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Oil Price Shock and Structural Changes in CMEA Trade: Pouring Oil on Troubled Waters?[*]

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Abstract

We analyse trade between countries of the Council of Mutual Economic Assistance in Eastern Europe between 1950 and 1990. Despite central planning and political motivation of the CMEA, we show that trade could be explained by standard demand factors surprisingly well. Moreover, we document that the oil price crisis had several repercussions on Eastern Europe. The Soviet Union as a supplier of crude oil benefited from the energy crisis in the 1970s. In particular, it used energy exports as an instrument of foreign policy. In turn, the responses of the individual CMEA countries in Central Europe were largely different.

JEL-Numbers: F14, C22, N74.
Key words: Economic history, free trade areas, political economy, structural break, gravity model, oil price, CMEA trade.

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1 Introduction

This paper analyses structural change in Soviet foreign trade with the other member countries of the Council for Mutual Economic Assistance (CMEA). Foreign trade is indicative of a country's economic and political priorities. The CMEA is perhaps one of the most vivid examples where foreign trade mirrors politics and policy choices. Ideological and political, not economic considerations laid the basis of the CMEA's existence and determined further development. The result was a unique economic organization composed of several small member states at very different levels of economic development and one superpower, which, however, was not at the same time the economically most advanced among the members. On the contrary, the main commodities of export the Soviet Union contributed to CMEA trade were raw materials and in particular fuels.

The system of trade in the CMEA was established according to Soviet principles, the defining feature of which with regard to foreign trade was that it should be immune to unpredictable external influences. Through the state monopoly on foreign trade planned economies wanted to secure control of the channels of foreign impact.

Structural change is defined as a permanent change in the parameters of the trade functions. With regard to the world economy, the oil crisis of 1973 generally underscored an emerging structural crisis which was followed by a radical change from the old technological regime. With regard to CMEA economies in particular, a change in the general level of world prices, as was the case in 1973, was one of the channels identified as possibly having an impact on planned economies despite their monopoly on foreign trade (Trzeciakowski 1987, p.465). Furthermore, energy played a particular role in CMEA trade as CMEA member states were dependent on the Soviet Union for energy exports.

The CMEA features only marginally in historical studies, which are concerned with the overall development of communism, the Soviet Union and its relations to Eastern Europe. Historical studies of the smaller member countries tend to give more details on the CMEA taking into account the relatively greater impact the organization had on these countries. This paper provides the first analysis of CMEA trade over the entire period of its existence and focuses on the impact the oil crisis had on the CMEA. It, therefore, also provides a run-up history to the recurring discussions on dependence and political dimensions to energy supplies from Russia. We find that trade activity in the CMEA began to increase only by the late 1950s. Contrary to official announcements of the time and socialist ideology, a structural break occurred in CMEA trade

after the first oil crisis in 1973. Afterwards CMEA countries turned inwards and intra-CMEA trade increased. Only with regard to Soviet exports, however, trade continued to increase virtually until the collapse of the CMEA. With regard to exports from the smaller CMEA member states to the Soviet Union there was also a structural break after 1973. Trade, however, began to decline in the early 1980s already, which is indicative of politically motivated turning away from the CMEA by the smaller member states. Trade between the smaller member states developed in parallel to that with the Soviet Union, however on a lower level and without a distinct break. Trade activity between these states also declined by the early 1980s.

The paper is structured as follows. The next section provides an overview of the history of the CMEA in so far as it is relevant to structural change, i.e. drawing attention to the main phases of development and analyzing internal and external sources of structural change. Section 3 portrays and discusses the particular role of energy in intra-CMEA trade. Section 4 provides the econometric analysis of structural change in Soviet foreign trade with the CMEA countries and leads to the conclusions in the last section.

2 Historical Overview

Ideology and the economy in socialist states were closely interlinked: Success of the latter was taken as proof of the former and formed the basis of legitimacy for the system as a whole. Marx's vision of communism with regard to foreign trade promised an economy in control of the influence that other countries could have on it, and thus immune to the recurring economic crises of capitalism. The socialist revolution was expected to turn into a world revolution, so that foreign trade would also come to be governed by socialist economic principles.

The Russian Empire had been highly dependent on foreign economies for investment, technology and also human resources (Smith 1993, p. 20), exacerbating the task for the Bolshevik regime of insulating itself from "capitalist crises". In April 1918 a decree on the Nationalisation of Foreign Trade was passed, which established a state monopoly on foreign trade. Trade was a means to meet the overall plan. Imports were the means to accelerate domestic industrialisation, exports the necessary expenditure of domestic resources to obtain these imports. (Smith 1993, p. 43) In reality, however, the difference between world market and domestic prices was covered by the state budget: Isolation ultimately created macroeconomic disequilibria.

Until World War II the Soviet Union was the only planned economy and pursued economic "success" as defined by its ideology in the form of modernisation and industrialisation.

After World War II Communist regimes were set up in all Eastern European countries that fell under the Soviet sphere of influence. The system of planned economies was established according to the Soviet model across these states despite great differences in economic preconditions. From the start especially foreign economic relations and trade were a highly political issue. In addition to refusing Marshall Aid, none of the Eastern European states participated in international economic organisations, established after the War, such as the IMF.

