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European Integration and Changing Trade Patterns: The Case of the Baltic States

by

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Abstract

The analysis of Baltic regional trade patterns reveals that during the nineties the Baltic states made significant progress to integrate into the Western European division of labour although a significant share of (transit) trade with Russia remained. In view of this development, history seems to matter with respect to the interwar period and the period of Soviet occupation. In addition, a trade entropy analysis and gravity model estimates show that European integration of the Baltic states has a regional centre of gravity located in the Baltic Sea region. The Baltic trade flows increasingly follow the gravitational forces that generally shape trade relations, while regional integration is still much more important than it is normally the case.

Keywords: Eastern enlargement, regional integration, gravity model, Baltic trade patterns

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I. Introduction

At the end of the eighties, the overall collapse of the centrally planned economies in Central and Eastern Europe offered the chance to open the so far solely West European integration process for the emerging market economies. It became possible to complete the European integration process by a so called “Eastern Enlargement”. It started with Trade and Cooperation Agreements with the “pioneer reform countries” Czechoslovakia, Hungary and Poland soon followed by “Europe Agreements” signed in 1991, coming into force in 1994/95. The economic core elements of these agreements covered far reaching trade concessions such as an asymmetric opening of EU markets for industrial products from the associated countries and included steps towards a free movement of services, payments and investment capital. During the nineties, similar agreements were signed with further reform countries, totalling now ten countries waiting for EU full membership. The final stage of pre-accession was reached in 1998 when the first six applicant countries started accession negotiations with the EU. These negotiations were extended to another six applicant countries in 1999.

In contrast, the participation of Soviet successor states in the Eastern Enlargement process is limited to trade agreements, with exceptions granted only to Estonia, Latvia and Lithuania. The political independence of the former sovereign Baltic states was internationally recognized in autumn 1991 again — 45 years after the Soviet occupation of these countries. Although starting rather late in the integration process compared to the “pioneer reform countries”, they managed to sign Europe Agreements in 1995 and Estonia was among the first applicant countries invited to accession negotiations in 1998. The Baltic “catching-up process” was completed by the invitation of Latvia and Lithuania to join the negotiations in 1999.

In view of this accelerated integration process, the question arises what makes the Baltic states so much different from the other Soviet successor states which still do not even dare to think about EU accession seriously. To answer this question this paper intends to elaborate the determinants of the Baltic process of economic integration and to show empirically in which way these determinants are reflected in the emerging patterns of trade. Based on this analysis an idea of the future role of the Baltic states in the European division of labour is developed. Accordingly, the paper is organized as follows: in section II theoretical approaches are discussed which help to explain the shaping of the direction of foreign trade and of economic integration resulting from trade relationships. In section III the development of the Baltic states' regional trade in the decade after independence and the lines of economic integration are elaborated. In section IV the approaches of how to explain economic integration are applied to the regional trade patterns of the Baltic states. The empirical analysis makes use of historical trade data, trade entropy indicators and a gravity model. Finally, in section V the results are summarized and the perspectives for further integration into the EU are discussed.

II. Some Ideas on how to Explain the Baltic Trade Patterns

The disintegration of the Central and Eastern European "Community of Mutual Economic Assistance" (COMECON) and the collapse of the Soviet Union in the early nineties offered a chance for the Baltic States to find a new place in the international division of labour. The rearrangement of Baltic trade relationships that happened during the last decade can be attributed to a number of mutually interdependent determinants. Among them are the stepwise integration into the EU markets, the closer ties with other Baltic Sea countries, historical trade relations originating from the pre-war period and the time of Soviet occupation,

and the general globalization tendencies enhancing trade diversification.

One answer to the question of how to explain emerging Baltic trade patterns in the years after independence can be derived from the ongoing EU integration: Due to their early efforts to integrate economically and politically into the EU, a shift of trade flows towards EU markets should have been expected. In general, countries participating in the same regional arrangement or preferential trade agreement (PTA) can be expected to trade more with one another than predicted by incomes, population and distance.[12] PTA membership can create wholly new trade between member countries, but can also cause a substitution of trade with non-member countries by intra-bloc trade. It depends on the specific circumstances of a PTA whether trade-creating or trade-diverting effects are dominant and which kind of welfare effects they will have finally.[13]

