

Value-added Timber Processing in 21st Century Russia:
An Economic Analysis of Forest Sector Policies

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Abstract

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Beginning in 2007, the Russian government implemented a series of policies, including export tariffs on roundwood, in order to develop a more competitive timber-processing sector and increase the production and export of value-added forest products. This thesis is a policy analysis of Russia's 2007 initiatives for its forest sector—principally export taxes on raw, unprocessed logs (roundwood) and subsidies for investment in value-added processing infrastructure—which shows that Russia, at least in the short-run between 2007 and 2011, is achieving its stated goal of transitioning its forest sector away from a raw-materials export model of development. Russia's continued progress in this regard depends on the efficiency of policies and the ability of federal and regional regulators to foresee changes to incentives that these policies directly or indirectly create.

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I) Introduction

The term ‘sustainability’ as it is often understood in contemporary society is a relatively new construct. It was not until the 1987 publication of the World Commission on Environment and Development’s Report *Our Common Future*, or as it is known, the Brundtland Report, that the term sustainable development first appeared. According to the Brundtland Report, sustainable development is defined as, “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (World Commission on Environment and Development, 1987, p. 43). After the collapse of the Soviet Union in 1991, economists eagerly projected the emergence of a new consumer market as well as the potential for freer export of Russia’s wealth—particularly natural resources—onto the global market. Would Russia sustainably develop its resources to provide for long-run economic profit and long-term resource planning? Or would Russian natural resources be available for easy, unrestricted extraction that would result in large short-run profits by domestic and foreign companies?

While the forest sector in Russia languished for much of the first 15 years following the break-up of the Soviet Union, beginning in 2007 the Russian government instituted a set of policies designed to develop and modernize the Russian forest sector. This thesis is a policy analysis of Russia’s 2007 initiatives for its forest sector—principally export taxes on raw, unprocessed logs, or roundwood, and subsidies for investment in value-added processing infrastructure—which proves that Russia, at least in the short-run between 2007 and 2011, is achieving its stated goal of transitioning its forest sector “away from the outdated raw-materials export model” (Russian

Federation, 2010, para. 4). Russia's continued progress in this regard will depend on the efficiency of policies and the ability of federal and regional regulators to foresee changes to incentives that these policies directly or indirectly create. However, Russia's recent accession to the World Trade Organization (WTO) in August 2012 not only required alterations to the roundwood export tax, one of Russia's central forest sector development policies, but also more generally, makes Russia's forest sector development particularly vulnerable in the short-term. Russia's WTO accession alters the future competitiveness of its forest sector domestically as well as internationally. Despite strong government determination since 2007, the medium- and long-term goals that it set forth may be harder to achieve through conventional policy instruments.

This research is significant for several reasons related to the fact that Russia is a major player in the international trade in logs and forest products. Russia's export tax on roundwood was highly scrutinized globally for its direct implications on altering dynamics of the international trade in forest products. Additionally, recent laws in the United States and the European Union have sought to eradicate illegal logs and products made from illegal logs from being imported into the United States and EU countries.¹ Understanding the dynamics of Russian domestic policies can elucidate the changes in incentives that people face and allow for a more nuanced understanding of what drives evasion, illegal logging, and corruption in the Russian forestry sector. Lastly, this research highlights how WTO accession directly affects the Russian export tax on roundwood and how this might affect Russia's domestic goals. If there is any hope of managing Russia's

¹ In May 2008, the USA amended the Lacey Act from 1900, which originally forbade any handling or trade of fish or wildlife that was sourced illegally in foreign countries, to now include the handling or trade of plants and plant products, inclusive of wood and timber products. As of yet, there has been only one case of illegal timber sourcing prosecuted under the 2008 Lacey Act amendment, the high-profile investigation of Gibson Guitar. In 2003, the European Union developed a FLEGT (Forest Law Enforcement, Governance, and Trade) Action Plan, which stipulated several initiatives to limit illegal timber from EU markets. The most recent element, a piece of 2010 legislation called the EU Timber Regulation, took effect on March 3, 2013, and fully prohibits illegally produced wood products to enter the EU market.

forests more sustainably—that is, having a balance of ecological conservation and economic growth—the initial step is an analysis of Russia’s current forest sector policies and goals for its domestic forest industry.

The second chapter gives a detailed background to some of the challenges that plagued post-Soviet Russia’s forest sector through the 1990s and beginning of the 21st century. This introduction gives the necessary foundation for understanding why Russia instituted its 2007 forest sector policies, which were enumerated in the Ministry of Industry and Trade’s (*MINPROMTORG*) 2008 document titled ‘Strategy for the Development of the Forest Sector to 2020’. The second chapter concludes with a brief discussion of each of the three major policy initiatives of this Strategy.

The third chapter goes into an in-depth review of the theory and literature that addresses Russia’s forest sector policy that received the most attention internationally, Russia’s decision to substantially increase its export tax on roundwood in 2007. There exists a large body of economic research devoted to export restrictions on primary commodities as well as forestry literature on the effects of log export tariffs on international trade. Russia’s increased roundwood export taxes have been heavily scrutinized for their impact on Russia’s European export market, and in particular, on Finland—Russia’s second largest roundwood export market. Whereas, there appears to be little research on the effect of the export taxes on Russia’s Asian export market, and in particular, on China, which is Russia’s largest export market for roundwood. Russia’s Asian market is especially important to analyze as the flow of illegal logs from Russia to China is a major concern and has received much international publicity. Additionally, most previous

research on Russia's roundwood export tax analyzes the impacts from an international trade perspective, which evaluates Russia's policies for their impact on global or regional efficiency. Surprisingly, there is very little research on Russia's domestic markets and whether the export tax succeeded in helping Russia achieve any of its forest sector development goals, at least in the short-run from 2007-2011. This chapter and accompanying appendix B give the necessary theory to address this gap in the literature.

The fourth chapter is split into three sections. The first section provides an overview of Russia's forest sector between 2000 and 2007. The second section provides a systematic treatment of short-term forest sector trends from 2007 to 2011, with particular focus on investments, production, and exports. The last section of the fourth chapter details Russia's recent WTO accession and its effects on the domestic forest sector. The fifth and final chapter concludes by summarizing recent forest sector trends in light of their effectiveness to help Russia achieve its 2007 forest sector goals.

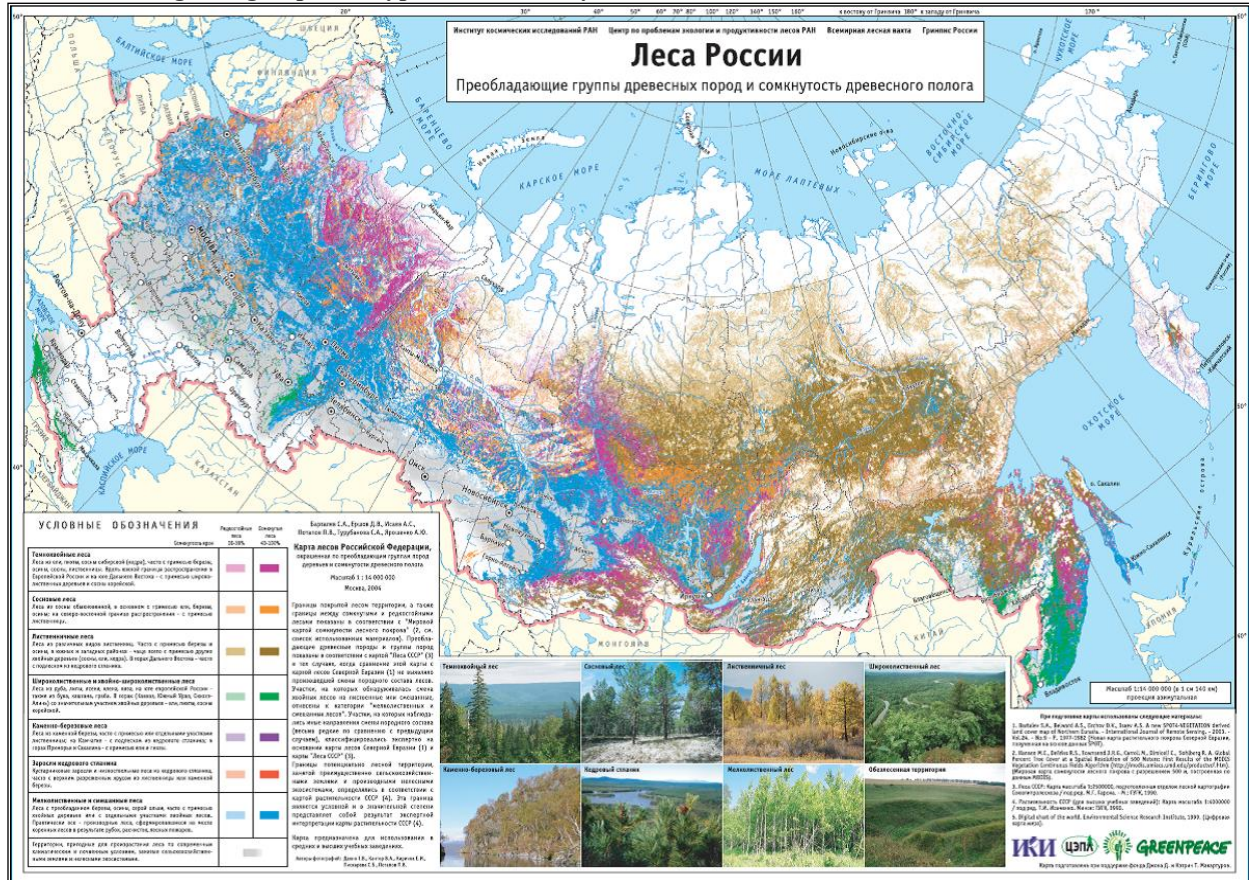
2) Background

During the Soviet era, central planners and state organizations dealt with all aspects of the forest sector. All timber destined for foreign markets was processed by the state-run organization Eksportles, which fulfilled foreign demands for wood and paper products by working together with the domestic forest sector. Under the centrally-planned Soviet Union, the production, consumption, and allocation of all goods “took place under a different social, political, and economic regime; [this is to say that]...in a market economy, prices and costs perform allocative roles as opposed to simple monitoring roles in a centrally planned economy” (Backman, 1998, p. 7). Intensive Soviet forestry practices led to high outputs and sustained production of timber for domestic and export markets alike through the late 1980s. Soviet forest sector production was heavily reliant upon the presumption that their forests resources were inexhaustible and thus forestry practices and levels of production and export were neither economically nor ecologically sustainable (Barr and Braden, 1988). Following the collapse of the Soviet Union and the subsequent decline in economic activity, domestic production fell up to 40% (Backman, 1998). Meanwhile, domestic consumption in Russia fell, but not nearly as significantly as the drastic decline in wood exports which was due to large increases in transportation costs as well as failed coordination throughout all of the former Soviet Union to match buyers with sellers (Backman, 1998). Current harvest levels in Russia still lag behind production levels in the mid-1980s (Tykkylainen et al., 2008).

Despite the drastic fall of forest sector production that lasted well into the 1990s, Russia’s extensive natural resource base gives it a natural advantage for global trade. Indeed, Russia was the world’s largest exporter of natural resources in 2008, with exports of \$341.2 billion,

representing 9.1% of the world’s natural resources trade (WTO, 2010). Just under a quarter of the world’s total forests are contained within the Russian Federation—more than the combined forest area of Canada and Brazil (Killmann and Whiteman, 2006). Forested ecosystems constitute 46.6% of Russia’s total territory and are distributed evenly across its nine time zones (Figure 2.1).

Figure 2.1: Distribution of Forests in the Russian Federation—all shaded areas are considered forested, with each color designating a specific type of forest ecosystem.



Source: <http://www.forestforum.ru/info/pictures/rusmap.pdf>

More than 60% of the world’s northern, or boreal, forests are located in Russia, and approximately 80% of these forests are coniferous (Lesniewska et al., 2008). The forests of Russia support annual growth estimated around 1 billion cubic meters (Backman, 1998). Recently, boreal forest ecosystems have become known for their ability to sequester large

amounts of carbon and are therefore of particular importance in the struggle to mitigate global climate change. According to the World Resources Institute (2005), current above-ground forest biomass in Russia contains approximately 35.1 billion tons of carbon equivalents and has a tremendous capacity to maintain high sequestration levels in the future. While the value of Russia's forests might be recognized internationally, Russia struggles to capitalize on this potential value, due to insufficient investments in technology, limited transportation networks with extremely high costs, and environmental and ecologic constraints associated with working in temperate and boreal ecosystems (Nilsson and Shvidenko, 1997). "A forest resource can be regarded as an asset in an economic sense only within a suitable framework of institutional arrangements" (Carlsson et al., 2000, p. 605). Despite the fact that Russia contains the largest area of natural forests in the world, its current share in the trade of world forest products is below 4 percent. "Forests occupy over half of the land of the country, but the share of the forest sector in the 2010 gross domestic product (GDP) was only 1.3 percent; in industrial production, 3.7 percent; in employment, 1 percent; and in export revenue, 2.4 percent" (UN FAO, 2012, p. viii). These low figures suggest that Russia's domestic forest sector has languished since the break-up of the Soviet Union in 1991.

Post-Soviet Russia's Forest Sector Trends

The territory of the Russian Federation is 6.5 million square miles, with forest resources spanning the entire length of the country east to west, as well as extending as far south as 43°, near Vladivostok in the Far East, and as far north as 69°, above the Arctic Circle, near Murmansk on the Kola Peninsula (Global Forest Watch, 2002). Firms in the Russian forest sector, like firms in any industry, rely on specific factors of production in order to transform inputs into outputs. Inputs most often fall under broad categories like land/forests, capital (buildings, equipment,

etc.), labor (human services, skilled and unskilled workers, etc.), and materials (raw natural resources, processed products, etc.) (Varian, 2006). Firms make decisions based on the availability of specific factors of production as well as many other factors, like access to markets, government regulations, and other societal, political, and social circumstances. The distribution of these factors of production throughout the territory of the Russian Federation is not consistent. While Russia’s forests extend across its landscape, its people do not; that is, not only are almost three quarters of the Russian population urbanites (Table 2.1), fourth fifths of Russia’s biggest

Table 2.1: Levels of urbanization across Russian economic regions, 1996 (percentages)

Russia	73.0
North	75.7
Northwest	86.2
Central	82.9
Volga-Vyatka	70.1
Central Black Earth	61.6
Volga	73.0
North Caucasus	55.0
Ural	74.5
West Siberia	71.0
East Siberia	71.4
Far East	75.8

Source: Shaw, 1999, p. 164

cities are clustered in western, also known as European, Russia (Shaw, 1999). Shaw (1999) notes, “the major aim of Soviet migration policy was to induce people to locate in areas of labour shortage, especially in resource frontier regions of the north and east” (p. 158). It is important to remember that the Soviet government often relocated people, settlements, and full industrial complexes for political, not economic criteria

(Thornton, 2011). While the government offered significant compensation for relocating people to live in remote places, “the lack of realistic measures of opportunity costs meant that, on the eve of the break-up of the former Soviet Union, everyone was in the wrong place and doing the wrong thing” (Thornton, 2011, p. 3).

Additionally, as the Soviet Union collapsed, many of the central government’s subsidies disappeared, and investments were halted and ignored (Thornton and Ziegler, 2002). Thornton (1996) estimated that in the first few years following the collapse of the Soviet Union, the forest products sector in Russia’s Far East was negative value-added at world prices—that is, “assessed

at world prices, the value of domestic output would not cover the cost of purchased raw materials alone, even if existing labor and capital prices were zero” (Thornton, 2011, p. 14). Thornton (1996) posits that in the early 1990s the forest products sector, in addition to the fishery and agricultural sectors, “cannot be competitive on the world market unless they accomplish significant technical change and improved efficiency” (p. 226). The Russian Federation’s total population declined 4 percent between 1990 and 2009, and population out-migration from remote regions, like Siberia and the Russian Far East, has become a serious problem. Population decline, mainly due to out-migration, was 7.4 percent in Siberia and 20 percent in the Far East (Thornton, 2011).

Thus, in the years since the break-up of the Soviet Union, an important component of Russia’s goals appears to be the renewed development of forest product industries as a source of productive and prosperous employment in many of the remote, forest-rich, areas of Russia.

Thornton (2011) notes:

With the drastic declines in industrial output, between 1992 and 1998, the share of the population with incomes less than a subsistence minimum rose from about one-quarter to more than one-third. However, the situation began to improve after 2000 as Siberian production responded to a four-fold depreciation in the ruble exchange rate, a re-monetization of the domestic economy, and rapid growth of world demand for Russia’s exports. Further, the drastic change in exchange rates allowed a recovery of import-substituting domestic production and increased the competitiveness of Russia’s exports (p. 17).

Between 2000 and 2007, there were gains in domestic production for many Russian forest products, like logs, lumber and wood-based panels (see Appendix A for a brief introduction to forest products terminology). In fact, production of roundwood in 2007 was higher than any post-Soviet production level thus far, exceeding 160 million cubic meters of roundwood (but still

far from Soviet-era levels). Between 2000 and 2007, sawnwood production increased by 47% and wood-based panel production increased by 120.8% (Global Trade Atlas, 2012). However, Russia's forest sector continued to remain under-developed and heavily reliant upon old infrastructure to achieve its advances.

Despite the aforementioned increases in production between 2000 and 2007, Russia's forest sector continued to struggle. Internationally, this prompted many people to question the economic role of Russia's forests. Timber in Russia is usually transported via roads or rail, but poor road quality and a limited rail network severely limit the geographic extent to which timber can travel cost-effectively. While high transportation costs are not unique to the forestry sector, wood is particularly heavy, and without a robust transportation network for freight, the extremely high transportation costs segments the Russian timber supply into eastern and western markets, a concept known as market segmentation. Short of being able to significantly lower these costs, one very important aspect of forest sector development is the ability for timber processing facilities to be located within reasonable proximity to the forests from which the logs are harvested. For this reason, regional processing capacity (the capacity each region has to process the amount of timber harvested within its jurisdiction) can be seen as an indicator for Russian forest sector development. Data from 2005 indicates, "in only two regions, the Northwest and Siberia, did [regional] processing capacity exceed 25%. In the remaining five regions, which possess about half of the country's available harvest, the processing capacity averaged just 6.6% of the actual harvest and just over 3% of the economically available timber harvest" (Eastin and Turner, 2009, p. 1) (Table 2.2). Given the low capacity to process timber regionally throughout Russia, the amount of timber that ends up being harvested is often lower than the maximum legal

amount allowed, or annual allowable cut (AAC). Additionally, with such a low capacity to process timber throughout the whole country, Russia has had no real alternative but to become an exporter of un-processed roundwood logs, which is tied to costs associated with transporting heavy logs long distances.

