BELLA ABLAYEVA
The Impact of Currency Devaluation on US Poultry Exports: The Case of Russia
(Under Direction of GLENN C.W. AMES)

The objectives of this study were to describe the Russian market for imported US poultry meat in the 1990s and to analyze the impact of the Russian ruble devaluation on the volume and value of US chicken leg quarter exports to Russia.

The currency devaluation shock was simulated using the Global Trade Analysis Project (GTAP) as combined effects of a subsidy on all Russian exports and tax on all imports. The results include changes in world poultry prices, trade and production. Following the 75% ruble depreciation, Russian poultry imports fell and domestic prices of poultry and other foods rose.

US poultry meat exports to the Russian market declined, pushing more dark meat onto the domestic market and other export destinations. Prices in the US wholesale market fell. Thus, exchange rate changes in a primary export market had a ripple effect on the commodity in both the importing and exporting country.

INDEX WORDS: Poultry Trade, Russia, Global Trade Analysis Project

THE IMPACT OF CURRENCY DEVALUATION ON US POULTRY EXPORTS: THE CASE OF RUSSIA

by

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Посвящается моей Маме

To My Mother

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CHAPTER 1

INTRODUCTION

US Poultry in the World Market

The US is the largest producer and exporter of poultry products in the world. In 2000, the US produced 16.36 million metric tons of poultry meat, mainly chicken meat, exporting 2.82 million metric tons to the world market (USDA, FAS, March 21, 2001). The major poultry importing countries and regions of the world are the former Soviet Union led by Russia, Japan, Hong Kong, China, and the Middle East. In the export market, the US competes with Brazil, France, and the Netherlands (Michel, 1998).

Poultry exports have become very important to the US poultry industry. Delmi Salin (2001) indicates that "exports of 5.5 billion pounds accounted for almost one-fifth of US broiler production in 2000 and are expected to continue increasing their share of production in 2001" (p. 7). In 1989, exports accounted for only 4.7% of total production, but during the 1990s, exports increased from 7.1% of production in 1992 to 15.2% of production in 1995 (USDA, *Poultry Outlook*, Feb. 16, 1995). In 2000, the major importing countries for US poultry were: Hong Kong, Russia, Mexico, Canada, Japan, China, and Poland (USDA, FAS, March 2001). In the mid-1990s, Russia dominated the import market for US poultry meat but lost its first place ranking due to the financial crisis of 1998. The value and volume of US poultry meat exports, by country, from 1995 to 2000 are reported in Tables 1.1 and 1.2, respectively. In both tables, countries have

Table 1.1. Value of US Poultry Meat Exports, by Country, Calendar Years, 1995–2000

Country	1995	1996	1997	1998	1999	2000
			$1000			
Russian Federation	603,440	912,573	789,238	537,372	152,972	325,631
Latvia	1,314	72,866	96,597	91,038	136,256	61,908
Estonia	53,112	24,714	18,157	35,146	79,262	36,269
Georgia	0	1,012	4,924	38,549	13,208	38,419
Hong Kong	402,524	419,779	435,956	369,979	406,992	388,104
Japan	171,247	171,508	133,603	139,003	136,418	131,611
Canada	169,117	169,093	201,437	230,765	218,488	242,573
Mexico	164,260	208,256	227,130	230,830	200,095	249,401
Poland	47,215	56,302	54,076	56,065	26,328	24,964
China	33,892	60,345	52,413	38,474	49,477	45,363
Korea	30,786	28,054	27,782	13,248	40,692	52,883
All others	345,619	359,864	376,765	398,917	364,663	372,390
Total Exports	2,022,526	2,484,366	2,418,078	2,179,386	1,824,851	1,969,516

Source: USDA, FAS, "Status of Meat and Product Exports as of 2000", *Livestock and Poultry: World Markets and Trade, Commodity and Country Analysis*, Table 7. March 2001.

URL: http://www.fas.usda.gov/dlp/circular/2001/01-03lp/toc.htm

Table 1.2. Volume of US Poultry Meat Exports, by Country, Calendar Years, 1995–2000

Country	1995	1996	1997	1998	1999	2000
	- Metric Tons [a] -					
Russian Federation	728,828	937,048	987,001	730,358	328,507	643,111
Latvia	1,295	70,604	114,831	134,732	314,312	141,145
Estonia	61,957	27,461	25,463	52,260	164,343	70,879
Georgia	0	1,195	6,431	49,519	28,242	62,581
Hong Kong	469,185	506,357	536,950	533,968	660,874	679,436
Japan	127,881	129,381	107,236	109,339	109,096	109,831
Canada	61,272	68,030	79,962	99,593	100,064	115,406
Mexico	156,783	180,014	206,783	243,476	240,497	283,910
Poland	56,618	64,916	68,892	69,916	45,904	51,248
China	42,758	79,996	69,786	59,255	76,573	83,319
Korea	24,577	21,640	20,576	13,160	59,401	83,650
All others	306,181	302,887	356,290	449,798	484,289	523,319
Total Exports	2,037,335	2,389,529	2,580,201	2,545,374	2,602,102	2,847,835

[a)] Product Weighted Equivalent

Source: USDA, FAS, "Status of Meat and Product Exports as of 2000", *Livestock and Poultry: World Markets and Trade, Commodity and Country Analysis*, Table 8. March 2001.

URL: http://www.fas.usda.gov/dlp/circular/2001/01-03lp/toc.htm

been ranked according to the largest volumes and values in year 2000, except for the Baltic Republics, Latvia and Estonia, and the Republic of Georgia.

The composition of agricultural trade between the US and Russia changed from dominance of grains and oilseed meals during the 1970s and 1980s to meat and other consumer-ready products after 1992. In 2000, poultry meat accounted for 54% of the total value of all agricultural exports to Russia, or $325.6 million (USDA, FATUS, November 02, 2001).

While poultry meat has been the dominant export commodity to Russia, exports have fluctuated widely due to economic conditions in the importing country. In 1996, poultry meat, valued at $912 million, accounted for almost two-thirds of the value of all US agricultural and food exports to Russia (Table 1.3). The Russian market accounted for 40% of all US poultry exports world wide in that year. However, the dominance of one important market can have a significant impact on export revenue if economic conditions change in the import country.

Russia's current economic crisis began in August 1998. The main cause of this crisis was the Russian government's decision to default on its short-term international debt, resulting in the devaluation of the ruble on August 17, 1998. After the Russian ruble devaluation of August 1998, US exports to Russia dropped significantly (see Figure 1.1). Even though poultry exports also declined, they fell at a slower rate than all other exports to Russia. Thus, poultry meat exports to Russia represent an excellent case study of the impact of economic conditions—the ruble devaluation and changes in trade policy—on US exports of agricultural products to the major market in the Newly Independent States (NIS) region.

Table 1.3. Total US Agricultural Exports to Russia, Calendar Years, 1995–2000

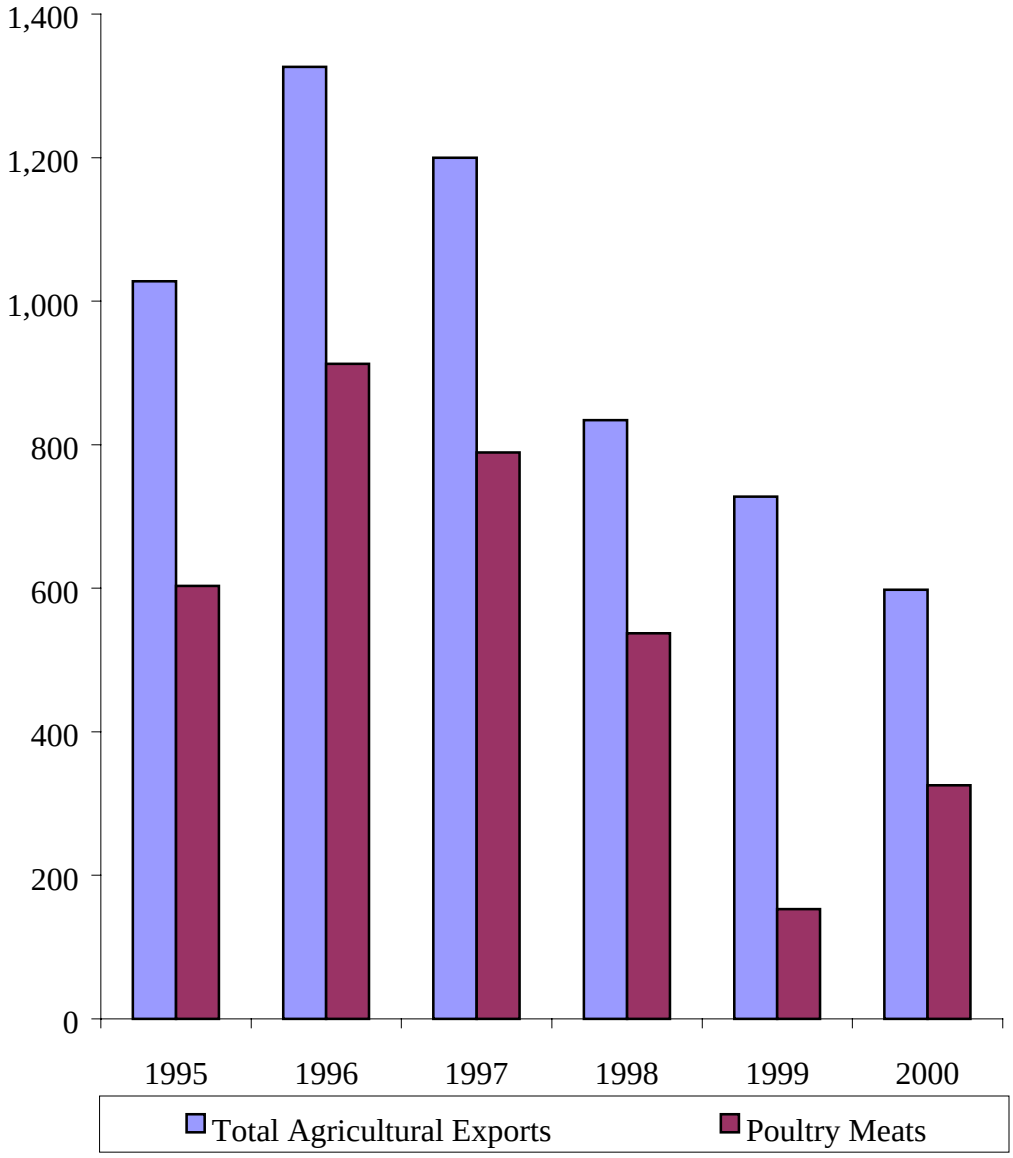
	1995	1996	1997	1998	1999	2000
			$ Million			
Total Agricultural Exports	1,027.86	1,326.30	1,199.91	834.17	727.63	598.12
Poultry Meat Exports	603.44	912.57	89.24	537.37	152.97	325.63
Total US Exports	2,823.34	3,345.85	3,364.92	3,552.62	1,845.68	2,318.00
Share of Poultry Meat in Total Agricultural Exports (%)	58.70	68.80	65.80	64.40	21.00	54.40
Share of Agricultural Exports in Total Exports (%)	36.40	39.60	35.70	23.50	86.00	25.80

Source: USDA, ERS, FATUS, *US Trade Exports - FATUS Commodity Aggregations*.

November 02, 2001.

URL: http://www.fas.usda.gov/ustrade/USTExFatus.asp

Figure 1.1. Value of Total US Agricultural Exports to Russia, 1995-2000, in $ Millions



Source: USDA, ERS, FATUS, *US Trade Exports - FATUS Commodity Aggregations*. November 02, 2001. URL: http://www.fas.usda.gov/ustrade/USTExFatus.asp

Objectives

The objectives of this study are: (1) to describe the economic situation in the Russian market with reference to US poultry meat imports in the 1990s; (2) to analyze the impact of the devaluation of the Russian ruble on the volume and value of US chicken leg quarter exports to Russia; (3) to estimate the impact of the Russian poultry meat import embargo of 1996 and changes in Russian import tariff policy on export prices; and (4) to analyze the effects of the ruble devaluation on the US chicken leg quarter prices.

Russia's Economic Crisis and Its Effect on Agricultural Trade

The primary cause of the ruble devaluation was a drop in world prices of Russia's main exports (energy and metals), which put pressure on the ruble and reduced export tax revenue(USDA, ERS, March 8, 2001). This caused a large rise in the government's budget deficit as a result of increased expenditures and lower tax revenues. Another important factor was the spill over effect from the Asian crisis on investor confidence in Russia (USDA, ERS, March 8, 2001). Andrey Illarionov, the editor of *Izvestia*, a leading Russian newspaper, believes that a shortage of liquid reserves of hard currency to meet loan repayment commitments contributed to the unavoidability of the ruble's devaluation (*Izvestia, Financial* News, July 2, 1998, p. 5).

Stefan Osborne (2001) argues "the ensuing financial crisis caused foreign investors to sell ruble-denominated assets, resulting in a significant depreciation of the ruble. The weak ruble caused the price of imports to rise relative to the price of domestically produced goods" (p. 2). Devaluation of the ruble was not only unavoidable but also beneficial to the Russian economy, according to some Russian economic

commentators. The devaluation of the Ruble may provide a partial solution to a list of micro economical problems in Russia. It changed the level of the internal prices in the country in relationship to imported goods from the rest of the world, making domestic producers more competitive in the internal market in the short term (*Izvestia, Financial News*, July 2, 1998, p. 5).

Russia's economic crisis strongly affected the country's agricultural and food sectors in particular. Stepan Pavlovsky, a correspondent for *Izvestia*, mentioned that, immediately after the August 1998 crisis, the devaluation of the national currency, along with the government's directive to raise customs duties, resulted in reduction of imports by one-fourth (*Izvestia*, September 3, 1998, p. 2).

The ruble devaluation and the increase in import tariffs raised prices on imported foodstuffs, reducing urban consumers' real incomes. The ruble crisis reduced the demand for food and lowered food consumption. Prices for domestic foodstuffs rose in proportion to the depreciation of the ruble. Real consumer income and wealth fell drastically.

Russian Market Immediately after the Devaluation

According to *Izvestia*, "People started buying all the products [mainly food] 'just in case.' Prices rose and food supplies became scarce. Prices in the market rose by 30–40% and it became apparent that this was too much for Russian consumers. Their real incomes fell. They were not able to buy as much food at the moment of crisis as they wanted. The importers could not clear customs for fish, milk products, and other food imports because of the banking system's collapse" (*Izvestia*, September 1, 1998, p. 1).

Moscow's food market reacted immediately to the falling ruble exchange rate. On Thursday and Friday, August 18 & 19, 1998, almost all the importing companies stopped

their sales to wholesalers, dealers and distributors, reasoning that instability in the currency market would jeopardize payments for food imports. Food imports to Russia were completely stopped (*Izvestia, Financial News,* September 1, 1998, p. 1).

Russian manufacturers who depended on imported materials—wrapping, packaging, food ingredients, and raw materials—also either stopped their sales or raised their prices to recover higher costs of food processing. Wholesale markets and retail stores experienced a sharp increase in the price of the primary food groups. Prices for imported alcohol rose by 5–10%, tea by 40%, coffee by 30–40%, sunflower oil by 50%, chicken leg quarters by 40%, butter and cheese by 15% and sausage products by 10%. (*Izvestia, Financial News,* September 1, 1998, p. 1).

Moscow's citizens [moskvichi] with disposable income rushed to the wholesale markets to buy food. The capital, Moscow, like other Russian megalopolises, is almost entirely supplied by imported food products. In the early transition period, imports accounted for nearly 80% of all food consumed in Moscow and St. Petersburg (RUSAG-L, Feb. 4, 1997). The currency crisis resulted in a frenzy of food purchases in the local market to avoid rising prices. In Moscow, for example, 80–90% of the city's meat is imported from abroad. Meatpacking plants buy a large part of the imported meat, depending on their needs, and cut and repackage it for the wholesale market. The prevailing domestic products on the wholesale market are vegetables, bread, and milk (*Izvestia,* September 1, 1998, p. 1).

The devaluation also resulted in a backlog of imports in the warehouses. The State Customs Committee of Russian Federation (GTK RF) accumulated enough food in its storage facilities to supply the whole population for three months. In addition, the

public usage of products stored there would be enough to satisfy the urban area's demand for six months. Imported cargos had cleared inspection but could not be shipped due to overdue customs duties, which precipitated some bottlenecks in the food distribution system. While September was expected to be a peak month for imports and revenues for the state treasury due to higher customs fees, food imports declined drastically in the fall of 1998, due to the economic crisis (*Izvestia*, September 4, 1998, p. 2).