With a view to the Baltic States the central task is to analyse to what extent the free trade agreements with the EU contributed to the changing trade patterns of these again independent countries in the nineties. The answer to this question will be given by gravity model estimates. Moreover, it has to be examined whether the trade agreements with the EU fostered efficiency-reducing trade diversion or promoted the creation of new trade on balance.[14]

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[12] To estimate the trade effects of PTAs a gravity model is usually applied which standard equation is supplemented by at least one dummy variable for PTA participation. While the basic variables in the gravity equation explain the normal trade between two countries in the absence of PTA, the dummy variable explains the trade which can be attributed to PTA participation. This approach is applied in e.g. Soloaga and Winters (1999), Eichengreen and Irwin (1996), Frankel, Stein and Wei (1995) and Hamilton and Winters (1992).

[13] See Viner (1950: pp. 41) whose concepts set the fundament of the discussion on welfare effects of PTA's (summarized in Bhagwati, Panagariya 1996).

[14] See e.g. the analysis of Wonnacott, Lutz (1989: pp. 74) who try to identify changes of trade patterns which can be attributed to the formation of regional associations.

To be sure, the Baltic states' stepwise integration into the EU does not imply a pure shifting of weights in trade relationships. Instead, the changing trade patterns indicate a far-reaching change of production structures closely linked to economic integration. For obvious reasons the question has to be answered whether this kind of structural change favours the economic development of small and peripheral countries like the Baltic states. As Krugman (1991a: pp. 83) and Krugman and Venables (1996) argue, peripheral countries are not necessarily the losers of economic integration. Following their line of thought, in the course of integration investors might prefer locations in a central region because of the good access to large markets (which typically characterize central regions) and the opportunity to realize economies of scale. The latter would foster a self-sustaining concentration of producers and their suppliers in central regions from where they could serve the economic space as a whole. Centralization of production does not necessarily mean one central location because a polycentric geography of production with geographically highly concentrated industries could offer similar advantages. Such kind of concentration would further benefit from the reduction of transaction costs (transport, trade barriers) due to economic integration. But a reduction of transaction costs might also offer incentives to shift production to peripheral countries with a low-wage, well-educated work-force. Thus, a competitive labour endowment combined with lowered transaction costs could be the decisive advantage of a peripheral location of production. These possible scenarios illustrate that economic integration is not necessarily correlated with a certain pattern of trade and production: it depends on the strength of the central and peripheral regions' individual merits which direction the adjustment process will take in the course of economic integration.

Having these integrations scenarios in mind, Estonia, Latvia and Lithuania have at least good opportunities to emerge as winners from the integration process: the

association with the EU has already removed barriers to trade in goods and services as to capital movements thus reducing transactions costs in trade with EU countries effectively; the Baltic workforce should fulfil the quality criteria applied by enterprises looking for locations suitable for labour-intensive productions. Accordingly, it can be expected that the Baltic trade statistics already mirror the closer economic relationship with the EU by a growing share of Baltic-EU-trade. Furthermore, the Baltic integration scenario of EU full membership could be supplemented by an East European element: if access to large markets outside the EU influences the decisions on locating production (and/or related services), the Baltic states can profit from their geography and its former participation in the Soviet division of labour. Under these circumstances, history would play a role for the Baltic patterns of trade which should have a significant share of trade with the "Community of Independent States" (CIS), especially with Russia. West European trade and enterprise strategies on the one hand and historical ties and Baltic insider knowledge on the other hand would foster Baltic regional trade diversification.

This means that history can matter for current trade patterns. The analysis of the regional arrangements' influence on the Baltic patterns of trade falls too short if it is not taken into account that even before a regional association is formed the potential members could trade more with one another than otherwise predicted. The idea put forward by Eichengreen and Irwin (1996) is that past trade patterns influence current trade flows in a way that a passing historical event causes lasting cost reductions. A level of trade is generated greater than predicted by the scale and geographical distance of the markets, and the disproportionate level of trade continues over time. This kind of hysteresis in trade can be explained by a number of factors, in particular by a history of colonialism or migration or by a temporary shock like a tariff or a exchange rate fluctuation which all can have

effects on trade with significant persistence.[15] The permanent effects on the pattern of trade are associated with sunk costs of market entry and exit: prior to export sales it is necessary to invest in a distribution and sales network; thus the incentives to leave the market again after the shock passed by (e.g. a temporary appreciation) are rather small.[16] It can be concluded that past trade flows can serve as an explanatory variable for current trade structures.