Table 2.2: Comparison of the actual harvest, available harvest and processing capacity in Russian regions

	Actual Harvest (million cubic meters)	Economically Available Harvest* (million cubic meters)	Ratio of Actual to Available Harvest (%)	Processing Capacity (%)**
Northwest Region	44	59	74.6%	38%
Center Region	10	19	52.6%	13%
South Region	.3	.5	60%	2%
Volga Region	20	36	57.2%	11%
Ural Region	10	37	27%	5%
Siberia Region	32	64	50%	25%
Far East Region	14	33	42.4%	2%
Total	130.3	248.5	52.4% (AVG)	14% (AVG)

Source: CIBC, 2007

*Quantity that is economically feasible to harvest in each region. Eastin and Turner (2009) note “the disparity between the actual harvest and the economically available harvest varies across regions in Russia and is correlated with the available processing capacity and the existing transportation infrastructure in each region” (p. 1).

**Percentage of regional harvest that can be processed within the regional wood processing sector.

By shifting its reliance on roundwood exports to more value-added wood products, Russia could increase employment in the timber processing sector and encourage the development of a more sustainable method of resource-use. This would be an effect of decreasing the processing and transportation costs associated with less-valued secondary wood pieces, like branches and woodchips, thereby making them more cost effective to use for end-use products like paper, pulp, and many wood-based panels. Additionally, if Russia could domestically produce more value-added wood products, it could substantially raise higher revenues and thus contribute more to the country’s GDP. “But such investment has not been forthcoming, primarily due to illegal logging, capital flight, and corruption” (Newell, 2004, p. 68). Current President and former Prime Minister Vladimir Putin stated, “*We strongly believe that our niche on the global market is in products with high-value added, including construction materials, paper and the like. New jobs should be created here in Russia, not elsewhere*” (Russian Federation, 2010, para. 9). The Russian government recognized that its forest sector could benefit greatly from investments, as domestic processing could generate benefits of spillovers, capturing value added, job creation,

skill upgrading, and increased competitiveness in its forest sector. A major obstacle for the Federal government was to devise policies that could at least bypass, if not stymie, the flagrant corruption, capital flight, and illegal logging, in order to attract new investments and bolster the domestic production of value-added forest products.

Government Support for Domestic Production of Value-Added Products

In 2006, at a meeting on forest sector development, President Vladimir Putin acknowledged the lack of domestic production by noting “processing facilities are needed...we are desperately short of processing capacity...there are not enough companies performing even minimum processing...and [Russia is] doing little to develop our own wood products and timber processing industry” (Russian Federation, 2006, para. 8). In order to make the forestry sector and timber industry more effective and competitive, Putin called for the prioritization of the following three initiatives: (1) establishing a stronger legal foundation for forest sector development via the passing of the new, more effective, Forest Code; (2) instituting structural change in the sector by helping small companies transition from logging to the establishment of developed processing; and (3) creating economic conditions that will make processing industries attractive to investors. “These issues are all interlinked,” stated Putin, “and if we fail to deal with one of them, we will fail to resolve the problem as a whole” (Russian Federation, 2006, para. 31).

Beginning in 2007, the Russian government began to implement a series of policies in order to accomplish Putin’s stated goals. In addition to making changes to the domestic forest policy, the Forest Code, in 2007, Russia announced a substantial increase to its log export tariff, which was

designed to reduce the export of roundwood logs. In 2008, Russia's Ministry of Industry and Trade (*MINPROMTORG*) adopted an initiative titled "Strategy for the Development of the Forest Complex to 2020," which formally enumerated the list of policies designed to encourage the development of a domestic processing industry. In addition to passing a new version of the Forest Code, two of the core initiatives were export taxes on roundwood and a domestic mechanism of subsidizing timber processing development as a way to attract investments, known as priority investment projects (MINPROMTORG, 2008). What follows is a brief introduction to each of the three 2007 policies that greatly affected Russia's domestic forest sector: the Forest Code, export taxes on roundwood, and subsidies for investments in infrastructure.

Changes to the Forest Code: With the collapse of the Soviet Union, the Russian forest sector has undergone significant changes in the last quarter century. The Soviet Union had a highly centralized forest management system that designated all functions related to forest use and management to be carried out by the state-run Forest Service. Thornton (2011) notes:

In the command era, administration of forests provided for centralized assignment of rights of use from Moscow, thousands of kilometers distant, centralized investment from the state budget, and transfer of workers to Siberia from other regions. The output targets of harvesters focused on quantity at the expense of quality and variety. The absence of stumpage costs and focus on labor and fuel costs led harvesters to deliver to final users only a small share of the timber actually felled and left in the woods. Production bases, called 'lespromkhoz,' used obsolete technologies and provided few amenities to workers (p. 23).

In 1993, the first formulation of a post-Soviet overarching forest policy was established, called the Forest Code of 1993. Two subsequent reformulations of forest policy have taken place—in 1997 and most recently, in 2006-2007. Each edition of the Forest Code tries to bring Russian policy closer to other countries' models of allowing individuals, companies and governments to

have as complete as possible exercise of property rights in forest lands (see Table 2.3 for a description of the development of jurisdictional changes in the system of land management for Russia’s forest fund). Despite this, the legacy of Soviet structures and processes still remains. The 2006 Forest Code continued the legacy of federal ownership of 92% of Russia’s forests (the entire Federal Forest Fund), but re-oriented many other structural aspects away from federal jurisdiction. Forest leases are offered through auctions to private companies, with lease rights now being the main means for timber harvesting. The minimum lease length is one year for uses such as mining or pipelines, but for forest management, the lease tenure can be from 10 to 49 years, with sub-leasing allowed. The move to decentralize forest governance was initiated by stripping the Federal Forest Agency (*ROSLESHOZ*) of much of their responsibilities and placing the Agency under the Ministry of Agriculture. The Federal Forest Agency was charged with fulfilling the duties of inventory, evaluation and monitoring of Russia’s forests (Lesniewska, 2008). This included overseeing pilot and full-scale projects, such as “monitoring using remote sensing, creating a central database for all forest users and logging permits, and devising a system of roadside checkpoints with electronic scanning” (Lesniewska, 2008, p. 11). In an effort to provide regions with more responsibility, the 2006 Forest Code stipulated that each province (or oblast, krai, respublik, or autonomous okrug) would need to create a provincial Forest Service with the responsibility of ratifying, implementing, and clarifying the laws expressed in the Federal Forest Code.

Table 2.3: Jurisdictional Changes in the System of Land Management for Russia’s Forest Fund

Levels and Functions of Management		Foundational Forest Legislation, 1993	Forest Code, 1997	Federal Law No. 122 of 8/22/2004	Federal Law No. 199 from 12/31/2005, Forest Code, 2006
Russian Federation	Constitutive / Right establishing	+	+	+	+
	Property management	0	0	+	0
	Supervisory / Oversight	+	+	+	+
Subjects of the Russian Federation	Constitutive / Right establishing	0	+	0	+
	Property management	0	+	0	+
	Supervisory / Oversight	0	0	0	0
Administrative Regions	Constitutive / Right establishing	0	0	0	0
	Property management	+	0 or +	0	0
	Supervisory / Oversight	0	0	0	0

(+) - function exists, (0) - no function exists, (*) - limited opportunities

Source: World Bank, 2011

The provincial forest services are split into three separate departments: forest management, inspection and monitoring, and commercial institutions. First, the department of forest management is charged with administration and forest management. Previously, “there were 3,500 forest district units (known as *leskhoz*s) that specialized in management logging and processing which have now been abolished. The new 2006 Forest Code replaced it with the ‘*lesnichestvo*,’ a forest district with no right to undertake commercial harvesting or processing operations, responsible only for administration and forest management” (Lesniewska, 2008, p. 12). Second, the department of inspection and monitoring is tasked with forest patrols and monitoring the general condition of the districts’ forests. These tasks were previously done by each district’s *leskhoz*, however now that these tasks are administered at the provincial level, in addition to many fewer workers appointed to this job, there has been an overall reduction in forest oversight. The third and last of the departments are the commercial institutions which are only loosely under provincial oversight. That is, each province has set up a commercial enterprise that maintains its autonomy as an independent company, but employs many of those who used to work for the *leskhoz*s.

Increased Export Taxes on Roundwood: On February 5, 2007 the Russian government announced an *ad valorem*, or percentage-based, export tariff on roundwood which would increase incrementally each year. By instituting an export tax on unprocessed wood, the Russian government intended to decrease exports of raw wood in order to increase its price abroad and lower its relative price domestically, thereby directing log sales into the domestic market to encourage domestic roundwood use and production. As of January 1, 2007, the Russian Federation’s tax on roundwood had been 6.5%. However, by July 1, 2007, the tax increased to

20% and by April 1, 2008, the tax again increased to 25% (CIBC, 2007). While the government's goal ultimately had been to raise the tax rate up to 80% by January 2009, Russian authorities announced in November 2008 that they would delay the increase to an 80% log export tax indefinitely. Citing the rapidly deteriorating global financial crisis, the government maintained that the tax rate would remain at 25% for both softwood and hardwood logs.

Subsidies for Infrastructure Investments: While the Ministry of Industry and Trade of the Russian Federation (*MINPROMTORG*) passed its Strategy in 2008, two of its key elements had already begun in 2007: subsidies for processing infrastructure, known as priority investment projects, and export taxes on roundwood. With the passing of Federal Resolution No. 419 on June 30, 2007, priority investment projects were established to encourage the development and modernization of wood-processing infrastructure throughout all of Russia. Status would be given to projects that had an initial investment of no less than 300 million rubles (*MINPROMTORG*, 2008). Additional perks are given to projects that are selected for priority investment project status, like allowing projects to bypass public auctions as a way of attaining forest land (Bloom, 2010; UN FAO, 2012). Two additional resolutions have been passed—No. 53 February 2nd, 2010 and No. 450 on June 8th, 2011—which stipulate additional selection criteria as well as detail exceptions given to priority investment projects (*MINPROMTORG*, 2012). Post-hoc additions include: (1) requirements for more thorough detail in project applications concerning project planning, financing, and specific forest resource management and harvesting, and (2) a requirement that the Federal Forest Agency (*ROSLESHOZ*) must give their full agreement prior to the approval of each investment project (*ROSLESHOZ*, 2011).

Conclusions

While it is difficult to entirely separate the effects that each of these three major policies have had on the Russian forest sector since 2007, this thesis identifies the most salient features of MINPROMTORG's 2008 Strategy in order to evaluate whether Russia has been successful at bolstering domestic value-added wood production and exports. Since the break-up of the Soviet Union, Russia's attempts to write and enforce forestry laws effectively have been a major obstacle (Bloom, 2010). The imposition of policies (e.g. roundwood export taxes and production subsidies) that try to directly influence Russia's position as an exporter of logs has been a visible attempt by the government to institute trade barriers as a way to alter its domestic economy. Russia's path to success, in this regard, has been heavily scrutinized since, more generally, the institution of trade barriers on unprocessed logs (either in the form of an export tax or ban) has been utilized by many developing nations globally. Unfortunately, many of these countries have struggled to achieve their goals despite the fervent justification of the use of export restrictions on roundwood. Therefore, before it is possible to evaluate the short-term effectiveness of these policies with respect to helping Russia achieve its value-added production and export goals, the following chapter highlights the most significant forest policy and trade economic literature that informs the evaluation of these policies.

3) Theory and Literature Review

Government policies often change the opportunities and incentives that people and businesses face, and as a result, some groups may do better than others. The forestry sector is no exception. In order to assess the short-term effectiveness of Russia's 2007 initiatives, this research draws heavily on previous theory and literature from several sub-fields within the discipline of economics. Theory from the field of forest and natural resource economics offers an understanding of the decisions that individuals and companies face with regard to harvesting timber. Theory from the field of development economics informs a discussion of the political economy of the Russian government's general interest to increase its exports of value-added forest products. Moreover, trade theory informs an analysis of Russia's imposition of export taxes on roundwood and its institution of subsidies for investments in value-added timber production. Within trade economics, there is a subset of literature on trade in natural resources, or primary commodities. Of particular relevance for this research are the economic and policy analyses that directly relate to the institution of export restrictions on unprocessed roundwood logs, a common policy used by many forest-rich countries.

The effectiveness of export restrictions on primary commodities (of which roundwood log export taxes are one example) in helping to achieve a country's stated development goals is a complicated matter. Export restrictions may help a country in the short-term, but also may lead to net economic losses. Thus, export restrictions continue to be debated heavily, particularly on an individual country basis. While this literature review does not address the justifications or analysis of other countries' specific circumstances with regard to the imposition of roundwood export taxes or bans, a discussion of the many sides of the debate is reviewed in this chapter,

with specific attention paid to the details of Russia's export tax policy. This chapter will first introduce issues related to the economics of timber harvesting in Russia, and then briefly discuss the political economy of Russia's goal to increase its exports of value-added forest products. A detailed discussion of the theory and literature that specifically addresses Russia's use of export taxes and federal subsidies for the development of its forest sector will end this chapter.

The Economics of Timber Harvesting in Russia

Timber harvesting during the Soviet Union, and for the first several years following the break-up of the Soviet Union, suffered from major inefficiencies (Brown and Wong, 1993). Brown and Wong (1993) describe the implications of achieving efficiency in harvest levels under a quasi-decentralized system: "while a local agent is free to choose the values of some variables, other variables whose values are needed to achieve an optimal harvest are controlled by the central government...even if the goals (such as production levels) are accurately specified to maximize some national objectives (such as welfare), there remains a lot of room for the regional units to choose the type of production process to satisfy its own objective and at the same time fulfill the assigned goals" (p. 212). Since the break-up of the Soviet Union, Russia has attempted to fully decentralize its forest harvesting decisions through several editions of its Federal Forest Code. The most recent redaction, the 2006 Forest Code, attempted to correct the problems of inefficient quasi-decentralization (Hitztaler, 2011).

Yet, when looking at the economic determinants of timber supply, economic theory suggests using the Faustmann Rule (Deacon, 1986). The Faustmann Rule allows forest managers to determine a timber stand's optimal rotation age "for a stand under infinite rotation or from a

single rotation period” (Wendland et al., 2011, p. 1291). The Faustmann Rule is used to determine the optimal age at which to cut a stand of timber and is determined with respect to time preference (that is, the discount rate) when the relative value of the stand’s growth rate is equal to the interest on the value of forest capital invested in timber and land (Pearse, 1990). However, there are many assumptions of the Faustmann Rule that do not appear to hold true in the case of forestry in Russia. In post-Soviet Russia, there continues to be a distinct lack of well-defined property rights as well as a lack of enforcement on the rights that are defined by law. There are many lease concessions that last little more than the duration of timber harvesting operations, and the industry structure provides separation of firms from inter-temporal forest management decisions (Lesniewska et al., 2008; Hitztaler, 2011). Nevertheless, the microeconomic theory that the Faustmann Rule relies upon is still very relevant. Firms receive forestland concessions on land that has standing trees. Since there is no shortage of forests in Russia there is little incentive for timber firms to lease land that has anything other than mature forest (typically, this means forest stands that have an average periodic annual increment [PAI] that is already less than its mean annual increment [MAI]²). The Faustmann Rule’s main objective of identifying an optimal rotation age is rendered moot, in this case, since no ‘rotation’ exists *per se*. (Note that the Faustmann Rule abstracts from any environmental value of the forest).

Individual firms seek to maximize their return on investment (ROI), which depends on the rate of return from the given forest stand compared to the interest rate and the rate of return elsewhere in

² By calculating a tree’s average annual productivity, or rate of growth, (known as, mean annual increment, MAI) and comparing that to a specific period of that tree’s growth, or periodic annual increment, PAI, one can determine the current and previous rates of productivity of the tree. When MAI and PAI are graphed together, the point at which they intersect is known as the biological rotation age since it is the age at which a stand should be harvested if it were managed to maximize long-term sustainable yield (provided stand regeneration is either natural or done by human replanting) . When PAI is greater than MAI, the tree is still growing and has not yet reached maturity. When PAI is less than MAI, the tree is past maturity.

the economy. A firm will seek to maximize its rate of return by maximizing net present value (NPV) in order to determine if the investment is worthwhile. Net present value is equal to present revenue less present costs. Thus, a profit maximizing firm will seek to maximize its revenue and minimize its costs. While there are many contributing factors to the benefits and costs of doing business in Russia, in general, the costs of doing business can often outweigh potential revenue, and thus can sometimes make forest sector operations and new investments far from lucrative. Nijnik (2004) notes:

On the one hand, financial returns in forestry are commonly low. There are high risks with investing in silvicultural activities, e.g. due to possible forest fires or frequently insecure property rights. Hence decision making on long-term investments in forestry under risks and uncertainties tend to encourage the employing of a rather high value of discount rate in order to ensure securing the benefits of timber extraction now rather than later (Samuelson, 1961) (p. 411).

As was mentioned in the previous chapter, the costs associated with operating in the Russian forest sector are many: attributable to transportation costs, aging infrastructure due to a lack of investments, and bribery and corruption (Newell, 2004). By striving to lower these associated costs of ‘doing business’ in the forestry sector, the Russian government hopes to instigate newer investments and to improve its forest industry’s competitiveness.