The ruble declined from 6.02 rubles/dollar to 14.13 rubles/dollar between January 1998 and September 1998, a decline of 57.4% in nine months (Table 1.4). The further devaluation of the ruble after 1998 continued the crisis. The ruble declined another 37.7% between September 1998 and January 1999. The exchange rate continued to fall throughout 1999, declining from 22.61 rubles/dollar on January 1999 to 26.71 rubles/dollar on December 1999, a devaluation of another 15% (Table 1.4).

Russian Economic Recovery

In the fall of 1999, the Russian economy began to recover. One of the main reasons for this recovery was the rise in world prices for energy, thereby increasing both Russian export earnings and government revenue. Also, by improving the price competitiveness of Russian output *vis-à-vis* the world market, the crisis-induced depreciation of the ruble stimulated domestic production. Outputs of both import-competing goods and traditional exports rose (USDA, ERS, March 8, 2001).

The crisis may help rather than hurt Russian agriculture. The rise in domestic producer prices for traded agricultural goods should stimulate production. On the other hand, the ruble's depreciation has improved the price competitiveness of Russian producers, not only in agriculture but economy-wide, *vis-à-vis* foreign competitors. Certain sectors of the Russian economy may benefit from the crisis of August 1998,

Table 1.4. Monthly Average Russian Ruble/US Dollar Exchange Rate, 1994–2001

	1994	1995	1996	1997	1998	1999	2000	2001
January	1535.80	3836.30	4688.20	5606.40	6.02	22.61	28.08	28.22
February	1579.10	4214.80	4761.00	5657.80	6.05	22.94	28.74	28.34
March	1717.30	4721.00	4830.00	5705.80	6.07	23.30	28.48	28.51
April	1790.10	5039.00	4899.00	5742.90	6.13	24.98	28.07	28.62
May	1876.60	5053.90	4979.00	5756.40	6.15	24.39	28.04	29.04
June	1952.20	4724.60	5065.00	5764.40	6.20	24.15	27.71	28.98
July	2022.90	4522.50	5150.50	5788.30	6.24	24.13	27.61	
August	2118.20	4415.00	5303.40	5816.00	7.19	24.69	27.76	
September	2346.40	4471.60	5387.90	5853.00	14.13	25.15	27.84	
October	3065.40	4501.30	5436.10	5874.50	16.27	25.61	27.88	
November	3144.00	4539.00	5492.60	5912.10	17.20	26.17	27.64	
December	3388.20	4619.80	5541.70	5942.00	20.70	26.71	27.72	
Annual average	2314.80	4554.90	5127.90	5785.00	9.86	24.57	27.96	28.28

Note: During the currency reform that occurred on January 1, 1998, all currency was redenominated so that one thousand old rubles equaled one new ruble. The data before January 1, 1998 can be divided by 1,000 in order to calculate consistent exchange rates after the redenomination.

Source: University of British Columbia, Vancouver, Canada.

URL: http://pacific.commerce.ubc.ca/xr/data.html

ceteris paribus, since it improved the price competitiveness for selected trade-competing products.

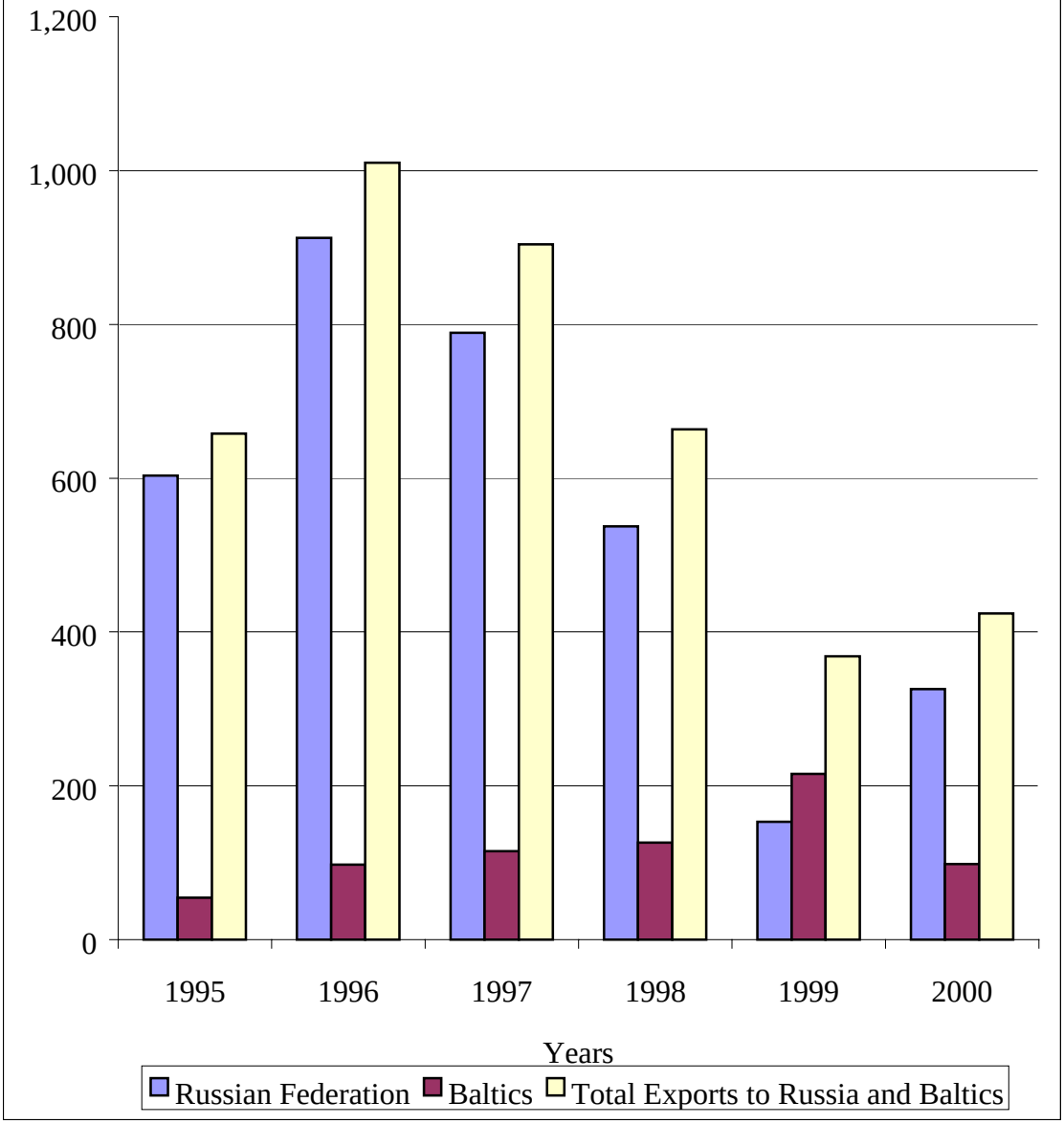
In 1999, output by the food processing industry rose 10% over the previous year, further evidence that Russian producers are responding to ruble depreciation by expanding output (USDA, ERS, 1999). Ruble depreciation appears to have helped the food processing industry, which competes directly with imported processed foodstuffs (House and Raftery 2001, p. 1).

Falling food consumption and ruble depreciation have resulted in a decline of commercial imports of agricultural products and food. Imports from the US to the Russian Federation fell from $1.2 billion in 1997 to $727 million in 1999. Poultry imports drop even more, from $789.24 million to $152.97 million between 1997 and 1999, a decline of 80.5% in two years (see Table 1.3).

After the crisis, the total value of US agricultural exports to Russia, including poultry, dropped to 20-25% from the previous period (Figure 1.2). Within a year, US f.o.b. dark meat prices fell from $0.36/lb in August 1998 to $0.16/lb in August 1999, a decline of 55.5% (USDA, AMS). Specifically, US poultry export prices to Russia fell more than 50% relative to prices in August 1998 (USDA, FAS).

Another important issue in US-Russian poultry trade is black market imports; that is, shipments bypassing Russian Federation customs collection points. According to Dmitriy Ivanov, a correspondent for *Rossijskaia Gazeta*, the Russian “chicken market” is valued at 1–1.2 million metric tons per year. Half of the chicken on the market comes from the US. Before the crisis, a few large operators legally imported 70–120 tons per month. Currently, according to some sources, legal imports are much lower because

Figure 1.2. Value of US Poultry Meat Exports to Russia and Baltic Region, 1995-2000, in Million Metric Tons



Source: USDA, FAS, "Status of Meat and Product Exports as of 2000", *Livestock and Poultry: World Markets and Trade, Commodity and Country Analysis*, Table 8. March 2001.

URL: http://www.fas.usda.gov/dlp/circular/2001/01-03lp/toc.htm

black market importers supply the merchandise bypassing customs, thus avoiding high import tariffs (*Rossijskaia Gazeta,* March 11, 2000, p. 8).

The reasons behind black market imports are simple. In November 1998, the value of the ruble fell two times in relation to the dollar. Although US poultry prices fell after the crisis, the tariff importers paid for the product at the customs (0.3 euro/kg, which is equivalent to $0.73/lb) remained the same. As a result, the tariff component of the price of the chicken meat rose 5–6 times per kilogram. This gave the black market importers a tremendous opportunity for growth, since they avoided customs duties wherever possible. Small companies substituted for large operators. Combining their financial resources, they would buy a ship load of chicken (6,000–8,000 tons), bring it to Riga's seaport, unload the merchandise into trailers, and ship it from Latvia around customs checkpoints to Russia (*Rossijskaia Gazeta,* 2000, p. 8). Growth in US poultry meat exports to the Baltic region before and after the crisis is shown in Table 1.5.

The first attempts to improve the situation were made by the heads of the State Trade Committee in December 2000. The import rules for the American leg quarters imports were toughened. Unfortunately, this action did not bring the expected results. Currently, a small reduction of the import tariffs is much more promising. As one of the importers declared, "…with new duties, legal importers have an opportunity for positive profitability" (*Rossijskaia Gazeta*, 2000, p. 8).

Certainly, an instant change in the import situation was not possible. Eighteen months of inactivity led many companies to sell their subsidiaries and storage facilities. Therefore, they will not be able to handle large import quantities in the future. It is quite possible that in 2001 the legal companies will get back on track and compete against the

Table 1.5. Value of US Poultry Meat Exports to Russia and Baltic Region, Calendar Years, 1995–2000

Country	1995	1996	1997	1998	1999	2000
			$ Million			
Russian Federation	603	913	789	537	153	326
Baltic Region	54	98	115	126	216	98
Total Exports to Russia and Baltic Region	657	1,011	904	663	369	424

Source: USDA, FAS, "Status of Meat and Product Exports as of 2000", *Livestock and Poultry: World Markets and Trade, Commodity and Country Analysis*, Table 8. March 2001.

URL: http://www.fas.usda.gov/dlp/circular/2001/01-03lp/toc.htm

black market importers on the Russian market. It is important to consider another outcome as well. According to A. Gordeev, the Minister of Agriculture and Foodstuffs, eliminating the black market import channels will cause the import volume to decrease dramatically, leading to the extinction of alleged dumping prices (*Rossijskaia Gazeta*, 2000, p. 8). Low income Russians will lose the ability to enjoy low-cost food imports due to their inability to afford them.

Data and Methodology

The Global Trade Analysis Project (GTAP) model (Hertel, 1998) was utilized to simulate the impact of the currency devaluation on US poultry meat exports to Russia. Since currency devaluation cannot be modeled directly in GTAP, we can derive it by simulating the impact of a Russian import tax or tariff. An import tax on US dark meat imports can be made the equivalent to the actual percentage change in the dollar/ruble exchange rate. To carry out explicit modeling in GTAP, the special GEMPACK software was utilized. GEMPACK (General Equilibrium Modeling PACKage) is a general-purpose economic modeling software package especially suitable for general and partial equilibrium models (Hertel, 1998). It can handle a wide range of economic behavior. In this case, it will be used to analyze the impact of the devaluation of the Russian Ruble on poultry meat imports from the US.

The popular belief is that Russia will gradually become a stronger economy in the world (Michel 1998, p. 42). In this case, the GTAP simulation could be used to predict possible appreciation of the Russian ruble relative to US dollar. This information could help predict the medium term outlook for US poultry meat exports to Russia and the rest of the world.

Since the Ruble devaluation should theoretically reduce US exports to its primary market, the impact on poultry meat export prices, before and after the crisis, was analyzed. Monthly data from January 1994 to April 2001 were used in the analysis of poultry meat export prices also. This period was chosen to analyze changes in export volumes and values affected by devaluation of the Russian Ruble in August 1998. This data covers a significant period before and after devaluation. The US Department of Agriculture's Foreign Agricultural Service supplied the data on the quantity and value of monthly US exports of chicken leg quarters to Russia and other world markets. The detailed description of the data used in the thesis is given in Chapter 4.

Organization of the Thesis

This thesis is organized into several chapters. The review of literature on the world poultry market, trade barriers and theoretical issues are presented in Chapter 2. The US market share for poultry meat in Russia is presented in Chapter 3. The US chicken leg quarters price analysis is presented in Chapter 4. The Global Trade Analysis of Russian devaluation on US poultry meat exports, and its impact on overall welfare is presented in Chapter 5. The conclusions and implications are presented in the last chapter of the thesis.

CHAPTER 2

LITERATURE REVIEW

US poultry trade has become an important and interesting subject for analysis due to the rapid rise in poultry product exports in the last 15 years. Several studies have been conducted on different aspects of US poultry trade, including competition with other exporters and the comparative advantage of the US poultry industry among competing producers.

Koo and Golz (1994) developed a spatial equilibrium model to evaluate optimal production and trade flows of broiler meat among three countries—US, Canada and Mexico. The authors developed a model with seven different scenarios. The base model scenario used existing trade policies in the US, Canada and Mexico, where the transportation costs among the three regions were adjusted to incorporate import tariffs for all three countries. Other constraints were added in the model to include quotas and import licensing. Scenario two eliminated the Canadian import quota and tariffs between the US and Mexico, while scenario three removed Mexican import licenses and tariffs between the US and Mexico, respectively. Scenario four simulated a complete free trade environment. Scenarios five and six simulated free trade with an increase in each region's production capacity by 15% and 30%, respectively. Based on these six scenarios, they concluded that "eliminating trade barriers would increase the need for production capacity in the US, that has a comparative advantage over Canada and Mexico in producing broiler meat" (Koo and Golz 1994, p. 510).

The last two alternative scenarios used by Koo and Golz dealt with how the US Dollar appreciation or depreciation would affect trade flows of broiler meat between these three countries. They assumed that an appreciation of the US Dollar relative to the Canadian Dollar and Mexican peso would have a greater impact on trade between the US and Mexico than on trade between the US and Canada. Their results indicated that trade between the United States and Mexico is more sensitive to changes in exchange rates than trade between the United States and Canada (Koo and Golz 1994, p. 510).

Narrod and Pray (2001) conducted a study on technology, policies, and the role of the private sector in the global poultry revolution. They argued that private firms developed biological technologies and spread them throughout the world. “Imported private technology was important to the growth of private research but also emphasize the importance of complementary government investment such as veterinary services, which are provided by the public sector in many countries” (p. 1). Poultry technology was relatively easy to transfer between countries.

The above-referenced authors believe that the major factor responsible for the expansion of poultry production in less developed countries is an increase in productivity. They argue that the “Poultry Revolution” was based on biological technology—new poultry breeds—which were developed primarily by private sector investment. Complementary inputs for an increase in productivity were high quality feed, pharmaceuticals and supplements to prevent disease. In order to get improved poultry breeds and the inputs needed for high productivity, countries either had to develop their own poultry flocks through public and private breeding or import improved breeds.

Countries also had to import or produce their own feed, medicine, and buildings (Narrod and Pray 2001, p. 2).

Rapid technological change is also discussed in Narrod and Pray's study. Advances in breeding that improved animal size, fecundity, growth rate, and uniformity have increased output per unit of feed, helped to decrease mortality and better control animal disease. All the above-mentioned factors produced rapid technological change in the poultry industry and "helped expand the large-scaled operations where poultry farmers were able to achieve significant economies of scale and unit cost reduction" (p. 2). In turn, "improvements in feed technology ensured that the improved breeds were using the ideal combination of ingredients at the least cost" (Narrod and Pray 2001, p. 2).

Narrod and Pray also discussed that "in the poultry industry, trade policies, regulations, and government investment have historically influenced poultry production by interfering with trade of inputs" (p. 7). Their concern is that those policies may impact agricultural development by slowing down technological progress and reducing farmers' access to modern inputs. They conclude that many countries are now "trying to increase domestic agricultural production by promoting policies that encourage the open trade of modern inputs and the transfer of technology from multinational companies" (p. 7).

Finally, Narrod and Pray specified a poultry supply response function similar to other output models, incorporating input/output price ratios, research expenditures, technological factors and factors specific to the poultry industry. They concluded that trade barriers, either tariff or non-tariff barriers can reduce access to new technology and result in lower productivity in the poultry sector (p. 17).

