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Vertical Restructuring of the Infrastructure Sectors of Transition Economies**

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The Countries

The previous discussion has suggested several localized factors that are likely to be relevant in the evaluation of restructuring options in the railroad, electricity, and telecommunications (and other) sectors. Among the most important of these would seem to be the following:

- the capabilities of sectoral regulators (who in fact may not exist in particular countries);

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- the effectiveness of the judicial system in enforcing regulatory orders; and
- the effectiveness of the telecommunications and information systems in the country (which, in conjunction with the size of the country, may determine the scope of the regulator's effective authority).

As very rough indicators of the first two of these factors, we will use the composite indicators of Government Effectiveness, the Regulatory Framework, and the Rule of Law calculated by Kaufmann, Kraay, and Zoido-Lobatyn (1999a and 1999b) (hereinafter KKZL). KKZL summarize the content of these three indicators as follows:

- In "Government Effectiveness" we combine perceptions of the quality of public service provision, the quality of the bureaucracy, the competence of civil servants, the independence of the civil service from political pressures, and the credibility of the government's commitment to policies into a single grouping. The main focus of this index is on "inputs" required for the government to be able to produce and implement good policies.
- "Regulatory Burden" ... is more focused on the policies themselves. It includes measures of the incidence of market-unfriendly policies such as price controls or inadequate bank supervision, as well as perceptions of the burdens imposed by excessive regulation in areas such as foreign trade and business development.
- In "Rule of Law" we include several indicators, which measure the extent to which agents have confidence in and abide by the rules of society. These include perceptions of the incidence of both violent and non-violent crime, the effectiveness and predictability of the judiciary, and the enforceability of contracts. Together, these indicators measure the success of a society in developing an environment in which fair and predictable rules form the basis for economic and social interactions.

Table 1 shows the levels of these three indicators for the four countries under examination here, as well as values for the lowest and highest countries rated on each indicator.

Table 1

Composite Indicators of Governance Effectiveness

Indicator	Lowest country	Lithuania	Poland	Romania	Russia	Highest country
Government Effectiveness	-1.883 (Iraq)	0,127	0,674	-0,570	-0,595	2.082 (Singapore)
Regulatory Framework	-3.142 (Iraq)	0,089	0,565	0,199	-0,303	1.245 (Singapore)
Rule of Law	-2.153 (Dem. Rep. Of Congo)	0,18	0,538	-0,088	-0,722	1.996 (Sweden)

In addition to these broad factors, we will examine particular sectoral factors, which may determine the degree of monopoly power of the N incumbent – for example, the quality of the road network for rail, the existence of low-marginal-cost hydro or nuclear or imported power for electricity, the existing level of population coverage for telecommunications. As rough measures we use mainly the following:

- information on road density from the International Road Federation (2000),
- information on electricity generation from the Energy Information Agency of the US Department of Energy (2001), and
- information on telecommunications coverage from the International Telecommunications Union (2001).

Table 2 shows the levels of these measures for the four countries under examination here, along with those for selected other countries.

Let us consider, then, how these factors might play out in the three infrastructure sectors under examination here in a very large country (Russia), a very small country (Lithuania), a medium-sized country that is rela-

tively advanced on the transition path (Poland), and a medium-sized country that is not so advanced on the path (Romania).

Table 2

Selected Infrastructure-Specific Factors Affecting Reform

Indicator	Lithuania	Poland	Romania	Russia	USA	France	South Africa
Road Density (km/km ²)	1,09	1,22	0,66	0,3	0,65	1,62	0,29
Nuclear and Hydro Electricity Generation (% of Total)	0,822	0,032	0,462	0,326	0,274	0,885	0,079
Main Telephone Lines per 100 Inhabitants	32,11	28,24	17,46	21,67	67,3	58,02	12,53