The Political Economy of Russia’s Forest Sector Competitiveness

There has been much discussion about how a country’s endowment of forests and economic activity can affect exports of various forest products (Uusiruori and Tervo, 2002). Despite Putin’s belief that Russia has a comparative advantage in value-added forest products, specialists raise doubts (Turner et al., 2008). “Competitiveness in economics usually refers to the ability of countries, industries, or firms to prosper in certain market conditions. It is an elusive concept,

with few clear indicators” (Makela, 2009, p. 6). That is, the economic indicators most often used to assess export-oriented competitiveness “do little to measure the potential competitiveness of a country, but rather assume that the potential has already been realized and is therefore evident in its current export statistics” (Makela, 2009, p. 11). The ability to export profitably depends on domestic costs and on the prevailing exchange rate.

Makela’s (2009) findings are particularly relevant since the data used for the study are from 2006, immediately prior to Russia’s forest sector development initiatives. Having analyzed this specific point in time, given the policy changes that followed, Makela’s 2009 analysis interjects an important development into whether Russia *had* any comparative advantage³ in any of its processed forest sector products. Makela (2009) makes some rudimentary observations regarding what kinds of Russian wood products had the highest revealed comparative advantage (RCA)⁴ in 2006. Makela (2009) finds that “the most competitive products in the Russian forest sector are products that require little processing” with roundwood logs having the highest RCA value (harmonized commodity system [HS] code 4403⁵) (Table 3.1) (p. 32). Yet, it should be noted, also, that Makela (2009) finds Russia to be relatively competitive in railway sleepers (HS Code 4406), sawnwood (HS Code 4407), and plywood (HS Code 4412). Makela (2009) notes:

While Russia’s forest products are not particularly developed, as could be seen from their RCA indicators, Russia had not been ‘left behind’ in terms of modernization either. Russia’s export basket represents the type of export basket a country in that development state would export. This does not mean that trade policy could not be used to improve Russia’s situation, but it does mean that Russia’s current level of export sophistication is by no means unusually low. (p. 39-40)

³ It should be noted that this research, as well as Makela (2009) explicitly uses the economic notion of David Ricardo’s comparative advantage, and is not to be confused with Michael Porter’s business notion of ‘competitive advantage’ which, often, is also used as an analytical framework in forest sector research.

⁴ The RCA indicator is calculated using trade statistics and is an index used for identifying the relative advantages of specific goods in specific countries relative to other goods and other countries.

⁵ This research is specifically devoted to researching those forest products that fall under HS Code classification series beginning with ‘44’—defined as ‘wood and articles of wood’

Table 3.1: Products with the Highest RCA Indicator in the Russian Forestry Sector calculated using 2006 prices, quantities, and exchange rates.

Harmonized Commodity System Code (HS) #	Heading	RCA
4403	Wood in the rough or roughly square	12.73
4406	Railway or tramway sleepers (cross-ties of wood)	5.10
4407	Wood sawn or chipped lengthwise	2.79
4801	Newsprint, in rolls or sheets	2.47
4702	Chemical wood pulp, dissolving grad	2.20
4704	Chemical wood pulp, sulphite, other	2.03
4412	Plywood, veneered panels and similar	1.78
4910	Calendars of any kind	1.54
4703	Chemical wood pulp, soda or sulphat	1.42
4804	Uncoated kraft paper and paperboard	1.16

Source: Makela, 2009, p. 32

A discussion of Russia's desired ability to increase its welfare as a result of specific government policies (the 2007 initiatives) should acknowledge the parallels of historical lessons from other countries (see WTO, 2010, p. 131 for a more thorough discussion of international comparisons). That is, the institution of forest sector development policies by countries that appear to lack a clear basis for developing an export-oriented competitiveness in wood processing tends to result in an inefficient wood processing sector that is unable to compete internationally without the continued provision of subsidies over the long-term (Eastin and Turner, 2009). Previous studies indicate that promotion of log export restrictions can indeed promote value-added processing and exports for foreign exchange (Varangis et al., 1993; Goodland and Daly, 1996; Resosudarmo and Yusuf, 2006; Solberg et al., 2010); but there have been empirical studies that have shown, in specific instances (like in Indonesia, Ghana, and Costa Rica), that a country's overall level of economic welfare has declined as a result (Resosudarmo and Yusuf, 2006; Kishor, et al., 2004; Perez-Garcia et al., 1997; and Manurung and Buongiorno, 1997). Thus, the following section is a discussion of the specific type of economic policy instrument that is frequently imposed by

governments wishing to develop value-added timber processing, and of the resulting economic outcomes from their imposition. With regard to Russia, Makela (2009) concludes:

Russia has so far focused on the low end processing part of the forest industry: roundwood, sawnwood, and pulp. It is now attempting to transform its industry toward more value-added products, but it is a relevant question to ask whether this would necessarily even be desirable. The aim to develop production toward high levels of sophistication makes sense, particularly as Russia possesses vast natural resources and hence a natural advantage in the field. Still, the transition the industry currently faces may make a transition from raw materials to processed goods production unprofitable at least in the short term. (p. 40-41)

It should be noted that there is a trade-off between the reductions in transport costs and the costs of maintaining processing facilities and supporting a labor force in remote, northerly locations.

Economics of Export Taxes on Roundwood⁶

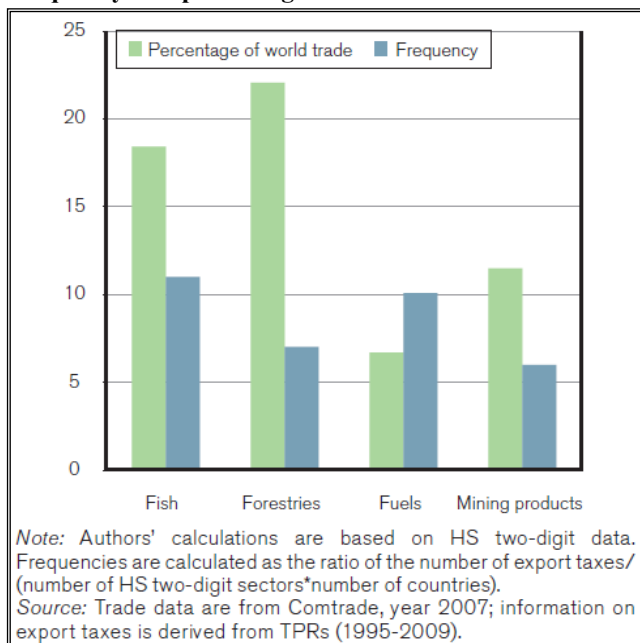
The large global presence of export restrictions on primary commodities, that is, any good in an unprocessed state, suggests that they are a common policy instrument utilized by regulators (Figure 3.1; see the 2010 OECD publication ‘*The Economic Impact of Export Restrictions on Raw Materials*). Trade theory tends to focus on the robustness of arguments for export taxes and their economic implications. Piermartini (2004) addresses both of the above factors in a review article for the World Trade Organization on export taxes on primary commodities. Piermartini describes and systematically evaluates each of the following justifications that countries primarily use for imposing export taxes: the terms-of-trade argument, stabilization of domestic prices, controlling inflationary pressures, the infant industry argument, retaliating to tariff escalation in export markets, and importance as a source of government revenue collection. The

⁶ See Appendix B for a model of Russia’s export taxes on roundwood in its domestic economy and a graphical partial equilibrium trade model explaining the economic effects of Russia’s export tax on roundwood and trade with China.

infant-industry argument (*sensu* J.S. Mill’s 1904 treatise ‘Principles of Political Economy’) is the only argument that economists concede may necessitate the imposition of an export tax. The

argument goes as follows: “countries that specialize in lower value-added sectors will be locked

Figure 3.1: Export taxes by natural resource sector – frequency and percentage of world trade



Source: WTO, 2010

into a production structure that entails lower growth rates than those of countries specialized in higher value-added sectors”...and thus, “temporary protection or subsidization of a newly established domestic manufacturing industry that is less productive than foreign industries is seen as a way of trying to develop a comparative advantage in that industry” (Piermartini, 2004, p. 11).

In general, however, export taxes are considered blunt policy instruments that create a wedge in domestic and world market prices and can cause net distortions in the form of negative net efficiency losses to societal welfare and income distribution. Instituting structural reforms would be most effective, and thus export taxes are often considered a second-best option for policy-makers. This is to say that from an economic efficiency perspective, developing efficient financial markets, improving the tax administration system, developing better institutions with well-defined and enforced property rights, and building a functioning legal system are the logical first-best options for policy-makers. With respect to the forestry sector, this includes auctioning off rights to harvest individual stands of timber—for example, collecting rents—at market

competitive prices. However, many developing countries struggle to bring about such reforms and thus, in the absence of domestic capabilities, try to exert influence at the border where commodities are more easily tracked, and hence taxed. Standard trade analysis would suggest a production subsidy for processing as a tangible, first-best, option in lieu of export taxes.

Piermartini (2004) thus concludes that export taxes may be justifiable as a short-run, second-best policy. “The overall consequences of maintaining export taxes for longer than their short-term justification warrants are efficiency losses, lower welfare and lower growth in the long run” (Piermartini, 2004, p. 20).

Goodland and Daly (1996) offer an explanation of why countries impose export taxes and bans despite economists’ fervent warning of their inefficiencies. Their analysis provides several important points that shed light on the rigidity of only using neoclassical economic analysis to understand why export restrictions are commonly utilized. First, the debate, they state, is “difficult because the argument against [log export restraints] relies so totally on counterfactual projections: what may possibly have happened in the absence of the [log export tax restraint]” (Goodland and Daly, 1996, p. 189). Second, they posit that the neoclassical approach tends to evaluate these policies based on their ability to achieve ‘global allocative efficiency’ and fails to account for a national perspective on development. That is, if nation-states strive to better their own position globally, in order to do so, they may need to choose a second-best policy from the perspective of net global efficiency. In terms of prioritizing national development, Goodland and Daly (1996) point out that an initiative that seeks to improve domestic processing efficiency offers more for development than just exporting logs. They note how a high log export tax may, in some cases, improve the infrastructure and efficiency of domestic processing.

The "infant industry" argument is put forth by countries to justify the institution of tariffs so as to temporarily provide support for under-developed domestic industries so that they can grow stronger and eventually become internationally competitive. Economists concede that there are specific instances that can justify the imposition of trade barriers. For example, in certain cases the infant industry argument may be justifiable if, and only if, the country imposing the export restraint has the ability to raise world prices, and be considered a 'large' country or 'price maker' on the world economy. Even then, economic theory indicates that trade barriers "evoke both positive and negative effects: there is a positive terms-of-trade effect and a negative efficiency effect" (Piermartini, 2004, p. 4). The total net effect on a country's welfare can depend upon the size of the terms-of-trade and the efficiency effects. Additionally, history indicates that there can be crippling effects to using high barriers to trade beyond the short-term, like sustained government subsidies that just barely maintain an inefficient wood processing sector's international competitiveness (Eastin and Turner, 2009).

If a country possesses some monopoly power on the exports of a commodity—that is, a price-maker—then there exists some positive optimal tax rate that would increase the country's welfare. Determining whether Russia exhibits monopoly power on the supply of timber depends upon the perceived elasticity of demand for Russian exports of roundwood. Piermartini (2004) warns that overestimating the elasticity of demand, and hence choosing an export tax rate that is too high, can have a large negative effect on welfare⁷. The Russian government recognizes that it

⁷ Perceived elasticity of demand is the perceived responsiveness or sensitivity of consumers to changes in the price of a good. The Lerner Index, or price markup, $\frac{p-mc}{p} = -\frac{1}{\epsilon}$, where p is price, mc is marginal cost, and ϵ is elasticity, measures the ratio of the difference between price and marginal cost to the price and is a convenient way to show how the elasticity of demand affects a monopoly's price relative to its marginal cost. Values of elasticity of demand between 0 and -1 are considered inelastic or relatively inelastic. Elasticity of demand values between -1 and negative infinity represent elastic, or relatively elastic, demand. The more elastic the demand curve the less a monopoly can raise its price without losing sales. Thus, Piermartini's caution of overestimating the elasticity of demand refers to estimating that the demand curve is less elastic, since an inelastic demand curve would have a smaller negative value.

could benefit greatly from supporting a domestic timber processing industry and finds it imperative to institute specific policies which it thinks will support investment in processing infrastructure. There is ample debate over whether export taxes on primary commodities positively or negatively affect a country's economic and social welfare, national development of specific industries, terms-of-trade with other countries, and rates of environmental degradation. In general, if a country is selling into a competitive market, then the incidence of the export tax falls on domestic producers—although domestic producers may have implicit subsidies in the absence market-determined stumpage fees on their access to timber. Thus, Piermartini (2004) identifies that without monopoly power on exports, the expansion of value-added through export taxes will typically reduce economic welfare.

Since the increased imposition of Russia's export tax on roundwood in 2007, there has been economic literature (Khramov et al., 2008; Makela, 2009; and Tarr, 2010) devoted to discussing if there is an optimal roundwood export tax level for Russia in relation to Scandinavian demand. Tarr (2010) posits that it is likely that Russia possesses some monopoly power on the exports of timber. Khramov et al. (2008) identify that Russia does possess some monopoly power on exports of roundwood logs to Finland and Sweden and thus derives an optimal tax level to be 11.5 %. This is much lower than the current export tax rate of 25%. While Russia exports various quantities of roundwood to different countries, those quantities of Russian logs represent a specific percentage of each country's total imports. Thus, each country relies on (demands) Russian roundwood imports differently, at varying prices and quantities. Determining an optimal export tax rate requires derivation of the perceived price elasticity of demand for Russian exports of roundwood in specific markets, which, depends upon how price sensitive consumers

(countries, in this case) are to Russian roundwood. Tarr (2010) notes that for markets in close geographic proximity to Russia, the role of Russian roundwood is typically even more significant. As of yet, there have been no studies determining optimal tax rates for Siberian and Russian Far East timber exports to Asia, and principally China. There are several factors specific to Russia's exports to China that can make any potential calculation of China's perceived elasticity of demand for Russian roundwood particularly difficult, since calculation relies on trade statistics and transport costs.

That is, using official customs trade statistics, the proportion of Russian exports destined for China is large; however, actual exports appear to exceed officially reported exports. The Russian-Chinese timber trade is known to have a high instance of illegal logging, which includes both illegal harvesting of Russian logs as well as illegal trade into China. "According to *ROSLESHOZ* [The Russian Federal Forest Agency] official figures, illegal logging in 2010 totaled 1.3 million cubic metres... this volume represents less than 1 percent of the total wood harvest in the country and meets the best international standards in the forest sector...[yet,] according to Worldwide Fund for Nature (WWF) Russia and World Bank estimates, up to 20% of logging in Russia (about 25 million cubic metres) is of illegal origin. The total amount of budget loss as a result of this illegal activity may reach 13-30 billion rubles annually" (UN FAO, 2012, p. xi-xii). Although the Russian government says it complies with best international standards with regards to illegal logging, publications from organizations like WWF (2013, 2011a, 2011b, 2004), Forest Trends (2009, 2007a, 2007b, 2006, 2005, 2004), Greenpeace (2006, 2002), and Environmental Investigation Agency (2012, 2007) as well as academic literature, like Robbins and Perez-Garcia (2012), and Krkoska and Korniyenko (2008), suggest that the

movement of illegal logs between Russia and China is a major concern. On the 25th of February 2013, the director of WWF Russia, Igor Chestin, and *ROSLESHOZ* department head, Alexander Mariev, held a press conference together in Moscow on illegal logging in the Russian Far East and Russia's trade with China⁸.

Acknowledging the degree of illegal logging between Russia and China necessitates recognizing that official trade statistics are an underrepresentation. Indeed, trying to calculate China's perceived elasticity of demand for Russian roundwood using only official statistics would yield an artificially high elasticity of demand value, thereby making it seem as if a lower export tax rate would be optimal. There are many points along the supply chain of logs (i.e. harvesting, scaling, transportation, processing, etc.), that logs themselves, their sourcing documentation, or their reported quantity or value can be altered in order to obfuscate reality. Deriving estimates of illegal log flows is very difficult and depending on what point or flow of the supply chain is scrutinized, the scale of the problem can widely vary. For instance, in attempting to better understand China's reliance on log imports, Robbins (2011) notes:

Using officially reported product statistics, combined with reasonable input-output coefficients for production [in China], it is estimated here that actual timber consumption [in China] exceeded officially reported consumption by approximately 45% in 2007. Total consumption of coniferous and non-coniferous logs, if calculated using official statistics, was between 91-102 million CUM [cubic meters] in 2007. However, using the [CINTRAFOR Global Trade Model], consumption is calculated to have been more than 132 million CUM. While lumber and sawnwood production grew over the past decade by an average 21% and 19% per year, respectively, log consumption reportedly grew only by 6% per year. This seems doubtful. This discrepancy is likely a result of underreporting in both domestic log production and import volumes (p. 130).

Nevertheless, it is important to point out that there is competition between exporters of timber from Russia, which draws down the ability of Russian firms to exploit any monopoly power that

⁸ <http://pressria.ru/media/20130225/601426352.html>

may exist. If Russia exhibits some monopoly power in its roundwood markets, then an export tax could be used to extract the monopoly rents from Russia as a whole (Tarr, 2010). Meanwhile, Eastin and Turner (2009) identify how Russia's export tariff affects global markets and Tykkylainen and Lehtonen (2008) focus their analysis specifically the impact the export tariff has on Finland's border economy. Turner et al. (2008), and Solberg et al. (2010) address how Russia's export tax on roundwood could impact Russia's domestic forest sector as well as timber markets globally.

Turner et al. (2008) model Russia's export tax using the Global Forest Products Model [GFPM], to offer insight into Russia's role as a major roundwood supplier. Turner et al. (2008) conducted their analysis at the time when Russia was still considering an 80% tax rate—as well as prior to any knowledge of the impending global financial crisis—and thus they evaluate the change in world production, trade and prices in 2020 with no export tax and with an 80% tax rate. Despite the fact that the tax rate never increased past 25%, their findings are still valuable. In particular, Turner et al. (2008) find that the “main impact of Russia's imposition of an export tax would be an 18% reduction in the global trade of industrial roundwood” (p. 158). The reduction in trade and concurrent decrease in production as a result of the export tax would result in an increase in the global price for roundwood (Turner et al., 2008). Meanwhile, they find that within Russia's domestic economy, there would be “a 15.5% lower price of industrial roundwood” (p. 158). These effects suggest that Russia does maintain some monopoly power on roundwood exports, and thus that the incidence of the export tax would not fall exclusively on Russia, but also affect the world price of roundwood.

