TRADE FLOWS IN TRANSITION ECONOMIES: ECONOMIC OR INSTITUTIONAL DETERMINANTS?

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Abstract

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Trade responsiveness to market signals may be considered as an indicator of success in economic reforms. This paper attempts to provide evidence for persistence of institutional factors in Ukrainian trade. Estimated price elasticities of export and import of three selected Central European economies with Ukraine and European Union (EU) give support for negative effect of institutional arrangements in Ukraine expressed in lower price elasticities in trade with it relative to the other region. The negative causal relationship running from export flows to real exchange rate is found in trade of sampled countries with EU. This supports the findings of "modern theory" of trade determination. For Ukraine negative association of export and relative prices arises due to significant policy induced impediments for trade that tend to have larger impact on it than the market forces, thus reversing the relationship. For the same sample of countries for the period of 1995-1999 import demand tend to work in accordance with predictions of conventional demand theory. Therefore, although sampled Central European countries managed to achieve success in moving to market (as reflected by higher elasticities), there is an evidence of its partiality due to the reversed causality. For Ukraine this problem is even more appealing.

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GLOSSARY

Appreciation. Fall in the nominal exchange rate when it occurs under a floating rate system.

Depreciation. Rise in the nominal exchange rate when it occurs under a floating rate system.

Devaluation. Rise in the nominal exchange rate when it occurs under a pegged exchange rate system.

Vector Error Correction Model A Vector Autoregression model that builds in cointegration into the empirical estimation..

Nontradables. Goods that can be consumed only in the economy in which they are produced and can not be exported or imported.

Real exchange rate. Exchange rate adjusted for relative inflation in countries-trade partners.

Revaluation. Fall in the nominal exchange rate when it occurs under a pegged exchange rate system.

Tradables. Goods that can be exported or imported.

Trade controls. Introduction of tariffs, import quotas, export subsidies and other measures that country can undertake to decrease import and promote export in order to reduce balance of payment deficit.

I N T R O D U C T I O N

Increase in international trade has always been considered as an important indicator of transition from plan to market. The success of this transition can be determined by the forces underlying it. If trade volumes change due to economic factors, such as devaluation, increased demand, then it can be claimed that transition country made significant steps on its way to market. The aim of this paper is to assess the Ukrainian progress on this front by analyzing the relative sensitivity of Ukrainian trade to economic and structural or institutional determinants.

The subject of growth and development and their association with external trade is one of major interests of economists and is particularly important for Ukraine. Trade expansion produces many positive results[1]: (1) technological penetration, which improves the welfare of people; (2) a demand or Keynesian effect on the economy, that by means of 'multiplier' effect stimulates economic growth and the overall efficiency in the economy, (3) benefits for individual firms as trade increases the size of the market, promotes economies of scale and increases the return on investment while also stimulating the overall economic activity in the economy as a whole, (4) increased range of consumer choice, and (5) reduction in the costs of inputs such as raw materials and manufactured components, which then lowers the overall costs of production. Trade also has another effect on society, namely on its culture, institutional structure, values, behavior of the society (McNeill, 1954). Therefore, the investigation of factors that affect trade will allow finding out the possible instruments of stimulating economic growth in the economy.

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[1] Gilpin, R. (1987). Political Economy of International Relations. Princeton University Press, Princeton NJ p. 171

Most researches are dedicated to investigation of purely economic factors. When conducting this kind of analysis for Ukraine, it was found that Marshall-Lerner conditions do not hold and thus these factors can not be considered as a comprehensive explanation.

This may be due to the fact that trade performance in Ukraine as well as some other transition economies is influenced by other factors, that undermine market incentives and does not allow them to determine the most effective allocation of resources and directions of trade, the basis of which is comparative advantage. Since transaction costs in trade activity are far from zero, the institutions are important to reduce them. As claimed by Steven N. S. Cheung (1982), subject to existing constraints, society will always chose that institutions that impose the lowest transaction costs. Institutions of domestic economy that do not work properly and conditions created by government that restrict enterprise external trading activities impose additional costs on them.
In Ukraine, the level of these costs is much higher than in other countries. Consequently, this generates comparative disadvantage for its trade and makes it difficult to determine prices of goods. Moreover, information is obtained in much more costly manner and thus making it difficult to coordinate the use of resources in cost minimization way.
Therefore, in general, it is unrealistic that demand for export and import do not depend on i.e. presence or absence of stabilization, geographic and commodity non-diversification of trade, slow process of enterprise reform and macroeconomic situation in the country. Thus, Newbery and Stiglitz (1981) argued that the market solutions will be inefficient in this case and their reason is the same supported by Hazell and Scandizzo (1975), namely that there are missing markets. Even with rational expectations, because of the absence of markets, the outcome is inefficient. That is why the focus of this work is to find support for the persistence of institutional factors in Ukrainian trade and

therefore find the factors responsible for its price rigidity.

For this purpose, different kinds of government presence in foreign trade of the country are classified into three major categories and the effect of their weaknesses on trade has been investigated. But it is important to notice that, as argued by Rodriguez and Rodrik (1999), ["...there is no strong reason to expect their (trade policies) effect on trade and growth to be quantitatively (or even qualitatively) similar to the consequences of changes in trade volumes that arise from economic factors, say, reductions in transport costs or increases in world demand. To the extent that trade restrictions represent policy responses to real or perceived market imperfections or, at the other extreme, are mechanisms for rent-extraction, they will work differently from natural or geographic barriers to trade and other exogenous determinants"[2]]. From this perspective, the common assumption that restrictive domestic conditions will make enterprises to export and help to discourage import is oversimplified especially due to uncertain, volatile and underdeveloped conditions of domestic market that failed to provide good ground for day-to-day export and import operations. This stimulates to look at the consequences of government policies undertaken to 'promote' trade.

The effect of these determinants has rarely been incorporated in the research and empirical estimation. This seems to be an unjustifiable fault due to existence of a huge number of nontariff obstacles, arrears and nonmonetary payments, lack of favorable investment climate, weak contract and property rights, and little microeconomic structural changes in Ukrainian economy. Poor financial conditions, uncertainty that arise due to delay in privatization, removal of major economic linkages in the domestic market, credit rationing that affected undercapitalized enterprises, poor financial intermediation constitute

[2] Rodrik D., F. Rodrigues (1999). Trade Policy and Economic Growth: A Skeptic's Guide to the Cross-National Evidence. NBER WP#7081, p.6.

only a part of the whole bunch of obstacles. Relative importance of these factors has been neglected in most cases.

This paper addresses this drawback and focuses attention primarily on the role of institutional impediments in realization of trade potential in Ukraine. It attempts to answer: what is the analysis mechanism that allows amending for institutional factors and whether these factors are important determinants of trade flows in transition economies. Therefore, it uses a comparative method that looks at differences in price elasticities of sampled countries with Ukraine and European Union. The trade flows with latter are expected to be more sensitive to market incentives than with the former.

There are different views about the size of long-run elasticities and their effectiveness in altering trade flows discussed in contemporary literature. To contribute to these aspects, the relative long run price elasticities of trade in a number of Central European countries are also estimated thus giving an opportunity to compare them. The innovation of this work is that this is done by disaggregation of trade flows into two regions, according to their historical and geographical specific features.

First part of the paper is dedicated to literature review and proposes theoretical background of the work. In chapter 2 the specification of the estimated model is explained, its assumption, data and technique used. Third part discusses the results of estimation received and investigates the plausibility of alternative explanations of empirical outcome. Conclusions include policy recommendations.