3.1 Russia

The first central fact about Russia for our purposes is its size. The second is its devolution of governing authority to the oblasts: what Moscow says may or may not be what gets done. The KKLZ index of Government Effectiveness for Russia is -0.595, lowest of the four countries included in this study. The third is the lack of any tradition of market-style infrastructure regulation. The KKLZ index of the quality of the Regulatory Framework in Russia is -0.595, again the lowest of our four countries. The fourth is the absence, both current and historic, of the rule of law: an unfortunate legacy of centuries of autocratic rule is the complete lack of a tradition of an independent judiciary upholding the rights of citizens against government abuses.¹ The KKLZ index of the Rule of Law in Russia is -0.722, again the lowest of our four countries. The fifth is the legacy of the socialist system of production organization, "gigantism", the existence of huge, vertically integrated plants, much larger than their counterparts in the West. The sixth is the poor state of the overall national telecommunications system, which undoubtedly exacerbates the problems encountered by Moscow

¹ Some of the authors in Murrell (2001) are less pessimistic.

when it tries to impose its will. The telephone network penetration rate, at 21.7 main lines per 100 inhabitants in 2000, is not bad for a formerly socialist economy but still only about one-third of the rates for the UK (56.7 per 100) or the US (67.3 per 100). Furthermore, penetration must be much lower in Asian than in European Russia.

Finally, there are sector-specific facts. The road system is not very good in European Russia and dreadful outside it; the density of the overall network (km roads/km² land area) is only 0.30, the lowest among our four countries. As the road density in European Russia is probably somewhere in the range of those of Poland (1.22) or Romania (0.66), density in the vast Asiatic steppes must be closer to those of Kyrgyzstan (0.10) and Kazakhstan (.04). Such roads as there are rarely more than two lanes and are often in poor condition. Electricity is mostly generated by thermal sources (67 percent), so competition from new gas generation plants may be feasible.

What does all this suggest for the three sectors under examination here? The railroad sector will continue to have market power over shippers for the foreseeable future: shipment distances are long – in part because decisions concerning enterprise locations were typically made using non-economic criteria – and the roads are so poor that many commodities that would travel by truck in the West must travel by rail in Russia. In any case, bulk commodities such as oil, nickel, and timber are still the big export earners. The distances of haul are so great relative to the likely volume of traffic that unexhausted economies of density will likely prevent meaningful competition among competing train operators in most regions, and the poor quality of the regulatory and telecommunications systems mean that it would be very difficult to detect and prevent discrimination against unintegrated train operators by an integrated track and train operator.

All of this suggests that a variant of the Mexican rail reorganization system may be appropriate for Russia: the creation of a number of *vertically integrated regional monopolists*, connected at cities and/or large production centers to provide source competition at those points.² Large shippers in Russia usually have internal rail systems and own their own rolling stock, so a limited amount of self haulage, as is contemplated but not yet in place in Mexico, may be an appropriate check on the market power of the integrated railroads. The previous analysis suggests that neither the regulatory system nor the rule of law are of sufficiently high quality to enforce the option of vertical restructuring with competition, and the unlikelihood of

² See Garcia de Alba (2000) for a detailed discussion of the reorganized Mexican railway system. I discuss the benefits of such a system for Russia in greater detail in Pittman (2000).

much train competition renders the vertical separation option unattractive. A system of regional integrated monopolists seems the best outcome for the time being.

With regard to electricity, Russia has abundant supplies of cheap natural gas, and hydro and nuclear generation account for only about one-third of the country's electricity supplies, so, as noted above, it seems likely that a competition generation market could be created. Again, however, with a very weak regulatory and judicial system, it is probably quite unlikely that discrimination by an integrated enterprise against unintegrated generators could be successfully prevented.³ This would seem to argue for the *vertical separation* model in the Russian electricity sector.

In telecommunications, the poor penetration rate through most of the country, and only moderate penetration rates even in more advanced European Russia, suggest that a privatized incumbent wireline operator will not have a large first mover advantage over later, more technologically advanced entrants. If and as such entrants are allowed to offer basic service to businesses and individuals desiring value added services such as high-speed internet connections, the local wireline company will need connection to these new networks as much as the new networks will need access to the local wireline network. This suggests that bilateral negotiation may be a better regulator of competition than would a very imperfect telecommunications regulator, and that the *vertical integration with competition* model may be the best of imperfect restructuring choices. If this model is chosen, of course, any areas where the incumbent enjoys a significant advantage may require the regulatory body to attempt to enforce equitable, nondiscriminatory access conditions.