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[15] According to Frankel and Rose (2000) e.g. a former colony-colonizer relationship leads to bilateral trade flows which are nine times higher as if such a historical tie did not exist. A common currency, a PTA and common policies result in flows being three times higher than normal.

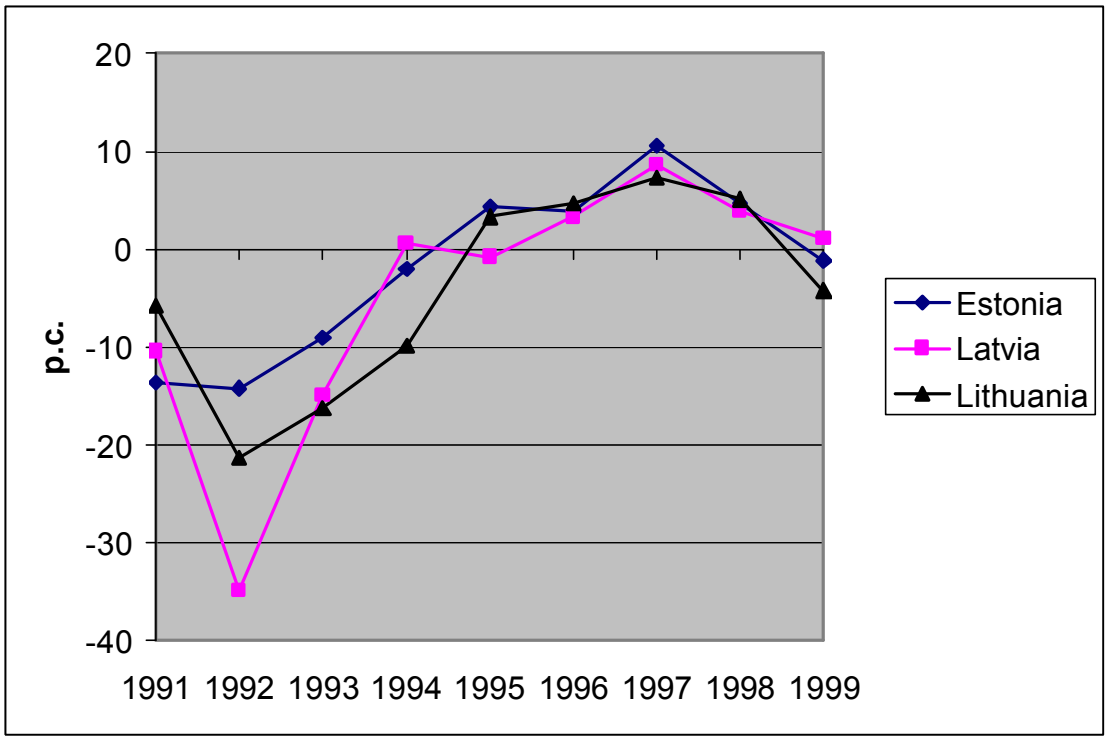
[16] The model analysis of Baldwin (1988, 1989) and Baldwin and Krugman (1989) shows that sufficiently large exchange rate shocks can have persistent effects on trade prices and quantities: in the case of sunk market-entry costs domestic market structures can be altered thereby inducing hysteresis. Although empirical evidence of these model findings is rather weak, at least the fluctuations of the U.S. dollar in the early 80ies seem to support the "persistent trade effect-hypothesis". Complementary model work was done by Dixit (1989) whose analysis at the industry level also shows hysteretic effects of exchange rate fluctuation when sunk costs are important for each firm.

III. Emerging Regional Trade Patterns after Independence

In the early nineties, the collapse of the Soviet Union and the central planning system was followed by a short but visible transformation crisis: real GDP decreased by two-digit rates in the Baltic states (Figure 1). But during the nineties Baltic economies recovered and positive growth rates turned up.

