Modeling Convergence
of Ukraine Towards the EU[*]

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SUMMARY. This article studies the pre-accession experience of new European Union member states of Central and Eastern Europe and accordingly examines the prospects for a convergence of Ukraine's economic performance with that of the EU countries. The authors develop econometric models to evaluate the trade and foreign direct investment (FDI) effects of EU-accession for Ukraine. The trade potential between Ukraine and the EU is assessed based on the gravity model of international trade using economic distance indexes. The FDI effects are analyzed according to an econometric data panel model. The article also examines the benchmarks of Ukraine's convergence with the EU in terms of trade volume and FDI potential values.

KEY WORDS: regional integration effects, trade effects, FDI effects, economic distance, gravity model of trade, convergence, panel data.

Introduction

Ukraine's geopolitical position today requires the settlement of issues concerning European integration. In its Program of Action, «Towards the People», the new Ukrainian government declared Euro-integration as Ukraine's foreign economic policy priority. The Ukrainian government intends to move from declarative statements to concrete steps in the implementation of the EU-Ukraine Action Plan. The goal of the Program of Action is to establish the appropriate foundation and economic basis for Ukraine's full membership in the EU.

In this context, it is extremely important to realistically assess the opportunities and benefits of a deeper cooperation with the EU and Ukraine's possible accession. Of special interest is the anticipated prospects for a convergence of Ukraine's economic performance (a rapprochement over time) with that of the EU. Ukraine's integration with the EU is expected to raise the living standards of the Ukrainian people to European ones, which is the government's strategic goal.

The overall objective of this article is to provide scientific arguments for the Ukrainian economy's pre-integration adaptation as well as an assessment of prospects for Euro-integration. Based on a study of the experiences of the Central and Eastern European (CEE) countries, this article develops models of Ukraine's convergence with the EU and identifies the conditions for Ukraine's effective integration into Europe.

While studying the general effects of regional integration, we have noted that trade and FDI effects can be observed even at the initial stages of the integration process. The main parameters analyzed in this article are the aggregate trade volume between Ukraine and the EU-25 and FDI flows into the Ukrainian economy. The potential values of these indicators are evaluated in the context of the government's policy on Ukraine's economic rapprochement with the European Union.

Literature review

Adherence to the Euro-integration vector of Ukraine's foreign economic policy primarily implies the implementation of the EU-Ukraine Action Plan. This document was approved by the EU-Ukraine Cooperation Council on 21 February 2005 for a three year period. The implementation of the Action Plan will significantly harmonize the rules and standards of Ukrainian law with EU law. It will also lay the foundation for further economic integration, including the creation of an EU-Ukraine free trade area after Ukraine's accession to WTO. The adoption and implementation of the economic and trade provisions and rules set out in this document will facilitate trade, investment and economic growth.[1]

Several studies have investigated Ukraine's integration into the EU. One study, Ukraine on the Road to Europe,[2] offers a comprehensive analysis of Ukraine's integration into Europe. This book justifies the European choice of Ukraine, examines Ukraine's progress in its integration into the world economy, and discusses the prospects for Ukraine's convergence to the EU. In particular, W. Quaisser and V. Vincentz in their work, Integrating Ukraine into the World Economy: …How, How fast and Why?, concluded that there

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[1] *EU-Ukraine Action Plan*, Delegation of the European Commission to Ukraine, approved on 21 February 2005, http://www.delukr.cec.eu.int.
[2] The German Advisory Group on Economic Reforms with the Government of Ukraine, *Ukraina na shliakhu do Yevropy*, [Ukraine on the Road to Europe], 2000.

is a high potential for trade between Ukraine and the EU, but this largely depends on the progress of Ukraine's economic reform.[3]

In her publication, *Ukraine and the European Union*, N. Kukharska[4] reviews the current progress of economic relations between Ukraine and the EU, the preconditions for Ukraine's accession to the EU, and discusses the short-term and long-term consequences of EU expansion. However, the author concludes that it is premature to talk about Ukraine's accession to the EU in the nearest future. She argues that Ukraine first needs to develop a funding mechanism that supports its adaptation of international standards and builds a competitive domestic economy.

The experience of the CEE countries, which have already integrated into the EU following the collapse of the communist regimes in these countries, is of great value for the analysis of EU-accession effects on Ukraine.[5] A number of research articles review the accession effects on CEE countries.[6]

Baldwin, Franзois and Portes[7] studied the cost and benefits of integration for both CEE countries and the EU-15 countries, i.e. the «core» member countries. With the help of a global general equilibrium model, the researchers simulated trade effects, common market effects and FDI effects for these groups of countries. The modeling results significantly vary depending on the assumptions about FDI effects. An optimistic scenario envisages a decrease in investment risks in CEE countries to the level of Portugal which results in lower risk premiums for investors, increased demand for capital and ultimately higher volumes of attracted capital in these countries. A conservative scenario considers only the effect of the increased rate of return on capital and its impact on the FDI stock. In the case of the conservative scenario, the cumulative FDI inflows increased by 1.2 % and the real GDP increased by 1.5 % in comparison with the scenario of non-accession to the EU. However, according to the optimistic scenario, the FDI stock increased by 68% and the real GDP increased by 18.8% compared with the non-accession scenario. The experience of Ireland, Spain and Portugal

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[3] The German Advisory Group on Economic Reforms with the Government of Ukraine, *Ukraina na shliakhu do Yevropy*, [Ukraine on the Road to Europe], 2000.

[4] Kuharskaya, N., *Ukraina i Yevropeiski Soyuz*, [Ukraine and European Union], MEiMO, 2005.

[5] On 1 January 2004, 10 new members joined the EU: Estonia, Cyprus, Latvia, Lithuania, Malta, Poland, Slovenia, Slovakia, Czech Republic, and Hungary.

[6] Aarle, B., Skuratowicz, A. (2000); Baldwin, R. E., Venables, A.J. (1995), *Regional Economic Integration*, in G. Grossman, K. Rogoff (Eds.), *Handbook of International Economics*, Vol. III, Elsevier Science B.V., Amsterdam, 1597-1644.]; Baldwin R. E., Joseph F. Francois, and Richard Portes (1997), *The Costs and Benefits of Eastern Enlargement: The Impact on the EU and Central Europe*, Centre for Economic Policy Research; Breuss, F. (2001), *The Role of Time in EU Enlargement*, in: S. Arndt, H. Handler (eds.), *Eastern Enlargement: The Sooner, the Better?* European Academy of Excellence, 118—132.

[7] *Ibid.*, Baldwin, R., François, J., Portes, R. (1997).

speak in favor of the optimistic scenario, while the experience of Greece speaks in favor of the conservative scenario.

Other studies analyze the prospects for convergence[8] of CEE countries with the EU-15. For instance, Fisher, Sahay and Vegh[9] applied three distance concepts to CEE countries: physical distance, economic distance and temporal distance.[10] Accordingly, economically stronger CEE countries are situated closer to the poorer EU-15 countries, with the estimated period for convergence with the level of the poorer EU-15 countries being 23−24 years on average.

