U.S. BILATERAL TRADE WITH ITS MAJOR TRADING PARTNERS AND RUSSIA

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By

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The Supervisory Committee certifies that this ***disquisition*** complies with North Dakota State University's regulations and meets the accepted standards for the degree of

MASTER OF SCIENCE

ABSTRACT

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This study examines U.S. exports and imports to/from its major 15 trading partners and Russia. To analyze U.S. export and import flows the gravity model approach is used. Factors affecting U.S. bilateral trade flows with its 16 trading countries are evaluated using Generalized Method of Moments (GMM). Annual data from 2000 to 2009 are used for this study. Goods traded between the U.S. and its trading partners are disaggregated into three groups based on the Standard International Trade Classification (SITC).

Results show that major factors affecting both U.S. export and import flows are distance and change in polity score. Also U.S. exports are influenced by U.S. trading partner Gross Domestic Product (GDP) for agricultural (AGR) and middle sector (MID) groups. U.S. foreign direct investment is a complement for U.S. exports of final (FIN) group and at the same time it serves as substitute for U.S. exports of AGR. On the other hand, U.S. imports of AGR and foreign direct investment (FDI) from 16 trading partners to the U.S. are substitutes. This study also reveals that the U.S. and Russia bilateral trade could be improved through economic growth in both countries, improving political cooperation and increasing inward and outward FDI.

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CHAPTER 1. INTRODUCTION

Foreign trade is an important component of any economy, generally accounting for a significant share of GDP. Importance of U.S. trade with other countries is well established with the existence of multilateral and bilateral trade agreements with other countries. Even though there are established trade agreements the volume of trade between the U.S. and other countries has either increased, decreased or remained neutral. The reasons for increasing, decreasing and neutral trade flows have yet to be examined in a comprehensive way. In this study it is proposed to first identify a set of factors and evaluate importance of these factors in the bilateral trade flows.

All the countries could be divided into three groups: those who have

a) High trade volume with the U.S.;

b) Low trade volume with the U.S.;

c) No trade with the U.S. (countries against which the U.S. has embargo).

This study focuses on the U.S. and Russia bilateral trade. Russia has been one of the world's largest and fastest growing economies in transition in recent years. It is on track to join the World Trade Organization (WTO). Being in the list of 10 largest economies in the world the U.S. and Russia bilateral trade volume and levels of foreign direct investment are surprisingly low.

Identification of the factors effecting trade flows between countries would allow quantifying the extent of the importance of these factors. Second and more importantly this study will help to understand how the U.S. can expand its market access to Russia.

Although Russia's economic and political strength has been diminished a lot since the Soviet period, its influence seems to be growing recently. Russia's economy is large enough to effect global economy. Many countries are highly dependent on Russian natural gas. Russia is a significant player in many issues which are critical to

the U.S. However, national interests of these two countries do not always match, creating a hostile political environment.

The Bilateral Presidential Commission established in April 2009 is expected provide policy alternatives which increase trade and investment between the U.S. and Russia. Russia remains one of the most promising markets for U.S. exporters. In 2009, Russian GDP per capita was the highest among the BRIC (Brazil, Russia, India, and China) countries (Gosling, 2010). Before 2009, Russia had a continuous economic growth for nine years (1999-2008). Russia's GDP was increasing at approximately 7% annually for that period (U.S. Department of state, 2010).

Russia's economic prospects have direct and indirect implications for the U.S. One way to measure the direct implications is by examining the status of U.S.-Russian economic ties. U.S.-Russian trade and investment flows have increased in the post-Cold War period reflecting the changed U.S.-Russian relationship. In recent years, trade between Russia and the U.S. has grown fast but it is still on a low level. In 2008, Russia accounted for about 0.7% of U.S. exports and 1.3% of U.S. imports. On the other hand, U.S. accounted for 3.4% of Russian exports and 5.4% of Russian imports. U.S. imports from Russia have risen 19% annually since 2000 (U.S. Department of Commerce, 2010b). U.S. imports from Russia have increased substantially, rising from $0.5 billion in 1992 to a peak of $26.8 billion in 2008. The large increase in U.S. imports reflects not so much an increase in the volume of trade but the rise in world prices of raw materials, particularly oil, that comprise the bulk of those imports (64% in 2008). Russian exports to the U.S. were down 32% in 2008 ($18.2 billion).

U.S. exports to Russia have increased 22% per year on average from $2.1 billion in 1992 peaking at $9.3 billion in 2008. Major U.S. exports to Russia consist of machinery, vehicles, and meat (mostly chicken).In 2009 U.S. exports to Russia

experienced a 42% decrease from the 2008 level ($5.4 billion). In some areas, such as agriculture, Russia has become an important market for U.S. exports. Russia is the largest foreign market for U.S. poultry. Furthermore, U.S. exports of energy exploration equipment and technology, as well as industrial and agricultural equipment, have increased. Russian equipment and technology are getting old. That means that demand for these products is expected to grow.

Despite the increase in bilateral trade, U.S. and Russia still account for small shares of each others' FDI. Russia accounted for only 0.3% of U.S. FDI stock abroad on average from 2000 to 2008 (Nestmann, 2009). According to Russian government data, by the end of 2008, the United States accounted for 3.3% of total accumulated foreign direct and portfolio investments of Russia and was the eighth largest source of foreign investment (Cooper, 2009). U.S.-Russian investment relations could grow if Russia's business climate improves. Being in a transition period on the way to building free market economy, Russia has some issues to deal with concerning international standards in accounting, intellectual property rights, taxation and many others to make the environment attractive to U.S. investors and businesses.

The importance of Russia's economic policies and prospects to the U.S. also lies in their indirect effect on the overall economic and political environment in which the U.S. and Russia operate. From this perspective, Russia's continuing economic stability and growth can be considered positive for the U.S. in the interrelated global economy. For example, as a major oil producer and exporter, Russia influences world oil prices that affect the U.S. economy. Also the U.S. is concerned about Russian role in U.S. national security interests. Russia is a major supplier of natural gas to many U.S. European allies, which can possibly make them vulnerable to political pressure. In

2006, Russia accounted for 20% of France's, 25% of Italy's, and 36% of Germany's consumption of natural gas (Cooper, 2009).

There are other impediments affecting U.S.-Russia economic relations. Some of them are: history of the cold war, large geographical distance, and lack of cultural ties. At the same time there are institutional impediments: the fact that the U.S. does not grant Russia permanent normal trade relations (NRT) status, and Russia's membership in the WTO.

Russia is the largest and most populous country that is not a member of the WTO. It means that Russia is excluded from the process of making world trade rules. Russia is already in the world trade but it has not engaged in shaping the rules of trade (Putin, 2002).

Moreover, Russia is still subject to restrictions under Jackson-Vanik amendment included in the Trade Act of 1974, which impact on U.S.-Russia trade hasn't been quantified yet (Cooper, 2007). Russia's accession to the WTO is important for the Russian economy since the WTO requires its members to extend mutual unconditional MFN status to one another's exports (Cooper, 2006).

To answer the question "Why is the trade between Russia and U.S. low?" it is necessary to compare it with trade between U.S. and its main trading partners and analyze how different factors influence bilateral trade flows between those pairs of countries. In order to have a better picture of reasons for low U.S.-Russia trade three different aggregated sectors (agricultural goods (AGR), middle-technology (MID), and high-technology manufacturing goods (FIN)) are studied.

Objective

The primary focus of this study is to analyze bilateral trade relationship between the U.S. and its major trading partners, including Russia. Specific objectives of the study are:

a) evaluate main factors influencing U.S. bilateral trade with its main trading partners;

b) analyze economic and political characteristics significantly affecting the U.S. and Russia trade relationship;

c) evaluate some economic variables which could enhance bilateral trade relationship between the U.S. and Russia.

Method

A gravity model for U.S. trade with its major trading partners and Russia is developed for the study to analyze factors affecting U.S. exports and imports to/from those countries. The panel data for 16 countries from 2000 to 2009 was used for the study. Main variables considered in the model are U.S. GDP, GDP of 16 countries, distance, exchange rate, inward and outward foreign direct investment, change in polity score and dummy variables for language and 2009 year. Hausman and Taylor method is used to conduct econometric estimation of the gravity model.

Organization

Chapter 2 will describe main trends in the U.S. trade with its main 15 trading partners and Russia emphasizing how U.S. Russia bilateral trade is different in comparison with U.S. and other countries trading relationship. Previous studies regarding gravity model and determinants of bilateral trade are addressed in Chapter 3. A theoretical framework for bilateral trade and development of empirical model is

presented in Chapter 4. Then Chapter 5 is devoted to the description of data and econometric procedures for estimating the trade model using the Hausman and Taylor method. Results of the econometric analysis are discussed in Chapter 6. Finally, Chapter 7 includes implications and conclusions drawn from the results.

CHAPTER 2. U.S. TRADE WITH ITS 16 TRADING PARTNERS

In that section characteristics of bilateral trade between the U.S., its major trading partners and Russia will be discussed. To understand reasons for U.S. bilateral trade with other countries, it's necessary to have a look at the current situation in their trade with the U.S. Since the focus of this thesis is the U.S. and Russia trade relations, Russian economy characteristics will be discussed in this chapter in more detail.

Russia's Macroeconomics

The Russian economy was one of the fastest growing economies in the world since 1999 until the worldwide recession in 2009. Real gross domestic product (GDP) was increasing 6.9% annually on average. The growth brought an improvement in economic stability that Russia had not experienced at the beginning of its existence as an independent country. However, the Russian economy experienced negative growth (7.9%) in 2009 (Cooper, 2009).

After the collapse of the Soviet Union, Russia has been existing as an independent country since 1991. The economic crisis that struck all post-Soviet countries in the 1990s was twice as intense as the Great Depression that the countries of Western Europe and U.S. had in the 1930s. Russia was the only country that took the responsibility for settling the USSR's external debts. Most of the industry was privatized as a result of economic reforms in 1990s and the country moved from a centrally-planned to a market-based economy.

The financial crisis of 1998 brought a 60% decline in the value of the ruble decreasing flows of FDI, delayed payments on sovereign and private debts, and the threat of runaway inflation. However, Russia was revived from 1998 crisis fast and paid off its entire Soviet-era Paris Club debt of $22 billion in late 2006 (U.S. Department of state, 2010).

There are still lots of problems in the country such as weak private sector, reliance on commodity exports as the main source of country income, high inflation, weak protection of property rights and many others. However, some progress in building the market economy is achieved. The main characteristics of the Russian economy in comparison with the U.S. and its two major trading partners Canada and China are described in Table 2.1. In 2009 Russia had smaller nominal GDP, real GDP growth rate than China, Canada and the U.S. Moreover, Russia's inflation was highest out of these three countries.

Table 2.1 The Russian Economy at a Comparative Glance in 2009

	Russia	**China**	**Canada**	**USA**
GDP in current prices, billion of U.S. dollars*	**1229.23**	4908.98	1336.43	14256.28
-Place in the world	**12**	3	10	1
-Place among 16 U.S. trading partners	**10**	2	8	-
Real GDP Growth Rates*	**-7.90**	9.10	-2.50	-2.60
Per Capita GDP current prices, U.S. dollars*	**8693.80**	3677.86	39668.62	46380.91
-Place in the world	**59**	98	18	9
-Place among 16 U.S. trading partners	**12**	15	5	-
Consumer Price Index (CPI)*	**304.24**	119.60	119.97	124.60
Inflation, %*	**11.65**	-0.69	0.29	-0.32
U.S. Outward FDI (million of U.S. dollars)**	**21328**	49403	259792	-
-Place among 16 U.S. trading partners	**13**	10	3	-
U.S. Inward FDI (million of U.S. dollars)**	7792	791	225836	-
-Place among 16 U.S. trading partners	**11**	15	4	-

*Source: International Monetary Fund, World Economic Outlook Database, April 2010
**Source: U.S. Bureau of Economic Analysis. (June 25, 2009). International Economic. Accounts Data: U.S. Direct Investment Abroad and Foreign Direct Investment in the U.S.

GDP

In 2009 agriculture composed 4.7% of Russian GDP, industry 34.8%, services 60.5% (CIA-World Fact Book, 2010). Russia was ranked 14th in GDP among the 16

U.S. trading partners and number 23[d] in the world ($195.907 billion) in 1999. Figure 2.1 shows the development of Russian GDP in comparison with the U.S. and its five main trading partners.

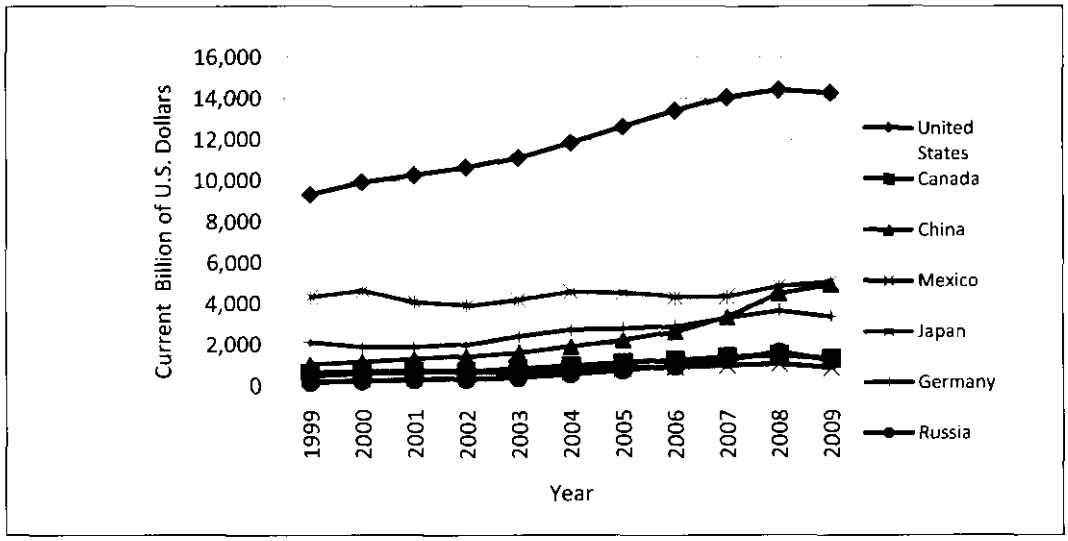

Figure 2.1 Gross Domestic Product of the U.S., Its 2009 Year Five Main Trading Partners and Russia 1999-2009.
Source: International Monetary Fund. (April, 2010). *World Economic Outlook Database.*

In absolute terms Russia was 31[st] largest trading partner of the United States (0.46% of the U.S. total trade value in 1999). Since then, the Russian economy grew. In 2009 it was ranked 12[th] in the world in value of GDP according to IMF (2010b); it had 10th largest economy in GDP among U.S. main trading partners (Figure 2.1). Also the country was ranked at number 25 in total trade turnover among U.S. trading partners (0.90% of U.S. total trade value). Figure (2.2) shows changes in the Russian GDP more clearly for 1992-2009 period. A sharp growth in nominal GDP after 1999 is attributed to increase in oil prices and beginning of a political stability period with the new president, Putin V.

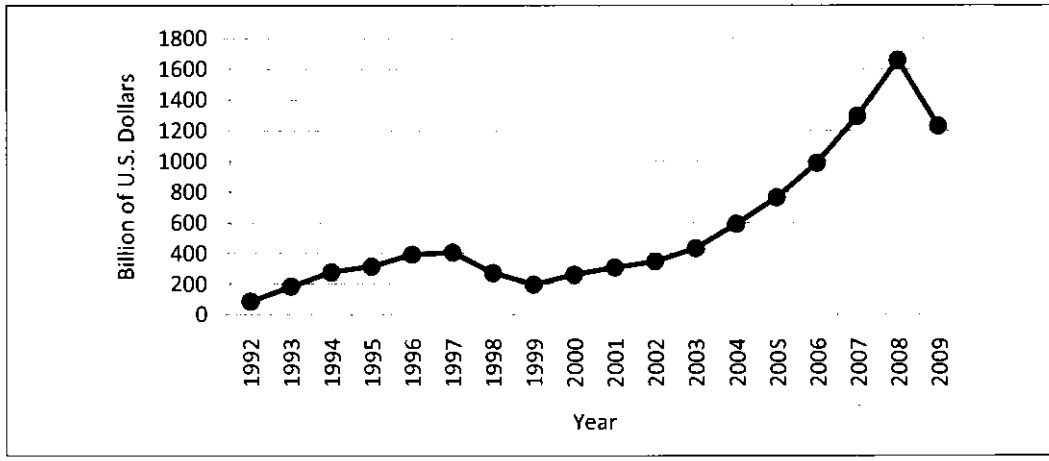

Figure 2.2 Russian Gross Domestic Product, 1992-2009.
Source: International Monetary Fund. (April, 2010). *World Economic Outlook Database.*

GDP Growth

Russian economy had on average a 7% growth since the 1998 financial crisis till 2008 (Figure 2.3). Between the financial crisis of 1998 and global crisis of 2008, Russian socio-economic indicators were improved, through sound macroeconomic management and policy changes at the national and regional level (OECD Observer, 2009).

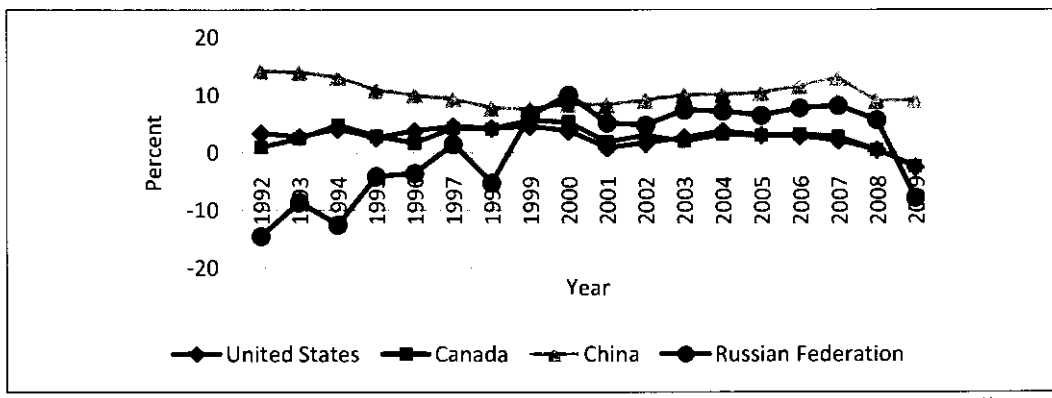

Figure 2.3 Annual Gross Domestic Product Growth of the U.S., Its Two Main Trading Partners and Russia.
Source: International Monetary Fund. (April, 2010). World Economic Outlook Database.

By 2008 Russian dollar reserves grew to the third-largest in the world (almost $600 billion), part of which is classified as Stabilization fund. The Stabilization Fund of

the Russian Federation ("the Fund") was established on January 1, 2004 as a part of the federal budget to be balanced at the time of when oil price falls below a cut-off price. Furthermore the Fund is an important tool for absorbing excessive liquidity, reducing negative influence on the economy from volatility of raw material export earnings (Ministry of Finance of the Russian Federation, 2010).

Russia was extremely vulnerable during the recent global economic downturn, since its economy is highly dependent on oil prices. In fact, the Russian Federation went through its worst recession in 15 years, decreasing the GDP by 7.9% in 2009 which was much worse than in the U.S. and its two main trading partners Canada and China. However, surge in energy price, various stimulus programs and low interest rates made Russia grew at 2.9% annually in the first quarter of 2010 (Trading Economics, 2010).

GDP Per Capita

Russia is classified as upper middle income country (World Bank, 2010b). Russia was ranked at number 59 in 2009 by its GDP per capita (IMF, 2010b). In comparison with U.S. and its main 15 trading partners Russia had 13th in terms of GDP per capita in 2009 (Figure 2.4).

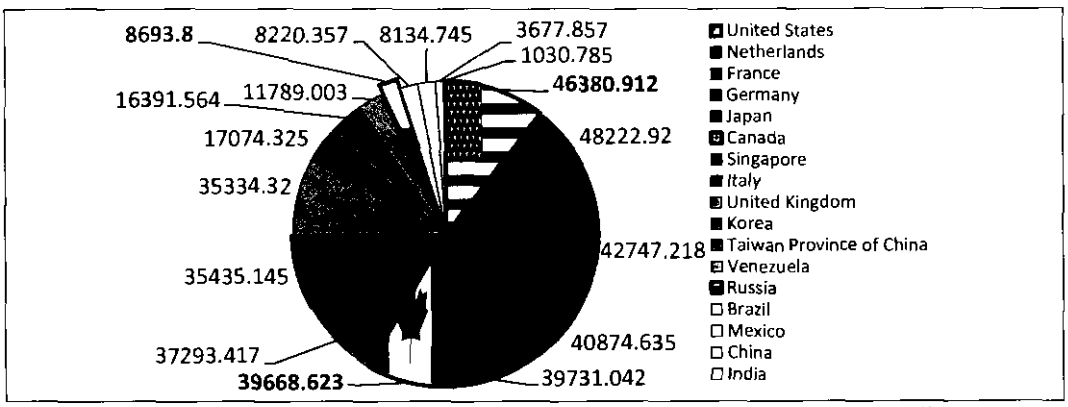

Figure 2.4 Gross Domestic Product per Capita in 2009 of the U.S., Its 15 Trading Partners and Russia. ($).
Source: International Monetary Fund. (April, 2010). *World Economic Outlook Database.*

Changes in GDP per capita over time for selected developed and developing countries are presented in Figure 2.5. This Figure shows a stable growth for the period with the highest value in 2008. Moreover, Russia had the largest per capita GDP among BRIC (Brazil, Russia, India, and China) countries and is one of the most promising markets for U.S. exporters. Russia has fewer people than other BRIC countries, but it is the richest nation among BRIC nations. On average Russian GDP per capita is twice higher than Chinese and five times higher than Indian (Gosling, 2010).

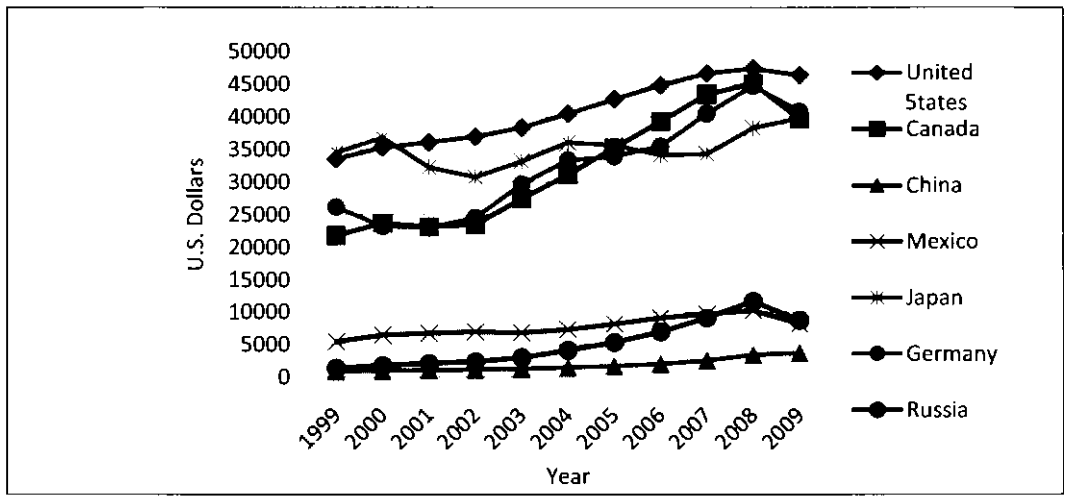

Figure 2.5 Gross Domestic Product per Capita in the U.S., Its Five Main Trading Partners and Russia in 1999-2009.
Source: International Monetary Fund. (April, 2010). *World Economic Outlook Database.*

Consumer Price Index

The Russian economy was bad for the first seven years of Russia's transition from the Soviet central planned economy (1991-1998) to free market based economy. During that period, Russia lost about 30% of its real gross domestic product (GDP), which is similar to a decline of the 1930s Great Depression in the United States. Russia also suffered very high rates of inflation– over 2000% in 1992 and about 900% in 1993– before it became more tolerable. Inflation was of around 20% by the end of the 1990s (Cooper, 2009).

However, inflation remained a problem later as the government failed to constrain the growth of prices between 1999–2007. In 2009 inflation in Russia was 11.7% that is much less then in 2008 (14.1%) but still high (Figure 2.6).

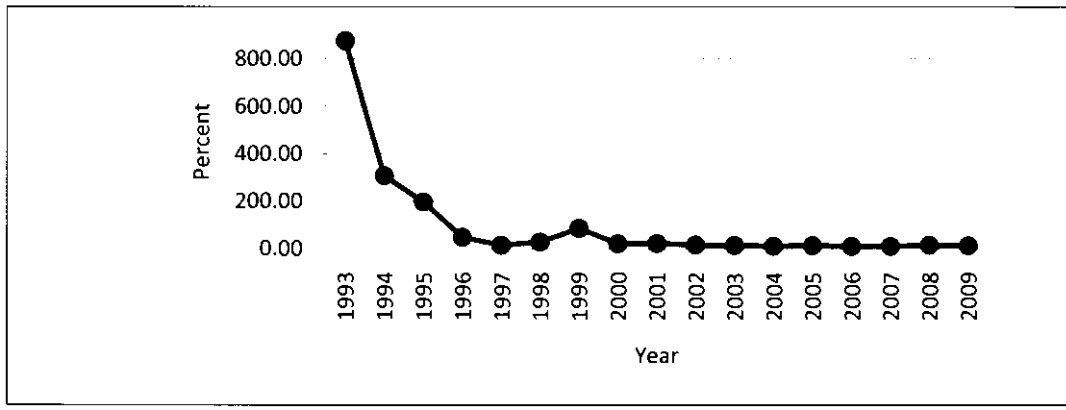

Figure 2.6 Inflation in Russia, Average Consumer Prices.
Source: International Monetary Fund. (2010). *International Financial Statistics Online.*

Also shown in Figure 2.7 Russian inflation in 2009 was much higher than the inflation in the U.S. and its 15 main trading partners. Russia's economy was hit hard by the world financial crisis. In 2009 GDP decreased by 7.9% and the government wasn't able to hold the inflation.