CHAPTER 1

LITERATURE REVIEW AND THEORETICAL BACKGROUND

According to economic theory, among a number of macroeconomic variables, the real exchange rate and trade are expected to be the major links of domestic economy to the world one. The contemporary literature reveals a significant amount of work in estimating trade equations and determining economic factors responsible for changes in trade volumes. They relate the volume of export and import to relative prices and level of activity by means of GDP. Starting with Orcutt's (1950) paper, international trade researches' attention was periodically dedicated to this issue. Similar works but with application to other countries were done by Sawyer and Sprinkle (1997) and Song (1997), investigating this relationship for Japan; by Bahmani-Oskooee (1998) for less developed countries; by Arize (1998) for US imports. Warner and Kreinin (1983) modeled and estimated the import and export demand for 19 industrial countries. This research was based on assessing the sensitivity of trade flows to the number of economic variables (relative prices, income, lagged and expected exchange rates, reserves). Stern (1976), Goldstein and Khan (1985) first surveyed the literature on the estimation of the demand for export and import. Almost all studies found demand for exports and imports to be responsive to changes in income and relative prices at different levels of significance.

On the contrary, the role of trade policy, responses of producers to the "policy regime" have not been as much investigated by macroeconomic theorists. The literature on the effects of trade policies on trade volumes as well as their consequences is rather uninformative. Feenstra (1995) attempted to estimate the impact of trade policies under imperfect competition. He decomposes welfare effects into four major channels:

- improvement in terms of trade (possible gain),
- changes in the scale of firm (ambiguous effect),

- distorting consumption and production decisions (possible loss),
- shifting profits among countries (ambiguous effect).

His findings quantify the costs of trade, primarily tariff restrictions. Some authors (Rodrigues and Rodrik (1999)) approach this issue by investigating the direct link between trade policies and economic growth. This relation is based primarily on the effect of trade policies with and without market imperfections, production externalities, different levels of technological developments and factors endowments in the economy.

Rodrik (1998) focused his study on the role of trade and trade policy in achieving sustained long-term growth in Africa. His attention was dedicated primarily to trade restrictions. Other factors, namely, poor infrastructure, geography, dependence on a limited number of primary products, in his mind, can not be considered as causing low responsiveness of exports and imports to prices or traditional instruments of commercial policy.

On the other hand, Cooper and Gasc (1997) claim that the primary disadvantage of trade in emerging market economies after abandoning most forms of direct subsidies to trade was the poor financial, economic and institutional infrastructure available for export and import. In support of his argument he conducted a number of surveys for selected transition economies investigating the relative importance of different demand and supply impediments for trade. The results of the survey focused on microeconomic and institutional factors have showed that the commodity composition of trade does not match the pattern prescribed by endowments or comparative advantage. It is primarily distressed trade, which in long run weakens financial conditions of trading enterprises and, thus, cannot be sustained. They revealed that enterprises inherited inefficient strategies and conditions, as well as domestic economic situation, are the most important determinants of their export performance. It is difficult to find empirical support for this hypothesis since institutions'

weaknesses and implicit impediments to trade are hard to measure. So, I first turn to economic factors that affect trade volumes and have strong theoretical bases. Then the institutional factors will be classified and discussed.

2.1. Economic factors and Demand Theory.

The choice of factors affecting trade flows is based on conventional demand theory that represents quantity demanded as function of its price, price of its substitutes and income. Therefore, the level of trade flows, namely exports and imports, is determined by two major factors: the level of real exchange rate in the country relative to other country or countries and level of disposable income.

In the long run the level of national prices plays an important role in determining relative prices at which goods are traded at international markets. The background of interaction of exchange rate and price level in the country is based on the purchasing power parity (PPP) theory. It predicts that the exchange rate between two countries expressed as number of domestic currency units per unit of foreign currency is equal to the ratio of those countries' prices. This relationship can be expressed in formal terms: $E_{HR/\$} = P_{Hr}/P_{\$}$, where $P_{HR,}$ $P_{\$}$ are the prices of the reference commodity baskets sold in Ukraine and USA respectively.

The further extension of PPP theory is the concept of real exchange rate. The PPP concept predicts the real exchange rate to be constant. In general, turning back to our previous notation, the real exchange rate is defined as a hryvnja value of foreign country (e.g. USD) commodity basket relative to the same reference Ukrainian basket. Namely,

$Q = E_{HR/\$} * P_{\$} / P_{HR}$

A rise in the real exchange rate is called **real depreciation**. This change means a fall in Hryvnja's purchasing power over American goods and services relative to its purchasing power over Ukrainian goods. As a result foreign goods become more expensive relative to domestic goods and foreign demand for domestic goods increases. Therefore exports increase.

A decrease in real exchange rate is considered as **real appreciation**, which reflect a relative increase in Hryvnja's purchasing power over USA goods in comparison with Ukrainian. This change causes export to decrease.

The second factor that affects trade volumes is disposable income. Only current income matters for exports and imports. A rise in it makes consumers to increase their spending on all goods, including imports. An increase in the foreign country's disposable income may cause increase in their spending on foreign goods, thus making our exports to that country increase**.** No distinction is made between permanent and transitory income.

There are two major theories that explain the relationship between exchange rate and trade balance in the country. The first one uses the "J-curve hypothesis" that predicts decrease in trade balance following a devaluation of the real exchange rate. According to it, trade balance first worsens as a result of devaluation because import prices expressed in domestic currency grow quicker than export prices. Over time prices converge and trade balance starts improving and then reversed. Estimations that exists in contemporary literature do not propose clear evidence on the validity of J-curve hypothesis. Some authors even reject it by finding no statistically significant pattern, others find a "delayed" J-curve effect.

The second theory targeting explanation of exchange rate – trade balance relationship is the "modern theory" of trade balance determination (Razin, 1984; Greenwood, 1984; McKinnon and Ohno, 1986; Zhang Z. 1996). This theory emphasizes the importance of intertemporal and exogenous shocks in explaining trade imbalances. It implies that exogenous shocks affect both trade and real exchange rate, therefore change in one variable can be responsible for changes in

another one only partly; and that the direction of causality may be bi-directional. Conventional theory assumes it to be unidirectional. In transition economies where trade balance constitutes a significant part of current account balance export revenues are major sources of foreign currency inflow. The association between the two is negative: increase in domestic country export causes inflow of foreign money, thus making domestic currency to appreciate. From the other side, import by affecting demand for foreign currency and supply of domestic also may have an effect on domestic exchange rate and effect is expected to be reversed. Therefore, there is a need to turn to empirical estimation to find a comprehensive dynamic relationship between the exchange rate and trade flows.

Taken together, these points imply that there should be no presumption in favor of founding an unambiguous causal relationship between the trade and real exchange rate variables in transition economy.

The neoclassical theory assumes that trade transactions are costless. But this is questionable in transition economies in particular; therefore I turn to institutional factors.

2.2. Institutions and their effect on international trade.

For centuries the taxation of international trade was one of the most important sources of wealth for political elites and for imperial powers. Many empires developed at trade crossroads and fought to control the trade routes of Africa, Asia and the Middle East. Brooks Adams in "The Law of Civilization and Decay" (1895) considered shifts in trade routes and their control to be the key to human history.[3]

For the twentieth century, although trade taxation is less vital for the governments due to their replacement by domestic sources of revenues, trade still remains one the major areas of government intervention, especially in developing

[3] Gilpin R. (1987), Political Economy of International Relations. Princeton University Press, Princeton NJ p. 171.

and transition economies. Thus, the domestic economic policies undertaken by national governments are important determinants of volumes and directions of trade in these countries.