Orden, Josling and Roberts (2000) analyzed the influence of sanitary barriers among a broader set of factors and policy decisions that affect poultry trade flows and forecast further trade expansion opportunities. Six key exporting and importing countries and two aggregate rest-of-the-world (ROW) regions were used to construct an equilibrium model to simulate trade flows of poultry among major exporters and importers. Their model includes the two largest exporters, the US and Brazil, "two of the most significant importers" Japan and Russia, and China and EU, which are both exporters and importers. The authors draw the distinction between high-value and low-value poultry in the world broiler meat trade. The Russian market is predominantly a low-value market, according to the authors, due to its dependence on dark meat imports (p. 29).

The issues of avian and human health associated with poultry trade "have led to segregation by country of origin by importers and potential importers among suppliers and potential suppliers" (Orden et al. 2000, p. 25). Generally, domestic and international borders strictly control poultry imports. The conditions of industrial poultry production are accompanied by the threat of fast spreading disease. Since birds are concentrated in small areas, the threat of fast spreading disease is very prevalent. Poultry disease can be classified as universal and regional. Bronchitis, Coccidiosis and Gumboro are considered to be universal since they are spread throughout the world. Other diseases are mainly found in certain countries. Exotic Newcastle Disease (END) and Avian Influenza (AI) are considered to be highly infectious avian diseases and can cause "a perpetual problem for intensive poultry production, and can cause financial distress to affected producers" (Orden et al., p. 12).

In 2001, Josling, Orden and Roberts evaluated the impact of technical barriers on trade volumes and trade patterns, attempting to search for "missing" trade discouraged by those restrictions. They raise the issue of Sanitary and Phytosanitary (SPS) impact on trade flows.

Josling et al. (2001) argue that most countries that have modern poultry facilities do not export. On the other hand, some countries do not import a lot of poultry even though it is a cheap source of protein. The authors were searching for an explanation why exports are not more widespread, given the strong growth on demand for poultry meat. On the import side, it could be expected that SPS regulations supplement traditional trade barriers and "reflect domestic pressure in cases where imports increase" (p. 4). That is how the authors defined the essence of the "search for missing trade." They find a major explanation for that in economies of scale, plant size and feed availability, but also exporting countries' sanitary standards.

While reporting a significant increase in the demand for poultry meat, Josling et al. (2001) confirmed that "for many it [poultry meat] is the most affordable form of animal protein to supplement a diet of vegetable starches such as cereals, beans or root crops" (p. 5). On the production side, they mention that productivity gains in the production and processing of poultry have been matched by changes in distribution system. The major impact on poultry sales was also caused by the growth of supermarkets and retail outlets. At the same time, the production structure in US, Europe, Thailand and Brazil has become highly concentrated. Advanced management techniques allow production facilities to be located close to urban areas (p. 6).

Josling et al. emphasized that “poultry meat is increasingly traded as poultry parts, rather than as a whole birds, and is generally frozen” (p. 6). According to the authors, “divergent sanitary measures among countries are considered by many to be a serious impediment to trade for poultry and other animal products” (p. 16). They recommend that the adoption of international standards can benefit exporters. However, the major exporters, US, EU and Brazil, have different SPS standards, which ultimately restrict trade in poultry products.

The Russian poultry meat embargo of 1996 “increased awareness of the potential for SPS measures to seriously disrupt agricultural markets” (Orden et al. 2000, p. 25). The background motive for Russian officials to stop issuing import licenses for US poultry meat was a shipment of spoiled chicken leg quarters. On March 1996, with “high political pressure brought to bear on both sides,” an agreement on a new trade protocol was reached and shipments to Russia resumed (p. 26).

Another major SPS trade issue is the EU-US poultry dispute concerning microbial decontamination in processing facilities. While the EU uses trisodiummono-phosphate or lactic acid decontamination, the US uses less costly end-of-line chlorine decontamination. Disagreement in the EU-US poultry case mainly concerns the fact that US decontamination processes do not meet EU requirements. Meanwhile, in 1997, US increased restrictions on EU exports, but EU barriers to US poultry exports were not removed. Based on several simulation models, Orden, Josling and Roberts (2000) found that “Tariff Rate Quotas (TRQ) imposed on high-value poultry products by the EU result in lower world prices” (Orden et al. 2000, p. 46).

Sanitary issues also influence trade between the US and Brazil. The South American country has recurring outbreaks of poultry disease. Based on this fact, US had to preclude any potential trade between these two countries. It become obvious that three major exporting countries (US, Brazil and the EU) impose heavy SPS restrictions among themselves. It is interesting to note that "the EU does not find END a reason to block imports from Brazil, while the US does" (Orden et al., p. 27). The authors concluded "both the sanitary barriers that are imposed and those that might be expected but are not enforced, have implications for the flow of poultry products in the world markets" (p. 27). The relaxation of a non-trade technical barrier is one of the policy simulations, used by the authors. Authors emphasize that the EU eliminates TRQs but retains sanitary barriers with the US and China. EU domestic prices fall with the ROW, imports by EU expand, "putting upward pressure on the initial world price and inducing more exports, and less imports, around the globe" (p. 40).

The second simulation conducted by Orden et al. considered imposition of sanitary barriers. Russia was taken as an example for the low-value poultry products market. The authors assumed that Russia imposes an embargo on poultry imports from the US. Orden, Josling, and Roberts were surprised to find that the embargo "has no effect on the equilibrium quantities of exports and imports of each country or on the world equilibrium price" (Orden et al. 2000, p. 41).

Traditional Trade Barriers in the World Poultry Markets

Poultry product tariffs are now bound in the WTO. It means that their levels cannot be increased without offering compensation to trading partners. Importing countries establish 10–30% tariffs for imported commodities. This is a sufficient increase

in the final price of imported goods that allows domestic prices to rise above levels on the world market. Under the Uruguay Round Agreement on Agriculture all non-tariff border measures were converted to tariffs (Orden et al. 2000, p. 7). In the poultry market, tariff-rate quotas are considered to be a significant part of market access conditions.

In their study, Orden et al. (2000) give a review of different trade regimes in several major exporting and importing countries. They concluded that the Japanese market is relatively open. Tariffs in Brazil are bound at 35% on all poultry products. The EU established poultry TRQs. Brazil, Central and Eastern Europe "…have quota-restricted preferential access under Europe Agreement" (p. 8).

US poultry markets are protected by tariffs and some exports have been subsidized under the Export Enhancement Program (EEP). Poultry EEP subsidies were designed in order to allow US exporters to compete with subsidized exports from the EU (Moyer and Josling 1990, p. 217). Generally EEP has not been applied to exports to the Russian market. However, minor shipments of poultry for food aid have been made in 2000 (USDA, FAS, Food Aid Programs).

Russian Import Tariff Reform of 2001

According to Russian State Customs Committee, on January 1, 2001, new duty rates on thousands of commodities took effect in Russia, based on government resolution No. 886 signed on December 1, 2000 (Nowek 2001, p. 3). The new import tariff structure is supposed to standardize and unify Russian customs tariffs into four base rates of 5%, 10%, 15% and 20%. Duties on poultry and poultry items are set at 25% , down from 30%. For most poultry products, the expected measure means a reduction in duties. For some products, however, including poultry offals, all turkey, goose, and duck

products, currently subject to 15% but not less than 0.15 euros per kilogram import duties, the change means a significant increase. Initially, these new tariff rates are introduced for a period of nine months. Even though the estimated customs payments will be lower at 12%, Russian customs officials believe that it will eliminate the common practice of mislabeling imports in order to pay cheaper rates.

Nowek (2001) uses the two best-known examples of mislabeling products, such as chicken-turkey and flowers-greenery to illustrate importers' efforts to avoid higher tariffs. Improper labeling involves substituting turkey for chicken (taxed at 15% versus 30%, respectively), and greenery for cut flowers (taxed at 5% and 25%, respectively). Therefore, Russian customs officials concluded that the new import tariff reform will lead to an overall increase in customs revenues, since there will be less incentive to avoid duties on imported food stuffs. This policy change should simplify business activities with Russia and reduce barriers to foreign trade.

Smith and Maximenko (2000) assume that, in general, Russia will continue to toughen its regulations concerning imported poultry meat. In April 2000, the State Customs Committee (SCC) implemented restrictions on imported poultry meat from countries which do not have land routes with Russia (GAIN Report #RS1003, 2001, p. 3). This restriction is obviously discriminatory against importers of transoceanic poultry. However, the restriction does not affect border entry discrimination against US poultry (GAIN Report #RS0053, 2000, p. 2). If poultry tariffs become rationalized, US poultry is expected to have a bright future in Russia.

CHAPTER 3

US MARKET SHARE FOR POULTRY MEAT IN RUSSIA

Russian Data

The Ministry of Agriculture and Foodstuffs of the Russian Federation and Statistical Services at the Customs Committee of the Russian Federation generously provided annual data on imports of frozen broiler parts to Russia for the following market share analysis. This data set includes annual reports on quantities and values of broiler part exports to Russia by the US, as a major exporter, and the top 30 competing suppliers. The six primary competing exporters for the Russian market are the US, the Netherlands, Canada, France, Germany and Great Britain (Table 3.1). Data also specifies total Russian imports of frozen broiler parts from the whole world.

Availability of data on competing exporters were used to calculate market shares and compare prices of frozen broiler parts among different exporters to the Russian market. The data covers the period from 1994 to 2000. This permitted an illustration of year-to-year market share change. Data for quantities are in metric tons and volumes are specified in thousands of dollars.

Analysis of US Market Share for Poultry Meat in Russia

Overall exports of poultry meat to Russia consist mainly of dark chicken meat, broilers and some turkey meat. US frozen broiler part exports to Russia are predominately frozen chicken leg quarters. The market share analysis refers only to the position of frozen broiler parts or chicken leg quarters in the Russian market.

Table 3.1. Annual Quantities and Values of Frozen Broiler Parts Imported into Russia by Major Suppliers, Calendar Years, 1994 – 2000 [a]

	Suppliers						
Years	US	Netherlands	Canada	France	Germany	ROW	Total imports to Russia
	Metric Tons						
1994	171800	31229	678	886	1384	28134	234113
1995	374786	45612	789	1299	6067	51998	480551
1996	545737	13265	9387	1426	511	11081	581407
1997	674964	7976	6218	2568	764	25070	717560
1998	550265	11108	4753	6710	2161	16592	591589
1999	114376	5387	940	475	3373	9329	133880
2000	491311	23296	1088	3633	8431	40082	567841

Years	US	Netherlands	Canada	France	Germany	ROW	Total imports to Russia
	1000 lb						
1994	378.8	68.8	1.5	2.0	3.1	62.0	516.1
1995	826.3	100.6	1.7	2.9	13.4	114.6	1059.4
1996	1203.1	29.2	20.7	3.1	1.1	24.4	1281.8
1997	1488.0	17.6	13.7	5.7	1.7	55.3	1581.9
1998	1213.1	24.5	10.5	14.8	4.8	36.6	1304.2
1999	252.2	11.9	2.1	1.0	7.4	20.6	295.2
2000	1083.1	51.4	2.4	8.0	18.6	88.4	1251.9

Years	US	Netherlands	Canada	France	Germany	ROW	Total imports to Russia
	$ Millions						
1994	178.1	28.2	0.8	1.1	1.5	30.1	239.7
1995	336.7	32.3	0.7	1.1	5.2	37.6	413.5
1996	349.9	10.3	8.8	1.0	0.5	7.3	377.8
1997	491.5	6.0	7.1	1.8	0.5	16.5	523.5
1998	362.2	7.3	4.4	4.0	1.5	12.8	392.3
1999	76.3	4.2	0.7	0.4	2.9	6.5	91.0
2000	248.3	16.0	0.8	3.4	6.6	17.3	292.4

a) This data reflects only frozen broiler parts imports into Russia. Total poultry meat exports into Russia reach $904 million from the US alone in calendar year 1997, prior to the currency devaluation.

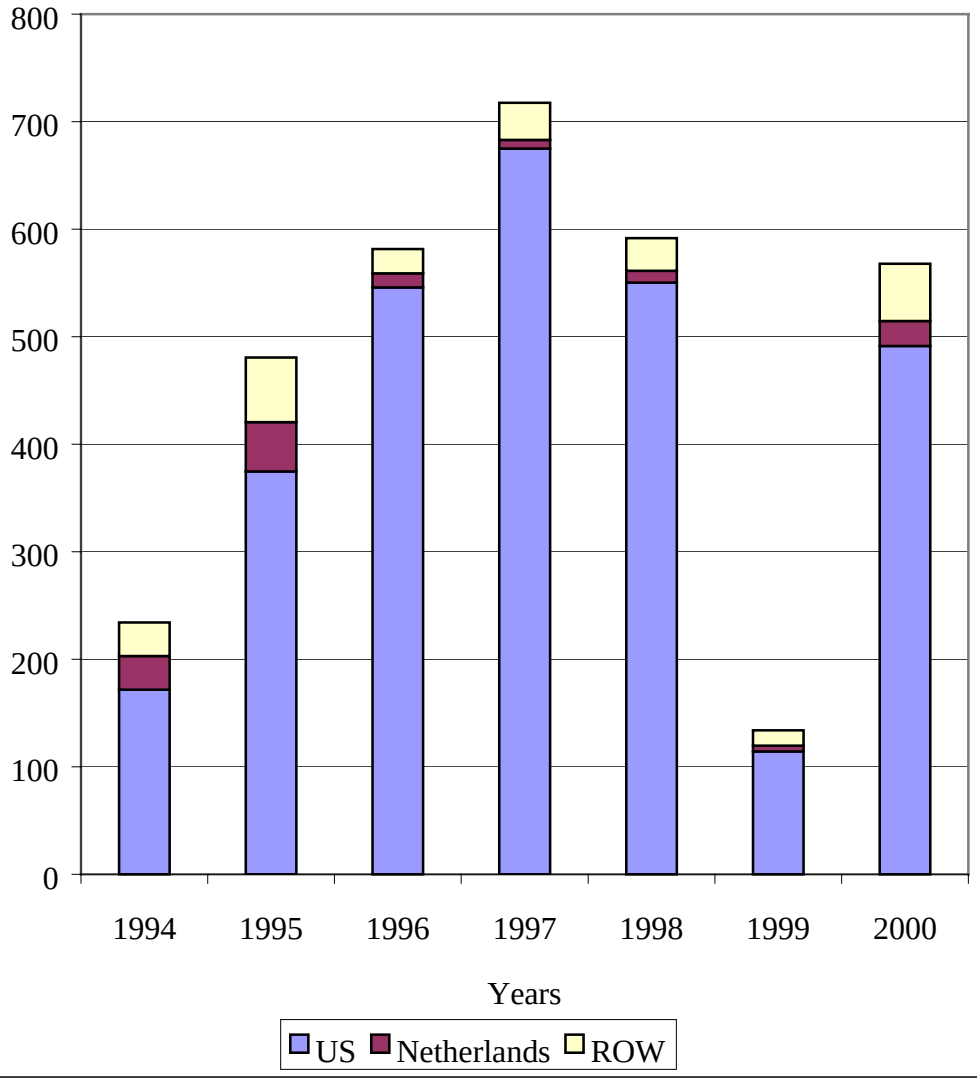
Source: Ministry of Agriculture and Foodstuffs of Russian Federation and Statistical Services at the Customs Committee of Russian Federation, (Ministerstvo Sel'skogo Hosjajstva I Prodovol'stvija RF, I Gosudarstvennij Tamozhennij Commitet RF, 2001.) *Annual Reports.*

The import market shares for frozen broiler parts suppliers were calculated using annual data obtained from the Ministry of Agriculture and Foodstuff of Russian Federation and Government Customs Committee of the Russian Federation. This data indicates that the US poultry meat exporters appear to have gained a dominant position in the Russian market during the 1990s (see Figure 3.1). Stefan Osborne (2001) emphasizes that "Russian poultry imports fell dramatically after the August 1998 crisis, but recovered in 2000. Since the US is the low-cost producer of imported Russian poultry, it is difficult for other poultry-exporting countries to compete for market share in Russia. The most significant competition for poultry exports to Russia comes from the EU" (p. 3).

Only the US, the Netherlands and the rest of the world (ROW) were chosen for illustration purpose due to the extremely small market shares of other suppliers. The market shares are divided into two parts, the pre-devaluation period (1994–1997) and post-devaluation period (1998–2000), based on the assumption that devaluation may have caused changes in the distribution of market shares. Detailed data on annual quantities and values of frozen broiler part imports and their average annual prices are provided in the Tables 3.1 and 3.2, respectively. The market shares by country of origin are represented in a separate Table 3.3.