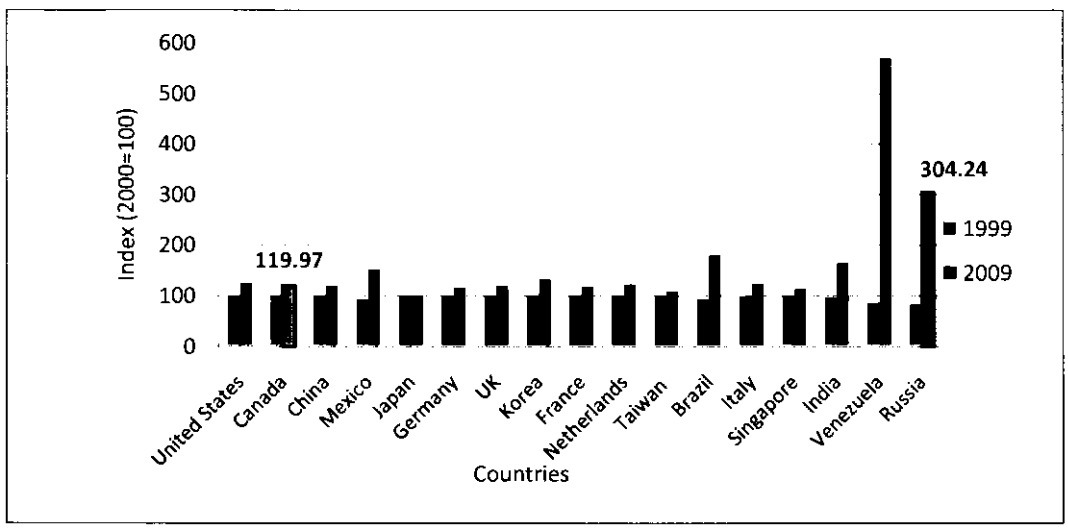

Figure 2.7 Consumer Price Index (2000=100) Annual Average of the U.S. Its 15 Main Trading Partners and Russia in 1999 versus 2009.
Source: International Monetary Fund. (April, 2010). *World Economic Outlook Database.*

Figure 2.8 shows distinctly the difference between the U.S. and Russian inflation levels. Pick of inflation occurred during the period of financial crisis for the 1998-1999 period in Russia. Since 2000, Russia's inflation has remained at less than 20%, but much higher than inflation rate in the U.S.

Figure 2.8 Comparison of Inflation in Russia and the U.S., Average Consumer Prices. Source: International Monetary Fund. (2010). *International Financial Statistics Online.*

FDI in Russia

Curtis, Griffin, Kornecki (2009) provide an investigation of FDI changing patterns in Russia between 1994 and the first quarter of 2009. The growth of FDI in Russia began only from the first quarter of 2003. Before that the Russian economy was politically unstable. Tarr and Volchkova (March, 2010) point out that in the first ten years of transition the inflow of FDI in Russia was very low compared to Eastern European countries and the BRICs.

Right after the collapse of the Soviet Union, Russia was incurring serious capital outflow - some $150 billion worth between 1992 and 1999. Russia's investment climate had improved during the last few years, a byproduct of Russia's robust growth (Cooper, 2009). Table 2.2, Figure 2.9 and Figure 2.10 demonstrate changes in Russian FDI inflow for the 1999-2009.

Table 2.2 Foreign Direct Investment in Russia, 1999-2009

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
FDI, net inflows (current $ billion)	3.3	2.7	2.7	3.4	7.9	15.4	12.8	29.7	55.1	72.8	37.1
FDI as % of GDP	1.7	1.0	0.9	1.0	1.8	2.6	1.6	2.9	4.2	4.5	3.0

Source: World Bank. (2010). *World Development Indicators.*

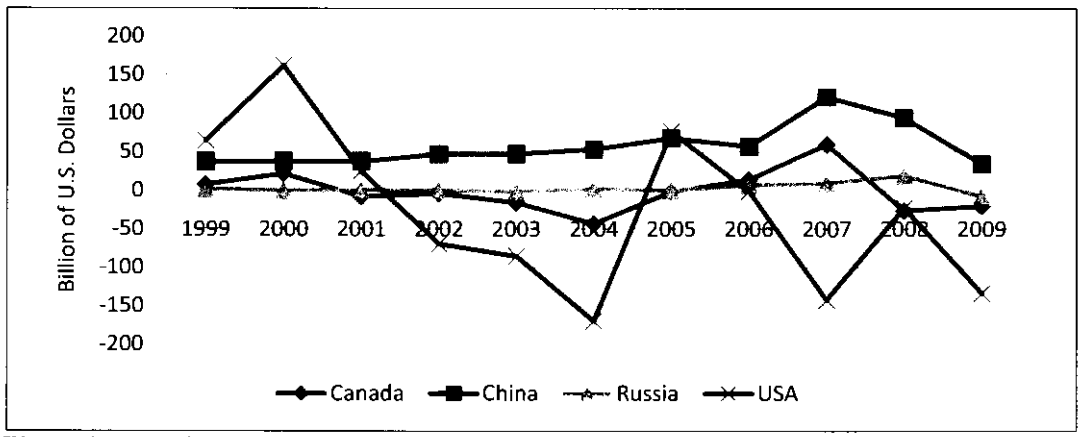

Figure 2.9 Foreign Direct Investment, Net, Balance of Payments.
Source: World Bank. (2010). *World Development Indicators.*

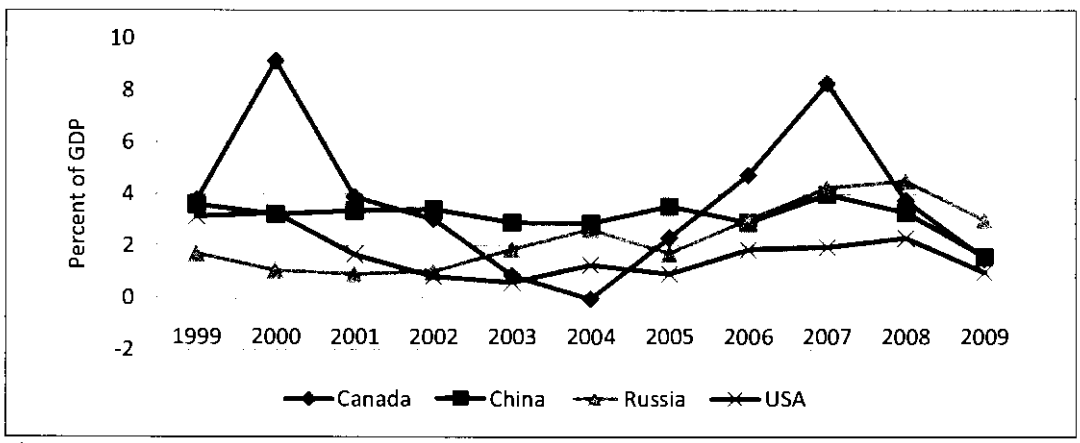

Figure 2.10 Foreign Direct Investment, Net Inflows.
Source: World Bank. (2010). *World Development Indicators.*

The Figures show that during the period of political stability and strong economic growth (2000-2008), FDI into the Russian economy has been growing and since 2007 it is higher as a percentage of GDP than China. At the same time, in absolute

terms FDI in Russia is much smaller than in China during the whole period (1999-2009).

The United Nations Conference on Trade and Development (2009) ranked Russia among the most attractive locations for FDI in 2009-2011 after China, the United States, India, and Brazil. In 2008 the largest inward investments in the economy of Russia were from Cyprus (21.1%), Netherlands (17.5%), Luxemburg (13%), and United Kingdom (11.6%) as a result of repatriation of Russian funds. According to Curtis, Griffin, Kornecki (2009), by the end of 2008, the U.S. accounted for 3.3% of total accumulated foreign direct and portfolio investments in Russia and was the 8th largest source of foreign investment.

On the other hand, Russia has become the third largest outward investor among emerging markets after Hong Kong and Singapore. In 2007 Russia's largest outward investments were in Netherlands (51.9%), Cyprus (13.5%), and U.S. (8.1%). Curtis, Griffin, Kornecki (2009) found out that this was influenced by efforts to avoid taxes and instability of domestic situation.

Risks associated with Russian business environment and recent import-substitution measures prevent U.S.-Russia relations from improvement. Macroeconomic risks are caused by Russia's dependence on highly volatile prices of several commodities, since high share of Russian output and exports is in energy sectors. In addition, there is a need for Russia to improve its institutional environment. According to the World bank (2010d) and Transparency International (2010) Russia ranks 123 out of 183 on the Doing Business Index; 94 out of 155 on the Logistics Performance Index; and 154 out of 178 on the Transparency International Corruption Perceptions Index. Finally, in order to diversify the economy the Russian government has employed several import-substitution-industrialization measures. According to Tarr

and Volchkova (March, 2010), among those are high export taxes on timber to develop the wood processing industry; increased import tariffs on processed food, light industry and automotive sectors; use of sanitary and phyto-sanitary measures for protection against meat imports; increases in agricultural production subsidies; restrictions on foreign investment in the Russian economy through the introduction of the law of foreign investment in strategic sectors in 2008.

U.S. Outward FDI to Russia

U.S. FDI to Russia is only 0.3% of U.S. FDI stock abroad on average for the 2000-2008 period (Nestmann, 2009). U.S. FDI increased sharply from 2003 to 2007 but dropped significantly in 2008 and 2009. It has been concentrated in the mining sector (53%) over the 2000-2008 period. During these years, another important sector was manufacturing (16%). For all other sectors, Russia's share was close to or even well below 1% of worldwide U.S. FDI (Nestmann, 2009).

In 1999 Russia was number 53[d] in U.S. Direct Investment Position Abroad. That year U.S. investment in Russia was only $1,678 million. This is a much lower than in any of the U.S. 15 main trading partners (Figure 2.11).

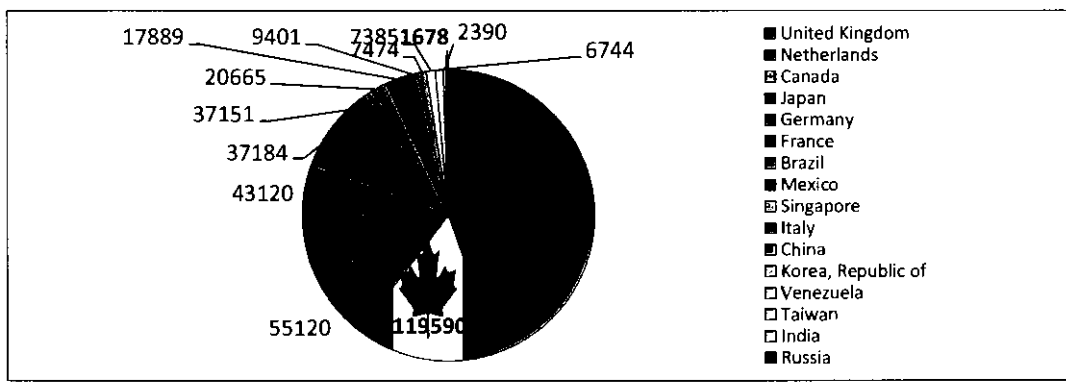

Figure 2.11 U.S. Direct Investment Position Abroad to Its 15 main Trading Partners and Russia in 1999 on a Historical-Cost Basis. ($Million).
Source: U.S. Bureau of Economic Analysis. (June 25, 2009). International Economic. Accounts Data: *U.S. Direct Investment Abroad and Foreign Direct Investment in the U.S.*

The situation changed for the last 10 years. In 2009 the U.S. invested $21,328 million in the Russia economy. That was higher than investments in other countries individually: Taiwan, India and Venezuela ($19,534, $18,610 and $14,506 million respectively) (Figure 2.12). With regard to the stock of U.S. FDI, Russia ranked below Brazil and China, slightly below India and above Turkey on average for 2000-2008 period (Nestmann, 2009).

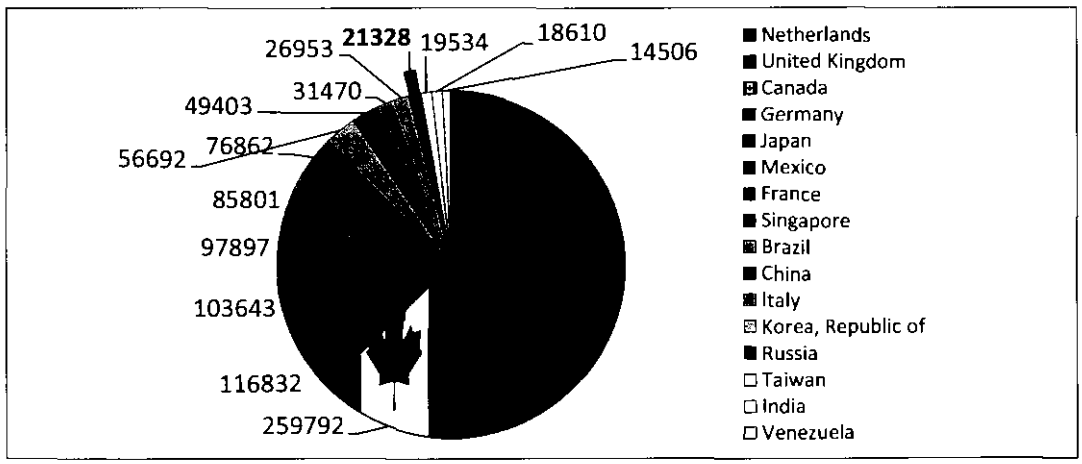

Figure 2.12 U.S. Direct Investment Position Abroad to Its 15 Main Trading Partners and Russia in 2009 on a Historical-Cost Basis. ($Millions).
Source: U.S. Bureau of Economic Analysis. (June 25, 2009). International Economic. Accounts Data: *U.S. Direct Investment Abroad and Foreign Direct Investment in the U.S.*

Russia's FDI to the U.S.

Data on Russian FDI stock in the U.S. is limited. Media reports and expert assessments reveal that Russian FDI stock in the U.S. was dominated in the steel sector, accounting for 90-95% in recent years (Nestmann, 2009). In 1999 Russia invested $97 million, 0.01% (45th absolute place) of total FDI into the U.S.

In 2009 Russian investment in the U.S. was equal to $7,792 million. Russia's investment in the U.S. economy was ranked 21st (0.34% of total FDI in the U.S.) in 2009 (Figure 2.13).

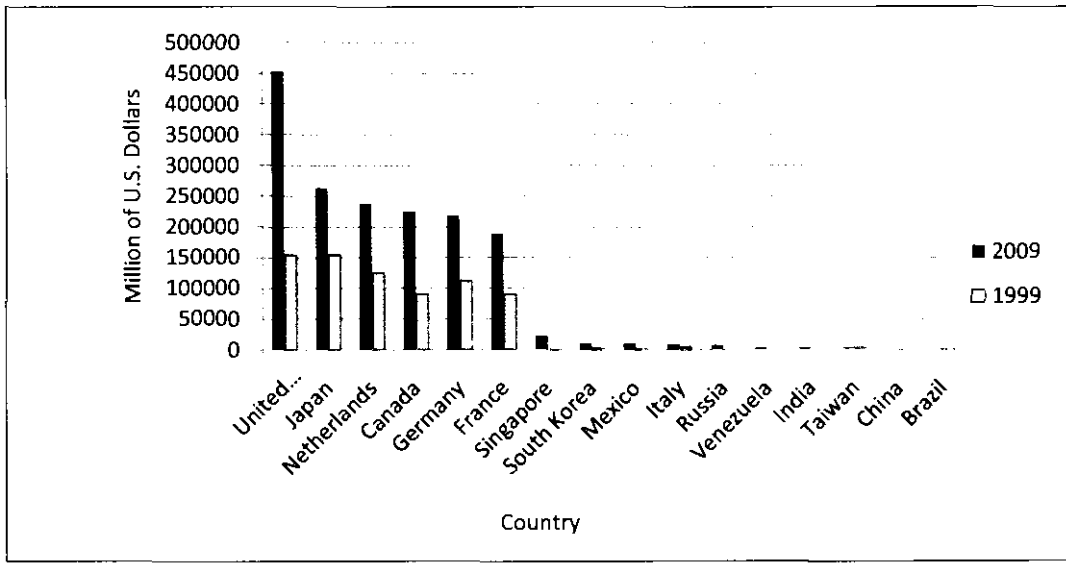

Figure 2.13 Foreign Direct Investment Position to the U.S. from Its 15 Major Trading Partners and Russia in 1999 and 2009 on a Historical-Cost Basis.
Source: U.S. Bureau of Economic Analysis. (June 25, 2009). International Economic. Accounts Data: *U.S. Direct Investment Abroad and Foreign Direct Investment in the U.S.*

Trade in Russia

Russia foreign trade has increased sharply in the last nine years (1999-2008) and the country has experienced rapidly increasing trade surplus. During that period Russian exports grew 4 times from $75.67 billion in 1999 to $303.39 billion in 2009. Imports grew 4.84 times from $43.59 billion in 1999 to $210.98 billion in 2009 (Figure 2.14).

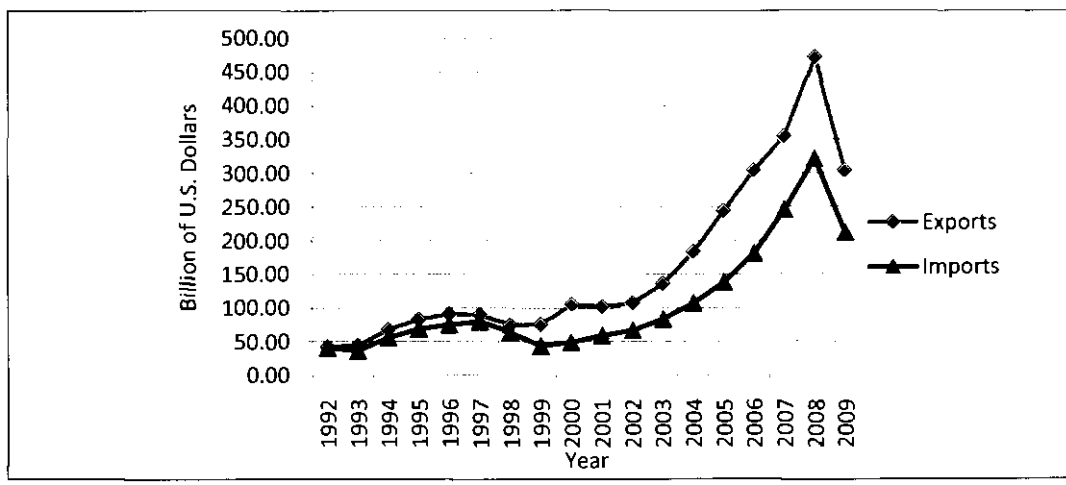

Figure 2.14 Russian Exports and Imports of Goods and Services.
Source: International Monetary Fund. (2010). *International Financial Statistics Online.*

Russia exported and imported less than China, Canada or the U.S. in 2009 (Table 2.3). At the same time, Russian exports were 12th largest in the world in 2009 (Figure 2.15). Russia has an abundance of natural gas, oil, coal, and precious metals and various natural resources. Oil and petroleum-related products have dominated Russia's exports and as a result economy is still commodity-driven despite its growth.

Table 2.3 Russian Exports and Imports at a Comparative Glance, 2009

	Russia	China	Canada	USA
Exports (billion of U.S. dollars)	303.39	1201.79	314.01	1056.75
Imports (billion of U.S. dollars)	191.80	954.30	327.20	1563.00

Source: International Monetary Fund. (2010a). *International Financial Statistics Online.*

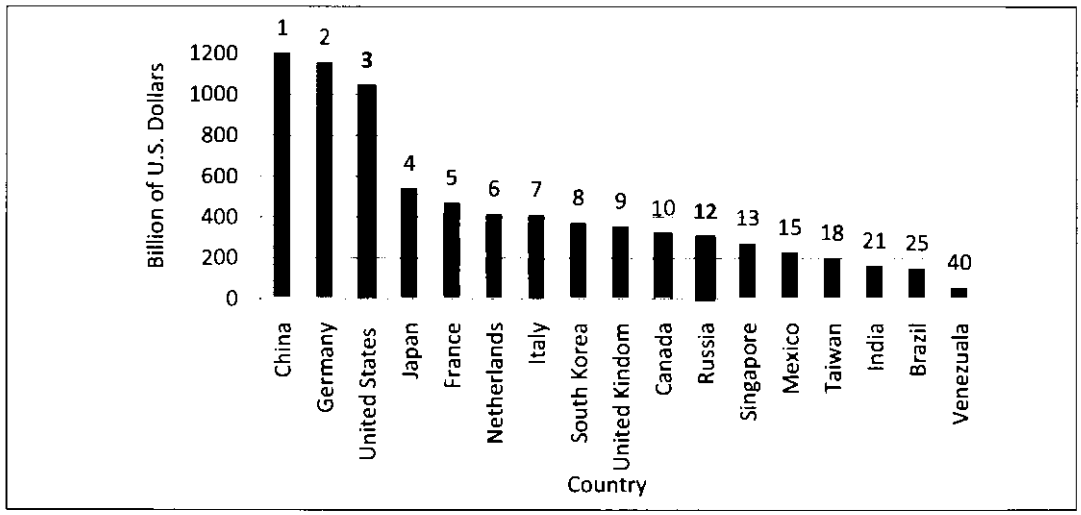

Figure 2.15 Countries' Place in the World Exports of Merchandise in 2009. Comparison of U.S., Its 15 Main Trading Partners and Russia.
Source: CIA-World Fact Book. (2010). Country Comparison: Exports.

The Russian reliance on commodity exports makes Russia vulnerable to highly volatile global commodity prices. In 2008, oil, natural gas, and other fuels accounted for 64.8% of Russian exports. If metals are included, the share of raw materials was 78.7% in 2008 (Cooper, 2010).

According to CIA-World Fact Book (2010), Russia is the world's largest producer of oil in 2009 (9.932 million bbl/day) followed by Saudi Arabia (9.764 million

bbl/day) and the U.S. (9.056 million bbl/day). At the same time Russia was second largest world's exporter of oil (4.93 million bbl/day) in 2009. Russia took second place in the list of world leaders in natural gas production of 2009 in (546.8 billion cu m). The first place in 2009 belonged to the U.S. (593.4 billion cu m). However, Russian was number one exporter of natural gas in the world (207.7 billion cu m) in 2009. Moreover, Russia was third largest exporter of steel and primary aluminum in 2009.

Thus Russia's main export commodities are petroleum and petroleum products, natural gas, grain, wood and wood products, metals, chemicals, and a wide variety of civilian and military manufactures. The main export partners as of 2009 are Netherlands (10.62%), Italy (6.46%), Germany (6.24%), China (5.69%), Turkey (4.3%), Ukraine (4.01%).

Because of the world economic crisis Russian imports were much lower in 2009 ($191.8 billion) than in 2008 ($291.9 billion) (Figure 2.16). Machinery and equipment accounted for 43.9% of Russian imports, and food and other agricultural products accounted for another 16.9%.The leading import commodities in general are vehicles, machinery and equipment, plastics, medicines, iron and steel, consumer goods, meat, fruits and nuts, semifinished metal products. The main importers to Russia in 2009 were Germany 14.39%, China 13.98%, Ukraine 5.48%, Italy 4.84%, the U.S. 4.46%.

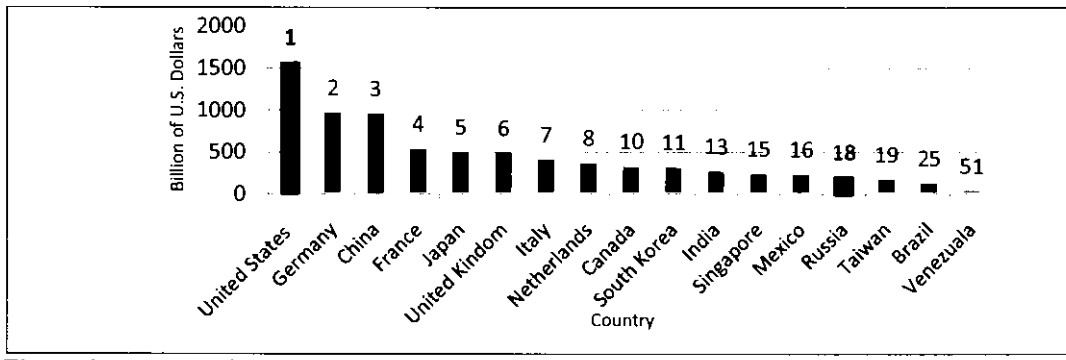

Figure 2.16 Countries' Place in the World Imports of Merchandise in 2009. Comparison of U.S., Its 15 Main Trading Partners and Russia.
Source: CIA-World Fact Book. (2010). Country Comparison: Exports.

Putin V. in his late years of presidency and the current Russian president Medvedev D. set a goal to modernize the country's economy, reduce its dependence on raw materials exports and developing high technology sector (Levy, 2009).

Characteristics of U.S. Trade with Russia

U.S.-Russia Relations

Contradictory geopolitical issues have historically dominated U.S.-Russia relations. As a result, bilateral trade and investment levels are low. However, bilateral trade between the two countries has grown rapidly in recent years and closer economic relations may help to stabilize the political relationship between Russia and the U.S.

After the collapse of the Soviet Union in December 1991 Russia became an independent country. As a recently appeared democracy it has had a contradictory history of political and economic development. U.S.-Russia relations were not always easy and characterized by some tension most of the time. According to Cooper and Nichol (2010) in early 1990s U.S.-Russia relationship could be characterized as "strategic partnership", followed by difficulties later. After the terrorist attacks September 11, 2001, the two nations reshaped their relationship in order to cooperate against terrorism. However, later tension began to rise because of NATO enlargement, Kosovo's independence, proposed the U.S. missile defenses in Eastern Europe, Iranian and North Korean nuclear issues and nuclear non-proliferation in general (Cooper and Nichol, 2010). In 2008 as a result of Russia-Georgia conflict, U.S.-Russia bilateral ties reached their lowest point since the Cold War. Nevertheless, the situation improved lately. The White House (June 24, 2010) reported that the new presidents agreed to "reset" bilateral relations between the U.S. and Russia in order to improve cooperation.

Despite this cooperation, the two countries still disagree about Moscow's recognition of the independence of South Ossetia and Abkhazia.