3.2 Lithuania

In contrast to Russia, the first central fact for our purposes about Lithuania is its small size: at 25,174 square miles, smaller than any of the EU countries except for Belgium (11,779 sq. mi.) and the Netherlands (13,433 sq. mi.). KKLZ governance indicators are in the middle range of our four countries and indeed in the middle range of the KKLZ rankings. Lithuania's years of interwar independence and longstanding connection

³ In August 2001, the Russian Ministry of Anti-Monopoly Policy found the integrated Unified Energy Systems enterprise guilty of an abuse of its dominant position for refusing access to the electricity grid to Rosenergoatom, owner and operator of nine of Russia's ten nuclear power plants. The final outcome of the dispute remains to be seen. See Kirill Koriukin, "UES Found Guilty of Power Abuse," *Moscow Times*, August 27, 2001.

with Poland provide it with a much stronger heritage of constitutional government and judicial power and independence than were the post-socialist inheritance in Russia. Road density and telephone penetration are high for Eastern Europe, and in fact, the former is better than some EU countries – Greece, Italy, Portugal, and Spain all have road penetration below 1 km per sq. km. Lithuania is a special case regarding electricity; its 82 percent share for nuclear power ranks it, along with France, among the highest in the world.

In the rail sector, Lithuania's high road density suggests that intermodal competition to a rail monopolist should be fairly effective. Lithuania's small size suggests further that many shippers captive to rail will be shipping beyond Lithuania's borders, but a monopoly Lithuanian railroad would still control the "monopoly leg" of the journey, and thus, absent international rail rate regulation, still likely to be able to charge a monopoly price. Should Lithuania eventually join the EU, it will be required to allow some kind of international train operators to operate over its track system, but whether this EU requirement will extend to providing competitive train operations to local shippers is not yet clear. In any case, the rail sector is in the process of being opened up for competition, and several train operators are expected to enter the market in 2001. Eventually, though not immediately, a vertical separation model is anticipated.

As I have suggested above, however, it is not at all clear that the vertical separation model is the best one for the rail sector, especially in a small country. Economies of density in train operation may preclude the development of effective competition among train operators. The UK experience so far is not encouraging. In the long run I suspect that the *vertically integrated monopolist* model is more appropriate for Lithuania's rail sector.

Let us add two qualifications, however. As I suggested for Russia earlier, it may be that a useful amendment to this model would be for large captive shippers to be allowed to operate trains over the track to serve their own needs. Also as in Russia, it seems possible that some source competition could be created here in the longer term. Two of Lithuania's four largest cities, Vilnius and Siauliai, are relatively near international borders, and are connected by direct rail lines to Minsk and Riga, respectively. One possible rail reform plan for Lithuania might be to create a vertically integrated monopolist for most of the country, but, in conjunction with neighboring countries, to seek to inject source competition by creating independent international railroad companies serving, among other locations, the Vilnius-Minsk corridor and the Siauliai-Riga corridor.

With regard to electricity, Lithuania's heavy reliance on power generated by the nuclear power plant at Ignalina makes it unlikely that new gas generating plants, or any other new sources, could result in competitive generation markets in the near future. Furthermore, even if EU-inspired plans to close the Chernobyl-style reactor at Ignalina by 2005 come to fruition,⁴ the country has adequate fossil fuel generation capacity to serve its own needs.⁵ In the longer term, both environmental concerns and the availability of cheap natural gas supplies may dictate the creation of a new electricity generation sector *ab initio*. In this case, a good deal of foreign investment is likely to be required, and the protection to investors against discrimination offered by the *vertical separation* model would seem to have much to offer.