In early January 1949, an article in Pravda reported the establishment of the Council for Mutual Economic Assistance (CMEA). Its founding members were the Soviet Union, Bulgaria, Czechoslovakia, Hungary, Poland, and Romania. Albania joined in February 1949 and the GDR in September 1950. Three more countries outside Europe joined much later: Mongolia in 1962, Cuba in 1972, and Vietnam in 1978. From 1965 onwards Yugoslavia had associate status. In the announcement of its foundation the CMEA explicitly distanced itself from the Marshall Plan, which it saw as violating national sovereignty. The Pravda article stressed the equality of all CMEA members, but the aims of this new organisation were kept rather vague – an increase in economic cooperation and mutual aid.[1]

There had been earlier proposals to establish organisations for economic cooperation for example between Czechoslovakia and Poland or in the form of a Balkan confederation. None of these proposals envisioned the participation of the Soviet Union. (Metcalf 1997, pp. 20-22) In contrast to these earlier plans and to other economic confederations the CMEA was unique in its structure, consisting as it did of one superpower and several small countries at very diverse levels of economic development. Its member countries had fairly low levels of mutual trade before World War II, so the CMEA's establishment entailed a considerable redirection of trade flows from the pre-war West-orientation.

The establishment of the CMEA was partly the result of the Soviet Union's political interest to complement military with economic control over Eastern Europe. It was also due to the fact that Eastern Europe and the Soviet Union were limited in their choice of trading partners through Western embargos, in particular by the establishment of the Coordinating Committee for Multilateral Export Controls (CoCom). (Zwass 1989, p. 26) In addition, for the smaller Eastern

[1] International Arts and Sciences Pr. (1974) 'Socialist International Organizations: COMECON: The Creation of the Council for Mutual Economic Assistance, Pravda, January 25, 1949', *Soviet Statutes and Decisions. A Journal of Translation*, 9, 1, pp. 4-5 (p.4).

European countries, who had suffered from Nazi occupation, cooperation with the Soviet Union brought military protection in exchange.

Integration within the CMEA was initially very limited. Joint CMEA activities amounted mainly to the unification of statistical reporting systems, collecting members' plans and recording trade. (Smith 1983, p. 174) Member states were encouraged to aim for economic autarky and to pursue economic development according to the Soviet model, i.e. rapid industrialisation with the main emphasis on heavy industry. The Eastern European economies did achieve very high annual growth rates – on average 23.5% between 1947 and 1950 (Zwass 1989, p. 24). As in the Soviet Union, relocation of labour from agriculture to industrial production and exploitation of domestic raw materials were the foundation for growth. Owing to this policy of extensive industrialisation and also to Soviet "exploitation" soon a radial pattern of bilateral trade developed with the Soviet Union in the centre as key supplier of energy and raw materials and importer of industrial products. The East European economies were not integrated with each other through this pattern of trade.

The CMEA only began its active existence after the death of Stalin. Then, reform of the CMEA became necessary for both domestic and foreign political reasons. Until the early 1950s the economic relationship between the Soviet Union and Eastern Europe had imposed a considerable burden on the Eastern European states. Crucially, for the Soviet Union, many of the East European satellite states were not only economically on a more advanced level but its civil societies were also more developed even though "semi-suppressed". (Hosking 2006, p. 270) The World War had not destroyed social memory as the revolution and civil war had done in Russia. National identity in Eastern Europe remained strong, and could easily turn into anti-Russian or anti-Communist feelings. (Hosking 2006, p. 229) Khrushchev's famous secret speech at the 20th Party Congress, therefore, brought a severe crisis of legitimacy to the newly established communist regimes of Eastern Europe. Opposition movements and the open protests which erupted were often in part driven by economic grievances. Subsequent discussions on how to reform the economy and measures undertaken could be broadly summarized as an attempted change from extensive industrialisation to intensive development but varied a great deal across countries. In consequence to Eastern European "crises", especially the Polish and Hungarian ones in 1956, the planning systems of the CMEA member states became much more diverse and more difficult to unite in one economic organisation. Unity in economic matters, however, was politically necessary in the Soviet bloc's rivalry with the West.

From the 1950s, therefore, a reform process and intensification of intra-CMEA relations began. Initial measures – the abolishment of reparations and improvement of terms of trade - reduced the share of the economic burden carried by Eastern Europe. Subsequent reforms had the goal of greater integration within the CMEA leading to greater efficiency through the division of labour and specialisation of countries according to natural endowments and ultimately establishing a trading pattern which would genuinely integrate the partners. Crucially, in contrast to market economies the CMEA could not rely on "market forces"; the only mechanism available to achieve greater integration was essentially "administrative".

With the CMEA Statutes or Charter of 1959 reform of the rudimentary institutional structure of the CMEA was initiated.[2] Joint production projects were the second major reform effort aimed at integrating the CMEA. The "Basic Principles of the International Socialist Division of Labour" of 1962 saw coordination of national plans as the primary means for achieving the division of labour. The second major joint action programme, the "Comprehensive Programme for the Further Extension and Improvement of Cooperation and the Development of Socialist Economic Integration" adopted in 1971, placed the emphasis on "integration" of the socialist bloc instead of on the division of labour. The chief methods for achieving integration were seen as increased cooperation in planning and forecasting, exchange of experience and research work. Furthermore, the Programme outlined cooperation on projects of joint interest through joint investment and direct contribution of labour and human capital. (Zwass 1989)

None of these reforms, however, aimed at radical permanent change; rather they were designed as a continuous reform process with far-reaching goals and development plans for up to 20 years and a smooth increase of foreign trade. Hence, no single reform measure seems radical enough to hypothesize a structural break in CMEA trade as a consequence.