Wagner and Hlouskova[11] assessed the projections for economic growth and convergence of CEE countries with the level of the EU-15 based on their analysis of various scenarios. The authors used an implicit approach in which the forecasting equation for the economic growth in CEE countries is calculated with the date of the EU-14[12], while the forecasts of economic growth are obtained based on the values of independent variables for CEE countries. The use of the implicit approach is justified by structural changes in the economy of these countries, which have occurred due to the effects of transition and EU integration. The forecasts of the direct approach provide evidence of a divergence between the CEE countries and EU-14, while the indirect approach demonstrates that CEE countries can achieve 100% convergence with the levels of EU-14 within 38 to 74 years, depending on the country.

Integration effects: the experience of CEE countries

International economic integration implies the harmonization of all elements of a country's economic system with the standards adopted in the European or world community. According to the classification of economic integration levels accepted in the theory of international trade, trade relations between Ukraine and the EU have only passed the initial level of preferential trade agreements that establish lower trade barriers between the parties as opposed to

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[8] Economic rapprochement of countries implies the rapprochement of macroeconomic policy parameters (inflation, budget deficit), income per capita, etc.

[9] Fisher, S., Sahay, R., and Vegh, C. A. (1998), *How Far is Eastern Europe from Brussels?* IMF Working Paper 98/53

[10] Physical distance is measured in kilometers from the capital of a given CEE country to Brussels; economic distance is an aggregate of the following data: the difference of income per capita, average annual inflation, percentage of budget deficit in relation to GDP, and the economic liberalization index; temporal distance is the number of years needed for a CEE country to achieve an average level of EU-15 countries with a comparatively low income (Greece, Spain, Portugal).

[11] Wagner, Martin, Hlouskova, Jaroslava (2004), *CEEC Growth Projections: Certainly Necessary and Necessarily Uncertain*, Discussion paper, Universität Bern, Volkswirtschaftliches Institut.

[12] EU-15 except Luxemburg.

any third countries and most favored nation status in trade relations. The two sides have taken preliminary steps to raise Ukraine to the second level of economic integration — a free trade area (in the form of associated membership).[13] Other more advanced levels of economic integration include a customs union, a common market and, finally, economic union which Ukraine strives to achieve in the nearest future.

Studies on regional integration[14] point out the following integration effects of an economic union:

• **Trade effects:** Decreased economic distance by removing trade restrictions, development of trade infrastructure and reconciliation of quality standards;

• **Common market effects:** Improved production, increased productive capacity and price competition;

• **Movement of productive factors:** Increased volumes of foreign direct investment and migration of labor to the EU;

• **Integration losses:** Lower budget revenues from tariff cuts; Slower investment dynamics for EU members.

In this section, we will analyze the integration effects by using the pre-accession experiences of the new EU member states. We will review the cases of Poland and Hungary which suggest changes in macroeconomic data during the pre-accession period. We will analyze the dynamics and structure of trade volume, FDI inflows into the countries, and gross domestic product. The analysis of these data allows us to make certain conclusions on the convergence of these countries with the EU during the pre-accession period.

On average, European integration proved to be a „win-win»[15] situation in terms of GDP for both EU and CEE countries. Each side in the integration process — EU member states and the countries acceding — has benefited from EU expansion in general, with negative effects being superceded by significant positive effects.

Trade effects. We illustrate the convergence of trade indicators by using statistical data of the International Monetary Fund on bilateral exports and imports from 1984 to 2003. (IMF, DOTS — Directions of Trade Statistics)

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[13] Chuvardynsky, O. H., *Yevropeisky soyuz i rozvytok suchasnykh integratsiynykh zviazkiv Ukrainy*, [European Union and Development of New Integration Ties of Ukraine], Kiev, Naukovyi Svit, 2002.

[14] Baldwin, R. E., Venables, A.J., *Regional Economic Integration*, in G. Grossman, K. Rogoff (Eds.), *Handbook of International Economics*, Vol. III, Elsevier Science B.V., Amsterdam 1995, 1597—1644.]; Baldwin R. E., Joseph F. Francois, and Richard Portes, *The costs and benefits of eastern enlargement: the impact on the EU and central Europe*, Centre for Economic Policy Research, 1997; Breuss, F., *The Role of Time in EU Enlargement*, in: S. Arndt, H. Handler (eds.), *Eastern Enlarement: The Sooner, the Better?* European Academy of Excellence, 118—132.

[15] *Economic and social context of Slovakia's integration into the EU,*. Institute of Slovak and World Economy SAS, Bratislava, 2003.

The diagrams represent the dynamics of aggregate exports and imports for Poland — EU-15 and Hungary — EU-15:
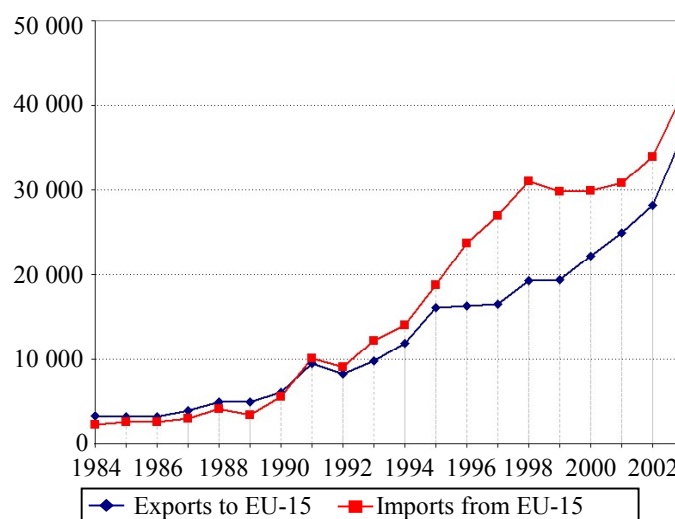
Export and import flows between Poland and EU-15, million USD
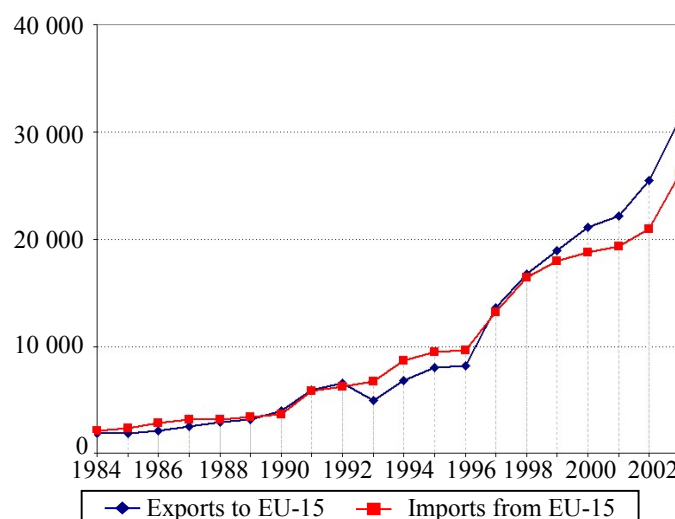
Export and import flows between Hungary and EU-15, million USD

In 1984 to 2003, the aggregate trade volume between Poland and the EU-15 increased from USD 5,753 million to USD 78,443 million, that is 13.6 times. The average annual increase of trade turnover was 7.9 % in 1984−1989 and 15.8 % in 1990−2003. Respec-

tively, the aggregate trade volume between Hungary and the EU-15 was USD 4,130 million in 1984 and grew to USD 57,417 million in 2003. The average annual growth rate of Hungary's trade volume with EU-15 was 10.2% in 1984−1989 and 16.7% in 1990−2003.

