competing ports on the Black Sea and comparable ports around the world (Laing and Nivievskyi, 2017).[8] To add insult to injury, the proceeds from these user costs go directly to the Ukrainian treasury, which uses some but by no means all of these sums for investments in river and port facilities (Lang and Nivievskyi, 2017). As the Ministry of Infrastructure (2017, p. 83) notes, "In 2015, USPA [Ukrainian Seaports Administration] generated UAH 2.99 billion in net profits, of which over 60% were transferred to the State budget" – at the time, in the neighborhood of USD 100 million. Seaport assets were and are heavily depreciated and obsolete, and dredging was and is inadequate. As noted by one analyst, "The main problems with Ukraine's seaports – as well as its river ports – are aging technologies and poor infrastructure."[9]

In the seaport sector, the crucial legislation that awaits enactment is that removing the designation of "strategic assets" from the state-owned stevedoring companies. Even without a new law, entry by private stevedoring companies has resulted in a reduction in the share of the state-owned enterprises in freight transshipment from 100 percent in 1991 to 34% in 2014 (Ministry of Infrastructure, 2017), but former Infrastructure Minister Andriy Pivovarsky has argued that only further reform and privatization would complete the task of ridding this sector of the inefficient remnants of the past.[10]

Step 3. Land reform

Like other post-Soviet and post-socialist countries, Ukraine began a program of agricultural land reform in the early 1990's (Csaki and Lerman, 1997). A series of official acts including the Resolution of Parliament on Land Reform (1990), the Law on Farming (1991), and the Presidential Decree on Land Reform in Agricultural Production (1994) resulted in a gradual transfer of formal ownership of most agricultural land from the state and collective farms to individual citizens in the form of certificates of ownership (Pugachov and Pugachov, 2017). However, a moratorium on resale of agricultural land was imposed, and in addition the actual physical location of the land within a former collective farm connected to individual certificates of ownership was often unspecified, so that a lease back to a large agricultural organization was the only realistic way to monetize the ownership share. The result has been an agricultural sector divided between small farms cultivated by their owners at least partly for own-consumption and huge corporate farms assembled through lease and purchase transactions, sometimes of uncertain legality, with few farming enterprises of intermediate size (Keyzer, *et al.*, 2017).

The moratorium on agricultural land sales was adopted in its current form in 2002. It was designed as a temporary measure, in part to insure an orderly transition to a privately owned countryside and in part to prevent the immediate purchase of the best land by large and especially

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[8] See also Andrey Lopakhin, "Why Vessel Calls at Ukrainian Ports are the Most Expensive in the World," Centre for Transport Studies, March 21, 2016, http://en.cfts.org.ua/articles/why_vessel_calls_at_ukrainian_ports_are_the_most_expensive_in_the_world, accessed 8 December 2017; Andrey Smirnov, "How High Port Charges Hinder Ukraine's Exports," Centre for Transport Studies, June 10, 2016, accessed 8 December 2017. See also Ministry of Infrastructure (2017).

[9] Anna Kyslytska, "Airports, rivers, railways, highways tie EU-Ukraine," *Ukraine Business Journal*, https://theubj.com/news/view/airports-rivers-railways-and-highways-are-binding-ukraine-to-europe.

[10] Ilya Timtchenko, "Cargill to invest $100 million into grain terminal at southern port," *op. cit.*

foreign firms and investors. However, it has been renewed repeatedly and remains in force, in part at least under pressure from politically powerful local agricultural interests.[11]

The results are arguably the presence of a large gray market for agricultural land, the continued high rate of poverty in the countryside, constraints on the use of land as collateral for borrowing, uncertainty of property rights that leads to both overintensive cultivation and suboptimal investment, and the continued bimodal distribution of farm size (Nizalov, *et al.*, 2016). The indirect result is agricultural productivity that – as with the situation in logistics discussed above – is significantly below that of other countries, despite the advantage of Ukraine's extremely fertile soils. Kayzer, *et al.* (2017) estimate that maize yields in Ukraine are 15 percent below the levels of the EU-27 and wheat and barley yields are 40 percent below those levels (though the gaps have become smaller since 2000).

Ukraine joins Belarus as the only two post-Soviet or post-socialist countries that continue to prohibit the sale of agricultural land.[12] Separate legislation prohibits the sale of remaining state-owned agricultural land (10.5 million hectares, about 25 percent of total agricultural land) and privately owned agricultural land (27.7 million hectares).[13] It seems clear that the termination of the moratorium on one and then the other source of land allowed to be traded freely would lead to increased production, productivity, and incomes in rural Ukraine – as it has in every other country in the region save Belarus. In addition, the sale of state-owned land would provide a windfall to the government budget – the former Minister of the Economy estimates that the sale of just 1 million of the 10 million hectares of the state-owned land would yield revenues of USD 1 to 2 billion.[14]

Discussion

As we have discussed, Ukraine has a number of reform steps open to her that would increase agricultural yields and remove constraints and bottlenecks holding back yields, earnings, logistics, and exports. The country lags most conspicuously behind its neighbors in its continued moratorium on the private sale of agricultural land; yet it is not clear that the transport and logistics system could easily handle the increased grain yields that might be expected to result from the removal of restrictions on agricultural land markets.

Our own judgment is that investments and legal reforms related to river freight transport have the most potential for easing constraints that threaten to limit the ability of the agricultural sector to reach its production and especially export potential. This is partly because the vast Ukrainian river system so recently carried so much more freight traffic. Significantly increased volumes of grain moving

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[11] See, *e.g.*, "The Fine Print: IMF Backs Down on Ukraine Land Reform Ultimatum, But at a Price," *Sputnik News*, 23 July 2017, https://sputniknews.com/europe/201707231055806243-ukraine-imf-conditions-hidden-cost/, accessed 26 December 2017.

[12] Heinz-Wilhelm Strubenhoff, "Unleashing the potential of agriculture in Ukraine," *Future Development* blog, Brookings, March 3, 2016, https://www.brookings.edu/blog/future-development/2016/03/03/unleashing-the-potential-of-agriculture-in-ukraine/, accessed 26 December 2017.

[13] "Establishment of a land market in Ukraine: current state and prospects," Embassy of the Netherlands in Ukraine, 19 January 2017, http://infagro.com.ua/eng/establishment-of-the-land-market-in-ukraine-current-state-and-prospects/, accessed 26 December 2017.

[14] Alvaras Abromavičius and Alexey Mushak, "The Right Land Reform Could Transform Ukraine Now," Atlantic Council, April 19, 2017, http://www.atlanticcouncil.org/blogs/ukrainealert/the-right-land-reform-could-transform-ukraine-now, accessed 26 December 2017.

down the Dneiper River (especially) would free scarce railway system capacity both for its own share of the growth of agricultural production and for its crucial role in carrying both non-agricultural bulk freight, especially for export, and passengers. All of this would in turn ease some of the ongoing punishment suffered by the road system of Ukraine as it carries too many cars and trucks that weigh too much.

There is much to be done if incomes in the countryside are to improve and if Ukrainian agriculture is to grow to its potential to meet both domestic and international demand. We believe that there are policy steps waiting to be taken to allow the country to reach its goals.

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