

THE RELATIONSHIP BETWEEN FOREIGN
DIRECT INVESTMENT AND TRADE FLOWS IN
A TRANSITION ECONOMY: THE CASE OF
UKRAINE

by

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Abstract

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This paper examines relationships between foreign direct investment (FDI) flows into Ukraine, and imports and exports to and from the country. Theoretically, FDI and international trade can be substitutes or complements. Empirically, the paper shows that FDI from the European Union (EU) into primary industries is mostly export-oriented and thus complements trade, whereas that into secondary, manufacturing industries tends to substitute for trade. The paper argues that primary-industry FDI from the EU is motivated by Ukraine's comparatively abundant and cheap natural resources, whereas secondary-industry FDI is motivated on the cost side by Ukraine's low wage labor and on the revenue side by its large and relatively untapped domestic market. Secondary-industry FDI thus has the potential for import-substitution, although tests of this hypothesis at aggregate levels were inconclusive.

By contrast, FDI from countries of the former Council for Mutual Economic Assistance (CMEA) complements trade in secondary products. The paper argues that FDI from the CMEA is motivated by the potential for economies of scale, including those that might arise from resuming production links obtained during the Soviet times. This inference is supported by evidence of relationships between FDI from the CMEA and intra-industry trade between the CMEA and Ukraine.

TABLE OF CONTENTS

INTRODUCTION	1
Motivation.....	1
Thesis Questions.....	3
Structure of Thesis.....	4
Literature Review.....	5
CHAPTER 1. THEORETICAL BASE	10
Theoretical background for substitutability between FDI and trade flows	10
Possible explanations of complementarity relationship.....	16
Existence of factors of common influence.....	23
Asymmetry of the relationship	24
CHAPTER 2. COUNTRY DESCRIPTION	25
Initial Conditions.....	25
Specificities of Transition.....	27
Peculiarities of FDI flows in Ukraine: Initial Evidence.....	28
Motives and impediments of foreign investors.....	32
Main Hypotheses.....	35
CHAPTER 3. EMPIRICAL STUDY	38
Methodology.....	38
The Data.....	41
Model 1: Export Supply Function.....	42
Model 2: Import Demand Function	45
CHAPTER 4. IMPACT OF FDI ON TRADE DIVERSIFICATION	50
Intra-Industry Trade: Paradigm.....	50
Model 3: Intra -Industry Trade Estimation.....	53
Discussion of results for intra-industry estimations.....	54
CLOSING REMARKS	56
General Conclusions of Research.....	56
Political implications.....	57
Credibility of conclusions.....	57
WORKS CITED	58
APPENDIX A: DATA DESCRIPTION	61
APPENDIX B: EXPORT SUPPLY FUNCTION ESTIMATIONS	63
APPENDIX C: IMPORT DEMAND FUNCTION ESTIMATIONS ..	67
APPENDIX D: ESTIMATIONS FOR THE LEVEL OF INTRA_ INDUSTRY TRADE	69

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Introduction

Motivation

Foreign direct investment (FDI) is an important factor for most economies. It is practically important for transition countries that suffer from lack of domestic savings to finance their economic upgrading. FDI facilitates economic integration and growth through transfer of technologies and technological spillovers (Ponomareva, 2000). It also fosters the process of transition, mainly through the learning effect which is important not only due to the learning about new technologies and production processes but also, and what is even more important for transition countries like Ukraine, due to the learning about new organizational methods of managing economic activity (Goloven, 2000).

FDI could be an important source for Ukrainian economy and one of the major driving forces of transition (Burakovskyy, 1998). However, its potential remains as yet unrealized. Despite natural comparative advantages, Ukraine has one of the lowest level of FDI inflows among countries of the former Council for Mutual Economic Assistance (CMEA), so-called Former Soviet Bloc that was composed of the Former Soviet Union (FSU) republics and the socialist countries of Central and Eastern Europe (CEE). A non-favorable investment climate, unstable political environment, and slow privatization process can explain the low FDI volumes in Ukraine, at least partially. So far, investors have generally bypassed Ukraine (Dean and Manea, 1998).

Analysis of investment climate is extremely important for Ukraine today. According to research of the Flemings/CAPS Consortium (2000), which was conducted on the basis of a survey of foreign investors in Ukraine, the dominant factor of current FDI inflows into Ukrainian economy is the possibility of new markets expansion. The Flemings/CAPS study concludes that the low wages and

other Ukrainian comparative advantages, which could lead to investments in more efficient production and stimulate foreign trade, seem to be not important factors today. In fact, foreign trade is still badly regulated in Ukraine and the custom regulations are non-transparent and unclear. On the one hand, this may serve as a sizable impediment for export-oriented FDI, and on the other hand, it could be a stimulating factor for FDI inflows in order to substitute a commodity import into Ukrainian market for its local production.

Even so, survey results are always suspect and require formal testing. In this paper, we propose one more convenient way to analyze incentives and impediments of foreign investors at the macro level, which is an analysis of relationship between FDI and trade flows for a particular country.

A large body of modern economic theory provides sufficient basis for analyzing complementarity as well as substitutability between FDI and trade flows. Empirical research has found both patterns of relationship in the economic history of different countries. The empirical evidence for transition economies, such as Poland, Hungary, Slovenia and the Check Republic, exhibits strong complementarity relationship between FDI and trade (Guerrieri, 1998; Kaminski, 1998).

Aggregate Ukrainian data provide some support for the complementarity thesis, showing that through the years of transition, with decreasing level of gross domestic output, the level of foreign trade as well as the share of export in Ukrainian GDP has increased substantially. Can this rise in export be explained by FDI inflows?

Moreover, analysis of FDI and foreign trade for Ukraine provides sufficient ground to suspect that the FDI into Ukrainian economy made by investors from

different groups of countries (such as G7, the EU, and the countries of the Former Soviet Union) have different impact on Ukrainian trade flows. The difference in relationship between FDI and trade for different groups of countries suggests the possibility of different incentives for FDI for investors from different groups of countries.

Thesis Questions

The paper aims to answer the question whether FDI into Ukraine is a complement or a substitute to trade flows. The answer to this general question would help us to reveal the major motives for investing in Ukrainian economy, which in turn might allow Ukrainian policy makers to take appropriate measures for stimulating further capital inflows. We expect that aggregate data for Ukraine does not show the real linkage between FDI and trade flows. Therefore, hunting for a true answer we formulate more disaggregated questions. They are following:

- (1)** Does FDI into production of primary products have a different relationship to the country's trade than FDI inflows into production of secondary products? We raise this question on the basis of theory of international trade which treats FDI and trade flows in primary products as potential complements (Schmitz and Helmberger, 1970) while FDI and trade in secondary products as potential substitutes (Mundell, 1957).
- (2)** Does the relationship between FDI and trade with EU behave differently from that with the countries of the former CMEA? There are could be different motives as well as impediments for investors from different groups of countries. The relationship between FDI and trade depends on the stage of similarities between investing and recipient countries (Somwaru, Bolling, 1999) Obviously, cheap labor or undeveloped internal market in Ukraine may attract investors from developed countries but cannot attract those from the former CMEA since investors from the transition countries have the same

conditions in their own countries. At the same time they have advantages over western investors due to their strong historical links and may intend to renew former production links. This suggestion leads us to investigate the following question as well.

- (3) Does FDI have an impact on the level of intra-industry trade in Ukraine?** If FDI into Ukraine were oriented on establishment of vertical production links, it would raise the level of intra-industry trade (Hoekman, Djankov, 1996) and support complementarity relationship between FDI and trade flows.

Finding the answers to the stated questions would allow policy-makers to diversify and fine-tune their policy concerning FDI attraction to different industries from different countries of the world. The possible policy implications of obtained results might also add some grounds for analyzing country's competitiveness, long-term growth potentials and development of other macroeconomic variables.

We also offer theoretical justifications that can explain the revealed relationship and finally we will make an attempt to propose several practical suggestions concerning external sector policy in Ukraine.

Structure of Thesis

The present study is split into four chapters. The first chapter presents the theory of different relationships between FDI and trade flows. The second chapter describes the Ukrainian economy; main emphasis here is on relevant specifics of the transition process and on some initial evidence of particular behavior of Ukrainian foreign sector after liberalization. On the basis of theory and the initial evidence, the main hypotheses are formulated. Further research of the problem is proposed

in the third chapter which describes our empirical testing procedure and results. To support our inferences about the relationship between FDI and trade flows, in chapter four we offer investigation of possible impact of FDI inflows on the level of trade diversity in Ukraine.

Literature Review

There are many scientific researches about the relationship between FDI and different macroeconomic parameters of a specific country's economy. There is a view that the greater is the ratio of FDI to country's GDP, the larger is total private domestic investment (Brenton, 1999); in other words FDI stimulates domestic investment activity. However, through the years of transition FDI into Ukraine was slightly increasing, but domestic investments decreased sharply. It is a particular feature of FDI in transition and the explanation of such a fact can be found beyond the problems of advanced economies. Therefore, to analyze the foreign sector performance of Ukraine we should refer not only to the international economics literature, but to the theory of transition as well.

The analysis of foreign sector activities has been an important issue throughout the 20th century. Many studies of factor mobility refer to 1950-60s when the cross-border capital movements were largely regulated by government. Stimulated by massive capital flows observed in 1990s, the examination of the linkages between international capital movements and international trade remains a topic issue of international economics. Saggi (2000) gives a very detailed survey of the literature on trade and foreign direct investment.

The relationship between FDI and trade was raised in the classical theory of international trade by Robert Mundell (1957). Within the framework of the Heckscher-Ohlin theory of trade, Mundell demonstrated that international trade in products and international capital movements are substitutes. His conclusion

was that trade impediments stimulate factor movements and, correspondingly, that increased impediments to factor movements stimulate trade.

Deep theoretical background to the topic is found in Goldberg and Klein (1999). They also use the Heckscher-Ohlin-Samuelson model to explain the substitutability of international trade and factor mobility. The generally accepted suggestion is that FDI is encouraged by forces of trade restrictions (Brainard, 1997) and thus it is a substitute for trade.

Schmitz and Helmberger (1970) argued that a shortcoming of Mundell's analysis was that "it referred explicitly to trade in secondary manufacturing... while the large part of international trade and direct foreign investment associated with it are in primary commodities and primary manufacturing" (Schmitz and Helmberger, 1970, p. 762). They were among the first who demonstrated through theoretical modeling that international capital movements and trade in primary products are complements rather than substitutes.

The theoretical analysis of FDI draws out the advantageous conditions that can outweigh the inherent disadvantages of foreign production. These disadvantages are the additional costs of being present in the country. They include communication costs, the reallocation of the personal abroad, the resources used in overcoming language barriers and the costs of "being outside the business and government framework" (Markusen, 1995, p. 173). The advantageous conditions (incentives for investors) are often described by the OLI framework that was proposed first by Dunning (1977). The OLI Framework identifies three broad conditions that are necessary before a firm will engage in direct investment: *Ownership, Location and Internalization*.

There are other reasons for investors to deal with developing countries or with the countries in transition. Much of FDI in the last decades appears to have been

motivated by so-called “tariff jumping” (WB, Global Development Finance, 1997, p. 27). Thus, FDI are generally not caused by the difference in the general return to capital. The multinational enterprises are formed to take advantage of specific business opportunities rather than the secondary benefits of general levels of interest rates and returns to capital.

Interesting empirical research in this area for advanced countries such as France, Sweden and the USA was made by Fontagné and Pajot (1997). On the basis of bilateral and sectoral empirical analysis they revealed the complementarity between trade and inward FDI flows. In case of France and the USA, outward FDI is found to be a complement for export but substitute for import. They also emphasize the positive impact of FDI on competitiveness at the recipient country market. The effect of FDI on the Japanese balance of payments is analyzed in the paper of Inaba (1999) who argues that FDI “did not necessarily contribute to reducing the huge Japanese trade surplus” and suggests that the worldwide structural changes “may have had a great impact on the trade balance” (Inaba, 1999, p.4). The positive relationship between FDI and trade for the case of China has also been observed by Chunlai (1997).

Somwaru and Bolling (1999) investigate whether FDI and trade are substitutes or compliments for the case of food processing industry of the USA. They show that the relation between FDI and trade depends on the “stage of similarities of economic development of the host countries as macroeconomic factors – such as exchange rate fluctuations and income growth – act differently in developing vs. developed countries, and exporting vs. importing countries” (Somwaru and Bolling, 1999, p.8).