In 1994, the US exported 171,800 tons of frozen broiler parts to Russia, representing 73.38% of the total broiler parts import market. Average annual import prices were calculated by dividing annual import values by annual import quantities by country suppliers in 1994. The average US import price was $0.47/lb, about 10% less than the average price for poultry imported from Canada, France, and Germany. The import price from the US was still $0.06/lb more than the average price offered by Dutch

Figure 3.1. Changes in Quantities of Frozen Broiler Parts Imported into Russia, 1994 – 2000, in 1000 Metric Tons



Source: Ministry of Agriculture and Foodstuffs of Russian Federation and Statistical Services at the Customs Committee of Russian Federation, (Ministerstvo Sel'skogo Hosjajstva I Prodovol'stvija RF, I Gosudarstvennij Tamozhennij Commitet RF, 2001). *Annual Reports.*

Table 3.2. Average Annual Prices of Frozen Broiler Parts Imported into Russia by Major Suppliers, Calendar Years, 1994 – 2000

Years	US	Netherlands	Canada	France	Germany
			$ per lb		
1994	0.47	0.41	0.51	0.56	0.49
1995	0.41	0.32	0.38	0.38	0.39
1996	0.29	0.35	0.42	0.32	0.48
1997	0.33	0.34	0.51	0.31	0.33
1998	0.30	0.30	0.42	0.27	0.31
1999	0.30	0.36	0.33	0.34	0.39
2000	0.23	0.31	0.32	0.43	0.35

Source: Ministry of Agriculture and Foodstuffs of Russian Federation and Statistical Services at the Customs Committee of Russian Federation (*Ministerstvo Sel'skogo Hosjajstva I Prodovol'stvija RF, I Gosudarstvennij Tamozhennij Commitet RF*, 2001). *Annual Reports*.

Table 3.3. Market Shares for Frozen Broiler Parts Imported into Russia, Calendar Years, 1994–2000

Market Shares by Quantity				
Years	US	Netherlands	ROW	Imported by US & Netherlands together
	Percent			
1994	73.4	13.3	13.3	86.7
1995	78.0	9.5	12.5	87.5
1996	93.9	2.3	3.9	96.1
1997	94.1	1.1	4.8	95.2
1998	93.0	1.9	5.1	94.9
1999	85.4	4.0	10.5	89.5
2000	86.5	4.1	9.4	90.6
Market Shares by Value				
Years	US	Netherlands	ROW	Imported by US & Netherlands together
	Percent			
1994	74.3	11.8	13.9	86.1
1995	81.4	7.8	10.8	89.2
1996	92.6	2.7	4.7	95.3
1997	93.9	1.2	5.0	95.0
1998	92.3	1.9	5.8	94.2
1999	83.9	4.7	11.4	88.6
2000	84.9	5.5	9.6	90.4

Source: Ministry of Agriculture and Foodstuffs of Russian Federation and Statistical Services at the Customs Committee of Russian Federation (*Ministerstvo Sel'skogo Hosjajstva I Prodovol'stvija RF, I Gosudarstvennij Tamozhennij Commitet RF,* 2001). *Annual Reports.*

exporters. For the past 7 years (1994–2000) the Netherlands was the US's main competitor in the Russian market, accounting for only 13.34% of the dark meat market shares in 1994.

Poultry Import Price by Supplier

During the period from 1994 to 2000, the highest average price of chicken leg quarters imported into Russia was registered at $0.56/lb in 1994 charged by French exporters, while the highest price for imports from the US was $0.47/lb, 16.1% less than French poultry. Although, the average US import price was $0.47/lb, the average price of its major competitor, the Netherlands, was $0.41/lb or 12.8% lower.

In 1995 the average price fell to $0.39/lb, stimulating an increase in the level of US broiler meat consumption in Russia. Total exports of chicken leg quarters nearly doubled, while the US exports to Russia increased 2.18 times. US market share increased by 5% despite the fact that the price for US frozen broiler parts was $0.03/lb higher than the price charged by its smaller competitors, Canada and France, and $0.09/lb higher than that charged by Dutch exporters to Russia.

In 1996, the US price for broiler parts fell to $0.29/lb and the US captured 93.86% of Russian market share. The US exported 545,737 tons of broiler parts to Russia, about 150% higher than the previous year's volumes. The temporary embargo did not affect annual export quantities but did impact monthly exports temporarily. While the US dark meat exports dominated the Russian market, the US also appeared to be a price setter in the market.

The peak demand for broiler parts occurred in 1997. The price for US produced dark meat was one of the lowest among suppliers at only $0.33/lb. Lower prices helped the US to increase the volumes of exports 23.75%.

The devaluation of August 1998 strongly affected Russian consumers purchasing power. Average and low-income individuals in Russia had to exclude chicken leg quarters from their food baskets. In 1999 Russian consumers were still impacted by a loss of purchasing power. Total imports from all sources declined drastically.

The post devaluation period (after August 1998) was stable relative to market share distribution between the major importers. However, imports drastically declined, accounting for only 114,376 tons in 1999, down 79.2% from the previous year. In 1999, the US market share fell by 7.5% from 1998.

The availability of the US chicken leg quarters in Russian stores made the transformation process slightly less difficult for the people with the low and average incomes. Even after the devaluation, dark meat remained the lowest priced source of the protein in Russia and was consumed regardless of the rapid increase of its price in Russian ruble terms (GAIN Report #RS0040, p. 2).

In the import market, poultry competes with pork and beef. In August 2000, the differential imported prices in Russia favored poultry at $0.94 per kilogram ($0.42/lb), while pork shoulders and beef trimmings are priced higher at $1.37 per kilogram ($0.62/lb), and $1.52 per kilogram ($0.69/lb), respectively. Within the market for consumer goods, competitive factors between the US and other exporting countries include price and quality (House and Raftery 2001, p. 4).

Russian importers started to restore their level of purchases in 2000. Chicken leg quarters exports rebounded to 567,841 tons, which is 4.2 times more than in 1999, and only about 15.7% lower than Russian imports in 1997, prior to the economic crisis.

In 2000, chicken leg quarters prices fell to $0.23/lb, 23% lower than in 1999, while other countries kept their prices at $0.31/lb and higher. However, the US still has not recaptured the same market share that it had in 1996 – 1998 period.

Promotional Activities

Import market shares may be influenced by export promotion as well as by excess supplies available in the export market. The regional trade policy of the USA Poultry and Egg Export Council (USAPEEC) office in Moscow focuses on establishing direct contacts with major regional trading companies that are interested in the distribution of US broiler meat in the Russian Federation (Davleyev, 1999). Various promotion activities are being held in order to maintain or expand market share in the regions of the Russian Federation. Promotional activities along with adequate supplies account for the growth in US market share.

According to Albert Davleyev (1999), the director of USAPEEC office in Moscow, “the period of easy growth for US broiler meat sales, which didn’t require intensive promotional activities, ended in 1998” (p. 1). Now in order for US poultry exporters to maintain their market share versus other exporters and Russian production, it will require stepped up efforts and resources. USAPEEC is addressing this challenge by reconsidering previous promotional practices and finding new effective ways of promoting US chicken exports to Russia.

Another important component of gaining and maintaining market share in the Russian market is expanding marketing coverage geographically. Regional coverage is considered to be very important to maintain high rates of sales growth. Promotional programs must be adapted to meet the needs of consumers and channel members in different regions (Allvine 1987, p. 203). USAPEEC put a lot of effort into promoting US poultry products in different regions of Russia. In the annual Russian market report in 1999, Albert Davleyev emphasized that "USAPEEC periodically carries out national outdoor advertising campaigns, aimed at increasing product awareness and interest in US chicken leg quarters. Advertisements were placed on 3x6 meter billboards on 95 fresh food markets in 11 major cities of Russia. In addition, over 45,000 colour stickers were placed in rail cars, in subway rail cars and buses in 19 other major cities" (Davleyev, 1999, p. 3). The promotional campaign was extremely successful, due to the excellent image of the appetizing roasted leg quarters, looking like a traditional Russian dish, and a well thought out media plan, which targeted consumers at points of sale and in public transport (Davleyev, p. 3).

In order to study the Russian market for US poultry meat, two big studies, "Chicken Legs Advertising Effectiveness" by Russian Public Opinion & Marketing Research (ROMIR) and "Poultry Meat Products Consumption" by COMCON Group Market and Media Research, were conducted for USAPEEC in 2000. The survey of advertising effectiveness, conducted by ROMIR, concluded that, most frequently, Russian consumers buy chicken legs (76%) or whole chicken (61%). As compared to the total sample, consumers who buy chicken legs come from an income group with a level of purchasing power that allows buying food, but not clothes (80%). On average, people

buy chicken legs once every two weeks and approximately two kilograms at a time. Fifty-nine percent of the respondents prefer chicken leg quarters from the USA. Most of the chicken leg quarters are bought in a market place (ROMIR 2000, p. 14).

COMCON's "Poultry Meat Products Consumption" study, held in ten major cities of the Russian Federation, surveyed a total of 2000 consumers. The main findings of their study indicated that broilers, chicken for soup and chicken leg quarters are the most popular poultry meat in Russia. The COMCON's survey also indicates that the share of customers buying domestic products is approximately equal to the share of those buying imported poultry products (COMCON 2000, p. 5).

Another conclusion of COMCON's study is that, when buying chicken leg quarters, buyers in Russia pay attention to both the producer and price. However, the importance of price is slightly higher than the importance of the producer. When buying chicken leg quarters, domestic Russian products are more attractive than US and Dutch products. According to the COMCON Group (2000), among the Russian consumers, poultry meat products are most often consumed at home; whole birds are mostly used for cooking broth as the base for soup, while chicken leg quarters are most often fried (COMCON, p. 7). Based on consumer interviews, the authors of the COMCON Group study concluded that chicken leg quarters are perceived as products for daily consumption. "Consumers believe that their price is acceptable. Chicken leg quarters have a strong positive association with the statements "for the poor" and "for elder people." Nevertheless, the relationship between the age and the level of consumption was found to be as follows: the younger the buyer, the more often they buy chicken leg

quarters (p. 11). The product is easily found on sale and produced mostly by foreign producers" (COMCON, p. 14).

Exporters generally sell consistently better quality products to keep their profitability and high market shares (Allvine, p. 199). This develops stable demand over time, regardless of the number of competitors. US poultry producers and processors who are members of USAPEEC strive to maintain high quality products and capture market share in Russian market. The consequences of failure to maintain consistent quality in the market are severe. They may include loss of consumer confidence, a decline in sales and even potentially a loss of import certificates due to a violation of SPS regulations.

Conclusions

Import market shares are influenced by many factors, including quality, price, packaging, and other product characteristics. The US captured market share after 1994 when large volumes of dark meat were imported into Russia. Moreover, the US maintained market shares of over 90% through 1998. However, after the economic crisis, the US' market shares slipped approximately 9% in two years. Dutch exporters captured market shares, as US shares declined. Nevertheless, the overall market for broiler meat remains strong in Russia.

CHAPTER 4

US CHICKEN LEG QUARTER PRICE ANALYSIS

Introduction

By 1996, the growth in sales of dark meat to Russia accounted for approximately 40% of the value of US chicken meat exports. Thus prices received by poultry processors in the Southeast for dark meat, mainly leg quarters, became closely tied to exports to Russia. US domestic and export prices are hypothesized to be highly correlated, given the importance of US dark meat exports in the total demand for lower-valued poultry products.

In August 1998, a serious financial crisis hit the Russian market; Russia devalued the Ruble almost 4 times by the end of the year. Real consumer income in Russia fell drastically. Food prices, denominated in domestic currency units, rose, decreasing imports from all over the world, including the US. Thus, when the drop in Russian import demand occurred, it had a ripple effect on prices for chicken leg quarters in the US.

Objectives

The objective of this chapter is: (1) to estimate the impact of exchange rate changes between the Russian ruble and US Dollar on bilateral poultry trade; and (2) to determine the extent of shifts in trade policy on the export prices of US dark poultry meat. Specifically, this analysis estimates the effect of exchange rate changes on freely traded poultry products, particularly chicken leg quarters, between the United States and Russia.

Description of the Data

Monthly values and quantities for total US exports of chicken leg quarters, from January 1994 to April 2001, were collected using various sets of USDA trade data. While data on monthly exports of chicken leg quarters to the world market after 1997 are available on the Foreign Agricultural Service (FAS) web site, the specific 10 digit Harmonized System (HS) code for chicken leg quarters (0207140010) did not exist in USDA trade reports before January 1997.

Data, covering a period from January 1994 to December 1996, were estimated using a weighted average proportion of US exports of chicken leg quarters in total poultry meat (HS code 0207140000), based on annual averages in years 1997 through April 2001. The computed averages were then applied to the total US poultry exports for the previous years (i.e., 1994, 1995, 1996) in order to estimate the value and quantity of chicken leg quarters exported during these years.

While this estimation procedure is based on the assumption that the pre-1997 poultry meat trade to Russia did not differ from the late 1990's export product composition, there is no reported reason to suspect that it changed from its initial mix. Dividing the values of US chicken leg quarter's exports to the world market by the estimated share by weighted averages of exports to Russia provided a price series for total US exports of chicken leg quarters. While the original data for quantities were in metric tons and values in thousands of dollars, the unit price was converted to dollars per pound to conform to US wholesale prices.

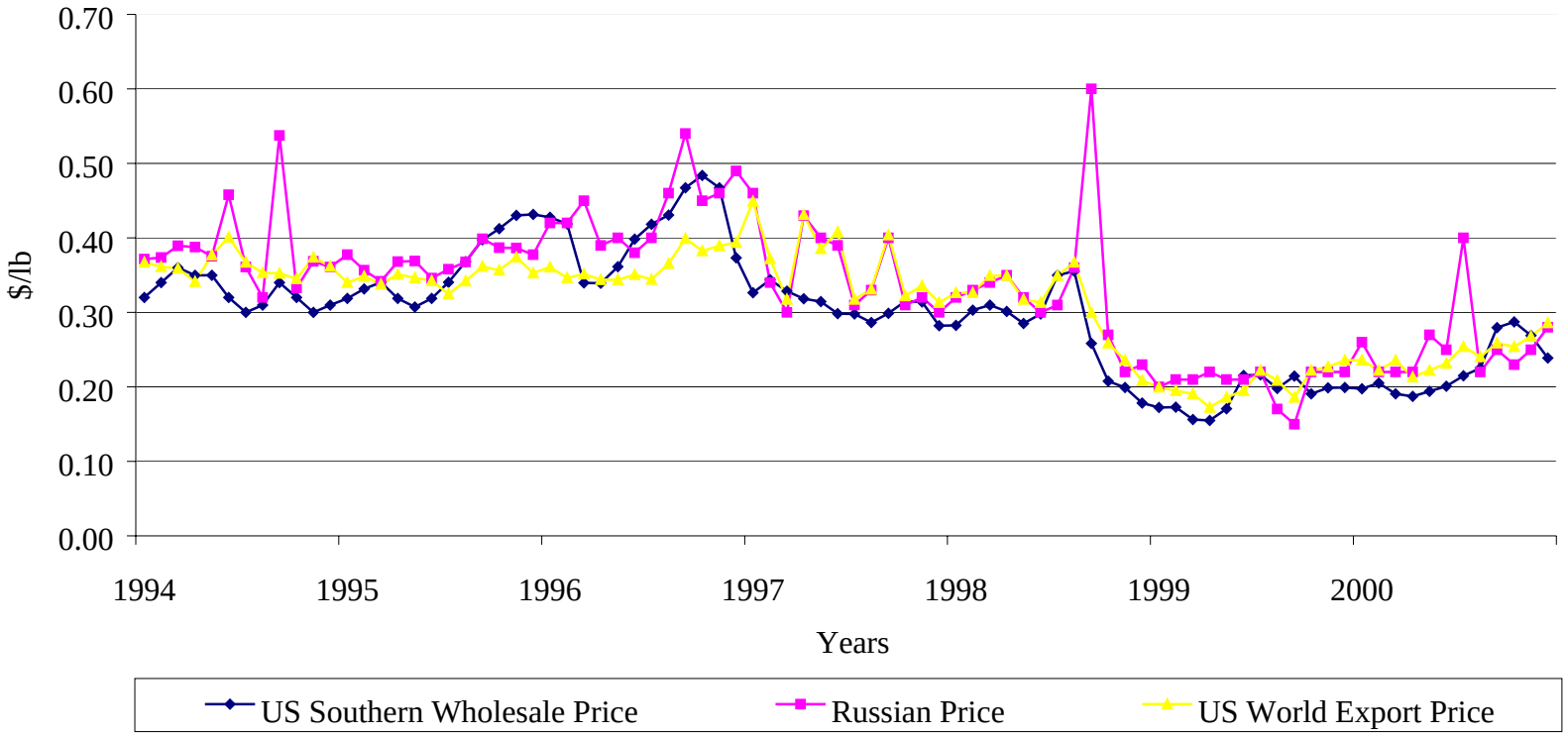
Weekly weighted average prices for truckload sales of iced packed and CO_2 packed broiler parts, f.o.b. dock, southern area, from January 1994 to December 2000

were used as the wholesale data for identifying the price correlation between US f.o.b. prices, US export prices to Russia, and US total export prices. The southern area includes Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, South Carolina, Tennessee and Texas. Total US f.o.b. prices and volumes for broiler parts were divided into the southern area and northeast f.o.b. dock prices and volumes. Comparison between f.o.b. prices and volumes for both above-mentioned regions shows that southern area accounts for about 70% of total US f.o.b. dock weekly volumes. Based on this evidence, US southern area f.o.b. prices and volumes were used in this analysis.