The diagrams below represent the percentage ratio of EU-15 trade volumes to total world trade volumes for Poland and Hungary:
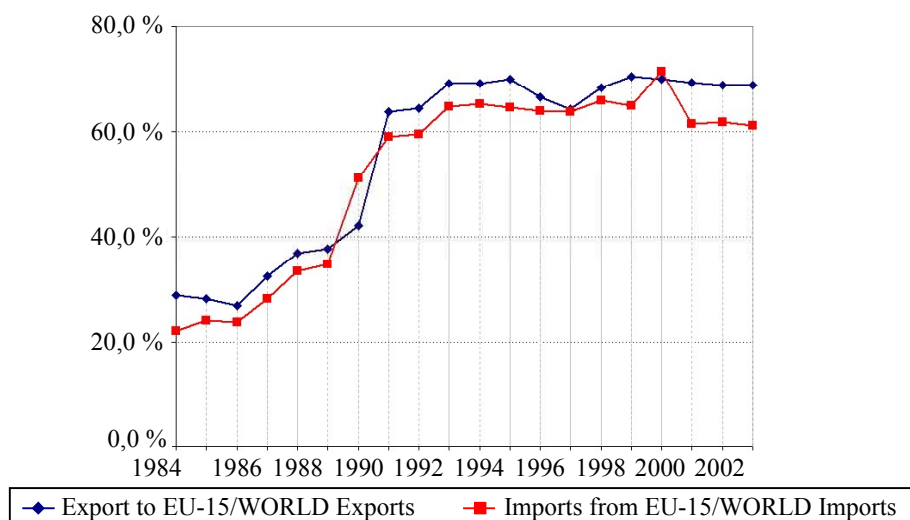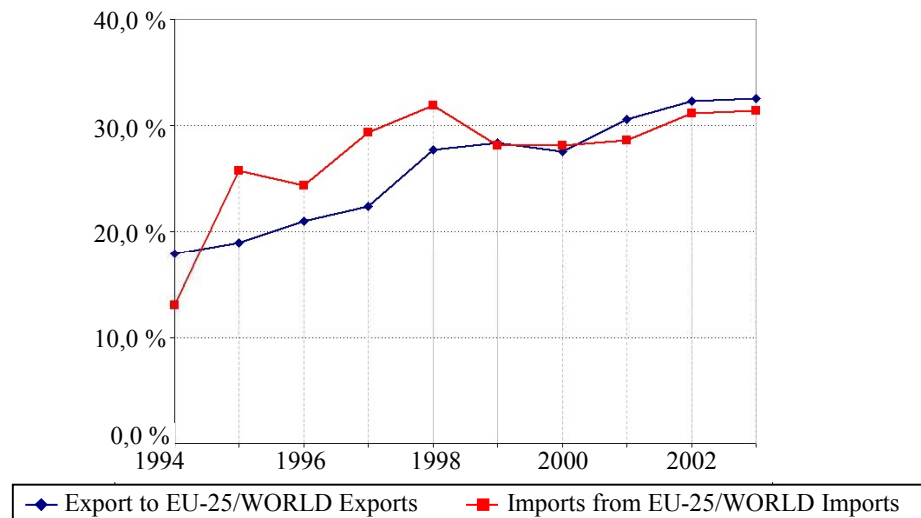

Ratio of EU-trade volume to total world trade volume, Poland, %
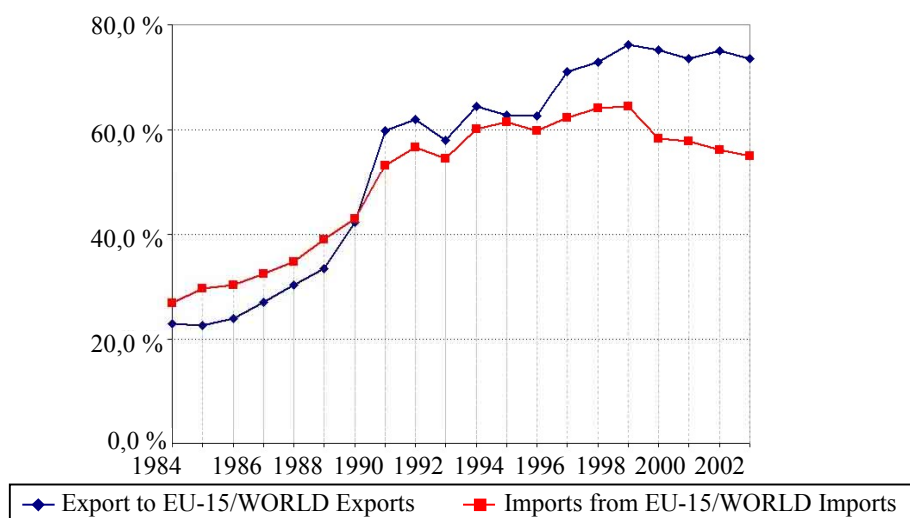
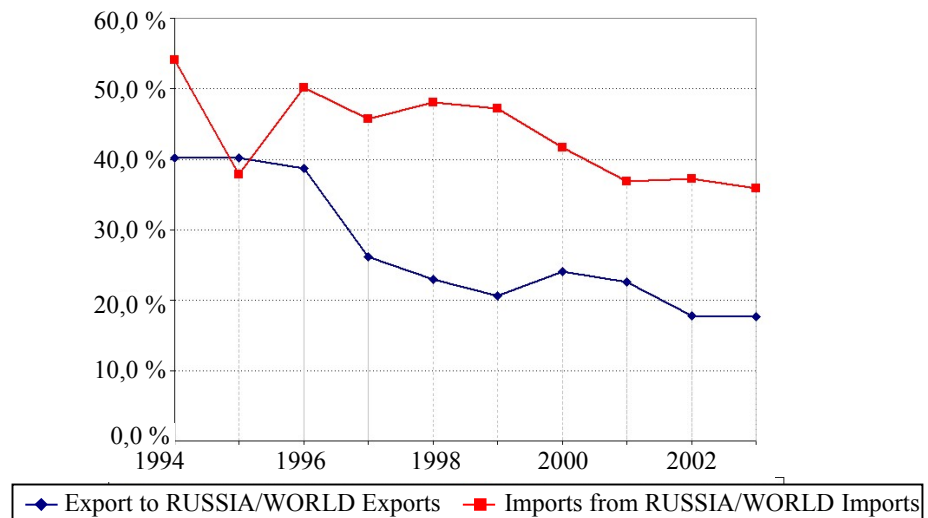Ratio of EU-15 trade volume to total world trade volume, Hungary, %

The share of Poland's trade volume with the EU-15 was 25 % to 30 % in 1984−1987. A reorientation in its trade from 1988 to 1994 led to a gradual increase in the share of trade with the EU-15. This indicator stabilized at 65 % after 1995. The situation was similar in Hungary: the corresponding share was 24 % to 32 % in 1984−1988; after reorienting its trade between 1989−1994, Hungary's trade volume with the EU-15 stabilized at the level of 66 %.