Moreover some traces of Cold War such as Jackson-Vanik amendment have not yet disappeared.

Jackson-Vanik Amendment and WTO

A fair amount of literature talks about Jackson-Vanik amendment and Russian nonmenbership in the WTO. Nestmann (2009) gives some reasoning for the low trade volume between the two countries. Among those reasons are geopolitical and historical issues, technological impediments, lack of cooperation between the countries, existence of Jackson-Vanik amendment that implies no permanent normal trade relation status (PNTR) for Russia, lack of Russian economy diversification. The fact that Russia is not a member of WTO influences U.S.-Russia trade negatively (Nestmann, 2009).

Nichol and Cooper in the Congressional Research service report (2010) summarize Russian political, economic situation and their relation to the U.S. interests. In that report authors discuss the problems of Russian accession to the WTO and absence of PNTR for Russia from the U.S. The WTO requires that each member grant to all other members "unconditional" most-favored-nation status (MFN), or permanent normal trade relations status (PNTR). NTR is used to denote nondiscriminatory treatment of a trading partner compared to that of other countries. In fact only a few countries do not have NTR status in trade with the U.S. Nevertheless, the U.S. doesn't grant Russia this status.

Russia's NTR status is governed by Title IV of the Trade Act of 1974, which includes the Jackson-Vanik amendment (section 402). As Pregelj (2005) explains it was the U.S. reaction to the severe restrictions the Soviet Union had placed in late 1972 on the emigration of its citizens, and was applied to so-called "nonmarket economy" countries.

Under Title IV, Russia currently receives NTR because of granted by the

President waiver, which is based on results of semiannual review of Russia's compliance with freedom-of-emigration criteria under section 402 subject. (Nichol and Cooper, 2010). Russia will receive "permanent" NTR (PNTR), only if Congress passes and the President signs legislation indicating that Title IV no longer applies to Russia. At the same time, Kyrgyzstan, Georgia, Armenia, Ukraine, China and Vietnam have PNTR (Cooper, 2007).

WTO accession will certainly result in the elimination of the Jackson-Vanik Amendment against Russia as a result of a commercial pressure on the U.S. from its own exporters and investors. In practice, the U.S. has dropped Jackson-Vanik on all countries that have acceded to the WTO with one exception (Moldova).

Russia has a long history of negotiations with WTO. The country applied for membership in the General Agreement on Tariffs and Trade (GATT) in June 1993 which was transformed into the World Trade Organization (WTO) in 1995.

"As of June 2009, there were 153 member countries of the WTO. Trade among them represented 97% of the world's trade value, including over 94% of the foodstuffs. Russia is the largest economy outside the WTO" (Tarr and Volchkova,2010).

Entering WTO was stated as a one of the priorities by the first Administration of President V. Putin WTO was seen as an important tool for Russia's move toward an open trade and investment model of economic development. The Russian Duma (the lower house of the parliament) passed into law about 42 significant packages of legislation to conform to WTO requirements. Although in 2009 Russia announced that it hopes to accede to the WTO with Belarus and Kazakhstan on the basis of a common external tariff.

A series of studies quantitatively estimate effect of Russia's accession into the WTO. The computable general equilibrium model of the Russian economy numerically

estimated liberalization of barriers against FDI (Jensen, Rutherford and Tarr, 2004). According to the authors' estimation, the gains to Russia from WTO accession are 7.2% of Russian consumption (3.3% of GDP) in the medium run, and 23.6 % of Russian consumption (11.0% of GDP) in the long run in their comparative steady state analysis. To understand the sources of these gains, several scenarios are executed in the paper for decomposing the impacts. The results of this analysis indicate that Russia will get most gains from FDI liberalization in services (5.2% of the value of Russian consumption), which amounts for over 70% of the total gains from Russian WTO accession. Also it is concluded in the study that tariff reform is responsible for 1.3% increase in consumption gain. Improved market access accounts for 0.6% of the welfare gain.

Bilateral Trade Between the U.S. and Russia

On the whole, U.S.-Russian trade and investment flows have increased in the post-Cold War period. U.S. imports from Russia have increased substantially, rising from $0.5 billion in 1992 to $26.8 billion in 2008 (Cooper and Nichol, 2010). However, the pattern of U.S.-Russia trade undergone several different periods. Boyrie, Pak, Zdanowicz (2005) analyzed millions of import/export transactions between the U.S. and Russia for the period 1992-1999. This study tests two portfolio models, Cuddington (1987) and Pastor (1990), to explain large capital movements from Russia through trade with the U.S. The problem was especially big in Russia right after disappearance of the Soviet Union. The results showed that the capital flight from Russia to the U.S. during the five-year period studied was $8.92 billion. This resulted from $7.24 billion under-invoiced exports from Russia to the U.S. and $1.68 billion over invoiced imports into Russia also from the U.S. The authors suggest that capital movement out of Russia was due to money laundering activities and/or tax evasion.

Nestmann (2009) made a recent overview of U.S.-Russia economic relations for

the 2000-2008 period. Russia and the U.S. account for minor fractions of each other's trade with the rest of the world. On average trade between the two countries in 2000-2008 was equal to $18 billion per year. Nestmann (2009) states that it was more than 13 times lower than total trade volume with China. In 2008, Russia accounted for about 0.7% of U.S. exports and 1.3% of U.S. imports. The U.S. accounted for 3.4% of Russian exports and 5.4% of Russian imports (Cooper and Nichol, 2010). The situation for 2009 is presented in Table 2.4.

Table 2.4 U.S.-Russia Bilateral Trade at a Comparative Glance, 2009

	Russia	**China**	**Canada**
U.S. Exports to a Foreign Country (billion of U.S. dollars)*	5.33	69.50	204.66
-Relative Share**	0.50%	6.58%	19.38%
-Absolute place **	32	3	1
U.S. Imports from a Foreign Country (billion of U.S. dollars)*	18.20	296.37	226.25
-Relative Share**	1.17%	19.00%	14.51%
-Absolute place **	20	1	2
Total Trade Value between the U.S. and a Foreign Country (billion of U.S. dollars)**	23.53	365.87	430.91
-Relative Share**	0.90%	13.99%	16.47%
-Absolute place **	25	2	1

Source: * U.S. Department of Commerce. TradeStats Express. (November 11, 2010).
** Calculated by the author.

In recent years, trade between Russia and the U.S. has grown fast but it is still on a low level. Since 2000, U.S. exports to Russia have increased 22% per year on average while U.S. imports from Russia have risen 19% annually. Back in 1999 Russia was 31st largest trading partner of the U.S. by total value. It accounted for 0.46% of U.S. foreign trade. In 2008 Russia was 23rd U.S. trading partner (1.07% of U.S. trade value). As a result of global crisis these numbers decreased in 2009 and Russia was ranked at number 25 (0.9% of U.S. trade value) (Figure 2.17).

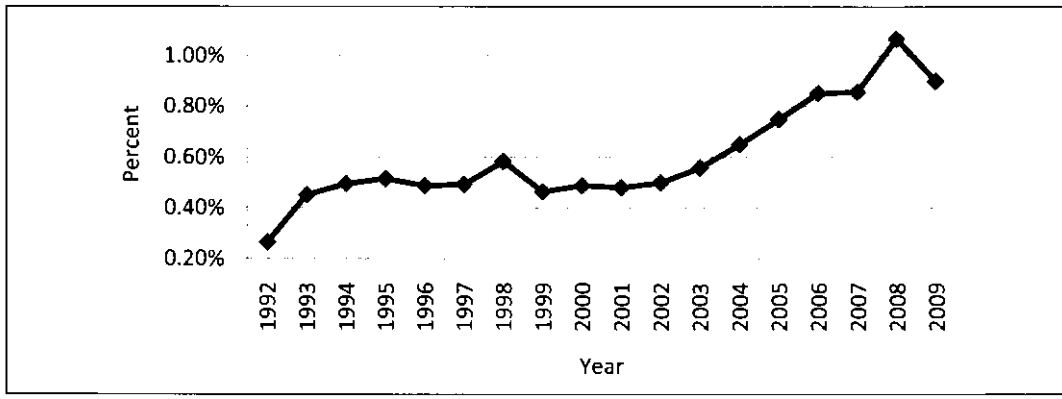

Figure 2.17 Relative Share of U.S. Trade Value with Russia in Its Total Trade Value with All Countries, 1992-2009.
Source: Data obtained from U.S. Department of Commerce. TradeStats Express. (2010), calculations done by author.

The value of U.S. imports from Russia has been bigger than the value of U.S. exports. The trade deficit has grown rapidly since 1999 (Figure 2.18). At the same time the two countries have made some effort to strengthen their economic ties. Russia has become an important trading partner for the U.S. in agricultural trade.

Major U.S. exports to Russia consist of machinery, vehicles, energy and exploration equipment, technology, and meat (primarily chicken) (U.S. Department of Commerce, TradeStats Express, 2010). The experts predict that Russian demand for that equipment will grow as Russian old equipment and technology need to be modernized.

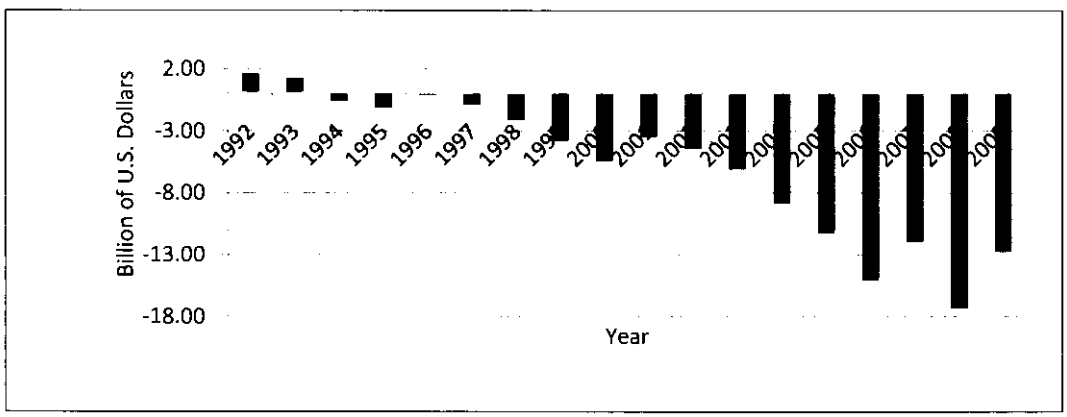

Figure 2.18 The U.S. Balance with Russia for SITC All Merchandise, 1992-2009.
Source: U.S. Department of Commerce. TradeStats Express. (2010).

Russia is also the largest foreign market for U.S. poultry. Nestmann (2009) states that 39% of total U.S. chicken is exported to Russia and 32% of U.S. fertilizer imports come from Russia. However, Russian restrictions on meat imports (pork, poultry, beef) imposed recently created tension in U.S.-Russian trade relations.

Russia is an important supplier of a number of raw materials (petroleum and petroleum products, different types of metals) that are critical to U.S. manufacturers. However, Russian economy lacks diversification while focusing on oil, gas, and other natural resources. That implies Russia's significance is relatively small as a supplier of U.S. imports.

U.S. Exports to Russia

Russia's absolute place as a destination of U.S. exports was 39 in 1999 with $2.06 billion. At that time Russia accounted for 0.3% of U.S. exports to other countries (Figure 2.19).

Machinery and Transport Equipment (SITC-7) comprised the largest part of U.S. exports to Russia in 1999. This group of products made up 51% or 1045.73 millions of U.S.

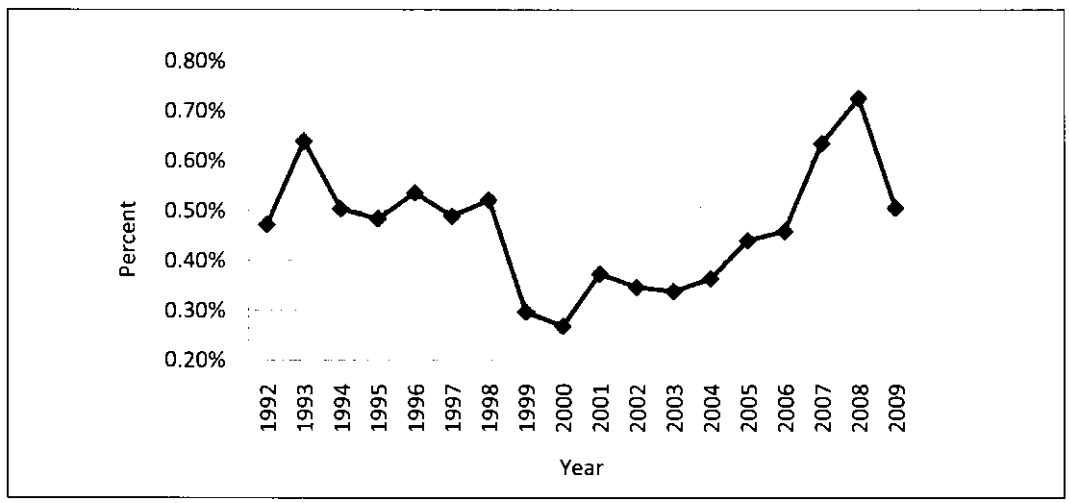

Figure 2.19 Relative Share of U.S. Exports to Russia in Total U.S. Exports to All Countries, 1992-2009.
Source: Data obtained from U.S. Department of Commerce. TradeStats Express. (2010), calculations done by author.

For the last 10 years U.S. exports to Russia in SITC-4 and SITC-9 decreased by 97% and 10%, respectively. U.S. export of SITC-05 group to Russia demonstrated the largest growth by 940% by 2009 in comparison with 1999. Other groups showed strong increase as well.

U.S. Imports from Russia

The magnitude and composition of U.S. imports from Russia have changed during 10 years (Figure 2.21).

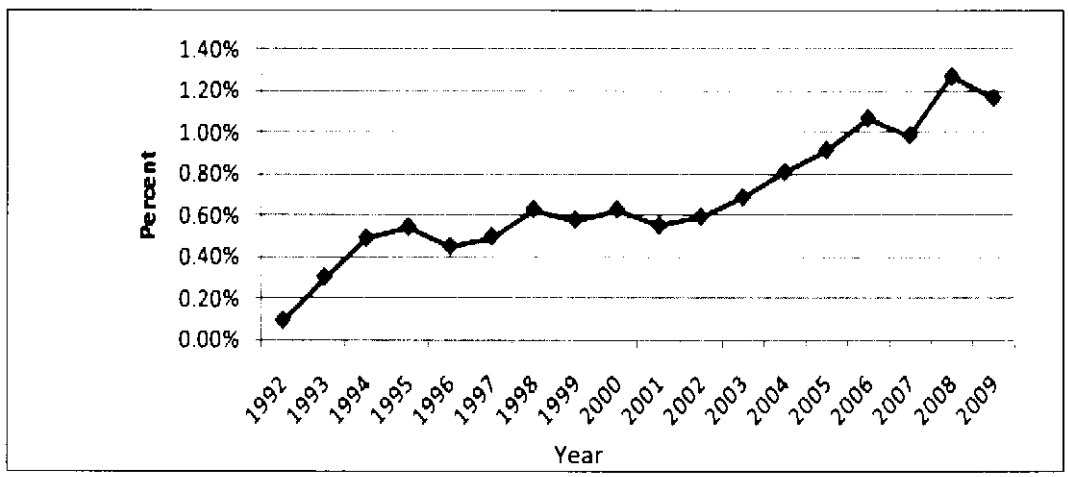

Figure 2.21 Relative Share of U.S. Imports from Russia in Total U.S. Imports from All Countries, 1992-2009.
Source: Data obtained from U.S. Department of Commerce. TradeStats Express. (2010), calculations done by author.

Right after dissolution of the Soviet Union U.S. imports from Russia were even less than 0.01%. In 1992 U.S. imports from Russia were $0.48 billion which accounted for 0.09% of U.S. imports from all foreign countries.

By 1999 situation improved, Russia had 28th absolute place among countries importing to the U.S. (0.58% of total U.S. imports from the world). U.S. imports from Russia were dominated by SITC-6, SITC-5, SITC-3 with 62%, 14%, 9%, respectively (Figure 2.22).

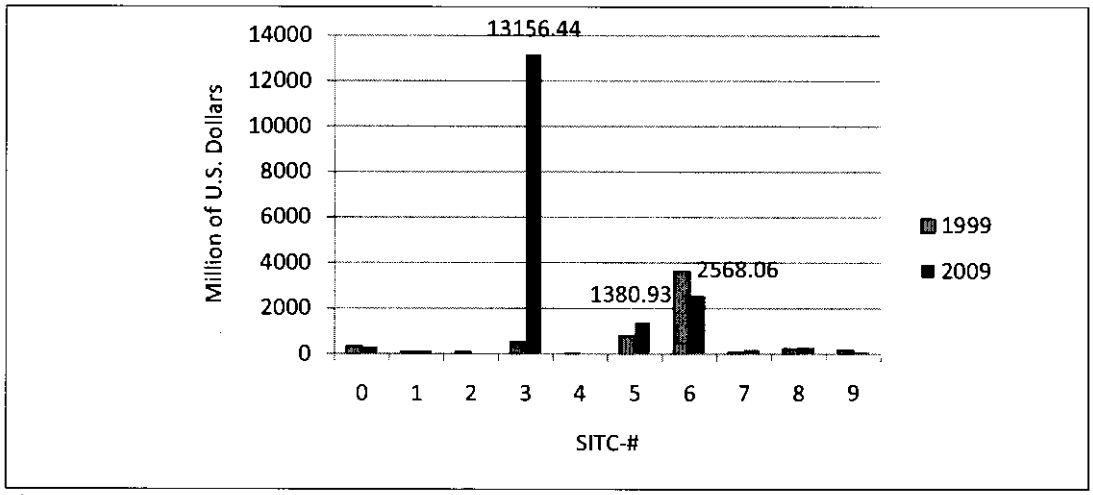

Figure 2.22 Composition of U.S. Imports from Russia, 1999 and 2009.
Source: U.S. Department of Commerce. TradeStats Express. (November 11, 2010).

The situation has changed in 2009. That year total Russian exports to the U.S. increased by three times from 1999 and equaled to $18.20 billion (1.17% of U.S. total imports from foreign countries) down 32% from year 2008. In 2009 Mineral Fuels, Lubricants and Related Materials (SITC-3) comprised the largest part of U.S. imports from Russia. It comprised $13.16 billion or 72% all U.S. imports from Russia in 2009. Second and third places belonged to SITC-6 and SITC-5, respectively (Figure 2.22). U.S. imports of all groups of products from Russia increased. As a result Russia became the 20th U.S. largest trading partner in terms of imports versus 61st place in 1992.

Finally, U.S.-Russia trade is dominated by inter-industry trade. The U.S. mainly exports skill-intensive products to Russia and imports raw materials from Russia. While Russia and the U.S. each only account for minor fractions of the other's trade with the rest of the world, there are a few products for which bilateral trade is significant.

Characteristics of U.S. Trade with Its Main 15 Trading Partners

The U.S. was the 3rd largest exporter in the world in 2009. Also it took the 1stplace in the world in imports in 2009 (CIA-World Fact Book, 2010).The relations with each trading partner have been changing over time as a result total trade value with

them has been changing. In 1992 U.S. trade value with all countries was equal to $1720.42 billion. At the same time trade value with its main 15 trading partners was equal to $1330.88 billion.

The total trade value increased 1.52 times since 1999. In 2009 U.S. trade value with all countries was equal to $2615.7 billion. At the same time, trade value with its main 15 trading partners was equal to $1878.8 billion. The composition of the U.S. main trading partners has been changing over time (Table 2.5).

Table 2.5 List of U.S. Main Trading Partners in 1999 and 2009. ($Billion)

#	Year 1999		#	Year 2009	
1	Canada	365.31	1	Canada	430.91
2	Mexico	196.63	2	China	365.87
3	Japan	188.33	3	Mexico	305.55
4	China	94.90	4	Japan	146.94
5	Germany	82.03	5	Germany	114.80
6	United Kingdom	77.64	6	United Kingdom	93.18
7	Taiwan	54.34	7	South Korea	67.83
8	South Korea	54.14	8	France	60.73
9	France	44.59	9	Netherlands	48.34
10	Singapore	34.44	10	Taiwan	46.85
11	Italy	32.45	11	Brazil	46.17
12	Malaysia	30.48	12	Italy	38.70
13	Netherlands	27.91	13	Singapore	37.94
14	Brazil	24.52	14	India	37.61
15	Hong Kong	23.18	15	Venezuela	37.37
31	Russian Federation	7.98	25	Russian Federation	23.53

Source: U.S. Department of Commerce. TradeStats Express. (2010).

Figure 2.23 shows the change in U.S. trade value with 5 main trading partner for the 1992-2009 period. U.S.-China bilateral trade was increasing rapidly. In 2003 China surpassed Japan and became the third main trading partner of the U.S. Three years later China was already the second largest trading partner leaving Mexico behind in spite of Mexico's obvious geographic advantage.

Since 1999 U.S. exports to all countries grew by 66% and comprised $1056.04 billion in 2009. The main exported products by category are represented in the Figure 2.24.

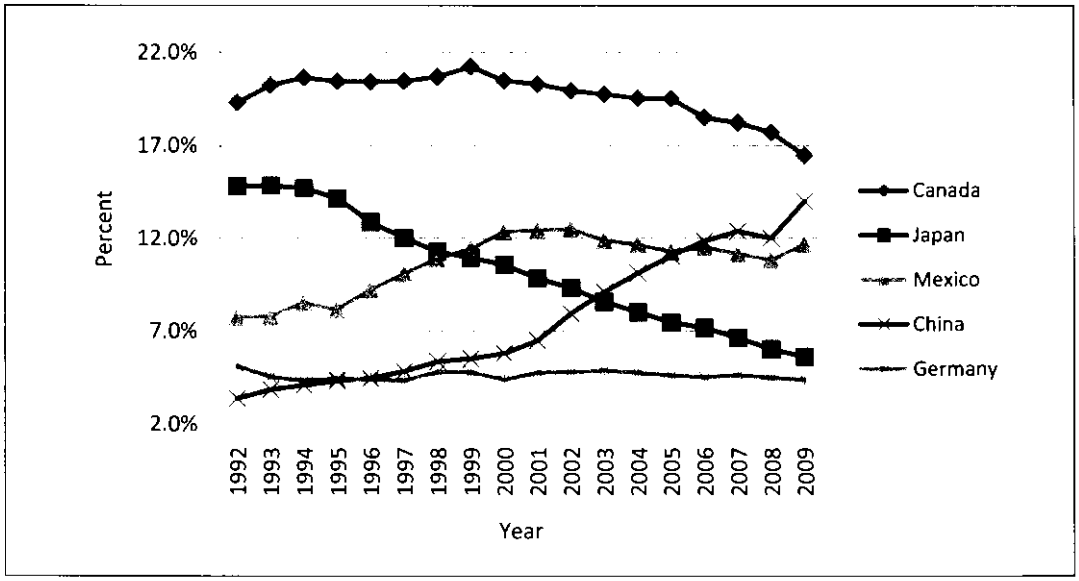

Figure 2.23 Relative Share of U.S. Trade Value with 5 Main Trading Partners in Its Total Trade Volume with All Countries, 1992-2009.
Source: U.S. Department of Commerce. TradeStats Express. (2010).

The composition of U.S. exports hasn't changed much over years. The main exported groups (SITC-7, SITC-5, SITC-8) are still three leading categories, making 41.8%, 15.1%, 11.4% of total U.S. exports in 2009, respectively.

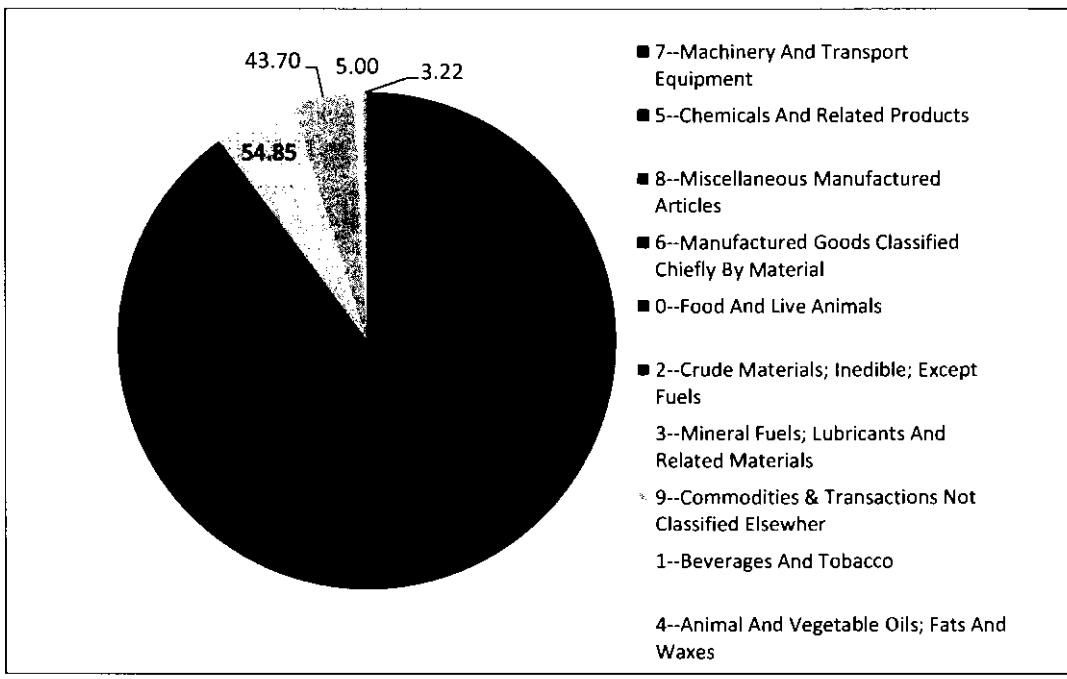

Figure 2.24 U.S. Exports to the World of SITC (1-9) All Merchandise, 2009. ($Billion)
Source: U.S. Department of Commerce. TradeStats Express. (2010).

Lately U.S. exports to its four main trading partners have decreased, however exports to China have been growth since 2001. Exports to Japan have been decreasing the most among the U.S. five major trading partners (Figure 2.25).