In general, according to Dixit A. (1986), the government intervention into the economy (and as a result their preferences relative to trade) can be divided in three major groups: macro, compensatory and adjustment policies. Each has a varying degree of effectiveness in different countries.

Macro policies foresee different actions of the state to facilitate the operation of the market and to accumulate scarce economic resources for domestic agents. Not only conventional fiscal and monetary policies are included, but also different policies to support education, culture, basic research and development**.**

Another type of policies is called **compensatory**. Since most economic changes involve winners and losers, the role of the government is to compensate the most painful and harmful changes to society or particular groups. These measures are primarily short-term and encompass such regulations as trade restrictions. They include tariff and nontariff barriers. An import tariff is a duty on the imported commodity, while an export tariff is a duty on exported commodity. The former is more important and can be categorized into ad valorem and specific. Nontariff trade barriers include import quotas, voluntary export restraints, technical, administrative regulations, anti-dumping. These compensatory policies have become an integral feature of the modern welfare state. (Kindleberg, 1978, p. 5).

Structural adjustment or industrial policies constitute a third, more controversial type of government interventions. Strategic trade policies are policies that are targeted on improvement of economic performance by promoting particular export or discouraging particular imports in order to capture rents arising from market power. These policies are aimed to affect the process of organization and composition of national economy in response to external shocks in long run. Such policies may encompass targeting of specific industrial sectors for technological development or other industries and spheres for

commercial progress with purpose of building large external sector and promotion of future economic growth. In spite of this, many argue that these policies are not necessary in market economy with a narrow exception of few areas of market failure or necessities of public goods.

Ukraine can be characterized by the presence of all these directions of government interventions into international trade activity, but their effectiveness in achieving the set goals is rather suspicious.

Macro policies. The main effect of these instruments appeared in shifting the economic factors that affect international trade, namely nominal exchange rate and price level. Tight credit policy and absence of institutions of collateral borrowing restrain investment plans because firms are forced to finance investment plans entirely from limited internal sources. Ukrainian government imposed a number of measures that are called to replenish its foreign reserves but are discouraging for domestic entities e.g. the mandatory 50% sell of foreign currency revenues by exporters.

Compensatory policies. Most components of the "old protectionism", namely high tariff rates have been abandoned in Ukraine already. However, a variety of nontariff barriers and other obstacles named New Protectionism continue to grow and impede the further trade liberalization. Such a deeply affected economic spheres in transition economies are subsidies to enterprises involved in international economic activity called to compensate losses due to change in international comparative advantage or loose of competitiveness as a result of real appreciation or low productivity.

Structural adjustment or industrial policies. In Ukraine there are a number of industries that experience explicit and implicit government support. Agriculture, machinery building are examples of import substitutions promotion. Metallurgical industry is an example of export promoting strategic policy of the government. All these examples proved to be inefficient in the sense of created deadweight losses for society. The opposite can not be even showed by the simplest indicators: growth

of industry or market share of targeted industry.

All the above mentioned factors constitute the limits imposed by government policies on economic system. They are the humanly devised constraints that structure human interaction.[4] These limits are called **institutional factors**.

It is very difficult to find a good measure of trade restrictions, government intervention in trade. The one used in researches is the average tariff level, calculated as a ratio of total import duties to total volume of import. This measure underweights the level of high tariff rates because the corresponding import level tends to be low. In addition it does not allow for substitutability between tariff and nontariff restrictions. The second commonly used indicator is a coverage ratio for non-tariff impediments. It does not fulfill its function as well because can not distinguish between highly restrictive barriers and those that do not have a significant impact on trade. Transaction costs and implicit barriers are even more difficult to quantify.

Therefore, in order to evaluate the hypothesis of persistence of institutional factors in trade, their weaknesses in transition economies I apply the comparative method, which compare the respective export/import price and income elasticities in different regions. I claim that these elasticities with respect to trade with Ukraine are lower then the corresponding elasticities in trade with countries from the rest of the world. This results from the presence of institutional factors that create disincentives for trade or cause geographical misallocation of trade flows. The weaknesses of these factors do not allow trade volumes to respond to changes in economic factors in full. Institutional channels through which the negative impulses on trade are transmitted are "the information held by economic agents and their incentives"[5]. They encompass:

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[4] North D. (1993). Economic performance through time. The American Economic Review, vol. 84, No.3 p. 359.

[5] Alston L., T. Eggerrtsson, D. North (1996). Empirical studies in institutional change. Cambridge university press, p. 59.

- deterring domestic trade policies (licensing, quotas, import/export taxes, foreign exchange surrender of export revenues)
- underdeveloped public infrastructure: transport, freight, insurance, guarantee schemes, communication, financial arrangements
- costs, exchange rate, risks
- entry costs: lack of information about potential customers, trading practices, standards or in other words - learning the market
- low quality, quality control and standards, reliability of products
- indecisiveness of country's permanent trade mission abroad.

As follows, government does not perform even those roles that are expected and prescribed in any market economy: creation of basic conditions for efficient export and import operations according to comparative advantage, namely minimal trade and financial infrastructure. This originates a number of impediments that weaken the link between economic variables in trade and restrain its potential to react fully to changes in economic determinants, namely relative prices, exchange rate and income. As a result price elasticities of export and import in operations of different countries with Ukraine are expected to have much lower absolute values than the respective elasticities in trade with other (rest of the world) regions.

C H A P T E R 2

THE MODEL

In general, the type of the model adopted depends on the type of traded goods (homogeneous or differentiated), on the final usage of the traded good (final consumption or input for production), on institutional environment in which trade is conducted (market factors vs. government interventions) and on the purpose of the estimation (forecasting or hypothesis testing).

This model is based on combining three sets of factors, which determine the size of bilateral international trade flow: the demand for imports, the demand for exports and the costs of doing business. Institutions and the technology employed determine the transaction and transformation costs that constitute the costs of production. Since it is not costless to transact the institutions are important in determining trade flows.

2.1. Specification

The specification adopted in this work is based primarily on the *imperfect substitute model* of international trade. The rationale for this choice is that if foreign and domestic goods were perfect substitutes, one will observe that the goods only from one source will grab the whole market, or each country will be pure exporter or importer but not both.

The specification of the model, used in estimation, relates the volumes of trade to its relative prices expressed as real exchange rate and the level of income. All other variables are assumed to be fixed. This is especially true under the supposition that importers are primarily interested in the relative prices of the goods they consume. Assume also that demand function is multiplicative, so that all variables are in logarithm form and corresponding coefficients can be interpreted as elasticities. The lag structure of export and import demand

equations usually subject to choice between two variants of the "Koyck" model[6]. One predicts usage of partial adjustment model, where the additional lagged export or import variable appears as a result exports or imports adjustment to the difference between the demand for export/import and its actual level. The following specification is applied:

$$Log(IM_{tij}^{d}) = \alpha_0 + \alpha_{1j} \log(RER_{tij}) + \alpha_{2j} \log(Y_{ti}) + \alpha_{3j} \log(IM_{t-1ij}) + \alpha_4 u_t \quad (2.1.)$$

where $\alpha_{1j} = \delta_i * \beta_{1i} < 0, \quad \alpha_{2j} = \delta_i * \beta_{2i} > 0, \quad \alpha_{3j} = 1 - \delta_i, \quad \alpha_4 = \delta_i \quad 0 < \delta_i < 1$

This equation determines the quantity of import demanded by country *i* (IM^{d}_{tij}) from country or region *j* as a function of relative prices in two countries (RER_{tij}) and the level of income in country *i* (Y_i) and past value of country import (IM_{t-1}).