Data were also obtained from *Annual Poultry Market Statistics*, provided by Poultry Division of the Agricultural Marketing Services (AMS), USDA. This data for the US southern area f.o.b. dock prices is of importance, because it reflects the price at which chicken leg quarters could be sold in the US. This price series is selected because it represents the domestic wholesale prices for the largest proportion of US produced chicken leg quarters. Original AMS data for prices were in cents per pound and volumes in thousand pounds. Based on this weekly data, weighted monthly averages were calculated and used in this analysis.

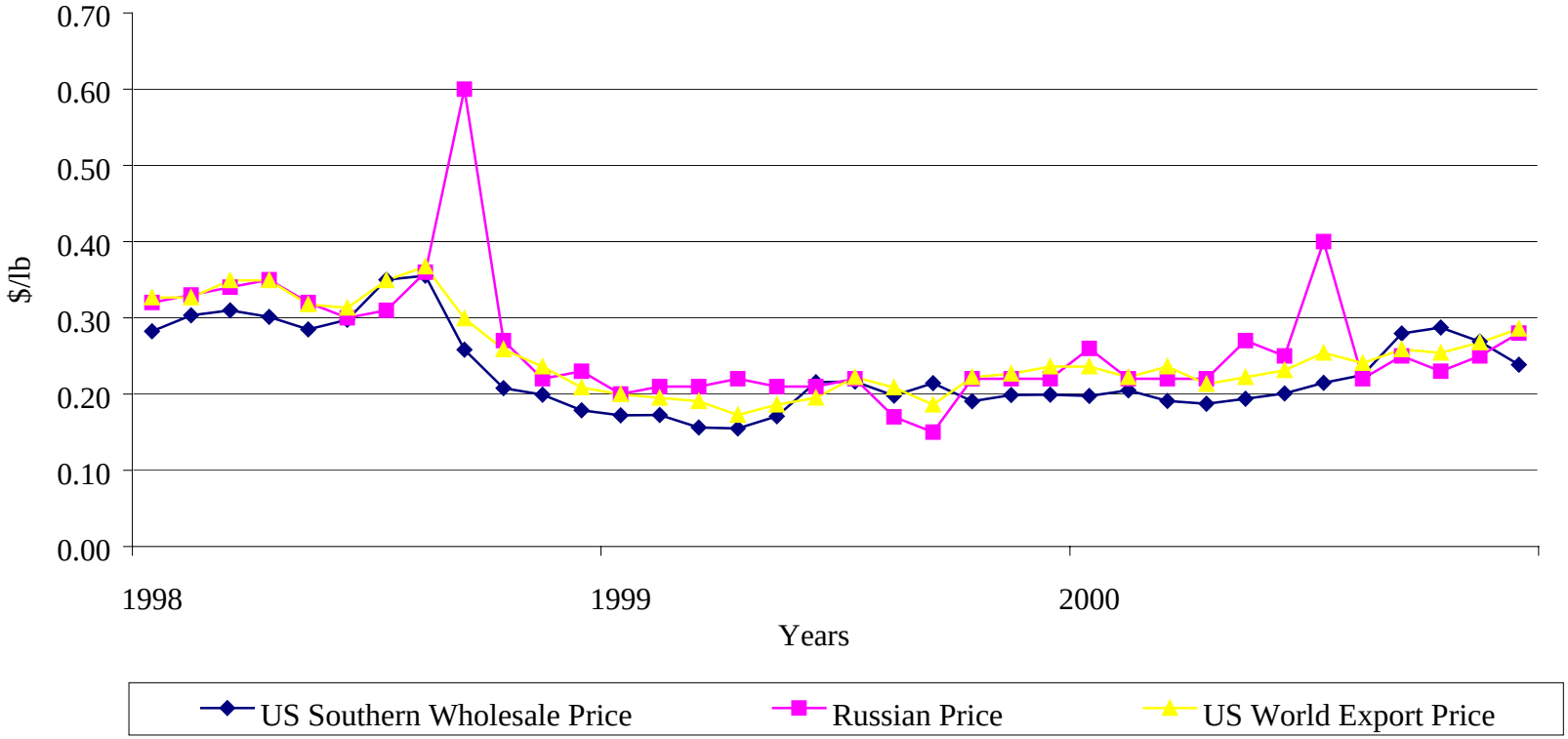
The Dairy, Livestock and Poultry Division of FAS, USDA provided data for the years 1994, 1995 and 1996 (web site has data from 1997). The data were used to calculate prices for US exports of chicken leg quarters to Russia. While these data for quantities and values were in metric tons and dollars, respectively, they were converted to a consistent basis with the wholesale price series. The graphical illustration of the high correlation between US world export price for chicken leg quarters, US f.o.b. prices and US prices for chicken leg quarters exported to Russia is depicted in Figures 4.1 – 4.1.d.

Figure 4.1. US World Export Prices, US F.O.B. Prices and US Export Prices to Russia for Chicken Leg Quarters, 1994 - 2000



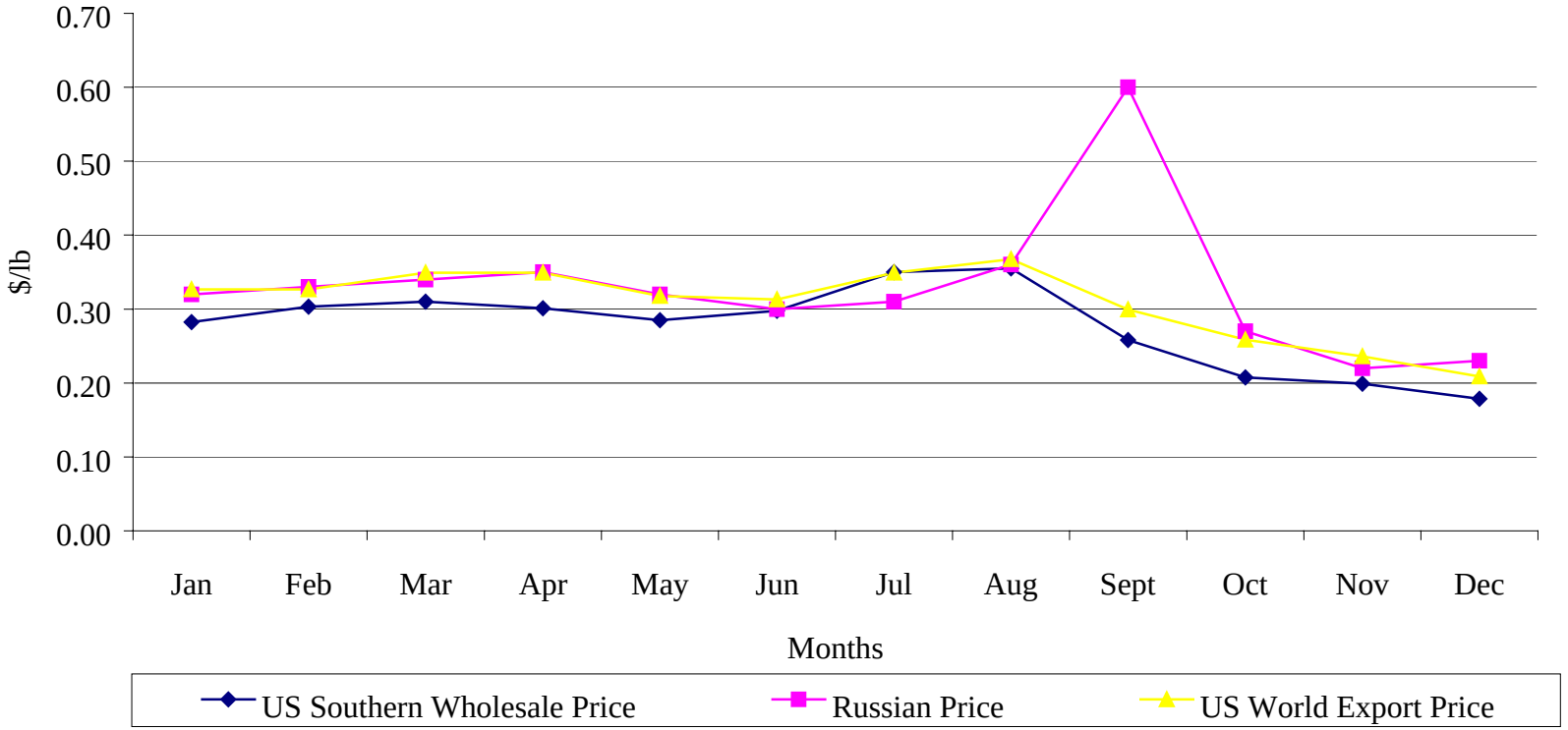
Sources: USDA, AMS, *Poultry Market Statistics*, Annual Reports, 1994–2000; Ministry of Agriculture and Foodstuffs of Russian Federation and Statistical Services at the Customs Committee of Russian Federation, *Annual Reports*; and USDA, ERS, FATUS, *US Trade Exports–FATUS Commodity Aggregations*.

Figure 4.1.a. US World Export Prices, US F.O.B. Prices and US Export Prices to Russia for Chicken Leg Quarters, 1998-2000



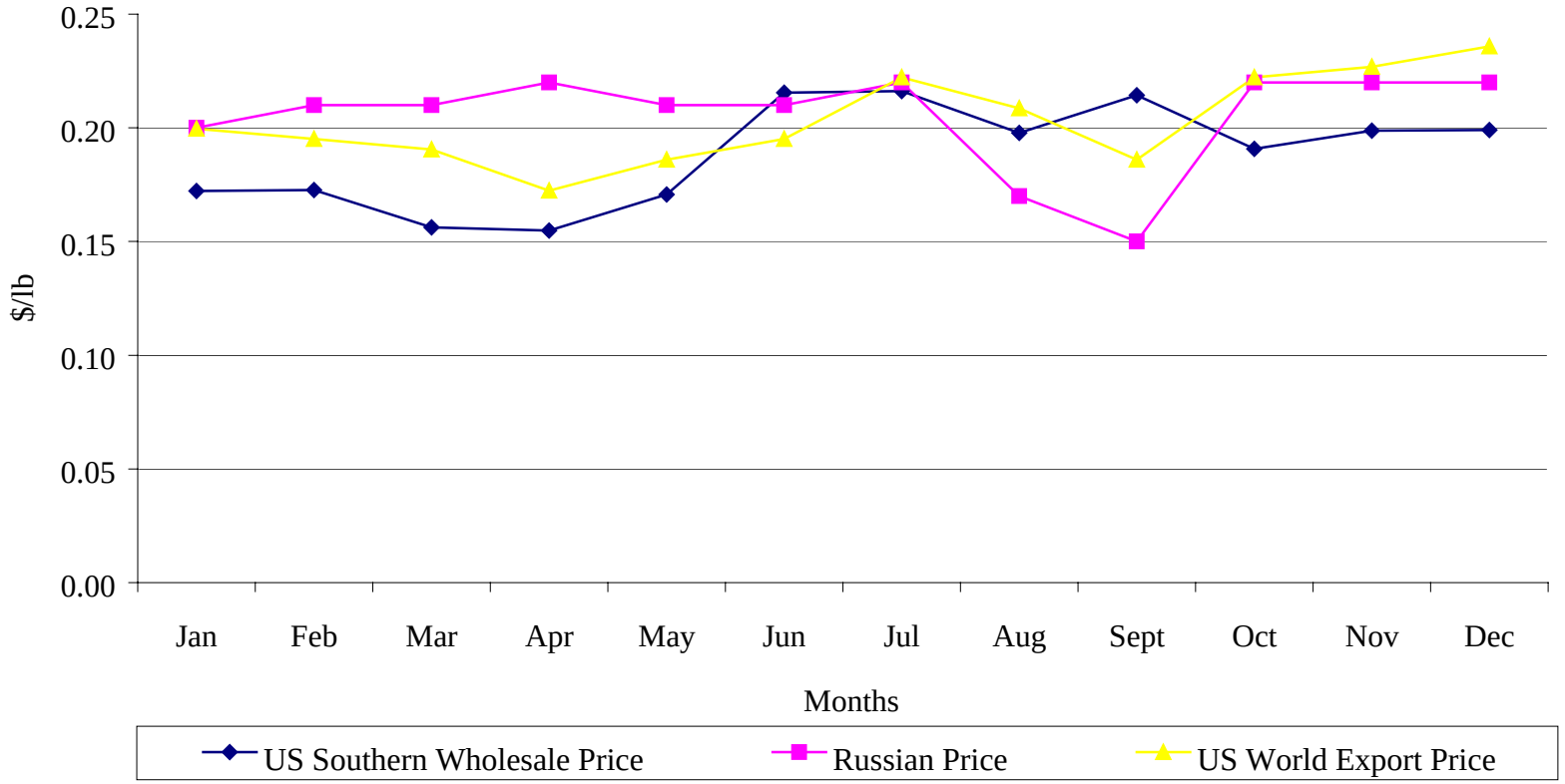
Sources: USDA, AMS, *Poultry Market Statistics*, Annual Reports, 1994–2000, and Ministry of Agriculture and Foodstuffs of Russian Federation and Statistical Services at the Customs Committee of Russian Federation, *Annual Reports;* and USDA, ERS, FATUS, *US Trade Exports - FATUS Commodity Aggregations.*

Figure 4.1.b. Nominal Prices for Chicken Leg Quarters, 1998



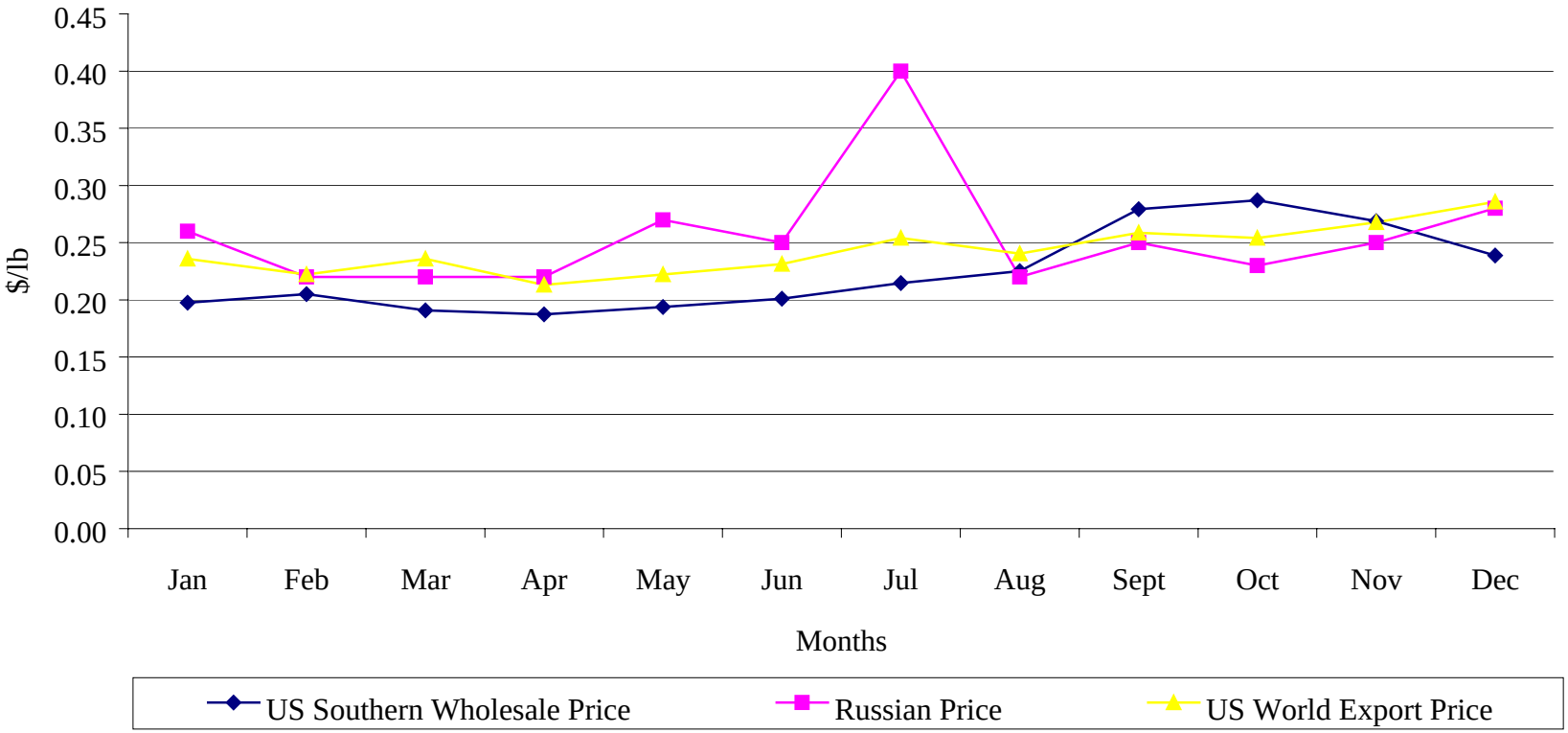
Sources: USDA, AMS, *Poultry Market Statistics*, Annual Reports, 1994–2000; Ministry of Agriculture and Foodstuffs of Russian Federation and Statistical Services at the Customs Committee of Russian Federation, *Annual Reports;* and USDA, ERS, FATUS, *US Trade Exports - FATUS Commodity Aggregations*.