The analysis of trade and FDI for Central and Eastern Europe (CEE) obviously should include aspects of structural transformation and its consequences on foreign integration. Such research has been done by Guerrieri (1998). He argues

that the FDI played a significant role in shaping trade patterns of Poland, Hungary and the Check Republic, which attracted about a third of the total amount of foreign capital that has been directed former planned economies of CEE.

Bartłomiej Kaminski (1998) makes a comparison of different behavior of foreign sector in Hungary and Slovenia. He argues that different development paths and different institutions created different outcomes. Kaminski demonstrates the close links between FDI and export performance in these countries. He shows that among medium and large firms in Hungary there are no purely Hungarian-owned private companies. The share of foreign owned firms in Hungarian export increased from 37% in 1992 to almost 80% in 1997. Over the same period, the volumes of export almost doubled. Therefore, growth has come mainly from firms with foreign capital. Kaminski also makes conclusions about the crucial contribution of FDI to the level of intra-industry trade to the Hungarian and Slovak economies.

The substitutability thesis is supported by theoretical studies as well. Razin, Yuen and Sadka (1999) analyze the gains from trade in the case of asymmetric information and uncertainty. They prove that these gains could be “sizable when domestic credit market is either underdeveloped or failing as a result of financial crisis” (Razin et al, 1999, p. 1).

Specifically regarding Ukraine, a very interesting research was done by the Consortium Flemings/CAPS (2000) for the World Bank. They investigate the particular motives of investors in Ukraine arguing that the commonly accepted view about cheap labor force is the main reason for FDI is wrong.

The analysis proposed in this thesis concerns primarily a transition economy that is widely discussed in today’s literature. The emphasis should be given to

institutional approach of analyzing such the economies. An interesting and rather deep work was done by Gerald M. Meier (1995). He proposes the institutional analysis of evolution of developing economies. Extremely interesting there are his notes about the institutional environment that induces FDI. The development and growth of institutions, which include such factors like information, property rights and laws transparency, cultural base, is the precondition for the efficient functioning of a market economy. According to Douglass North (1994), institutions, the formal and informal constraints for economic agents in the economy, form the incentive structure in society. The rise in the culture of entrepreneurship in transition economy like Ukraine to a large extent depends on the foreign sector. Foreign investment as well as foreign trade have the highly valuable learning effect on Ukrainian economy which channels new organizational methods and business management which is critical for realizing the entrepreneurship potential of transitional economies. In this regard, the analysis of country's external sector is highly important for growth oriented policy measures.

Chapter 1

THEORETICAL BASE

Theoretical background for substitutability between FDI and trade flows

Macroeconomic fundamentals of substitutability relationship are grounded almost on the Heckscher-Ohlin model which represents analysis of the impact of factor endowments on trade flows between countries. The model described below is very similar to the model provided by Mundell (1957), where he theoretically proved that “under certain rigorous assumptions the substitution of commodity for factor movements will be complete” (Mundell, 1957, p. 321). It is worthwhile to restate Mundell’s model as it is closely related to the topic of this paper.

The Heckscher-Ohlin model analyses a world economy of two goods, X and Y, two countries, A and B, and two factors of production, labor (L) and capital (K), which are homothetic in both countries and easily transferable among industries within one country. Countries are assumed to have identical preferences and identical technologies with constant returns to scale. Goods are assumed to be different in terms of factor intensity. There are no transport costs and no market distortions in the world economy. The crucial assumption of the model is that relative factor endowments differ between countries; however, each country produces both goods and no pure specialization arises in free trade.

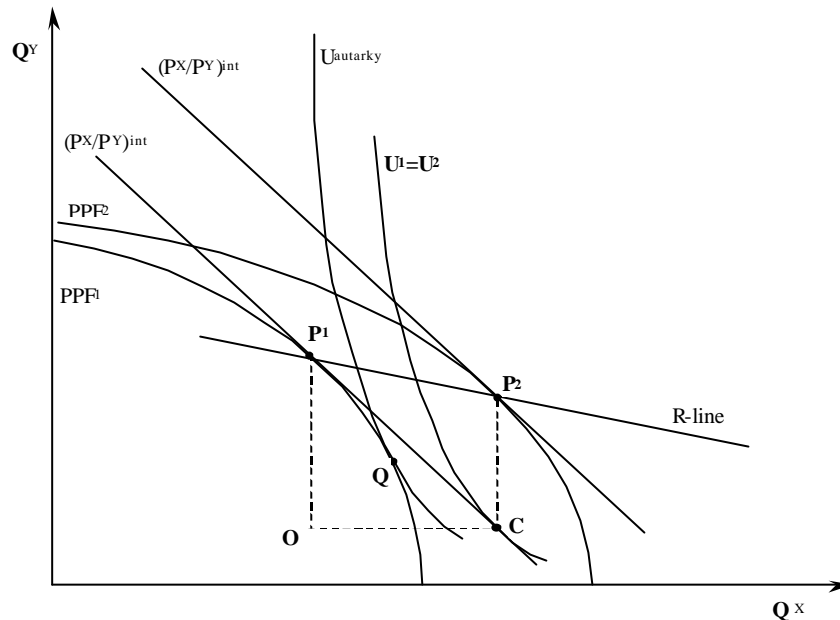
Let good Y be labor-intensive relative to good X, and let country A be labor-abundant relative to country B. Also, to make the analysis easier, we may consider country A as a small country relative to country B (the latter may be called as “rest of the world”). We are allowed to do this because the object of our

analysis is the Ukrainian economy that obviously may be considered as small in today's world economy.

Initially there is free trade in goods and no trade in factors (no capital mobility between countries). We apply here a general equilibrium analysis represented in Figure 1. Country A's production is at point P_1 where the production possibilities frontier PPF_1 is tangent to the price ratio with minus sign. Goods are traded at the internationally determined price ratio $(p_x/p_y)_{int}$. Under free trade, country A's consumption is at point C. The trade in goods allows country A to achieve higher level of welfare, U_1 , than it could achieve in autarky, $U_{autarky}$ in the graph. Country A exports good Y (in the amount OP) and imports good X (in the amount OC). According to the factor-price equalization theorem from the theory of international trade, as the free trade equilibrium is achieved, factor prices are equalized internationally implying that marginal product of capital is the same in both countries. Here, no incentive exists to trade in capital, "all gains from trade are captured through commodity trade" (Markusen et al, 1995, p. 386). Even if we allow capital mobility, no movement would take place and equilibrium would remain the same.

Suppose that country A imposes trade barriers, let it be import tariff on good X. This will increase price for good X in country A relatively to its price in B (international price): $(p_x/p_y)_A > (p_x/p_y)_{int}$. With the price of X higher, country A will shift its production and consumption along PPF_1 from point P_1 in the direction toward autarky production point Q (factors will move out of production of labor-intensive good Y into production of capital-intensive good X). As a result, marginal product of capital in A will become higher and marginal product of labor will become lower relative to rest of the world (since price for capital-intensive good will now be higher in country A relatively to the rest of the world).

Figure 1. **Capital movements may completely substitute country's trade flows.**



Now suppose that some exogenous factor eliminates all barriers to trade in factors (perfect capital mobility). High returns to capital in country A relative to the rest of the world will induce foreign investors to import capital into country A. Consequently, the factor-endowment ratio of country A will approach that of the rest of the world. This will result in reducing trade in goods as capital will become less scarce in country A and labor will become less abundant (in the Heckscher-Ohlin model differences in relative factor endowment are the main force for international trade).

As long as there is trade in goods, the differences in their relative prices will remain because of the tariff. This in turn determines differences in marginal products of factors of production in country A and rest of the world. Obviously, capital flow to country A will continue until all trade in goods is totally eliminated.

“With perfect capital mobility, the marginal products of both labor and capital must be equalized in A and B” (Mundell, 1957, p. 324). In our analysis, marginal products of both factors in country A should approach the marginal products of these factors that are determined internationally, that is they must be the same as they were before the tariff was imposed. When capital flow fully equalizes marginal products of factors, it equalizes prices of goods as well (if prices of goods continue to be different there still would be incentives for capital inflows). In case of country A, price-ratio for goods will move back to its international level.

Graphically, with more capital inflows, A’s production possibility frontier will expand until new equilibrium is reached. Since good X is capital-intensive, with continued capital inflows the maximum feasible output of good X will increase than the maximum feasible output of good Y, that is PPF-curve will shift more toward the X axis. Now we must show that the new equilibrium resulting from perfect capital mobility will be exactly the same as the equilibrium in free trade.

With the same marginal products of capital and the same prices for goods, income earned by initial domestic factors of country A and utility of all its agents must be unchanged. Thus, consumption will remain at point C – the consumption point in free trade. Production, however, will not remain the same, because country A should pay some interest to B on imported capital, the interest being equal to value of marginal product of the capital inflow.

To find the exact new point of production, let us refer to the Rybczynski theorem which states that, if price ratio holds constant, an inflow of capital leads to an increase in the output of the good which uses capital relatively intensively, and a decrease in the output of the other good. Therefore, new equilibrium production point will be at point somewhere southeast from point P_1 where there is larger output of X but smaller output of Y. The so called R-line through

point P_1 shows the locus of all efficient production points that result from changes in capital endowment with price ratio for goods holding constant.

As we have shown above, in new equilibrium country A will consume at point C without trade and at the same time make the required interest payments to B. This means that the exact production point would be point P_2 that is directly above S. At any other point along R-line to the right of P_2 , country A would have to import good X to achieve the level of consumption at C. Also, there is no need for capital inflow beyond the point P_2 , “although any point the southeast [of P_2] is would be consistent with equilibrium” (Mundell, 1957, p. 325).

Although being very abstract, the model described above leads to a very practical importance: when trade is caused by differences in factor endowments it can be substituted by a capital movement in the sense that capital movement reduces trade in goods. Indeed, if we eliminate some of the assumptions, the model would become generally invalid. The real world is characterized by market distortions, such as economies of scale, international differences in technologies, non-homogeneous factors of production (for example, skilled and unskilled labor), positive transportation costs, differences in preferences of economic agents, etc. Nevertheless, differences in factor endowments provide a significant explanation of possible relationship between the capital and good flows. If the effect of these market distortions will not overcome the effect of difference in factor endowments, the substitutability relationship between the capital flows and trade flows would dominate at aggregate level. Thus, we would expect that foreign investment might substitute the endowment-based trade for labor-intensive items, such as clothing, and/or capital-intensive items, such as machinery, that is widely conducted between developed countries and developing or transition countries. This theoretical conclusion allows us to formulate the relevant suggestion for the case of Ukraine: FDI into the Ukrainian secondary

manufacturing (such as light industry and machine-building industry) may potentially substitute trade.

Microeconomic fundamentals of substitutability relationship between FDI and trade flows support the conclusions of Mundell's model to some extent. Typically, they are based on the standard theory of multinational corporations which analyses microeconomic agent's internationalization choices (Ethier, 1986; Jensen and Thursby, 1987). The key assumption of this quite popular theory is that a firm chooses between exporting or local production as between two alternatives. However, economists do not have as fully developed a theory of multinational enterprise as they do of many other issues in international economics, it "is still in its infancy" (Krugman & Obstfeld, 1996, p. 172). This theory takes its ideas from other sources, in particular from the Heckscher-Ohlin model of international trade as well.

Theory of product cycle may serve as one additional explanation of substitutability relationship between FDI and trade (Vernon, 1996). It explains that the lifetime of a product is a sequence from domestic production to its export and then foreign production. This theory is known as the "first dynamic interpretation of the determinants of, and the relationship between, international trade and foreign production" (Chunlai, August 1997, p.3).

Most of the theories that argue for substitutability relationship between FDI and trade flows fail to explain many patterns of trade in a modern world. Economic literature also provides analysis of the divergence from the assumptions of Heckscher-Ohlin-Samuelson models that may lead to complementarity rather than substitutability between trade and capital flows.