The model of country *i's* export to the other region or country *j* , is:

$$Log(EX^{d}_{tij}) = \gamma_0 + \gamma_{1j} \log(RER_{tij}) + \gamma_{2j} \log(Y^{*}_{ti}) + \gamma_{3j} \log(EX^{d}_{t-1ij}) + \gamma_4 v_t \quad (2.2.)$$

where $\gamma_{1j} = \delta_j * \mu_{1j} > 0, \quad \gamma_{2j} = \delta_j * \mu_{2j} < 0, \quad \gamma_{3j} = 1 - \delta_j, \quad \gamma_4 = \delta_j, \quad 0 < \delta_j < 1$

These equations are called to estimate the quantity of country *i*'s export, demanded by country or region *j* (EX^{d}_{ij}). This equation relates export demand from country *j* as a function of relative prices (RER_{tij}), income of importing foreign country *i* (Y_{ti}) and past value of country exports (EX_{t-1ij}).

A second variant of Koyck model is relating demand not to actual prices but rather to some expected prices.

2.2. Major assumptions of the underlining model.

- Neither import nor export can be considered as perfect substitutes for domestic goods. One of supportive factors is the empirical evidence on the

[6] Goldstein M., Khan M. S. "Income and Price Effects in Foreign Trade", Handbook of International Economics, vol..2 p.1066-1067.

fact that "the law of one price or PPP" does not hold for the most categories of goods both between countries and within each separately. Therefore, finite price elasticities of export and import can be estimated

- Consumers are maximizing their utility subject to budget constraints and transaction costs.
- Partial equilibrium framework is assumed, since all other variables, not included in the model are held constant.
- Consumers do not have money illusion, that is the increase in money supply and the same prices in prices leaves demand constant.
- No possibilities of inferior goods or of domestic complements to imports.
- Trade flows in bilateral trade relationships are assumed to be independent one from another, implying cross-elasticities of commodities with respect to price being zero.

- Capital flows are exogenous and fixed.

In order to check the hypothesis, the above determined specification of export and import equations are used to estimate price and income elasticities for a sample of selected Central European countries with respect to two regions: Ukraine and European Union. The set of countries consists of Hungary, Czech Republic and Poland. These countries have long term trade relationships with Ukraine due to historical reasons and geographical proximity. Moreover, the choice of commodities traded among them is very wide, that will not bias the results.

2.3. Data and estimation technique.

For empirical investigation data on a sample of three selected transition Central European countries are collected. The time series for each country cover the period of 1995-1999 by quarters. As a result the pool of approximately 60

observation is obtained. Statistics on export and import flows were found at the countries' Central banks web-cites. Ukrainian export and import data were taken from Ukrainian balance of payment. Import and Export variables are estimated in real terms by taking their values in dollar equivalent (mln USD) in trade with Ukraine and in German mark equivalent in trade with EU.

GDP was used as a proxy for income variable for each country. It was included in export equation of trade with Ukraine and calculated as a dollar equivalent of its nominal value: GDP/(NatCurrency/USD). The data for countries GDP was found at the respective statistical offices web-sites, GDP for EU comes from European Union Central bank.

To check the plausibility of institutional factors importance hypothesis the real exchange rate $RER_{i,j}$, is estimated; i=1..3 correspond to a country from the sample; j=1,2- conform for two regions trade partners: Ukraine and European Union. For its calculation, the respective price indices were used. For three selected countries CPI from national Central banks and Statistics Committees were taken. Germany price index was taken as proxy for EU CPI. Ukrainian prices statistics comes from UEPLAC[7] database. Foodstuff price indices, used for calculation of food real exchange rates were received from CESTAT Statistical bulletin.

German mark exchange rates for each country from the sample were taken as proxies for exchange rates of European Union trading region. Data comes from Central banks' web-sites. Cross rates of UAH per each country domestic currency are calculated using the respective exchange rates to USD. Real exchange rates are constructed as a nominal exchange rate corrected for price differences in each country from the sample and for each of three regions.

[7] Database supported by Ukrainian - European Policy and Legal Advice Center (UEPLAC) in Kiev, Ukraine.

The cointegration technique is used to establish a direct link between the real exchange rate and trade flows. One of the advantages of this approach is that it allows to get rid of non-stationarity in time series used in estimation procedure. Time series of real export, import, real exchange rate and GDP are, by nature, non-stationary stochastic processes and in testing for equilibrium they very often reveal strong trends (sustained upward or downward movements). In this case high R^2 reflect not the true relationship among the variables in the regression but rather the presence of this trend. In this situation estimates of coefficients and forecasts are not reliable. To check the data for stationarity the augmented Dickey-Fuller (ADF) test was applied. For some of the series unit root was rejected in first differences, for others in second differences specification. For most its presence is rejected at 10% significance level. The choice of lag order in this test was based on Schwarz criterion (minimum value) and the size of the sample. Since the sample is not large two lags were included (by rule of thumb). Schwartz criterion was minimized if one lag was chosen. But for both lag orders the unit root could not be rejected at reasonable level of significance.

In order to avoid problems with non-stationarity in further estimation, the multivariate Johansen cointegration test for each country variables from the sample was performed. The specification of the test includes linear deterministic trend and intercept in data but no trend in cointegrating equations. For each country the existence of at least one cointegrating vector could not be rejected. This means that there exists a linear combination of variables that is stationary and the direct estimation of series in level form by OLS is meaningful. Moreover, with this technique no valuable long-term information is lost, which would result if the first differences were used in regressions instead. Results are also presented in *Appendix 1, 2*. This means that variables tend to create a long-term relationship and the estimated elasticities reflect the long-term structure of trade.

Test for causality between variables is conducted by means of Granger causality procedure. It follows the classical methodology of Granger (1969, 1986) and Engle and Granger (1987), when variable is regressed on past values of itself and the other variable under consideration. Statistically significant coefficients of the latter imply presence of causality. However, although the Granger test remains reliable, methodology differs when time series are cointegrated. In this case causality has to be estimated within the framework of error correction model that works by the same principle as Granger test (focused primarily on short-term relationship) but allows incorporating information revealed by cointegrating relationship. The ECM is given by the following form:

$$\Delta X_t = \phi_0 + \Sigma\delta_I \Delta X_{t-1} + \ldots + \Sigma\rho_j \Delta Y_{t-j} + \lambda_p \varepsilon_{p\,t-1} + \nu_{p\,t} \qquad (2.3.)$$

where ΔX_{t-i} , ΔY_{t-j} are lagged values of variables and $\varepsilon_{p\,t}$ – lagged values of residuals from the cointegrating equation. λ_p in this case is the error correction coefficient, which significance imply causality. With this technique causality can be revealed through the residuals even if Granger test does not foresee such causal link.

C H A P T E R 3 .

DISCUSSION OF RESULTS.

3.1. Estimation Results.

There exist a number of other economic factors that are not included in the estimation but affect external trade. These are, primarily, the significant volumes of shadow transaction in both export and import, under- and over-invoicing of trade, smuggling, prevalence of barter and non-monetary payments in export and import. All this does not allow receiving reliable statistics on the actual volumes of trade.

In spite of this, the results received from empirical estimations provide support to the hypothesis stated in this paper, namely that institutions do matter in determining levels of trade flows in transition economies. As shown in Table 1, for both export and import demand equation elasticities of trade with Ukraine are much lower than elasticities estimated with respect to the European Union.