Figure 4.1.c. Nominal Prices for Chicken Leg Quarters, 1999



Sources: USDA, AMS, *Poultry Market Statistics,* Annual Reports, 1994–2000; Ministry of Agriculture and Foodstuffs of Russian Federation and Statistical Services at the Customs Committee of Russian Federation, *Annual Reports;* and USDA, ERS, FATUS, *US Trade Exports - FATUS Commodity Aggregations*.

Figure 4.1.d. Nominal Prices for Chicken Leg Quarters, 2000



Source: USDA, AMS, *Poultry Market Statistics,* Annual Reports, 1994–2000; Ministry of Agriculture and Foodstuffs of Russian Federation and Statistical Services at the Customs Committee of Russian Federation, *Annual Reports;* and USDA, ERS, FATUS, *US Trade Exports - FATUS Commodity Aggregations.*

Dark Meat Price Analysis

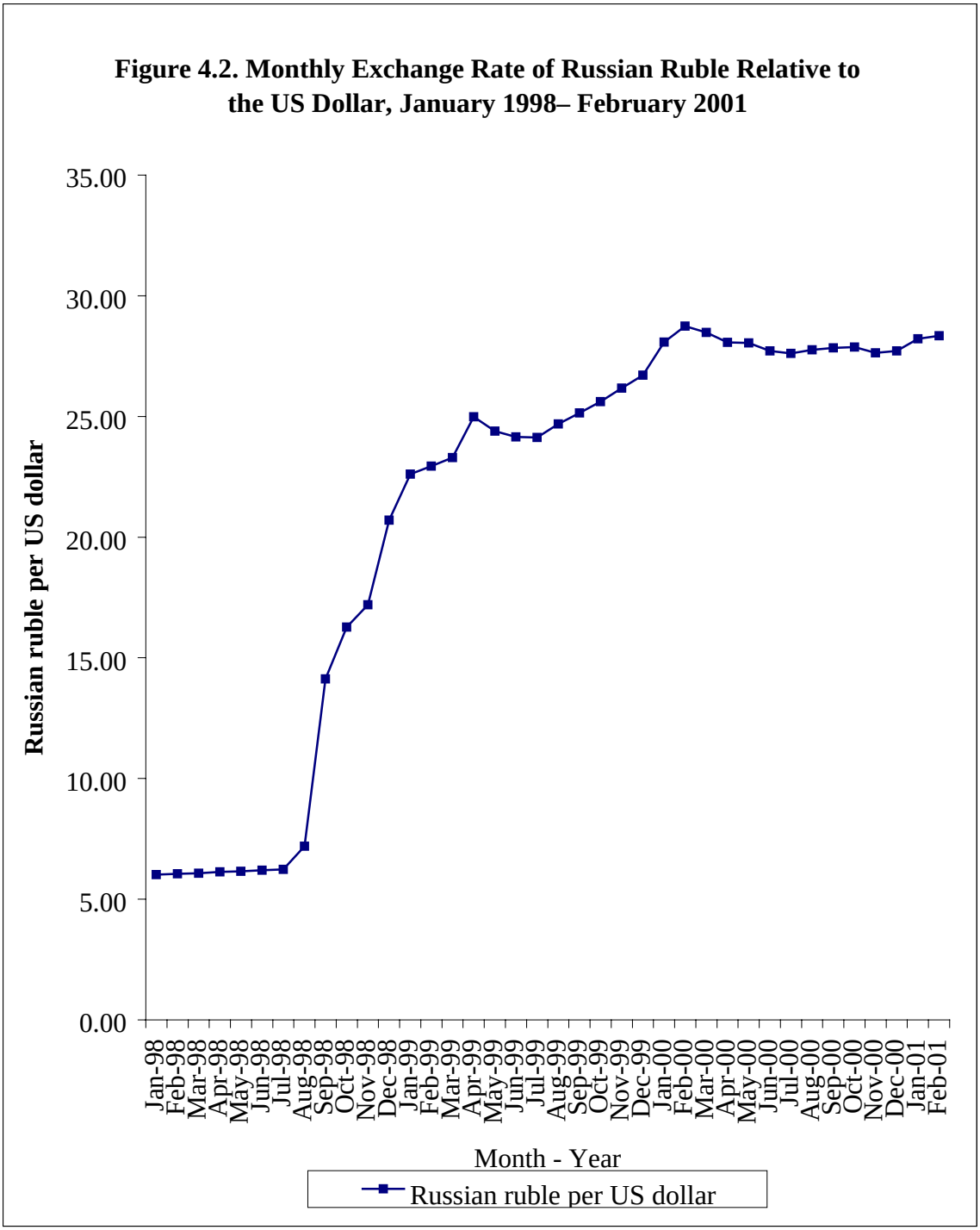
The objective of the price analysis is to estimate the interrelationship between the US world export price of chicken leg quarters and the exchange rate of its major importer, Russia, that accounts for more than 40% of US world exports of chicken leg quarters. The US supplied nearly 90% of Russia's poultry imports during this period of time (Ministry of Agriculture and Foodstuffs of Russian Federation and Statistical Services at the Customs Committee of Russian Federation, *Annual Reports*).

Since exchange rate changes usually affect international transactions across the board, their movements can override and obscure the effects of other, more specific or narrow trade and economic policies. When a nation's currency falls in value relative to those of other countries, imports of goods and services tend to fall and exports tend to rise (Houck 1986, p. 168).

The ruble devaluation of August 1998 (see Figure 4.2), coupled with the falling purchasing power in the Russian Federation, put a downward pressure on US world export prices for chicken leg quarters. Thus, it is hypothesized that the US world export prices are inversely related to the Russian ruble/US dollar exchange rate. US world export prices are represented in the model as the dependent variable (USWP). Since the exchange rates have a major impact on US export prices of chicken leg quarters as well as US f.o.b. dock prices, the Russian ruble exchange rate was included into the model as an independent variable (EXRATE). The exchange rate was specified as rubles per US dollar.

US world export prices, US f.o.b. dock prices and US export prices to Russia appear to be a very high correlated (see Figure 4.1). US world export prices are also

Figure 4.2. Monthly Exchange Rate of Russian Ruble Relative to the US Dollar, January 1998– February 2001



Source: Pacific Exchange Rate Service, *Russian ruble/US dollar Exchange Rate*, University of British Columbia, Vancouver, Canada.

URL: http://pacific.commerce.ubc.ca/xr/data.html

driven by US wholesale prices for chicken leg quarters exported to Russia, its largest importer. Thus wholesale prices were included in the model. The Pearson Correlation Coefficients test was conducted, in addition to the graphical observations to test relationships between the three above-mentioned price variables and relationships between all the other variables in this model.

The monthly volumes of chicken leg quarter exports to Russia are also expected to explain changes in US world prices. It was justified in the theoretical part of this chapter that quantities exported to Russia have an impact on US world prices. In the model, a natural logarithmic transformation of the monthly quantity exported to Russia (LQRUS) was used as the explanatory variable for quantities of US chicken leg quarters exported to Russia. However, exports to the Russian market have not been without problems due to shifts in trade policy.

Russia placed an embargo on US exports in February 1996. The embargo is hypothesized to affect US prices for a period of at least three months because of the short resolution of this trade dispute. The embargo lasted only a little over one month (from February 16, 1996 to March 25,1996) but it is hypothesized to have had a carry over effect. This action was aimed at protecting Russian domestic producers from foreign competitors (Ames, 1998). The embargo is hypothesized to affect US world prices negatively in that it decreased US exports to its largest importer. Embargo (EMBARGO) was included in the models as an intercept shifting dummy variable. A negative relationship between this explanatory variable and the dependent variable in the OLS-USWP model is expected due to the restrictive nature of the policy change.

In January 2001, Russian Customs Committee reduced the tariff rate on all poultry items imported to Russia from 30% to 25%. This has allowed a bigger volume of US chicken leg quarters to be exported to Russia at a slightly lower import price. Based on this change in Russian trade policy, a tariff reduction appears in the model OLS-USWP as an intercept shifting dummy variable (TARIFF). The relationship in the model is expected to be positive, since this policy change reduces barriers to trade by lowering tariffs by 5%.

Econometric Model

The OLS-USWP model is posited to explain how changes in exchange rates, US export prices to Russia, quantities exported to Russia, and policy changes such as the embargo and tariff rates affect US world export prices. Data for the model cover the period from January 1994 until April 2001. There are a total of 88 monthly observations in this data set. The general model is specified as follows:

$$USWP = \exists_{10} + \exists_{11} EXRATE + \exists_{12} USRP + \exists_{13} LQRUS + \exists_{14} EMBARGO + \exists_{15} TARIFF + \varepsilon,$$

where a detailed description of the variables can be found in Table 4.1. The means and summary statistics of the variables are presented in Table 4.2. The expected signs of the estimated coefficients are given in Table 4.3.

Estimation Results for OLS-USWP Model

The results of the econometric analysis indicate that the model explained 87.35% of the variation in US export prices of chicken leg quarters. Not only is there an overall good fit of the model to the data, individual parameters of the model also have the expected signs and are significantly different from zero.

Table 4.1. Definition of Variables in Price Analysis Model OLS-USWP

Variable Name	Abbreviation	Definition
US world export price	USWP	Monthly average price for US world exports of chicken leg quarters, 1994–2001, $/lb
US southern area f.o.b. price	USFOB	Monthly average price for US chicken leg quarters, f.o.b., Southern area, 1994–2000, $/lb
Exchange rate	EXRATE	Currency exchange rate between Russian ruble and US dollar, 1994–2001, Russian rubles per US dollar
Price for US exports to Russia	USRP	Monthly average price for US exports of chicken leg quarters to Russia, 1994–2001, $/lb
Quantity exported to Russia	QRUS	Quantity of chicken leg quarters exported to Russia, 1994–2001, lbs
Logged quantity exported to Russia	LQRUS	Natural logarithm of the quantity of chicken leg quarters exported to Russia, 1994–2001, 1000 lb
Quantity exported to the world	QWUS	Quantity of chicken leg quarters exported from the US to the world market, 1994–2001, lbs
Embargo	EMBARGO	Dummy variable for embargo, imposed on US poultry exports to Russia in February, March and April 1996 (= 1 if February, March and April 1996 , = 0 if not)
Tariff	TARIFF	Dummy variable for a change in Russian tariff rates from 30% to 25%, which has been in effect since January 2001 (= 1 if post-January 2001, = 0 if before)

Table 4.2. Summary Statistics for the Variables Included in Correlation Analysis, Monthly Data, 1994 – 2001

Variable	N of Obs.	Mean	Std Deviation	Minimum	Maximum
USWP	88	0.31	0.07	0.17	0.45
EXRATE	88	12.21	10.33	1.54	28.74
USRP	88	0.33	0.09	0.15	0.60
LQRUS	88	11.00	1.04	4.25	12.47
USFOB [a)]	84	0.30	0.08	0.15	0.48
EMBARGO	88	0.05	0.21	0.00	1.00
TARIFF	88	0.05	0.21	0.00	1.00

[a)] there were four fewer observations for USFOB prices due to data availability at the time of the analysis

Table 4.3. Expected Signs of Coefficients for OLS-USWP Model

Variables	Expected Signs of Coefficients
EXRATE	Negative
USRP	Positive
LQRUS	Positive
EMBARGO	Negative
TARIFF*	Positive

* The coefficient of change in Russian tariff rate is expected to have a positive sign since it was not an imposition of a new tariff, but a reduction in the tariff rate from 30% to 25%.

The exchange rate and the dummy variable for embargo of 1996 were hypothesized to be inversely related to the dependent variable, USWP. As explained earlier, the devaluation of Russian Ruble would increase imported poultry meat prices. Thus, reducing import demand. Conversely, the embargo resulted in surplus stocks of poultry meat on the US market thus, depressing US prices.

On the other hand, US export prices for shipments to the Russian market and quantities exported to Russia were hypothesized to be positively related to the USWP. That is, the higher these price levels are, the higher world prices, on average, would expected to be. The signs of the estimated parameters are as expected while the estimated coefficients are statistically significant at the 0.01 level, except for the embargo and tariff coefficients, which are significant at 0.05 level. The estimated coefficients for the continuous OLS-USWP model are presented in the Table 4.4.

Relationships between all price variables and an exchange rate variable were separately tested by Pearson Correlation Coefficients test since USFOB price was not included in the model but was used for graphical presentation of the correlation between USFOB, USWP and USRP prices for poultry. These correlation coefficients are shown in Table 4.5. Also, relationships between all the variables in this model were tested by Pearson Correlation Coefficients test. The signs are as expected and the values represent the theoretical foundations of this trade issue described in the previous chapters. The Pearson Correlation Coefficients between all variables in the OLS-USWP model are shown in Table 4.6.

Table 4.4. Estimated Coefficients for the Continuous OLS-USWP Model, Monthly Data, 1994 – 2001

Dependent Variable	Explanatory Variable	Parameter Estimates	Standard Errors	T-values
USWP	Intercept	0.1269	0.0445	2.848
	EXRATE	-0.0033	0.0005	-7.133
	USRP	0.3537	0.0466	7.582
	LQRUS	0.0098	0.0030	3.289
	EMBARGO	-0.0283	0.0131	-2.155
	TARIFF	0.0318	0.0137	2.328

$R^2 = 0.87$

Adj $R^2 = 0.86$

n = 88

Table 4.5. Pearson Correlation Coefficients between US World Export Prices, US F.O.B. Prices and US Export Prices to Russia for Chicken Leg Quarters, Monthly Data, 1994-2001

	USWP	EXRATE	USRP	USFOB
USWP	1*			
	0**			
	88***			
EXRATE	-0.8771	1		
	0.0001	0		
	88	88		
USRP	0.8346	0	1	
	0.0001	0.0001	0	
	88	88	88	
USFOB	0.8294	-0.7843	0.7679	1
	0.0001	0.0001	0.0001	0
	84	84	84	84

* Pearson Correlation Coefficients
** Prob > absolute value of R under H_o: Rho=0
*** Number of Observations

Table 4.6. Pearson Correlation Coefficients for the Continuous OLS-USWP Model, Monthly Data, 1994-2001

	USWP	EXRATE	USRP	LQRUS	EMBARGO	TARIFF
USWP	1					
	0					
EXRATE	-0.8771	1				
	0.0001	0				
USRP	0.8346	0	1			
	0.0001	0.0001	0			
LQRUS	0.3752	-0.3815	0.0969	1		
	0.0003	0.0002	0.3691	0		
EMBARGO	0.1097	-0.1560	0.2022	0.1705	1	
	0.3088	0.1467	0.0588	0.1122	0	
TARIFF	-0.1910	0.3443	-0.2492	-0.0004	-0.0476	1
	0.0746	0.0010	0.0192	0.9973	0.6595	0

* Pearson Correlation Coefficients (88 monthly observations)
** Prob > absolute value of R under H_o: Rho=0

Elasticities

In order to get a unit-free measure of the estimated coefficients, elasticities at the means for the continuous OLS-USWP model are calculated and are presented in Table 4.7. The estimated elasticities indicate that US world price for chicken leg quarter exports to the world market are strongly affected by exchange rates, and the prices of US dark meat poultry destined to the Russian market. A 10% change in the Russian ruble/US dollar exchange rate results in a 1.3% decline in monthly US chicken leg quarter export prices.