Gorbachev's coming to power in 1985 did not mark a sharp turning point in CMEA reforms either. Reform policy was still influenced by competition and comparison with the West: In December 1985 a new "Comprehensive Programme for Scientific and Technological Progress up

[2] The council meeting was established as the highest authority, supplemented by the executive committee and CMEA international organisation committees, standing sectoral committees, and the CMEA secretariat with its headquarters in Moscow. In addition to these coordinating institutions two banks were set up. The International Bank for Economic Cooperation was established in 1962. This Bank was designed as an international clearing bank. In 1970 the International Investment Bank was established. The CMEA members contributed capital to this bank according to their share in Intra-CMEA trade. One function this bank was designed for was to provide capital investment credits for joint production projects.

to the Year 2000" was adopted, aiming to "make the community independent of Western technology and also to make it invulnerable to pressure and blackmail from the forces of imperialism." (Zwass 1989, p. 161) In general, reforms of the foreign trade system under Gorbachev were aimed at streamlining administrative and operative mechanisms and improving bureaucratic efficiency. The establishment of joint ventures was permitted and so called "free enterprise zones" established (Smith 1993, p. 127). The connection to the central planning system and the state monopoly on foreign trade were left untouched.

Nevertheless, Gorbachev's new foreign policy of pursuing reconciliation with the West was important for CMEA relations as it put an end to the concept of the capitalist West as an enemy and Eastern Europe, therefore, lost its importance for the Soviet Union as a "buffer zone". On a domestic level perestroika and glasnost' had a destabilizing effect on the East European countries, even though these policies were not intended as "commodities for obligatory export" (Service 2003, p. 464), and Gorbachev probably did not foresee their ultimate consequences. Eastern Europe and with it the CMEA had lost its priority status in Soviet political interests. Increasingly the negative influence of the CMEA on the Eastern European economies and also the disadvantage of intra-CMEA trade for the Soviet Union are topics discussed in official documents.[3]

The one part of the CMEA trading system which remained essentially unreformed throughout was the pricing system. Prices on the domestic market were fixed by each of the socialist countries' planning agencies; they were a means of transferring income between enterprises, but not a means of allocation. They did not reflect real value. The CMEA, therefore, developed its own pricing system for trade in the form of adapted world market prices converted into "transferable roubles". The transferable rouble was a notional, non-convertible currency unit which was used only for the settlement of accounts in CMEA trade. The actual price of a traded good was established in bilateral bargaining agreements. The bargaining system divided products into soft goods and hard goods. Hard goods were raw materials and products which could be traded on the world market for hard currency. Soft goods were goods not in demand on the world

[3] Stone 1996, p. 43 quotes a report of the Soviet Union's Communist Party Central Committee: "The countries are becoming increasingly dissatisfied with the state of cooperation and the circumstances under which it is carried out. (…) For its part, the USSR has been compelled to extend credits in order to rectify the balance of payments. (…) In all countries, the interest in cooperation is falling because of the quality and technical level of the goods being exchanged."

market. Overall analyses of the CMEA pricing system conclude that hard goods tended to be under-priced and soft goods over-priced. Prices for one and the same good could vary a great deal between bilateral trade agreements. The fact that trading profits or losses could not ultimately be established remained a source of conflict. Both Western economists and Soviet and East European planning officials estimated the loss or profit of CMEA member countries using various methods, and reaching highly divergent results. Until 1991 there were 6 different systems of establishing prices for intra-CMEA trade based on world market prices, but these changes never touched the essence of the pricing system. Establishing convertibility in CMEA trade, though, was possibly the one essential reform which would have made genuine multilateral trade possible.

At the 45th meeting of the CMEA in January 1990 in Sofia all hopes of reform within the CMEA structure were given up and unanimous agreement reached to switch all trade to hard currency trade. A commission was instituted which would oversee this fundamental restructuring of the entire CMEA. In the end, the dissolution of the CMEA was precipitated even faster than the member states may have foreseen in 1990. All trade was converted to hard currency by the beginning of 1991. The introduction of convertibility has been identified as one of the reasons for the collapse of the CMEA. Trade data indicate, however, that a redirection of trade began much earlier. (Richter 1994, p. 186)

To sum up this historical overview, the CMEA was established predominantly for political reasons; its reform process was set off by political crisis and continued throughout its existence, but the most distinguishing feature of the CMEA remained its radial pattern of trade with the Soviet Union in the centre. This overview, therefore, leads to the first hypothesis to be examined in the econometric analysis:

Hypothesis 1:

The CMEA was a politically motivated free trade area.

3 The Energy Crisis and its consequences for the CMEA

As described above, CMEA trade was characterized by a radial pattern of trade with the Soviet Union in the centre as the main provider of raw materials and energy. Since the Second World War the global economy has seen an unprecedented increase in openness and integration, with the rate of growth in world trade consistently surpassing growth in real world output. Increased integration was accompanied by continuing technological advances which manifested themselves in the “service and communication” revolution at the beginning of the 1970s. Facilitated

communication and transportation between countries in turn increased trade. International agreements such as the Kennedy Round agreement of the GATT attempted to reduce formal trade barriers. Gradually these changes began to force also CMEA member states into incipient economic opening up towards the West. In a study of trade of 48 countries 80% of the countries are found to show evidence of a significant structural break in their trade-output ratios. (Ben-David et.al. 1997, p.7) The most frequent break year for imports was the year of the first energy crisis, 1973. In contrast to these findings, in 1979 Radio Moscow broadcast: "[The CMEA] is the only industrially developed zone on this planet which has not been affected by the energy crisis."[4]