Possible explanations of complementarity relationship

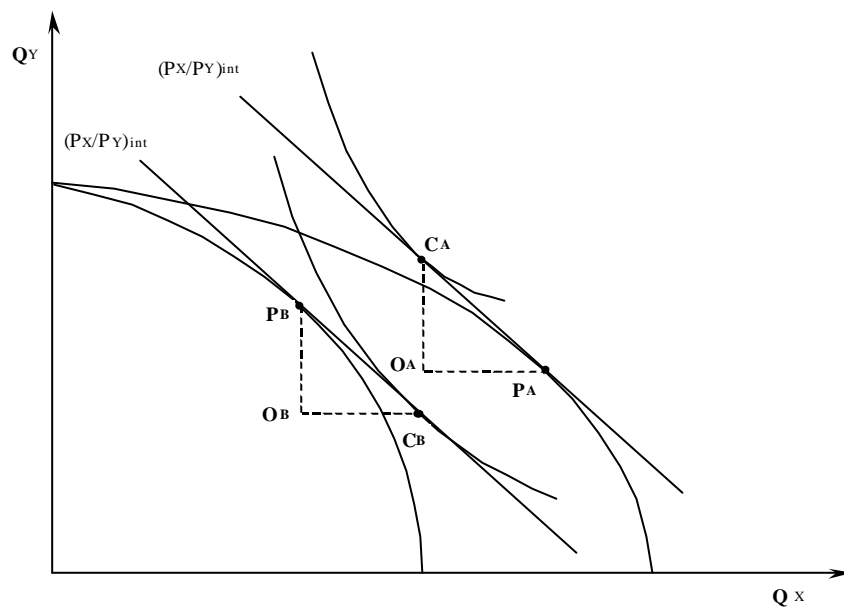
The theory of international trade explains various situations where trade between countries is caused by many other factors, not only by the difference in factor endowments, as postulated in the Heckscher-Ohlin model. We will review some of these explanations below.

Consider the model in which trade is caused by differences in production technologies. The analysis of this model which is proposed below relies on the work by Markusen et al (1995), and Purvis (1972) who proved that in this case factor mobility cannot be a substitute for trade, and that “the introduction of capital mobility into a free trade situation may serve to increase the volume of trade” (Purvis, 1972, p. 992).

Again, consider the model of two countries, A and B, which produce two goods, X and Y, with two factors of production, capital (K) and labor (L). As in the previous model, no transport costs, no economies of scale, and no market distortions are allowed. Countries are assumed to have the same factor-endowment proportions (this assumption excludes the possibility for the Heckscher-Ohlin type of trade). However, countries have different factor production technologies. For example, countries may have different natural endowments, say mineral resources, that allows country A to use its capital more effectively in producing capital-intensive good X. For simplicity, good Y, which is again labor-intensive, is assumed to be produced by identical technologies in both countries. Thus, countries can produce the same maximum feasible amount of good Y, but country A can produce higher maximum amount of good X because of its superior technology (with the same capital and labor inputs country A can produce more units of X). Production possibilities frontiers PPF_A and PPF_B of countries A and B respectively are depicted in the Figure 2.

According to general theory of international trade, difference in technologies is a sufficient determinant of international trade beyond the explanation of Heckscher-Ohlin model where different factor-endowments ratios determine trade flows. Let P_A and P_B be free trade efficient equilibrium production points in countries A and B respectively, and C_A and C_B – their equilibrium free trade consumption points. With free trade equilibrium relative prices of goods will be equalized between countries: country A will export good X (in the amount $O_A P_A$) and import good Y (in the amount $O_A C_A$) at the price ration $(p_X/p_Y)_{int}$.

Figure 2. **Capital mobility may complement trade if there are technological differences between two countries.**



However, in this case factor prices will not be equalized between countries because marginal product of producing good X will be less in country A relative to that in B (fewer factor inputs are needed in A for production one more unit of X). Here, as Purvis (1972) showed, when “we relax the identical technologies assumption... free trade is, in general, not sufficient to establish world efficiency in production; further, capital mobility is now a necessary condition for such

efficiency”. In this model, each country will have relatively higher price for the factor which it uses intensively in export industry (Markusen et al, 1995, p. 388). In such situation, there is a strong incentive for trade in capital.

If we allow free capital mobility, country A will experience capital inflow and labor outflow; vice versa for country B. This capital migration makes relative factor endowment unequal between countries. Moreover, each country ends up with higher relative endowment of that factor which is used intensively in its export industry (Markusen at al, 1995, p. 389). The resulting difference in relative factor endowments will further stimulate trade in goods on the basis of Heckscher-Ohlin model.

Thus, we may conclude that when production technologies differ between countries, factor mobility can lead to an increase volume of trade in goods. In this sense, we may say that factor movements and trade in goods are complements.

This model might be applicable to Ukraine if we consider the differences in natural resources endowments as the determinant for difference in production technologies. If these differences were strong enough to overcome all other impediments to trade, the complementarity relationship between FDI and trade would dominate for the Ukrainian economy (at least in some particular primary industries, where the differences in natural endowments and, thus, differences in technologies are easily observable).

On support of the model above, we refer to the assertion that when a country permits foreign capital inflow in order to promote domestic development, the complementarity relationship would prevail. This statement was theoretically presented by Schmitz and Helmberger (1970). They argued that “a shortcoming

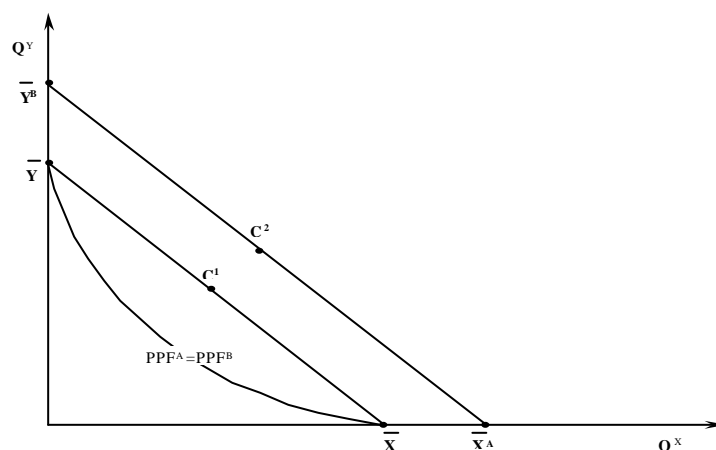
of the Mundell analysis is that no distinction is made among the major classification of product trade” (Schmitz and Helmberger, 1970, p. 762). In Heckscher-Ohlin model of international trade, it is explicitly assumed that the trade between countries is conducted in the “secondary manufacturing” whereas virtually a large part of international trade and FDI are in “primary commodities”. As was pointed out by Schmitz and Helmberger, it is really a mistake to claim that trade in oil, copper or wood products would be fostered by imposing barriers on the international capital flows as implied by the Heckscher-Ohlin model (Schmitz and Helmberger, 1970). The relevant conclusion in this context is that the “capital movements and trade in primary products are complements rather than substitutes... and impediments to one also impede the movement of another” (Schmitz and Helmberger, 1970, p. 762). (Theoretical model that would show this relationship is similar to the already described model of trade between countries with different production technologies, although it requires relaxing the Mundell assumption of identical demand conditions between countries.)

The conclusion of Schmitz and Helmberger may be of high value to our analysis of Ukrainian economy. In fact, the widespread financial difficulties of transition countries often induce policies that stimulate export-oriented production in order to generate foreign currency inflows. Natural resources are one of the few assets of these countries that attract foreign partners. Therefore, we may suspect that FDI into primary industries in transition economies, in particular in Ukraine, would be a complement to trade rather than substitute. We will refer to this statement while formulating our relevant empirical hypotheses in the next chapter.

The Heckscher-Ohlin theory of trade has met with a lot of criticism, especially in modern literature, as it provides little explanation of trade between similar economies (Ethier, 1982). Similar economies, such as the countries of FSU or CEE, may not base their trade relations on the basis of different factor endowment, but on the existence of economies of scale.

A model where trade is induced by economies of scale may serve as a second example of complementarity (Ethier, 1982). Assume that countries A and B have completely identical economies (same relative factor endowments, production technologies, and consumer preferences) that their production possibilities frontiers are both the same. However, production technologies are characterized by increasing returns to scale such that production possibility frontiers are convex (scale economies overweight any factor-intensity effect) as depicted in Figure 3.

Figure 3. **Capital mobility may complement trade if the scale economies exist.**



According to the theory of international trade, economies of scale offer gains from specialization and may serve as a force for mutually beneficial trade between countries even if no comparative advantages are present. Suppose

country A specializes in production of capital-intensive good X (produces \bar{X} units) and country B specializes in production of labor-intensive good Y (produces \bar{Y} units). They trade half of \bar{X} and half of \bar{Y} and both consume at point C_1 that corresponds to a higher utility level than was available in autarky (not depicted here).

As in the previous model, relative factor prices will not be equalized between countries because of different returns to factors of production. If factor mobility were allowed, country A would import capital and export labor. As a result, both countries would be able to produce higher maximum amount of output in their export industries. Let \bar{X}_A and \bar{Y}_B be the production levels of countries A and B respectively under free capital mobility. Hence, owing to factor movement, countries would diverge in relative factor endowments, and that, in turn, will increase the volume of trade and countries would be able to reach a higher level of consumption at point C_2 .

This model also provides a strong conclusion about the complementarity relationship between capital flows and trade in goods. It states that if the effect of specialization outweighs all other effects obtained from any pattern of comparative advantage, the complementarity relationship will dominate.

This conclusion of the model may have practical importance to our analysis. As we know, scale economies were widespread in the planned economy. Therefore, we may suspect that the FSU or CEE countries will try to continue to exploit the advantages from economies of scale inherited from the former economic system. Most of the capital flows between the FSU and CEE countries might be probably explained on the basis of the above model meaning that the FDI and trade flows between these countries might appear as complements. These theoretical predictions allow us to formulate our preliminary hypothesis the

Ukrainian situation: FDI into Ukraine from the countries of FSU and CEE is expected to be complement to trade.

In microeconomic theory, the most popular argument for complementarity relationship refers to the theory of vertical FDI (for example, Markusen et al, 1996). Indeed, investing in manufacturing may increase the import of inputs to the recipient country as well as the export of intermediate goods to the investing country through the vertical production relations. The output of one subsidiary is often the input into production of another. This was virtually the case with high level of integration between the FSU countries where one or several unique plants could exist to provide inputs of particular products to the whole Union's production infrastructure, significantly economizing on scale. Hence, a significant part of modern trade between these countries as well as their bilateral FDI could be explained by the historically established vertical production relations. This suggestion theoretically supports our hypothesis that FDI into Ukraine from former planned economies might be complement to country's trade flows.

In addition, the economic literature proposes that the complementarity relationship between FDI and trade flows can be explained by increased demand for a firm's product because of *proximity advantages*. This term was introduced by Brainard (1993) to point out that local production may have important demand effects by decreasing variable costs, facilitating marketing, and by creating customer loyalty. Unfortunately, this effect is hard to be captured empirically.

Therefore, many arguments in theoretical literature support both complementarity and substitutability relationships between FDI and trade flows. Having found which pattern of these relationships dominates in Ukraine, we would be able to make some conclusions about particular incentives of and impediments to foreign investors in Ukraine.

Existence of factors of common influence

Based on the theoretical possibility of complementarity between FDI and trade in goods presented above, the question of factors boosting trade and capital movement simultaneously became an interesting policy issue (Eaton and Tamura, 1994). These factors may include: market size, regional integration policy or foreign sector liberalization. Indeed, regional trade partnership agreement may induce not only trade volumes but the bilateral FDI flows as well. Liberalization of external sector, which is an essential part of the transition process, increases the level of competitiveness in the internal market that, in turn, would be beneficial for some importers and investors and hence stimulate both FDI and trade flows. As a result, the conclusion of complementarity between FDI and trade flows *at aggregate level* might be based on a “pure artefact” (Foltag  and Pajot, 1997, p. 9).

Unfortunately, no strong empirical methodology to reveal this complex mechanism was found in the commonly available economic literature. Eaton and Tamura (1994) have shown the correlation between residuals of FDI, export and import flows for advanced countries such as USA and Japan. Nevertheless, this correlation was observed only for outward FDI whereas inward FDI did not follow this “correlation rule”.