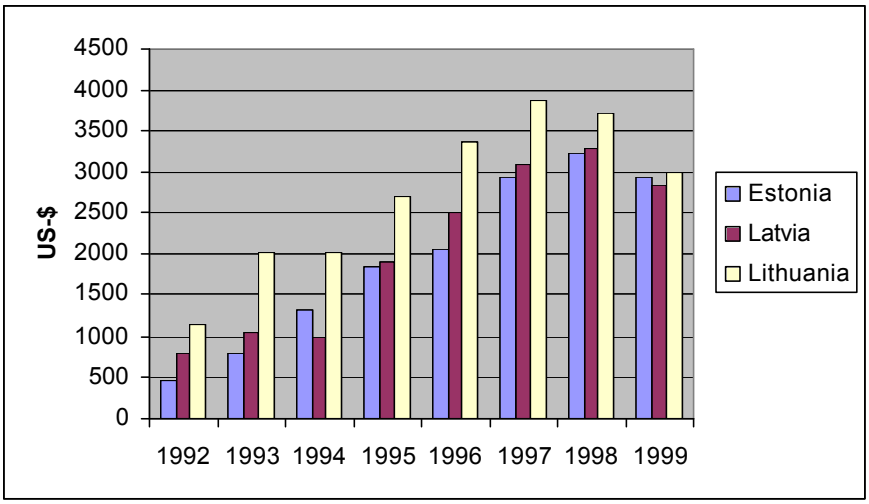
Export and import volumes were closely correlated with economic growth. This means that the change of regional trade patterns analysed below took place in a period of growing export and import activities and it is not at all the result of a minimization of trade activities due to the breakdown of the socialist division of labour (Figure 2).

Figure 1 — Economic Growth in the Baltic States after Independence (percentage change of real GDP)

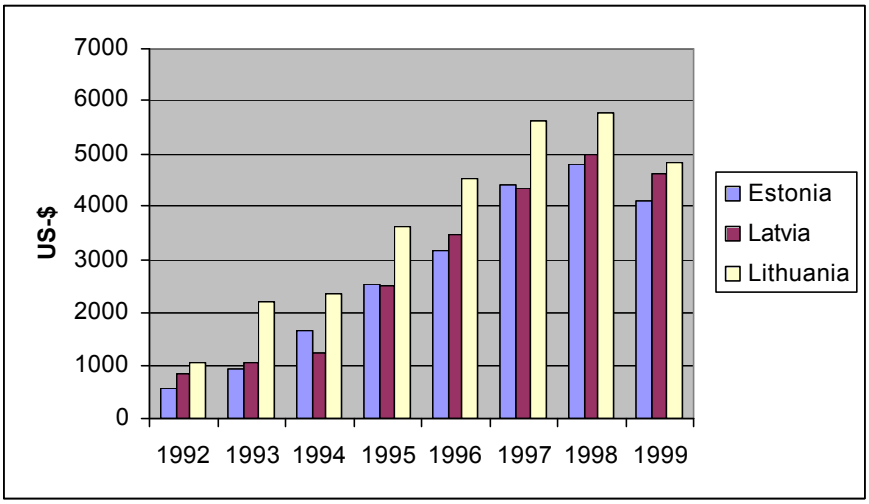


Source: OECD (2001); EBRD (1998); own composition.

Figure 2 — Baltic Foreign Trade in the Course of Independence:
a. Exports (Mill. US-Dollars)



b. Imports (Mill. US-Dollars)



Source: Statistics Lithuania [a]; EBRD (1998); own composition.

In 1991, the first year of internationally recognized independence, the trade statistics of the three Baltic states still reflected the era of intra-soviet trade and economic integration in the Baltic Sea's Eastern rim region (Tables 1 and 2); foreign trade with EU countries was still of minor importance.

Table 1 — Developments in the Regional Trade Patterns of the Baltic States: Exports[a]

	Estonia			Latvia			Lithuania		
	1991	1995	1999	1992[g]	1995	1999	1991	1995	1999
(1) EU INTEGRATION									
EU-15	3.7	54.0	62.7	39.9	39.2	48.3	3.0	36.4	50.1
EU-27[b]	15.5	68.0	77.0	49.1	53.1	66.2	13.2	51.1	71.4
(2) REMAINING TIES WITH TRANSFORMATION COUNTRIES									
Baltic States	11.5	12.1	12.6	4.9	9.8	14.0	9.0	9.3	15.1
Central & Eastern Eur. Countries[c]	75.3	25.8	14.0	44.2	41.9	25.1	77.9	44.6	22.9
Russia	*56.5*	*17.7*	*9.2*	*26.0*	*26.7*	*12.4*	*57.0*	*20.4*	*7.0*
CIS	83.3	25.1	13.4	45.0	41.1	23.2	85.9	42.3	18.2
(3) BALTIC SEA INTEGRATION									
Baltic Sea Region	71.3	75.7	74.5	53.4	62.3	56.0	68.3	54.9	55.3
West[d]	*3.2*	*44.7*	*52.1*	*20.2*	*23.2*	*26.9*	*1.6*	*21.3*	*28.6*
East[e]	*68.1*	*31.0*	*22.4*	*33.2*	*39.2*	*29.0*	*66.7*	*33.6*	*26.7*
(4) GLOBAL DIMENSION									
Europe[f]	90.5	94.5	92.8	89.5	93.0	89.5	90.2	93.5	90.9
America	0.2	2.7	3.6	1.0	1.6	5.1	n.a.	1.2	5.3
Asia	8.6	2.3	2.9	9.1	4.9	4.9	n.a.	5.2	3.5
Africa	0.0	0.4	0.7	0.3	0.4	0.4	n.a.	0.1	0.1
Australia/Oceania	0.0	0.0	0.0	0.1	0.0	0.0	n.a.	0.0	0.0