The rapid industrialisation pursued in Eastern Europe and the quasi war-like preparations during the Cold War necessitated an extensive use of energy and energy resources. In the 1950s coal was the predominant energy source (68%), this share dropping to around 20% during the 1960s and 70s (IMF, The World Bank, OECD & EBRD 1991, p. 183). As the emphasis in industrial production began to change, oil and to a lesser degree gas became more significant as energy sources, as well as gaining significance as raw materials for industrial production. Eastern European states, especially Poland and Czechoslovakia, were initially net energy exporters to the Soviet Union. By the early 1960s, partly due to the shift in the composition of energy consumption, they had become dependent on the Soviet Union for oil and gas (Balmaceda 2004, p. 163). In 1973, the smaller CMEA member states were receiving between 80 and 90% of their overall oil imports from the Soviet Union. By the mid-1960s, moreover, readily accessible Soviet resources were beginning to be depleted and extraction had to be moved to remoter regions of Siberia. The cost of exploration and extraction in these regions was much higher and the distance of transportation sharply increased even within the Soviet Union from an average of only 80km in 1970, to 1910km in 1980, and to 2350km in 1988 (Smith 1993, p.9). The cost of energy, therefore, had been on the agenda of the CMEA for a while before the oil crisis.

Soviet discussion of this issue recognized the connection between Eastern European industrialisation and energy consumption and acknowledged the unequal distribution of energy resources. After the energy crisis statements point out the need to increase Soviet raw material exports if industrial growth in the CMEA member states was to be maintained (Kosygin 1980, p.

[4] Radio Moscow, Broadcast 10 August 1979, quoted in: Kramer, John M.: The Energy Gap in Eastern Europe, Toronto 1990, p. 12.

30). The CMEA was seen as "a powerful instrument" to solve this problem (Dudinskii 1966, p. 85).

Concrete measures discussed in the CMEA were increased domestic production of energy, increased imports from developing countries, development of alternative sources of energy, especially nuclear energy, and finally improvements in technology and efficiency. The debate could acquire a political overtone with regard to possible energy supplies from the West.[5] Just like in the overall approach to the CMEA, "cooperation" and "integration" were among the most frequently used words in discussions on possible solutions for the energy problem.

As all other prices, prices for raw materials were established in the bilateral bargaining system, with the prices for fuel and raw materials generally below world market prices. The oil crisis sharply augmented the difference between the world market and intra-CMEA price levels. The price increase on the world market radically improved the terms of trade for the Soviet Union in relation to Western countries. (Marer et.al. 1992, p. 208) The subsequent increase in hard currency revenue contributed to the Soviet economy's stability at a time when Western economies were in shock. None of the other CMEA member states, however, could "smooth" their domestic economic problems due to improved terms of trade with the West.

Soviet economists had criticized the CMEA pricing system in the context of energy trade as imposing a burden on the Soviet economy as early as 1966 (Dudinskii, 1966, p.88). Until 1973 this did not have an effect on Soviet policy. In reaction to the oil crisis, however, the so-called Bucharest principle of fixed prices was amended in 1975 to a 5 year moving average. This meant a distinct though slightly delayed and smoother increase in prices for energy in the CMEA. The East European CMEA member states had different options to react to this: 1) increase purchases from non-CMEA suppliers, or 2) increase domestic extraction and improve energy efficiency. In relation to the Soviet Union, they could either 3) increase their exports to the Soviet Union to compensate for higher raw material prices and thus achieve a balanced import-export ratio. Alternatively they could 4) run up a deficit with the Soviet Union, or 5) increase participation in extracting and transporting of Soviet fuels.

The first major cooperation project was the joint construction of the "Druzhba" pipeline, agreed in 1959: The traditional infrastructure (ships, trains) had become inadequate, and the Druzhba pipeline network helped to double oil exports from the Soviet Union to CMEA member states

[5] Sojak, Z. & Riha L. (1968) 'Cooperation with the Socialist Countries', Zivot Strany, January 1968, translated in: Radio Free Europe Czechoslovak Press Survey No. 2000, pp. 1-5 (3), also quoted in: Metcalf, L.K. (1997), p. 99.

between 1960 and 1965 (Balmaceda, 2004, p. 163). Other joint projects were undertaken soon afterwards, such as the construction of the gas pipeline "Bratstvo", initially linking the Soviet Union with Czechoslovakia. The emphasis on projects of "joint interest" intensified with the Comprehensive Program in 1971 and found its continuation in the Long-Term Target Programmes. Overall, 70% of the joint projects were located on the territory of the Soviet Union (Zwass, 1989, p. 83). The most famous of these probably was the "Soiuz" or "Orenburg" pipeline agreed in 1974. In contrast to earlier joint projects the East European states contributed labour and equipment to the construction of this pipeline not only on their own territory. Furthermore, they also contributed equipment purchased and loans taken out from the West.

Opposition to the increase in prices or the predominance of joint projects on Soviet territory is not expressed in official documents. However, for example one Czech writer in Nové Slovo points out that demand for Soviet raw materials on the world market improves the Soviet Union's position vis-à-vis the East European countries: "the Soviet Union makes good use of this fact for obtaining excellent credit terms for its oil extraction."[6] The sharpest reaction to the change in the pricing system came from Albania, who had withdrawn from the CMEA in 1961: "This fact proves once again the true state of the relationship between the USSR and the other countries of Eastern Europe. These are capitalist relations, and in no way do they differ from those prevailing between metropolitan countries and their colonies where the stronger dominates and exploits the weaker."[7] It has been a matter of some controversy and sources suggest different conclusions, whether the Soviet Union used energy prices as a policy tool in these bilateral negotiations and therefore shielded some countries more than others from the sharp increase in oil prices.[8] Furthermore, Western scholars also debated if and to what extent the Soviet Union used cheap

[6] Radio Free Europe *'Nové Slovo: "Facts About the Economic Links between the CSSR and USSR", 7 November 1968'* Czechoslovak Press Survey No. 2143, quoted in: Metcalf, L. K. (1997), p. 99.