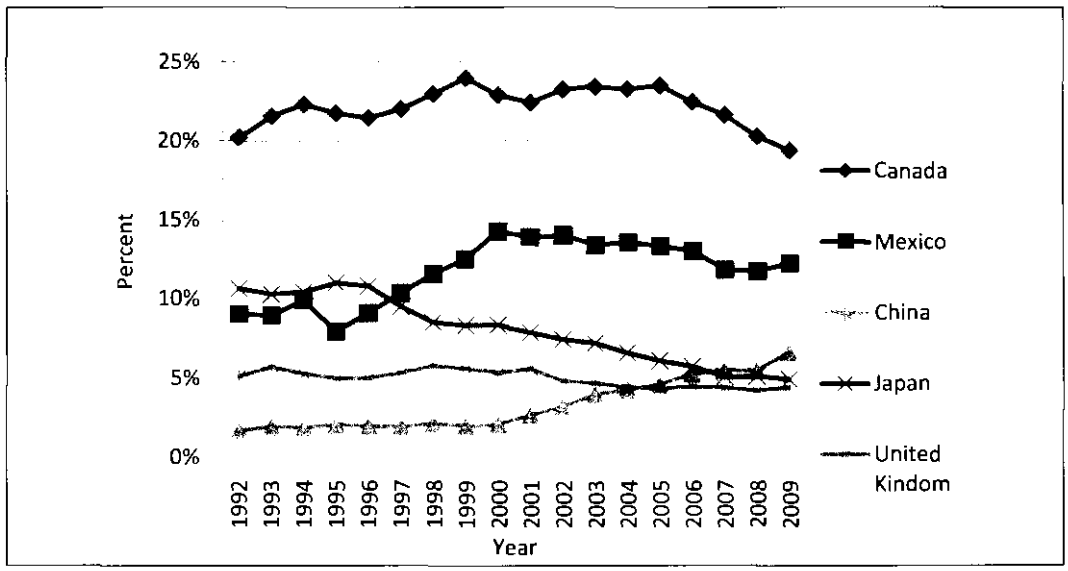

Figure 2.25 Relative Shares of U.S. Exports to Its Five Major Trading Partners in Total U.S. Exports to All Countries, 1992-2009.
Source: U.S. Department of Commerce. TradeStats Express. (2010).

Canada enjoys a substantial trade surplus with the U.S., which absorbs nearly 80% of Canadian exports each year. The U.S. is by far its largest trading partner, accounting for about 73% of exports and 63% of imports as of 2009 (Statistics Canada, 2010). Canada is the U.S.'s largest foreign supplier of energy, including oil, gas, uranium, and electric power.

Since 1999 U.S. imports from all countries grew by 66% and comprised $1,559.62 billion in 2009. The composition of U.S. imports hasn't change with years as well as the composition of exports. The main exported groups (SITC-7, SITC-3, SITC-8) are still three leading categories generating 41.8%, 15.1%, 11.4% of total U.S. exports in 2009 (Figure 2.26).

For a long time the U.S. has been experiencing trade deficit. Import is much

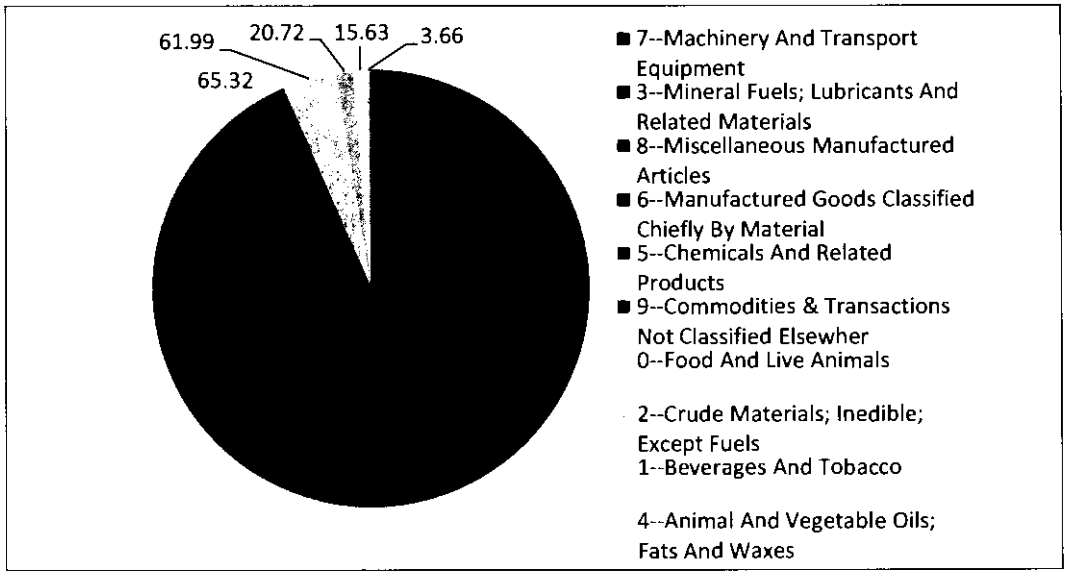

Figure 2.26 U.S. Imports from the World of SITC (1-9) All Merchandise, 2009, ($Billion).
Source: U.S. Department of Commerce. TradeStats Express. (2010).

higher than export and it has been growing during the 1992-2009 period (Figure 2.27). U.S. imports from China have increased sharply. In 2009 China became the main source of U.S. imports, followed by Canada, Mexico, Japan and Germany.

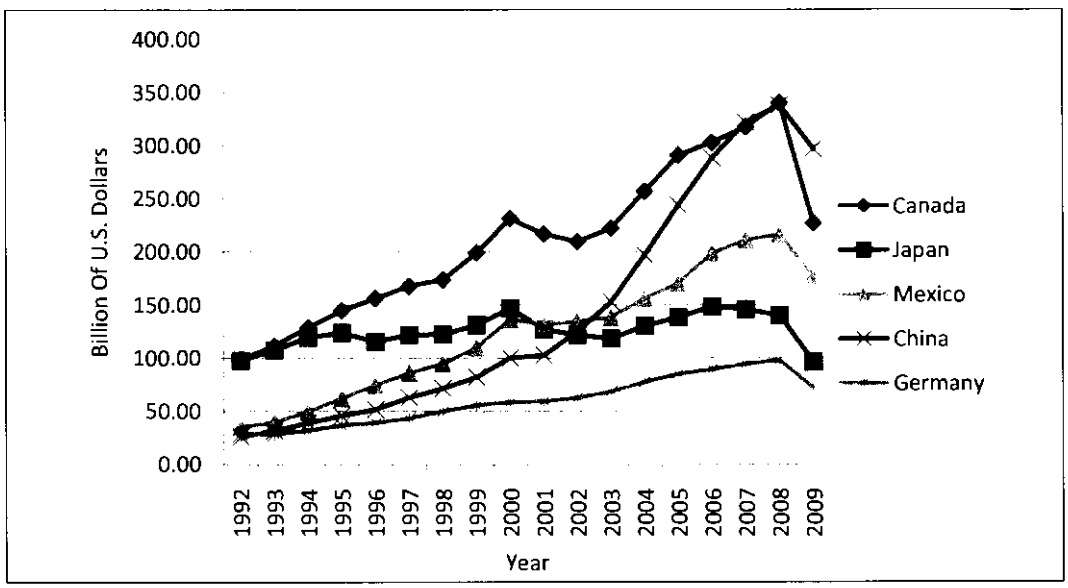

Figure 2.27 U.S. Imports from Its Five Major Trading Partners, 1992-2009.
Source: U.S. Department of Commerce. TradeStats Express. (2010).

CHAPTER 3. LITERATURE REVIEW

This section is devoted to the review of the literature on international trade and specifically determinants of bilateral trade. The chapter especially reviews studies which describe different factors influencing international trade and bilateral trade models.

Various international trade studies are trying to find out what is the effect of different variables on bilateral trade flows. Some focus on the effect of exchange rate, others on FDI, political factors and so on.

An analysis by Baek and Koo (2008) explored the short run and long-run relationships between the U.S. agricultural trade balance and U.S. exchange rate, disposable income, U.S. agricultural price and U.S. agricultural production for the period of 1981-2003. The U.S. has been a net exporter for several decades and had a record high agricultural trade surplus of $27 billion in 1996. However, since 1997 U.S. agricultural imports increased by about 50%. The U.S. trade surplus shrunk to $7 billion in 2004. The authors used an auto-regressive distributed lag model (ARDL) model to measure short and long term effect. The results show that the exchange rate, agricultural price, and disposable income have significant impact on U.S. agricultural balance both in the long and short run. That implies that the depreciation of the dollar can improve U.S. competitiveness in agricultural trade.

Another study examines the effects of the Canada–U.S. Free Trade Agreement (CUSTA) and the Canada–U.S. exchange rate on bilateral trade of agricultural goods between the two countries and on U.S. farm income (Kim, Cho and Koo, 2004). After CUSTA took effect in 1989, trade between the two countries increased. However, U.S. imports from Canada grew more than exports, which resulted in a substantial growth of the U.S. agricultural trade deficit. Quarterly data are used, from the fourth quarter of

1983 through the first quarter of 2000. The authors applied two time series models: the vector error correction model (VECM) and vector moving average model (VMA). The results indicated that the exchange rate was more significant than the CUSTA as a determinant of the observed level of asymmetric trade between the two countries.

The study by Bahmani-Oskooee, Artatrana (2008) evaluates the exchange rate sensitivity of U.S. bilateral trade flows. The authors specified a direct relation of export and import value to the real exchange rate. Error-correction model was estimated between the U.S. and its 19 trading partners that accounted for 54.34% total the U.S. trade in 1999. The results reveal that U.S. trade flows are sensitive to real exchange rate in most of the cases. However, the results from the study indicate that the trade flows to Canada are not sensitive to the exchange rate. However, trade with Japan (the farthest and another large partner) is found to be highly sensitive to the exchange rate. Nevertheless, devaluation of the U.S. dollar does not lower U.S. imports from Japan because Japanese exporters squeeze their profit margin and accept price-cuts.

There is no clear and uniform answer on the issue of links between trade and FDI. Different studies produce very ambiguous results depending on the model, type of trade and country experience. One issue is whether FDI and trade are substitutes or complements.

Hejazi and Safarian (2001) studied bilateral trade flows between the U.S. and 51 countries for the period of 1982-1994 and argued that FDI and international trade are complements, and increase in FDI leads to increase in international trade. The authors test their hypothesis using a traditional gravity model and adding the data on inward and outward U.S. FDI stocks. The complementary relationship between FDI and trade is shown to be sensitive to sectoral distribution of FDI. The authors conclude that U.S. outward FDI have a larger impact on U.S. exports, while the inward FDI stimulates

imports more. The authors argue that FDI variables in the gravity model link it to the transaction cost-based theory of multinational enterprise (MNE). MNEs have an essential effect on trade patterns: facilitates the flow of information between home and host economies, reduces costs of conducting business, which leads to increases in international trade.

Fontagne (1999) also studied the relationship between trade and FDI in three levels of aggregation: the microeconomic or firm level, the macroeconomic or economy-wide level, and the sectoral or industry level. The author came to the conclusion that in most cases trade and investment are complementary. The analysis showed that the relationship between investment and trade can change with time. According to the paper until the mid-1980s, international trade generated direct investment. Later the cause-and-effect relationship was reversed Fontagne's analysis of 14 countries indicating that each dollar of outward FDI produces about two dollars' worth of additional exports. Another conclusion of the paper is that the nature and extent of the relationship (complementarity or substitution) can differ from one country to another. According to the paper, each dollar of inward investment is associated with an additional $1.40 of imports in France, and only with 60 cents in the U.S.

Marchant, Cornell and Koo (2002) investigated the relationship between exports and FDI. The authors stated that developing countries have become major growth markets for U.S. agricultural exports, and FDI has become even more important than exports as a mean of accessing foreign markets. Empirical analyses were used by the authors to examine the relationship between U.S. FDI and exports of processed foods into East Asian countries – China, Japan, Singapore, South Korea, and Taiwan-from 1989 to 1998. In the paper a simultaneous equation system for FDI and exports was estimated using two-stage least squares. In the first equation FDI was explained by the

volume of processed foods exports, interest rate, compensation rate, exchange rate, GDP. In the second equation for the volume of processed foods exports, independent variables were FDI, the export price for processed foods, exchange rate GDP. The results indicated a complementary relationship between FDI and exports.

Utilizing generalized gravity framework Vollrath, Hallahan and Gehlhar (2006) studied factors influencing bilateral agri-food trade between 69 countries for 1996, 1998, 2000, 2002 years. The study focused on two food types: processed, manufactured products and staple commodities. Beside traditional gravity variables such as exporter's and importer's GDP, and distance between the two trading partners, the authors included difference in per-capita income between countries, land/labor ratio, measures of governance quality in the importing country, exchange rate misalignment and a set of other determinants influencing bilateral trade. The results show that absolute difference in per capita incomes negatively affects trade in processed food, but not in staple commodity. Significant and positive value of land/labor ratio proved that relative factor endowments is an important variable influencing bilateral trade flows. Moreover, institutional variable was found to be important, meaning that corruption in importing country adversely affects agri-food trade.

Other authors modify gravity models in a way that allows to create commodity specific models. That was done by Koo, Karemera and Taylor (1994) analyzed specific effects of export promotion programs and import restriction policies on the world meat trade. The study included 22 countries for the period of1983-1989. The gravity model identified and evaluated factors affecting volume and direction of meat trade flows. Results from the study indicate that exporting countries subsidies to producers do not influence trade flows. According to the study, among other factors long-term agreements enhance international meat trade. Moreover, it was found that importing

countries' polices influence trade volume and direction more than exporting countries' policies. The results of the study show that economic integration, such as EC, stimulates trade flows. On the other hand, distances between exporting and importing countries negatively influence trade flows.

Another commodity specific gravity model was developed by Koo and Karemera (1991). Studying a highly government regulated market of wheat in 9 exporting countries and 34 importing countries from 1981 to 1987, the authors incorporated dummy variables in the model in order to analyze effects of comprehensive trade policies used on the world wheat trade. The study proves that long-term agreement policy and credit sale increase international wheat trade. At the same time both the Export Enhancement Program used by the U.S. and Export Refund Program used by the EC are found to be less effective in stimulating the world wheat trade. The study shows that protectionist policies in importing countries greatly impair wheat trade. Moreover, this analysis indicates that distances trading partners aren't important for the wheat trade flow. The authors attribute that to the differences in demand for various wheat type and quality specifications.

There have always been questions about the proper formulation of the gravity model and proper econometric techniques. Assessing the influence of seven regional free trade agreements (RFTAs) on trade, Carrere (2006) uses specification of the model that allows identifying Vinerian trade creation and trade diversion effects. The study was conducted for 130 countries and estimated the model with panel data over the period 1962–1996. According to the study panel estimates revealed a more plausible pattern of trade effects associated with RTAs than cross section specification does. In general, the authors show that most of the RTAs result in an increase in intra-regional trade. At the same time a reduction in imports from the rest of the world, and sometimes

reduction in exports to the rest of the world is seen, suggesting evidence of trade diversion.

Koo, Kennedy, Skripnitchenko (2006) came to a different conclusion in their study, suggesting no evidence of a trade diversion effect. They applied a dummy-variable approach in a gravity model framework for studying the effect of preferential trade arrangements (PTAs) on agricultural trade. The AFTA, CAN, EU, and NAFTA are the individual PTAs included in this study. The authors found that the overall effects of RPTA are positive and significant. Another important finding is that RFTAs in general improve world welfare by increasing trade among member countries and not decreasing it among nonmember countries.

Egger (2005) compared possible estimation methods for cross-section gravity model. The author applied four estimation methods to a cross-section of average 1990–97 bilateral exports in a randomly drawn sample of OECD and non-OECD countries. The paper indicates that, a Hausman–Taylor approach is appropriate and superior to OLS, the traditional random-effects model and the fixed-effects framework. This approach may provide consistent parameter estimates, when OLS or the traditional random-effects models are biased. Countries have specific unobservable characteristics that can't be tackled in a simple OLS framework. Controlling for fixed or random country effects does not allow to derive information on the impact of observable explanatory variables such as GDP or GDP per capita. Moreover, the results show that the estimates could be often biased due to correlation between the observed and the unobserved determinants.

The problem of large U.S. trade deficit has stimulated numerous studies which estimated both aggregated and disaggregated trade equations. Often the purpose of those studies is to forecast how much the depreciation of the U.S. dollar could be

expected to improve the U.S. deficit. Crushman (1990) assesses bilateral trade between the U.S. and its seven trading partners. The author doesn't use bilateral export price indices. Instead he uses trade value approach to void the possibility of specification error and resultant poor forecast from a miscalculated export price index. The study revealed that standard bilateral trade equations violate the basic regression assumptions of stability. That means that these equations cannot be for forecasting purposes.

Silva and Tenreyro (2006) draw attention to the fact that in the presence of heteroskedasticity the OLS estimator for log-linearized models leads to significant bias. Also the authors point out that log-linearization is incompatible with the existence of zero trade data, which could lead to truncation of the sample. Moreover OLS estimation exaggerates the role of geographical proximity and colonial ties. To deal with the estimation problems, the authors proposed a simple Poisson pseudo-maximum-likelihood method and assessed its performance using Monte Carlo simulations. Besides being consistent in the presence of heteroskedasticity, this method also provides a natural way to deal with zero values of the dependent variable.

The problem of dealing with zero-valued bilateral trade flows in the gravity equation is as well discussed in the work of Linders and Groot (2006). In their paper the authors present an overview of the solutions used before, such as simple OLS regression on a sample excluding the zero flow observations, tobit estimation that imposes artificial censoring on the data, truncated regression, OLS after substituting arbitrary small values for all zero flows. Arguing that these methods yield misleading results the authors suggest using the sample selection model. According to the paper this model is preferred theoretically and econometrically although omitting zero flows from the sample and often leads to acceptable results.

Bilateral trade model for the U.S. and China relations was used by Koo and Zhuang (2007) to find effects of the Sino-U.S. exchange rate and the weighted exchange rate between the U.S. and other Asian countries on the Sino-U.S. trade patterns. The study covers 16 years from 1989 till 2004. In this study, all the traded goods were divided into three sectors: those which produce agricultural goods (AGR), middle-technology manufacturing goods (MID), and high-technology manufacturing goods (FIN). According to the estimation results the bilateral exchange rate is an important factor affecting the bilateral trade and increasing trade surplus with the U.S. The same is true for the weighted average exchange rate between the United States and other Asian countries because the third country effect is particularly true for the HIGH sector. The results indicate the U.S. bilateral trade balance could improve if China appreciates its currency against the U.S. dollar.

Traditional gravity model can typically explain about one half variation in bilateral international commerce. In their paper Hausman, Lee and Subramanian (2005) examine the effect of logistics cost and time, that harm the export competitiveness of countries, on bilateral trade patterns. The authors assumed that a typical 20-foot FCL container with medium-value products was used and the time and cost of its importing and exporting was calculated. A single global logistics indicator was developed by the authors. The study included 70 coastal and 10 landlocked economies and showed that poor logistics performance has a significant adverse effect on bilateral trade.

Groot, Linders, Rietveld, and Subramanian (2004) studied the effect of institutional quality and similarity in governance quality on trade. The authors hypothesized that institutions matter for international trade. Estimation of different specifications of the gravity model proved that both institutional quality and similar

quality of governance have a significant, positive and substantial impact on bilateral trade flows.

The study by Ward and Hoff (2007) incorporated firstly, the polity score variable for countries, which accounted for institutional environment, and secondly, a measure of cooperation between the two countries in conflictual international disputes in the standard gravity model for bilateral trade. The results of this analysis indicate that international conflict is not significant for bilateral trade flows. The authors hypothesized that countries with developed democratic institutions will export and import more. The hypothesis was proved to be true and democratization is strongly associated with increased trade, even in just one of the trading nations.

CHAPTER 4. THEORETICAL FRAMEWORK AND MODEL

Theoretical Framework

All countries around the world benefit from trade through improvement of production efficiency and consumer utility. However in some cases the factors that influence the pattern of trade are not very clear. For example in the case of two countries the question is why one exports X and the other one exports Y when the countries produce both X and Y. International trade theory started with classical economists' assumption that goods are exchanged on the basis of the relative amount of labor used to produce them. Since that time economists have sought answers to a number of questions concerning international trade such as: Why do countries trade with one another and which good(s) each country produces and exports?

Suppose that country A produces and exports good X to country B. At the same time country B produces and exports product Y to country A. Bilateral trade between the two countries occurs simply because of differences in prices of products X and Y between the countries.

The differences in prices between these two countries are based on the differences is costs of producing the products between the two countries. The Hecksher-Ohlin (H-O) theorem explains a nation's comparative advantage and costs of production based on recourse endowments. The theorem, which has a set of simplifying assumptions such as perfect competition and constant returns to scale, states that the capital-abundant country tends to have a comparative advantage in producing capital intensive goods and specializes in producing those goods, while a labor-abundant country has a comparative advantage in producing labor intensive goods and specializes in production of those goods. The specialization leads to trade between the two countries. The capital abundant country exports capital intensive goods in exchange for

labor intensive goods and labor abundant country does the opposite (Koo and Kennedy, 2005).

Suppose there are two countries A and B, endowed with fixed quantities of two factors of production, labor (L), and capital (K) in producing two commodities X and Y.

Assume that commodity X is defined as labor-intensive, since it uses more units of labor (L) per unit of capital (K). Similarly, commodity Y is defined as capital-intensive, since it uses more units of capital (K) per unit of labor (L).

If country A is labor abundant relative to country B, a capital to labor ratio in country A is smaller than in country B as follows:

(4.1) $(K/L)^a<(K/L)^b$

Since wage in a labor abundant country A is lower and interest rate is higher than in country B, input price ratios between the two countries are:

(4.2) $(r/w)^a>(r/w)^b$

This implies that country A has a comparative advantage in producing labor intensive good X over country B, and country B has a comparative advantage in producing capital intensive good Y over country A.

In producing a labor-intensive good X, country A pays lower wages (w) to its workers than country B. Country A specializes in production of good X and exports it to B. The same logic is true for country B in producing product Y. Country B specializes in production of good Y and exports it to country A.

The H-O theorem explains inter-industry trade based on the differences in resource endowments among countries under a set of assumptions including perfect competition, constant returns to scale, and full employment. Krugman relaxed the assumptions and developed trade theory explains trade flows between countries under

assumptions of economies of scale and imperfect competition. The new trade theory introduced explanation for intra-industry trade that occurs when countries exchange exports and imports of goods within the same industry or product group (Sawyer and Sprinkle, 2006).

In fact many industries exhibit increasing returns to scale, meaning that a proportional percentage increase in inputs will result in a larger percentage increase in output. Instead of trying to produce all commodities, a country can specialize in producing a specific set of differentiated goods. Through specialization the country is able to decrease their average costs and increase its efficiency in producing that group of commodities under an assumption of increasing returns to scale (Koo and Kennedy, 2005). Thus existence of economies of scale means decrease in the costs of production which results in the difference in prices among countries. It is typically the case that efficiency increases with the size of the firm or industry. Trade allows countries to focus on the production of certain products and still maintain a variety of products for consumption. Even though countries may have identical production technologies and resources, the existence of increasing returns to scale encourages trade and gains from trade will occur for both countries. At the same time resources are drawn away from other industries. As a result without trade it may reduce the variety of products available for consumption.

Specification of a Gravity Model

The gravity model of international trade predicts bilateral trade flows based on the economic sizes of two nations, and the distance between them. Gravity equation relates trade between two countries positively to both of their incomes and negatively to their distances. Gravity model generally explains bilateral trade patterns among countries. However, many authors state that the gravity equation doesn't have a

theoretical foundation and inconsistent with H-O model. Deardorff (1995), however, shows that the gravity model can in fact be derived from both H-O and monopolistic competition models of international trade.

The traditional gravity equation was introduced by Tinbergen (1962), Anderson (1979). Later Anderson and Wincoop (2003) developed a gravity equation that takes into account multilateral resistance terms or fixed effects. The generalized framework developed by Anderson (1979) assumes the Cobb-Douglas expenditure system and incorporates an assumption that goods produced by different countries are inherently imperfect substitutes. Monopolistic competition is assumed, meaning that each country specializes in different products and has identical homothetic preferences. Zero balance of trade is also assumed to hold in each period. Then the equilibrium for trade flow from country *i* to *j* (X_{ij}) at any time period *t* can be expressed as:

4.3) $X_{ij} = \theta_i Y_j$

or

4.4) $\theta_i = \frac{X_{ij}}{Y_j}$

Where θ_i denotes a fraction of income spent on country *i*'s products (the fraction is identical across importers) and Y_j denotes real GDP in importing country *j*.

It is assumed that country *i*'s GDP is equal to the sum of exports and domestic consumption of goods and expressed as follows:

4.5) $Y_i = \sum X_{ij} = \sum \theta_i Y_j = \theta_i (\sum Y_j)$

where j=1,2...k and i=1,2…n. If i=j, then X_{ij} represents domestic consumption of country i.

Equation 4.5 can be rewritten to:

4.6) $\theta_i = \frac{Y_i}{(\sum Y_j)} = \frac{Y_i}{Y_w}$

where $\sum Y_j = Y_w$ is world real GDP, which is constant across country pairs.

Combining equation (4.3) and (4.6), rearranging by adding time-invariant variables such as distance and common language gives the following:

4.7) $X_{ij} = \frac{Y_i Y_j}{(\sum Y_j)} = (T_{ij})(\frac{Y_i Y_j}{(Y_w)})$

The basic empirical gravity equation is obtained by taking a natural logarithm of both sides of (4.7) as follows:

4.8) $\ln X_{ij} = \alpha + \beta \ln Y_i + \gamma \ln Y_j + \phi \ln T_{ij}$

where $\alpha = (-\ln Y_w)$. In reality countries do not have identical and homothetic taste, that is why the coefficients (β and γ) and should not be unity, but are not significantly different from unity in aggregate level trade (Anderson 1979).