[a] Percentage of total exports (general trade for 1995 and 1999). — [b] EU-15 plus countries already participating in accession negotiations: Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia.— [c] Albania, Belarus, Bosnia-Herzegovina, Bulgaria, Croatia, Czech Republic, Hungary, Macedonia, Moldova, Poland, Romania, Russia, Slovakia, Slovenia, Ukraine, Yugoslavia. — [d] Included are Denmark, Finland, Germany, Norway, Sweden. — [e] Included are Estonia, Latvia, Lithuania, Poland, Russia. — [f] Including Cyprus, but without the Caucasian states. — [g] Data for the year 1991 are not available in adequate quality.

Source: Statistical Office of Estonia [a]; Central Statistical Bureau of Latvia [a]; Statistics Lithuania [a, b]; own calculations and compilation.

Table 2 — Developments in the Regional Trade Patterns of the Baltic States: Imports[a]

	Estonia			Latvia			Lithuania		
	1991	1995	1999	1992[g]	1995	1999	1991	1995	1999
(1) EU INTEGRATION									
EU-15	6.1	66.0	57.7	29.5	44.6	43.9	2.9	37.2	46.5
EU-27[b]	19.3	71.6	65.1	42.0	58.6	64.8	11.5	50.5	59.7
(2) REMAINING TIES WITH TRANSFORMATION COUNTRIES									
Baltic States	11.5	3.6	3.8	9.5	10.1	13.6	6.5	4.9	3.5
Central & Eastern Eur. Countries[c]	63.4	19.9	18.9	39.0	28.6	30.1	70.5	47.0	33.8
Russia	*46.2*	*16.1*	*13.5*	*27.9*	*19.8*	*18.2*	*49.6*	*31.2*	*20.1*
CIS	73.8	18.8	17.0	37.6	33.0	28.1	83.8	42.0	24.4
(3) BALTIC SEA INTEGRATION									
Baltic Sea Region	62.0	74.5	64.2	60.9	63.6	65.5	58.8	65.2	56.9
West[d]	*3.8*	*54.2*	*44.9*	*22.2*	*31.6*	*28.9*	*1.3*	*24.8*	*27.7*
East[e]	*58.2*	*20.3*	*19.3*	*38.6*	*32.0*	*36.6*	*57.5*	*40.4*	*29.2*
(4) GLOBAL DIMENSION									
Europe[f]	81.0	91.2	82.5	79.1	85.4	90.3	80.0	91.7	85.8
America	3.8	3.4	5.1	3.9	3.0	1.9	n.a.	3.4	5.1
Asia	13.9	5.3	10.3	4.6	10.8	7.6	n.a.	4.6	6.9
Africa	0.0	0.1	1.9	0.4	0.1	0.1	n.a.	0.2	0.4
Australia/Oceania	0.0	0.0	0.1	0.0	0.6	0.1	n.a.	0.1	0.1

[a] Percentage of total imports (general trade for 1995 and 1999). — [b] EU-15 plus countries already participating in accession negotiations: Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia.— [c] Albania, Belarus, Bosnia-Herzegovina, Bulgaria, Croatia, Czech Republic, Hungary, Macedonia, Moldova, Poland, Romania, Russia, Slovakia, Slovenia, Ukraine, Yugoslavia. — [d] Included are Denmark, Finland, Germany, Norway, Sweden. — [e] Included are Estonia, Latvia, Lithuania, Poland, Russia. — [f] Including Cyprus, but without the Caucasian states. — [g] Data for the year 1991 are not available in adequate quality.