Solberg et al. (2010) set out with similar aims to Turner et al. (2008) but instead of using the GFPM, they use a global trade model developed through the European Forest Institute, EFI-GTM. They explicitly state that their analysis “differs from Turner et al. (2008) in a least three ways” (p. 18). Solberg et al. (2010) look at Russia’s export tariffs as they exist closer to reality – that is, they consider not just softwood roundwood exports—which was the unit of analysis for Turner et al. (2008)—but also non-coniferous roundwood and consider the roundwood taxes at several different tax-rate scenarios. Additionally, Solberg et al. (2010) consider “the potential improvement in the investment climate in Russia” in their model scenarios (p. 19). By running six scenarios, Solberg et al. (2010) find that “the tariffs alone bring in about a 10-15% increase in the sawnwood production in Russia over time compared to [the no tax scenario]” (p. 20). Their model does divide Russia into two segments, European, and Asian Russia, and they note “the effectiveness of the export tariffs also comes into question in the Far East, where Chinese trades may accept roughly processed logs to meet Russian export requirements...[and that] policies having positive effects on the investment climate would be even more vital for the Russian forest industries than the export tariffs” (Solberg et al., 2010, p. 22). Thus, understanding the dynamics of sectoral production and investments regionally are important to evaluating Russia’s progress with achieving its broader forest sector goals.

With regard to value-added production capability and investments, Russia’s hope for renewed domestic and foreign investments in its domestic forest sector was no secret; in fact, revitalizing the aged forestry sector with new capital investments and technological innovation was one of the central concepts in *MINPROMTORG’s* 2008 Strategy. The institution of a direct large-scale mechanism for subsidies for investments in timber processing infrastructure, called ‘priority

investment projects’, was designed to bring international forest sector processing capabilities to Russia. However, in addition to these direct production subsidies, economic theory suggests that Russia’s imposition of export taxes can instigate development of timber processing industries in two ways. First, export taxes “effectively subsidize downstream industries because it allows them to source inputs at a lower price than otherwise prevailing in the international market” (Ruta and Venables, 2012, p. 15) and can create an indirect feedback effect on domestic processing (See Appendix B for a discussion of the feedback effect). Second, the export tax can indirectly increase investments by way of ‘tariff-jumping foreign direct investment (FDI)’. Economic theory (Brander and Spencer, 1987; Wong, 1995) and policy research (WTO, 2010) have shown that the imposition of tariffs can lead to increases in foreign direct investment. That is, one option for resource importing countries to maintain access to natural resources involves circumventing (or ‘jumping’) the export taxes by investing in the exporting country’s resource sector (WTO, 2010). The importing country’s investments in the resource-exporting country can take the form of acquisitions and mergers in addition to foreign direct investment and are directed towards initiatives that are involved in the production or processing of the raw material (WTO, 2010). Effectively, this allows companies in resource-importing countries to ‘jump’ the higher tax rates on unprocessed raw materials, while also helping to instigate foreign investments in domestic processing infrastructure. While it is no surprise that Russia struggled to attract FDI to its domestic forest sector throughout the 1990s, Nilsson and Soderholm (2002) identify:

Governments attempting to encourage FDI must make sure that an effective legal system is in place, one in which property rights are unambiguous and secure. However, given the legacy from the communist past, it may be difficult for the Russian Government to make credible commitments to new property rights laws [...] In most transition economies there is a major difference between formal property rights and de facto property rights. [...] In particular, our findings confirm that the ambiguous legal system has played an important role in deterring FDI flows into the sector...[and] an important aspect of this problem is

the lack of clear delineation of authority between federal and local governments in Russia (p. 312).

MINPROMTORG's 2008 Strategy acknowledges many of these issues and presents some institutional and legal reforms that Russia must undergo in order to have its suite of policies work in coordination with each other and help develop and modernize Russia's forest sector.

Conclusions

This chapter has highlighted some of the most pertinent theory and literature related to Russian forest sector management and development. The incentives that companies face with regard to leasing and harvesting have been altered by Russia's roundwood export tax and subsidies for processing infrastructure. Having emphasized some of the economic and political justifications for the imposition of export restraints on raw materials in this chapter, it is important to point out that many aspects of Russia's roundwood export tax continue to be evaluated and debated within Russia as well as abroad. Goodland and Daly's (1996) reminder that policies can be evaluated at different (i.e. global, regional, national) resolutions of efficiency is particularly apt since this research prioritizes Russia's national development by focusing specifically on the short-term efficacy of Russia's domestic forest sector development since the implementation of Putin's priorities in 2007. The analysis that follows is results-oriented and focuses on Russia's ability to increase more value-added processing and exports as well as attract investments into its timber processing sector.

4) Pre- and post-2007 Forest Sector Trends

In order to discuss some of the short-term dynamics of the domestic forest sector since the implementation of Putin's priorities in 2007, it is first necessary to provide a brief background. This chapter is split into three sections, with the first section addressing domestic forest sector trends prior to the adoption of the Russian government's initiatives in 2007. The second section then evaluates forest sector trends between 2007 and 2011—including investments, production and exports. The expansion of government subsidies for investments in processing infrastructure called priority investment projects is discussed first. Since the intention for these subsidies was to help modernize and develop Russia's domestic processing industry, domestic forest sector production trends will then be presented. After that, export trends for Russia's forest products are discussed with specific attention paid to the increasing regional dynamics between Russia's eastern and western markets. This second section concludes with a discussion of specific short-term trends associated with Russia's forest products trade with China.

The third and final section of this chapter addresses Russia's 2012 accession to the World Trade Organization (WTO). By juxtaposing Russia's short term forest sector trends with its recent WTO entry, this section highlights how Russia's forest sector policies have been a topic of international debate. Particularly relevant for the medium- to long-term effects of domestic forest sector development is how Russia's WTO accession is expected to affect its goals for its forest sector.

Trends between 2000 and 2007

Throughout the 1990s and first decade of the 2000s, the lack of investments in infrastructure, transportation, and timber processing limited the modernization of the forest industry (Newell, 2004). In 1998, the same year that Russia defaulted, widespread flooding in China caused the implementation of a Chinese Natural Forest Conservation Program that led to a significant decrease in the harvesting of domestic forests within China. In the four years from 1999-2002 this policy caused a tripling of Russian logs exports to China (Newell, 2004) and more generally from 1953 to 2000, China's dependence on timber imports has increased by roughly 9000% (Cheng et al, 2010). Eastin and Turner (2009) show that from 2002 to 2008 China's share of Russian softwood log exports jumped from 45% to 71%. While there were domestic production gains for many forest products between 2000 and 2007, Russia's forest sector continued to remain under-developed and heavily reliant upon old infrastructure to achieve its advances.

Production Trends between 2000 and 2007 (FAOSTAT, 2012): Domestic forest industry production trends between 2000 and 2007 indicate increases in logs, lumber, and wood-based panels. Between 2000 and 2007 average production of softwood logs increased by 77.6% to reach just over 120 million cubic meters in 2007. Average production of hardwood logs increased by 40.5% during that time and in 2007 almost reached 42 million cubic meters. Thus, 2007 total roundwood production surpassed 160 million cubic meters, which was the highest of any post-Soviet production level, but still fell short of Soviet-era production levels—in 1989 roundwood production reached 286 million cubic meters (Backman, 1998). Between 2000 and 2007, total sawnwood lumber production increased by 47.1% with 2007 levels reaching 29.4 million cubic meters. Production of coniferous sawnwood increased by 51.8% while that of non-

coniferous sawnwood only increased by 14.6%. Between 2000 and 2007, Russian production of wood-based panels increased dramatically (120.8%). Strong production growth was led by veneer (582.9%), particleboard (135.6%), fiberboard (116.9%) and plywood (87.1%). While these trends might seem to suggest that Russia's forest sector was not in need of overhaul, it is important to remember that domestic production remained severely limited in 2000, just 2 years after the Russian ruble was devalued by 40% and Russia defaulted on its debt.

Export Trends between 2000 and 2007 (Global Trade Atlas, 2012): From 2000 to 2007, Russia's share of the global quantity of log exports increased from 11.5% to 31.0%, which amounted to export revenue of \$4.1 billion in 2007. In 2006, Russian roundwood exports peaked at 51 million cubic meters (Table 4.1). The destinations for Russia's timber exports clearly identify the degree

Table 4.1: Major destinations for Russian softwood and hardwood log exports, 2001-2007 (cubic meters)

Russian softwood log exports							
	2001	2002	2003	2004	2005	2006	2007
Total	29,524,993	28,309,665	27,667,724	31,078,036	34,309,649	37,195,303	36,415,147
China	9,640,210	12,860,826	12,285,192	13,245,650	16,298,951	19,051,199	23,049,916
Finland	4,851,867	5,458,677	5,284,514	5,514,956	6,907,796	5,811,051	3,733,609
Japan	8,368,293	4,533,563	4,701,821	5,637,713	4,553,874	5,094,749	4,376,282
S. Korea	2,273,866	1,572,728	1,509,186	1,593,686	1,733,415	1,974,154	1,224,244
Sweden	1,681,813	1,449,060	1,386,941	1,456,914	899,346	584,843	369,940
Russian hardwood log exports							
Total	8,037,549	8,349,397	9,253,511	10,311,603	13,635,535	13,885,578	12,876,224
Finland	5,985,740	5,974,232	6,072,376	6,170,988	7,503,176	7,494,419	6,306,537
China	599,333	953,064	1,774,469	2,229,556	2,862,490	3,901,983	4,559,993
Sweden	709,961	872,513	781,934	1,078,379	1,949,062	1,357,562	1,265,915
Total Russian Roundwood Exports							
	37,562,542	36,659,062	36,921,235	41,389,639	47,945,184	51,080,881	49,291,371

Data Source: Global Trade Atlas, 2012

to which Russia's market is segmented. European Russia and Western Siberia have large tracts of forest and are situated in close geographic proximity to Europe, allowing these regions to

supply Scandinavian and European markets, while Eastern Siberia and the Russian Far East are also heavily forested and closely linked via rail with Asian markets (Northway et al., 2009). According to official customs statistics from 2006, Russian softwood logs represented 92.1% of total Chinese softwood log imports, 54.0% of Japanese softwood log imports, 26.2% South Korean softwood log imports, and 74.9% of Finnish softwood log imports (Global Trade Atlas, 2012).

The revenue from Russia's sawnwood exports increased from \$731 million in 2000 to \$3.2 billion in 2007, a 343.1% increase. Wood-based panel exports grew steadily between 2000 and 2007 with particleboard gaining 893.5%, veneer gaining 569.9%, fiberboard gaining 389.5%, and plywood gaining 243.8%. While these gains may appear great, it is necessary to put them into perspective by noting that the export values in 2000 were particularly low and thus by 2007, despite the impressive percentage increases, the export values remained modest. While the total export value of wood products increased from \$2.4 billion in 2000 to \$8.8 billion in 2007, the percent of this total that is attributable to forest products that at least require basic processing fluctuated between 37.0% (in 2001) and 50.5% (in 2007). These low percentages of value-added exports contributed to Russia's first-place rank in the world for highest quantity of roundwood exports between 2003 and 2005 (Global Trade Atlas, 2012). While this ranking illustrates the prominence of Russian logs in international markets, it was far from optimal from Russia's perspective.

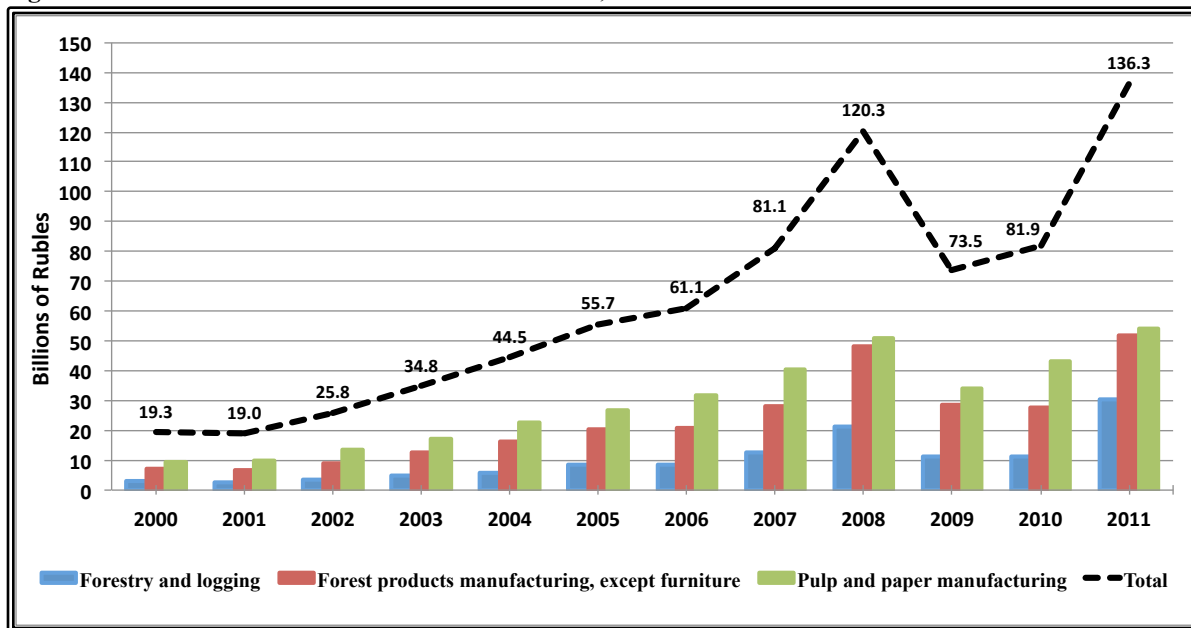
Trends between 2007 and 2011

The combined effects of the global financial crises between 2007 and 2009 as well as Russia's export tax on roundwood in early 2007 contributed to a drastic decline in Russia's total roundwood exports –from 49.3 million m³ in 2007 to 21.9 million m³ in 2011. Resulting from the export tax, domestic log prices were relatively lower and thus, in conjunction with the other federal policies, were meant to encourage an increase in domestic production of value-added wood products. Simultaneously, the reduction of log exports was expected to encourage demand for Russian value-added wood products in international markets. The short-term effectiveness of Russia's policies can be evaluated by looking at domestic forest sector investments, as well as production and export trends since 2007; although, as Makela (2009) suggests, the short-term trends may not necessarily be indicative of the potential for long-term success.

Investments and Priority Investment Projects: While the need for investments in the Russian forest sector has been well-documented, the list of suggested reforms needed to attract such investments is unending. Nilsson and Soderholm (2002) note that in order for Russia to increase its FDI into its domestic forestry sector, it must do more than just refer to its low labor and raw material costs. In addition to suggesting a variety of institutional reforms that Russia must undergo, Nilsson and Soderholm (2002) posit, “it is also advisable for Russia to target improving the physical infrastructure and raising the educational levels of its domestic work force” (p. 312). Since the passing of *MINPROMTORG*'s 2008 Strategy and Putin's 2006 call for reforms (as cited in chapter 2), there has been an increase in investments into the domestic forest sector.⁹

⁹Not only have there been capital investments, but there also appears to be the beginnings of a media and education campaign to revitalize forestry education in Russia. An example of some of the media initiatives is a WWF/Ikea produced 39-minute movie released in February 2013 which is designed to attract Russian students into professions in the forestry sector (<http://www.youtube.com/watch?v=-DgXcVRQJlI>). An example of the recent educational initiatives is a 2011 textbook on improving law enforcement and governance in Russia's forest sector designed specifically for forestry students (<http://www.empi-fleg.ru/publications/uchebnoe-posobie-sovershenstvovanie-pravoprimereniya-i-upravleniya-v-lesnom-sektore-rossijskoj-federacii>).