[7] Radio Free Europe (1975) *'Radio Tirana, 25 February 1975'*, Polish Press Survey No. 2472, p. 5.

[8] A letter from the Central Committee of the CPSU to the CC of the Polish United Workers Party, June 5, 1981 states "[Some slanderers] contend that the Soviet Union is "plundering Poland"… one says that of a country which is supplying the main branches of Polish industry with deliveries of oil, gas, ore, cotton, at prices one and a half to two times lower than world prices." quoted in Lavigne, M. (1984), p. 150, footnote 1. An excerpt of Jaruzelski's memoirs making a similar point is quoted in: Stone, R. W. (1996), p.104. By contrast, Zbigniew Madej, permanent representative to the CMEA remembers: "The economic representatives of the Soviet Union did not make big maneauvers before the state of martial law, nor did they help much after it was introduced.", quoted in: Stone, R. W. (1996), p. 107.

energy as a subsidy and hence policy tool.[9] Relations, therefore, certainly had the potential of being interpreted on a political basis, even if trade prices and volumes were established on a purely economic basis.

We will therefore examine the following hypothesis

Hypothesis 2:

The Soviet Union was the dominant energy exporter and benefited from the energy crisis. It increasingly used energy exports as an instrument of foreign policy after the energy crisis.

Furthermore, it is likely that the energy crisis did not have a uniform effect on CMEA member states. Therefore, we can formulate also the following hypothesis:

Hypothesis 3:

The effect of the energy crisis on Soviet exports had different repercussions on Eastern European trade.

4 Econometric Approach to Analysis of the CMEA Trade and Oil Price Shocks

In previous sections we derived three hypothesis on political economy of CMEA trade from the perspective of oil price crisis. These hypotheses will be tested by estimation of a country specific trade demand model based on gravity models.

4.1 Data

The estimation of the empirical trade equations uses yearly data from 1950 to 1990. Trade flow data are taken from statistical yearbooks of the CMEA countries.[10] These data in national currency units are converted into current US dollars using the official exchange rate. Especially during the first years, however, data are not always internally consistent. For the years 1950-

[9] This debate was sparked off by Marrese and Vanous (1983) with their claim that "(…) the Soviet Union has implicitly transferred resources equivalent to $87.2 billion to Eastern Europe during 1960-80; the bulk of these resources - $75.5 billion – was transferred during 1971-80. Moreover, unlike debt, implicit trade subsidies are non-repayable aid." (Marrese, M., Vanous, J. 1983, p. 3).

[10] Soviet Union: Ministerstvo Vnešnej Torgovli SSSR, Planovo-ėkonomičeskoe Upravlenie: Vnešniaia torgovlia SSSR, Moscow annual issues.

Bulgaria: Nacionalen Statističeski Institut: Statističeskij godišnik na Narodna Republika Bălgarija, Sofia, annual

Czechoslovakia: Statistická ročenka Československé socialistické republiky, Prague, annual issues.

Hungary: Hungarian Central Statistical Office: Statistical Yearbook, Budapest 1970-77, 1981-90, data for 1978-1981 taken from: Vienna Institute of Comparative Economic Studies: Comecon Data 1989, Vienna 1990.

Poland: Główny Urząd Statystyczny: Rocznik statystyczny, Warsaw, annual issues.

1969, therefore, data are taken from Marer (1972), who adjusted these trade data of the individual CMEA countries into consistent time series. The year 1991 is omitted from the data series, as trade was changed to convertible currencies and overall virtually collapsed. Romania and the GDR are omitted from the sample as they are both exceptions in intra-CMEA trade: Romania, opposed what it perceived to be attempts at imposing CMEA over national interests and had unilaterally withdrawn from CMEA by the late 1960s. The GDR's trade pattern differed considerably from other CMEA members because of its trade with West Germany. The general quality of the data from socialist economies has been the subject of debate both before and after the collapse of communism. The data is, however, the only one available and therefore has been widely used, bearing in mind the possible distortions. The country-specific estimations use the largest possible sample for each country. Correspondingly, the sample starts approximately in 1950/1953 and ends in 1988/1990. GDP data in international 1990 Geary-Khamis dollars are taken from Maddison (2003). In further estimations oil prices are added as an additional variable. Yearly nominal prices for oil in US dollar are taken from InflationData.[11] For the purpose of the estimation all data are in logarithms.

4.2 Econometric Specification

Gravity models were originally proposed by Linder (1961) and Linnemann (1966). They were constructed similarly to the law of gravity in physics, hence, they were also often criticized as atheoretical approached to trade analysis. Only after more than four decades of intensive use, they received a sound theoretical foundation by Anderson and van Wincoop (2003). Econometric analysis proxies force of gravity with trade flows and mass with the trading partners' GDP. In their analysis of structural change in Austrian trade with CMEA Fidrmuc et al. (2008) explain exports by income prospects through real GDP and terms of trade. However, the terms of trade data are not available for all CMEA countries during the whole historical period. Therefore, this omitted variable will be dealt with by time effects.[12]

This analysis will estimate a gravity model with panel data for 5 CMEA countries, the Soviet Union and Bulgaria, Czechoslovakia, Hungary, and Poland (CMEA4) from 1953 to 1990. It will

[11] Inflation Data, Historical Crude Oil Price: http://www.inflationdata.com/inflation/Inflation_Rate/Historical_Oil_Prices_Table.asp, last accessed: 13/07/08.