Table 1. Elasticities of export supply and import demand in three selected transition economies

	Export		Import	
	Ukraine	EU	Ukraine	EU
Poland	0.62**	-1.24**	0.19	-0.75**
Czech	0.59**	-1.91**	0.49**	-1.06**
Hungary	0.86**	-3.85**	0.33	-3.49**

** - significant values at 5% significance; * -at 20%

Results received predict the trade of sampled CE countries with EU to be much more sensitive to changes in relative prices. In trade with Ukraine the absolute values of export and import elasticities are much lower, implying inability to adjust to changes in market conditions due to persistence of non market forces that weaken the link between trade and prices.

All elasticities in trade with EU and elasticities of export to Ukraine are statistically significant at 5% level. The estimates received tend to have negative signs for both export and import equations with respect to EU and positive signs for trade with Ukraine. The negative sign for EU is explained by weaknesses of these countries in their capacity to export. The driving force in this relationship, therefore, is not market price but rather export as a foreign currency generating mechanism. This logic predicts relative price to be a function of export volumes in this case. Granger and ECM tests for causality confirmed this hypothesis (*Appendix 7, 8*). They supported presence of dynamic relationship running from country's export levels to prices. Namely, growth of export increases the inflow of foreign currency and makes domestic currency to appreciate. This relationship is statistically significant for sampled countries with respect to EU. The output is given in *Appendix 9*. These results seem to be in accordance with the "modern theory" of the trade balance determination that foresees passive role of real exchange rate in determining level of export. Its emphasizes is given to strong causal relationship that goes from trade to the exchange rate.

There was not found statistically significant causality going from Ukrainian export to real exchange rate with CE countries. This is reflected in insignificance of estimated respective elasticities. Consequently, this implies something else to be a driving force of CE countries' trade relationships with Ukraine. For better understanding we can look at this problem from the perspective of Ukrainian export to this countries which is a symmetrical

reversed reflection of CE countries trade relationships with Ukraine *(Appendix 5*). From Ukraine's side export and import follows the pattern similar to that of CE countries with EU trade. Both price elasticities of Ukrainian trade have negative sign.

Absence of causality from export to real exchange rate in Ukraine makes it necessary to find other explanations for distressed situation with its export. In general this can not be attributed to persistence of formal barriers to export in Ukraine. Most of explicit restrictions on export were removed during 1994-1996. But these measures failed to result in at least small growth of export from Ukraine. Both export and import of goods are declining since 1996 in absolute values. Absence of export barriers and simultaneous failure of export expansion indicates presence of implicit export barriers and inefficient government policies of export promotion. Major implicit impediments in Ukrainian trade encompass volatile and ambiguous tax system, unstable legislative framework, corruption of custom officials and their low-quality services. Excessive regulation of foreign exchange market and mandatory sale half of foreign currency revenues from export activities, introduced to support Hryvna and prevent devaluation, expose Ukrainian producers to additional transaction costs that lower their export potential. Problems related to weak banking system (late payments, lack of guarantees and insurance) constitute additional set of problems that exporters are faced in Ukraine. All this burdens makes exporters insensitive to market signals, but rather react to prices together with transaction costs that they have to carry in export activity. Therefore, devaluation of domestic currency which is a result of government decision making, accompanied by a number of implicit restrictions that impose additional costs on exporters results in a decrease of export from Ukraine. Policy impediments tend to be stronger than market forces in adjusting Ukrainian export.

Imports from CE countries to EU and from Ukraine to CE countries follow the relationship predicted by conventional demand theory and thus have the expected negative association with real exchange rate. (*Appendices 3, 4*)

All these findings imply that sampled Central European countries, although achieved significant success in their reforms in external sector, reflected by higher price elasticities of their trade, still have partly market oriented management of their trade, as mirrored by reversed causality. Ukraine still remains several steps behind, since the forces driving trade flows and pattern of their trade management remains non-market, highly regulated. This situation impedes the adjustment to market signals and responsiveness of trade to economic factors, as well as integration of Ukraine into the world financial system.

The signs of trade flows deman confirm that Ukraine follows the same pattern of exchange rate – trade flows dynamics as Central European countries. The forces driving import are the same (price signals), although have different degree of responsiveness, while for export they are different. Thus, change in CE countries exports results in respective adjustment of exchange rate through fiscal, monetary or other policies (with reverse correlation between the variables), for Ukraine respective estimates are not only insignificant but also are negative due to excessive government involvement. Elasticities in trade with Ukraine are summarized in Table 2.

Table 2. Price elasticities of Ukrainian trade with CE countries.

	Poland	Czech	Hungary
Export	-0.19	-0.49**	-0.33
Import	-0.62**	-0.59**	-0.86**

**- 5% significance level

Lagged values of export and import in both equations are found to be insignificant.

3.2. Four explanations of differences in price elasticities across countries.

1. The divergence of price elasticities with three regions can also arise due to peculiarities of commodity structures of trade relationships between foreign countries and Ukraine.

As Goldstein and Khan (1985) based on the survey of existing empirical analysis, pointed out there are significant differences in price and income elastisities across commodity groups. Namely, the price elasticity of manufactures is significantly larger then for nonmanufactures. Within the latter group, the elasticities of raw materials and fuels tend to be larger, than those for food and beverages, but the difference is not big enough.

The variety of goods traded between Ukraine and this group of countries is very wide, ranging from chemicals and minerals to linen and cloth and hence can not be attributed to the prevalence of some specific types of commodities that have low elasticities in export or import. But to check the possibility of differences in price elasticities due to peculiarities of commodity structure of trade with three different regions, the additional estimation are performed. Evaluation of elasticities is conducted by controlling for the specific good, which is traded with all three regions. Food is chosen as an example of such commodity. This choice is explained, primarily, by the data availability and presence of food products in exports and imports of all countries. Real exchange rates for foodstuff exports and imports are calculated and incorporated into the empirical estimation. The results received (*Appendices 10-13*) are in accordance with the hypothesis: the price

elasticities of foodstuff export and import in trade with Ukraine are lower than those in trade with EU (Table 3).

Table 3. Elasticities of export supply and import demand of foodstuff in three selected transition economies.

	Export		Import	
	Ukraine	EU	Ukraine	EU
Poland	0.16	-1.97**	0.40*	-1.00**
Czech	0.40	-1.53*	0.36*	-0.08
Hungary	0.74*	-3.72**	0.21	-2.54**

**- significance at 5% level; * - significance at 20% significance level.

It follows that the commodity structure of trade does not explain the relative differences in price elasticities in trade with Ukraine. Therefore, the findings support the hypothesis of persistence of institutional factors in Ukrainian trade.

2. Another explanation proposed in contemporary literature is the differences in share of imports in total domestic demand and supply across countries.

They arise from the relation of price elasticity of demand for import and price elasticity of supply for export to the domestic demand and supply price elasticities. This is true only under the assumption of perfect substitutability of domestic and imported goods and expected not to emerge in imperfect substitutes model. In general this relationship can be expressed:

$$\varepsilon^{d}_{im} = (D_i / IM_i)*l - (S_i / IM_i)*\eta \qquad (3.1.)$$

$$\varepsilon^{s}_{ex} = (S_i / EX_i)*\eta - (D_i / EX_i)*l, \qquad (3.2.)$$

where ε^{d}_{IM} – price elasticity of demand for import, ε^{s}_{EX} – price elasticity of supply for export, D_i - domestic demand in country *i*, S_i - domestic supply in country *i*, $l<0$ – elasticity of domestic demand, $\eta>0$ – elasticity of supply.