Thus the basic gravity equation includes income of trading partners and distance between them. However, these variables usually don't fully explain trade patterns because the latter could be very specific between different countries and for different groups of traded goods. That is why beside this basic variable researchers include other various socio economic factors (Hejazi and Safarian, 2001).

Empirical Model

For analyzing U.S. trade with its trading partners, the gravity model specified in the previous section is used. The model includes the U.S.'s 15 major trading partners and Russia. Two equations are developed; U.S. exports to those 16 countries and U.S. imports from them.

Koo and Zhuang (2007) studied U.S.-China trade by dividing all traded products into three sectors: agricultural foods (AGR), middle-technology (MID), and high-technology manufactured goods (FIN). The authors used 2-digit SITC to filter commodities into these groups. This study utilizes a disaggregation into three similar, but a little different in composition from the Koo and Zhuang study. The groups are agriculture and foods (AGR), recourses and materials (MID), finished products (FIN). Agriculture is comprised of SITC-0, 1, 4. Middle-technology sector includes SITC-2, 3, 5, 6. Finished products group is SITC-7 and 8. The most traded goods between U.S. and Russia are in groups SITC-3, 7, 6, 0. The U.S. deficit in trade balance with Russia is in groups SITC-3, 6. However, there is a surplus for SITC-7, 0.

Three equations are formulated to define U.S. exports of the three groups (AGR, MID, FIN) to foreign countries and three equations define U.S. imports of the same three groups of products (AGR, MID, FIN).

According to the concept of the traditional gravity equation in Eq.(4.8) , bilateral trade can be explained by GDP, distance, common language. The relationship between trade flows and the explanatory variables are discussed below.

GDP

According to the international trade theory, as income in country B increases, the demand for all goods increases, including the demand for imported goods from country A. On the other hand, a decline in U.S. income would cause a decline in the demand for imported goods. GDP in a country could serve as a variable representing the country income as it is the market value of all final goods and services officially made within the borders of the country in a year.

Distance and Language

Also, following the definition of the basic gravity model, distance between trading partners and common language are included in this model (Koo, Kennedy and Skripnitchenko, 2006; Groot, Linders, Rietveld, and Subramanian, 2004; Hejazi and Safarian, 2001). Distance between U.S. and its trading partner serves as a proxy for transportation costs and other distance related trade costs. At the same time, common language is the factor that supposedly makes trade between the two countries easier. Based on the theoretical definition of a gravity mode (equation 4.8), an empirical model can be written as:

4.9) $X_{ijt}^{k} = \alpha_0 GDP_{it}^{\beta_1} GDP_{jt}^{\beta_2} Dist_{ij}^{\beta_3} e^{\beta_4 Lang_{ij}} u_{ijt}$

4.10) $M_{ijt}^{k} = \alpha_0 GDP_{it}^{\beta_1} GDP_{jt}^{\beta_2} Dist_{ij}^{\beta_3} e^{\beta_4 Lang_{ij}} u_{ijt}$

where X_{ijt}^{k} (M_{ijt}^{k}) are exports of country i (the U.S.) to country j (one of 16 trading partners) in time period t (imports of country i from country j in time period t respectively) for group k (AGR, MID, FIN). GDP_{it} and GDP_{jt} are GDPs of country i and country j, respectively. $Dist_{ij}$ and $Lang_{ij}$ are dummy variables for distance between the two trading partners i and j and common official language in countries i and j. u_{ijt} is the error term. Taking the logarithm of both sides of equations 4.9 and 4.10 transforms them into the following:

4.11) $\ln X_{ijt}^{k} = \beta_0 + \beta_1 \ln(GDP_{it}) + \beta_2 \ln(GDP_{jt}) + \beta_3 \ln(Dist_{ij}) + \beta_4 Lang_{ij} + u_{ijt}$

4.12) $\ln M_{ijt}^{k} = \beta_0 + \beta_1 \ln(GDP_{it}) + \beta_2 \ln(GDP_{jt}) + \beta_3 \ln(Dist_{ij}) + \beta_4 Lang_{ij} + u_{ijt}$

where $\beta_0 = \ln(\alpha_0)$. This logarithmic transformation is valid, since $X_{ijt}^{k} > 0$ and $M_{ijt}^{k} > 0$. Dummy variable for language is a binary and time invariant variables (either countries have common official language or they don't).

The empirical model also includes other country-specific and bilateral characteristic variables affecting trade: exchange rate (ER_{jit}), institutional quality variable ($\Delta\ Pscore_{jt}$), Foreign Direct Investment (FDI) from the U.S. to its trading partners ($FDI^{k}_{ij(t-1)}$), FDI from its trading partners to the U.S. ($FDI^{k}_{ji(t-1)}$) .The additional explanatory variables are defined in this gravity model as follows:

Exchange Rate

Following international trade theory and gravity model approach exchange rate is included as an explanatory variable for variation of bilateral trade patterns (Bahmani-Oskooee and Artatrana, 2008; Baek and Koo, 2008).Exchange rate is defined as the price of a currency in terms of other currencies. For example, the exchange rate of U.S. dollars in terms of Russian rubles. The exchange rate affects the ability of companies to export their products and the willingness of consumers to import goods and services.

Changes in exchange rate make international trade different from interregional trade within a large country. Prices of goods could remain unchanged in the domestic currency but change considerably when denominated in foreign currencies. In addition exchange rates are difficult to forecast in the long run and impede the ability of businesses to make plans over any time horizon longer than 6 months.

FDI

Outward and inward FDI will be incorporated into the model. As countries become more integrated, limitations on resource movements between countries are relaxed. As a result, labor and capital will migrate toward their most profitable use (Koo and Kennedy, 2005). Factors of production and technology move across national boundaries. A capital-abundant country exports capital-intensive commodities or

exports capital through foreign investment. It imports labor-intensive goods or allows immigration from labor-abundant countries. In some markets such as processed food FDI has become even more important than exports as means of accessing foreign markets. The critical question is whether FDI is a substitute for or a complement of exports. Hejazi and Safarian (2001) proved, using U.S. exports and imports on a bilateral basis to 51 countries for the period 1982-1994, that FDI and international trade are complements and increase in FDI leads to increase in international trade. Fontagné (1999) also proved that FDI and international trade are complements. At the same time he discovered that their cause-and-effect relationship, the nature and extent of the relationship (complementarity or substitution), can differ from one country to another.

Institutional Quality (Polity Score)

Some researchers have been trying to incorporate socio-economic factors such as cooperation between countries in conflicts and similarity of political institutes. (Ward and Hoff, 2007). Polity score, ranging from -10 (hereditary monarchy) to +10 (consolidated democracy) calculated by Marshall and Jaggers (2010) is widely used by researchers to capture influence of institutional quality on trade. The relevance of quality of governance have been studied and proved to be a relevant factor influencing bilateral trade flows. According to Groot, Linders, Rietveld and Subramanian (2004) increase in institutional quality of one standard deviation from the mean will lead to 30-44% increase in bilateral trade.

Taking into consideration the difference and tension between the U.S. and Russia, difficult history in political relations, institutional variables are included in the study as well. Following Groot, Linders, Rietveld and Subramanian (2004), six indicators calculated by Kaufmann, Kraay and Mastruzzi (2010) and measuring some aspects of the quality of governance (Voice and Accountability, Political Stability,

Government Effectiveness, Regulatory Quality, Rule of Law, Control of Corruption) are used in the model. Since all these indicators are interrelated and positively correlated incorporating all six of them would cause multicollinearity problem. Therefore, this study calculated simple arithmetic average of the scores on each separate indicator to represent overall quality of governance.

Equations 4.11 and 4.12 are respecified by including the variables as follows:

$$\ln X^{k}_{ijt} = \beta_0 + \beta_1 \ln(GDP_{it}) + \beta_2 \ln(GDP_{jt}) + \beta_3 \ln(Dist_{ij}) + \beta_4 Lang_{ij} + \beta_5 \ln(ER_{jit}) + \beta_6 \ln FDI^{k}_{ij(t-1)} + \beta_7 \Delta \ln(Pscore_{jt}) + u_{ijt} \quad (4.13)$$

$$\ln M^{k}_{ijt} = \beta_0 + \beta_1 \ln(GDP_{it}) + \beta_2 \ln(GDP_{jt}) + \beta_3 \ln(Dist_{ij}) + \beta_4 Lang_{ij} + \beta_5 \ln(ER_{jit}) + \beta_6 \ln FDI^{k}_{ji(t-1)} + \beta_7 \Delta \ln(Pscore_{jt}) + u_{ijt} \quad (4.14)$$

where $FDI^{k}_{ij(t-1)}$ and $FDI^{k}_{ji(t-1)}$ are lagged one period, since the effect of FDI on trade flows are assumed to be delayed in time. Moreover, it is assumed that the increase or decrease of the polity score is supposed to respectively increase or decrease trade flow between the two countries. For that reason the difference of polity score ($\Delta Pscore_{jt}$) is included in the model.

Free trade agreements that are usually hypothesized to influence trade flows were not included in the equation in this model for a number of reasons. North American Free Trade Agreement (NAFTA) and common border dummies are not the variables of this model since they are by definition are the same and highly correlated with "distance" classical explanatory variable.

Dummy for WTO is not included, because Russia is the only country which is not the member of WTO among the 16 countries. That means that being not a member of WTO is incorporated in the unobserved time-constant country specific effect. It is not possible to differentiate effect of one variable from others since both factors (Russia country specific effect and WTO membership) ultimately divide the observations into

two groups, reflecting U.S.-Russia and U.S. other 15 trading partners respectively. In order to identify the model, only one variable (country specific effect) should be included.

Finally, European Union (EU) can't also be included in the model, since most of EU countries have high polity scores. That means that these two variables are highly correlated which causes multicollinearity problems in the model.

Hypotheses to be tested for the export model are as follows in the Table 4.1.

Table 4.1 Hypotheses Tested in the Model

Variable	X_{ijt}^{k}	M_{ijt}^{k}
GDP_{it}	+	+
GDP_{jt}	+	+
$Dist_{ij}$	-	-
$Lang_{ij}$	+	+
ER_{jit}	-	+
$\Delta\ Pscore_{jt}$	+	+
$FDI_{ij(t-1)}^{k}$	+/- (complements/ substitutes)	+/- (complements/ substitutes)
$FDI_{ji(t-1)}^{k}$	+/- (complements/ substitutes)	+/- (complements/ substitutes)

- GDP of importing countries (GDP_{jt} for U.S. exports equation and GDP_{it} for U.S. imports equation) should positively influence U.S. exports implying that increase in income of a trading partner would increase the quantity and quality demand for imported goods.

-GDP for exporting countries is expected to have positive effect on trade. The idea behind is: the bigger the economy of the exporting country (GDP_{it} for exports equation and GDP_{jt} for imports equation) the higher is the production and trade potential respectively.

-Distance is expected to negatively influence trade, since it is a proxy for transportation costs. The longer the distance between trading partners the higher are the costs of transportation of goods.

-Language as a traditional preference factor is expected to be positively related to trade flows, meaning that common language makes trade between countries easier. However, common language is not a significant factor in practicing international trade, mainly because trade occurs based on differences in relative endowments and economic structure.

-Exchange rates (foreign currency/$) negatively influence exports. As the U.S. dollar appreciates, U.S. goods become more expensive for foreign consumers and U.S. exports decline. On the other hand exchange rate should positively influence imports. Appreciation of U.S. dollar makes imports less expensive and more affordable for U.S. consumers and as a result increasing U.S. imports.

-FDI could negatively or positively influence trade flows, depending on whether U.S. exports/imports and FDI are complements or substitutes.

-A positive relationship between trade (both U.S. exports and U.S. imports) and the trading partner polity scores is expected. The more stable and efficient is the country politically, the greater amount of trade is expected.

CHAPTER 5. DATA AND ECONOMETRIC PROCEDURE

Data Description

The relevant data are collected for the U.S. and its 16 trading partners for the period of 10 years starting from 2000 to 2009 and are used to estimate the empirical model specified in chapter 4. Even though trade between the U.S. and Russia is not significant, the model includes Russia to evaluate economic potential in bilateral trade between the U.S. and Russia. These 16 countries accounted for 72.73% of total U.S. trade value with the world in 2009 ($1902.31 billion).

The period 1999-2009 is chosen because the focus of the study is U.S.-Russia trade relations and the goal is to find reasons for a low level of trade between the two countries. The first few years after Russia became an independent country, it experienced instability and hyperinflation. During that period economic data are not reliable.

All data used in the study is in real values. The nominal values are deflated by the 2000 base deflator obtained from IMF International Statistics database (2010). In contrast to the consumer price index (CPI), the GDP deflator reflects both price changes and market responses to those price changes. All the data by country for the 2000-2009 period are presented in Appendix A.

The data on bilateral trade flows (exports and imports) are obtained from the U.S. Department of Commerce "TradeStats Express" 2010 online database. That database provides bilateral trade data, classified according to Standard International Trade Classification (SITC).

Annual time series data for gross domestic products (GDP) for the countries and exchange rate index (ER) against U.S. dollar for the countries are obtained from the IMF International Statistics database (2010). Exchange rate provided by IMF is the

market period average rate of national currency per U.S. dollar. Year 2000 is taken as a base year for calculating the exchange rate indices used in the study.

U.S. Bureau of Economic Analysis (BEA) (2009) provides U.S. Foreign Direct Investment Position (FDI) abroad by country and industry on a historical-cost basis. The industry classification is based on North American Industry Classification System (NAICS). For the purposes of this paper FDI is disaggregated roughly by three sectors AGR, MID and FIN. U.S. outward FDI provided by BEA is comprised, for the most part, of the same industries with minor differences. In this study U.S outward FDI in AGR consists of only one item: manufacturing of food. U.S. outward FDI in MID includes manufacturing of chemicals, primary and fabricated metals, mining and utilities. Finally, FDI in FIN is comprised of manufacturing of machinery, computers and electronic products, electrical equipment, appliances and components, transportation equipment and other manufacturing. In contrary to FDI by country, FDI by country and industry has lots of missing values, especially for FDI in AGR.

In their studies Groot, Linders, Rietveld, and Subramanian (2004), Ward and Hoff (2007) showed that institutional variables are significant for defining bilateral trade patterns. World Bank governance indicators (2010) for Voice and Accountability, Political Stability, Government Effectiveness, Regulatory Quality, Rule of Law, Control of Corruption allow capturing influence of institutional variables on trade flows between countries. These 6 aggregate government indicators are based on several hundred individual underlying variables, drawn from a variety of survey institutes, think tanks, non-governmental organizations, and international organizations. The indices are measured on the scale from -2.5 to +2.5. The indicators are available for all years starting from 1998 except 1999 and 2001. The missing data for these years were

imputes by using a simple average between a preceding and a following year. A simple average of these six indices is calculated and included in the model as a variable.

Distances between the U.S. and its trading partners are obtained from CEPII (2010). Distance between two countries is based on bilateral distances between the largest cities of the two countries, those inter-city distances being weighted by the share of the city in the overall country's population. The common official language between U.S. and a trading partners is used as dummy variables in the study. The variable is 1 for common language between the U.S. and its trading partners and 0 for otherwise. CEPII (2010) was a source for the common language variable as well.

Finally, a dummy variable for 2009 year as a time variable is incorporated in the model. Year 2009 was chosen since it is a culmination of the world financial crisis.

Specification of Generalized Method of Moments (GMM)

An econometric model is used to estimate the relationship between U.S. exports/imports to/from its 16 trading partners. Independent variables included in this study are U.S. GDP, trading partner country GDP, exchange rate, distance, language, U.S. FDI into a trading partner country, and trading partner's polity score. The data for 16 countries from 2000-2008 are used to estimate the model. The panel data is aggregated into three different groups of traded products (AGR, MID, FIN).

Following Matyas (1997), Egger (2000) the proper model specification takes the general form like that:

5.1) $y_{ij} = \beta X_{ij} + (e_T \otimes z_{ij})\gamma + \psi_i + \kappa_j + \lambda_t + \varepsilon_{ij}$

where X_{ij} - matrix of time-varying explanatory variables; z_{ij} - matrix of time-in variant explanatory variables; e_t -unit vector; ψ_i - export country effect, κ_j - import country effect, λ_t - time effect, ε_{ij} - white noise.

In the specification of the model for U.S. the focus is on bilateral relations between U.S. and each one of its 16 trading partner. Since U.S. is the trading partner in all equations (either as exporter or as importer), U.S. country specific effect can't be estimated separately, because it will be absorbed by the intercept. In this case non U.S. country specific effects may be treated as pair-specific time-invariant effect (ϕ_{ij}). Thus, equation 5.1 can be rewritten as following:

5.2) $y_{ij} = \beta X_{ij} + (e_T \otimes z_{ij})\gamma + \lambda_T + \phi_{ij} e_T + \varepsilon_{ij}$

In this study GMM was preferred to fixed effects and random effects estimators for a number of reasons. Fixed effects method uses the transformation to eliminate ϕ_{ij} from the composite error, which is thought to be correlated with one or more of the explanatory variables, prior to estimation. At the same time, any time-constant explanatory variables are removed along with ϕ_{ij}. In the bilateral trade between the U.S. and its 16 trading partners, the model includes time invariant variables (distance, language) that would be removed if the fixed-effects model was used. On the other hand, random effects model assumes that ϕ_{ij} is uncorrelated with all explanatory variables, which is not true for Equations 4.13 and 4.14.

The model by Hausman and Taylor (1981) offers a middle ground between the random and fixed effects approaches. Egger (2005) demonstrated the advantage of using Hausman-Taylor approach in gravity models. The final estimated model for all T time periods is specified as:

5.3) $y_{ij} = \beta_1 X_{ij1} + \beta_2 X_{ij2} + (e_T \otimes z_{ij1})\gamma_1 + (e_T \otimes z_{ij2})\gamma_2 + \phi_{ij} e_T + \varepsilon_{ij}$

where X_{ij1} and X_{ij2} are $T \times k_1$ and $T \times k_2$ matrices, respectively, of time-varying explanatory variables, and z_{ij1} and z_{ij2} are $1 \times g1$ and $1 \times g2$ vectors of time-invariant explanatory variables. Time effect λ_T is treated here as a time-varying exogeneous

variable and it is estimated as part of X. Some form of heterogeneity is assumed to be present in the equation 5.3 (Im et al, 1999). All explanatory variables are strictly exogeneous with respect to time-varying error ε_{ij}, but X_{ij2} and z_{ij2} can be correlated with the unobserved effect ϕ_{ij}:

5.4) $u_{ij} = \phi_{ij} e_T + \varepsilon_{ij}$

Then the orthogonality conditions are as following:

5.5) E($X_{ij1} \otimes u_{ij}$)=0; E($X_{ij2} \otimes \varepsilon_{ij}$)=0; E($z_{ij1} \otimes u_{ij}$)=0; E($z_{ij2} \otimes \varepsilon_{ij}$)=0;

In the model some explanatory variables are expected to be correlated with the unobserved effect. In this particular case the GMM estimator is used to estimate the model with seven explanatory variables. The following variables are assumed to be uncorrelated with the unobserved country pair specific unobserved effect (ϕ_{ij}):

- GDP_{it} and GDP_{jt} are traditionally considered to be exogenous. They belong to group X_{ij1} in equation 5.1. Moreover, the time period of this study is too short (only 10 years) for GDP to change and to become an endogenous variable.

- $Dist_{ij}$ and $Lang_{ij}$ variables remain constant over time as they are predefined. Both variables belong to group z_{ij1} in equation 5.3.

- $FDI^{k}_{ij(t-1)}$ ($FDI^{k}_{ji(t-1)}$) and Δ $Pscore_{jt}$ are the variable that are lagged/differenced respectively. $FDI^{k}_{ij(t-1)}$ is considered to be predetermined and Δ $Pscore_{jt}$ is independent from the error term because of the orthogonal transformation. Both belong to the group X_{ij1} in equation 5.3.

The only variable that is assumed to be correlated with ϕ_{ij} is ER_{jit}. It is country pair specific by definition and thus belongs to group X_{ij2} in equation 5.3. The zero

conditional mean assumption is not met:

5.6) $E(\phi_{ij} | X_{ij2}) \neq 0$ and $E(u_{ij} | X_{ij2}) \neq 0$

The model 5.3 for the 6 estimated equations (U.S. exports of AGR, U.S. exports of MID, U.S. exports of FIN, U.S. imports of AGR, U.S. imports of MID, U.S. imports of FIN) can be written in a general matrix form as;

5.7) $Y = \delta X + u$

where Y is a stacked vector of dependent variables; X is an appropriate block-diagonal design matrix of explanatory variables; δ is a stacked vector of regression coefficients; u is the appropriate vector of composite error terms.

GMM method allows using instruments ($V_{ij} = V$) that are assumed to be exogenous and correlated with explanatory variables (X).

5.8) $E(V^T u) = 0$;

where V^T is the appropriate transposed matrix of instrument variables.

These instruments could include the original variables themselves if they are exogeneous:

Equations 5.7 and 5.8 give the general equation of moments:

5.9) $E(V^T (Y - \hat{\delta} X)) = 0$

It is necessary to find $\hat{\delta}$ that fits the equations of moments better than all the rest and gives the smallest variance from moments. The $\hat{\delta}$ that satisfies equation 5.9 will be aright estimator. In general it is not possible to find $\hat{\delta}$ that will set all moment conditions to exactly zero. In this case GMM estimator uses weighting matrix W to construct a quadratic form in the moment conditions. The GMM estimator is the one that minimizes $J(\hat{\delta})$.

5.10) $J(\hat{\delta}) = n(Y - \hat{\delta} X)^T V W V^T (Y - \hat{\delta} X)$

That yields estimator $\hat{\delta}_{GMM}$:

5.11) $\hat{\delta}_{GMM}=(X^TVWV^TX)^{-1}X^TVWV^TY$

5.12)Var($\hat{\delta}_{GMM}$)=$\frac{1}{n}(X^TVWV^TX)^{-1}(X^TVWE(V^Tuu^TV)WV^TX)(X^TVWV^TX)^{-1}$

If S is the covariance matrix of the moment conditions in equation 5.9:

5.13) $S=\frac{1}{n}E(V^Tuu^TV)=\frac{1}{n}E(V^T\Omega V)$, then

5.14) Var($\hat{\delta}_{GMM}$)=$\frac{1}{n}(X^TVWV^TX)^{-1}(X^TVWSWV^TX)(X^TVWV^TX)^{-1}$

Since W is not unique, equations 5.11 and 5.14 define a broad class of GMM estimators. The optimal choice of the weighting matrix (W) is the one that minimizes equation 5.12. This is achieved by choosing $W=S^{-1}$ (Baum, Heroit, Stillman, 2003). That gives the efficient GMM estimator (equation 5.15) with asymptotic variance (equation 5.16).

5.15) $\hat{\delta}_{EGMM}=(X^TVS^{-1}V^TX)^{-1}X^TVS^{-1}V^TY$

5.16) Var($\hat{\delta}_{EGMM}$)=$\frac{1}{n}(X^TVSV^TX)^{-1}$

In case of heteroscedastic and autocorrelated errors, in order to get robust results a consistent estimator of S ($\hat{S}$), constructed with consistent estimate of u_{ij}($\hat{u}_{ij}$)should be used:

5.17) $\hat{S}=\frac{1}{n}(V^T\hat{\Omega}V)$

Since $\hat{S}$ is unknown, it needs to be estimated. To summarize, the following algorithm is used to obtain efficient two-step GMM estimator (Baum, Heroit, Stillman, 2003):

a) Estimate the equation using instrumental variables (V).

b) Form the residuals $\hat{u}_{ij}$ and use them to form optimal weighting matrix

5.18) $\hat{W} = \hat{S}^{-1} = (\frac{1}{n}(V^T \hat{\Omega} V))^{-1}$.

c) Calculate the efficient GMM estimator $\hat{\delta}_{EGMM}$ and its variance-covariance matrix using the estimated weighting matrix and Eq. 5.13, 5.14. This yields:

5.19) $\hat{\delta}_{EGMM} = (X^T V (V^T \hat{\Omega} V)^{-1} V^T X)^{-1} X^T V (V^T \hat{\Omega} V)^{-1} V^T Y$

5.20) $\mathrm{Var}(\hat{\delta}_{EGMM}) = \frac{1}{n}(X^T V (V^T \hat{\Omega} V)^{-1} V^T X)^{-1}$

d) Calculate iterated GMM estimator. The described above procedure is iterated several times. For example, obtain residuals from the two-step GMM estimator, then use them to calculate a new $\hat{S}$, use this to calculate three-step efficient GMM estimator, and so on, for as long as the user wants or until the estimator converges. (Baum, Heroit, Stillman, 2003)

Based on the empirical model (Eq. 4.11 and 4.12) in the case for U.S. and its 16 trading partners the original equation is exactly identified. It has seven explanatory variables and seven moment equations for exports and imports for three traded groups of products. Errors from those equations are used for formulating equations of moments. In the studied case the matrix of instrumental variables defined as:

5.21) $V_{ij} = (I_T \otimes X_{ij1}, L \otimes X_{ij2}, I_T z_{ij1})$

where I_T is T×T matrix, L is T×(T-1) differencing matrix. The set of moments for the empirical model in equations 4.13, 4.14 is represented in Table 5.1.

The GMM for trade theory model for exports equations 4.13 and 4.14 along with moments specified above was econometrically estimated using system of equation methods. Results of the estimation are presented in Appendix B and will be discussed in the following chapter.