Similar results can be found for Ukraine. The illustrated dynamics of trade with the EU-25 and Russia is based on the IMF's data. In 1994, the aggregate trade volume of Ukraine's trade with the EU-25 was USD 3,143 million, and that of Ukraine with Russia was USD 9,835 million. In 2003, it increased to USD 15,456 million and USD 12,957 million, respectively. The structure of trade turnover is represented by the following diagrams:

Ratio of EU-25 trade volume to total world trade volume, Ukraine, %

Thus, in the past ten years there has been a clear tendency of change in Ukraine's foreign trade structure. While in 1994, 40.3 % of all exports went to Russia, the share of Russian export dropped to 18 % by 2003. At the same time, the share of Ukraine's exports to EU-25 increased from 17.8 % in 1994 to 32.5 % by 2003. This tendency without a doubt speaks in favor of an economic rapprochement between Ukraine and the European Union.

Ratio of Russia trade volume to total world trade volume, Ukraine, %

Foreign direct investment. Regarding the dynamics of FDI for Poland, Hungary and Ukraine, in 1993 the FDI stock, according to the Vienna Institute for International Economic Studies,[16] was USD 2,307 million for Poland, USD 5,585 million for Hungary, USD 370 million for Ukraine. By the end of 2002, the stock FDI for Poland was USD 45,500 million (the average annual increase was 39.3 % per year), for Hungary USD 30,935 million (20.9% per year), and for Ukraine USD 5,300 million (34.4 % per year). According to the International Monetary Fund,[17] foreign direct investment was USD 55,268 million for Poland, USD 42,915 million for Hungary, and USD 7,502 million for Ukraine in 2003.

The international rating agency, Standard & Poors (S&P) recently rated Ukraine at «BB-/Stable/B»[18] for investment risks (long-term credit rating). PRS Group has offered its own ICRG[19] risk index which was 72.0 for Ukraine in September 2004 (the 65th place among the rated countries). These ratings demonstrate that Ukraine may already today be referred to the group of countries with comparatively low investment risk. Certainly, Ukraine will be

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[16] The Vienna Institute for International Economic Studies - http://www.wiiw.ac.at/.
[17] IMF International Finance Statistics.
[18] http://www.sandp.com, data as of May 2005.
[19] ICRG (International Country Risk Guide, http://www.prsgroup.com). ICRG project publishes political assessments and economic data based on which it produces a risk rating on a monthly basis in 140 countries worldwide. Risk levels based on ICRG evaluation: Very High Risk 00.0 to 49.5 points, High Risk 50.0 to 59.5 points, Moderate Risk 60.0 to 69.5 points, Low risk 70.0 to 79.5 points, Very Low Risk 80.0 to 100 points.

able to attract more foreign direct investment upon accession to the European Union[20]; the confidence of foreign investors will be greater as the risks of investing in the Ukrainian economy gradually decrease.
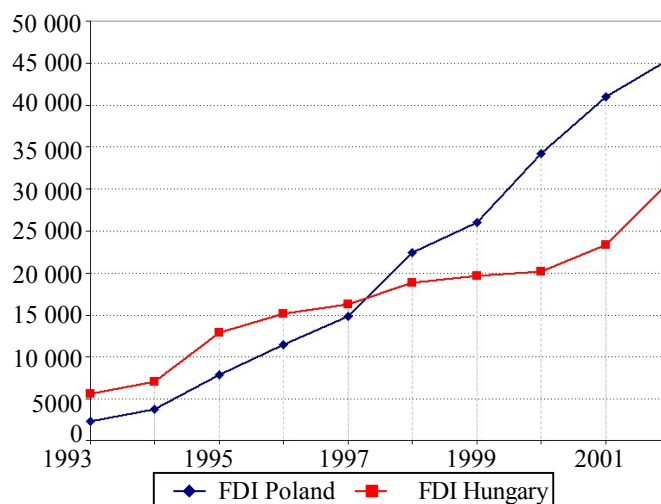
FDI stock for Poland and Hungary in 1993−2002, million USD
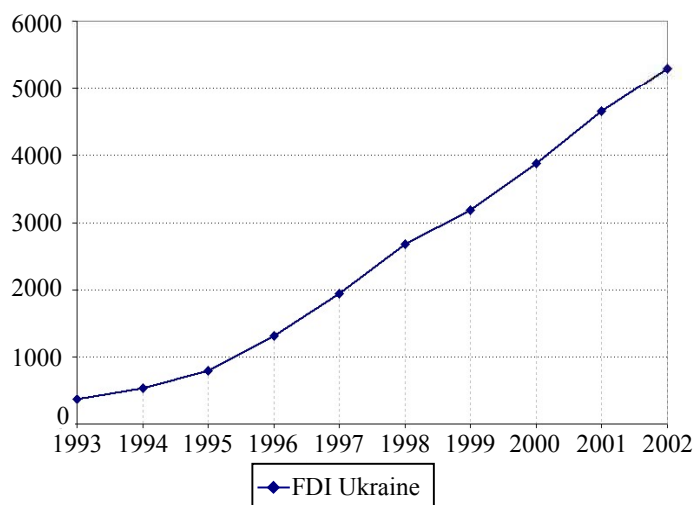
FDI stock for Ukraine in 1993−2002, million USD

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[20] ICRG index for some EU countries: Luxembourg — 90.0; Germany — 82.3; France — 78.3; Poland — 75.0; Hungary —74.8, data as of May 2005.

Economic growth. The following diagram represents the GDP per capita based on purchasing power parity (PPP) for EU countries and selected industrially developed countries in 2003−2004. This indicator is normalized with 100 as the average value for the EU-25.
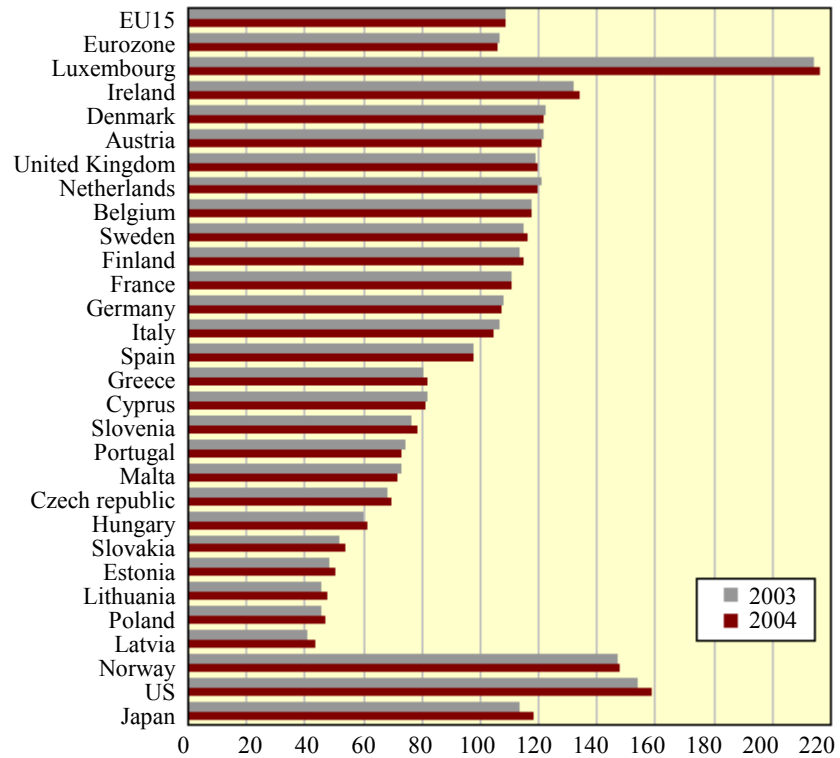
Figure 1. GDP per capita, by PPP, EU-25 level = 100