This means that price elasticity of demand for import and supply for export is positively related to elasticities of domestic demand and supply and negatively related to shares of import and export, respectively, in domestic demand and supply. Equations (3.1.) and (3.2.) predicts that import/export price elasticity can be high even for relatively inelastic commodity if domestic economy is closed (ratios are high).

In order to check this hypothesis I calculated the share of export and import in Ukrainian demand and supply and they appear to be quite low, constituting about 25% of domestic demand and production (supply), although tending to increase over time.

Table 4. Share of Import and Export in domestic demand & domestic production of goods in Ukraine.

	1995	1996	1997	1998	1999
D/IM	4.25	3.71	4.09	4.03	3.97
S/IM	4.26	3.53	3.93	3.89	3.96
D/EX	4.16	4.54	4.93	4.68	4.00
S/EX	4.18	4.32	4.73	4.52	3.98

As shown by figures in the Table 4 the level of import and export penetration in Ukraine is not high thus even small elasticities of domestic demand and supply are insufficient to make the import and export elasticities very low. This allows to

weaken the argument that low price elasticities of export and import in Ukraine might appear due to low domestic demand and supply sensitivity to prices.

3. Goldsbrough (1981) also found that price elasticities are much smaller for intra-firm trade (trade among branches of the same firm) than for the conventional trade. And depending on the share of intra-firm trade in the total volume, price sensitivity will differ across countries.

This definitely can not be applied to Ukraine, but could to trade with European countries. Thus, Hungary is the major recipient of foreign direct investment For other countries these levels are also higher than in Ukraine. This may to some extent reduce the price elasticities of trade in these selected central European countries with respect to EU and rest of the world. But still they remain much higher than with Ukraine.

4. A fourth explanation, common in contemporary literature is Vernon's (1966) "product cycle" theory. It predicts the dependence of country's price elasticity on the stage of the product cycle. Namely, if country exports new and technologically intensive manufactured goods (early stage) its price elasticity is expected to be low. On the other hand, if it exports or imports these goods when their production has become standardized, that occurs at later stage of product cycle, than price elasticity becomes higher. Ukraine does not import high-technology goods from these countries and does not export this kind of goods there as well. The share of Ukrainian equipment and machinery is about 2% in total export supply to these countries. In import this amount is not more then 5% of total. So, this explanation is also not responsible for low elasticities of trade of these countries with respect to Ukraine.

C O N C L U S I O N S

Low price and income elasticities of other countries' trade with Ukraine represent evidence in support of the persistence of institutional impediments in Ukrainian trade. Weak institutional factors undermine market incentives for trade and do not allow its potential to be realized according to comparative advantage. This is reflected by lower price elasticities of trade with Ukraine in comparison to EU. As a result of higher transaction costs that arise due to excessive and distorting government policies and weak institutional environment in Ukraine relative to other countries, prices do not reflect the true costs, information is difficult to obtain and resources are not used in cost minimizing manner. All this fosters comparative disadvantage of Ukrainian external activity. In addition, trade sensitivity to price and income signals in Ukraine is significantly worsened and for Ukrainian export even becomes negative. Import follows the pattern predicted by economic theory. It is highly significant, because the impediments fortify the unfavorable institutional environment thus enhancing the effect of devaluation.

The findings for a group of selected Central European countries are consistent with the predictions of "modern theory" of exchange rate determination. Namely, their export to EU is a driving force of price-quantity relationships and it determines the level of exchange rate in the country. This supports presence of partly market determinants in their export behavior. The reverse is true for imports.

The policy implications are straightforward. The reforms in the area of macroeconomic policy have not been an efficacious mechanism of increasing trade volumes. Therefore, their affiliation with economic growth through the trade intermediation is generally much weaker than for institutional factors. The fundamentals of long-run growth are strategic policies, promoting development of human resources, physical and financial infrastructure, macroeconomic

stability and the rule of law.[8] Only governments that undertake investment in these areas cab expect to achieve higher rates of economic growth. The restrictive adjustment policies towards export and import will definitely suppress incipient economic activity, but the liberalization by its own is not sufficient to provide sustained economic growth. So, the role of the government in transition economy is to create conditions for market development and improve the institutional arrangements of the trade environment.

Macro policies. The fact that trade flows in Ukraine are not responsive enough to economic signals makes devaluation undertaken in these conditions not helpful enough in improving trade balance. In addition, this low sensitivity of trade requires government to devalue its currency much more in order to promote competitiveness of domestic producers than it could have been without the institutional impediments. Such mechanism allows restoration of competitiveness only in the immediate future, while undervaluation of domestic currency will slow the restoration of long term comparative advantage. Exchange rate regime that allows domestic currency to be close to market level but protect from sudden and unexpected shocks is more appropriate.

Adjustment policies. In addition, government should not target imports in its restrictive policies. Import duties and barriers protect domestic producers but hinder import. According to a well-known theorem of international economics (Lerner's symmetry theorem), in a general equilibrium framework import duties correspond to the similar taxes on export. All such measures are the horizontal forms of government support of foreign trade activity and can protect domestic producers only in short run and by costs of restraining export potential.

[8] Rodrik, D. Trade Policy and Economic Stability in Sub-Saharan Africa. NBER WP #6562, p.7.

Strategic policies. Import of new technologies, markets and institutions becomes crucial for enterprises restructuring. This will promote the rebuilding of soviet times inherited structure of Ukrainian trade and fortify its position in the world market. Stable and uniform tax system, simplified custom procedures, and stable legal environment will increase transparency of trade operations and discourage shadow activity.

There are also a number of alternative explanations of low responsiveness of trade to price, but most of them are weak in conditions of transition economies. One of them is the commodity structure of Ukrainian trade. But empirical estimations showed that it is not a decisive factor for low trade elasticities with Ukraine. But in any case, these peculiarities of commodity structure further worsen the ability of trade to adjust to its optimal level. There is a need to improve the initial inherited structure of trade and regulate it according to comparative advantage formed on the basis of factor endowments, technology and preferences. Only after this the sustainable relationship between external trade and economic growth in the country is established and the reverse (economic growth will reinforce trade potential) will also take place.

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APPENDIX

Appendix 1. Multivariate Johansen Cointegration Test for Export to Ukraine Equations

Czech Export to Ukraine

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.955454	65.54547	42.44	48.45	None **
0.62381	21.98828	25.32	30.45	At most 1
0.447295	8.301033	12.25	16.26	At most 2

L.R. test indicates 1 cointegrating equation(s) at 5% significance level

Hungary Export to Ukraine

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.962905	64.42338	42.44	48.45	None **
0.740985	21.59786	25.32	30.45	At most 1
0.266923	4.036565	12.25	16.26	At most 2

L.R. test indicates 1 cointegrating equation(s) at 5% significance level

Polish Export to Ukraine

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.927945	77.38449	42.44	48.45	None **
0.789383	32.66905	25.32	30.45	At most 1 **
0.305107	6.187952	12.25	16.26	At most 2

L.R. test indicates 2 cointegrating equation(s) at 5% significance level

Appendix 2. Multivariate Johansen Cointegration Test for Export to EU Equations .