The telecommunications sector raises more difficult questions. Telephone density in Lithuania is higher than in any of the other four countries we examine here, but is firmly in the middle of the pack for Central and Eastern Europe as a whole, where coverage ranges from lows of 10.3 main lines per hundred in Bosnia and 13.3 in Moldova to a high of 37.8 in both the Czech Republic and Slovenia. The existing regulatory framework is already showing signs of inadequacy, as the incumbent wireline monopolist has refused to provide the Lithuanian Competition Council with the cost information that it needs to investigate charges of favoritism with regard to the incumbent's subsidiary internet services provider vis-a-vis non-integrated internet service providers. (As I write, this case is before the courts.)

With regard to coverage, one could say that the glass is half full, and that existing coverage is low enough that a technologically advanced entrant would have the leverage to force a bilateral nondiscriminatory access agreement on the incumbent wireline provider, or that the glass is half empty, and that the incumbent would refuse nondiscriminatory access unless a regulator so mandated (or attempted to so mandate). But Lithuania has no experience at all with a telecommunications regulator as yet, which suggests that discrimination will be difficult to prevent. This is probably a country where a *U.S. v. AT&T*-style *vertical separation* model is appropri-

⁴ Business Central Europe (2001).

⁵ The nuclear plant is not vertically integrated, but the remaining twenty percent of Lithuanian electricity that is generated in thermal plants is mostly part of a system that is integrated forward into the transmission and distribution monopolies. Currently the country's generation surplus is exported, largely to Belarus.

ate, at least for the short term, so that the incumbent loses the incentive to discriminate and P stages such as long distance and internet service provision may enjoy the benefits of full competition. As regulators gain sophistication and as P stage entrants gain market share, a Chilean-style simultaneous opening of P and N stages may then be appropriate.

3.3 Romania

Romania comes to the table with the least helpful historical inheritance of these four countries. The break in 1989 was not the complete break with the communist past that took place in Lithuania, Poland, and Russia. The pre-1989 dictatorship of Nicolae Ceausescu was closer in spirit to Stalin's than to Brezhnev's USSR, and closer in economic organization to Stalin's or Brezhnev's central planning than to the late experiments in socialist liberalization of Hungary, Poland, and the USSR. The interwar period of democracy was marred by a strong fascist and anti-semitic party, the Iron Guard. And the eighteenth and nineteenth century periods of (variously) Ottoman and Russian rule left a legacy of corruption and dependence.⁶ What is surprising in the KKLZ indicators is not that Romania does badly but that it does not do worse: only its measure for Government Effectiveness is in the same dramatically bad area as that of Russia, while its measures for Regulatory Framework and Rule of Law are both in the same neighborhood as that of Lithuania.⁷ Newbery's (2000) conclusion regarding reform in the oil and gas sectors can be applied across the board:

The regulatory regime needs to be in place and the methodology for setting the next periodic review tariffs needs to be clear before privatization to enable investors to properly value the assets. The magnitude of this task should not be underestimated, as there is no track record of any regulatory agency in Romania setting out clearly how it intends to set future prices, nor how it would reassure investors of

⁶ See, e.g., Stan (2000a and 2000b) on the post-1989 period; Manea (1992), Stan (1995), and Deletant (1999) on the communist period; Cretzianu (1998) and Sebastian (2000) on the interwar years; and Florescu (1997) and Constantinesco (1998) on the pre-20th century history. A fictional treatment of the interwar years, interesting partly because its author played an important role in those years, is Eliade (1978).

⁷ A recent, alternative source is less optimistic regarding the rule of law: "A majority of the Romanians distrust the judiciary, regard the laws as unjust and their application as unfair. 83% of Romanians consider that we cannot speak of the rule of law in Romania, as the laws are neither enforced by state agencies, nor abided by citizens." Romanian Academic Society (2001).

the credibility of such pledges, nor how it would resolve disputes satisfactorily. Dispute resolution ... through the courts ... has not yet been tested.

As in Russia, the privatization program to date has been consistently mired in scandal.

In terms of other indicators, the Romanian road system is bad, probably worse than the Road Density data would indicate since the roads are in bad repair and almost never more than two lanes. Using another common measure of road network quality, the km of paved roads per million population, Romania ranks last among the four countries examined here.⁸ Both hydro and nuclear generation are important components of its electricity supply, though far less important than in Lithuania. Telephone coverage is the poorest among these countries.