In order to clarify these relationships for Ukrainian economy, we propose to conduct relevant empirical analysis at both bilateral and aggregate sectoral levels. In addition, we suggest to split multinational firms that have made investment in transition economies into two groups: (1) those that originate from the countries with more advanced economies, such as countries of the European Union, and (2) those that originate from relatively similar to Ukraine transition countries, that is countries members of the former CMEA. If the possible common factors had a strong influence, we would obtain strong complementarity relationship at both

levels, bilateral and aggregate in most sectors, and for both types of FDI, from advanced countries and from transition countries. Otherwise, with some level of certainty we may reject significance of common factors, although such diagnosis might be bias as well.

Asymmetry of the relationship

Inward FDI, that is the object of our analysis, has “a priori a symmetrical impact” (Foltagé and Pajot, 1997, p. 11). As a result of investment, more efficient domestic production discourages import from investing country and may harm some other foreign producers from third countries whose products were imported before investment took place. This is the effect of substitutability relationship between FDI and trade flows. At the same time, country may increase its import of intermediate inputs to serve the newly created local production lines. The recipient country also exports its products that are produced with foreign capital to investing country or to third countries. This is the effect of complementarity relationship. Therefore, complementarity and substitutability relations between FDI and trade could exist simultaneously. Thus, we just may state that the combination of the two effects may lead to a positive or a negative net impact of FDI on export and import volumes. Whether it is positive or not depends on kind of effect which dominates for the particular situation.

Our further investigation of external sector behavior in Ukraine requires not only theoretical validation presented above but also the analysis of specific features of transition. The corresponding analysis is proposed in the next chapter.

Chapter 2

COUNTRY DESCRIPTION

Initial Conditions

It is natural for every world economy to possess some level of historical inertia. This refers to a path-dependency argument of institutional economics (Furubotn and Richter, 1998). Therefore, to better understand the features of external sector functioning in transition countries, in particular the relationship between FDI and trade, we first need to consider the initial conditions possessed by these countries before starting their economic transformation.

The general feature of planned economies was a high level of centralization and state regulation of all economic activities. The state as a major economic player determined priorities of economic development and directed the allocation of resources. Priorities were given to the expansion of production possibilities frontier where industrial production was enormously concentrated at mega-sized industrial enterprises. This strategy was formed on the assumption of the endless economies of scale. Thus, each region, republic or country within the borders of the CMEA had its own specialization.

Another important factor concerning the planning economy is the dominance of vertical subordination in decision-making process whereas horizontal links between producers were not important. “Enterprises were told what to produce, from whom to purchase, and to whom to sell” (Roland, 2000, p. 6). Prices were set under administrative control, and had no meaning for economic agents but played exclusively technical role for accounting, and did not influence distribution of resources between enterprises or between industries (Burakovsky,

1998). That resulted in the absence of voluntary trade links between enterprises (which were formed centrally).

The structure of productive sector in socialist economies was biased toward defense industries and minor attention was paid to production of consumer goods and services. In addition, production was characterized by little product differentiation that may be explained by endeavor to ease the planning process at the central level (Sachs and Pyvovarsky, 1996). This resulted in high market distortions and excess consumer demand that, at least partly, predetermined the distribution of today's investment flows.

External sector of planned economies might be characterized by some distinctive features as well. In particular, international activity was completely monopolized by the government. Volumes of export and import were defined by the central plan, and any international activity required special sanctions from central government (Shnyrkov et al, 1986).

International links were primarily oriented toward the countries of CMEA. So-called "socialistic industrialization" was aimed to gain an economic universality within the region and independence from the "capitalist" world. This strategy was called "collective autarky of the Soviet Bloc countries" (Burakovsky, 1998, p. 15).

International trade with developed industrial countries played virtually a function of balancing the plan: they imported only those goods which were in shortage or unavailable, specifically goods with high-technological content and consumer goods, and exported natural resources or resource-intensive products. Import was to some extent a substitute for new technologies in the domestic economy (Batt, 1992). At the same time, international trade with the CMEA countries was

characterized by high level of intra-industry trade due to vertical production links and significant portion of industrial products (Burakovsky, 1998).

Consequently, investment and trade flows of planned economies were far from those beyond the borders of the CMEA. These particular characteristics of the command-administrative system do require our attention, because, to a large extent, they underpin the problems of systemic transformation in Ukraine. On the basis of described above, we might suspect that today's Ukraine's links with countries of the former CMEA would differ from the links with other countries that, in turn, would be reflected in the relationship between FDI and trade flows. This is one of the core points of this paper.

Specificities of Transition

With the collapse of planning system, the liberalization of economic activities revealed vast differences between available structure of industrial sector and real needs of the economy. Thus, in the process of transition some structural adjustments of the enterprises as well as the reallocation of resources should happen. Poor technical development and excessive and relatively immobile stock of capital are not able to provide the base for competitiveness and growth. This caused the substantial decline in Ukraine's level of production. A particular feature of transition economy is an increase of export as well as of import of some industries' products while the general level of production of these industries might be declining. The foreign sector begins to compensate decreasing wealth of nation, as in some cases declining production but expanding trade may bring society to the higher utility level than that of the autarky.

As for Ukraine, during the early years of transition (1995-1996) the volumes of export and import increased substantially with the negative commodities trade balance throughout the period. In the later period, volumes of trade, both export and import, gradually decreased, yet maintaining the negative trade balance.

Nevertheless, the share of export in GDP of Ukraine was increased during all transition period (see Table 1).

Table 1. **Ukrainian export-to-GDP ratio dynamics.**

Year	Share of export volume in GDP
1996	31%
1997	28%
1998	44%
1999	40%
2000	53%

Source: Ministry of Economy, Department of Statistics (on trade volumes) and International Center for Policy Studies (on GDP data); own calculations

In this paper we address the issue if these evident changes in trade flows might be explained by FDI inflows to the Ukrainian economy.

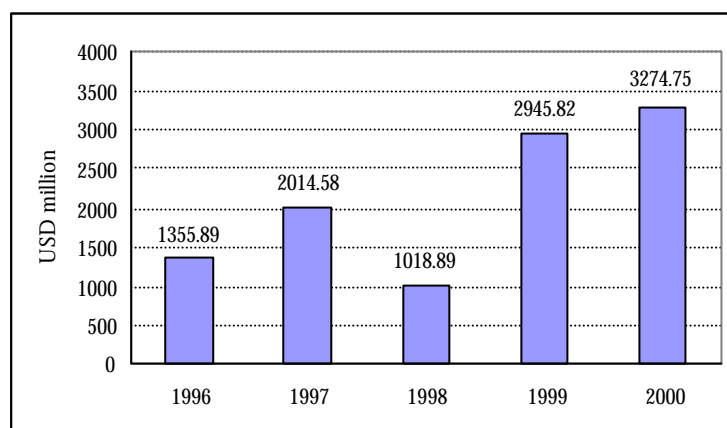
Peculiarities of FDI flows in Ukraine: Initial Evidence

There is a limited group of the new market economies in the world that are attractive to the most foreign investors. Ukraine is still outside this group, and behind other CEE countries on the volumes of FDI. Comparing with other transitional economies of CEE and FSU, in terms of cumulative FDI inflows Ukraine is only ahead of Belarus, Tajikistan, and Uzbekistan (EBRD Transition Report, 1999).

The rapid increase in investment inflows to Ukraine was observed during 1996-98 period of temporary macroeconomic stabilization. In 1998, net inflow of investments decreased because of high uncertainty of the national economy's behavior due to the negative impact of Russian financial crisis. During past two years there has been a rise in FDI flows into Ukraine what is mainly explained by the start of the large-scale privatization and adoption of more favorable investment legislation (Figure 4). However, the level of FDI

remains quite miserable in comparison to other transition countries and does not meet the Ukraine's demand for capital inflows.

Figure 4. **Cumulative FDI into the Ukrainian economy** (in constant prices of 1996)



Source: State Statistic Committee (Figures are presented as constant prices of 1996, calculated on the basis of USA DGP deflator)

According to the data of the State Statistical Committee, as for December 31, 2000, the cumulative net FDI stock to Ukraine since independence (August, 1991) totaled to USD 3274.65mn (in constant prices of 1996).

Foreign investment came to Ukraine from 109 countries of the world. During the years of transition USA remains the largest foreign investor with USD 538.65mn at the end of 2000 (in constant prices of 1996) or 16.5% of the total FDI value. Besides, we can distinguish two groups of countries which are the largest investors in Ukraine. First group is comprised of the European Union countries (except Portugal) which, as of December 31, 2000 have invested USD 945.59 mn or about 29% of the cumulative FDI flows into Ukraine. The second group, although with much smaller FDI inflows, is comprised of transition countries former members of the CMEA which have invested USD 492.08 mn or 15% of total. The FDI inflows from the neighboring countries of the former CMEA are almost half of FDI inflows

from the EU. Nevertheless, their portion is big enough to support some suggestions of gravity-type approach in the economic literature which claims that bilateral FDI flows tend to be more intense between similar countries in terms of GDP or GDP per capita as proxies (Brainard, 1993; Eaton and Tamura, 1996).

Also, a large part of investment inflows comes to Ukraine from the so-called “offshore zones” such as Cyprus (about 9.6% of total FDI inflows), British Virgin Islands (about 4.6%) and Switzerland (about 4.4 %). However, referring to a current wide discussion in mass media, we should be very careful with analyzing these figures because this FDI to some extent may account for the Ukrainian money coming back into domestic economy from abroad.

An interesting evidence is that FDI from countries of the former CMEA, mostly from Russia, is distributed differently from the FDI that came to Ukraine from the countries with advanced economies, such as those of the European Union. (In this paper, we do not analyze the investments from the USA partially in order to skip the parameter of transportation cost in estimating the relationship between FDI and trade flows, and partially because of complexity of state regulation concerning foreign trade from both sides, USA and Ukraine). Looking at the Table 2, we will see that the major recipient of FDI in Ukraine is the food industry (20% of all FDI inflows). However, this industry is mostly attractive for the investors from advanced countries rather than from transition countries: some 44% of all EU investment directed into food industry and only 4% of the investment from the former CMEA countries was directed to this industry. It might be partially explained by low domestic capacities to food processing and high internal demand that make

these investments profitable. This may also mean that food producers within EU lost their comparative advantages against Ukrainian producers.

Table 2. **Cumulative FDI into Ukraine, as of December 31, 2000 (constant prices of 1996).**

	Total FDI inflows		FDI from EU countries		FDI from former CMEA countries	
	Total (USD mn)	% of total	Total (USD mn)	% of total	Total (USD mn)	% of total
All sectors	3274.65	100	945.59	100	492.08	100
Industry	1680.13	51.31	703.62	74.41	241.72	49.12
<i>Electricity, fuel and atomic industry</i>	204.32	6.24	8.86	0.94	140.55	28.56
<i>Ferrous metal</i>	127.14	3.88	7.30	0.77	17.92	3.64
<i>Non-ferrous metal</i>	26.54	0.81	12.77	1.35	0.82	0.17
<i>Chemical and petrochemical</i>	137.46	4.20	47.15	4.99	9.48	1.93
<i>Machine-building</i>	294.44	8.99	103.35	10.93	16.56	3.37
<i>Wood-processing</i>	67.61	2.06	43.58	4.61	11.02	2.24
<i>Construction materials</i>	49.30	1.51	13.64	1.44	10.04	2.04
<i>Light industry</i>	36.68	1.12	23.66	2.50	5.78	1.17
<i>Food industry</i>	657.02	20.06	416.80	44.08	20.44	4.15
<i>Medical industry</i>	18.96	0.58	10.07	1.06	6.08	1.24
Agriculture	66.79	2.04	18.29	1.93	4.28	0.87
Transport and telecommunications	195.95	5.98	54.00	5.71	27.91	5.67
Building	105.88	3.23	34.10	3.61	15.89	3.23
Internal trade	616.60	18.83	183.13	19.37	56.14	11.41
External trade	39.10	1.19	8.81	0.93	0.94	0.19
Health and tourism	106.88	3.26	6.90	0.73	89.67	18.22
Finance and insurance	210.15	6.42	84.75	8.96	35.48	7.21

Source: State Statistic Committee, author's own calculation.