Figure 4.1: Investments in the Russian Forest Sector, 2000-2011

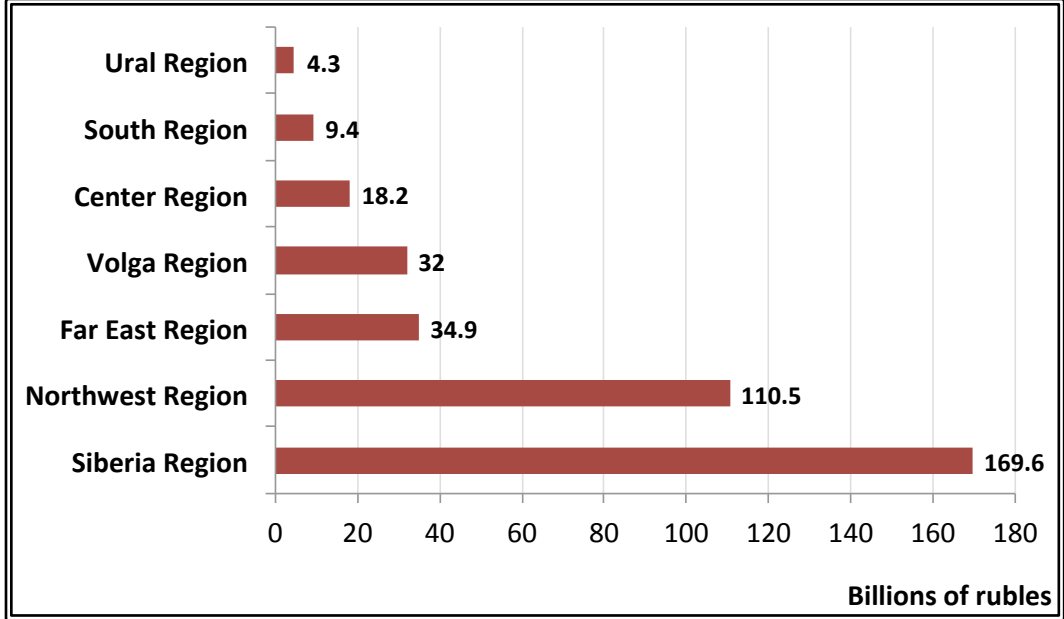


Data Source: ROSSTAT, 2012

While the Russian Federal State Statistics Service (*ROSSTAT*) data indicate (Figure 4.1) an increase in domestic forest sector investments between 2009 and 2011 as economies rebounded from the global financial crisis, another arm of the Russian government, the Ministry of Industry and Trade (*MINPROMTORG*) introduced its own incentives for investment. *MINPROMTORG*'s 'priority investment status' subsidies, a common occurrence in several Russian industries, moved into the Russian forest sector on June, 30, 2007 with the passing of Federal Resolution No. 419. The financing of some priority investment projects comes from domestic sources, while others are FDI or joint-venture projects between foreign and Russian companies. "Finland alone invested over €1 billion in Russian forest-product industries...and China built sawmills inside the Russian Federation, but close to its own border to process logs into basic export products" (UN ECE, 2012, p. 26). Krkoska and Korniyenko (2008) find that in 2008, official figures placed Chinese FDI in Russia at roughly \$3 billion and that the three major determinants of Chinese investments in Russia are proximity of the investment location, market size, and ability to use

Russia’s natural resources. Examples of large priority investment projects by Chinese investors the Russian forestry sector include the construction of a \$250 million processing facility in Khabarovskii Kray and a \$1 billion timber-processing facility in the Tomsk and Asinovsky regions (Krkoska and Korniyenko, 2008). In addition to Finland and China, investments in the Russian forest sector have come from many countries, including the United States, Malaysia, Austria, South Korea, and Japan (UN ECE, 2012). As of October 2012, there have been a total of 117 projects given priority investment status, with a total projected investment value of 379 billion rubles—approximately \$12.21 billion (MINPROMTORG, 2012). Recalling the particularly low percent of regional processing available through Russia’s regions (Figure 2.2 in Chapter 2), it is clear that the regional investments that are being made through priority investment projects will significantly increase the cost-effective, regional, processing capacity in many of Russia’s regions (Figure 4.2). However, as of October 2012, of the 117 qualified projects, only 24 of them already have begun operations, with a total investment of 70 billion rubles – or \$2.25 billion (MINPROMTORG, 2012).

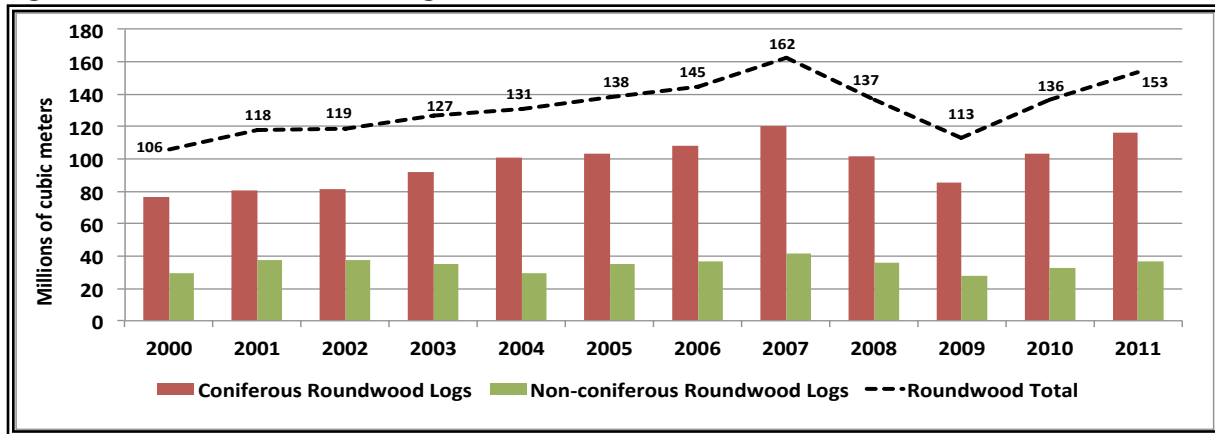
Figure 4.2: Investment Value of Priority Investment Projects by Region



Source: MINPROMTORG, 2012

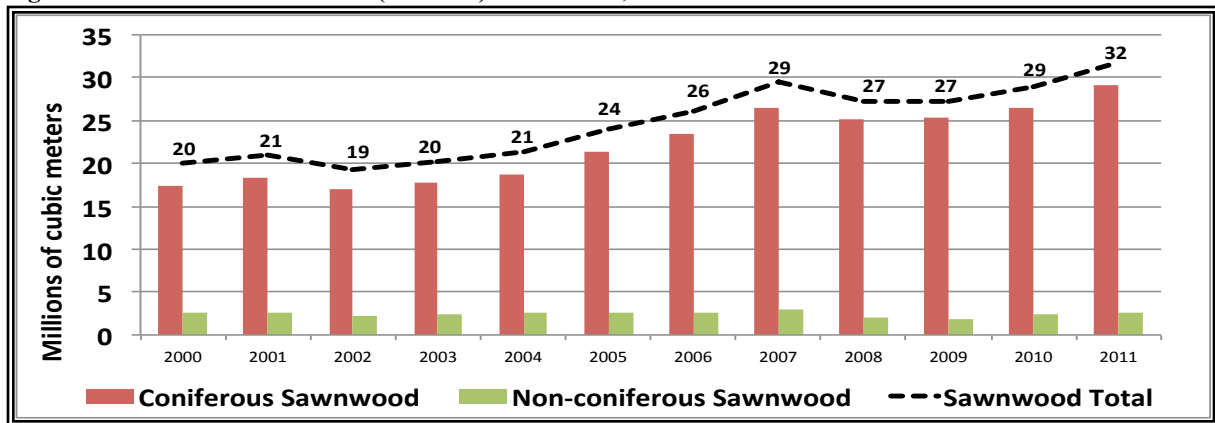
Production Trends between 2007 and 2011 (FAOSTAT, 2012): Looking at short-term production trends, there is a dramatic decrease in production of all forest products between 2007 and 2009. Most notable, and expected, is the plunge in total roundwood production from 162 million m³ in 2007 to 113 million m³ in 2009—a 30% decrease (Figure 4.3). However, since 2009 roundwood production has been rising with the largest increases coming from the production of coniferous sawlogs and veneer logs (FAOSTAT, 2012). Hence, between 2007 and 2011, roundwood production only decreased by 5%. Domestic production of sawnwood (Figure 4.4) also slumped between 2007 and 2009, but began an upward trend again in 2010 due to an increase in coniferous sawnwood production capacity. Coniferous sawnwood production in 2011 exceeded 29 million m³, a record production volume. Non-coniferous sawnwood production remained low, reaching just 2.6 million m³ in 2011. Meanwhile, production of wood-based panels stayed high between 2007-2008, peaking at 10.6 million m³, but then fell to 8.6 m³ in 2009 (Figure 4.5), before resuming its rapid growth trajectory between 2009 and 2011. Total wood-based panel production in 2011 reached 11.8 million m³, due to large production gains between 2007 and 2011 of particle board (+20.6%), followed by veneer (+14.3%), and plywood (+8.1%). It should be noted that fiberboard production suffered a slight loss (-1.6%), despite its long-term (2000-2011) production increases of (+116.9%). Short-term trends between 2007 and 2011 reveal that the production of wood products is rising. Much of the increased production of manufactured wood products was consumed domestically within Russia in response to large increases in consumer demand and construction projects. “In 2010 the Russian domestic market consumed almost two-thirds (61%) of the national forest sector production...the remaining part (39%) was exported” (UN FAO, 2012, p. 9).

Figure 4.3: Domestic Roundwood Log Production, 2000-2011



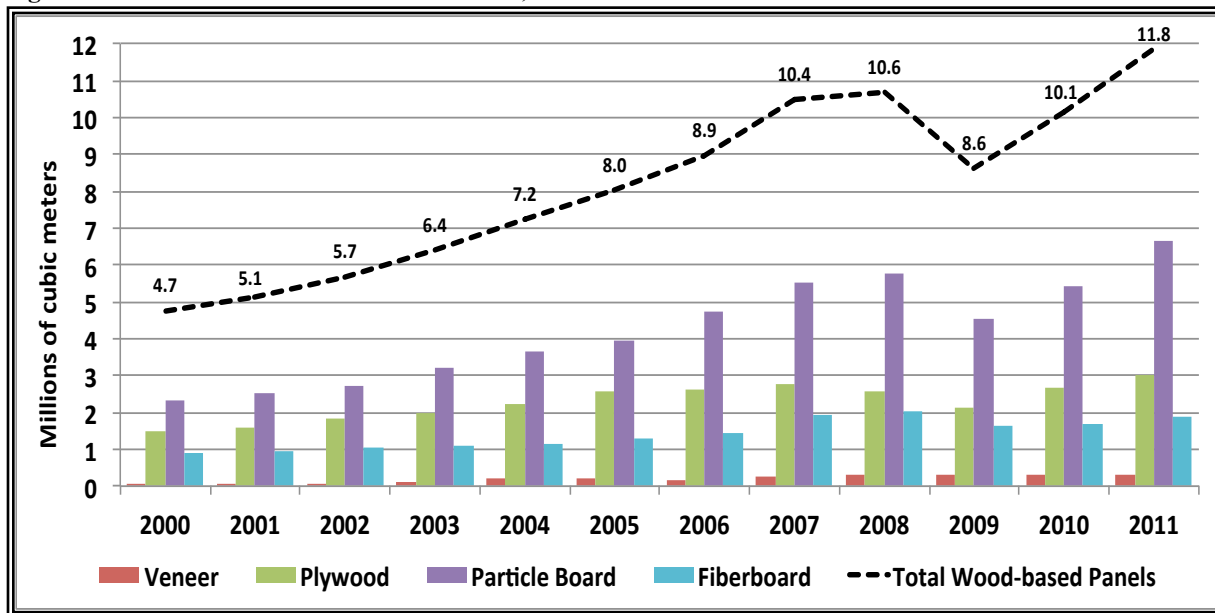
Data Source: FAOSTAT, 2012

Figure 4.4: Domestic Sawnwood (Lumber) Production, 2000-2011



Data Source: FAOSTAT, 2012

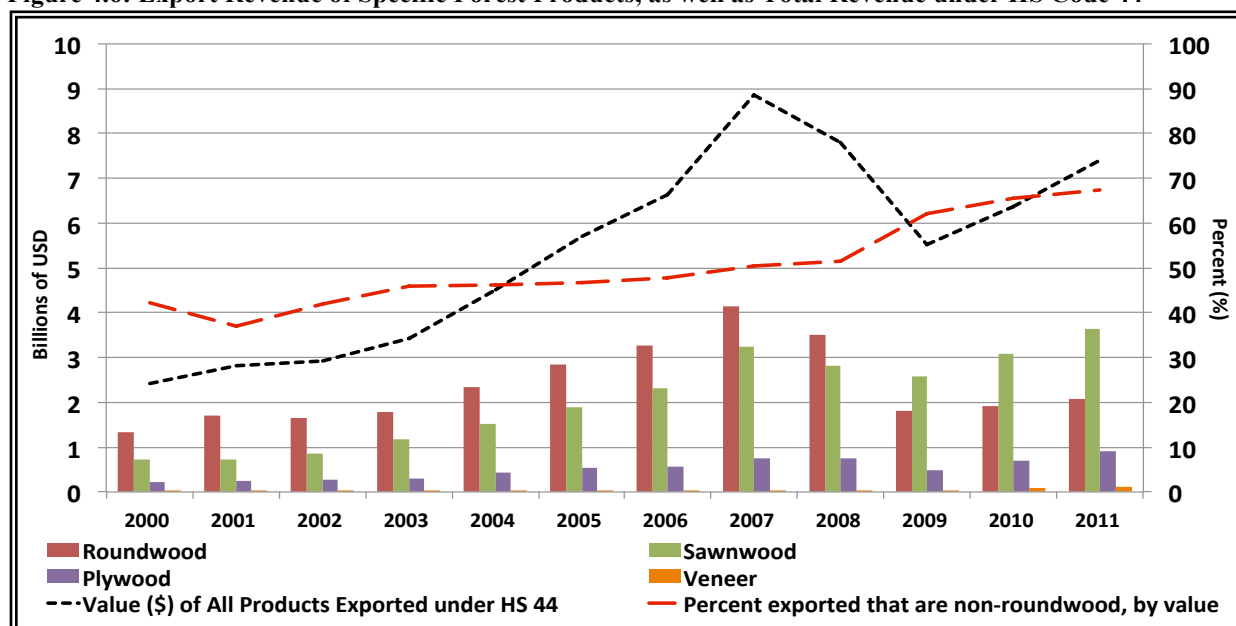
Figure 4.5: Production of Wood-based Panels, 2000-2011



Data Source: FAOSTAT, 2012

Export Trends between 2007 and 2011 (Global Trade Atlas, 2012): The combined effects of the increase of the roundwood export tax to 25% and the global financial crisis in 2008 contributed to a dramatic decline in export revenue from Russia's forest sector (black-dashed line in Figure 4.6). The total export revenue of wood products declined from \$8.8 billion in 2007 to \$5.5 billion in 2009, before resuming an upward trend again in 2010. By 2011, total export revenue of wood products reached \$7.4 billion.

Figure 4.6: Export Revenue of Specific Forest Products, as well as Total Revenue under HS Code 44



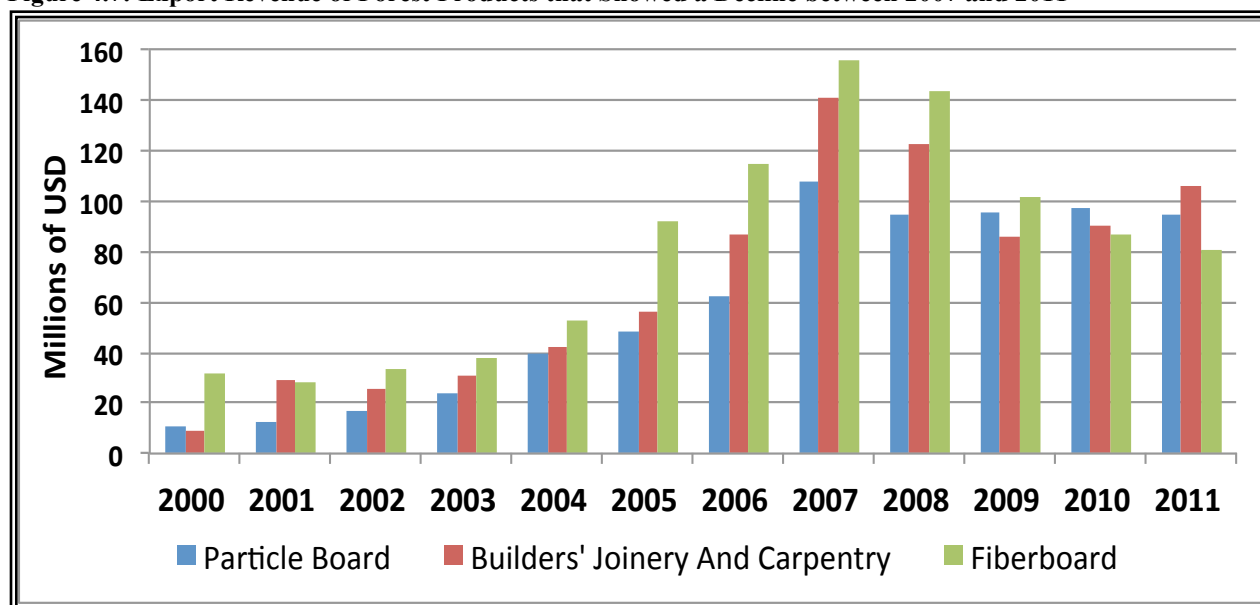
Data Source: Global Trade Atlas, 2012

Thus, between 2007 and 2011 the export value of all wood products decreased by 16.2%.

Nevertheless, exports of value-added wood products increased by 16.8 % to \$5 billion in 2011 (red dashed line in Figure 4.6). This trend was driven by increased exports of sawnwood lumber (+12.4%), plywood (+20.2%) and veneer (+426%). Yet, revenue for some forest product exports has decreased since 2007 (Figure 4.7). Between 2007 and 2011, there has been a decrease in export revenue of particleboard (-11.7%), builders' joinery and carpentry, which includes

parquet and cellular wood panels (-24.8%), and fiberboard (-48.5%). Thus, Russian wood products exports present a mixed-picture, since in the last five years production and exports of some value-added products has increased but is still skewed toward lower-value secondary wood products.

Figure 4.7: Export Revenue of Forest Products that Showed a Decline between 2007 and 2011



Data Source: Global Trade Atlas, 2012

With respect to quantity, the export of roundwood logically witnessed the largest declines, from 49.3 million m³ exported in 2007 to 21.5 million m³ in 2009—a 56% drop (see Table 4.1).

By 2011, the quantity of roundwood exports only increased marginally to 21.9 million cubic meters—maintaining the 56% drop in quantity of roundwood exports between 2007 and 2011.

However, while the percentage of roundwood exports after 2009 did not rebound and remained greatly diminished through 2011, the rebound of domestic roundwood production after 2009 meant that there was only a modest reduction of domestic production (-5%) between 2007 and 2011. Additionally, throughout much of the first decade of the 2000s, the percent of domestic roundwood production that was exported hovered just above 30%; however, by 2011, only 14%

of domestic log production was exported, while the rest was consumed domestically. These trends indicate that Russia's has become less reliant upon its roundwood export market and that, increasingly, as domestic demand for roundwood increases, levels of domestic roundwood production appear not to be driven exclusively by global demand.

Nevertheless, Chinese demand of global roundwood imports increased by 14%, from 37.1 million m³ in 2007 to 42.3 million m³ in 2011. Meanwhile, between 2007 and 2011, South Korean demand for roundwood imports decreased by 52%, from 9.4 million m³ to 4.4 million m³ and Japanese demand for roundwood imports decreased by 48% from 8.9 million m³ to 4.6 million m³. Logically, during this period, these countries' demand for Russian roundwood also decreased. While South Korean and Japanese imports of Russian logs decreased by 88.7% and 91.5%, respectively, between 2007 and 2011, Chinese imports decreased by 44.6% (Global Trade Atlas, 2013).