Romania's inadequate road system means that the Romanian railroad sector plays an unusually important role in both freight and passenger transport, and that shippers will often lack competitive intermodal alternatives to rail. (Water shipments, both by river and the Black Sea, account for a large share of Romanian freight shipments, but these are more often complements to than substitutes for rail shipments.) Early reform measures have divided the rail sector into five separate (and still publicly owned) enterprises, comprising freight, passenger, track, legal/financial, and "assets". Apparently there is some desire to implement the vertical separation model, but so far, even with only two train operators and with both of them belonging the same enterprise as the track operator, there have been frequent disputes over access prices and other terms.⁹ It seems very doubtful that Romania has, or will have in the foreseeable future, the regulatory capability to implement the vertical separation model, and it is not at all clear that competition would result from implementation.

Romania may be a country as well suited as Russia for the Mexican model of *vertically integrated regional monopolists* offering source competition to shippers at the center. Bucharest is certainly the economic hub of the country, and it seems possible that the railroads, or some subset of them, heading east from Bucharest (to Constan_a), northeast (to Ia_i),

⁸ The levels are as follows: Lithuania, 14,348; Poland, 6336; Russia, 5087; Romania, 3421. Winston [2000] notes that "one obvious reason for the inattention to road infrastructure is that until [the 1990s], regulation forced all surface transport with a journey greater than 50 kilometers to use rail."

⁹ Winston (2000).

northwest (to Bra_ov and Cluj) and west (to Timi_oara) could be restructured as independent, vertically integrated enterprises, competing against each other for traffic. As in Mexico, some protection for shippers who remain captive, for example the right to run their own trains on the track, could be considered. An alternative possibility something like what I have suggested above for Lithuania might also be viable – an integrated monopoly serving most of the country, but with competing lines heading into neighboring countries from regional centers such as Bucharest, Timi_oara, Cluj, and/or Ia_i – but in both the Lithuanian and the Romanian case this would require the institutional innovation of international freight rail carriers.

An alternative solution for medium-sized countries such as Romania and Poland that are seeking EU membership and so will be allowing some competitive train access anyway would be to implement the full *vertical separation with competition* model. True, this model has not yet been shown able to create significant competition in freight haulage, but freight transport in both Romania and Poland is more bulk shipment intensive than in other countries where this has been attempted (especially the UK), and this, combined with the poor Romanian road system, means that shippers will be more dependent on rail and so willing to pay higher rates, so there may be some reason for hope. However, given both the poor governance record in Romania and the unlikelihood of significant train competition because of economies of density, I am inclined to favor the Mexican model outlined in the previous paragraph.

In the electricity sector, the proportion of generation accounted for by thermal sources – still over fifty percent – makes it appear likely that gas generation could be a possible source of competition. The poor governance record and regulatory capabilities would then seem to argue for the vertical separation model. There are three problems with that model in this situation, however.¹⁰ The first is that Romania currently possesses a great deal of excess capacity in its electricity sector – and will possess more if deferred maintenance on existing coal-fired plants is ever made good – so that entry by new generating companies is not likely any time soon. The second is that Romania probably lacks the technical regulatory capabilities to administer the day-ahead or real-time spot markets that account for much of the gains from creating competition in wholesale energy markets. The third is that there is further nuclear generation capacity under construction at Cernavoda, a legacy of the Ceausescu era preference for autarky. It is

¹⁰ All three are well described in Wolak (2000).

unlikely that this plant will ever be completed even in its scaled down version (from fourteen reactors down to five), but one reactor at least seems likely to be completed.¹¹ On the other hand, there is no obvious reason why the 26 coal-fired plants could not be restructured into a competitive thermal generation stage.