Source: See Table 1; own calculations and compilation.

But during the first half of the nineties this trade structure changed entirely: the EU-15 countries became the main trading partners of the Baltic states, although the development of bilateral trade structures reveals that the Baltic states are not a homogeneous group despite sharing a lot of common features. In comparison with Latvia and Lithuania the relative change in Estonian trade structures was much more distinct: very soon after independence trade with EU countries covered more than half of Estonian exports and imports. Also Latvia and Lithuania made use of the free trade agreements with the EU (the far reaching Europe agreements were signed in 1995), but on a lower level. Not surprisingly, it can be observed that with no exception EU markets are more important for Baltic exports than for imports because Baltic goods face a tougher competition on world markets than on EU markets. Moreover, Baltic EU exports and imports are far from being evenly distributed: trade intensity with the more developed Northern EU countries is significantly higher, especially with Baltic rim countries, than with the poorer European South.

Although trade with former socialist countries lost importance, significant trade relationships continued — especially with Russia. The still important CIS trade reminds of the intra-Soviet division of labour and supports the hypothesis that the period of Soviet occupation had sustainable effects on Baltic trade patterns. Furthermore, in the Baltic Sea region the change of Baltic trade structures followed the changes in overall trade: trade relations with Western Baltic Sea countries intensified. As it was the case 70 years ago, the Baltic states' efforts of integrating economically and politically in the Baltic Sea region were concentrated on the Western rim again, although economic ties with the Eastern rim, notably Russia, continued. Despite this common feature of Baltic integration patterns, the single Baltic states do not share the same main trading partners in the Baltic Sea region: Estonia's main trading partners are Finland and Sweden, in addition Russian imports are of major importance; trade with Germany is most

important for Lithuania with respect to both exports and imports, imports from Russia count for 20 p.c.; Latvian exports concentrate on German and Russian markets, the same is true for Latvian imports. If total trade is analysed, these partner countries keep their status as main trading partners, thus underlining the importance of the Baltic Sea region for the Baltic countries.

The trade analysis reveals that during the nineties the Baltic states made significant progress of integrating into the Western European division of labour. These changes would be even more obvious if for all of these countries special trade data were available. In contrast to special trade data, general trade data which had to be applied here cover a fraction of transit trade channelled through customs warehouses. As a consequence, especially trade with Russia gains outstanding importance due to this kind of transit trade. A comparison of special and general trade figures — only possible for Latvia — corroborates this presumption: Latvian exports to Russia decrease by six points, imports decrease by eight points; similar changes happen in the trade with other CIS countries. Vice versa, trade with EU countries appears to be more important and trade with Western Baltic Rim Countries to be dominant. Due to similar transit trade relationships with Russia, it seems plausible that Estonia's and Lithuania's special trade structures would be of the Latvian type.

IV. Explaining Regional Integration of the Baltic States

1. Historical Determinants of Current Baltic Trade Patterns

The development of the Baltic states' regional trade in the nineties supports the idea that history may play a special role for current Baltic trade relationships. Having in mind that Baltic exports and imports were close to 100 p.c. part of intra-soviet trade while integrated in the Soviet Union, the changes in regional trade patterns following independence show parallels to the development of

Baltic trade after World War I. In contrast to other Soviet successor states Baltic trade history does not only comprise the decades of centrally planned foreign trade during the Soviet era. After World War I the Baltic states became independent from the Russian empire and its successor state, the Soviet Union. Before independence they were economically tied together with the other Russian provinces, and their industries — especially rubber, textiles and iron producing plants — were oriented at Russian markets. Independence meant a radical change in trade relationships: the Soviet Union introduced a policy of becoming economically self-sufficient, which led to a sharp decrease of foreign trade and Baltic enterprises lost the majority of their "home markets". However, loosening economic ties with Russia was in accordance with the Baltic states' political efforts to strengthen their newly won independence from their mighty neighbour. Simultaneously, trade relationships with Western Europe were intensified, especially with Germany and the United Kingdom. Both countries developed economic but also political and cultural interests in the affairs of the Baltic states; other countries trying to gain influence in this region were France, Sweden and Poland.[17]

Table 3 shows the interwar regional trade patterns which reflect the strategic change in the direction of economic integration: remembering that until the end of World War I the bulk of Baltic trade was Intra-Russian trade this change can be observed in the early twenties already. In 1922 the now Soviet Union was no longer a major trade partner of any Baltic state while at least three quarter of

[17] See Walter (1937: pp. 5) and Laaser and Schrader (1992: pp. 200).