Resultantly, Russia's share of Northeast Asia's (China, Japan and South Korea) roundwood log imports fell from 55% in 2007 to 28% in 2011. Between 2007 and 2011, by specific country, Russia's share of China's total log imports fell from 68% to 33%, while its share of South Korea's total log imports fell from 11% to 3%, and its share of Japan's total log imports fell from 45% to 7%. Yet, while Russia's market share of global forest product exports decreased substantially during those years, it continued to be the world's largest exporter of softwood logs (UN ECE, 2012). With respect to softwood log exports, China's share of Russia's 2011 total log exports was 85% (Table 4.2).

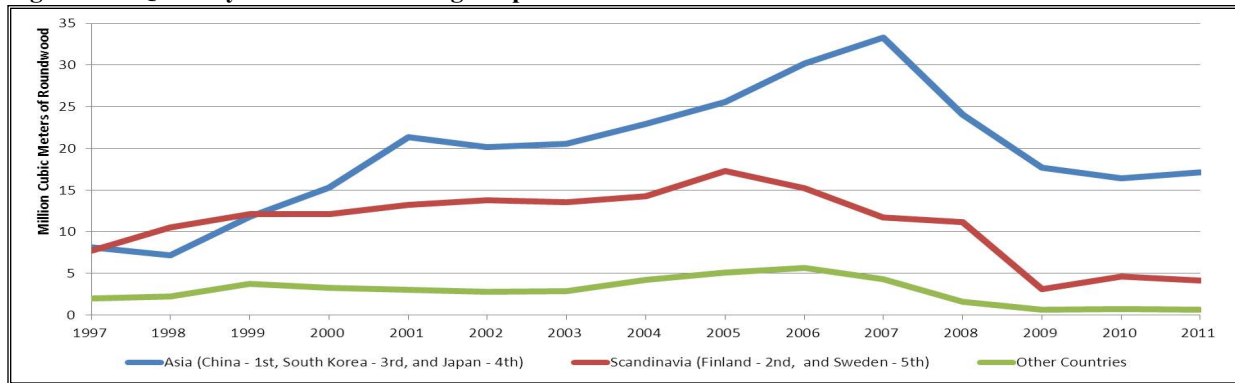
Table 4.2: Major destinations for Russian softwood and hardwood log exports, 2007-2011 (cubic meters)

Russian softwood log exports					
	2007	2008	2009	2010	2011
Total	36,415,147	24,993,021	18,189,841	17,063,168	17,569,698
China	23,049,916	17,965,915	15,265,937	14,564,187	14,989,033
Finland	3,733,609	3,030,848	1,029,588	1,001,876	867,075
Japan	4,376,282	1,933,267	763,861	462,591	399,623
S. Korea	1,224,244	714,228	522,705	328,693	682,117
Sweden	369,940	172,928	44,806	68,458	59,470
Russian hardwood log exports					
Total	12,876,224	11,765,671	3,296,749	4,620,190	4,331,268
Finland	6,306,537	6,866,706	1,796,232	3,051,179	2,870,408
China	4,559,993	3,337,505	1,118,280	1,003,681	1,011,199
Sweden	1,265,915	1,055,886	267,535	479,145	336,351
Total Russian Roundwood Exports					
	49,291,371	36,758,692	21,486,590	21,683,358	21,900,966

Data Source: Global Trade Atlas, 2012

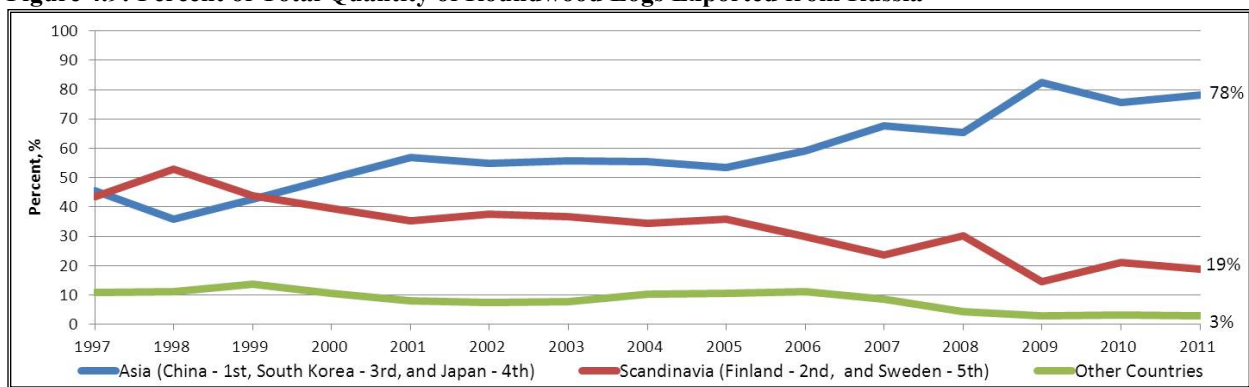
It is important to note that Russia's log exports increasingly demonstrate the degree of market segmentation that exists (Figures 4.8 and 4.9). While the total quantity of un-processed roundwood log exports from Russia has decreased substantially from its 2006 peak of 51 million m³ to 21.9 million m³ in 2011, there is an increasing asymmetry to the proportion of exports destined for the Asian market in the east compared to the Scandinavian market in the west. The Scandinavian market (19%) includes Finland (17.1%) and Sweden (1.8%), which made up Russia's second and fifth largest export markets in 2011. The Asian market (78%) includes China (73%), South Korea (3.2%) and Japan (1.9%), which made up Russia's first, third and fourth largest export markets in 2011. It is evident that the Chinese and Finnish markets are critical for Russian roundwood exports.

Figure 4.8: Quantity of Roundwood Logs Exported from Russia



Data Source: Global Trade Atlas, 2012

Figure 4.9: Percent of Total Quantity of Roundwood Logs Exported from Russia

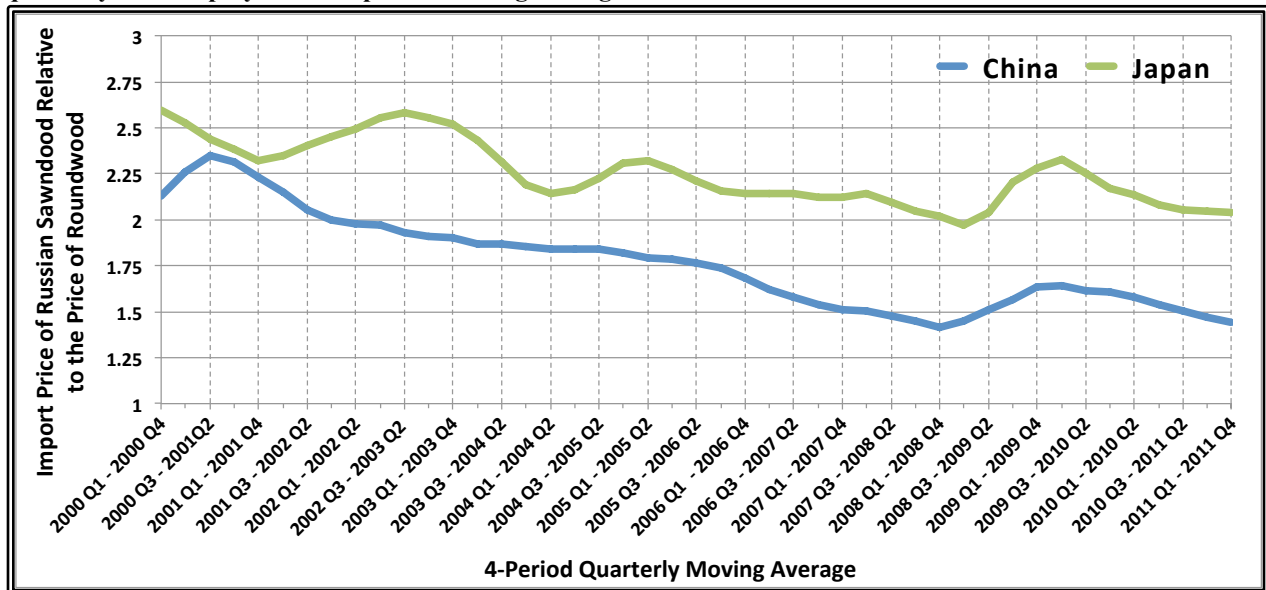


Data Source: Global Trade Atlas, 2012

Has the quantity of sawnwood exports from Russia increased as roundwood exports drastically decreased? That is, does trade data indicate that Russia's export tax may have led to a feedback effect in the sawnwood sector (refer to Appendix B for a thorough discussion of the feedback effect)? While Russia's total roundwood exports decreased 55% between 2007 and 2011, total sawnwood exports, however, increased steadily. Total sawnwood exports increased from 17.1 million m³ in 2007 to 20.9 million m³ in 2011 (+22.3%) and 32,247 metric tons in 2007 to 134,986 metric tons in 2011 (+318.6%). In 2009, Russia's sawnwood export revenue (\$2.5 billion) surpassed its roundwood revenue (\$1.8 billion), and by 2011 Russia's revenue from sawnwood reached \$3.6 billion, while roundwood exports only slightly increased to \$2.0 billion.

Did these trends have any effect on the relative prices of Russian roundwood and sawnwood in Asia? The price of Russian sawnwood relative to the price of Russian roundwood as it is observed abroad fell progressively between 2000 and 2011 (Figure 4.10). In Japan, the average price of Russian sawnwood in 2000 was 2.6 times higher than Russian roundwood. By 2011, the average price of Russian sawnwood fell to 2.0 times higher than roundwood—representing a 21% decrease in the relative price of sawnwood compared to roundwood. In China, the average price of Russian sawnwood in 2000 was 2.1 times higher than Russian roundwood, and by 2011 the relative price of sawnwood fell to 1.4 times that of roundwood—representing a 32% decrease. Much of the decrease, however, in these relative prices took place between 2000 and 2007. Between 2007 and 2011 the relative price only dropped 3.8% in Japan and 4.5% in China.

Figure 4.10: Import Price of Russian Sawnwood Relative to the Import Price of Russian Roundwood—quarterly data displayed as a 4-period moving average

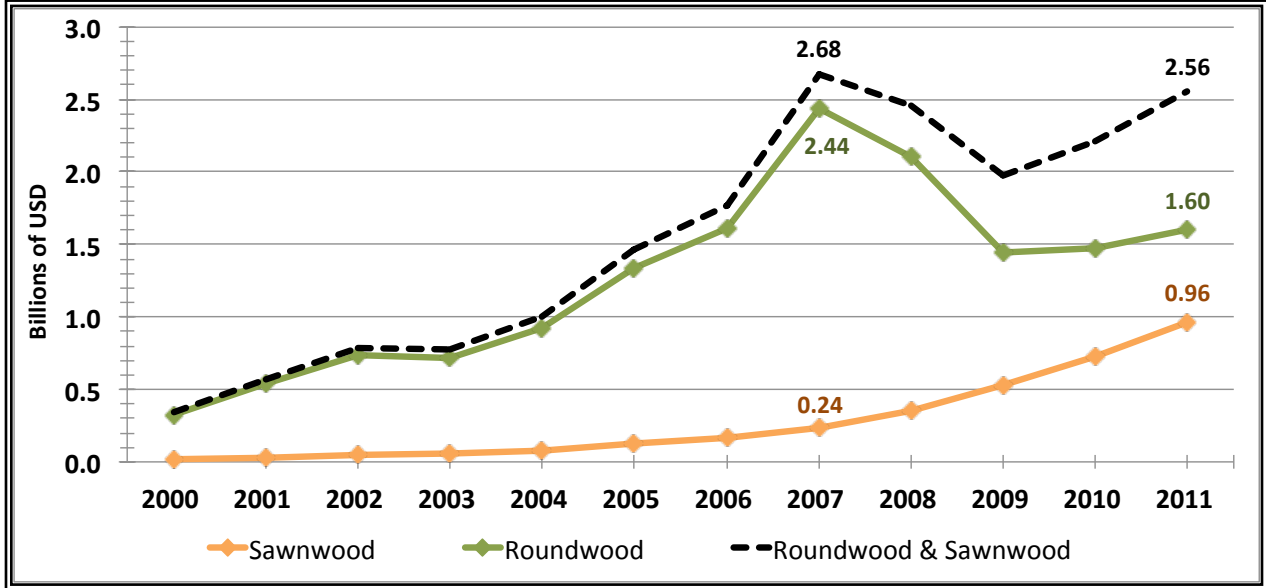


Data Source: Global Trade Atlas, 2012

Many of the above trends indicate that a feedback effect may have been present for some of Russia’s export markets. What follows is a brief exploration into the possibility of a feedback effect for Russia’s largest roundwood export market: China.

How has China responded to the imposition of Russia’s 2007 policies? From 2007 to 2008, imports of Russian logs to China fell from 27.6 million m³ to 21.3 million m³ and China sought the difference in timber imports from other countries (Global Trade Atlas, 2012; Eastin and Turner, 2009). Russian roundwood exports to China continued to decline to 16 million m³ by 2011, a 42% decrease between 2007 and 2011. Meanwhile, sawnwood exports to China increased from 1.5 million m³ and 22.7 thousand metric tons in 2007 to 7.4 million m³ and 131.7 thousand metric tons in 2011—representing a 379% increase for cubic meters of sawnwood and a 478% increase for metric tons of sawnwood. It is also worth noting the short-term dynamics of Russia’s roundwood and sawnwood export revenues to China (Figure 4.11).

Figure 4.11: Russian Export Revenue of Roundwood logs and Sawnwood lumber to China



Data Source: Global Trade Atlas, 2012

Revenue from roundwood exports to China decreased by 34% from \$2.44 billion in 2007 to \$1.60 billion in 2011. Meanwhile, revenue from sawnwood exports to China increased by 304% from \$237 million in 2007 to \$959 million in 2011. From another perspective, if Russian roundwood and sawnwood export revenue to China are grouped together, the revenue from these

exports slightly decreased by 4.45% from \$2.68 billion in 2007 to \$2.56 billion in 2011. While the grouped revenue of these exports is only slightly lower in 2011 compared to 2007, the change in the ratio of sawnwood to roundwood exports is significant. That is, in 2007, sawnwood exports constituted 8.9% of the grouped revenue, but by 2011, sawnwood revenue constituted 37.5% of the total grouped revenue. These trends suggest that Russia's roundwood export tax may have helped create a feedback effect in the case of Russia's trade with China. Yet, while these tariffs seem to be one of the central policies that helped Russia achieve its goals, at least in the short-run, the roundwood export tariffs have also been heavily scrutinized as a part of Russia's WTO accession in 2012.

Russia's Accession to the World Trade Organization

After 18 years of negotiating its membership, on August 22, 2012, Russia officially became a member of the World Trade Organization (WTO). Now that Russia is a member, more than 97 percent of all world trade takes place among member countries (NY Times, 2011). WTO countries agree to adhere to guidelines that not only restrict the imposition of future trade barriers, but require that most existing import tariffs be lowered. Prospective member countries go through a series of negotiations with WTO member states that typically require the prospective member to lower not just import tariffs, but some export taxes upon entry. Tarr and Volchkova (2010) note "in many cases, Russia implemented changes prior to accession to adapt to post-WTO requirements; in other cases, commitments may be implemented only several years after accession due to a negotiated adjustment period" (p. 202). The schedule, which contains the entire list of tariff changes for implementation that Russia agreed to follow upon WTO accession, is available in a 1734-page document from the Federal Russian Duma (2012).

In general, the “cumulative changes will move the [Russian] economy toward an open trade and investment model of economic development and away from an import-substitution industrialization economic model” (Tarr and Volchkova, 2010, p. 202). Rutherford and Tarr (2010) find that Russia will gain from WTO membership in three major ways: liberalizing barriers to foreign direct investment in services (like telecommunication, banking, insurance, and transportation); improved gains from trade due to tariff reduction which, in turn, improves domestic resource allocation; and the potential for improved access for select Russian products in markets of other WTO member states due to dispute settlement mechanisms inherent in WTO membership (like rights over anti-dumping and countervailing duty investigations). While there is much speculation on the actual short-, medium-, and long-term effects of Russia’s WTO membership, it is important to note that the competitiveness of Russia’s burgeoning timber-processing sector is particularly vulnerable and may see some short-run setbacks. That is, Russia’s accession to the WTO will affect the competitiveness of Russian timber in foreign markets, as well as change the incentive structure of the domestic timber industry and thereby alter the domestic market (Sheingauz and Antonova, 2008).¹⁰

Officially, the “focus of the WTO is on trade policy towards imports, not exports” (Ruta and Venables, 2012, p. 11). As such, the import tax rate for value-added and processed forest products being imported into Russia from abroad is required to be lowered from 16% to 8% over the next few years. This will result in Russian timber processors facing an increasing amount of competition from companies abroad for Russia’s domestic market (RFP, 2012). Additionally,

¹⁰The scope of this paper does not include an extensive discussion of the myriad ways in which Russia’s WTO accession will impact the competitiveness of Russian industries as they increasingly compete with foreign firms in Russia’s domestic market. While this paper does not address these issues comprehensively, it is important to mention that the United States’ repeal of the Jackson-Vanik amendment restored permanent normal trade relation (PNTR) status with Russia and thus allows US companies to do business in Russia at lower costs. This allows US manufacturers—for example, manufacturers of forestry machinery equipment—to enter the Russian market cost-effectively.

however, throughout the negotiation phases of WTO accession over the last few years, Russia's high export tax on roundwood was one of only a few trade policies that caused WTO member states to obstruct Russia's entry (Tarr and Volchkova, 2010; see NY Times articles 'In Outburst, Putin Says W.T.O. Rules Don't Apply' from April 8, 2011 and "Russians Step Closer to Joining the W.T.O.' from Nov. 25, 2010). In particular, "Finland, which is the most heavily affected by [Russia's] export tax measure, has strenuously opposed it; so has Sweden...[and] as bilateral talks with Russia failed, these two countries succeeded in getting the European Union to negotiate the matter as part of Russia's WTO accession negotiation" (Tarr and Volchkova, 2010, p. 212). Thus, feeling cornered, Finland and Sweden were able to leverage the European Union to negotiate specific roundwood export tax terms as part of Russia's WTO accession (ICTSD, no date).