This seems a very close call. On balance, the *vertical monopoly* model probably makes the most sense for Romanian electricity for the time being. The likely costs and uncertainties associated with vertical restructuring are simply unlikely to be exceeded by sufficient benefits to justify them. However, a procompetitive amendment to this model worth considering might be along the lines of the second alternative suggested for the railroad. Since many of the Romanian population centers are relatively near international borders – I mentioned Bucharest, Timi_oara, Cluj, and Ia_i above, and one could add Craiova, Arad, Oradea, and Satu Mare as lacking the rail connections but potentially having the electricity generation connections – source competition from integrated international companies could in principal supply at least one alternative generation source to a large percentage of the population, and more if the international transmission line is forced by regulators to carry the power of multiple generating enterprises.

Finally, Romania's telecommunications systems coverage is poor even for a transition economy: in Europe, only the above-mentioned Bosnia and Moldova rank lower.¹² Already the issue of interconnection prices between the incumbent wireline monopolist Rom Telecom and the two mobile radio operators that have been allowed to enter has been a difficult one, with neither the regulatory National Agency for Communications and Informatics nor the Competition Office able to play much of a role.¹³ This suggests that, as in Russia, the model of *vertical integration with competition* may be the best solution: new market entrants offering advanced technology may be able quickly to build up a network of subscribers that the incumbent wireline operator will desire interconnection with, so that bilateral negotiations among integrated suppliers may do a better job than regulation at preventing discrimination in access terms. Noll (2000) notes that already

¹¹ Newbery (2000).

¹² "By most measures, the Romanian telephone system at the time reform began was near the bottom for the region. Penetration of the system was low, the waiting time for service was nearly five years, call completion rates were low, and line faults were high." Noll (2000).

¹³ Noll (2000).

“business customers are being offered a growing array of alternative telecommunications services for data transmission activities and private networks.” My understanding is that the government has committed to opening up the market to vertically integrated competitors in 2003.

3.4 Poland

Poland is about the same size as Romania but came to the transition with a much superior heritage of governance, including pre-1989 steps toward economic liberalization, a more democratic interwar experience, and a long history of monarchies limited by parliaments. It has been a leader among the post-socialist countries in infrastructure and regulatory reform, though there is still much to do. Poland ranks highest among our four countries on all three KKLZ indicators and in fact is not far from many EU member countries on those three scales.¹⁴ Similarly, Poland has the highest road density of the four countries examined here, and the second highest telephone penetration rate. With a history of a large and important coal sector, its electricity is almost entirely thermal generated.

Poland has already begun railroad reforms that would separate ownership of infrastructure and operations and attempt to create competition among train operating enterprises. Its position as an applicant for EU membership and its location on important transport corridors between the EU and Eastern Europe and Asia dictated that it would take some steps in this direction in any case. In addition, Poland’s railroad sector has traditionally enjoyed one of the highest levels of freight traffic density in Europe.¹⁵ If any post-socialist country has the regulatory sophistication to make either a system of vertical separation or a system of vertical integration with competition work in the rail sector, it is probably Poland.

As I have discussed throughout this paper, there are reasons, both analytical and from experience, to be skeptical that either model will bring competitive benefits worth the costs of regulation and (in the case of vertical separation) the loss of scope economies. Poland’s coal sector will clearly become less important, not more important, as politically difficult

¹⁴ For example, the Regulatory Framework indicator value for France is 0.713, for Belgium 0.794. Poland’s indicator values for Government Effectiveness and Rule of Law are higher than those for Greece, which are respectively 0.560 and 0.496.

¹⁵ Freight traffic has been most dense on the north-south Gdansk-Kotowice route. However, density is also relatively high on the two east-west routes that run through *_yd_* and Krakow-Katowice. Mercer Management Consulting (1993).

decisions are made to close uneconomic mines.¹⁶ In addition, Poland's wage structure is among the highest in the post-socialist world – several multiples higher than Romania's or Russia's, somewhat higher than Lithuania's – which also suggests a future of higher value added products that are not so rail dependent.¹⁷ Thus domestic rail traffic, at least, seems likely to be stagnant for the foreseeable future, and this does not bode well for the development of multiple, competing train companies. If the outcome of reform is bilateral monopoly, the game will certainly have not been worth the candle. On the other hand, if the outcome is an integrated quasi-monopoly whose market power is tempered by large shippers running their own trains, and/or by international train operating companies with the rights to serve local shippers, things certainly look better. If the new rail regulator is up to the task, Poland is a country where *vertical integration with competition* may have a chance to succeed in the rail sector.¹⁸