Table 3 — Historical Trade Patterns of the Baltic States 1922–1938

	Estonia				Latvia				Lithuania			
	1922	1930	1938	1922-38	1922	1930	1938	1922-38	1922	1930	1938	1922-38
Exports[a]												
EU-15	64,3	85,2	82,1	81,2	88,2	76,4	87,5	82,0	74,3	89,5	81,1	82,7
EU-27[b]	71,6	90,6	85,5	87,5	91,5	82,0	89,7	87,7	85,6	96,5	86,4	90,8
Baltic States	6,5	4,2	2,0	5,4	3,2	4,1	1,6	3,8	11,3	6,9	1,2	6,4
Baltic Sea Region	63,3	55,5	51,5	51,6	28,6	49,8	42,4	41,4	61,0	70,8	37,4	50,9
West[c]	*30,3*	*45,6*	*43,9*	*39,3*	*18,5*	*30,3*	*37,1*	*29,6*	*37,6*	*62,4*	*30,5*	*41,0*
East[d]	*33,0*	*9,9*	*7,6*	*12,4*	*10,1*	*19,5*	*5,3*	*11,8*	*23,4*	*8,4*	*6,9*	*9,9*
Imports[a]												
EU-15	84,3	53,8	70,0	63,3	76,0	60,1	69,8	68,7	87,1	72,2	72,9	73,6
EU-27[b]	96,1	66,8	74,2	72,6	86,6	79,7	73,5	81,2	89,4	87,1	78,5	85,2
Baltic States	4,5	2,7	1,1	3,3	7,1	4,4	2,0	4,8	2,0	5,4	1,7	3,8
Baltic Sea Region	80,5	57,9	53,2	55,7	62,1	64,8	51,2	59,3	86,8	66,5	37,0	59,4
West[c]	*67,3*	*37,5*	*45,4*	*41,8*	*51,0*	*43,0*	*44,1*	*44,0*	*84,5*	*53,3*	*28,5*	*48,6*
East[d]	*13,2*	*20,4*	*7,7*	*13,8*	*11,0*	*21,8*	*7,1*	*15,4*	*2,3*	*13,2*	*8,4*	*10,8*

[a] Percentage of total exports rsp. imports (general trade); due to aggregations in the available export and import statistics a negligible share of exports rsp. imports might have to be added to the trade blocs introduced above. — [b] EU-15 enlarged by countries already participating in accession negotiations: Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia.— [c] Included are Denmark, Finland, Germany, Norway, Sweden. — [d] Included are Estonia, Latvia, Lithuania, Poland, Russia.

Source:Bureau Central de Statistique de l'Estonie, various issues; Centralinis Statistikos Biuras, various issues ; Bureau de Statistique de l'Etat, various issues; own calculations and compilation.

exports and imports fell to the trade with today's EU-15 countries (that share was only smaller for the Estonian exports due to a still high share of exports to the Soviet Union; but they rapidly declined in 1923). These patterns stabilized during the interwar period, though imports diversified to some degree. Thus the Baltic trade figures of the twenties and thirties strongly reflect the westward orientation of the newly independent states and underline the Baltic efforts to strengthen the economic ties with today's EU-15 countries. Trade relationships in those decades with countries now forming the group of EU-27 even indicate stronger historical economic ties with the European economic space.

To be sure, Baltic trade with pre-war Western Europe was regionally concentrated: Estonia's, Latvia's and Lithuania's participation in a Baltic Sea division of labour dominated their trade relationships. Although distance probably played an important role, political and cultural determinants of Baltic trade are obvious: most of the Baltic Sea trade was with Western partner countries, among them Germany as the main trading partner. Besides Baltic Sea trade the Baltic states trade with the United Kingdom was also of special importance. The obviously close Anglo-Baltic trade relationship points to British ambitions to become a political and economic player in this region which would have been otherwise part of an exclusively German sphere of influence.