[12] Imports are not estimated for statistical reasons: In panel data, the demand-oriented variable for imports (GDP of the importing country) is the same for every cross section and shows too little variance. Trade in a planned economy aimed to be largely balanced, allowing us to draw conclusions about import development from export analysis.

first analyse an overall panel with 20 cross-sections and then test these results on a reduced panel with 4 cross-sections for the Soviet Union's exports only. Distance is omitted as a variable from the estimation but can be controlled for by fixed effects regression in panel data. Baldwin and Taglioni (2006) argue that gravity models should be estimated using nominal trade data with time and country-specific dummy variables. Estimation of the gravity model will therefore use nominal trade data and three sets of time- and country-specific dummy variables:

$$x_{it} = \beta_0 + \beta_1 y_{it}^{cmea} + \beta_2 dxsu_{it} y_{it}^{cmea} + \beta_3 dxcm_{it} y_{it}^{cmea} + \beta_4 dcm_{it} y_{it}^{cmea} + \alpha_i + \varepsilon_{it} \quad (1)$$

where x_{it} represents exports from the Soviet Union and CMEA4, y^{cmea} stands for the GDPs of the countries of destination of the exports. *DXSU*, *DXCM* and *DCM* are the sets of time- and country-specific dummies: A set of yearly dummy variables for exports from the Soviet Union to CMEA4 (*DXSU*), a yearly dummy variable for exports from *CMEA*4 to the Soviet Union (*DXCM*) and a yearly dummy variable for exports among CMEA4 countries (*DCM*). Each of these variables is defined for individual years, e.g. *DXSU*70 will take on the value one for exports from the Soviet Union to CMEA4 in 1970, otherwise be zero, and *DXCM*70 will be one for exports from each of the CMEA countries to the Soviet Union in 1970, otherwise zero.[13]

To test results from the gravity model and a structural break in exports, our analysis proceeds with country-specific export demand models. These models use panel data with four cross sections for each of the five countries in the above model. The following equation is estimated,

$$x_{it} = \beta_0 + \beta_1 y_{it}^{cmea} + D75^b + D75\, y_{it}^{cmea} + \alpha_i + \varepsilon_{it} \quad (2)$$

where x_{it} denotes exports, y^{cmea} is the GDP of the countries of export destination, α_i are fixed effects, which capture omitted variables that vary across states but are constant over time. We consider a structural break in 1975, which corresponds to the oil price crisis.[14] *D*75 and $D75^b$ are dummy variables, which should capture the structural change indicated by gravity model results. *D*75 is equal to zero up to 1974 and takes on the value of one afterwards. Similarly, $D75^b$ takes on the value of one for 1975 and 1976 only, and zero otherwise. The former dummy variable

[13] In order to avoid multicollinearity problems, the estimation includes the time- and country-specific dummy variables as interaction variables only.

[14] To further examine the possibility of a structural break in exports of the CMEA countries in the mid 1970s, we applied a modified Chow test for a break at an unknown date. The QLR statistic is computed over a trimmed subset of the sample from 1958 to 1985 with two restrictions, both for the overall panel with 20 cross sections and for individual country panels with 4 cross sections each. The results, which are available upon request from authors, confirmed a structural break around 1975.

explains the long-run effects of different trade regimes, while the latter covers possible short-term effects during the regime change. The equation is estimated using period SUR standard errors and co-variances, which reduces the autocorrelation of residuals.

To analyse the nexus between the change in export demand and world energy price increase, an additional variable, world oil price, is added to the estimations. Stijns (2003) uses world energy prices in a gravity model to analyse the Dutch disease hypothesis. Korhonen and Ledyaeva (2008) document the link between trade and oil price in former Soviet Union countries. Oil price is added both to equation (1) and equation (2). The non-interacted dummy variable is dropped from equation (2) as it is multicollinear with oil prices.

4.3 Results of Empirical Analysis

The results of the estimations of equations (1) and (2) for the CMEA panel and all individual countries of the sample are summarized in Table 1. We can see that income of importing countries is a significant determinant of trade. Actually, this is quite a surprising result given the planning system in the CMEA countries. Moreover, the coefficients are comparably high in relation to results reported for standard OECD countries (usually close to one).[15] This can be explained by an excessive orientation of these countries to the CMEA and the isolation of these countries. It is also interesting to note that income elasticity of Soviet exports to other CMEA countries was especially high. Only Bulgaria and Poland showed slightly higher trade effects. The income elasticities of Soviet Union become slightly lower if oil price is included in the estimation (see Table 2).

The dummy and the interacted dummy variables which should capture structural change in exports in intra-CMEA trade are significant at the 1% level for all countries, except for Hungary. The oil price crisis had two different effects on CMEA trade. On the one hand, the absolute level of trade dropped down during the oil price crisis, as indicated by the coefficient for $D75^b$. On the other hand, the signs for coefficients of the interacted dummy variable and income in the individual CMEA countries are positive, which means that trade reacted stronger to economic developments in the target markets.