Source: Eurostat, http://epp.eurostat.cec.eu.int/**, 2004**

Despite an apparent difference in economic growth values between the established and newest members of the European Union, the available potential for attracting FDI and increasing trade volumes should significantly accelerate the convergence in the countries that recently joined the EU. We will discuss the available potential for trade development and FDI attraction in the following paragraphs with the help of developed convergence models for Ukraine.

The model of trade convergence

There are many recent empirical studies that attempt to explain and forecast the volumes of bilateral trade between countries with the help of the gravity model of international trade.[21] In its standard specification, the gravity model of international trade uses the geographic distance between economic centers of countries to measure the costs of goods delivery from one country to another. Such an approach is criticized in modern studies as being unable to adequately reflect transportation and other costs of market access.[22]

In contrast to the common practice of using geographic distance, we consider economic distance[23] as a major determinant of bilateral trade, especially as applied to integration processes. For example, the geographic distance between New York and Moscow (7,533 kilometers) is smaller than between Los Angeles and Tokyo (8,816 kilometers); however, one can hardly be convinced that the US is economically closer to Russia than Japan.[24]

The process of Ukraine's Euro-integration inevitably affects the economic distance between Ukraine and EU countries. Removing trade restrictions and complicated customs procedures, adopting new quality standards for goods, attracting FDI, and improving management in Ukraine should significantly reduce the cost of access to EU markets for Ukrainian producers and raise the competitiveness of Ukrainian goods on the European and world markets.

The beneficial geographic location of Ukraine between Russia and Western Europe is of strategic importance to the EU since Ukraine is a transit territory, especially for transporting Russian oil resources. In this respect, the EU will most probably be interested in developing Ukraine's infrastructure, an argument supported by the experience of the new member states from Central and Eastern

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[21] Hamilton, C. B., Winters, L. A. (1992), *Opening up international trade with Eastern Europe*. Economic Policy: A European Forum, April, pages 77-104/111-116.; Baldwin, R. (1994), *Towards an Integrated Europe*. Centre for Economic Policy Research, United Kingdom.; Frankel, J., Stein E., Wei, Shang-Jin (1998), *Continental trading blocs: are they natural, or super-natural?* in Frankel (ed.), *The Regionalisation of the World Economy*, National Bureau of Economic Research. The University of Chicago Press, Chicago and London.

[22] Head, K., Mayer, T. (2002), *Illusory Border Effects: Distance mismeasurement inflates estimates of home bias in trade*. CEPII (Centre D'Etudes Prospectives et D'Informations Internationales), Working Paper No. 2002-01; Cheng, I-Hui, Wall, Howard J. (2005), *Controlling for Heterogeneity in Gravity Models of Trade and Integration*. Federal Reserve Bank of St. Louis Review, January/February 2005, 87(1).

[23] Economic distance between countries is determined as an aggregate of transport cost, existing trade barriers, established economic, cultural and historic ties, differences in standards of product quality, relative advantages of consumers from the importing country with regard to goods from the exporting country, and a number of other factors.

[24] Wall, Howard J. (1999), *Using the Gravity Model to Estimate the Costs of Protection*. Federal Reserve Bank of St. Louis *Review*, January/February 1999, *81*(1), pp. 33—40.

Europe. Ukraine's orientation towards a closer cooperation with the EU, together with the possibility of further integration, is gradually reducing the economic distance between Ukraine and the European Union.

In this article we adapt the gravity model of trade to model the trade convergence of CEE countries and Ukraine with the EU. To describe trade volume dynamics within the EU-25 we use the gravity model specification with bilateral fixed effects. The same equation is also used for modeling Ukraine's trade flows with the EU-25:

$$\log\left(TV_{ijt}\right) = \alpha_{ij} + \alpha_t + \beta_1 \log\left(Y_{it}\right) + \beta_2 \log\left(Y_{ji}\right) + \varepsilon_{ijt}, \qquad (1)$$

where TV_{ijt} is the trade volume between countries i and j at time period t;

Y_{it} and Y_{jt} are the nominal GDPs of countries i and j;

α_{ij} is a constant (fixed effect) specific for each pair of countries,

α_t is a time trend common for all country pairs[25],

β_1 and β_2 are income elasticities of trade volume between countries i and j,

u_{ijt} is an error term,

indexes i and j denote a country from EU or Ukraine.[26]

For the econometric evaluation of Formula (1), we use the panel data of trade turnover in EU-25 countries and Ukraine for 1994—2003.

Fixed effects α_{ij} in Equation (1) control for all unobserved factors which are specific for each country pair and determine bilateral trade relations. In fact, the fixed effects in (1) reflect the influence of economic distance on the trade volume between the given countries. Basically, we are interested in estimating the «potential» economic distance between Ukraine and the EU, which can result from a convergence in the pre-accession period. To estimate the potential economic distance between Ukraine and the EU, we dissect the bilateral fixed effects for the EU-15 country pairs. By separating the components of transportation costs and availability of a common geographic border from fixed effects, we obtain the base economic distance between EU-15 countries. The base economic distance captures the degree of economic integration between the most developed

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[25] Temporal trend α_t in fact represents structural changes in trade orientation of EU-25 countries under the influence of deeper integration processes. It can therefore be fairly called the trade orientation trend.
[26] *Directions of Trade Statistics Yearbooks,* International Monetary Fund, 1994—2003.

EU countries. For that purpose, we formulate the following equation:

$$\alpha_{ij} = \delta + \theta_1 DIST_{ij} + \theta_2 BORD_{ij} + \varepsilon_{ij}, \tag{2}$$

where α_{ij} are the fixed effects obtained from (1);

$DIST_{ij}$ is the geographic distance between the capitals of countries i and j;

$BORD_{ij}$ is a dummy variable that equals 1 if countries i and j have a common geographic border or 0 if no such border is available;

δ is the base economic distance between EU-15 countries;

θ_1 represents the influence of geographic distance between countries;

θ_2 is the effect of common geographic border, and

ε_{ij} is an error term.

By using the dissected fixed effects for the EU-15 countries (2), we obtain potential values of economic distance between Ukraine and EU-25 countries. The underlying assumption is that the economic distance between Ukraine and the EU countries will gradually achieve the level of the base economic distance between EU-15 countries controlling for the influence of geographic distance and common border effect.