The largest part of all investment into electricity and fuel industries (about 70%) has come from other transition countries and mainly from Russia. Evidently, that Russia, as a large fuels exporter, and the main one for Ukraine, has interests in Ukrainian fuels market and such investment would allow Russians

to establish control over their traditional market of supply. This suggestion led us to exclude the electricity and fuel industry from our analysis of relationship between FDI and trade flows in Ukraine proposed in this paper.

In addition, comparatively high level of FDI flows into Ukraine from other transition countries is observed in health and tourism sector (almost 84% of all FDI in this sector). Probably, this fact might be explained by the interest of these countries in the traditional recreational centers in Crimea and Carpathian Mountains which are not interesting for investors from developed countries such as the EU.

As we see from the Table 2, other industries of the Ukrainian economy, such as machine-building, ferrous metals, chemical, and wood-processing are highly attractive for foreign investors and again they have quite different FDI intensity between investors from the former SMEA countries and those from the EU.

Substantially high level of investment came to development of the trade infrastructure in Ukraine. Both groups of countries try to create strong trade enterprises for marketing of their products in Ukraine (internal trade) and for importing and exporting (external trade). This fact supports our idea to analyze the relationship between FDI and trade. Thus, by chance, we can make a preliminary suggestion about different motives for FDI in Ukraine between investors from different groups of countries, in particular between investors from the advanced countries and investors from the transition countries.

Motives and impediments of foreign investors

Ukraine has a set of comparative advantages for foreign investors. Indeed, Ukraine possesses a wide scope of underutilized physical and human resources. It

has a large internal market (about 48 mn people – one of the largest in Europe). It has easy access to neighboring markets of Russia, Belarus and other FSU countries. Besides, Ukraine receives substantial financial aid from the international financial organizations (such as World Bank, EBRD, etc.). However, Ukraine is recognized as one of the most risky places among the countries of CEE (World Bank, 1999).

The institutional framework of the country, in particular quality and consistency of legislature and the stability of tax system, are the most important issues for serious potential investors when they are estimating risk of their investments. The European Bank for Reconstruction and Development identified the widespread corruption and unclear legislation, which lead to the difficulties of enforcing contracts, as the major obstacles for FDI in Ukraine (Madrid Publications, 2000; EBRD Transition Report, 1999).

The trade barriers of a VAT (20 percent), import duties (ranging from 5 to 200 percent) and excise taxes (10 to 300 percent) present a major obstacle for the trade with Ukraine (U.S. Department of Commerce, Country Report, 1999). A limited number of goods, including raw materials, component parts, equipment, machinery, and energy supplies imported to Ukraine by commercial enterprises for "production purposes and their own needs" are exempted from VAT. Import duties differ and largely depend on whether a similar item to that being imported is produced in Ukraine; if so, the rate may be higher. The later might have also some negative effect on the level of intra-industry trade in Ukraine. In addition, impediments to trade could stimulate investment inflows to substitute import as it was predicted by Mundell's analysis (1957).

Several very interesting studies concerning particular motives of foreign investors in Ukraine are available. All of them were conducted at a micro level on the basis of surveys results of investors which are often considered as

doubtful. According to the survey results of investors that have already invested in Ukraine, which was conducted by the Consortium Flemings/CAPS (2000), dominant factor of current FDI inflows in Ukrainian economy is the possibility of new markets expansion (Table 3) while increasing of effectiveness and natural resources are of subordinate interest. This finding supports the conclusions by Dean and Kudina (1999) and by the German Advisory Group (Mollers, 1998, p. 144-145). Table 3 presents the ranking of possible motives for the foreign direct investors in Ukraine according to the mentioned studies by the Consortium Flemings/CAPC and the German Advisory Group.

Table 3. Motives of foreign direct investors in Ukraine.

#	Motives	Rank
1.	Large internal market and its potential increasing	1
2.	Access to new regional markets (CIS, East Europe)	2
3.	Import barriers jumping	3
4.	Increasing of competitive supply strength to advance markets (such as markets of Western Europe) though a more effective foreign production due to cheap labor force, electricity and other inputs	4
5.	Production capacities	5
6.	Tax incentives	6
7.	Low barriers for the natural resources usage and extraction	7

Note: 4 = motive of highest importance; 3 = important; 1 = not very important; 0 = is not important

Source: Survey results of the Consortium Flemings/CAPS (2000) and German Advisory Group (Mollers, 1998).

Nevertheless, the evidence of strong dominance of a new market expansion motive does not eliminate other important motives for investing into the Ukrainian economy. The import barriers jumping and a possibility for more effective production are also among the reasons mentioned by investors whereas the low barriers for natural resources usage and extraction do not seem to be important factors today. This would mean that at aggregate level FDI oriented on internal market expansion might dominate in Ukraine, that is they

will not stimulate export. This would also mean that, being motivated by barriers jumping, FDI might tend to substitute import. Moreover, FDI into primary goods are not necessary motivated by further export possibilities of these products (the last statement is quite suspicious *prima facie*). Our analysis at aggregate level aims to confirm or to reject these statements. In this regard, we will analyze separately two groups of industries, primary and secondary, in order to distinguish the incentives of foreign direct investors into different kinds of production (the theoretical background for such separation was presented in the first chapter of this paper on the basis of arguments by Schmitz and Helmberger, 1970).

Main Hypotheses

On the basis of our initial evidence and the theory described above, we hypothesize that there are different patterns of FDI - trade relationship between different groups of countries. Investment from countries with transition economies, which are similar countries to Ukraine, and countries of the European Union, which are advanced countries, would probably have different impact on the trade flows because of different motives for investing. For example, investors from the countries of the former CMEA may make investment decisions which are lead by the former economic links and similar business culture which to some extent simplifies the investment process. Cheap labor, abundant resources and underdeveloped markets are present in these countries as well, and the abilities to realize profit opportunities are similar to those of Ukraine. Thus, unlike investors from the advanced economies of the EU, investors from the former CMEA countries could not be significantly motivated by the named comparative advantages, they are rather interested in recapturing the lost markets and re-establishment of the former CMEA's production links (Goloven, 2000). This logic provides substantial grounds to

suggest that investors from countries of the former CMEA have different motives from those from the advanced economies.

In addition, taking into account our initial evidence we may suggest that there might be some industries' specifics that predetermine incentives for FDI inflows and, in turn, relationship between FDI and trade flows. Thus, we hypothesize the following:

1. FDI into Ukraine from the European Union countries:

- **if it flows into industries that produce primary products**, it is mostly export-oriented, and should have a positive impact on the export performance of such industries (complementarity);
- **if it flows into industries that produce secondary products**, it is almost always oriented toward internal market expansion and is induced by possibilities to produce more efficiently within the country and by opportunities to avoid trade barriers. Such FDI, therefore, acts as a substitute for trade, particularly for import flows to Ukraine.

2. FDI into Ukraine from transition countries of the former CMEA:

- **either it flows into industries that produce primary products or secondary products**, it is motivated by the potential for economies of scale, including those that might arise from resuming production links obtained during the Soviet times. Consequently, this FDI will cause an increase in trade flows, both export and import (complementarity).

The hypotheses stated above will be tested on Ukrainian data. We should take into account that there are several other factors in Ukrainian economy that

influence trade volumes, and we should check if the hypothesized relationships are statistically significant with the use of empirical techniques.

Chapter 3

EMPIRICAL STUDY

Methodology

To analyze the relationship between FDI and trade flows we construct two models: one is export supply function (to analyze the relationship between FDI and export), and other is import demand function (to analyze the relationship between FDI and import). In general, these models should take the form of following equations:

$$X_t = g(FDI_t, \Omega)$$

$$M_t = f(FDI_t, \Psi)$$

where FDI_t – the measure of FDI at time t (the further analysis will only refer to the inflow FDI because outflow of FDI for Ukraine is too miserable to make strong conclusions about it).

X_t – the value of total exports at time t

M_t – the value of total imports at time t

Ω – set of parameters which shift the demand for import in host country (e.g. fluctuations in relative exchange rate, population income, transportation costs)

Ψ – set of parameters which shift the demand for export from the host country (e.g. gross domestic output, unit transportation costs, fluctuations in relative exchange rate, or dummy variable indicating whether the source of FDI and host country are members of the same trading bloc).

Most authors use the appropriate lag lengths for the testing relevant hypotheses. However, available data on Ukraine does not allow such a model. Besides, we

may refer to conclusions of some already conducted researches for Ukrainian economy that have shown that FDI into Ukraine are involved primarily into those projects that have very high returns to capital to cover all the expenses in short-run. For example, empirical estimations at aggregate level by Oleksiv (2000) resulted in statistically insignificant coefficients for lagged variables even at the (t-1) lag. However, being not so daring to ignore the past FDI inflows, we will test two types of models: first with FDI flows (value of FDI inflow during particular time period) as a measure of FDI, and second with FDI stocks (value of cumulative FDI inflow at the end of particular time period).

To construct the models of export supply function and import demand function we will use two common control regressors.

First, according to Linder's hypothesis, well known in the theory of international trade, the bilateral trade of manufactured goods between two countries will be negatively related to the difference in their per capita income. This hypothesis uses principles of gravity model that trade volumes between countries should be positively related to their size and negatively related to the distance between them. The absolute difference in per capita income between two countries should be included "to reflect differences in importer's tastes regarding the export from another country" (Thursby and Thursby, 1987).

Second, economic theory states that foreign exchange risk negatively affects the pattern of bilateral trade. Exchange rate variability can serve as a proxy measure of foreign exchange risk (Ethier, 1973). We will use the measure of the variance of the spot exchange rate around its quadratic trend, where trend is estimated from regression

$$\ln R_t = f_0 + f_1 t + f_2 t^2 + \varepsilon_t, \quad (*)$$

where R_t – is the spot exchange rate and t – time period.

As the analysis conducted in this paper refers to the years 1996-2000, we take the monthly official Exchange Rate of National Bank of Ukraine (source: Tacis, UEPLAC). The equation (*) is estimated for each year from 1996 to 2000 using the exchange rate observations for the twelve preceding months ($t=1$ for January each year), and the residual variance is used as a measure of variability for the year. The methodology for estimation of exchange rate volatility is borrowed from Kenen and Rodrik (1986).

Referring to the classical macroeconomic theory, we will control for population net real income as the determinant of import demand (hypothesized to make positive impact on demand for imported goods), and for the yearly real output of an industry as a determinant of export supply of this industry (hypothesized to make positive impact on supply of exported goods).

The analysis of relationship between FDI and trade flows is usually conducted at the bilateral level in order to investigate whether FDI flows influence trade volumes between home and host countries. However, we may suspect that this kind of analysis will not give us the whole picture about the impact of FDI on trade volumes for transition economies. Besides the reasons mentioned in the theoretical chapter, the test for aggregate trade volumes should also be conducted in order not to lose any economic conclusion. This means that if, say, a multinational firm from an advanced economy invests into some production process in Ukraine but does imports the final products back to the parent country, this should not necessarily imply that this investment does not induce trade. These products might be exported from Ukraine to other neighbor countries like Russia, Byelorussia or Moldova, and the volume of such trade might be even significant. That is why empirical analysis that is proposed further was conducted for both types of trade flows, bilateral and aggregate.

The Data

Empirical investigations often use the data on output of enterprises with FDI as a measure for FDI variable. Unfortunately, due to the underdeveloped process of collecting official statistics such data are not provided on the official level. The State Statistics Committee (Derzhkomstat) is the only responsible body that compiles official statistics on foreign direct investments in Ukraine at macro level. The data they provide is recorded in thousands USD and is based on the quarterly statistical reports of enterprises. There are certain forms (blanks) of statistical reports used in Derzhkomstat; they are presented in Appendix A. Unfortunately, we cannot fully rely on the quality of this data because of very high level of unreported (shadow) economic activity in Ukraine. Therefore, we may lose quite substantial volumes of FDI inflows (particularly those from countries of the FSU because they are “easier” to hide). Although purporting may introduce some bias in estimation, we may assume that if we obtain some statistically significant results of complementarity, they would be even strengthened by the additional (not accounted) FDI inflows.