Figure 1 plots coefficient values from the regression (1) of the three dummy variables interacted with the GDP of the importing countries over the years. As all variables are in logarithms, the

[15] A unity income elasticity corresponds to equal distribution of demand between home and foreign products.

coefficients can be interpreted as elasticities:[16] The results show that the oil price crisis influenced the demand for exports from the Soviet Union more that the export demand for other CMEA countries. This matches with the fact that the Soviet Union was at the centre of the CMEA trading pattern and the largest trading partner for all CMEA member countries. Demand for exports from the CMEA4 to the Soviet Union was initially larger than that for exports from CMEA4 to other CMEA4, but reaches a very similar level from the early 1970s onwards. Thus, it can be seen that between 1973 and 1975 there was an unusually sharp increase in the elasticity of Soviet exports (DXSU). In relation to the early 1950s in 1975 Soviet exports had increased by 12% - with a 3% increase from 1974 to 1975. The increase in Soviet exports continued until 1987 (21%). Soviet exports then began to decline. The sharp increase in DXSU around 1975 is mirrored partly in DXCM (dummy variable for exports from CMEA4 to the Soviet Union) with a 9% increase from the early 1950s – 2.3% from 1974 to 1975. Exports from CMEA member states to the Soviet Union, however, did not continue to increase but rather levelled out until 1980 to a maximum of only 11% above the initial level and then decreased. DCM (dummy variable for exports between CMEA4) shows a much smoother development: An overall increase of 8.5% from the early 1950s and 1% from 1974 to 1975. To sum up, the coefficients show that trade activity picks up after 1956 then develops more slowly to increase sharply around 1975. Towards the end of the existence of the CMEA there is a marked difference between demand for Soviet exports and demand for CMEA4 exports.

Altogether, analysis of exports of the five CMEA member countries from 1950 to 1990 confirms that there was a structural break in CMEA trade during this time and this can be associated with the oil crisis.

The first hypothesis, that the CMEA was a politically motivated union can be confirmed by results from Figure 1: After an initially "dormant phase", trade activity increased after the death of Stalin simultaneously with other politically motivated reforms. The energy crisis resulted in an increase in trading activity among CMEA member states. The response to the crisis was to increase trade among socialist countries, i.e. to turn inwards and attempt to withdraw from the world market, to aim for greater autarky from the world market. Interestingly, the phase of turning inwards was of limited duration with regard to the CMEA4. The Soviet Union continued a high level of exports to CMEA4, thereby possibly trying to support and keep together its sphere

[16] In particular, an increase of GDP by 1 percent caused trade growth by reported coefficient.

of influence. Results indicate, however, that by the early 1980s interest in CMEA trade from the part of the smaller member states began to decline and fell sharply by 1986 already.

The effects of the energy crisis were not uniform across countries. The higher level of elasticities (Figure 1) for exports from the Soviet Union confirms the second hypothesis that the Soviet Union was the dominant energy exporter and benefited from the energy crisis. Results from both the gravity and the demand model seem to confirm the second part of the hypothesis that the Soviet Union increasingly used energy exports as an instrument of foreign policy. Ultimately, of course, this part hypothesis can only confirmed in conjunction with official documents and statements (see section 3).

The third hypothesis that the energy crisis had different repercussions on Eastern European trade is confirmed in part in Figure 1. The effect on the Soviet Union was different to that on CMEA4. Table 1 shows also that trade elasticity increased more in the Soviet Union (increase by 8 percentage points) after 1975 than in any other CMEA country.

By contrast, Hungary, as far as the statistical analysis is concerned, was not significantly affected by the oil price crisis during the 1970s. There are various possible reasons for this "immunity" of Hungary. Firstly, it might well be that change, even though it occurred, happened much more gradually in Hungary's case. Secondly, Hungary was the most liberalised economy of the CMEA4, which could have had the effect of a quicker, compensating response of the domestic economy. Also, Hungarian energy consumption was lowest in comparison to the other countries. Moreover, there is some evidence that Hungary received a 700-million-ruble credit from the Soviet Union to cover the increased cost of oil imports between 1976 and 1980 (Stone 1996, p. 55). However, individual country results do not give reason to confirm that the Soviet policy was to shield one of the CMEA members more than another from the effects of the energy crisis.

Adding oil price as a variable to the overall gravity model in equation (1) and the individual countries' demand models in (2) confirms that world oil prices are a significant determinant of overall exports of the CMEA countries.[17] The oil price crisis contributed to the inward orientation of the CMEA trade. Our results (see Table 2) confirm that oil prices are a significant determinant of exports between CMEA countries, with Bulgaria as an exception, where the variable is only marginally significant. For Hungary, the interacted dummy variable hypothesising structural

[17] Adding oil prices to the estimation seems to distort coefficients for the time- and country-specific dummies. The reason for this could be that oil price change over the years is correlated with the time dummies, even though these are added to the equation only as interacted dummies.

change in 1975 remains not significant, as in the estimation of the demand model without oil prices. In Poland, the interacted GDP variable becomes insignificant. However, oil prices are significant for exports of both countries, which confirms the importance of oil shock also for them. For all other countries, both oil prices as well as the interacted dummy variable remain highly significant. Coefficient values in comparison to the demand model results without oil prices are approximately halved. With exception of Poland, the coefficient for the oil price is highest for Soviet Union, which is another confirmation of hypotheses 2 and 3.

5 Conclusions

Econometric analysis of Soviet foreign trade with the CMEA countries confirmed that there was a structural break in intra-CMEA trade around the first energy crisis. The change in energy policy in the CMEA, however, was not in the form of radical restructuring. It was characteristic of the time where the Soviet Union had entered a phase of "stagnation". The response to the energy crisis in the form of "turning inwards" could be interpreted as one last attempt by the Soviet Union to shield itself and the states under its influence from external influences. From the perspective of the smaller states, one could argue this policy – if only for a limited time – met national economic interests for cheaper oil. Ultimately, however, it delayed necessary more radical reforms, which, possibly, smaller member states realized when they began to turn away from the CMEA by the mid 1980s already. The change in 1973, therefore, was a not one of successful restructuring but one preceding the disintegration of the CMEA. Nevertheless, the CMEA and especially the pattern of energy trade it developed left a mark which is still recognizable today. The infrastructure it created leaves East European countries today still dependent on Russia for energy exports. This dependence is perceived as a burden and comments that Russia can use energy as an instrument of foreign policy continue to crop up.