As a result of the calculations,[27] we obtained income elasticities of bilateral trade volumes in these countries, which are determined by GDP indexes of the trading partners. Equation (1) was estimated separately for exports and imports for the EU-25 countries.

**Table 1. Calculated results
for the international trade model, EU-25 countries and Ukraine**

Explanatory variable	Trade volume logarithm	Exports l ogarithm	Imports logarithm
Fixed effects	-*	-*	-*
GDP logarithm for the exporting/importing country	0.74	0.63	0.84
GDP logarithm for the country of export/import destination	0.70	0.78	0.56
Total observations	5,972	6,005	6,010
R squared	0.97	0.97	0.97

* The fixed effects diagram is represented in Figure 2.

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[27] We use the 1994—2003 data for bilateral exports and imports for the EU-25 and Ukraine. The dataset was taken from open sources of the International Monetary Fund [*Directions of Trade Statistics Yearbooks*, International Monetary Fund, 1994—2003].

The exports equation will provide an example of economic interpretation. As GDP increases by 1 % in the country that imports goods and services, i.e. increasing aggregate demand in the importing country, export grows by 0.78 %. On the other hand, as a result of the GDP increase by 1 % in the exporting country, i.e. increasing supply, export grows only by 0.63%. These results show that it is demand in the importing country rather than supply in the exporting country that has greater influence on exports from one EU country to another one.

The fixed effects in equation (1) determine the bilateral economic distance. We calculate the potential economic distance between Ukraine and each of the 25 countries of the European Union, adding a respective geographic distance effect and common border effect with Poland, Slovakia and Hungary to the base economic distance. It should be noted that the value of potential economic distance could be a benchmark for Ukrainian government policy concerning EU integration. From a comparison of the potential economic distance with the actual one, we could infer the effectiveness of the government's EU-integration policy. Figure 2 represents the normalized values of fixed effects as the economic distance indicators:
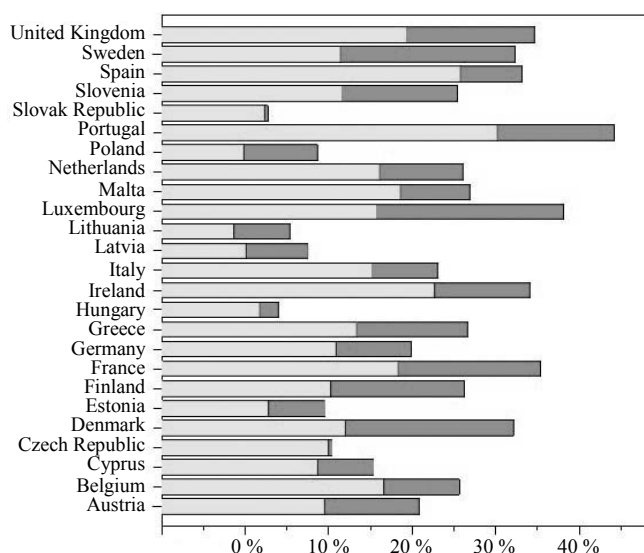

Figure 2. Economic distance between Ukraine
and the EU-25 countries (fixed effects of the model)

The fixed effects are normalized so that the base economic distance for the EU-25 countries is treated as zero, and the scale shows

the percentage deviation from this value. The full column reflects the actual economic distance between Ukraine and EU countries. The light gray color shows the potential economic distance, whereas the dark gray color shows the part of the actual economic distance which could be removed by a targeted economic policy of convergence to the EU. Thus, Figure 2 shows the percentage growth of Ukraine's trade volume with respective countries due to the decrease of economic distance. Figure 3 shows the potential trade volume between Ukraine and the European Union calculated under the assumption of a gradual decrease in economic distance to potential levels (see Figure 3). It should be noted that the potential trade volume would be observed with the same economic development indicators in respective years (aggregate demand and supply) but with a smaller economic distance.
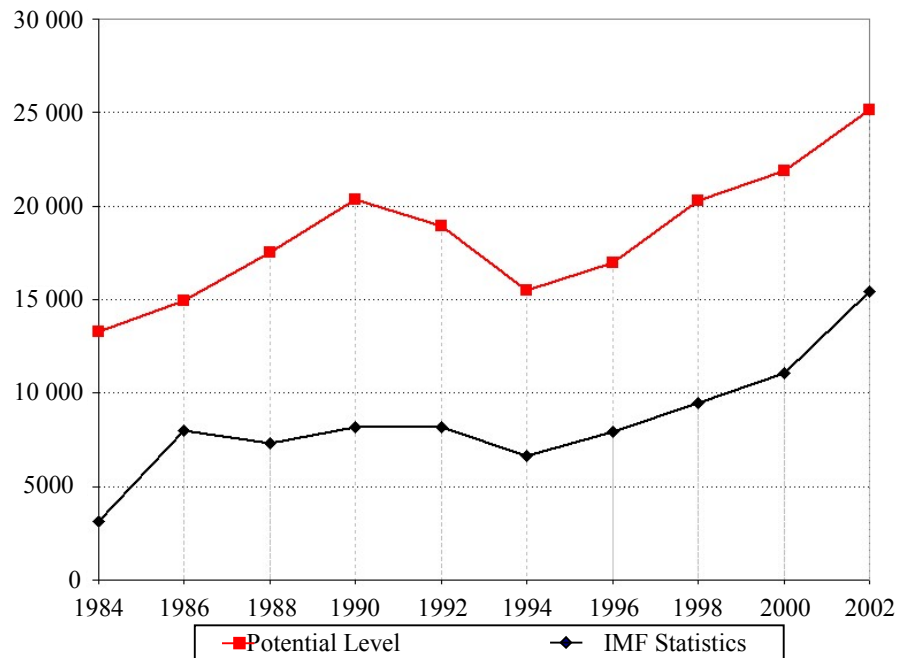

Figure 3. Trade volume between Ukraine
and the EU-25 countries, in million USD, 1994-2003

Therefore, taking into account Ukraine's strategic orientation towards EU-accession, we simulate the potential reduction of the economic distance between Ukraine and the EU-25 countries and calculate the corresponding potential trade volume between Ukraine and

the EU-25. It is worth noting that a convergence with the potential volume is impossible without the appropriate government policy that maximizes the benefits of EU-accession and limits any possible negative tendencies. Close cooperation with the EU in the harmonization of quality standards, development of trade infrastructure and the attraction of FDI into priority industries enables a new level of trade relations with the EU and significantly fosters national economic development.