The data which we will use for making this research is the yearly data on nominal FDI volumes for the period from 1996 to 2000 in thousands USD. To conduct meaningful analysis we transformed it into real values through the value of USA GDP deflator which was calculated using the data on real and nominal GDP of International Monetary Fund (2001)

The data on trade flows that is used for empirical research in this thesis is also compiled by the Derzhkomstat. However, as for the trade statistics, more dangerous problem of its quality arises. A discussion of the problem is proposed in Appendix A. The available data is 4-digit data on trade of goods partially processed by the Department of Statistics, Ministry of Economy of Ukraine (from 1996 to 2000 in thousands USD). The trade data was disaggregated by

industries according to the industries qualification that is used for presenting FDI volumes (see Table 2 of previous chapter). We rely on our intuition in disaggregating the available data by industries; although some bias could occur, the only way of obtaining the data disaggregated by industries was to do it intuitively because of no official statistics on the trade flows at industries level exists in Ukraine. And again the data on trade flows was transferred from nominal to real values by the procedure described above.

We refer to Tacis/UEPLAC (December, 2000) as the source of the data for population net real income (used in import function estimations) and to the official statistical bulletin of Derzhkomstat for the data of Ukrainian industrial output (used in export function estimations). The bilateral data of differences between Ukrainian and other countries' per capita income was obtained from Internet site of the International Monetary Fund (2001).

Model 1: Export Supply Function

We construct the export supply function for Ukraine as a function of FDI and some several control variables described above. The model for bilateral trade flows takes the following form:

$$X_{it} = a_i + b_1 \cdot FDI_{it} + b_2 \cdot DIF_GDPPC_{it} + b_3 \cdot ER_VAR_t + b_4 \cdot IND_OUTPUT_t + e_{it}$$

where i - index for country

t - index for time period (years from 1996 to 2000)

X - real export (USD tn) from Ukraine to country i

FDI - real FDI inflows (USD tn)

DIF_GDPPC - absolute difference in real GDP per capita (USD tn) between Ukraine and country i

ER_VAR - exchange rate variability

IND_OUTPUT - real output for industries analyzed (USD tn)

e_{it} - error term

If we consider not bilateral but the aggregate trade flows, the index i attached to the variable for export should be eliminated. Also there is no economic sense to include variable of DIF_GDPPC for estimation of aggregate export flows (Linder's hypothesis concerns only bilateral trade flows). Thus, the model for aggregate export flows takes the form:

$$X_t = a_i + \mathbf{b}_1 \cdot FDI_{it} + \mathbf{b}_2 \cdot ER_VAR_t + \mathbf{b}_3 \cdot IND_OUTPUT_t + \mathbf{e}_{it}$$

with the same definition of included variables.

To test the hypotheses concerning different motives for investment decision for investors from different groups of countries, we run the relevant regressions for two groups of countries separately: (1) the regressions that account for FDI from countries of European Union that are considered as those with advanced economies that differ significantly from the Ukrainian economy, and (2) the regression for the former CMEA countries that are considered as those that are very similar to Ukraine due to tight historical links and current transition period as common feature for all of them.

Also, as it is required by our hypotheses, two groups of industries will be analyzed: (1) industries that mostly produce secondary manufacturing products (for this purpose we consider Ukrainian food industry and machine-building industry as the ones that attracted the biggest portion of FDI), and (2) industries that mostly produce primary products (we analyze Ukrainian ferrous metal industry, chemical and petro-chemical industry, and the wood industry chosen by the same reason).

We run pool regressions on the basis of available panel data. The estimation techniques and the results of regressions are presented in the Appendix B. The conclusions concerning the relationship between FDI and trade flows can be made on the basis of estimated coefficient \mathbf{b}_1 which is presented in the Table 4.

Table 4. **Relationship between FDI and export flows.**

	Primary products		Secondary products		
European Union	0.030943 (0.9756)	11.76251 (0.0940)	0.004594 (0.9189)	-0.239703 (0.910)	FDI flows
	-0.272194 (0.7279)	14.50159 (0.174)	-0.01083 (0.5123)	-3.126760 (0.2131)	FDI stocks
Former CMEA	-3.30428 (0.3001)	38.76779 (0.187)	7.281681 (0.3708)	152.9517 (0.1426)	FDI flows
	2.092789 (0.4044)	11.92948 (0.382)	4.429213 (0.3446)	-82.39649 (0.2524)	FDI stocks
	Bilateral trade	Aggregate trade	Bilateral trade	Aggregate trade	

Note: figures represent coefficient b_1 and its p-value in parentheses

As we see from the table above, the hypothesis concerning the FDI from the EU countries into primary industries (here it is the case for export flows) appeared as quite strong. \$1 of inward FDI into the Ukrainian primary industries from the EU countries is associated with the additional export of primary products of about \$12 from Ukraine to the outside world. However, this relationship is not observed on bilateral level. According to our empirical results, export volumes of primary products, which is induced by FDI inflows into the Ukrainian primary industries, are not directed for ‘consumption’ of a particular investing country. It means that FDI into Ukrainian primary industries cannot be explained by the relative high demand for the primary products on the market of the investing country. Most likely that a high rate of return and unrealized profit opportunities on the world wholesale markets (especially for ferrous metals) is the reason for FDI inflows to the Ukrainian primary industries, in particular into ferrous metal industry, wood-processing industry and chemical industry. In addition, Ukraine possesses strong comparative advantages because of convenience of its natural resources’ geographic location (for example, copper ore and manganese deposits that are both used in production of ferrous metals are located nearby each other

and near the Black Sea ports what is convenient for the transport costs minimization).

We fail to accept our hypothesis concerning the complementarity relationship between FDI from transition countries into the Ukrainian primary industries and the trade in correspondent products. This may be explained by the lack of interest of investors from this group of countries in cheap natural resources comparative to the investors from the EU countries. This evidence is observable at aggregate data (see Table 2). As we see, huge industrial conglomerates built in the Soviet times to extract and to process natural resources provide Ukraine with an additional comparative advantages that attract investors from advanced economies.

In addition to the conclusion above we should note that past inflows of FDI in the Ukrainian primary industries do not matter for export volumes of primary industries. This finding supports some arguments about dominance of short-run investment projects in today's Ukrainian economy (Oleksiv, 2000).

FDI inflows to the Ukrainian secondary industries, specifically food industry and machine-building industry, do not explain the export volumes of these industries' products. They are found to be statistically insignificant for the both groups of investing countries. It means that these investments are almost induced by more efficient local production and are oriented on the local market for selling the final products. This finding supports the results by Dean and Kudina (1999) and by the Consortium Flemings/CAPS (2000) that were conducted on micro level.

Model 2: Import Demand Function

The import demand function is constructed as the function of FDI and other control variables described in the methodological section of this chapter. Particularly, the model takes the form:

$$M_{it} = a_i + \mathbf{b}_1 \cdot FDI_{it} + \mathbf{b}_2 \cdot DIF_GDPPC_{it} + \mathbf{b}_3 \cdot ER_VAR_t + \mathbf{b}_4 \cdot POP_INCOME_t + \mathbf{u}_{it}$$

where i - index for country,

t - index for time period,

M - real import (USD tn)

FDI - real FDI inflows (USD tn)

DIF_GDPPC - difference in real GDP per capita (USD tn)

ER_VAR - exchange rate variability

POP_INCOME - real income of Ukrainian population (USD tn)

\mathbf{u}_{it} - error term

As in the previous case, for aggregate trade flows the model will be transformed into the following equation:

$$M_t = a_i + \mathbf{b}_1 \cdot FDI_{it} + \mathbf{b}_2 \cdot ER_VAR_t + \mathbf{b}_3 \cdot POP_INCOME_t + \mathbf{u}_{it}$$

The same groups of countries and the same groups of industries have been analyzed for testing the hypotheses about the relationship between FDI inflows and import flows for Ukraine. Again fixed effect panel regressions on the basis of available panel data has been run. The results of regressions are presented in the Appendix C. In Table 5 we present the estimations of coefficient \mathbf{b}_1 that allows us to make some conclusions about the relationship between FDI inflows and import volumes in Ukraine.

The relationship between FDI and import of primary products is found as statistically insignificant (see Table 5). This means that FDI into Ukrainian primary industries does not explain the volatility of import of primary products. We may conclude that investments into production of primary products in Ukraine mostly based on domestic resources.

Table 5. **Relationship between FDI and import flows in Ukraine.**

	Primary products		Secondary products		
European Union	0.220815 (0.5621)	2.161537 (0.613)	0.019028 (0.9023)	3.373971 (0.1650)	FDI flows
	0.191366 (0.5122)	0.5971048 (0.796)	-0.043885 (0.4915)	0.954427 (0.3854)	FDI stocks
Former CMEA	0.182665 (0.7357)	-3.026884 (0.636)	9.174074 (0.0895)	109.9057 (0.0013)	FDI flows
	-0.14658 (0.7590)	-0.922058 (0.753)	6.312915 (0.0477)	37.87195 (0.1859)	FDI stocks
	Bilateral trade	Aggregate trade	Bilateral trade	Aggregate trade	

Note: figures represent coefficient β_1 and its p-value in parentheses

On the basis of obtained estimations we cannot accept our hypothesis that FDI into secondary industries by investors from the European Union would substitute import flows of secondary products in Ukraine. However, the negative coefficient near FDI variable allows us to say that secondary-industry FDI has the potential for import-substitution, although tests of this hypothesis is inconclusive. What is interesting, that the negative sign appears in estimations of import function on the aggregate level. This might mean that import of some secondary products decreases not because of multinational corporations' decision to produce in Ukraine rather than to export their products into the Ukrainian market, but because a newly created production in Ukraine harms third countries' importers of secondary products. Still, substitutability effect is not strong enough to overweight the other effects, such as the effect of overall foreign sector liberalization in Ukraine. The trade development leads to increase in trade volumes between countries that beat the effect of substitutability supposed on the basis of economic theory.

The hypothesis concerning the reintegration process between countries of the former CMEA can not be accepted on the basis of obtained results. We do not observe any pattern of bilateral trade in primary products induced by FDI

inflows from countries of the former CMEA. However, a significance of results for import of secondary products may to some extent support our initial suggestion regarding the reintegration processes. On the basis of obtained coefficients we may say that \$1 of foreign investment from the countries of former CMEA into Ukrainian secondary manufacturing results in about \$7 of import of secondary products from the same country and in about \$110 of the aggregate Ukrainian import of secondary products (the latter is of very high statistical significance). This might partially mean that some kinds of the intermediate secondary products, such as some machinery components, are imported into Ukraine for production of final goods. The same coefficient on aggregate trade level appears to be significant only for the FDI flows. It may be explained, again partially, by import of the machinery equipment for newly created production lines in Ukraine. These conclusions cannot be admitted without doubts. In the next chapter we refer to the analysis of intra-industry trade level in Ukraine in order to find some additional support for our hypothesis concerning the process of reintegration between the countries of the former CMEA.

Furthermore, on the basis of results for the import demand function estimations we accept our hypothetical suggestion concerning different patterns of relationship between FDI and trade for two types of investing countries. Indeed, obtained coefficients differ for the different types of investors.

As byproducts of our analysis are some inferences about other determinants of Ukrainian export and import volumes, they are following:

Linder hypothesis that bilateral trade between two countries is negatively related to the difference in their per capita incomes, can be accepted only for the trade flows between Ukraine and countries of the EU, but it is found to be weak in explaining bilateral trade flows between transition countries.

An exchange rate variability that is a proxy of exchange rate risk is not significant for export of primary products and makes a negative impact on the import of primary as well as export of secondary products in Ukraine. Also, it appears with “wrong” significant sign in estimations for import of secondary products. It might be partially explained by the fact that during years of transition a tendency to devaluation of the domestic Ukrainian currency, hryvna, dominates. With the home currency devaluation imported goods become more expensive what is beneficial for importers.

As it was expected, level of industrial output makes a positive impact on the export volumes of primary products. However, it appears with a wrong sign for the export function estimations for secondary goods. This result might mean that there was a high internal demand for secondary products, and the level of output of Ukrainian secondary industries does not seem to be an appropriate explanatory variable for the Ukrainian export supply function of secondary products. Income of the Ukrainian population is highly influencing import products that follows predictions of general economic theory.

To find more supporting evidence for our hypotheses that FDI have positive impact on the country's trade performance we refer in the next chapter to the analysis of relationship between the FDI and the level of country's intra-industry trade. The employment of the intra-industry trade notion would allow us to trace the impact of FDI onto country's trade diversification, which surely should be the result of intensified bilateral economic interrelations. The positive relationship between FDI inflows and country's intra-industry trade level for corresponding industries would allow to support our inferences on complementarity of trade and FDI. Particularly we will try to find additional evidence for Ukraine's integration processes with it's main trading partners.