Hungary Export to EU

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.699146	41.53593	34.91	41.07	None **
0.640969	21.1167	19.96	24.6	At most 1 *
0.195725	3.702831	9.24	12.97	At most 2

L.R. test indicates 2 cointegrating equation(s) at 5% significance level

Czech Export to EU

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.839118	44.29177	42.44	48.45	None *
0.641955	18.7126	25.32	30.45	At most 1
0.2662	4.333259	12.25	16.26	At most 2

L.R. test indicates 1 cointegrating equation(s) at 5% significance level

Polish Export to EU

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.592668	25.61153	24.31	29.75	None *
0.36252	10.34336	12.53	16.31	At most 1
0.146321	2.689403	3.84	6.51	At most 2

L.R. test indicates 1 cointegrating equation(s) at 5% significance level

Appendix 3. Estimation results of import demand equations for CE-EU trade

LS // Dependent Variable is CZ_IMP from EU

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Intercept	9.755798	3.76788	2.589201	0.0198
CZ_RER EU	-1.056834	0.453004	-2.332944	0.033
CZ_GDP	0.317142	0.337288	0.940271	0.3611
R-squared	0.80608	Mean dependent var		9.309394
Adjusted R-squared	0.78184	S.D. dependent var		0.146049
S.E. of regression	0.068216	Akaike info criterion		-5.226206
Sum squared resid	0.074455	Schwarz criterion		-5.077084
Log likelihood	25.68913	F-statistic		33.25409
Durbin-Watson stat	2.200587	Prob(F-statistic)		0.000002

LS // Dependent Variable is HU_IMP from EU

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Intercept	24.2312	2.022272	11.98216	0
HU_RER EU	-3.48561	0.461963	-7.545215	0
R-squared	0.770054	Mean dependent var		8.974572
Adjusted R-squared	0.756527	S.D. dependent var		0.27853
S.E. of regression	0.137435	Akaike info criterion		-3.869908
Sum squared resid	0.321102	Schwarz criterion		-3.770493
Log likelihood	11.80429	F-statistic		56.93028
Durbin-Watson stat	1.467108	Prob(F-statistic)		0.000001

LS // Dependent Variable is POL_IMP from EU

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Intercept	8.010301	0.590688	13.56097	0
POL_RER EU	-0.752588	0.173862	-4.328642	0.0005
POL_GDP	0.536382	0.067344	7.964853	0
R-squared	0.976597	Mean dependent var		9.670623
Adjusted R-squared	0.973672	S.D. dependent var		0.279699
S.E. of regression	0.045384	Akaike info criterion		-6.041268
Sum squared resid	0.032955	Schwarz criterion		-5.892146
Log likelihood	33.43221	F-statistic		333.8416
Durbin-Watson stat	2.014285	Prob(F-statistic)		0

Appendix 4. Estimation results of import demand equations for CE-Ukraine trade

LS // Dependent Variable is POL_IMP from Ukraine

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Intercept	11.09608	0.123453	89.88086	0
D(POL_GDP)	1.927629	0.615575	3.131428	0.0069
RER Pol/Ukr	0.185908	0.218268	0.851742	0.4078

R-squared	0.429442	Mean dependent va	11.30324
Adjusted R-squared	0.353368	S.D. dependent var	0.229214
S.E. of regression	0.184319	Akaike info criterion	-3.231166
Sum squared resid	0.509601	Schwarz criterion	-3.082771
Log likelihood	6.539605	F-statistic	5.645029
Durbin-Watson stat	1.85126	Prob(F-statistic)	0.014868

LS // Dependent Variable is CZ_IMP from Ukraine

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Intercept	-6.260086	3.991875	-1.568207	0.1408
CZ_GDP	1.984471	0.483678	4.10288	0.0012
RER Cz/Ukr	0.492108	0.171548	2.86864	0.0132

R-squared	0.584657	Mean dependent va	10.55706
Adjusted R-squared	0.520758	S.D. dependent var	0.198741
S.E. of regression	0.137583	Akaike info criterion	-3.799692
Sum squared resid	0.246079	Schwarz criterion	-3.654831
Log likelihood	10.69452	F-statistic	9.149715
Durbin-Watson stat	3.180577	Prob(F-statistic)	0.003309

LS // Dependent Variable is HU_IMP from Ukraine

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RER Hu/Ukr	0.328163	0.275174	1.192566	0.2544
Intercept	9.66886	1.262431	7.658919	0

R-squared	0.098613	Mean dependent va	11.17315
Adjusted R-squared	0.029275	S.D. dependent var	0.201181
S.E. of regression	0.198215	Akaike info criterion	-3.113244
Sum squared resid	0.510758	Schwarz criterion	-3.018837
Log likelihood	4.06525	F-statistic	1.422214
Durbin-Watson stat	2.183939	Prob(F-statistic)	0.254353

Appendix 5. Estimation results of export demand equations for CE – Ukraine trade

Pooled LS // Dependent Variable is ?Export to Ukraine				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP_UKR1)	0.338143	0.188499	1.793872	0.0791
POL_EXP--POL_RER Pol/Ukr	0.624326	0.301987	2.067394	0.0441
HU_EXP--HU_RER Hu/Ukr	0.862425	0.358479	2.405785	0.02
CZ_EXP--CZ_RER Cz/Ukr	0.594225	0.2922	2.033623	0.0475
Fixed Effects				
Intercept Poland	11.30149			
Intercept Hungary	6.685665			
Intercept Czech	9.005089			
R-squared	0.809123	Mean dependent va		11.0293
Adjusted R-squared	0.781855	S.D. dependent var		0.549521
S.E. of regression	0.25666	Sum squared resid		2.766715
Log likelihood	46.22312	F-statistic		59.34556
Durbin-Watson stat	1.556357	Prob(F-statistic)		0

Appendix 6. Estimation results of export demand equations for CE-EU trade

Pooled LS // Dependent Variable is ?EXP to EU				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP_EU)	6.255142	3.168113	1.974406	0.0535
POL_Exp--POL_RER EU	-1.24457	0.203541	-6.114594	0
CZ_Exp--CZ_RER Eu	-1.911743	0.285958	-6.685394	0
HU_Exp--HU_RER EU	-3.850504	0.353967	-10.87813	0
Fixed Effects				
Intercepr Poland	11.0405			
Intercept Czech	14.33594			
Intercept Hungary	25.65822			
R-squared	0.877386	Mean dependent var		9.110596
Adjusted R-squared	0.862059	S.D. dependent var		0.277434
S.E. of regression	0.10304	Sum squared resid		0.509628
Log likelihood	93.27537	F-statistic		114.4908
Durbin-Watson stat	1.68941	Prob(F-statistic)		0

Appendix 7. Granger Causality test for exports - real exchange rate relationship between CE countries and EU.

Pairwise Granger Causality Tests

Lags: 2 Null Hypothesis:	Obs	F-Statistic	Probability
POL_EXP to EU does not Granger Cause POL_RER EU	17	3.48012	**0.06427**
POL_RER EU does not Granger Cause POL_EXP to EU		0.06295	0.9393

Lags: 2 Null Hypothesis:	Obs	F-Statistic	Probability
HU_EXP to EU does not Granger Cause HU_RER EU	17	3.91755	**0.04903**
HU_RER EU does not Granger Cause HU_EXP to EU		1.99305	0.17891

Lags: 2 Null Hypothesis:	Obs	F-Statistic	Probability
CZ_EXP to EU does not Granger Cause CZ_RER EU	18	3.03165	**0.08305**
CZ_RER EU does not Granger Cause CZ_EXP EU		0.03446	0.96622

Appendix 8. Results of testing for causality between export to EU and RER by means of Error-Correction model.

Dependent variable	Causal variable	Country	Error Correction Coeficient	t-statistics
Export to EU	RER	Poland	-0.16927	(-0.49816)
		Czech	-0.28042	(-1.43085)
		Hungary	-1.217728	(-3.51681)***
RER	Export to EU	Poland	-0.601497	(-2.16309)**
		Czech	-0.243228	(-2.48879)***
		Hungary	-0.179197	(-1.67364)*

***means significance at 1%; **-at 5%; *-at 10%

Appendix 9. Estimated elasticities of real exchange rate with respect to export for CE-EU relationships.