As a result, while the export tax for roundwood logs would remain, the export tax rates would progressively fall over the next several years to single-digit final bound rates. A system of quotas was established for three specific softwood species – Norway spruce (*Picea abies* Karst.), silver fir (*Abies alba* Mill), and red pine (*Pinus sylvestris* L.)—whereby a given quantity, or quota, is allocated for export at a certain lower tax rate and any quantity exported above that level will receive a higher tax rate. Given Russia's segmented market for roundwood exports, the quota system—specifically called tariff-rate quotas (TRQs)—allocated not just an overall total quota level, but also specific threshold quantities that can be exported to countries in the European Union (EU) and to all other counties (Table 4.3).

Currently, Russia has instituted two sets of TRQs for specific tree species for 2013. Russian spruce and fir exports are lumped together into one quota with an in-quota tax rate of 13%, whereas red pine exports have an in-quota duty tax rate at 15%. Both quotas maintain an 80% out-of-quota tax rate (Rossiskaya Gazeta, 2012). While the new total quota levels have been set close to Russia's record-setting 2006 log export, its government has stated that the quotas will be revised each year (WTO RF, no date). Export tax rates have been lowered substantially for certain hardwood species, like poplar logs (now 10%), birch logs (now 7%) and aspen logs (now 5%). The roundwood export tariff for most other species, including larch, will remain at 25%, at least for the near future.

Table 4.3: Russia's Tariff Rate Quotas for 2013 (TRQs)

Aggregate of HS 4403 20 110 and 4403 20 190		
Wood in the rough of spruce of the species 'Picea abies Karst' or silver fir 'Abies alba Mill'		
Global volume of TRQ, cubic meters	In-quota duty	Out-of-quota duty
6,246,500 including: European Union: 5,960,600 Others: 285,900	13%	To be established in accordance with the tariff applied by the Russian
Aggregate of HS 4403 20 310 and 4403 20 390		
Wood in the rough of the species 'Pinus sylvestris L.'		
Global volume of TRQ, cubic meters	In-quota duty	Out-of-quota duty
16,038,200 including: European Union: 3,645,900 Others: 12,392,300	15%	To be established in accordance with the tariff applied by the Russian

Source: Russian Federation, 2012

Conclusions

Since 2007, it would appear as if Russia has been making progress in fulfilling its goals for the domestic forest sector. As many of the priority investment projects that were established over the last 5 years are beginning their operations, and will progressively increase their capacity over the next couple of years, continued growth of domestic production is expected. While identifying the

key policy for Russia's apparent short-term successes is near impossible, and as Putin himself stated, many of the reforms are interlinked, it is important to recognize that several of the current policies have helped advance Russia's forest sector. It appears that the "Russian Federation's introduction of log export taxes may have encouraged increased domestic conversion, at least in the eastern part of the country" (UN ECE, 2012). Despite the positive short-term evaluation of the role of the export taxes on Russia's forest sector development, over the last five years there have been numerous debates regarding the justification and potential negative effects of roundwood export tariffs (see Chapter 3). Additionally, many industry personnel in the Russian Far East have begun to re-think their initial positive evaluation of the roundwood export tax (Kommersant, 2013). Yet, these tariffs seem to be one of the federal policies, at least in the short-run between 2007 and 2011, which has helped Russia achieve the goals that MINPROMTORG envisioned in its "Strategy for the Development of the Forest Complex to 2020." However, the ability of Russia to increase its forest sector competitiveness in the medium- to long-term is also dependent upon many institutional, economic, and societal factors—factors that Russia's recent World Trade Organization (WTO) accession are expected to influence.

5) Conclusion

While the Russian Federation contains more forests than any other country, since 1991 it has struggled to manage and develop them in a way that is both economically and ecologically sustainable. Throughout the last 20 years, global demand for wood and timber products has increased dramatically. Due to the turmoil and lawlessness that was characteristic of the 1990s in Russia, filling some of this demand with Russian timber, particularly softwood, became an easy source for illicit profit. The amount of money that could be made trading in illegal Russian logs provided incentives to engage in the shadow, or illegal, economy. These perverse incentives helped undermine any hope of developing an economically and ecologically sustainable forest sector throughout much of the 1990s and 2000s.

Thus, in 2007, the Russian government's institution of policies to spur investment, modernization, and innovation in its forestry sector represented a large step forward. Since 2007, with the help of roundwood export taxes, subsidies for new investments, and several other changes in policy, Russia has made successful short-term progress in developing value-added wood processing industries. It appears that implementation of the Russian federal government's 2008 goals for its forest sector started to bring a boost to the aging infrastructure that has held back the development of the forestry sector through reduced efficiency and productivity for the last 20 years. As a result, there have been significant increases in both domestic and foreign direct investment in timber processing and related infrastructure development projects. Industrial Weekly Magazine (May 2011) noted, "today we may say that the mechanism of the priority investment projects appeared to be rather effective to change [the] face of the industry...at the same time, the mechanism became only the first step and it requires additional adjustments" (p.

3). Additionally, Industrial Weekly (May 2011) observed that *MINPROMTORG* offered several supporting measures, like subsidies of interest rates on credit, as well as heavily decreased import duties on equipment.

Yet, it is important to keep in mind that all policies change the incentives that people and businesses face, and as a result, some groups do better than others. The forestry sector is no exception. While the 2007 policies may have resulted in Russia achieving some of its short-term goals, how well Russia progresses towards its medium- and long-term goals will depend on the efficiency of policies and the ability of regulators to foresee changes to incentives that these policies directly or indirectly create. For instance, Industrial Weekly (May 2011) cited that the “mechanism of the priority projects appeared to be rather sensitive to credit risks” and that the existence of a time lag between project schedules and implementation is due to the “reduction of borrowed funds against the planned amounts” (p. 3).

Russia continues to face many obstacles in developing a domestic, value-added wood processing industry. In many forest-rich areas, there is a distinct lack of viable transportation options, and a severe deficiency of skilled and unskilled workers. Additionally, there are important aspects of the underlying ecology of Russia’s forests that need to be considered in order to develop a domestic forest sector that will achieve both economic and ecologic sustainability. The predominant forest-type in Russia is the boreal forest ecosystem, which typically has much lower growth rates, and hence productivity, than other types of forest ecosystems (UN FAO, 2012). According to UN FAO’s ‘Russian Federation Forest Sector Outlook Study to 2030’ (2012):

More than half of the forests of the Russian Federation grow on permafrost soils (Siberia and Far East) in severe climate conditions, which determine low

productivity and the fragmentary nature of growing stock. Only 45 percent of forest area is available for exploitation. The predominant part thereof – in the European North, in the Urals and along the Trans-Siberian Railway – is exhausted as a result of intensive exploitation. The economic availability of mature forests is even lower. Thus, the share of productive (I–III site classes) mature and over-mature coniferous growing stock does not exceed 16 percent (p. 5)

Thus, in many of these remote, cold regions where logging only possible in winter, economic activities tend to follow seasonal patterns. In these areas, the ability to attract and keep skilled workers is problematic and presents as much as a problem for Russia as coping with necessary changes to timber harvests as a result of global climate change and thawing permafrost soils (Lutz et al., 2013).

Nevertheless, it is important to ask how Russia might reconcile its national interest in supporting its burgeoning forestry sector with WTO accession. The liberalization of export and import tariffs—known collectively as tariff barriers—means that Russian industries increasingly will feel the pressure of global competition. Will the Russian forestry sector be able to compete globally with companies that already have well-established production and manufacturing? Or, can the Russian forest sector be characterized as an ‘infant-industry’? Recall, the ‘infant industry’ argument is put forth by countries to justify the institution of tariffs, which are principally designed so as to temporarily provide support for under-developed domestic industries so that they can grow stronger and eventually become internationally competitive. Economists concede that there are specific instances that justify the imposition of trade barriers, and only in certain cases might the infant industry argument apply. Even then, economic theory and history both indicate that there can be debilitating effects to using high barriers to trade beyond the short-term.

Despite the Russian government's efforts, MINPROMTORG's goals may not be able to be fully realized through the exclusive use of the 2007 policies. In the short-term, investments in value-added wood manufacturing will continue, but whether these new domestic manufacturers are able to compete with well-performing, highly efficient manufacturers abroad is unknown. While the decreased export tax rate on roundwood may contribute to increased log export revenue, it may not be enough to compensate for the government's loss in tax revenue. Yet, since the Russian government maintains that it has the right to adjust quota level volumes each year, there is still much uncertainty. Additionally, from an economic efficiency perspective, developing efficient financial markets, improving the tax administration system, developing better institutions with well-defined and enforced property rights, and building a functioning legal system are the logical first-best options for policy-makers. However, Russia, like many developing countries, has historically struggled to bring about such reforms and thus, in the absence of domestic capabilities, has exerted influence at the border where commodities are more easily tracked and, hence, taxed. Such export taxes are often considered a second-best option for policy-makers. Nevertheless, if there are significant improvements to institutional arrangements in Russia's domestic economy as a result of Russia's WTO accession, then Russia may be able to move away from its reliance on export taxes and institute efficient domestic policies that will support a productive domestic forest sector in the long-term.

Appendix A: Introduction to forest products terminology

Coniferous (C): commonly referred to as ‘softwood.’ All woods derived from trees classified botanically as Gymnospermae, e.g. fir (*Abies*), pine (*Pinus*), larch (*Larix*), spruce (*Picea*).

Non-coniferous (NC): commonly referred to as ‘hardwood.’ All woods derived from trees classified botanically as Angiospermae, e.g. maple (*Acer*), birch (*Betula*), oak (*Quercus*), poplar (*Populus*).

Roundwood: commonly known as **logs**. All roundwood felled or otherwise harvested and removed. It comprises all wood obtained from removals, i.e. the quantities removed from forests and from trees outside the forest, including wood recovered from natural, felling, and logging losses during the period, calendar year or forest year. It includes: all wood removed with or without bark, including wood removed in its round form, or split, roughly squared. It is commonly reported in cubic meters (m³). Identified under HS Code 4403.

Sawnwood: commonly known as **lumber**. Wood that has been produced from both domestic and imported roundwood, either by sawing lengthways, or by a profile-chipping process, and that, with a few exceptions, exceeds 5mm in thickness. It includes: planks, beams, joists, boards, rafters, and “lumber”, etc. in the following forms: un-planed, planed, grooved, tongued, finger-jointed, chamfered, etc. but excludes wooden flooring. It is most commonly reported in cubic meters (m³) and board feet (in North America) but is also sometimes reported in square meters (m²) or metric tons (T). Identified under HS Code 4407.

Wood-based panels: an aggregate category that in production and trade statistics represents the sum of:

Plywood: a panel consisting of an assembly of veneer sheets bonded together with the direction of the grain in alternate plies generally at right angles. The veneer sheets are usually placed on both sides of a central ply or core which may itself be made from a veneer sheet or another material. It excludes: laminated construction materials (e.g. glulam), where the grain of the veneer sheets generally runs in the same direction. It is most commonly reported in cubic meters (m³). Identified under HS Code 4412.

Particle Board: A panel manufactured from small pieces of wood or other ligno-cellulosic materials (e.g. chips, flakes, splinters, strands, shreds, etc.) bonded together by the use of an organic binder of the following agents: heat, pressure, humidity, a catalyst, etc. It includes waferboard, oriented strandboard (OSB) and flaxboard. It is commonly reported in cubic meters (m³). Identified under HS Code 4418.

Fiberboard: A panel manufactured from fibers of wood or other ligno-cellulosic materials with the primary bond deriving from the felting of fibers and their inherent adhesive properties (although bonding materials and/or additives may be added in the manufacturing process). It includes: hardboard, medium density fiberboard (MDF) and insulating board. It is commonly reported in cubic meters (m³) but is also sometimes reported in square meters (m²) or metric tons (T). Identified under HS Code 4418.

Veneer: Thin sheets of wood of uniform thickness, rotary cut (i.e. peeled), sliced or sawn. It includes wood used for the manufacture of plywood, laminated construction material, furniture, veneer containers, etc. It excludes: wood used for plywood production within the same country. It is most commonly reported in cubic meters (m³) but is also sometimes reported in square meters (m²) or metric tons (T). Identified under HS Code 4408.

Roundwood (logs) are the least processed forest product, while sawnwood represents various levels of minimal to moderate levels of processing. Wood-based panels require the most processing. For the purposes of this research, all forest products other than roundwood (and similar classifications, like fuel wood) are considered ‘value-added’ forest products.

Adapted from: UN FAO, 2010

Appendix B: A spatial partial equilibrium model of Russia's export taxes on roundwood and trade with China¹¹

Assumptions:

- Two countries: Russia and China—denoted in diagram-labels as *subscripts*
- Both countries produce two products: roundwood logs (R) and sawnwood lumber (L)
—denoted in diagram-labels as *superscripts*
- Price is on the y-axis and is assumed to be in identical units between the two countries—Quantity is on the x-axis and the units of the two products (logs and lumber) are assumed to be identical (roundwood equivalent, in this case)
- Transfer/Transaction costs assumed to be zero
- In the log (lumber) trade sector, the import demand curve represents the sum of the demands of a large number of wood processors (lumber processors) in China for logs (lumber) and the export supply curve refers to a large number of log (lumber) suppliers in Russia.

In a two-country model, the amount exported from Russia to China must, by definition, raise world price (in this model, there are only two countries that make up the 'world'). That is, China's imports only come from Russia and thus by the very nature of this assumption, effectively raise the 'world' price (again, the 'world' is only Russia and China). This means, that this model effectively models Russia as being able to influence 'world' price for logs. In other words, Russia is effectively modeled as having market power as a 'price-maker' or having monopoly power on its log exports, which is to say that China must now pay a higher price for log imports. (In reality, it will either pay Russia a higher price for logs, or pay for the increased transportation cost to import other countries' roundwood logs). This is an appropriate assumption, since, in reality, Russia does appear to have some monopoly power for roundwood logs, and hence exhibits market power (Tarr, 2010).

Before the trade model is presented, it is important to look at the potential welfare gains/losses to Russia's domestic economy as a result of instituting an export tax on roundwood (See figure B1, diagram A). Under free trade equilibrium prices and quantities, initial domestic price equals initial world price. At these prices, domestic consumption and demand $Q_{R(Consume)}^R$ is less than domestic supply/production $Q_{R(Prod)}^R$, the difference being exported to the world (China, in this case). As exports begin to get taxed, at initial prices, domestic producers look to supply domestic market demand (untaxed) rather than sell in international markets (taxed). In the domestic market, supply shifts out thus lowering domestic prices to P'^R_R , while the prevailing international price rises, in the case of a large country, to P'^R_C . At this price, domestic producers are indifferent between selling domestically and exporting. Consumers of domestic roundwood (in Russia) benefit from this policy as domestic demand of roundwood increases ($Q_{R(Consume)}^R$ to $Q'^R_{R(Consume)}$) at a lower price (P'^R_R). The surplus increases by (a) and (b). Domestic producers of roundwood are hurt since they produce and sell less ($Q_{R(Prod)}^R$ to $Q'^R_{R(Prod)}$) at a lower price (P'^R_R). Their surplus is reduced by (a+b+c+d+e).

¹¹ Adapted from Krugman, Obstfeld, and Melitz (2012), Appleyard, Field, and Cobb (2006), Gilbert (2000) and Perez-Garcia and Robbins (2012)

If Russia were to be considered a ‘small country’ or price-taker for its supply of roundwood onto the world market: The export tax increases government revenue by area (d), which indicates the post-tax levels of exports and the unit tax. Thus, from the Russia’s perspective, increases in surplus (consumer (a) and (b), plus government revenue (d)) may be more important than the losses in efficiency (c+e). However, as Tarr (2010) suggests could be the case, if Russia were to be considered a ‘large country’ or price-maker for its supply of roundwood onto the world market, then the export tax increases government revenues by (d+f). Consumers’ and producers’ surpluses are identically affected. Post-tax quantities of exports remain the difference between $Q^R_{R(Prod)}$ and $Q^R_{R(Consump)}$ but the value of unit tax received by the government is now the difference between P^R_C and P^R_R . If large enough, this increase in government revenue can offset the loss in efficiency and welfare of domestic roundwood producers.

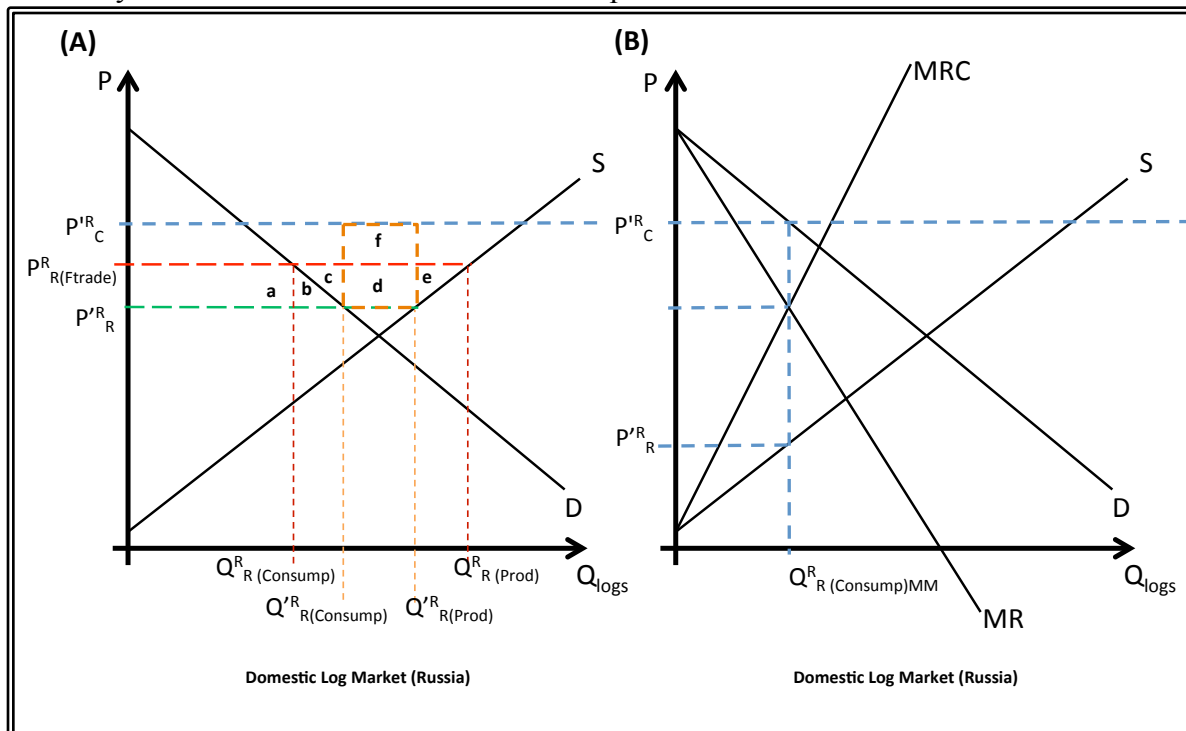


Figure B1: Diagram (A) indicates changes to Russia’s domestic welfare that can result from Russia’s export tax on roundwood. Diagram (B) indicates how the Russian government might act if it felt it had a double monopoly power as a monopoly supplier of logs and as a monopsony buyer of logs.