Table 5.1 Moment Equations for U.S. Exports and Imports

Moments Equations for U.S. Exports	Moments Equations for U.S. Imports
$\ln(GDP_{it}) * (\ln X_{ijt}^k - \ln \hat{X}_{ijt}^k)$	$\ln(GDP_{it}) * (\ln M_{ijt}^k - \ln \hat{M}_{ijt}^k)$
$\ln(GDP_{jt}) * (\ln X_{ijt}^k - \ln \hat{X}_{ijt}^k)$	$\ln(GDP_{jt}) * (\ln M_{ijt}^k - \ln \hat{M}_{ijt}^k)$
$\ln(GDP_{jt}) * (\ln X_{ijt}^k - \ln \hat{X}_{ijt}^k)$	$\ln(GDP_{jt}) * (\ln M_{ijt}^k - \ln \hat{M}_{ijt}^k)$
$\ln(Dist_{ij}) * (\ln X_{ijt}^k - \ln \hat{X}_{ijt}^k)$	$\ln(Dist_{ij}) * (\ln M_{ijt}^k - \ln \hat{M}_{ijt}^k)$
$(Lang_{ij}) * (\ln X_{ijt}^k - \ln \hat{X}_{ijt}^k)$	$\ln(Lang_{ij}) * (\ln M_{ijt}^k - \ln \hat{M}_{ijt}^k)$
$\Delta \ln(ER_{jit}) * (\ln X_{ijt}^k - \ln \hat{X}_{ijt}^k)$	$\Delta \ln(ER_{jit}) * (\ln M_{ijt}^k - \ln \hat{M}_{ijt}^k)$
$\ln FDI_{ij(t-1)}^k * (\ln X_{ijt}^k - \ln \hat{X}_{ijt}^k)$	$\ln FDI_{ji(t-1)}^k * (\ln M_{ijt}^k - \ln \hat{M}_{ijt}^k)$
$\Delta \ln(Pscore_{jt}) * (\ln X_{ijt}^k - \ln \hat{X}_{ijt}^k)$	$\Delta \ln(Pscore_{jt}) * (\ln M_{ijt}^k - \ln \hat{M}_{ijt}^k)$

CHAPTER 6. EMPIRICAL RESULTS

U.S. Trade with Its Trading Countries

In this chapter the results of econometric procedures are discussed. The analysis examines results for U.S. export and import trade patterns with its 16 trading partners for the three aggregated groups of products.

Table 6.1., 6.2 present the estimation results for U.S. exports/imports equations. R^2 of U.S. exports equations are 0.434 for AGR, 0.571 for MID and 0.736 for FIN, indicating more than 50% of variation of the dependent variable is explained by the independent variables included in the model except AGR. Since agricultural trade is less sensitive to economic conditions, the equation has low R^2. R^2s of U.S. imports for AGR and MID are 0.655 and 0.758, respectively. R^2 of U.S. imports equation for FIN is lower. In fact in the equation for U.S. imports of FIN, only change in polity score and distance are significantly different from zero at the 5% level. Change in polity score has a significantly higher influence to U.S. imports of FIN than any other commodity group considered. It is expected that in the case of high-technology goods the trade decisions are particularly influenced by institutional and political factors. Those factors have a complex mechanism of affecting bilateral trade through international alliances and multilateral agreements, which are difficult to account for in the economic model.

Most explanatory variables have expected signs, however, some are insignificant, mainly because of inequalities of some of cross-section data. According to the international trade theory GDPs of importing countries are supposed to have a positive effect on the volume of their imports. That is proved to be true for the U.S. exports of AGR and MID groups. In this case increase in GDPs of the U.S. trading partners are significantly different from zero at the 1% level. A 1% increase in GDP_{jt} results in 0.78% and 0.44% increases in U.S. exports of AGR and MID products.

Table 6.1 Estimation Results for U.S. Exports

Independent Variables	AGR	MID	FIN
Intercept (β_0)	30.734	17.696	36.651*
	(22.080)	(18.685)	(12.799)
U.S. trading partner GDP (ln (GDP_{jt}))	0.780*	0.443*	0.080
	(0.301)	(0.153)	(0.135)
GDP U.S. ($\ln(GDP_{it})$)	-0.429	1.451	-0.531
	(1.943)	(1.551)	(1.078)
Distance ($\ln(Dist_{ij})$)	-1.396*	-0.878*	-0.704*
	(0.251)	(0.260)	(0.134)
Language ($Lang_{ij}$)	0.031	0.475*	0.141
	(0.249)	(0.178)	(0.133)
Exchange rate ($\ln(ER_{jit})$)	0.444	-1.048	-1.245
	(1.577)	(1.038)	(0.939)
FDI from U.S. to trading partner ($\ln(FDI^k_{ij(t-1)})$)	-0.142**	0.117	0.358*
	(0.066)	(0.130)	(0.034)
Change Polity score of the U.S. trading partner	2.984**	2.041**	1.638**
($\Delta \ln(Pscore_{jt})$)	(1.372)	(1.027)	(0.809)
2009 year	0.009	-0.001	-0.058
	(0.289)	(0.232)	(0.151)
R-Square	0.434	0.571	0.736

*Statistically significant at 1% level
*Statistically significant at 5% level
**Statistically significant at 10% level
Numbers in parentheses represent standard errors of corresponding variables.

Table 6.2 Estimation Results for U.S. Imports

Independent Variables	AGR	MID	FIN
Intercept (β_0)	47.174*	-14.534	45.762
	(14.907)	(14.399)	(28.508)
U.S. trading partner GDP	-0.187	-0.405*	0.271
(ln (GDP_{jt}))	(0.199)	(0.137)	(0.277)
GDP U.S. ($\ln(GDP_{it})$)	-0.535	4.908**	-1.938
	(1.308)	(1.180)	(2.490)
Distance ($\ln(Dist_{ij})$)	-1.975*	-1.330*	-0.581**
	(0.145)	(0.167)	(0.290)
Language ($Lang_{ij}$)	0.095	-0.003	0.344
	(0.199)	(0.156)	(0.295)
Exchange rate ($\ln(ER_{jit})$)	-0.932	1.084	-0.575
	(1.083)	(0.945)	(1.721)
FDI from trading partner to U.S. ($\ln(FDI^k_{ji(t-1)})$)	-0.109*	-0.038	-0.042
	(0.030)	(0.024)	(0.040)
Change in Polity score of U.S. trading partner	1.979***	0.702	4.004**
($\Delta \ln(Pscore_{jt})$)	(1.129)	(0.901)	(2.0455)
2009 year	0.084	-0.101	-0.326
	(0.197)	(0.138)	(0.367)
R-Square	0.655	0.758	0.129

*Statistically significant at 1% level
*Statistically significant at 5% level
**Statistically significant at 10% level
Numbers in parentheses represent standard errors of corresponding variables.

However, for U.S. exports of the FIN group, importing country's GDP is insignificant. The estimated results for this group are influenced by U.S. exports to Mexico and Canada under NAFTA. As shown in Figure 6.1, U.S. exports to Canada and Mexico are larger than any other countries. Considering the small number of countries included in this study, U.S. trade of FIN with the two countries may play a dominating role in estimation of U.S. exports equation for FIN.

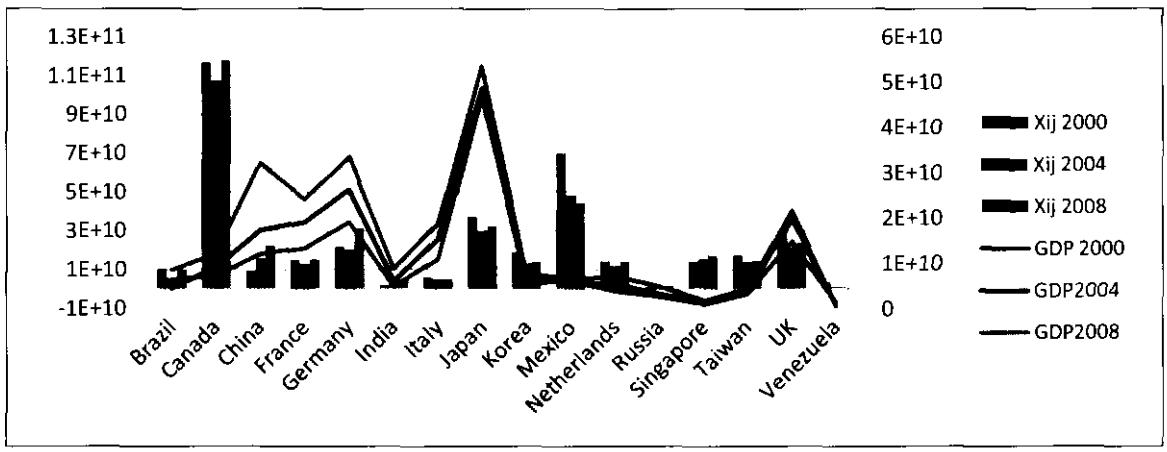

Figure 6.1 U.S. Exports of FIN to Its 16 Trading Partners and GDP of the 16 Trading Partners
Source: Calculated from International Monetary Fund. (April, 2010). *World Economic Outlook Database.*

Trade theory suggests that the bigger the economy of the exporting country the higher is the production and trade potential. Nevertheless, the result of this study show that GDPs of exporting countries are insignificant for AGR and FIN groups and are significant but have negative effect for MID. This is mainly because of the small number of countries included in this study. In the FIN group, South Korea is the biggest exporter to the U.S., followed by Mexico and Canada under NAFTA. As shown in Figure 6.2, Venezuela is the leading exporter of MID. During the 10 year period, U.S. had trade deficit of SITC-03 (Mineral Fuels, Lubricants and Related Materials) with Venezuela. In 2009 this deficit was more than $26 billion. At the same time Venezuela's GDP was the smallest in the sample of 16 U.S. trading partners during the

2000-2009 period. Thus the share of U.S. imports of MID group from Venezuela dominated U.S. imports and resulted in a negative relationship with the U.S. trading partner GDP variable in the U.S. import equation

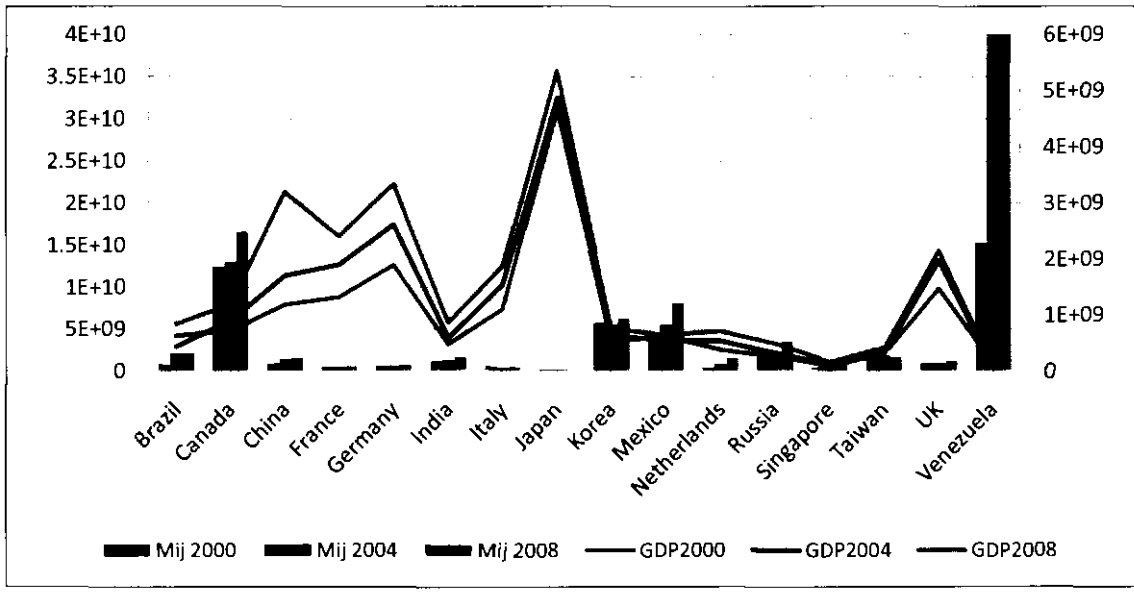

Figure 6.2 U.S. Imports of MID from Its 16 Trading Partners, U.S. Dollars and GDP, and GDP of the 16 Trading Partners.
Source: Calculated from International Monetary Fund. (April, 2010). *World Economic Outlook Database.*

U.S. GDP variable in the U.S. exports equation is insignificant in most cases for U.S. exports and imports. The reason for that is that U.S. GDP serves as explanatory variable in all 960 equations (U.S. exports and imports for three groups of commodities for 16 countries and 10 years). Thus in fact only 10 distinct observations are contributing to the explanation of U.S.'s GDP effect on trade. On the contrary, GDP_{jt} varies over 16 countries and time. Thus U.S. GDP (GDP_{it}) may serve as a constant unlike GDPs of U.S. trading partners (GDP_{jt}).

Distance, which is a classical gravity model variable, is significant at the 5% level for U.S. imports of FIN products and the 1% level in all other cases for both U.S. exports and imports equations. The variable is negative in both U.S. export and import

equations, indicating that distance is an impediment for trade. That confirms the classical gravity assumption and the hypothesis (Table 4.1). An increase in distance by 1% causes 1.396% decrease in U.S. exports of AGR, 0.878% for MID, and 0.704% for FIN. Increase in distance by 1% causes 1.975% decrease in U.S. exports of AGR and 1.330% for MID, and 0.581% for FIN. Products in AGR are often perishable, meaning that during a long transporting time the products can lose their quality, making AGR group most sensitive to distance between the U.S. and its trading partners.

Common language is hypothesized to make trade between countries easier and positively influences both exports and imports between countries. However, this has changed a lot since services of translators and intermediary companies, which make business in the foreign language easier, are available and affordable. In all cases except U.S. exports of MID, common language variable is insignificant.

Previous studies indicates that exchange rate should be significant for trade flows (Baek and Koo, 2008; Kim, Cho, and Koo, 2004; Bahmani-Oskooee and Artatrana, 2008). However, exchange rate is insignificant for both export and import equations for the three commodity groups (AGR, MID, FIN). This is mainly because this study uses annual data for 10 years from 2000 to 2009. Exchange rate in most of the countries was rather smooth during that period, exhibiting low variation, except Venezuela, where it stabilized in 2005 (Figure 6.3). In addition, since the exchange rate index is a series of annual market average data, rather than monthly or quarterly data. This aggregated annual data do not provide significant variances which exist in monthly and quarterly data.

International trade economists have different opinions about relation between FDI and trade flows. Unlike Marchant, Cornell and Koo (2002) and Fontagne (1999), U.S. FDI for AGR in the export equation is significant and has a negative effect of

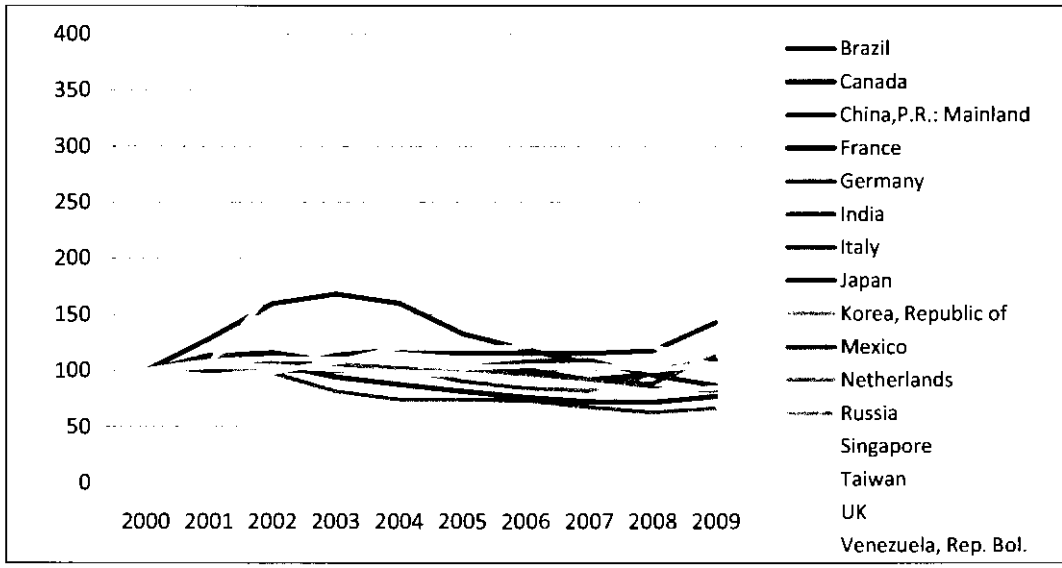

Figure 6.3 Exchange Rate Index. (2000 Basis).
Source: Data from International Monetary Fund. (April, 2010). *World Economic Outlook Database. Calculations made by the author.*

trade flow, indicating that the U.S. FDI to its trading partners is a substitute for U.S. exports of AGR. Similarly, the estimated coefficient of the FDI from trading partners for AGR in U.S. imports equation is significant at the 5% level and negative, indicating that FDI is a substitute for U.S. imports. A 1% increase in U.S. FDI for AGR to its trading partners causes 0.142% decrease in U.S. exports. A 1% increase in other countries' FDI for AGR causes 0.109% decrease in U.S. imports from those countries. Fontagne (1999) found that relationship between FDI and trade flows changes in time and between countries. In this particular case of U.S. and its 16 trading partners, there are differences in effects of FDI in different groups of commodities. Fontagne (1999) found that American outward investment has more complementary effect than inward investment from European countries. This study shows that U.S. outward FDI for the FIN group is a complement to U.S. exports. A 1% increase in U.S. FDI in FIN causes 0.358% increase in U.S exports to its major 16 countries. However, FDI from U.S. trading partners is either insignificant for U.S. imports of MID, or a substitute for U.S. imports of AGR.

Polity score is significant and positive for all three groups in both export and import equations, except U.S. imports of MID for which polity score is insignificant. As hypothesized, a cooperative political environment between the U.S. and its trading partners enhances U.S. exports as well as imports mainly because political cooperation tend to reduce technical trade barriers which commonly exist between countries.

Finally, a dummy variable for 2009 year as a time variable is incorporated in the model to capture the worldwide economic crisis that occurred in 2009. However, this variable for 2009 is insignificant in both export and import equations. This is mainly because the variable varies over time and constant over cross section. Moreover, the dummy variable is reflected in the exogeneous GDP variable, which dropped significantly in 2009 for U.S. and the 16 U.S. trading partners.

U.S.-Russia Bilateral Trade

One of the main objectives of this study is to examine the bilateral trade relationship between U.S. and Russia. Russia, one of the fastest growing economies, has not actively engaged in trade of goods and services with the U.S.

Based on the estimated U.S. export and import equations, this study investigates factors affecting the bilateral trade between the U.S. and Russia. Average values of the explanatory variables for the last 10 years are used to predict values of U.S. average exports and imports for the three product groups (AGR, MID, FIN) from the estimated equation. Then the predicted values are compared to the real trade values of AGR, MID, and FIN between the U.S. and its 16 trading partners (Appendix B).

The model predicts trade value between the U.S. and Russia rather accurately. The difference between predicted and real values range between $1.959 and $0.692 million. Predicted values versus real values for U.S. Russia trade are presented in Table 6.3.

Table 6.3 Ranking of U.S.-Russia Bilateral Trade

Trade Flow	Predicted Mean	Real Mean	Difference between Predicted and Real	Predicted Rank	RealRank
X_{ijt}^{AGR}	20.029	20.061	-0.031	13	10
X_{ijt}^{MID}	21.694	19.553	2.141	13	16
X_{ijt}^{FIN}	21.113	20.905	0.208	16	16
M_{ijt}^{AGR}	18.504	18.158	0.346	5	13
M_{ijt}^{MID}	21.298	21.420	-0.122	5	5
M_{ijt}^{FIN}	21.113	18.448	2.665	16	16

Source: Calculations done by author.

Russia ranks 10th in terms of U.S. exports of agriculture and 5th in U.S. imports of MID, while predicted ranks are 13th and 5th respectively. This is mainly because Russia is one of the largest markets for U.S. meat exports and at the same time the U.S. has a large trade deficit with Russia in SITC-03 (Mineral Fuels, Lubricants and Related Materials) and SITC-06 (Manufactured Goods Classified Chiefly by Material).

To understand the position of Russia among the U.S. major trading partners, it is necessary to examine the explanatory variables which are significant for U.S. export and import equations (Table 6.4).

Table 6.4 Significance of the Variables in the Gravity Model

Explanatory Variables	X_{ijt}^{AGR}	X_{ijt}^{MID}	X_{ijt}^{FIN}	M_{ijt}^{AGR}	M_{ijt}^{MID}	M_{ijt}^{FIN}
U.S. trading partner GDP($\ln(GDP_{jt})$)	×	×			×	
GDP U.S. ($\ln(GDP_{it})$)					×	
Distance ($\ln(Dist_{ij})$)	×	×	×	×	×	×
Language ($Lang_{ij}$)		×				
Exchange rate ($\ln(ER_{jit})$)						
FDI from U.S. to trading partner ($\ln(FDI_{ij(t-1)}^{k})$)	×		×			
FDI from trading partner to U.S. ($\ln(FDI_{ji(t-1)}^{k})$)				×		
Change in polity score ($\Delta\ln(Pscore_{jt})$)	×	×	×	×		×
2009 year						

From the Table 6.4 it is obvious that distance, which is a classical gravity model variable is significant for both U.S. export and import equations for all three groups. The greater the distance between the U.S. and its trading partners, the smaller the trade between them. All the countries are rather far from the U.S. except Canada, Mexico and Venezuela (Figure 6.4). However, distance is a physical variable and nothing could be done to decrease it for Russia to enhance trade with the U.S.

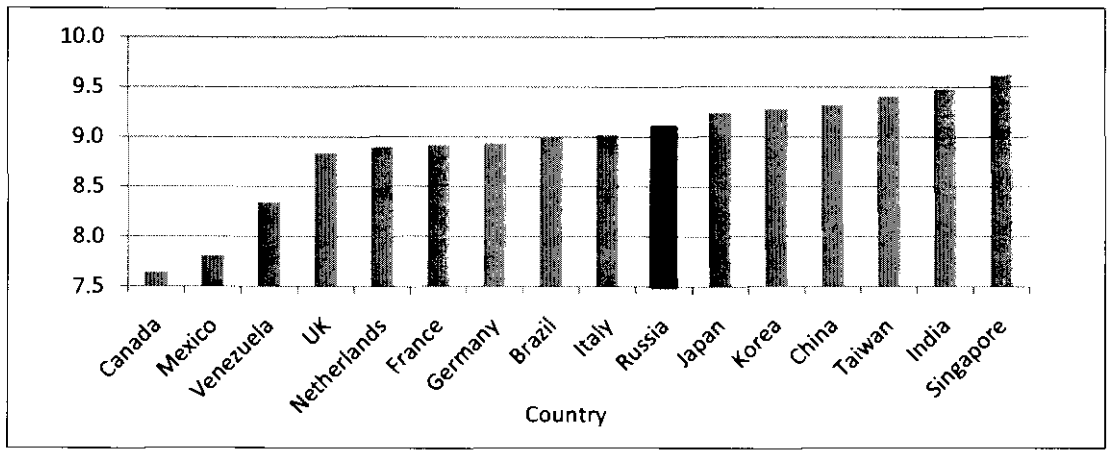

Figure 6.4 Distance between U.S. and Its 16 Trading Partners.
Source: The CEPII. (2010). *The Bilateral Data: Distance and Common Language.*

Another classical gravity model variable that is significant for both U.S. exports of AGR and MID is GDP of U.S. trading partners (Figure 6.5). In the sample of 16 the U.S. trading partners, GDP is one of the most influential and significant factor for U.S. exports of AGR and MID. Increase in U.S. trading partners GDP by 1% causes 0.780% and 0.443% increase in U.S. exports of AGR and MID, respectively. According to IMF World Economic Outlook (October, 2010) Russian projected real GDP could grow by 4.3% in 2011. This implies that U.S. trade with Russia could improve in the future.

FDI from the U.S. to its trading countries is very significant for U.S. exports of AGR and FIN. As shown in Figures 6.6 and 6.7 Russia is at the end of the list for the U.S. FDI in FIN and AGR. The same is true for U.S. imports of AGR which are sensitive to FDI from other countries (Figure 6.8).

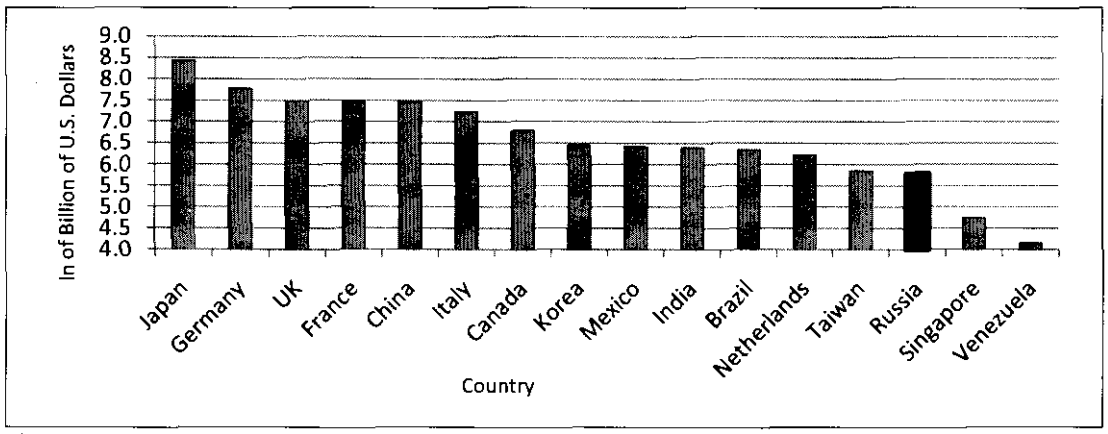

Figure 6.5 Average GDP for 2000-2009 of the U.S.16 Trading Partners.
Source: Data obtained from International Monetary Fund. (April, 2010). *World Economic Outlook Database.* Calculations done by the author.

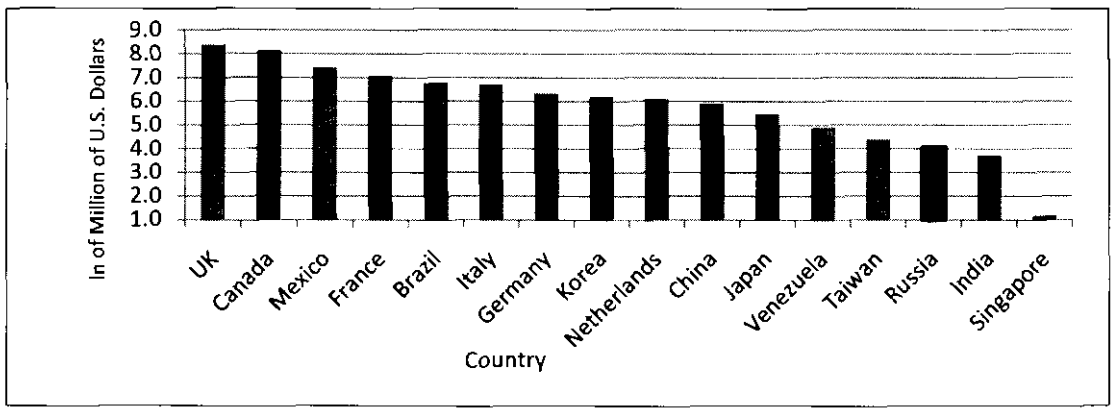

Figure 6.6 Average FDI for 1999-2009 into AGR from the U.S. to Its 16 Trading Partners.
Source: Data obtained from U.S. Bureau of Economic Analysis. (June 25, 2009). International Economic. Accounts Data: *U.S. Direct Investment Abroad And Foreign Direct Investment in the U.S.* Calculations done by author.