It is also useful to do a comparative analysis of economic distance to EU-25 for Ukraine and other candidate countries: Bulgaria, Romania and Turkey. The corresponding calculations via the trade convergence model (1)—(2) enables us to estimate the economic distance for this country group using the common scale. As before, zero is the average economic distance for EU-25 countries. The diagram (see Figure 4) represents the economic distances for Bulgaria, Romania, Turkey and Ukraine to EU member states:
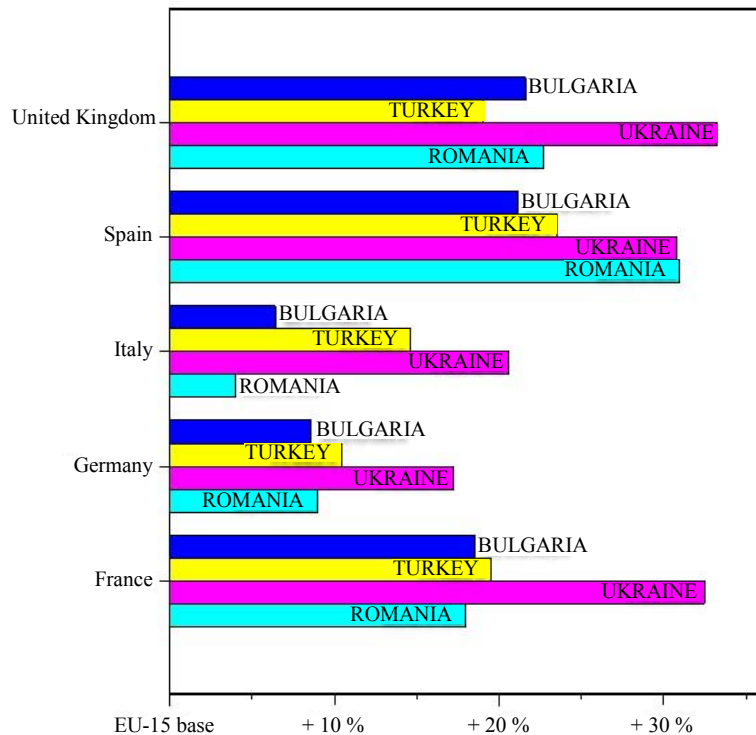

Figure 4. Comparative analysis
of economic distance to EU countries for the EU candidate countries

Estimates for Ukraine look realistic. Despite the fact that Ukraine is geographically situated in the center of Europe, Ukraine's economic distance to the European Union remains significant. Turkey, Romania and Bulgaria seem to be economically closer to all the countries considered above. Such a disadvantageous position for Ukraine compared with the other EU candidate countries raises the need for an appropriate economic policy to move closer to the EU, harmonize standards in quality and effectively stimulate the competitiveness of Ukrainian exports on European and world markets. Only then can Ukraine be viewed as a realistic applicant for EU membership and having the convergence potential.

Convergence model: Foreign Direct Investments

Among the factors that determine the flow of foreign direct investment in transition economies, recent studies distinguish such indicators as the level of investment risks, cost of labor, a country's market volume, progress of reforms, etc.[28] The different abilities of CEE countries to attract investments depending on which «wave of integration» they belong to are strongly emphasized.[29]

The experience of CEE countries reveals a significant impact of the EU integration process on the attraction of foreign direct investments. As noted above, EU integration reduces economic distance between the candidate country and the European Union. This follows an increase in the bilateral trade volumes of the candidate and EU member states in the pre-integration period. At the same time, most factors that determine the economic distance between countries also affect their investment attractiveness. Therefore, the economic distance as a generalized parameter of the market access cost would also affect volumes of investments.

The EU-15 countries are the major investors in the CEE countries. Therefore, the volumes of investments coming from EU-15 to a CEE country should depend on the average economic distance of a particular country to the EU-15. The average economic distance can be obtained by weighing paired economic distances to all EU-15 countries against the GDP of these countries (market size).

Similar to the papers discussed above, we consider the level of investment risks as the factor that determines foreign direct investment.

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[28] Kuznecovs, O., Maslovs, A. (2004), *Relative FDI Attractiveness of Eight EU Accession States*. SSE Riga Working Papers 2004:5 (60) Merlevede, B., Schoors, K. (2004), *Determinants of Foreign Direct Investment in Transition Economies*, Centre for Russian International Socio-Political and Economic Studies, Ghent University, Belgium.

[29] *Ibid.* The first wave of integration includes Estonia, Latvia, Lithuania, Poland, Slovenia, Slovakia, Czech Republic, Hungary; the second wave includes Bulgaria and Romania.

The level of investment risks in a recipient country has a significant impact on the average return on assets (the more risks associated with an investment project, the higher the return on investment for the investor) and ultimately on the volumes of attracted investment.[30] Moreover, our framework suggests that a country's market size can explain the variation of FDI volumes: the larger the domestic market volume, the more attractive is the country for investments.

Therefore, our model of foreign direct investment looks as follows:

$$\log(FDI_{it}) = \gamma_0 + \gamma_1 \log(Y_{it}) + \gamma_2 ED_{ist_i} + \gamma_3 ICRG_{it} + \varepsilon_{it}, \qquad (3)$$

where FDI_{it} is the volume of FDI in country i,

Y_{it} is GDP per capita in country i,

$EDist_i$ is the average economic distance between country i and the EU-15,

$ICRG_{it}$ is the index of a country's investment risk, and

ε_{it} is an error term.

We calculated equation (3) using the panel data for EU-25 countries and Ukraine in 1994-2003. The parameters in equation (3) were taken as equal for all countries, thus the values were obtained by the pooled estimation technique. All of the estimated parameters are statistically significant (see Table 2).

Table 2. Results of econometric calculation
of the model of foreign direct investment, EU-25 countries and Ukraine

Dependent variable	DFI logarithm	Standard error
Intercept, (γ_0)	7.35	2.21
Country's GDP logarithm, (γ_1)	0.67	0.05
Economic distance to the EU, (γ_2)	−0.86	0.15
Investment risk — ICRG (γ_3)	0.03	0.01
Total number of observations	59	—
Adjusted R Squared	0.83	—

Therefore, the results demonstrate a significant inverse relationship between the economic distance of a given country to EU-15 countries and volumes of foreign direct investments attracted by this country. The estimates of the other parameters are also valid from

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[30] Baldwin, R., François, J., Portes, R. (1997), *The cost and benefits of Eastern enlargement: The impact on the EU and Central Europe*. Economic Policy, vol. 12(24), pp. 125—76.

the economic perspective, i.e. market volume has a positive impact on the volumes of attracted investments and a negative one on the level of investment risks.

The reduced economic distance between CEE countries and EU-15 countries and a tendency to decrease investment risks (ICRG index — assessment of political, economic and financial risk — a technique of the PRS group) have significantly raised the attractiveness of investing in these countries for investors from the EU and the rest of the world. As a result, these countries have managed to attract significant foreign direct investments and are likely to converge with those of the EU-15 countries in terms of FDI per capita.