If we assume that the Russian government acts as a rent-maximizing monopolist standing between the two sides of the market, then the Russian government might act as if it had double monopoly power as a monopoly supplier of logs and as a monopsony buyer of logs¹² (indicated in Figure B1, diagram B). The rent-maximizing optimal quantity of logs exported would set marginal revenue from the sale of logs equal to the marginal resource cost of acquiring logs ($Q^R_{R(Consump)MM}$). Since there is a fringe supply of logs in China, the Chinese demand for Russian logs might reflect the difference between Chinese demand for logs and domestic Chinese supply at each possible price. At that quantity, the price for logs received by harvesters in Russia would be P^R_R , and the price paid for logs by importers in China would be P^R_C .

¹² I would like to thank Judith Thornton for suggesting this idea.

Now, turning to the trade model, Gilbert (2000) notes that sectoral spatial equilibrium models are most often used in forest sector trade analysis. Figure B2 depicts a bilateral trade flow between Russia and China of roundwood logs (top row, diagrams i-iii) and lumber (bottom row, diagrams iv-vi). Russia has a lower autarky, or non-trade price, than China for roundwood ($P^R_{R(\text{aut})} < P^R_{C(\text{aut})}$), and for lumber ($P^L_{R(\text{aut})} < P^L_{C(\text{aut})}$) thus leading to opportunities for gains from trade. Equilibrium is where the excess supply of logs (and lumber) from Russia is equal to the excess demand of logs in China (i.e. the quantity traded is equal to the difference in quantity between Russia's domestic production and consumption – visually, this is the horizontal red dashed line between $Q^R_{R(\text{Prod})}$ and $Q^R_{R(\text{Consump})}$ in diagram (i), which is equal to the horizontal distance between the origin and Q^R_T in the log trade sector or diagram (ii), which is equal to the red dashed line between $Q^R_{C(\text{Consump})}$ and $Q^R_{C(\text{Prod})}$ in diagram (iii). The aforementioned three horizontal distances described in each diagram are all equal). This is to say that the physical requirements for log (or lumber) production in each country are thus determined by the excess supply and demand for logs (or lumber) (Gilbert, 2000).

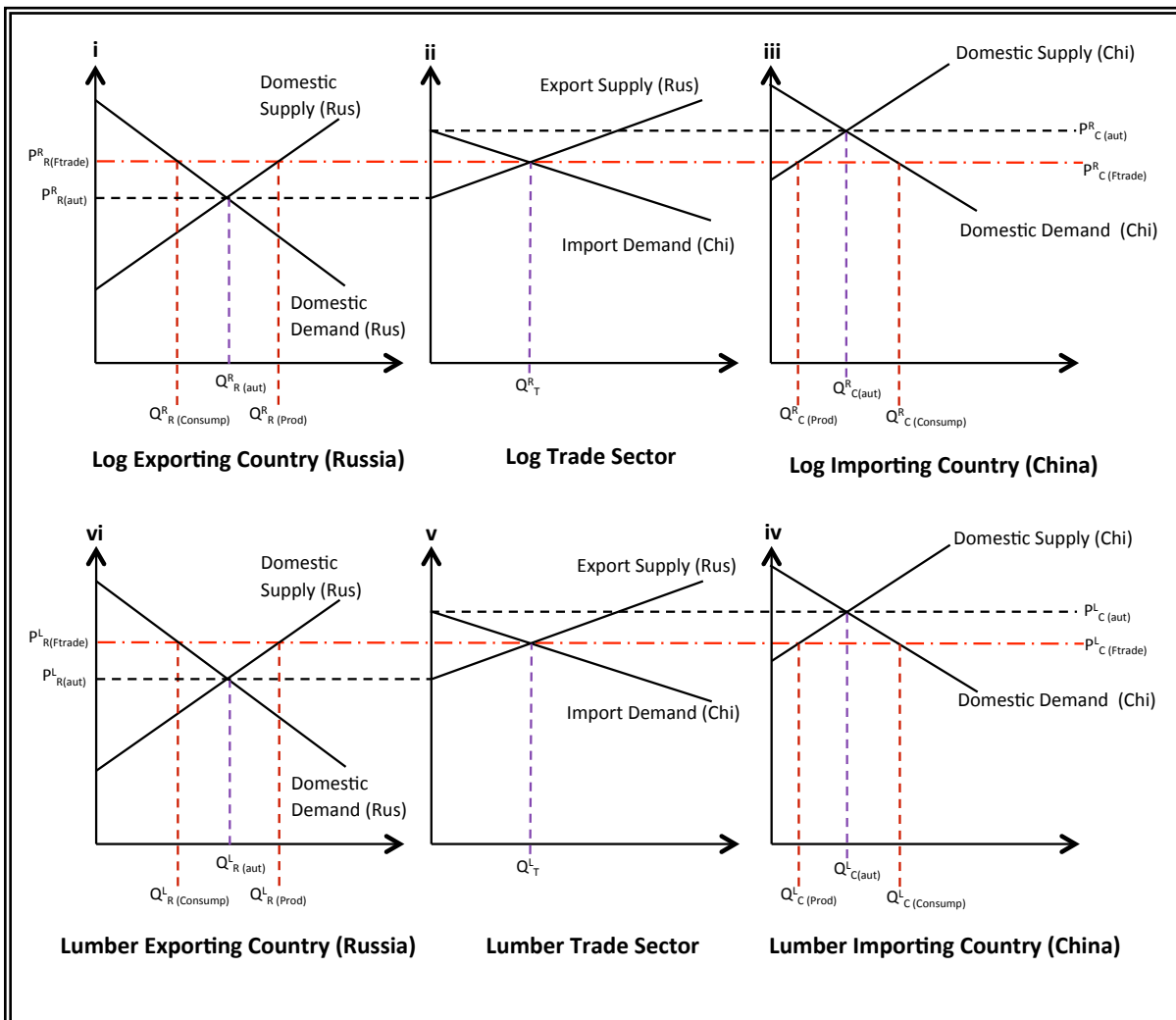


Figure B2: Bilateral trade-flow between Russia and China of roundwood logs (top row, diagrams i-iii) and lumber (bottom row, diagrams iv-vi) under autarky and free trade.

Thus, Russia's imposition of an export tariff reflects its ability to take advantage of its perceived monopoly power for roundwood log exports (as well as any monopsony power it may feel it has). The impact of an export tariff on roundwood logs from Russia is now considered in Figure B3, using the same diagrammatic framework that is given above in Figure B2. However, the following descriptions all pertain to Figure B3:

Diagram i: Russia's domestic log market

Step 1) Imposition of an additional transaction cost by Russia in the form of an export tariff on logs to reduce volume of logs leaving country. The log export tax creates a wedge between free trade equilibrium prices, $P_{R(\text{Trade})}^R$, that were previously observed in Russia and China.

The increase in cost at the border due to the export tax is indicated as **1a** and is explicitly labeled 'tax'. The log export tax decreases the price of logs in Russia. Given the lowering of the relative price of logs in Russia's domestic market, the domestic consumption of logs in Russia will be expected to increase to $Q_{R(\text{Consump})}^R$, while domestic production of roundwood decreases to $Q_{R(\text{Prod})}^R$.

Diagram ii: Log Trade Sector

Step 2) Due to the increased cost of Russian logs abroad, the quantity of exported Russian logs decreases. This is most easily seen in the trade sector and the decrease in logs exported is indicated as **1b**. Thus, there is a shift upward in the export supply curve of Russian logs, indicated as **1c**.

Step 3) As a consequence, the equilibrating log market price in China increases from $P_{C(\text{Trade})}^R$ to P_C^R . This increase is indicated as **1d**.

Diagram iii) China's domestic log market

Step 4) Given the higher price of logs in China, the quantity of logs consumed, or demanded, domestically in China decreases (indicated as **1e**).

Due to the price increase of log imports, the quantity of logs domestically produced in China increases* (indicated as **1f**).

Gilbert (2000) and Perez-Garcia and Robbins (2013) note that the interactions and effects of an roundwood export tax do not end there and the possibility of a so-called 'feedback effect' was "first debated by Weiner (1973) and later Haynes (1976, 1977), and refers to the extent of increased foreign demand for processed domestic wood products resulting from foreclose of the raw material source" (as cited in Gilbert, 2000). Gilbert (2000) explains:

We have in our diagrammatical treatment assumed that the lumber supply curves are fixed independent of the supply of logs. However, given that logs

are the major input into lumber, changes in the price of logs should impact the supply of lumber. [...] An export tax on logs lowers the price of logs in the exporting country and raises the price in the importing country. This is effectively a subsidy to lumber production in the exporting country, and a tax on lumber production in the importing country. We should expect the tax to result in a contraction of supply in the importing country. This results in an upward shift in the excess demand for lumber. This is the feedback effect.

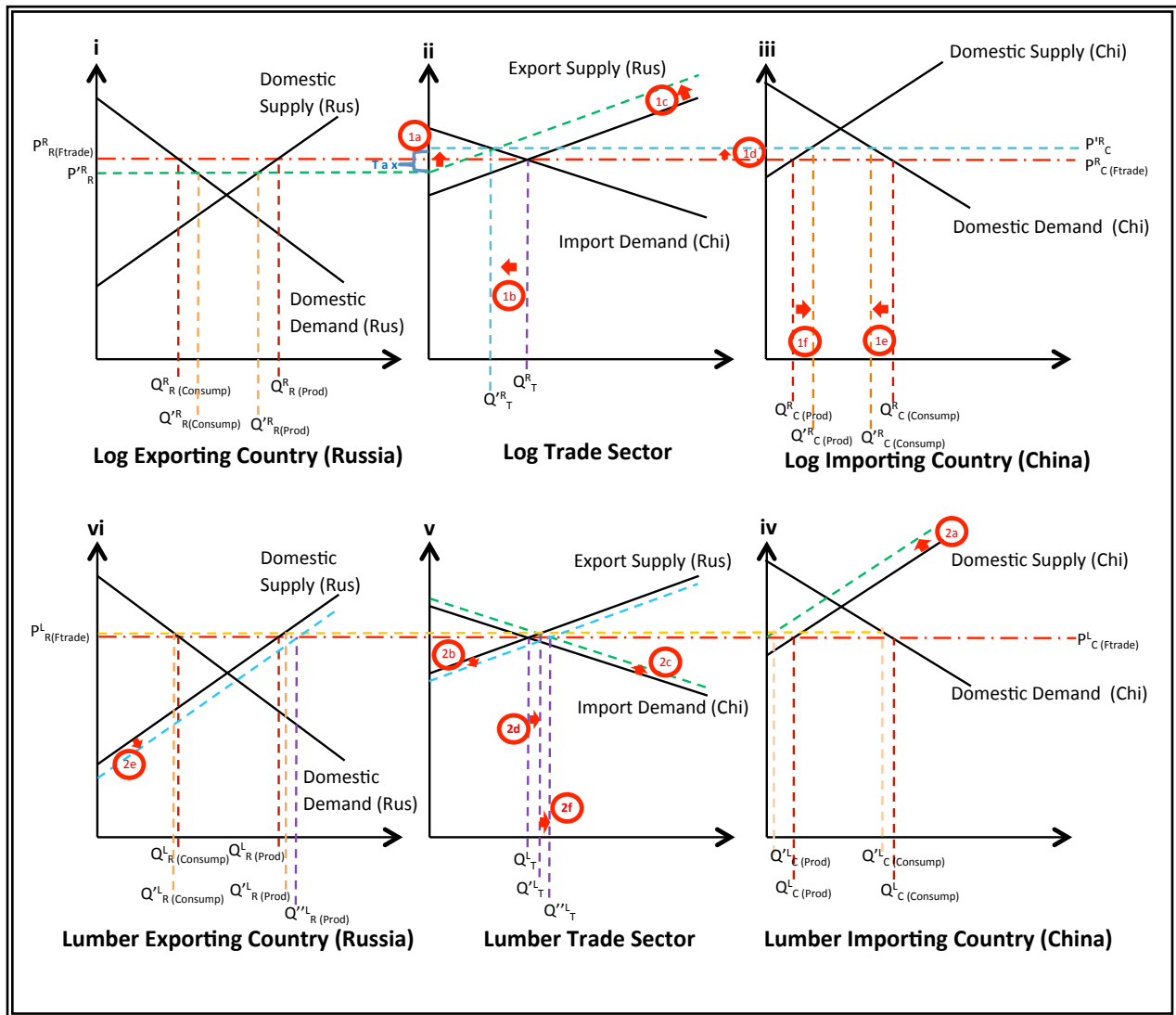


Figure B3: Two sector (roundwood and lumber) model showing both the effect of an export tax on roundwood and the potential for a feedback effect on the lumber sector.

The feedback effect is demonstrated in Figure B3, from diagram (iii) to diagrams (iv) through (vi) in a clock-wise movement:

Diagram iv) China's domestic lumber market

Step 5) The price increase of log imports from Russia leads to higher production costs for lumber producers in China, and thus a contraction of supply (indicated as **2a** which is a shift back in the domestic supply of lumber in China).

Diagram v) Lumber Trade Sector **

Two effects can occur simultaneously in the lumber trade sector:

Step 6) As a result of the lowered costs of sawnwood production in Russia, there would be an increase in the excess supply of lumber traded from Russia (indicated as **2b**).

Step 7) As a result of a feedback effect, import demand for lumber increases (indicated as **2d**) and there is an increase in the quantity of lumber traded (indicated as **2c**).

Diagram vi) Russia's domestic lumber sector

Step 8) In the case of Russia's export tax on logs, the domestic log price is hence relatively lower than the world price, and thus acts as an indirect subsidy for log production. Since logs are the primary input into lumber production, an indirect effect of the export tax would be to increase the supply of lumber production (costs of roundwood are lower and the quantities that sawnwood suppliers want to supply are larger at each and every price). This can be represented by an outward shift in Russia's lumber supply (indicated as **2e**). Russia's domestic lumber production would shift out to $Q''^L_{R(Prod)}$.

Step 9) Increasing Chinese import demand can cause an increase in the price of lumber to China. Hence Russia's exports of lumber to China increase as domestic consumption decreases and production increases to account for the increased foreign demand. However, if the increase in lumber exports due to this excess supply is high enough, it could counter-act any potential increase in lumber prices due to a feedback effect – thereby outwardly shifting Russia's export supply of lumber even more than would have been expected purely from any feedback effects (indicated as **2f in diagram v, the lumber trade sector**)

Model implications:

* In reality, there are many countries supplying logs to China, and thus due to the price increase of log imports (from Russia), the quantity of logs domestically produced could either increase OR China could chose to increase imports of logs from other countries instead.

** With regard to the dynamics of increased lumber production in the exporting country compared to the ability of a feedback effect to increase lumber prices in the trade sector compared, Gilbert (2000) finds:

The shift in supply functions feeds back into the demand for logs. A new equilibrium will eventually be reached where the price paid for logs is higher in the importing than in the exporting country. The restriction of exports of logs unambiguously causes an expansion of lumber exports if there is a feedback (note, however, that the tax also causes the excess supply curve in the exporting country to expand, so the effect on lumber price is ambiguous) (p. 47).

[...]

Note that if we allow for some market power in the log market and maintain the small country assumption for the lumber market (ignoring the possibility of indirect impacts on lumber prices) [...] then in this case it is possible that welfare may rise with a tax. However, this requires some of the incidence to be pushed onto the world market. The implication is that, while it is possible to increase welfare and processing at the same time, the two objectives are competing (the more successful the policy is in attaining one goal, the less successful it must be in attaining the other), a fact also observed by Keppler (1985) (footnote 3, p. 106).

[...]

If the country has market power in logs, but none in lumber (and again, ignoring the possibility of indirect effects on prices) an export tax would be strictly preferable to either an export subsidy or processing subsidy. This is because an export or processing subsidy leaves the price paid to domestic log producers equal to the world price, and since exports of logs fall, this must rise. Wages still rise as well, but the implication is that the return to owners of natural resources may rise. If this were to occur, a subsidy would have the effect of increasing transfers to foreign owned factors (in addition to the usual transfer to foreign consumers) (footnote 5, p. 107).

[...]

If we assume that the effect of a rise in log prices on the price of lumber in the home country is small, and the lumber consumption is only a small proportion of total consumption [...] then an export tax will tend to raise the foreign price of both logs and lumber (a situation that would be viewed favourably by a country exporting both of these products). It is important to note however, that it need not do so. Thus the assumption of a positive feedback effect in prices is not justified. Wiseman and Sedjo (1981) treat the limiting case of feedback as a rise in the price of logs having no effect on the world price of lumber. In fact, a rise in the price of logs could conceivably be accompanied by a decline in the price of lumber” (p. 91).

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