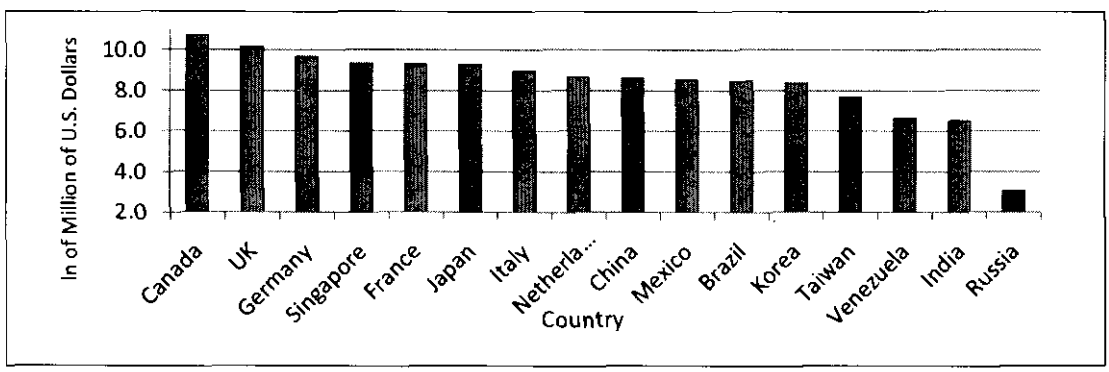

Figure 6.7 Average FDI for 1999-2009 into FIN from the U.S. to Its 16 Trading Partners.
Source: Data from U.S. Bureau of Economic Analysis. (June 25, 2009). International Economic. Accounts Data: *U.S. Direct Investment Abroad And Foreign Direct Investment in the U.S.* Calculations done by author.

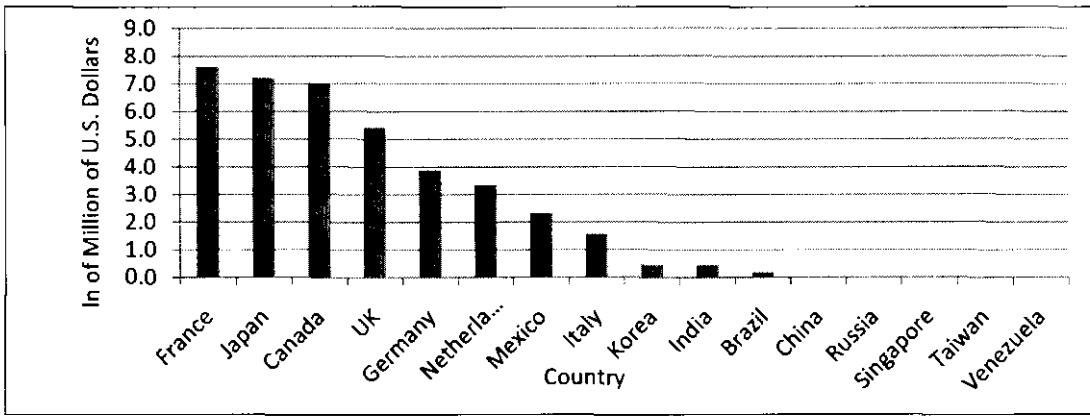

Figure 6.8 Average FDI for 1999-2009 into AGR from Trading Partners to the U.S. Source: Data obtained from U.S. Bureau of Economic Analysis. (June 25, 2009). International Economic. Accounts Data: *U.S. Direct Investment Abroad and Foreign Direct Investment in the U.S.* Calculations done by author.

U.S. FDI in FIN is a complement to U.S. exports, while U.S. FDI in AGR is a substitute for U.S. exports. This is also true for Russian FDI into the U.S. and U.S. imports of AGR (Table 6.1). A 1% increase of U.S. FDI into Russia will cause a decrease in U.S. exports of AGR by 0.142%. A 1% increase of Russian FDI into U.S. AGR group will cause 0.109% decrease in U.S. imports of AGR. At the same time, a 1% increase in U.S. FDI for the FIN group will cause 0.358% increase in U.S. exports. Russia is considered to be one of the countries where business is risky for international companies. Russia ranks very low in a variety of indices measuring easiness of conducting business (World Bank, 2010e). Due to the difficulty of going through the transition period after the Soviet Union breaking up and a big capital flight from the country, increase in FDI into Russia began only as late as 2003 and has been increasing since then.

Thus Russia should improve its investment climate in order to attract more U.S. FDI for the FIN group which will lead to increased U.S. exports of the FIN commodities. The Russian agricultural sector is another sector which needs U.S. FDI. The sector is not efficient in operation and needs new equipment for more efficient farm operations. Russia has all the necessary resources to attract more FDI. In fact, the

United Nations Conference on Trade and Development (2009) ranked Russia among the most attractive locations for FDI in 2009-2011 after China, the United States, India, and Brazil. Country's attractiveness for FDI is directly related to the political and institutional environment in the country. Unfortunately, Russia ranks very low among U.S. trading partners in the polity score variable, which represents an average of the World Bank indicators for Voice and Accountability, Political Stability, Government Effectiveness, Regulatory Quality, Rule of Law, Control of Corruption (Figure 6.9).

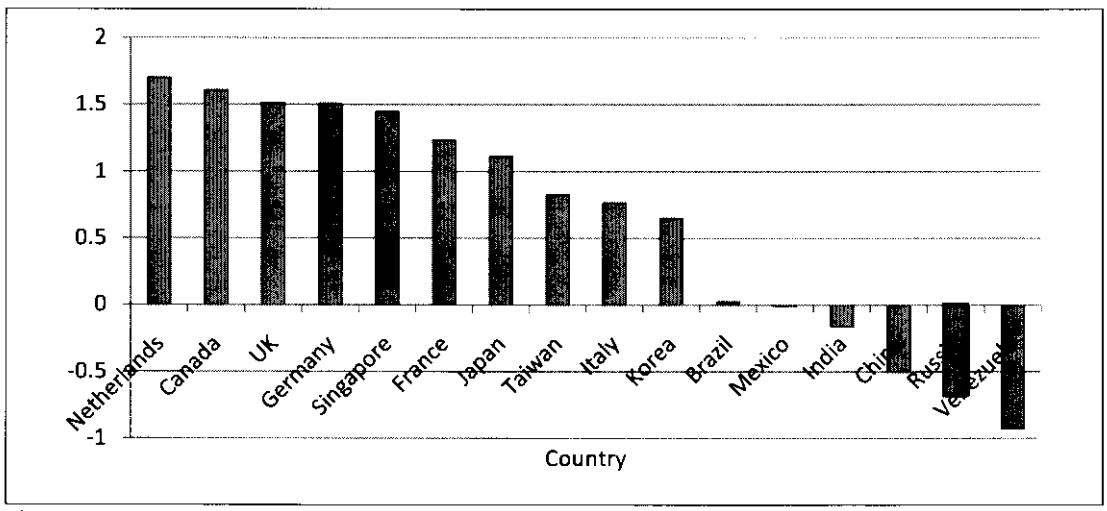

Figure 6.9 Average Polity Score Index of the U.S. 16 Trading Partners, 1999-2009. Source: Data obtained from World Bank. (2010). *Worldwide Governance Indicators.* Calculations done by author.

Annual change in polity score is another variable that is significant for all trade flows except U.S. imports of MID (Tables 6.1 and 6.2). However, Russia is ranked by average 10 year polity score a little higher than Venezuela, which is known as an anti-democratic political regime. The Russian government is working on building a strong democracy, more transparent environment for doing business, decreasing corruption and improving its law. Improvements could be seen on Figure 6.10. Russia's polity score has increased slightly on average by 0.002 during the period 2000-2009.

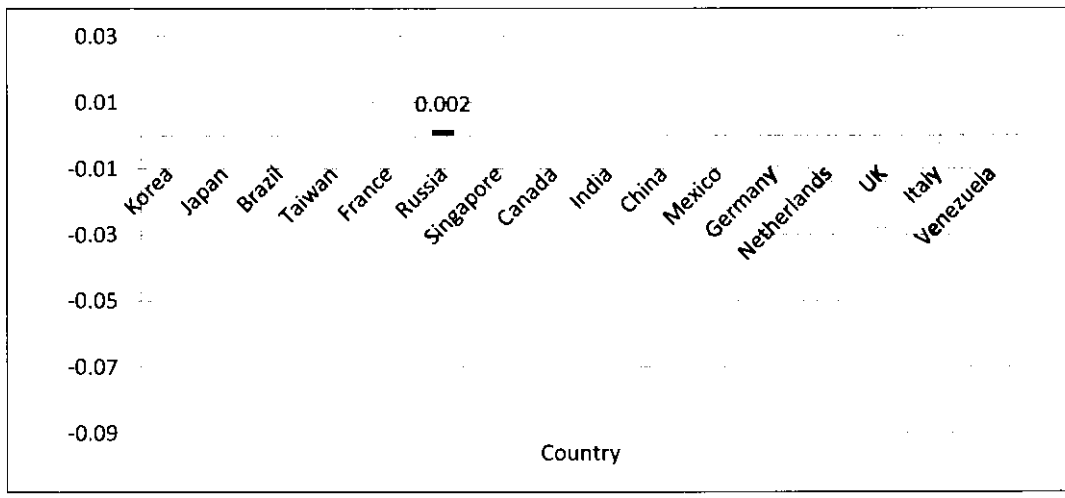

Figure 6.10 Average Polity Score Change of the U.S. 16 Trading Partners, 2000-2009. Source: Calculations done by author.

A lot has been done, however, that is not enough yet. Taking into consideration the fact that the polity score is very important for all trade flows from the U.S. and into the U.S., it is important for Russia to develop cooperative political environment with the U.S. in order to enhance its economic relationship with the U.S.

CHAPTER 7. CONCLUSIONS

U.S. bilateral trade relations with its trading partners (Canada, China, Mexico) have been widely discussed and analyzed by many researchers (Baek and Koo, 2008; Bahmani-Oskooee and Artatrana, 2008; Kim, Cho, and Koo, 2004). However, U.S.-Russia political and economic relations have not been addressed, though being widely discussed in media and international summits of political leader.

There are reasons for U.S.-Russia trade relations not to be popular among researchers. First, even though the U.S. and Russia are in the list of 10 largest economies in the world, trade between the two countries is not well established, compared to the U.S. trade with its major trading partners. Secondly, long period of cold war, political conflicts and lack of cultural ties, have been dominating issues in establishing a normal trade relation. Finally, data for the first 10 years of Russia's transition period to the market economy are not easily available and are not trusted.

At the same time the growth of the Russian economy for the last 10 years made the country a good potential business partner for the U.S. Russian leaders made attempts to improve the image of the country, to attract foreign direct investment, enter the WTO and build new post-cold war relations with the U.S. The growth of U.S. exports and imports to/from Russia (22% and 19% respectively) shows increase in U.S. businesses interest to Russia.

The goal of this study is to identify the reason for low trade value between the U.S. and Russia. In order to analyze it, the factors affecting bilateral trade between the U.S. and its 15 trading partners and Russia were studied. This thesis utilizes GMM approach to estimate U.S. exports and imports to/from its 16 trading partners. The estimation provides explanation of the determinants of exports and imports flows for three aggregated groups (AGR, MID, FIN) between the U.S. and its 16 trading partners.

The sample of the U.S. trading partners is very specific. It is not large thus its results can't be generalized to explain overall U.S. bilateral trade relations with all countries. The results of the study show that U.S. trading partners' GDP is significant and positive for U.S. exports of AGR and MID. Distance traditionally is statistically significant and negatively affects both U.S. exports and imports for all three groups (AGR, MID,FIN). FDI from the U.S. trading partners to the U.S. is significant and it is a substitute for exports of AGR. However, it is a complement for U.S. FIN exports. U.S. trading partners' FDI is significant only for U.S. imports of AGR. Moreover, flow of FDI and U.S. imports of AGR are substitutes. Finally a very significant variable for both U.S. exports and imports is change in polity score, implying that increase in U.S. trading partners' political, institutional stability increases these countries' trade with the U.S.

Taking into consideration all the variables that significantly influence U.S. exports and imports with its 16 trading partners, factors enhancing and impeding U.S. trade with Russia are analyzed. Russia should pay attention to the four factors significant to U.S.-Russia trade. Russian 10-year average GDP is small compared to other U.S. trading partners, meaning that Russian consumers on average have less income to spend on U.S. imports. The 10-year average flow of U.S. FDI into Russia for FIN is smallest among the 15 U.S. main trading partners and 14th for AGR. On The other hand, Russian FDI into AGR in the U.S. is close to zero. Finally, Russian polity score has been low during the period, followed by Venezuela which is considered to be an anti-democratic political regime. Working on all of the four mentioned factors would contribute to growth in U.S.-Russia bilateral trade in the near future.

Need for Further Study

It has been agreed from the beginning of this study that the goal is to find factors

influencing trade of the 15 major trading partners and Russia, meaning that the result can't be generalized for all U.S. trading partners. The results give the idea of what Russia should work on in order to be in the top 15 U.S. trading partners group. Increasing the sample of U.S. trading partners in the future studies could allow to generalize the results. Also additional research could be focused on specific traded commodities instead of the aggregated three groups.

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APPENDIX A.VARIABLE STATISTICS

Table A.1 Brazil

Variable	Label	Mean	Std Dev
U.S. trading partner GDP	$(\ln(GDP_{jt}))$	6.3735534	0.2580687
U.S. GDP	$(\ln(GDP_{it}))$	9.2845563	0.0723207
Exchange rate	$(\ln(ER_{jit}))$	4.8152930	0.2024795
Distance	$(\ln(Dist_{ij}))$	8.9982003	0
Language	$Lang_{ij}$	0	0
U.S. Exports of AGR	$\ln(USexpAGR)$	18.8067243	0.3758058
U.S. Exports of MID	$\ln(USexpMID)$	22.0855727	0.2203999
U.S. Exports of FIN	$\ln(USexpFIN)$	22.7681997	0.2577120
U.S. Imports of AGR	$\ln(USimpAGR)$	19.5143633	0.2284476
U.S. Imports of MID	$ln(USimpMID)$	21.1659404	0.4222820
U.S. Imports of FIN	$ln(USimpFIN)$	20.9098858	0.4182284
FDI from the U.S. to trading partner (AGR)	$\ln(FDI^{AGR}_{ij(t-1)})$	6.7296656	0.4296302
FDI from the U.S. to trading partner (MID)	$\ln(FDI^{MID}_{ij(t-1)})$	8.6117052	0.2849589
FDI from the U.S. to trading partner (FIN)	$\ln(FDI^{FIN}_{ij(t-1)})$	8.4907836	0.7620695
FDI from trading partner to the U.S.(AGR)	$\ln(FDI^{AGR}_{ji(t-1)})$	0.1747183	0.3726946
FDI from trading partner to the U.S. (MID)	$\ln(FDI^{MID}_{ji(t-1)})$	0.1986454	0.6281720
FDI from trading partner to the U.S. (FIN)	$\ln(FDI^{FIN}_{ji(t-1)})$	0.0506931	0.1603055
Change in Polity score	$(\Delta\ln(Pscore_{jt}))$	0.0099866	0.0988317
2009 year	y2009	0.0909091	0.3015113

Table A.2 Canada

Variable	Label	Mean	Std Dev
U.S. trading partner GDP	$(\ln(GDP_{jt}))$	6.8084669	0.2231417
U.S. GDP	$(\ln(GDP_{it}))$	9.2845563	0.0723207
Exchange rate	$(\ln(ER_{jit}))$	4.4704196	0.1492410
Distance	$(\ln(Dist_{ij}))$	7.6397851	0
Language	$Lang_{ij}$	1.0000000	0
U.S. Exports of AGR	*ln(USexpAGR)*	23.0699892	0.2187395
U.S. Exports of MID	*ln(USexpMID)*	24.7037055	0.1668396
U.S. Exports of FIN	*ln(USexpFIN)*	25.4226880	0.0940794
U.S. Imports of AGR	*ln(USimpAGR)*	21.1181152	0.0706018
U.S. Imports of MID	*ln(USimpMID)*	23.2726086	0.1382739
U.S. Imports of FIN	*ln(USimpFIN)*	23.1505173	0.2665762
FDI from the U.S. to trading partner (AGR)	$\ln(FDI^{AGR}_{ij(t-1)}))$	8.0970018	0.1881773
FDI from the U.S. to trading partner (MID)	$\ln(FDI^{MID}_{ij(t-1)}))$	10.4232161	0.1728051
FDI from the U.S. to trading partner (FIN)	$\ln(FDI^{FIN}_{ij(t-1)}))$	10.6873860	0.1724165
FDI from trading partner to the U.S.(AGR)	$\ln(FDI^{AGR}_{ji(t-1)}))$	7.0022386	0.2329769
FDI from trading partner to the U.S. (MID)	$\ln(FDI^{MID}_{ji(t-1)}))$	8.8541283	0.3245753
FDI from trading partner to the U.S. (FIN)	$\ln(FDI^{FIN}_{ji(t-1)}))$	9.7023071	0.3872082
Change in Polity score	$(\Delta\ln(Pscore_{jt}))$	-0.0015230	0.0358350
2009 year	y2009	0.0909091	0.3015113

Table A.3 China

Variable	Label	Mean	Std Dev
U.S. trading partner GDP	$(\ln(GDP_{jt}))$	7.5220065	0.3989106
U.S. GDP	$(\ln(GDP_{it}))$	9.2845563	0.0723207
Exchange rate	$(\ln(ER_{jit}))$	4.5596880	0.0731316
Distance	$(\ln(Dist_{ij}))$	9.3221885	0
Language	$Lang_{ij}$	0	0
U.S. Exports of AGR	*ln(USexpAGR)*	20.6601877	0.5688353
U.S. Exports of MID	*ln(USexpMID)*	23.2310230	0.6229719
U.S. Exports of FIN	*ln(USexpFIN)*	23.4618304	0.3688691
U.S. Imports of AGR	*ln(USimpAGR)*	18.6209615	0.2512158
U.S. Imports of MID	*ln(USimpMID)*	21.0003032	0.2696003
U.S. Imports of FIN	*ln(USimpFIN)*	22.8236316	0.1898866
FDI from the U.S. to trading partner (AGR)	$\ln(FDI^{AGR}_{ij(t-1)})$	6.0388838	0.5571661
FDI from the U.S. to trading partner (MID)	$\ln(FDI^{MID}_{ij(t-1)})$	8.2221644	0.2983038
FDI from the U.S. to trading partner (FIN)	$\ln(FDI^{FIN}_{ij(t-1)})$	8.6766568	0.3839385
FDI from trading partner to the U.S.(AGR)	$\ln(FDI^{AGR}_{ji(t-1)})$	0	0
FDI from trading partner to the U.S. (MID)	$\ln(FDI^{MID}_{ji(t-1)})$	0.8685019	1.8320620
FDI from trading partner to the U.S. (FIN)	$\ln(FDI^{FIN}_{ji(t-1)})$	0	0
Change in Polity score	$(\Delta\ln(Pscore_{jt}))$	-0.0061427	0.0451606
2009 year	y2009	0.0909091	0.3015113

Table A.4 France

Variable	Label	Mean	Std Dev
U.S. trading partner GDP	$(\ln(GDP_{jt}))$	7.4824728	0.2222306
U.S. GDP	$(\ln(GDP_{it}))$	9.2845563	0.0723207
Exchange rate	$(\ln(ER_{jit}))$	4.3763035	0.1737869
Distance	$(\ln(Dist_{ij}))$	8.9168772	0
Language	$Lang_{ij}$	0	0
U.S. Exports of AGR	*ln(USexpAGR)*	19.8342472	0.1579905
U.S. Exports of MID	*ln(USexpMID)*	22.3817414	0.2095843
U.S. Exports of FIN	*ln(USexpFIN)*	23.3482156	0.1038718
U.S. Imports of AGR	*ln(USimpAGR)*	18.8109397	0.0679307
U.S. Imports of MID	*ln(USimpMID)*	20.1858068	0.1295778
U.S. Imports of FIN	*ln(USimpFIN)*	20.7350066	0.2059533
FDI from the U.S. to trading partner (AGR)	$\ln(FDI_{ij(t-1)}^{AGR}))$	7.1866763	0.7834957
FDI from the U.S. to trading partner (MID)	$\ln(FDI_{ij(t-1)}^{MID}))$	8.8595480	0.2567635
FDI from the U.S. to trading partner (FIN)	$\ln(FDI_{ij(t-1)}^{FIN}))$	9.2945101	0.1189279
FDI from trading partner to the U.S.(AGR)	$\ln(FDI_{ji(t-1)}^{AGR}))$	7.6134377	0.2971613
FDI from trading partner to the U.S. (MID)	$\ln(FDI_{ji(t-1)}^{MID}))$	9.7971355	0.4801506
FDI from trading partner to the U.S. (FIN)	$\ln(FDI_{ji(t-1)}^{FIN}))$	9.9746116	0.3666260
Change in Polity score	$(\Delta\ln(Pscore_{jt}))$	0.0029432	0.0376624
2009 year	y2009	0.0909091	0.3015113

Table A.5 Germany

Variable	Label	Mean	Std Dev
U.S. trading partner GDP	$(\ln(GDP_{jt}))$	7.7989784	0.2216145
U.S. GDP	$(\ln(GDP_{it}))$	9.2845563	0.0723207
Exchange rate	$(\ln(ER_{jit}))$	4.3763035	0.1737869
Distance	$(\ln(Dist_{ij}))$	8.9353049	0
Language	$Lang_{ij}$	0	0
U.S. Exports of AGR	*ln(USexpAGR)*	20.6192008	0.1807544
U.S. Exports of MID	*ln(USexpMID)*	22.7907800	0.4246194
U.S. Exports of FIN	*ln(USexpFIN)*	23.8451747	0.1931965
U.S. Imports of AGR	*ln(USimpAGR)*	17.4202905	0.0545296
U.S. Imports of MID	*ln(USimpMID)*	20.4548853	0.1116098
U.S. Imports of FIN	*ln(USimpFIN)*	21.4422147	0.1187158
FDI from the U.S. to trading partner (AGR)	$\ln(FDI^{AGR}_{ij(t-1)}))$	6.3323163	0.6599747
FDI from the U.S. to trading partner (MID)	$\ln(FDI^{MID}_{ij(t-1)}))$	8.5898289	0.3463372
FDI from the U.S. to trading partner (FIN)	$\ln(FDI^{FIN}_{ij(t-1)}))$	9.6221311	0.2882460
FDI from trading partner to the U.S.(AGR)	$\ln(FDI^{AGR}_{ji(t-1)}))$	3.8578540	1.3895854
FDI from trading partner to the U.S. (MID)	$\ln(FDI^{MID}_{ji(t-1)}))$	10.0087948	0.1638263
FDI from trading partner to the U.S. (FIN)	$\ln(FDI^{FIN}_{ji(t-1)}))$	10.1025772	0.7060718
Change in Polity score	$(\Delta\ln(Pscore_{jt}))$	-0.0152207	0.0447470
2009 year	y2009	0.0909091	0.3015113

Table A.6 India

Variable	Label	Mean	Std Dev
U.S. trading partner GDP	$(\ln(GDP_{jt}))$	6.4267328	0.2497018
U.S. GDP	$(\ln(GDP_{it}))$	9.2845563	0.0723207
Exchange rate	$(\ln(ER_{jit}))$	4.6120930	0.0501348
Distance	$(\ln(Dist_{ij}))$	9.4828004	0
Language	$Lang_{ij}$	1.0000000	0
U.S. Exports of AGR	*ln(USexpAGR)*	19.0554644	0.3132624
U.S. Exports of MID	*ln(USexpMID)*	21.5995815	0.5705032
U.S. Exports of FIN	*ln(USexpFIN)*	21.8757879	0.4131608
U.S. Imports of AGR	*ln(USimpAGR)*	18.8397079	0.1735507
U.S. Imports of MID	*ln(USimpMID)*	21.0128881	0.1549310
U.S. Imports of FIN	*ln(USimpFIN)*	20.6959112	0.1995062
FDI from the U.S. to trading partner (AGR)	$\ln(FDI^{AGR}_{ij(t-1)}))$	3.3039409	1.1895724
FDI from the U.S. to trading partner (MID)	$\ln(FDI^{MID}_{ij(t-1)}))$	6.2928367	0.7739205
FDI from the U.S. to trading partner (FIN)	$\ln(FDI^{FIN}_{ij(t-1)}))$	6.5349925	0.3689510
FDI from trading partner to the U.S.(AGR)	$\ln(FDI^{AGR}_{ji(t-1)}))$	0.4143987	1.1445258
FDI from trading partner to the U.S. (MID)	$\ln(FDI^{MID}_{ji(t-1)}))$	1.3492809	1.3985468
FDI from trading partner to the U.S. (FIN)	$\ln(FDI^{FIN}_{ji(t-1)}))$	1.5769353	2.0433752
Change in Polity score	$(\Delta\ln(Pscore_{jt}))$	-0.0050638	0.0434749
2009 year	y2009	0.0909091	0.3015113