The potential (benchmark) level of foreign direct investment for Ukraine was calculated for two scenarios. In the first scenario, it was assumed that the economic distance between Ukraine and the EU counterfactually have been reduced to the potential level; in the second scenario, it was additionally assumed that Ukraine's country risk dropped to the level of Poland. To compare the calculated potential investment volumes with the historical data of FDI in Ukraine, we provide the counterfactual analysis. Here we suppose the complete economic adaptation in one year from 2000 to 2001. The forecasts obtained in both scenarios are presented in Figure 5.
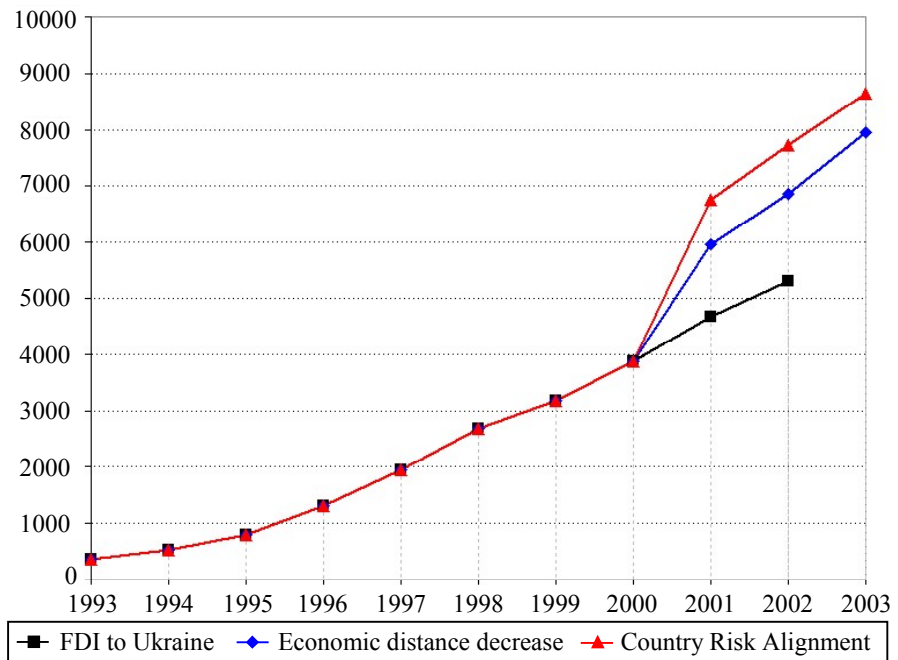

Figure 5. FDI convergence of Ukraine with the European Union

A gradual pre-integration adaptation process is certainly more realistic, and the speed with which the economic indicators converge with the potential levels, significantly depend on the economic policy of the specific country.

Government policy directed at the creation of a favorable investment climate for an economic rapprochement with the EU will contribute to the actual implementation of estimated FDI performance.

Conclusions

In view of the importance of Euro-integration for Ukraine, this article discussed the possibilities for a convergence of macroeconomic parameters in the pre-integration period. For that purpose, the econometric models of international trade and foreign direct investment were designed. Based on the historic experiences of economic development in CEE countries, we were able to make a quantitative analysis of the potential levels of trade volumes between Ukraine and the EU-25 and the possibilities of attracting investments into the Ukrainian economy.

To assess Ukraine's potential economic development and convergence with the EU, we used and mathematically formalized the concept of economic distance to the European Union. In comparison with other candidate countries of EU membership, Ukraine is still far from the European Union in economic terms. Only a close cooperation with the EU in harmonizing standards in the quality of goods, developing trade infrastructure, and attracting foreign investment in priority industries would help Ukraine to gradually raise its economic relationship with the EU to a principally new level and give a powerful impulse to the national economy.

Therefore, our analysis of the prospects of Ukraine's economic rapprochement with the EU outlines the benchmarks in trade development and promotion of foreign direct investment, which can be attained in the pre-integration period. The development of the Ukrainian economy is modeled based on a scenario of realistic economic rapprochement with the EU. This paper assesses the econometric models for trade convergence and convergence of FDI.

The results of this research can be used by authorities of the Ukrainian government to define the prospects for economic relations with the European Union and work out an appropriate economic policy for the pre-accession period.

Literature

1. *Economic and social context of Slovakia's integration into the EU*. Institute of Slovak and World Economy SAS, Bratislava, 2003.

2. Baldwin R. E., Francois, Joseph F., and Portes, Richard, *The costs and benefits of eastern enlargement: the impact on the EU and central Europe*, Centre for Economic Policy Research, 1997.

3. Baldwin, R. (1994), *Towards an Integrated Europe*, Centre for Economic Policy Research, United Kingdom.

4. Breuss, F. (2001), *The Role of Time in EU Enlargement*, in: S. Arndt, H. Handler (eds.), *Eastern Enlarement: The Sooner, the Better?, European Academy of Excellence*, 118−132.

5. Cheng, I-Hui, Wall, Howard J. (2005), *Controlling for Heterogeneity in Gravity Models of Trade and Integration*. Federal Reserve Bank of St. Louis Review, January/February 2005, 87(1).

6. *Directions of Trade Statistics Yearbooks*. International Monetary Fund, 1994−2003.

7. Fisher, S., Sahay, R., and Vegh, C. A. (1998), *How Far is Eastern Europe from Brussels?* IMF Working Paper 98/53.

8. Frankel, J., Stein, E., Wei, Shang-Jin (1998), *Continental trading blocs: are they natural, or super-natural?* in Frankel (ed.), *The Regionalisation of the World Economy*, National Bureau of Economic Research. The University of Chicago Press, Chicago and London.

9. Hamilton, C.B., Winters, L.A. (1992), *Opening up international trade with Eastern Europe*. Economic Policy: A European Forum, April, pages 77−104/111−116.

10. Head, K., Mayer, T. (2002), *Illusory Border Effects: Distance mismeasurement inflates estimates of home bias in trade*. CEPII (Centre D'Etudes Prospectives et D'Informations Internationales), Working Paper No. 2002−01.

11. *International Country Risk Guide*, http://www.prsgroup.com).

12. Kuznecovs, O., Maslovs, A. (2004), *Relative FDI Attractiveness of Eight EU Accession States*. SSE Riga Working Papers 2004:5 (60) Merlevede, B., Schoors, K. (2004), *Determinants of Foreign Direct Investment in Transition Economies*, Centre for Russian International Socio-Political and Economic Studies, Ghent University, Belgium.

13. Martin, Wagner, Jaroslava, Hlouskova (2004), *CEEC Growth Projections: Certainly Necessary and Necessarily Uncertain*, Discussion paper, Universitдt Bern, Volkswirtschaftliches Institut

14. The Vienna Institute for International Economic Studies − http://www.wiiw.ac.at/

15. Wall, Howard J. (1999), *Using the Gravity Model to Estimate the Costs of Protection*, Federal Reserve Bank of St. Louis Review, January/February 1999, 81(1), pp. 33-40.

16. IMF International Finance Statistics.

17. Kuharskaya, N., *Ukraina i Yevropeiski Soyuz*, [Ukraine and European Union], MEiMO, 2005.

18. German Advisory Group on Economic Reforms with the Ukrainian Government, *Ukraina na shliakhu do Yevropy*, [Ukraine on the Road to Europe], 2000, pp. 91−105.

19. *EU-Ukraine Action Plan*, Delegation of the European Commission to Ukraine, approved on 21 February 2005, http://www.delukr.cec. eu.int.

20. Chuvardynsky, O.H., *Yevropeisky soyuz i rozvytok suchasnykh integratsiynykh zviazkiv Ukrainy*, [European Union and Development of New Integration Ties of Ukraine], Kiev, Naukovyi Svit, 2002.