Chapter 4

IMPACT OF FDI ON TRADE DIVERSIFICATION

Intra-Industry Trade: Paradigm

As it was already explained in the previous chapter, the current chapter is designed for investigating the possible relationships between FDI and the level of intra-industry trade. Although this relationship might signify about the increased level of overall economic cooperation with the investing countries, it also might provide us with the evidence about complementarity relationship between FDI and trade (Markusen et al, 1996).

In transitional economies, FDI can be considered as source of innovation in industries, which push restructuring of industries toward more efficient ways of production of more diversified products. As a result of FDI inflows into production sector there might be an increase in diversity of output as well as trade in these products. EBRD Transition Report (1995) data shows that countries which are more successful in developing market institutions and stimulating environment for entrepreneurship, will export and import higher diversity of products, and consequently will be better integrated into the world economy, catching all externalities from such integration. In this chapter we will try to look on the trade diversity of the Ukrainian industries subject to FDI inflows from two groups of countries, EU and countries of the former CMEA.

The phenomena of intra-industry trade where countries trade with the similar products was firstly studied by Herbert Grubel and Peter Lloyd who suggested a simple index, which measures country's trade with similar product. The Grubel-Lloyd (G-L) index, is defined as:

$$GL^{ij} = 1 - \left(\frac{\sum |M_g^{ij} - M_g^{ji}|}{\sum (M_g^{ij} + M_g^{ji})} \right), \quad 0 \leq GL^{ij} \leq 1$$

where M_g^{ij} stands for import of commodity g from country i to country j .

If the goods are only just either exported or imported, the G-L index will be equal to zero, if more goods are simultaneously imported and exported the amount of intra-industry trade will be increasing and the index will approach 1.

The index, however, has some shortcomings, which were pointed by the Grubel and Lloyd themselves and which are discussed in the paper by Fontagne & Freudenberg (1997). Shortly, we have to note, that presented above G-L index is positively related to the country size and is biased to the aggregation level. As for the country's size, the bigger is the country in terms of GDP (and population), the higher diversity of products it may produce and in the same time it has more diversified demand for imports. The aggregation of products in trade statistics leads to some lost of information that might affect G-L index both in positive or negative directions. In our model we ignore the shortcomings of this simple version of measuring the intra-industry trade which instead gives us some simplicity in calculations.

With the liberalization of international trade activities the countries of the former CMEA have experiences one more interesting reorganization – shifts in intra-industry trade patterns. However, in Ukraine the level of intra-industry trade has being decreasing though the years of the transition period (see Table 6).

According to the theory of international trade the phenomena intra-industry trade refers to the situation where economies of scale are the major force of trade development between countries (Ethier, 1982; Helpman and Krugman, 1985). There are, however, another explanations of intra-industry trade (Marcusen, et

al., 1995). One of them is vertical production relations: countries may export some products for assembling or further processing and re-import these products back. These particular kind of intra-industry trade corresponds to Heckscher-Ohlin explanation of international trade, where cheap labor and factor endowments are the determinants of trade.

Table 6. Grubel-Lloyd index calculated for Ukraine.

Year	1994	1995	1996	1997	1998	1999	2000
G-L Index	0.153	0.143	0.118	0.196	0.090	0.086	0.085

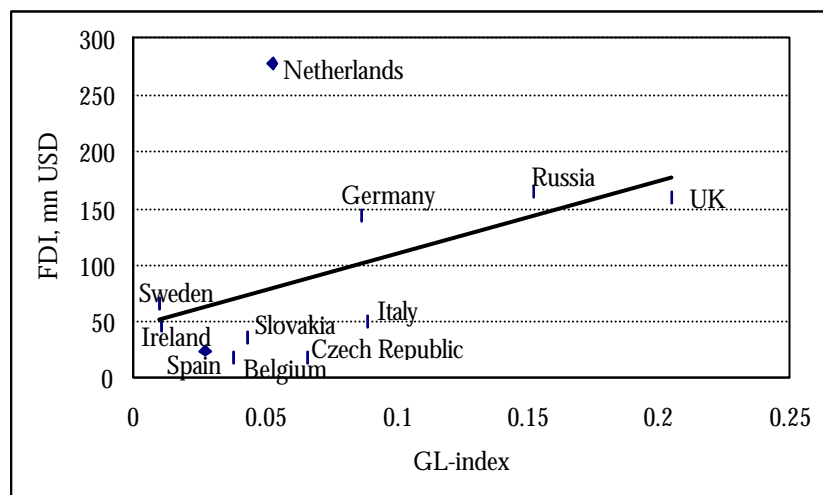
Source: Ministry of Economy, Department of Statistics; author's own calculations (the available 4-digit level statistics is of particular importance for estimating intra-industry trade indexes)

In empirical literature FDI inflows are found to be highly correlated with intra-industry trade levels. Hoekman and Djankov (1996) showed that transition countries that managed to attract the largest investment inflows more heavily rely on intra-industry trade and vertical specialization.

However, taking into account decreasing level of intra-industry trade in Ukraine during the years of transition, we may suspect that FDI inflows in Ukraine contradict the evidence of several other transition countries and, as we may suspect, do not positively influence the level of intra-industry trade. Virtually, it might be the case, because we have not made very strong conclusion about internalization of production processes on the basis of empirical analysis of the relationship between FDI and trade flows that was proposed in the previous chapter.

To clarify this phenomena we propose to analyze impact of FDI inflows to Ukraine on the bilateral level of intra-industry trade with investing country. Our evidence that is graphically presented in the Figure 5 allows as to hypothesis that although GL index for total trade flows of Ukraine has decreased, at the bilateral level between Ukraine and major investing countries it has increased.

Figure 5. **Intra-industry trade between Ukraine and other major investing countries (2000).**



Source: State Statistic Committee (for FDI data) and Ministry of Economy, Department of Statistics (for t4-digit level trade volumes data); author's own calculations

The empirical test of the proposed hypothesis is offered in the next section.

Model 3: Intra-Industry Trade Estimation

Again, we use our equations for the trade volumes, however, this time our dependent variable is the value of the Grubel-Lloyd index. The distinctive feature of this kind of model is that the G-L index as a measure of trade diversity and thus for some extent a measure of the trade complexity and country's external sector advance, might be more accurate measure of the country's progress with external trade liberalization and development of macroeconomic reforms.

Model:

$$GL_{it} = a_i + b_1 \cdot FDI_{it} + b_2 \cdot DIF_GDPPC_{it} + b_3 \cdot ER_VAR_t + b_4 \cdot IND_OUTPUT_t + b_5 \cdot POP_INCOME_t + h_{it}$$

where all variables have the same meaning as the variables of models 1 and 2 in the previous chapter (h_{it} is the error term).

Again, we consider two types of industries, primary and secondary

Regression estimations provide us with quite interesting results (see Appendix D). Naturally, the obtained coefficients are hard to being analyzed. Therefore, in Table 7 we present only signs of coefficients that are enough to conclude about particular impact of FDI inflows on the level of intra-industry trade in Ukraine.

Table 7. Relationship between FDI and level of bilateral intra-industry trade for Ukrainian economy

	Primary products	Secondary products	
European Union	positive (0.9076)	positive (0.6206)	FDI flows
	negative (0.8255)	positive (0.0671)	FDI stocks
Former CMEA	positive (0.4181)	negative (0.9606)	FDI flows
	positive (0.0000)	positive (0.0758)	FDI stocks

Note: figures represent sign of coefficient b_1 and its p-value in parentheses

Discussion of results for intra-industry estimations

On the basis of estimation results presented in the Table 7 we can make inference that bilateral FDI inflows into Ukrainian economy positively influence the level of intra-industry trade between Ukraine and investing countries. For FDI inflows from the former CMEA this result appears to be significant for both types of Ukrainian industries, primary (namely, ferrous metals industry, chemical industry and wood-processing industry) and secondary (namely, food industry and machine-building industry); whereas for investment from the EU positive influence of FDI on the level of intra-industry trade is observed only for secondary products.

Although FDI from the former CMEA have the positive impact on the intra-industry level trade of both primary and secondary products, for the countries of

the EU FDI's we observe positive impact on the intra-industry trade only for secondary products. This supports our hypotheses on the different motives of investments for these two groups of countries which might be caused by the specifics of natural resources endowments the corresponding needs for primary products trade flows. The hypothesis of re-establishment of broken economic links might be also supported with these findings.

This result allows us to make additional inference about possibility of reintegration of Ukraine with countries of the former CMEA, as the G-L index to some extent also measures the overall level of cooperation between countries.

In any case the study of the relationship between FDI inflows and the level of the country's intra-industry trade has the room for improvement, as the measure of the trade diversity can be fine-tuned, as well as the selection of the instrument variables could be conducted more rigorously. Nevertheless, these small investigation for the intra-industry trade developments is the value added to our main analysis of the paper.

Closing Remarks

General Conclusions of Research

The present research has shown that for Ukraine, like for other transition countries, the complementarity relationship between FDI and trade flows dominates. However, the patterns of relationship between FDI and trade flows depend on the type of investors or, in other words, on the stage of similarities between investing and recipient countries. Moreover, our research has revealed that different groups of industries, primary and secondary, obey different patterns of relationship between FDI and trade

FDI from the European Union (EU) into primary industries is mostly export-oriented and thus complements trade, whereas that into secondary, manufacturing industries tends to substitute for trade. This finding supports the results of the previous studies of Ukrainian investment climate that we discuss in the paper. We conclude that primary-industry FDI from the EU is motivated by Ukraine's comparatively abundant and cheap natural resources, whereas secondary-industry FDI is motivated on the cost side by Ukraine's low wage labor and on the revenue side by its large and relatively untapped domestic market. Secondary-industry FDI thus has the potential for import-substitution, although tests of this hypothesis at aggregate levels were inconclusive.

By contrast, FDI from countries of the former Council for Mutual Economic Assistance (CMEA) complements trade in secondary products. This FDI is motivated by the potential for economies of scale, including those that might arise from resuming production links obtained during the Soviet times. This inference is supported by evidence of positive relationships between FDI from the CMEA and intra-industry trade between the CMEA and Ukraine.

Political implications

The studying of peculiarities of external sector of countries with transition economy is necessary for development of optimal strategies of reforms in Ukraine and conducting relevant foreign policy. The development of state policy concerning external sector is under heavy complexity also because the integration processes take place along with large-scale institutional and structural changes.

Our results might provide policy-makers with the inferences about what spheres need their attention if the need to improve the current FDI and foreign trade policies emerges. Particularly, the probable differences between the FDI motives and trade patterns of the former CMEA countries and countries of the EU may allow to diversify the policy measures defining different actions for different countries depending on the political priorities the country currently pursuing.

Credibility of conclusions

The idea to divide investors into two categories was not met in the available literature. We have not seen such the investigation nor for transition countries, nor for developing or advanced countries. Nevertheless, this idea can be strongly supported by institutional economics principles and by the empirical analysis proposed above. To make my results more credible, similar analysis should be conducted for other transition countries.

Also, the credibility of results becomes weaker if to take into account the quality of statistical data for Ukraine. (see appendix A).

In fact, the Ukraine's poor performance in terms of FDI inflows as well as slow pace of the market reforms do not provide enough empirical observations to support our evidence for other sectors of Ukrainian economy.

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APPENDIX A: DATA DESCRIPTION

I. Official FDI data in Ukraine is provided in the special forms of statistical reports compiled by the Derzhkomstat. There are 37 types of forms and each form has its own official code. For the empirical estimations that are presented in the paper we used the following forms (for the years 1996 - 2000):

#	Form's code	The data included into the form
1.	O1_1	Foreign Direct Investments into Ukraine – general overview
2.	O10_1	Direct Investments from Ukraine by countries
3.	O11_1	Foreign Direct Investments to Ukraine by industries (and branches)
4.	O12_1	FDI from Ukraine to other countries by industries (and branches)
5.	O13_1	Foreign Direct Investments by currencies (end of period)
6.	O14_1, O18_1	Foreign direct investments by the branches of economy of Ukraine and by countries

II. The important issue that cannot be ignored while making empirical analysis of trade patterns for Ukrainian economy is the quality of the trade data. Wide analysis of this issue is presented in Tacis/UEPLAC bulletin “Ukrainian Economic Trends” of the April 1998 and in MA paper by Goloven (1999). It is worthwhile to include it in the present paper.