Table A.7 Italy

Variable	Label	Mean	Std Dev
U.S. trading partner GDP	$(\ln(GDP_{jt}))$	7.2617565	0.1959535
U.S. GDP	$(\ln(GDP_{it}))$	9.2845563	0.0723207
Exchange rate	$(\ln(ER_{jit}))$	4.3763035	0.1737869
Distance	$(\ln(Dist_{ij}))$	9.0220819	0
Language	$Lang_{ij}$	0	0
U.S. Exports of AGR	*ln(USexpAGR)*	19.8991735	0.1573980
U.S. Exports of MID	*ln(USexpMID)*	22.1122639	0.1903749
U.S. Exports of FIN	*ln(USexpFIN)*	22.4319974	0.0750598
U.S. Imports of AGR	*ln(USimpAGR)*	18.9019695	0.1307229
U.S. Imports of MID	*ln(USimpMID)*	20.1773223	0.1234310
U.S. Imports of FIN	*ln(USimpFIN)*	20.8618740	0.1370590
FDI from the U.S. to trading partner (AGR)	$\ln(FDI^{AGR}_{ij(t-1)}))$	6.6457328	0.2635683
FDI from the U.S. to trading partner (MID)	$\ln(FDI^{MID}_{ij(t-1)}))$	7.9094740	0.1501333
FDI from the U.S. to trading partner (FIN)	$\ln(FDI^{FIN}_{ij(t-1)}))$	8.9359772	0.2954108
FDI from trading partner to the U.S.(AGR)	$\ln(FDI^{AGR}_{ji(t-1)}))$	1.8479296	2.3903131
FDI from trading partner to the U.S. (MID)	$\ln(FDI^{MID}_{ji(t-1)}))$	6.0775754	1.0841003
FDI from trading partner to the U.S. (FIN)	$\ln(FDI^{FIN}_{ji(t-1)}))$	5.5838657	1.2972215
Change in Polity score	$(\Delta\ln(Pscore_{jt}))$	-0.0328696	0.0434853
2009 year	y2009	0.0909091	0.3015113

Table A.8 Japan

Variable	Label	Mean	Std Dev
U.S. trading partner GDP	$(\ln(GDP_{jt}))$	8.4511319	0.1011417
U.S. GDP	$(\ln(GDP_{it}))$	9.2845563	0.0723207
Exchange rate	$(\ln(ER_{jit}))$	4.6423056	0.0815531
Distance	$(\ln(Dist_{ij}))$	9.2385575	0
Language	$Lang_{ij}$	0	0
U.S. Exports of AGR	*ln(USexpAGR)*	23.0920876	0.1230053
U.S. Exports of MID	*ln(USexpMID)*	23.4827796	0.1928626
U.S. Exports of FIN	*ln(USexpFIN)*	24.1735035	0.0954415
U.S. Imports of AGR	*ln(USimpAGR)*	16.1771373	0.0874133
U.S. Imports of MID	*ln(USimpMID)*	19.6666054	0.0997654
U.S. Imports of FIN	*ln(USimpFIN)*	21.5717117	0.1928028
FDI from the U.S. to trading partner (AGR)	$\ln(FDI^{AGR}_{ij(t-1)})$	5.4669426	0.2334387
FDI from the U.S. to trading partner (MID)	$\ln(FDI^{MID}_{ij(t-1)})$	8.2168782	0.1596736
FDI from the U.S. to trading partner (FIN)	$\ln(FDI^{FIN}_{ij(t-1)})$	9.3201765	0.2681157
FDI from trading partner to the U.S.(AGR)	$\ln(FDI^{AGR}_{ji(t-1)})$	7.2394618	0.1451155
FDI from trading partner to the U.S. (MID)	$\ln(FDI^{MID}_{ji(t-1)})$	9.1419136	0.4154455
FDI from trading partner to the U.S. (FIN)	$\ln(FDI^{FIN}_{ji(t-1)})$	10.7748843	0.1563405
Change in Polity score	$(\Delta\ln(Pscore_{jt}))$	0.0112895	0.0688027
2009 year	y2009	0.0909091	0.3015113

Table A.9 South Korea

Variable	Label	Mean	Std Dev
U.S. trading partner GDP	$(\ln(GDP_{jt}))$	6.4517438	0.2194903
U.S. GDP	$(\ln(GDP_{it}))$	9.2845563	0.0723207
Exchange rate	$(\ln(ER_{jit}))$	4.6032192	0.1120511
Distance	$(\ln(Dist_{ij}))$	9.2763959	0
Language	$Lang_{ij}$	0	0
U.S. Exports of AGR	*ln(USexpAGR)*	21.5262832	0.2697753
U.S. Exports of MID	*ln(USexpMID)*	22.6675217	0.2130715
U.S. Exports of FIN	*ln(USexpFIN)*	23.4049005	0.1516986
U.S. Imports of AGR	*ln(USimpAGR)*	19.2181023	0.0959575
U.S. Imports of MID	*ln(USimpMID)*	22.4930539	0.1718103
U.S. Imports of FIN	*ln(USimpFIN)*	24.0288204	0.2283520
FDI from the U.S. to trading partner (AGR)	$\ln(FDI^{AGR}_{ij(t-1)}))$	6.2052384	0.3026672
FDI from the U.S. to trading partner (MID)	$\ln(FDI^{MID}_{ij(t-1)}))$	6.8933170	0.1538125
FDI from the U.S. to trading partner (FIN)	$\ln(FDI^{FIN}_{ij(t-1)}))$	8.3126937	0.2336985
FDI from trading partner to the U.S.(AGR)	$\ln(FDI^{AGR}_{ji(t-1)}))$	1.0202994	1.8673521
FDI from trading partner to the U.S. (MID)	$\ln(FDI^{MID}_{ji(t-1)}))$	5.2893388	1.5645915
FDI from trading partner to the U.S. (FIN)	$\ln(FDI^{FIN}_{ji(t-1)}))$	4.5740372	1.9357030
Change in Polity score	$(\Delta\ln(Pscore_{jt}))$	0.0281135	0.0835964
2009 year	y2009	0.0909091	0.3015113

Table A.10 Mexico

Variable	Label	Mean	Std Dev
U.S. trading partner GDP	$(\ln(GDP_{jt}))$	6.3962598	0.0803560
U.S. GDP	$(\ln(GDP_{it}))$	9.2845563	0.0723207
Exchange rate	$(\ln(ER_{jit}))$	4.7213279	0.1078818
Distance	$(\ln(Dist_{ij}))$	7.8113275	0
Language	$Lang_{ij}$	0	0
U.S. Exports of AGR	*ln(USexpAGR)*	22.4190270	0.1386186
U.S. Exports of MID	*ln(USexpMID)*	24.0629786	0.1146249
U.S. Exports of FIN	*ln(USexpFIN)*	24.6458449	0.1636559
U.S. Imports of AGR	*ln(USimpAGR)*	20.9710414	0.1454192
U.S. Imports of MID	*ln(USimpMID)*	22.4093713	0.2220250
U.S. Imports of FIN	*ln(USimpFIN)*	23.5572974	0.0920441
FDI from the U.S. to trading partner (AGR)	$\ln(FDI^{AGR}_{ij(t-1)}))$	7.3855196	0.1556410
FDI from the U.S. to trading partner (MID)	$\ln(FDI^{MID}_{ij(t-1)}))$	8.4251276	0.2174187
FDI from the U.S. to trading partner (FIN)	$\ln(FDI^{FIN}_{ij(t-1)}))$	8.5722425	1.0290702
FDI from trading partner to the U.S.(AGR)	$\ln(FDI^{AGR}_{ji(t-1)}))$	2.8036971	3.6197434
FDI from trading partner to the U.S. (MID)	$\ln(FDI^{MID}_{ji(t-1)}))$	4.5612740	2.6031483
FDI from trading partner to the U.S. (FIN)	$\ln(FDI^{FIN}_{ji(t-1)}))$	1.8504981	3.0083275
Change in Polity score	$(\Delta\ln(Pscore_{jt}))$	-0.0096642	0.0605922
2009 year	y2009	0.0909091	0.3015113

Table A.11 Netherlands

Variable	Label	Mean	Std Dev
U.S. trading partner GDP	$(\ln(GDP_{jt}))$	6.2428563	0.2282863
U.S. GDP	$(\ln(GDP_{it}))$	9.2845563	0.0723207
Exchange rate	$(\ln(ER_{jit}))$	4.3763035	0.1737869
Distance	$(\ln(Dist_{ij}))$	8.8931353	0
Language	$Lang_{ij}$	0	0
U.S. Exports of AGR	*ln(USexpAGR)*	20.6285959	0.1316086
U.S. Exports of MID	*ln(USexpMID)*	22.8502642	0.4035812
U.S. Exports of FIN	*ln(USexpFIN)*	23.2576190	0.1055835
U.S. Imports of AGR	*ln(USimpAGR)*	19.4060037	0.1860495
U.S. Imports of MID	*ln(USimpMID)*	20.5691846	0.5087549
U.S. Imports of FIN	*ln(USimpFIN)*	20.3807261	0.0905046
FDI from the U.S. to trading partner (AGR)	$\ln(FDI_{ij(t-1)}^{AGR}))$	6.1481891	3.3336655
FDI from the U.S. to trading partner (MID)	$\ln(FDI_{ij(t-1)}^{MID}))$	9.3816449	0.3395022
FDI from the U.S. to trading partner (FIN)	$\ln(FDI_{ij(t-1)}^{FIN}))$	8.5607951	0.3683282
FDI from trading partner to the U.S.(AGR)	$\ln(FDI_{ji(t-1)}^{AGR}))$	3.0282401	3.9343372
FDI from trading partner to the U.S. (MID)	$\ln(FDI_{ji(t-1)}^{MID}))$	9.3234036	0.7066887
FDI from trading partner to the U.S. (FIN)	$\ln(FDI_{ji(t-1)}^{FIN}))$	9.9587376	0.5323423
Change in Polity score	$(\Delta\ln(Pscore_{jt}))$	-0.0191013	0.0322339
2009 year	y2009	0.0909091	0.3015113

Table A.12 Russia

Variable	Label	Mean	Std Dev
U.S. trading partner GDP	$(\ln(GDP_{jt}))$	5.7885716	0.2293723
U.S. GDP	$(\ln(GDP_{it}))$	9.2845563	0.0723207
Exchange rate	$(\ln(ER_{jit}))$	4.6048234	0.0889474
Distance	$(\ln(Dist_{ij}))$	9.0955265	0
Language	$Lang_{ij}$	0	0
U.S. Exports of AGR	*ln(USexpAGR)*	20.0344222	0.3469930
U.S. Exports of MID	*ln(USexpMID)*	19.5496911	0.2238032
U.S. Exports of FIN	*ln(USexpFIN)*	20.8720038	0.2688697
U.S. Imports of AGR	*ln(USimpAGR)*	18.1498489	0.1605803
U.S. Imports of MID	*ln(USimpMID)*	21.4445133	0.3734775
U.S. Imports of FIN	*ln(USimpFIN)*	18.4222761	0.3502080
FDI from the U.S. to trading partner (AGR)	$\ln(FDI^{AGR}_{ij(t-1)}))$	3.6385467	2.5175435
FDI from the U.S. to trading partner (MID)	$\ln(FDI^{MID}_{ij(t-1)}))$	7.1134613	1.1977965
FDI from the U.S. to trading partner (FIN)	$\ln(FDI^{FIN}_{ij(t-1)}))$	3.0283326	1.8877408
FDI from trading partner to the U.S.(AGR)	$\ln(FDI^{AGR}_{ji(t-1)}))$	0	0
FDI from trading partner to the U.S. (MID)	$\ln(FDI^{MID}_{ji(t-1)}))$	2.8524535	3.0783774
FDI from trading partner to the U.S. (FIN)	$\ln(FDI^{FIN}_{ji(t-1)}))$	0	0
Change in Polity score	$(\Delta\ln(Pscore_{jt}))$	0.0019037	0.0701060
2009 year	y2009	0.0909091	0.3015113

Table A.13 Singapore

Variable	Label	Mean	Std Dev
U.S. trading partner GDP	$(\ln(GDP_{jt}))$	4.7741929	0.2636883
U.S. GDP	$(\ln(GDP_{it}))$	9.2845563	0.0723207
Exchange rate	$(\ln(ER_{jit}))$	4.5534934	0.0825999
Distance	$(\ln(Dist_{ij}))$	9.6239469	0
Language	$Lang_{ij}$	1.0000000	0
U.S. Exports of AGR	*ln(USexpAGR)*	19.5085645	0.1464851
U.S. Exports of MID	*ln(USexpMID)*	22.0537108	0.3360280
U.S. Exports of FIN	*ln(USexpFIN)*	23.4188581	0.1119978
U.S. Imports of AGR	*ln(USimpAGR)*	17.3475914	0.1693068
U.S. Imports of MID	*ln(USimpMID)*	20.4561476	0.4431004
U.S. Imports of FIN	*ln(USimpFIN)*	22.0151819	0.3712860
FDI from the U.S. to trading partner (AGR)	$\ln(FDI^{AGR}_{ij(t-1)}))$	1.0264056	1.1987459
FDI from the U.S. to trading partner (MID)	$\ln(FDI^{MID}_{ij(t-1)}))$	7.0781629	0.3527482
FDI from the U.S. to trading partner (FIN)	$\ln(FDI^{FIN}_{ij(t-1)}))$	9.2835977	0.2388513
FDI from trading partner to the U.S.(AGR)	$\ln(FDI^{AGR}_{ji(t-1)}))$	0	0
FDI from trading partner to the U.S. (MID)	$\ln(FDI^{MID}_{ji(t-1)}))$	0.7921667	2.0936518
FDI from trading partner to the U.S. (FIN)	$\ln(FDI^{FIN}_{ji(t-1)}))$	3.7599786	2.8834422
Change in Polity score	$(\Delta\ln(Pscore_{jt}))$	-0.000029417	0.0501589
2009 year	y2009	0.0909091	0.3015113

Table A.14 Taiwan

Variable	Label	Mean	Std Dev
U.S. trading partner GDP	$(\ln(GDP_{jt}))$	5.8657348	0.1421336
U.S. GDP	$(\ln(GDP_{it}))$	9.2845563	0.0723207
Exchange rate	$(\ln(ER_{jit}))$	4.6566718	0.0332899
Distance	$(\ln(Dist_{ij}))$	9.4055683	0
Language	$Lang_{ij}$	0	0
U.S. Exports of AGR	*ln(USexpAGR)*	21.2232180	0.2146063
U.S. Exports of MID	*ln(USexpMID)*	22.4464005	0.2665721
U.S. Exports of FIN	*ln(USexpFIN)*	23.3483320	0.1535621
U.S. Imports of AGR	*ln(USimpAGR)*	18.2191412	0.2014429
U.S. Imports of MID	*ln(USimpMID)*	21.2879757	0.1251469
U.S. Imports of FIN	*ln(USimpFIN)*	22.7583464	0.1936608
FDI from the U.S. to trading partner (AGR)	$\ln(FDI^{AGR}_{ij(t-1)}))$	4.3580471	0.2961173
FDI from the U.S. to trading partner (MID)	$\ln(FDI^{MID}_{ij(t-1)}))$	6.9867397	0.2718937
FDI from the U.S. to trading partner (FIN)	$\ln(FDI^{FIN}_{ij(t-1)}))$	7.7219652	0.4209093
FDI from trading partner to the U.S.(AGR)	$\ln(FDI^{AGR}_{ji(t-1)}))$	0	0
FDI from trading partner to the U.S. (MID)	$\ln(FDI^{MID}_{ji(t-1)}))$	5.9272070	2.3630709
FDI from trading partner to the U.S. (FIN)	$\ln(FDI^{FIN}_{ji(t-1)}))$	4.2545196	0.7885315
Change in Polity score	$(\Delta\ln(Pscore_{jt}))$	0.0049557	0.0505657
2009 year	y2009	0.0909091	0.3015113

Table A.15 United Kingdom

Variable	Label	Mean	Std Dev
U.S. trading partner GDP	$(\ln(GDP_{jt}))$	7.4925512	0.1703257
U.S. GDP	$(\ln(GDP_{it}))$	9.2845563	0.0723207
Exchange rate	$(\ln(ER_{jit}))$	4.7102657	0.1081294
Distance	$(\ln(Dist_{ij}))$	8.8361550	0
Language	$Lang_{ij}$	1.0000000	0
U.S. Exports of AGR	*ln(USexpAGR)*	20.7759799	0.0905349
U.S. Exports of MID	*ln(USexpMID)*	22.9268933	0.1942662
U.S. Exports of FIN	*ln(USexpFIN)*	23.8678161	0.1517545
U.S. Imports of AGR	*ln(USimpAGR)*	18.2783583	0.0778465
U.S. Imports of MID	*ln(USimpMID)*	20.7940107	0.1510503
U.S. Imports of FIN	*ln(USimpFIN)*	20.9400158	0.1486837
FDI from the U.S. to trading partner (AGR)	$\ln(FDI^{AGR}_{ij(t-1)})$	8.3726195	0.2804290
FDI from the U.S. to trading partner (MID)	$\ln(FDI^{MID}_{ij(t-1)})$	9.9410649	0.2969703
FDI from the U.S. to trading partner (FIN)	$\ln(FDI^{FIN}_{ij(t-1)})$	10.1555671	0.1688012
FDI from trading partner to the U.S.(AGR)	$\ln(FDI^{AGR}_{ji(t-1)})$	5.6597092	3.9180940
FDI from trading partner to the U.S. (MID)	$\ln(FDI^{MID}_{ji(t-1)})$	10.0236554	0.4366810
FDI from trading partner to the U.S. (FIN)	$\ln(FDI^{FIN}_{ji(t-1)})$	10.4927585	0.2838357
Change in Polity score	$(\Delta\ln(Pscore_{jt}))$	-0.0305859	0.0564701
2009 year	y2009	0.0909091	0.3015113

Table A.16 Venezuela

Variable	Label	Mean	Std Dev
U.S. trading partner GDP	$(\ln(GDP_{jt}))$	4.1296126	0.4345142
U.S. GDP	$(\ln(GDP_{it}))$	9.2845563	0.0723207
Exchange rate	$(\ln(ER_{jit}))$	5.3403100	0.5189861
Distance	$(\ln(Dist_{ij}))$	8.3439104	0
Language	$Lang_{ij}$	0	0
U.S. Exports of AGR	*ln(USexpAGR)*	19.0843109	0.5540984
U.S. Exports of MID	*ln(USexpMID)*	20.4161913	0.4837905
U.S. Exports of FIN	*ln(USexpFIN)*	21.2206058	0.5907303
U.S. Imports of AGR	*ln(USimpAGR)*	19.2236543	0.3790005
U.S. Imports of MID	*ln(USimpMID)*	24.3532179	0.8533945
U.S. Imports of FIN	*ln(USimpFIN)*	19.5248447	0.5847433
FDI from the U.S. to trading partner (AGR)	$\ln(FDI^{AGR}_{ij(t-1)}))$	4.8602690	1.1735329
FDI from the U.S. to trading partner (MID)	$\ln(FDI^{MID}_{ij(t-1)}))$	7.0861685	0.8912426
FDI from the U.S. to trading partner (FIN)	$\ln(FDI^{FIN}_{ij(t-1)}))$	6.2491004	1.3350910
FDI from trading partner to the U.S.(AGR)	$\ln(FDI^{AGR}_{ji(t-1)}))$	0	0
FDI from trading partner to the U.S. (MID)	$\ln(FDI^{MID}_{ji(t-1)}))$	0	0
FDI from trading partner to the U.S. (FIN)	$\ln(FDI^{FIN}_{ji(t-1)}))$	1.6785032	2.0378050
Change in Polity score	$(\Delta\ln(Pscore_{jt}))$	-0.0803733	0.0887275
2009 year	y2009	0.0909091	0.3015113

APPENDIX B. ESTIMATION RESULTS

Table B1. U.S. Exports of AGR to Its 16 Trading Partners, Million of U.S. Dollars

Country	Predicted Mean	Real Mean	Difference between Predicted and Real	Predicted Rank	RealRank
Brazil	20.36924	18.81705	1.552195	9	16
Canada	22.20629	23.03664	-0.83035	1	2
China	20.74851	20.58885	0.159663	7	9
France	21.04549	19.83638	1.209104	6	12
Germany	21.34844	20.62435	0.724091	4	7
India	20.04937	18.99183	1.057547	11	15
Italy	20.67759	19.88324	0.794358	8	11
Japan	21.84371	23.08053	-1.23682	3	1
Korea	20.04729	21.50414	-1.45685	12	4
Mexico	21.86884	22.41097	-0.54213	2	3
Netherlands	20.16089	20.62325	-0.46236	10	8
Russia	20.02991	20.06064	-0.03073	13	10
Singapore	18.88904	19.48683	-0.59779	16	13
Taiwan	19.64817	21.1925	-1.54434	15	5
UK	21.11251	20.78276	0.329745	5	6
Venezuela	19.85748	19.11822	0.739255	14	14

Source: Calculations done by author

Table B2. U.S. Exports of MID to Its 16 Trading Partners, Million of U.S. Dollars

Country	Predicted Mean	Real Mean	Difference between Predicted and Real	Predicted Rank	RealRank
Canada	24.42167	24.6998	-0.27813	1	1
China	22.46364	23.1579	-0.69427	9	4
France	23.06613	22.36041	0.705717	5	10
Germany	23.10927	22.73788	0.371384	4	7
India	21.97549	21.52556	0.449928	11	14
Italy	22.65788	22.10981	0.548065	7	11
Japan	22.9686	23.47479	-0.50619	6	3
Korea	21.89673	22.65142	-0.75469	12	8
Mexico	23.16056	24.06987	-0.90931	3	2
Netherlands	22.54511	22.80486	-0.25975	8	6
Russia	21.69407	19.55333	2.14074	13	16
Singapore	21.25754	22.00742	-0.74988	15	13
Taiwan	21.43359	22.43254	-0.99895	14	9
UK	23.45865	22.91576	0.542895	2	5
Venezuela	20.88465	20.46853	0.416113	16	15

Source: Calculations done by author

Table B3. U.S. Exports of FIN to Its 16 Trading Partners, Million of U.S. Dollars

Country	Predicted Mean	Real Mean	Difference between Predicted and Real	Predicted Rank	RealRank
Brazil	22.94936	22.76432	0.185038	12	12
Canada	25.25764	25.4391	-0.18146	1	1
China	23.16875	23.42745	-0.2587	9	8
France	23.90943	23.34285	0.566583	4	10
Germany	24.04444	23.8417	0.202746	2	5
India	22.27354	21.82975	0.443788	14	14
Italy	23.63436	22.44662	1.187737	6	13
Japan	23.5091	24.19229	-0.68319	8	3
Korea	23.02796	23.42925	-0.40129	11	7
Mexico	23.89737	24.67237	-0.77501	5	2
Netherlands	23.51659	23.2644	0.25219	7	11
Russia	21.11303	20.90474	0.208287	16	16
Singapore	23.06407	23.42945	-0.36538	10	6
Taiwan	22.50773	23.37314	-0.86542	13	9
UK	24.00683	23.8914	0.115428	3	4
Venezuela	21.78965	21.28725	0.502398	15	15

Source: Calculations done by author

Table B4. U.S. Imports of AGR to Its 16 Trading Partners, Million of U.S. Dollars

Country	Predicted Mean	Real Mean	Difference between Predicted and Real	Predicted Rank	RealRank
Brazil	17.94865	19.51235	-1.5637	11	3
Canada	20.91222	21.12022	-0.208	1	1
China	17.44506	18.62367	-1.17861	15	10
France	18.38144	18.82386	-0.44242	6	9
Germany	18.32047	17.41672	0.903757	7	14
India	17.65381	18.86313	-1.20932	14	8
Italy	18.20578	18.89065	-0.68487	8	7
Japan	17.33358	16.16758	1.166001	16	16
Korea	17.7859	19.21941	-1.43351	12	6
Mexico	20.37329	20.93518	-0.56189	2	2
Netherlands	18.80894	19.38052	-0.57158	4	4
Russia	18.50427	18.15783	0.346436	5	13
Singapore	18.12772	17.34065	0.787071	9	15
Taiwan	17.75213	18.23236	-0.48024	13	12
UK	17.95137	18.26058	-0.3092	10	11
Venezuela	19.21176	19.27536	-0.0636	3	5

Source: Calculations done by author

Table B5. U.S. Imports of MID to Its 16 Trading Partners, Million of U.S. Dollars

Country	Predicted Mean	Real Mean	Difference between Predicted and Real	Predicted Rank	RealRank
Brazil	21.39608	21.16315	0.232939	4	7
Canada	22.56028	23.28514	-0.72486	3	2
China	20.23566	21.015	-0.77934	15	8
France	20.57074	20.19627	0.374471	11	14
Germany	20.41296	20.45931	-0.04635	14	12
India	20.51219	21.00715	-0.49496	13	9
Italy	20.52212	20.19379	0.328334	12	15
Japan	20.05213	19.69149	0.360638	16	16
Korea	20.80419	22.51965	-1.71546	10	3
Mexico	22.82453	22.39637	0.428161	2	4
Netherlands	21.07319	20.52182	0.551374	6	11
Russia	21.29832	21.42018	-0.12186	5	5
Singapore	20.93109	20.37824	0.552849	7	13
Taiwan	20.91956	21.31622	-0.39666	8	6
UK	20.89575	20.76727	0.128484	9	10
Venezuela	23.65983	24.31534	-0.65551	1	1

Source: Calculations done by author

Table B6. U.S. Imports of FIN to Its 16 Trading Partners, Million of U.S. dollars

Country	Predicted Mean	Real Mean	Difference between Predicted and Real	Predicted Rank	RealRank
Brazil	22.94936	20.991	1.958352	12	9
Canada	25.25764	23.20586	2.051779	1	3
China	23.16875	22.84029	0.328467	9	4
France	23.90943	20.76209	3.147343	4	12
Germany	24.04444	21.47402	2.570422	2	8
India	22.27354	20.69574	1.577797	14	13
Italy	23.63436	20.89202	2.742336	6	11
Japan	23.5091	21.62505	1.884056	8	7
Korea	23.02796	24.06881	-1.04084	11	1
Mexico	23.89737	23.55713	0.340234	5	2
Netherlands	23.51659	20.37688	3.139715	7	14
Russia	21.11303	18.44823	2.664799	**16**	**16**
Singapore	23.06407	22.05887	1.005202	10	6
Taiwan	22.50773	22.79349	-0.28576	13	5
UK	24.00683	20.95884	3.047988	3	10
Venezuela	21.78965	19.64383	2.145821	15	15

Source: Calculations done by author