Geoffrey Hosking states that the aim of European supra-national institutions created after the war was to "break down distrust between nations". He continues "Money makes possible the exchange of infinitely diverse goods and services (…). It can take many forms (…). But it always both presupposes a measure of social trust – consensus that a monetary unit has a certain value and will continue to have it – and also confirms and extends that trust" (Hosking 2006, p. 112) The CMEA as a supra-national institution failed to break down distrust, and as a trading system did not create trust.

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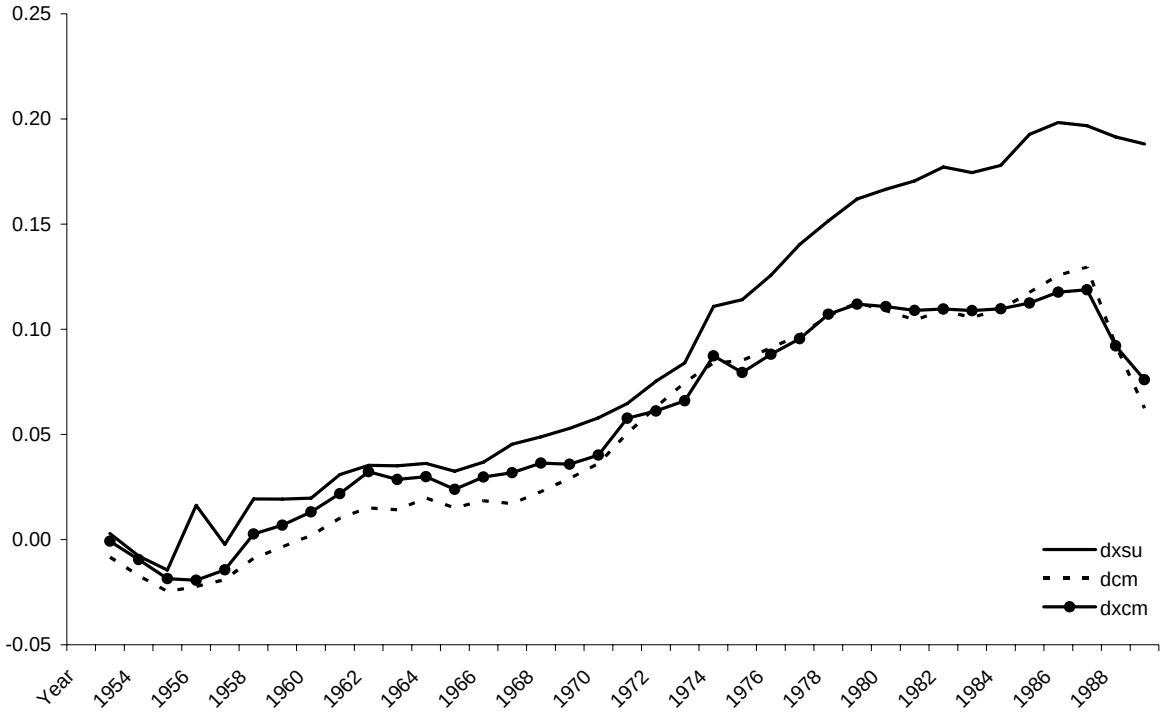
Figure 1: Gravity Model Coefficients of Dummy Interaction Variables



Note: DXSU – dummies in exports from the Soviet Union to CMEA4, DXCM – dummies in exports from CMEA4 to the Soviet Union, DCM – dummies in exports among CMEA4 countries. Interacted variables are significant from 1968 for DXSU, from 1969 for DXCM and from 1971 for DCM.

Table 1: Intra-CMEA Exports, structural break 1975

Variable	CMEA [a]	Soviet Union	Bulgaria	Czechoslovakia	Hungary	Poland
GDP ^{CMEA}	1.33***	2.21***	2.70***	1.68***	2.15***	2.36***
D75b		-0.61***	-0.45***	-0.43***	-0.02	0.26***
D75 GDP ^{CMEA}		0.10***	0.07***	0.07***	0.02**	0.03***
intercept	-10.46***	-17.71***	-27.70***	-14.13***	-20.72***	-22.29***
Adjusted R^2	0.97	0.97	0.99	0.96	0.98	0.97
Observations	760	164	156	152	155	155
Sample	1953-1990	1953-1988	1955-1988	1956-1988	1953-1988	1953-1988

Note:

***/**/* denotes significance at the 1%/5%/10 level, respectively.

a – The coefficients of dummy interaction variables are reported in Figure 1.

Table 2: CMEA Trade and World Market Oil Price

Variable	CMEA [a]	Soviet Union	Bulgaria	Czechoslovakia	Hungary	Poland
GDP ^{CMEA}	1.10***	2.10***	2.66***	1.63***	2.06***	2.21***
D75 GDP ^{CMEA}		0.04***	0.04***	0.05***	-0.01	-0.01
oil	1.21***	0.31***	0.15***	0.14**	0.20***	0.28***
intercept	-9.23***	-16.95***	-27.44***	-13.77***	-19.86***	-20.84***
Adjusted R^2	0.97	0.97	0.98	0.96	0.97	0.98
Observations	760	164	156	152	155	164
Sample	1953-1990	1950-1990	1952-1990	1953-1990	1950-1990	1950-1990

Note:

***/**/* denotes significance at the 1%/5%/10% level, respectively.

a – The coefficients of dummy interaction variables are not reported.