Pooled LS // Dependent Variable is ?RER in EU

Variable	Coefficient	Std. Error	t-Statistic	Prob.
POL_RER--POL_Export to EU	-0.696781	0.060469	-11.52292	0
CZ_RER--CZ_Export to EU	-0.423488	0.05379	-7.873053	0
HU_RER--HU_Export to EU	-0.19026	0.032736	-5.811985	0
Fixed Effects				
Intercept Poland	7.930424			
Intercept Czech	6.614618			
Intercept Hungary	6.059452			
R-squared	0.998705	Mean dependent var		2.862219
Adjusted R-squared	0.99858	S.D. dependent var		1.187669
S.E. of regression	0.04475	Sum squared resid		0.104135
Log likelihood	142.3221	F-statistic		20048.4
Durbin-Watson stat	1.398986	Prob(F-statistic)		0

Appendix 10. Estimation results of foodstuff export demand elasticities for CE-Ukraine trade.

Pooled LS // Dependent Variable is ?EXP to Ukraine
Date: 05/21/00 Time: 20:44
Sample(adjusted): 1995:2 1999:2
Included observations: 17 after adjusting endpoints
Total panel observations 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP_UKR)	0.412089	0.202236	2.037659	0.0476
POL_EXP--POL_RER Ukr Food	0.164755	0.296305	0.556031	0.581
CZ_EXP--CZ_RER Ukr Food	0.406806	0.36672	1.109308	0.2733
HU_EXP--HU_RER Ukr Food	0.743667	0.431279	1.724327	0.0917
Fixed Effects				
Intercept Poland	11.81722			
Intercept Czech	9.837888			
Intercept Hungary	7.983971			
R-squared	0.819858	Mean dependent va		11.07039
Adjusted R-squared	0.791414	S.D. dependent var		0.548773
S.E. of regression	0.250631	Sum squared resid		2.387007
Log likelihood	43.30954	F-statistic		57.64818
Durbin-Watson stat	1.621804	Prob(F-statistic)		0

Appendix 11. Estimation results of foodstuff import demand elasticities for CE-Ukraine trade

LS // Dependent Variable is HU_IMP from Ukraine
Date: 05/21/00 Time: 20:35
Sample(adjusted): 1996:1 1999:2
Included observations: 14 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Intercept	10.42725	1.228579	8.487242	0
HU_RER Hu/Ukr	0.210156	0.340183	0.617774	0.5483

R-squared	0.030823	Mean dependent va	11.18546
Adjusted R-squared	-0.049941	S.D. dependent var	0.202836
S.E. of regression	0.207839	Akaike info criterion	-3.010421
Sum squared resid	0.518364	Schwarz criterion	-2.919127
Log likelihood	3.207808	F-statistic	0.381645
Durbin-Watson stat	2.164088	Prob(F-statistic)	0.548269

LS // Dependent Variable is POL_IMP from Ukr

Variable	Coefficient	Std. Error	t-Statistic	Prob.
POL_GDP	-0.233404	0.208041	-1.121913	0.2795
POL_RER Pol/Ukr	0.407758	0.248623	1.640065	0.1218
Intercept	12.87462	1.224902	10.51074	0

R-squared	0.153935	Mean dependent va	11.28967
Adjusted R-squared	0.041127	S.D. dependent var	0.236058
S.E. of regression	0.231153	Akaike info criterion	-2.778341
Sum squared resid	0.801474	Schwarz criterion	-2.629945
Log likelihood	2.464173	F-statistic	1.364572
Durbin-Watson stat	2.640039	Prob(F-statistic)	0.285447

LS // Dependent Variable is CZ_IMP from Ukr

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CZ_GDP	1.806401	0.559087	3.230986	0.008
CZ_RER Cz/Ukr	0.365311	0.22317	1.636917	0.1299
Intercept	-4.256934	4.394886	-0.968611	0.3536

R-squared	0.530138	Mean dependent va	10.55865
Adjusted R-squared	0.444708	S.D. dependent var	0.212983
S.E. of regression	0.15871	Akaike info criterion	-3.493942
Sum squared resid	0.277078	Schwarz criterion	-3.357001
Log likelihood	7.592457	F-statistic	6.20556
Durbin-Watson stat	2.884863	Prob(F-statistic)	0.015698

Appendix 12. Estimation results of foodstuff import demand elasticities for CE-EU trade.

LS // Dependent Variable is POL_IMP from EU

Variable	Coefficient	Std. Error	t-Statistic	Prob.
POL_RER EU Food	-1.000631	0.225879	-4.429936	0.0005
POL_GDP	0.649466	0.048955	13.26652	0
Intercept	5.215629	0.169652	30.74311	0

R-squared	0.979051	Mean dependent var	9.654277
Adjusted R-squared	0.976258	S.D. dependent var	0.278313
S.E. of regression	0.042884	Akaike info criterion	-6.147501
Sum squared resid	0.027586	Schwarz criterion	-5.999106
Log likelihood	32.78662	F-statistic	350.5096
Durbin-Watson stat	1.671891	Prob(F-statistic)	0

LS // Dependent Variable is CZ_IMP from EU

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CZ_RER EU Food	-0.084167	0.513435	-0.163928	0.872
CZ_GDP	1.029178	0.251307	4.095306	0.001
Intercept	1.552361	2.791334	0.556136	0.5863

R-squared	0.730641	Mean dependent var	9.302165
Adjusted R-squared	0.694727	S.D. dependent var	0.146744
S.E. of regression	0.081078	Akaike info criterion	-4.873665
Sum squared resid	0.098606	Schwarz criterion	-4.72527
Log likelihood	21.3221	F-statistic	20.34393
Durbin-Watson stat	1.872027	Prob(F-statistic)	0.000053

LS // Dependent Variable is HU_IMP from EU

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HU_RER EU Food	-2.537355	1.181808	-2.14701	0.0475
Intercept	17.39073	3.928659	4.426632	0.0004

R-squared	0.223665	Mean dependent var	8.956803
Adjusted R-squared	0.175144	S.D. dependent var	0.275301
S.E. of regression	0.250032	Akaike info criterion	-2.66789
Sum squared resid	1.000259	Schwarz criterion	-2.56896
Log likelihood	0.47012	F-statistic	4.609654
Durbin-Watson stat	0.54515	Prob(F-statistic)	0.047464

Appendix 13. Estimation results of foodstuff export demand elasticities for CE-EU trade.

Pooled LS // Dependent Variable is ?EXP to EU
Total panel observations 51

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP_EU)	6.617405	5.977622	1.10703	0.2736
POL_EXP--POL_RER EU Food	-1.978396	0.673828	-2.936055	0.005
CZ_EXP--CZ_RER EU Food	-1.538905	0.821769	-1.872674	0.067
HU_EXP--HU_RER EU Food	-3.716744	0.86666	-4.288584	0.0001
Fixed Effects				
Intercept Poland	7.021562			
Intercept Czech	12.18721			
Intercept Hungary	21.15711			
R-squared	0.631204	Mean dependent va		9.08843
Adjusted R-squared	0.580914	S.D. dependent var		0.274256
S.E. of regression	0.177544	Sum squared resid		1.386969
Log likelihood	64.25262	F-statistic		25.10244
Durbin-Watson stat	0.863181	Prob(F-statistic)		0

Appendix 14. Goods Export and Import Dynamics in Ukraine. 1996-1999.