The different sources of trade statistics exist in Ukraine. These are: statistics of Customs Committee, based on customs declarations; statistics of State Statistics Committee (Derzhkomstat), where they adjust customs data based on statistical

reports of enterprises; and the balance of payments data compiled by the National Bank.

The State Customs Committee reports trade according to customs declaration and this is the main basic source of initial data. State Statistics Committee makes compilations of customs data, as adjusted on the basis of enterprise reports. These could include for example goods that were not subjected to customs control, like goods bought and consumed by Ukrainian residents abroad, or fish caught in neutral seas and sold abroad. Then, the National Bank of Ukraine makes its own adjustments to this data, the main items of which are: volume of the shuttle trade by individuals, goods for processing, and finally corrections made on repairs on goods.

Also, we have to mention that a large portion of Ukrainian trade is done in barter form, so that Ukrainian enterprises frequently exchange of goods for goods instead of exchanging goods for money or money for goods. These all result in huge distortions of data that we should keep in mind while claiming about strength of our results and conclusions.

APPENDIX B: EXPORT SUPPLY FUNCTION ESTIMATIONS

Regression results for products of **primary industries** (ferrous-metal, chemical, and wood-processing)

At **bilateral** level:

	FDI flow	FDI stock	C	DIF_ GDPPC	ER_ VAR	IND_ OUTPUT	R2	Fixed or Random effect
from EU	0.03094 (0.9756)		129900.3 (0.0022)	-4.21216 (0.0408)	373772.3 (0.1367)	6.68E-05 (0.9753)	0.880679	RE
		-0.272194 (0.7279)	132413.1 (0.0022)	-4.12160 (0.0448)	361634.3 (0.1463)	-0.00021 (0.9244)	0.881202	RE
from CMEA	-3.30428 (0.3001)			81.80779 (0.0134)	10187.38 (0.9794)	0.009224 (0.0169)	0.81896 2	FE
		2.092789 (0.4044)		79.62670 (0.0167)	75228.81 (0.8533)	0.009675 (0.0202)	0.804453	FE

At **aggregate** level

	FDI flow	FDI stock	C	DIF_ GDPPC	ER_ VAR	IND_ OUTPUT	R2	d- statistics	Fixed or Random effect
from EU	32.8222 (0.093)		3778653 (0.000)		-465105 (0.369)	.219038 (0.000)	0.4581	2.924034	RE, Endogeneity exists
	11.76251 (0.0940)				-520333 (0.1131)	0.21523 (0.0000)	0.32840	“white”- option used	IV variable (with trend)
		14.5016 (0.174)	3708312 (0.000)		-527517 (0.310)	0.22234 (0.000)	0.4480		RE
from CMEA	38.7678 (0.187)		3912983 (0.000)		-513716 (0.324)	.207443 (0.000)	0.4470		RE
		11.9295 (0.382)	3838359 (0.000)		-577887 (0.270)	.214903 (0.000)	0.4365		RE

Estimation techniques:

We run our regressions by the generalized least square method which is commonly used for estimation of pool regression models. It also allows us to deal with possible heteroscedasticity problem in our regressions.

In the regression where we obtained diagnosis of autocorrelation on the basis of Durbin-Watson statistics, we estimated new coefficients with “white heteroskedasticity-regression” option (of the E-views software). It allows us partially to deal with the problem of autocorrelation. The use of standard remedy measures is not possible for our models because it significantly reduces the number of observations in our regression such that makes the results not very meaningful.

The possibility of endogeneity relation between FDI and trade volumes forced us to apply modified Hausman test on model specification (Pindyck and Rubinfeld, 1991, p. 303-304). In addition, we apply Hausman test proposed by STATA software to reveal the most efficient outcome for panel data. The STATA output for the Hausman test allows us to define the type of pool regression to run, fixed effect or random effect.

For primary products:

A list of the former CMEA countries includes the following 11: Bulgaria, Poland, Hungary, Czech Republic, Russian Federation, Belarus, Estonia, Latvia, Lithuania, Slovenia and Slovakia (those countries of the former CMEA that has made positive net FDI inflow to Ukrainian ferrous industry, chemical industry, and wood-processing industry)

A list of countries of European Union includes the following 11: Austria, Belgium, United Kingdom, Ireland, Spain, Italy, Netherlands, Germany, Finland, France, and Sweden (countries are chosen by the same reason)

APPENDIX B (CONTINUED): EXPORT SUPPLY FUNCTION ESTIMATIONS

Regression results for products of **secondary industries** (food & machine-building). Fixed effect everywhere.

At **bilateral** level

	FDI flow	FDI stock	DIF_ DGPPC	ER_ VAR	IND_ OUTPUT	R2
from EU	0.004594 (0.9189)		-0.493638 (0.3565)	44015.43 (0.2287)	8.07E-05 (0.8433)	0.964829
		-0.01083 (0.5123)	-0.574335 (0.2644)	49798.61 (0.1720)	7.46E-05 (0.8456)	0.965828
from CMEA	7.281681 (0.3708)		79.25475 (0.0064)	-890177.2 (0.0252)	-0.005189 (0.0084)	0.750891
		4.429213 (0.3446)	71.14281 (0.0117)	-992983.3 (0.0166)	-0.005439 (0.0124)	0.747744

At **aggregate** level

	FDI flow	FDI stock	DIF_ DGPPC	ER_ VAR	IND_ OUTPUT	R2
from EU	-0.239703 (0.910)			-32760074 (0.0000)	-0.174968 (0.0000)	0.658153
		-3.126760 (0.2131)		-31280392 (0.0000)	-0.165689 (0.0000)	0.674907
from CMEA	152.9517 (0.1426)			-32677945 (0.0000)	-0.171259 (0.0000)	0.689192
		-82.39649 (0.2524)		-30980486 (0.0000)	-0.167194 (0.0000)	0.670311

For secondary products:

A list of the former CMEA countries includes the following 12: Bulgaria, Poland, Hungary, Czech Republic, Russian Federation, Belarus, Georgia, Estonia, Latvia, Lithuania, Slovenia and Slovakia (those countries of the former CMEA that has made positive net FDI inflow to Ukrainian food and machine-building industry)

A list of countries of European Union includes the following 12: Austria, Belgium, Denmark, Luxemburg, Greece, Spain, Italy, Netherlands, Germany, Finland, France, and Sweden (countries are chosen by the same reason)

APPENDIX C: IMPORT DEMAND FUNCTION ESTIMATIONS

Regression results for products of **primary industries** (ferrous metal, chemical, wood-processing)

At **bilateral** level

	FDI flow	FDI stock	DIF_DGPPC	ER_VAR	POP_INCOME	R2	Fixed or Random effect
from EU	0.220815 (0.5621)		-2.363891 (0.0034)	110486.8 (0.1764)	1.699585 (0.0001)	0.9048	FE
		0.191366 (0.5122)	-2.289571 (0.0051)	105479.8 (0.2057)	1.776709 (0.0001)	0.9065	FE
from CMEA	0.182665 (0.7357)		28.55381 (0.0023)	-63117.1 (0.6031)	3.625612 (0.0000)	0.9443	FE
		-0.14658 (0.7590)	27.85939 (0.0032)	-66874.2 (0.5866)	3.559809 (0.0000)	0.9423	FE

At **aggregate** level

	FDI flow	FDI stock	C	DIF_DGPPC	ER_VAR	POP_INCOME	R2	Fixed or Random effect
from EU	2.161537 (0.613)		520047 (0.000)		-3316823 (0.003)	89.90584 (0.000)	0.9046	RE
		0.597105 (0.796)	519959.4 (0.000)		-3366663 (0.002)	89.88657 (0.000)	0.9042	RE
from CMEA	-3.026884 (0.636)		525868.1 (0.000)		-3421507 (0.002)	89.87153 (0.000)	0.9045	RE
		-0.922058 (0.753)	531126.4 (0.000)		-3360378 (0.002)	89.52592 (0.000)	0.9043	RE

(Here the sample of countries is the same as for export supply function estimations – see Appendix B)

APPENDIX C (CONTINUED): IMPORT DEMAND FUNCTION
ESTIMATIONS

Regression results for products of **secondary industries** (food & machine-building). Fixed effect everywhere. No endogeneity among FDI and import flows has been revealed.

At **bilateral** level

	FDI flow	FDI stock	DIF_ DGPPC	ER_VAR	POP_ INCOME	R2	d-statistics
from EU	0.019028 (0.9023)		-3.653366 (0.0025)	255660.1 (0.0490)	6.252365 (0.0000)	0.959895	
		-0.043885 (0.4915)	-3.969246 (0.0007)	294019.9 (0.0258)	6.267596 (0.0000)	0.958529	
from CMEA	9.174074 (0.0895)		35.32102 (0.0019)	-145976.8 (0.3584)	4.250335 (0.0000)	0.941290	1.782*
		6.312915 (0.0477)	41.64386 (0.0002)	-194597.4 (0.2634)	5.357513 (0.0000)	0.948775	1.856*

At **aggregate** level

	FDI flow	FDI stock	DIF_ DGPPC	ER_VAR	POP_ INCOME	R2	d-statistics
from EU	3.373971 (0.1650)			9789643 (0.0000)	196.2783 (0.0000)	0.950684	
		0.954427 (0.3854)		9866233 (0.0000)	199.6217 (0.0000)	0.946160	
from CMEA	109.9057 (0.0013)			9928692 (0.0000)	192.3522 (0.0000)	0.967114	“white” option
		37.87195 (0.1859)		9511049 (0.0000)	200.2345 (0.0000)	0.949489	

* - no autocorrelation at 1% level of significance

(Here the sample of countries is the same as for export supply function estimations – see Appendix B)

APPENDIX D: ESTIMATIONS FOR THE LEVEL OF
INTRA_INDUSTRY TRADE

At **bilateral** level only. (Fixed effect everywhere. No endogeneity for this kind of regressions was revealed)

Regression results for products of **primary industries** (food & machine-building).

	FDI flow	FDI stock	DIF_ GDPPC	ER_ VAR	IND_ OUTPUT	POP_ INCOME	R2	d-sta- tistics
from EU	3.37E-08 (0.9076)		-2.55E-07 (0.8206)	0.1834 (0.208)	-1.99E-09 (0.6131)	1.33E-06 (0.5237)	0.52227	2.070*
		-5.35E-08 (0.8255)	-1.55E-07 (0.8870)	0.1684 (0.245)	-1.98E-09 (0.6144)	1.24E-06 (0.5517)	0.52203	2.087*
from CMEA	9.52E-07 (0.4181)		-1.51E-05 (0.0286)	0.6276 (0.000)	7.71E-10 (0.8419)	-1.49E-07 (0.9411)	0.96994	1.690*
		1.83E-06 (0.0000)	-1.16E-05 (0.0542)	0.6870 (0.000)	3.63E-09 (0.3305)	-1.29E-06 (0.4938)	0.97087	1.819*

Regression results for products of **secondary industries** (ferrous metal, chemical and wood-processing)

	FDI flow	FDI stock	DIF_ DGPPC	ER_ VAR	IND_ OUTPUT	POP_ INCOME	R2	d-sta- tistics
from EU	8.25E-08 (0.6206)		-3.46E-06 (0.1307)	-0.2302 (0.277)	-3.26E-09 (0.1934)	-4.64E-06 (0.0001)	0.90981	2.106*
		8.93E-08 (0.0671)	-3.35E-06 (0.1303)	-0.2539 (0.214)	-3.83E-09 (0.1106)	-4.73E-06 (0.0000)	0.92123	2.137*
from CMEA	-2.59E-07 (0.9606)		-1.03E-05 (0.0672)	-0.1485 (0.424)	-2.59E-09 (0.1714)	-2.25E-06 (0.1141)	0.96085	2.346*
		4.52E-06 (0.0758)	-1.21E-05 (0.0245)	-0.3161 (0.076)	-3.84E-09 (0.0332)	-2.82E-06 (0.0219)	0.97162	2.360*

(Here the sample of countries is the same as for export supply function estimations – see Appendix B)