Elasticities indicate that the US world price (USWP) for chicken leg quarters are generally responsive to changes in the variables in the model. For instance a 10% change in the US dollar/Russian ruble exchange rate accounts for approximately 1.3% decline in the USWP. Similarly, a 10% change in US export prices to Russia (USRP) results in a 3.7% change in the US world export price. Each one-percent change in the log of monthly quantities exported to Russia brings a positive increase in USWP as expected.

Conclusions and Implications of the Chicken Leg Quarter Price Analysis

These results are relatively consistent with devaluation of an importer's currency in a large country case. Lowering the purchasing power of the Russian Ruble in international market produces upward pressure on food prices and, consequently, a decrease in the amount of imports demanded by consumers. This means that the additional availability of export supplies on the world market will press down prices in the primary exporting country, the US. The price effects are split between the Russian Federation, whose domestic prices increase, and other importers and US poultry processors and exporters, whose wholesale prices fall, *ceteris paribus*.

Table 4.7. Elasticities at the Means for the Continuous OLS-USWP Model

Parameter	Elasticity*
EXRATE	- 0.13
USRP	0.37
LQRUS	0.03

* generally: $,_x = \partial y/\partial x * xbar/ybar = \beta * ybar$
elasticity for logs: $,_z = \partial y/\partial z * 1/ybar = \beta * 1/ybar$

Calculation of Elasticities:

$,_{exrate} = - 0.003287 * 12.211/0.311 = -0.129 \approx -0.13$

$,_{usrp} = 0.349423 * 0.33/0.311 = 0.37$

$,_{lqrus} = 0.009787 * 1/0.311 = 0.03$

CHAPTER 5

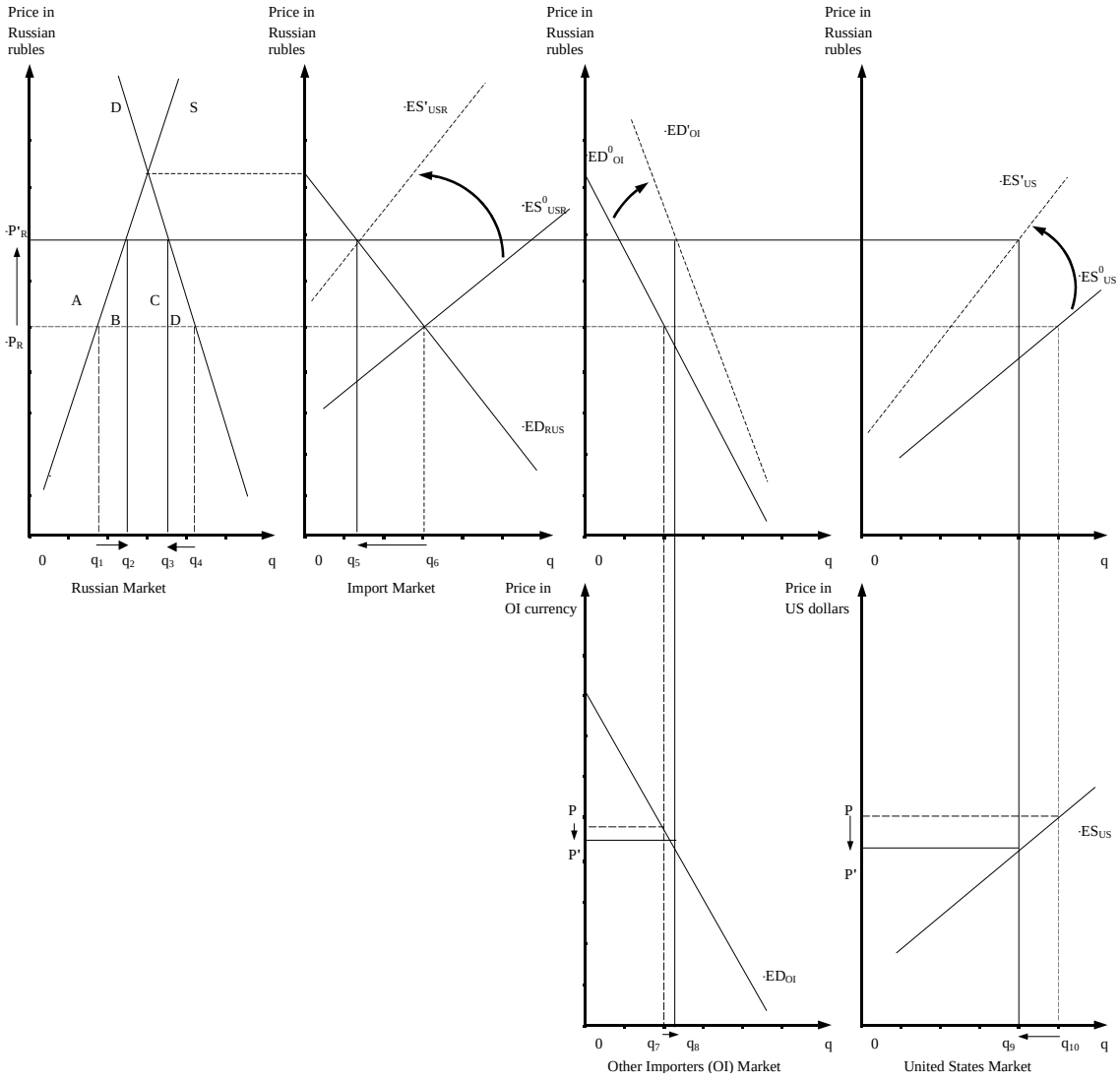
GLOBAL TRADE POLICY ANALYSIS OF THE RUBLE DEVALUATION OF AUGUST 1998 AND ITS IMPACT ON US-RUSSIAN BILATERAL TRADE

Welfare Analysis of the Russian Ruble Devaluation

The basic structure of the US-Russian poultry trade and the impact of the ruble devaluation on the Russian poultry meat import can be illustrated using a partial equilibrium framework (Houck, 1986). Russian ruble devaluation can be illustrated using a three-region approach. Russia, being the major importer for US dark meat, is included in the model as a net importing country with a depreciating currency. The US, as the world's leading exporter of poultry products, is included as a net exporter while Other Importers (OI) represents the rest of the world's importing market (such as Hong Kong and China) for US dark meat.

Poultry meat is priced in Russian rubles, US dollars and a composite Other Importer's currency. The upper panel of Figure 5.1 illustrates the following: supply and demand in the Russian market, the Russian excess demand, the excess demand of other importers, and US excess supply of chicken leg quarters. The initial excess demand and initial excess supply are priced in Russian rubles while the horizontal axis measure supply, demand, imports and exports. The lower panels of Figure 5.1 represents the ED^0_{OI} and ES^0_{US} expressed in terms of other importers' currencies and US dollars, respectively.

Figure 5.1. The Effects of the Russian Ruble Devaluation on Poultry Meat Imports



Source: Houck, 1986.

The import supply function facing buyers in Russia is ES^{0}_{US} at the original exchange rate. Before the devaluation of August 1998, the US accounted for 90% of Russian dark meat imports (Ministry of Agriculture and Foodstuffs of Russian Federation, *Annual Reports*). This function is the difference between the excess supply of total exports from the US (ES^{0}_{US}) and the excess demand of other importers (ED^{0}_{OI}).

In this analysis, the Russian ruble devalued relative to both US dollar and the currencies of other importers. Devaluation caused the rotation of ED^{0}_{OI} and ES^{0}_{USR} to ED'_{OI} and ES'_{USR}, respectively. Devaluation decreases the purchasing power of the Russian consumer. This will drive up domestic prices, expressed in Russian rubles, and, at the same time, will decrease the Russian import demand for dark meat. The original dark meat price is P^{0}_{R} before devaluation, while P'_{R} represents the Russian import price after devaluation.

With more leg quarters being available for other importers due to excess supplies originally intend for the Russian market now being available for other importers, prices for other importers will decline. Other Importers will import more dark meat but at lower prices. Russian domestic prices increase as a result of the devaluation, while prices in the US market and other import markets decrease (Houck, 1986).

Before August 1998, the Russian Ruble may have been overvalued, *ceteris paribus*. The impact of the devaluation on consumers and producers can be analysed using standard welfare measures. Russian consumers lose surplus from the initial trade position by the amount A + B + C + D. Area A is an increase in Russian producers surplus since domestic producers receive higher prices for local chicken products but a loss in consumer surplus for Russian households who must pay higher prices. Area B

represents the additional cost of production for poultry producers in Russia. It measures the additional payment to variable inputs that are needed to expand domestic production from q_1 to q_2. Area C is a change in revenue for importers due to the higher Ruble price of imported dark meat. In the presence of a tariff, part of area C would be collected as tariff revenue (Houck 1986, p. 54).

Area D is a deadweight consumption loss because Russian consumers allocate household expenditures away from the more expensive imported dark meat after devaluation to other sources of protein. It is part of the real income lost by consumers because of the Russian ruble devaluation and the chicken leg quarter price increase from P^0_R to P'_R. Area D cannot be traced anywhere in the economy and, therefore, it is considered to be a net loss. Prior to devaluation Russian consumers benefited from the lower domestic price (P^0_R) but after devaluation they suffered welfare losses due to a drastic decline in their real income.

When a country's currency value falls, as in the case of the ruble, domestic prices of traded goods tend to rise while world prices tend to fall. A falling exchange rate is inflationary as the case of Russia in the late 1990s clearly illustrates. The empirical estimates of the ruble devaluation are simulated in the Global Policy Trade Analysis in the next section of this study.

Overview of the GTAP Data Base and International Trade Data

The Global Trade Analysis Project (GTAP) was established in 1992, with the objective of lowering the cost of entry for those seeking to conduct policy and quantitative analyses of international economic issues in an economywide framework (Hertel, p. 3). GTAP is a computable general equilibrium (CGE) model used by the

government agencies to simulate changes in policies and their impacts on specific countries, regions, and the world markets. GTAP database is derived from government and non-government sources. The current version uses a 1997 base year. In this study of US-Russian poultry trade, GTAP is used as a simulation tool for its analyses of the ruble devaluation of August 1998.

The trade data upon which the GTAP database is built originated from United Nations D-series trade statistics. COMTRADE (COMmodity TRADE) is the registered name of the database maintained by the United Nations (UN) Statistical Office (Hertel, p. 76). The reason why this database is chosen by GTAP is that it is one of the most complete and exhaustive databases in terms of commodity and country coverage. While modeling policy changes or changes in exchange rates for such regions as Russia, one of the major obstacles is finding a complete database for analyses. This is one of the major advantages of using GTAP to study the changes in US exports of poultry to Russia. The GTAP data are consistent across countries and well documented.

The GTAP database consists of bilateral trade, transport, and protection matrices that link 66 country/regional economic database (Hertel, p. 74). The listing of regions in the database includes “Former Soviet Union” as one of the country specific regions. Using evidence from the different sources, it can be concluded that sales through the Baltic regions were initially assigned to Russia. For example, Orden et al. (2000) states, “in the case of Russia, sales through the Baltic region, with relatively low tariffs, are being discouraged by the Russian authorities. Other exports to Russia are included under the US food-aid program” (p. 8). Meanwhile we can assume exports to the Baltic regions are mainly intended for sales in Russia.

Methodology

The appropriate regional and commodity aggregation of the GTAP database was conducted for the simulation of the currency devaluation. The aggregation was built in accordance with the theoretical assumptions of this thesis. Therefore, the 66 regions of the GTAP were aggregated into six new regions: Russia as a major importer of poultry meat, US as a major exporter of poultry meat, Hong Kong as a competing importer, China as a competing importer, EU poultry exporting countries as a competing exporter (see Chapter 3 on market shares) and the rest of the world. The 57 commodities, available in GTAP were aggregated into new commodity groups: poultry meat (not elsewhere classified meat: poultry, pork, eggs), other meat (cattle, sheep, goats, horse), other food (other food and agricultural commodities) and other (all other sectors). GTAP does not include poultry as a separate category. However, poultry accounts for 93.23% of US-Russian trade in the poultry, pork and eggs group. These region and commodity aggregations are presented in the Table 5.1 and Table 5.2, respectively.

Stefan Osborne (2001) states that imports become more expensive relative to domestically produced goods due to currency depreciation. The author assumes that therefore, “a currency depreciation has the same effect as erecting economy-wide trade barriers that protect domestic production from international competition” (p. 2).

The currency devaluation shock was simulated in GTAP as the combined effect of an export subsidy on all Russian exports and an import tax on all imports to Russia. To model export subsidy effects on the devaluing country’s market a “txs” shock was introduced. In our simulation “txs” represents a subsidy on good “i” [all goods] from region “r” [Russia] to “s” [all regions] (GTAP software). On the other hand “tms”

Table 5.1. Regional Aggregation in GTAP Modeling Analysis

Country Code	Region Description
Russia	Former Soviet Union
US	United States of America
Hong Kong	Hong Kong
China	China
EU	Netherlands, France, Germany (major EU poultry meat exporters to Russia)
ROW	Rest Of the World

Table 5.2. Commodity Aggregation in GTAP Modeling Analysis

Commodity Code	Commodity Description
Poultry Meat	Meat products not elsewhere classified (nec): poultry, pork, eggs [a)]
Other Meat	Meat: cattle, sheep, goats, horse
Other Food	Other food and agricultural commodities
Other	All other sectors

[a)] In the trade category, poultry accounts for 93.23% of the aggregate value of the three categories [poultry, pork and eggs] in the base year 1997 (USDA, FATUS, November 02, 2001).

represents an import tax on good “i” [all goods] from region “r” [all regions] to ”s” [Russia] (GTAP software).

Shock Values

The following formulas were used to calculate the shock values, applied to our aggregation. The methodology, presented in *Foundations of Multinational Financial Management* (Shapiro 1998, p. 39) was used for calculating the percent of depreciation and appreciation of Russian ruble and US dollar, respectively.

For calculating appreciation/depreciation of both foreign currencies involved in analysis July 1998 and July 1999 were used as a base months. Using the month of July 1998 exchange rate as the pre-devaluation exchange rate, in the formula is justified by the fact that the devaluation of Russian ruble took place in August 1998, so it was logical to include the month prior to the drastic decline in exchange rate calculations. One year gives a sufficient amount of time for exchange rates to adjust and become stable, *ceteris paribus*. Thus, the ruble/dollar exchange rate of July 1999 was chosen to represent the new ruble/dollar exchange rate.

The formula by which we calculated the Russian ruble’s depreciation is as follows: amount of ruble depreciation = 100 * (new dollar value of ruble–old dollar value of ruble) / old dollar value of ruble = 100 * (1/e1 - 1/e0)/1/e0 = % change = 100 * (1/24.13 – 1/6.24)/ 1/6.24 = (0.04 – 0.16)/0.16 = -75%. These calculations result in a 75% depreciation of Russian ruble relative to US dollar.

The formula used for calculation of US dollar appreciation is as follows: amount of dollar appreciation = 100 * (new ruble value of dollar–old ruble value of dollar) / old ruble value of dollar = (e1 - e0)/e0 = % change = 100 * (24.13-6.24)/6.24 = 287%. These

calculations result in a 287% increase in the value of the US dollar relative to Russian ruble in one year.

Exports from the devaluing country are now less expensive, and imports into the devaluing country are more expensive. These relations are equivalent to a 75% export subsidy and 287% import tariff. In GTAP shocks are as follows: txs = 75% and tms = 287%. Since currency devaluation changes a country's purchasing power, instead of "% change rate" option in choosing a type of shock we used "% change power" (Hertel, 1998). Taking into consideration the fact that both "tms" and "txs" are exogenous variables in the GTAP model, we may shock the system using these variables.

GTAP Simulation Results

The results of the GTAP simulation include changes in world poultry prices, trade and production. The changes in trade statistics between countries included in the model were as expected. These results are reported in the Tables 5.3 through 5.9. Bilateral trade data for the poultry meat category before and after the devaluation simulation are discussed in the following section.

As a result of the 75% Ruble depreciation relative to the US dollar projected levels of Russian poultry imports fell and domestic prices of poultry and other foods rose as expected. Poultry imports from the US fell 46.96% while other meat product imports from the US fell 72.79% (Table 5.7). Other Russian food imports from the US declined 75%. In 1997 poultry meat imports from US accounted for 65.8 % of all US food and agricultural imports into Russia (USDA, FATUS, November 02, 2001).