As electrical generation comes gradually less from Polish coal and more from Russian gas, the Polish generation sector has the potential to become competitively structured. Again, Poland's relative regulatory sophistication for this part of the world arguably makes the vertical integration with competition model potentially more workable than in the other three countries examined here. However, even in this country regulators are unlikely to be able to detect and prevent discrimination adequately, so that the *vertical separation* model would seem the most promising. As in Lithuania, this is especially the case to the extent that development of the gas generation sector will require significant foreign investment.

Telecommunications reform is another difficult call. Poland has had a telecommunications regulatory agency only since 2000, and the history of *de facto* regulation by the Polish Office of Competition and Consumer Protection is one of noncompliance and evasion by the incumbent wireline monopolist. According to an OECD report,

The traditional telecom monopoly, TPSA, has been subject to several orders, and sometimes fines, for refusing to contract for joint billing, excessive lease charges, obstructing connection and cutting off operators to force them to take better terms or eliminate com-

¹⁶ See, e.g., *Business Central Europe* (2000).

¹⁷ *Business Central Europe* (2001).

¹⁸ Janusz Ordovery and I argued this case, probably too strongly, in Ordovery and Pittman (1994).

petitors, targeting new entrants' customers with special terms, tying and unjustified charges ... , and anticompetitive cross-subsidized tariff structures.¹⁹

Three new entrants have received licenses to offer wireline services, but it is unclear how effectively they can provide competition without much more effective regulation. The same is true with potential entrants into long-distance service: one consortium that includes Poland's power grid company PSE and another that includes that railroad PKP have been unable to reach agreement on access terms with TPSA, and the government has not intervened.²⁰ This may be a country, like Lithuania, where *vertical separation* is in order until competing wireless providers can build up customer networks of sufficient size that the wireline incumbent agrees to equitable access terms voluntarily. At that point, the market could be opened to competition among vertically integrated firms.

Conclusion

Table 3 summarizes the recommendations for restructuring that result from the analytical framework that I have suggested.

Table 3

Summary of Recommendations for Restructuring

Sector	Russia	Lithuania	Romania	Poland
Rail	vertically integrated monopolist(s)	vertically integrated monopolist	vertically integrated monopolist	vertical integration with competition
Electricity	Vertical separation	Vertical separation	vertically integrated monopolist	Vertical separation
Telecommunications	vertical integration with competition	Vertical separation	vertical integration with competition	Vertical separation

¹⁹ OECD (2001b).

²⁰ Bush and Spiro (2000).

In Section 2 of the paper, I suggested that different restructuring options might be more appropriate in different infrastructure sectors. In particular, I argued that the best model for the rail sector would often be that of the vertically integrated monopolist; for the electricity sector, vertical separation, and for the telecommunications sector, vertical integration with competition. In Section 3, I suggested that these general sectoral recommendations might change when applied to particular settings. Table 3 suggests that this is exactly the case. Poland may be an only country where the theorist's dream of vertical integration with competition in the rail sector is workable. Romania has so much excess thermal capacity that competitive entry in electricity generation seems unlikely any time soon. In both Lithuania and Poland, the incumbent wireline monopolist is probably too well entrenched for vertical integration with competition to be successful at creating competition in telecommunications.

I trust that it is obvious that I do not claim to have "solved" a controversy with any one of the twelve recommendations listed in Table 3. Each entry in the table – not to mention potential recommendations for other sectors and other countries – clearly merits detailed examination on its own, far beyond the few paragraphs devoted to it here. My purpose has been to suggest a broad approach to the issues and to use particular sectors and countries for illustrations of this approach. Competition is worth striving for, all the more so in countries where regulation is new and regulatory resources are scarce. What kind of competition is attainable in what circumstances is the difficult question.