Additional simulation results indicate that the decreased Russian poultry imports, which are projected to result from the devaluation, would be accompanied by an increase

Table 5.3. Simulated Changes in World Market Prices for Poultry Meat due to Currency Devaluation

Region	Change
	- - - - - - - - - - - - - - - - - Percent -
Russia	101.06
US	-0.99
Hong Kong	-1.11
China	-1.34
EU	-1.30
ROW	-1.19

Table 5.4. Simulated Changes in Market Prices for Poultry Meat in Russia due to Currency Devaluation

Commodity	Change
	Percent
Poultry	101.06
Other Meat	79.84
Food	86.80
Other	71.71
CGDS	82.68

Table 5.5. Pre- and Post-Quantities of Poultry Meat Exports from All Regions to All Regions

Exporter	Russia	US	Hong Kong	China	EU	ROW
Pre-devaluation						
	- - - - - - - - - - - - - - - - - - 1000 Metric Tons - - - - - - - - - - - - - - - - - -					
Russia	175.21	1.28	0.04	0.19	2.03	11.48
US	1073.82	0.03	167.80	502.90	35.26	2372.96
Hong Kong	0.01	0.71	0.00	0.75	0.06	2.79
China	153.75	6.78	211.83	0.00	53.89	781.72
EU	407.35	40.31	15.83	88.38	2059.74	4677.57
ROW	1271.79	1132.32	298.87	182.52	4398.93	8861.35
Post-devaluation						
	- - - - - - - - - - - - - - - - - - 1000 Metric Tons - - - - - - - - - - - - - - - - - -					
Russia	55.88	0.70	0.02	0.10	1.13	6.44
US	569.55	0.03	166.37	494.53	34.72	2346.56
Hong Kong	0.00	0.71	0.00	0.75	0.06	2.77
China	83.03	6.84	213.24	0.00	53.68	783.09
EU	219.36	40.60	15.91	87.93	2061.37	4697.76
ROW	682.80	1134.56	298.87	181.10	4376.38	8842.50

Table 5.6. Simulated Impact of Currency Devaluation on Poultry Meat Exports from All Regions to All Regions

Exporters	Russia	US	Hong Kong	China	EU	ROW
	- Percent -					
Russia	-68.10	-44.80	-44.88	-44.70	-44.45	-43.90
US	-46.96	-0.38	-0.85	-1.67	-1.51	-1.11
Hong Kong	-46.32	-0.14	-0.02	0.05	-0.61	-0.46
China	-46.00	0.93	0.66	1.42	-0.39	0.17
EU	-46.15	0.72	0.50	-0.51	0.08	0.43
ROW	-46.31	0.20	0.00	-0.78	-0.51	-0.21

Table 5.7. Simulated Impact of Currency Devaluation on All Commodity Exports from All Regions to Russia

Commodity	Russia	US	Hong Kong	China	EU	ROW
	- Percent -					
Poultry	-68.10	-46.96	-46.32	-46.00	-46.15	-46.31
Other Meat	-74.19	-72.79	-72.23	-72.33	-72.34	-72.47
Food	-79.27	-74.78	-74.50	-74.48	-74.47	-74.53
Other	-76.25	-86.93	-86.76	-86.65	-86.51	-86.69

in Russian poultry production. Poultry production increases by 62.72% (Table 5.8) while other meat and food outputs rise by lesser amounts (Table 5.9). These supply responses are influenced by the price elasticities of supply internal to the GTAP program as well as the shares of production resources devoted to poultry and other commodities. This relatively large supply response could partially be explained by the response of a smaller sector relative to a large sector, i.e. poultry versus grains.

Consumers adjusted their purchases of food items to changes in market prices. In the case of poultry meat exports, quantities fell drastically as noted in the accompanied tables. US poultry meat exports to the Russian market declined pushing more dark meat to the domestic market and other export destinations. Prices fell in the wholesale market as these additional supplies became available. Thus, exchange rate changes in a primary export market can have a ripple effect on the commodity in both the importing and exporting country.

Table 5.8. Simulated Changes in World Poultry Meat Production Output Response due to Higher Market Prices after Currency Devaluation

Region	Change	Pre	Post	Change
	- - Percent - -	- - - - - - - - - 1000 Metric Tons - - - - - - - - - - -
Russia	62.72	3973.81	6466.30	2492.49
US	-1.09	54222.00	53631.05	-591.30
Hong Kong	-0.02	151.98	151.95	-0.03
China	-0.54	12486.00	12418.50	-67.80
EU	-0.39	46728.00	46545.96	-182.30
ROW	-0.42	157341.00	156685.64	-655.50

Table 5.9. Simulated Changes in Russian Overall Output Response due to Higher Market Prices after Currency Devaluation

Commodity	Change	Pre	Post	Change
	- - Percent - -	- - - - - - - - - - 1000 Metric Tons - - - - - - - - - - -		
Poultry	62.72	3973.81	6466.30	2492.49
Other Meat	14.05	6713.72	7657.23	943.51
Food	22.53	75688.98	92742.29	17053.30
Other	-1.27	1026793.00	1013721.00	-13072.20
CGDS	-44.96	123310.20	67869.92	-55440.30

CHAPTER 6

CONCLUSIONS AND IMPLICATIONS

A Summary of Trade Relations Between the US and Russia

Prior to 1991, most US food and agricultural exports were in the form of bulk commodities. After 1991, Russian domestic production declined due to the removal of subsidies widely available during the period of central planning. Demand for consumer ready products became increasingly important. US poultry exporters found a ready market for dark meat in Russian urban areas. Food imports became a more efficient means of satisfying consumer demand than bulk agricultural imports. US poultry exports rose 51% in just one year 1995–1996. In 1996, poultry meat, valued at $912 million, accounted for almost two-thirds of the value of all US agricultural and food exports to Russia. By the year 1997, US poultry meat captured 93.9% share (by value) and 94.3% share (by quantity) of the Russian market.

Poultry meat products represented 65.8% of total food and agricultural exports from the US to Russia in the late 1990s. Moreover, the Russian market represented 40% of the value of all US poultry meat exports world wide in 1997. Thus, the US poultry export market was heavily dependent on one import destination. This dependency set the stage for the dramatic impact of the Russian currency devaluation of August 1998.

The impact of the ruble devaluation on US poultry prices was evaluated in Chapter 4 through the analysis of poultry meat prices, and in Chapter 5 with the GTAP simulation. The results of the global trade policy simulation of the Russian Ruble

devaluation of August 1998 were consistent with the initial hypothesis about the impact of devaluation on prices, producers and consumers, and with the conclusions from the poultry meat price analysis. Simulation results indicate that the depreciation of the Russian ruble relative to the US dollar would cause poultry imports into Russia to fall by 46.96% and domestic prices to rise by 101%. At the same time other meat prices were projected to rise by only 79%. These price changes cause poultry imports from the US to Russia to fall and Russian poultry production to rise by 62.72%. Shrinkage of the Russian import market resulted in an additional excess supply of poultry meat in US. That in turn caused US domestic prices to fall in the wholesale market. In summary, the exchange rate changes in Russia resulted in a change of poultry positioning, not only in the Russian market itself, but also in poultry markets in US and in all the other countries importing and exporting that commodity.

Implications

As with any modeling exercise the results may be sensitive to the base period of analysis, the characteristics of the focus commodity, and the internal characteristics of supply and demand parameters in the analytical model. The drastic devaluation of August 1998 provided a clear shock for simulation purposes. The intermediate simulation results are consistent with trade theory and expectations. They are not meant to be precise measures of market reactions to currency devaluation but an approximation of the actual changes in trade flows as a result of market forces. These results, however, are very useful for trade policy analysis.

Just as the earlier South East Asian Crisis of the mid 1990s resulted in the loss of the US export markets and substantial decline in the US farm income, the Russian

currency crisis of 1998 had a similar impact on a single commodity, the US poultry dark meat market.

Discussion

According to the empirical results of this study, it could be concluded that the depreciation of the Russian ruble relative to the US dollar has a negative impact on US exports of chicken leg quarters to Russia. Import prices become too high compared to Russian poultry producers' prices and consumers' income.

After devaluation, an increase in Russian domestic production in the long run may cause declining sales in the Russian market for US producers of dark meat. Stefan Osborne (2001) concluded that future exports to Russia would depend upon the ruble exchange rate, consumer income, world oil prices, and competitors' trade policies (p. 1). Nevertheless, there are still many questions that have to be answered before excluding Russia from the list of the targeted markets for US dark poultry meat. One of the main questions is: can Russian producers increase output with existing grain and protein meal supplies. This question needs further investigation, but the GTAP model provides a partial answer to this question.

The currency devaluation should help rather than hurt Russian agriculture. The rise in Russian producer prices for traded agricultural goods should stimulate production. The ruble's depreciation has improved the price competitiveness of Russian producers, not only in agriculture but economy-wide, *vis-a-vis* foreign competitors. Russian economy could benefit from the crisis of August 1998, since it improved the price competitiveness for all trade-competing sectors. This study also indicates that the US market became too dependent on exports to a single market for dark meat and that is why

drastic changes in exchange rates can impact significantly prices and profits in the US poultry sector.

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APPENDIX

Table A. 1. Final Monthly Data for SAS Input File for the Regression Analysis, January 1994 – April 2001[*]

Year	Month	Exrate	USwprice $/lb	Rusprice $/lb	USfob price $/lb	Qrus in 1000 lbs	Qwus in 1000 lbs	Embargo	Tariff
1994	1	1535.80	0.37	0.37	0.32	45710.18	51112.75	0	0
1994	2	1579.10	0.36	0.37	0.34	32583.99	57853.58	0	0
1994	3	1717.30	0.36	0.39	0.36	74339.11	75510.81	0	0
1994	4	1790.10	0.34	0.39	0.35	69885.82	75557.45	0	0
1994	5	1876.60	0.38	0.38	0.35	58188.21	74776.94	0	0
1994	6	1952.20	0.40	0.46	0.32	47756.05	71602.30	0	0
1994	7	2022.90	0.37	0.36	0.30	32019.61	67452.22	0	0
1994	8	2118.20	0.35	0.32	0.31	71947.12	72812.11	0	0
1994	9	2346.40	0.35	0.54	0.34	45710.18	80677.28	0	0
1994	10	3065.40	0.35	0.33	0.32	112006.91	98145.56	0	0
1994	11	3144.00	0.37	0.37	0.30	88435.32	91205.33	0	0
1994	12	3388.20	0.36	0.36	0.31	108245.86	102994.29	0	0
1995	1	3836.30	0.34	0.38	0.32	101493.17	80657.23	0	0
1995	2	4214.80	0.35	0.36	0.33	97452.14	85289.46	0	0
1995	3	4721.00	0.34	0.34	0.34	123929.38	104355.42	0	0
1995	4	5039.00	0.35	0.37	0.32	115977.39	96041.80	0	0
1995	5	5053.90	0.35	0.37	0.31	101638.67	90111.80	0	0
1995	6	4724.60	0.34	0.35	0.32	88821.13	85730.67	0	0
1995	7	4522.50	0.32	0.36	0.34	112505.15	115832.51	0	0
1995	8	4415.00	0.34	0.37	0.37	148016.84	106434.66	0	0
1995	9	4471.60	0.36	0.40	0.40	101493.17	98548.04	0	0
1995	10	4501.30	0.36	0.39	0.41	153579.05	127965.48	0	0
1995	11	4539.00	0.37	0.39	0.43	131766.74	109033.14	0	0
1995	12	4619.80	0.35	0.38	0.43	202097.89	130673.12	0	0
1996	1	4688.20	0.36	0.42	0.43	129500.41	100815.63	0	0
1996	2	4761.00	0.35	0.42	0.42	260718.20	129957.43	1	0
1996	3	4830.00	0.35	0.45	0.34	73252.24	110921.26	1	0
1996	4	4899.00	0.34	0.39	0.34	105247.60	104888.08	1	0
1996	5	4979.00	0.34	0.40	0.36	165863.08	125404.09	0	0
1996	6	5065.00	0.35	0.38	0.40	112694.74	104787.38	0	0
1996	7	5150.50	0.34	0.40	0.42	147807.41	115155.42	0	0
1996	8	5303.40	0.37	0.46	0.43	175576.55	142138.61	0	0
1996	9	5387.90	0.40	0.54	0.47	136317.03	112375.59	0	0
1996	10	5436.10	0.38	0.45	0.48	214309.17	147511.67	0	0
1996	11	5492.60	0.39	0.46	0.47	197364.61	140822.00	0	0
1996	12	5541.70	0.39	0.49	0.37	142639.82	108642.80	0	0
1997	1	5606.40	0.45	0.46	0.33	52533.41	114627.05	0	0
1997	2	5657.80	0.37	0.34	0.34	29724.18	54712.00	0	0
1997	3	5705.80	0.32	0.30	0.33	79515.29	76166.95	0	0
1997	4	5742.90	0.43	0.43	0.32	57538.96	96052.88	0	0
1997	5	5756.40	0.39	0.40	0.31	77100.15	78862.73	0	0
1997	6	5764.40	0.41	0.39	0.30	66101.62	94331.31	0	0
1997	7	5788.30	0.32	0.31	0.30	89326.42	101859.13	0	0
1997	8	5816.00	0.33	0.33	0.29	63296.49	109223.82	0	0

1997	9	5853.00	0.40	0.40	0.30	69809.32	111602.14	0	0
1997	10	5874.50	0.32	0.31	0.32	110503.37	97488.51	0	0
1997	11	5912.10	0.34	0.32	0.31	71966.30	155331.93	0	0
1997	12	5942.00	0.31	0.30	0.28	121155.78	109407.02	0	0
1998	1	6.02	0.33	0.32	0.28	132585.53	160512.08	0	0
1998	2	6.05	0.33	0.33	0.30	87068.91	134455.25	0	0
1998	3	6.07	0.35	0.34	0.31	71866.65	111211.49	0	0
1998	4	6.13	0.35	0.35	0.30	43298.78	76905.49	0	0
1998	5	6.15	0.32	0.32	0.28	38510.39	98495.13	0	0
1998	6	6.20	0.31	0.30	0.30	121575.75	176339.56	0	0
1998	7	6.24	0.35	0.31	0.35	71837.77	123260.95	0	0
1998	8	7.19	0.37	0.36	0.36	31233.23	90002.35	0	0
1998	9	14.13	0.30	0.60	0.26	70.11	45294.83	0	0
1998	10	16.27	0.26	0.27	0.21	37153.24	97410.03	0	0
1998	11	17.2	0.24	0.22	0.20	29974.18	83428.24	0	0
1998	12	20.7	0.21	0.23	0.18	38465.42	120144.97	0	0
1999	1	22.61	0.20	0.20	0.17	66156.08	134529.76	0	0
1999	2	22.94	0.20	0.21	0.17	45840.69	147250.97	0	0
1999	3	23.30	0.19	0.21	0.16	14133.47	94257.45	0	0
1999	4	24.98	0.17	0.22	0.15	24074.67	185972.12	0	0
1999	5	24.39	0.19	0.21	0.17	10804.08	99002.85	0	0
1999	6	24.15	0.20	0.21	0.22	9408.13	152140.55	0	0
1999	7	24.13	0.22	0.22	0.22	11406.60	141142.24	0	0
1999	8	24.69	0.21	0.17	0.20	32153.65	163562.36	0	0
1999	9	25.15	0.19	0.15	0.21	86396.07	194324.03	0	0
1999	10	25.61	0.22	0.22	0.19	153810.75	239985.48	0	0
1999	11	26.17	0.23	0.22	0.20	34503.53	102706.14	0	0
1999	12	26.71	0.24	0.22	0.20	9665.85	122214.21	0	0
2000	1	28.08	0.24	0.26	0.20	34035.94	117365.63	0	0
2000	2	28.74	0.22	0.22	0.21	42205.08	118837.42	0	0
2000	3	28.48	0.24	0.22	0.19	24418.81	78209.95	0	0
2000	4	28.07	0.21	0.22	0.19	37115.76	100664.90	0	0
2000	5	28.04	0.22	0.27	0.19	19030.11	112726.71	0	0
2000	6	27.71	0.23	0.25	0.20	71079.17	154086.33	0	0
2000	7	27.61	0.25	0.40	0.21	11823.27	88851.99	0	0
2000	8	27.76	0.24	0.22	0.23	82570.87	181730.03	0	0
2000	9	27.84	0.26	0.25	0.28	52226.31	150013.77	0	0
2000	10	27.88	0.25	0.23	0.29	82927.35	172786.41	0	0
2000	11	27.64	0.27	0.25	0.27	115520.60	217148.69	0	0
2000	12	27.72	0.29	0.28	0.24	48983.13	147440.78	0	0
2001	1	28.22	0.23	0.21	.	91537.42	219723.66	0	1
2001	2	28.34	0.24	0.21	.	83872.02	189191.50	0	1
2001	3	28.51	0.29	0.25	.	18676.49	121082.36	0	1
2001	4	28.62	0.25	0.23	.	90084.37	251773.70	0	1

* Data set used for estimation of OLS-USWP covers January 1994 – April 2001
Data set used for graphical presentation of prices correlation covers
January 1994 – December 2000.