This analysis of Baltic regional trade patterns in the interwar period supports the hypothesis that history matters. More precisely: the economic history of the independent Baltic states can at least partly explain current Baltic efforts to participate in the EU integration process. Moreover, the present political and cultural situation of the Baltic states, which shows parallels to the development soon after World War I, and the collapse of the Russian empire recommends such a direction of economic integration. Nevertheless, more than four decades of Soviet occupation and integration in the Soviet division of labour also left its

mark in Baltic (economic) history. On the one hand the economic structures developed under Soviet central planning proved to be not competitive when Baltic markets were liberalized and opened for global competition (for details see Schrader, Laaser 1994). As a result of more rigorous reform policies than in other Soviet successor states — especially in market-minded Estonia — the painful though inevitable adjustment process which led to the collapse of Soviet-style industries paved the way for more competitive structures. But on the other hand a core of trade relationships with former Soviet republics survived the transformation process thus giving some of the old industries the opportunity to stay in the markets. Moreover, the Baltic service sector benefited from the Russian demand for logistic services, especially in Baltic Sea trade (Böhme et al. 1998).

2. Regional Trade Concentration versus Dispersion

The emerging regional trade patterns of the Baltic States during the nineties already gave evidence of the countries' growing participation in the European division of labour after decades of isolation. It also became obvious that the EU integration of the Baltic states means to resume their interwar trade relationships and historical path of economic integration. Complementary to the analysis of Baltic regional trade, the quality of trade integration can be measured by trade entropy indicators which give information on the spatial concentration of trade relations. The rationale behind measuring the degree of spatial concentration of trade flows is the notion that a country which is trading with many other countries can be considered to be more deeply integrated into the international division of labour than a country trading with only a few partner countries. A country being „everybody's darling" in this sense is expected to be fully integrated into world markets, whereas a country with trade relations to only a few counterparts only cultivates limited economic contacts with the world

markets (Marwah 1995: 10). In the same manner the level of integration into the European division of labour can be evaluated.

In numerical terms of a trade concentration indicator, trading with nearly everybody means relatively low and equally distributed shares of trading partners' exports or imports in a country's aggregate trade figures. In contrast, trading only with a few countries means unevenly distributed shares: some shares will be very high while the rest equals zero. Accordingly, a country with a low concentration record is considered being well integrated into the international trading community; in case of a high concentration record a country's trade relations seem to be restricted to a small number of partners which could mean isolation.

a. Methodological Remarks

A specific indicator which is used in trade analyses to measure concentration or dispersion of trade flows is addressed under the heading of „trade entropy".[18] The formula of the entropy index which has been derived to measure the spatial concentration of trade flows reads as follows, formula (1) being specified for import shares a_{ij} of trading partners j of country i and formula (2) for export shares b_{ij} respectively:[19]

$$(1) \quad I_{mi} = \sum a_{ij} \ln(1/a_{ij}) \text{ with } 0 < a_{ij} < 1 \text{ and } \sum a_{ij} = 1.$$

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[18] Cf. Marwah (1995: 10), Marwah and Klein (1995), and Lundqvist and Persson (1998: pp. 63). The entropy indicator which is applied to international trade relations borrows its name from physics where it plays a central role in the second law of thermodynamics. Its econometric application comes from information theory and has taken its way also to various economic concentration problems, such as income distribution, market power analyses or international trade. In information theory, it is related to the expected information content of a message on an arbitrary event which may come true with a certain possibility. See Theil (1971: pp. 636) on details.

[19] Cf. the extensive explanations in Theil (1971: pp. 636) whose reasoning Marwah (1995: 10) takes as a starting point when constructing his trade entropy indicator.

$$(2) \quad I_{xi} = \sum b_{ij} \ln(1/b_{ij}) \text{ with } 0 < b_{ij} < 1 \text{ and } \sum b_{ij} = 1$$

This formula measures the degree of dispersion of the statistical distribution of all a_{ij} (b_{ij}). It renders a suitable concentration indicator for our purpose because (i) it weights each single share a_{ij} (b_{ij}) by its relevance $ln(1/a_{ij})$ ($ln\ (1/b_{ij})$) and (ii) it reaches its maximum value with all a_{ij} (b_{ij}) being equal. Hence, all single terms a_{ij} (b_{ij}), which are shares of $\sum a_{ij} = 1$ ($\sum b_{ij} = 1$), have the same value in this situation of maximum entropy (or even distribution), whereas I_m (I_x) will exhibit smaller values if the a_{ij} (b_{ij}) differ and some a_{ij} (b_{ij}) have substantially higher values than the rest of them. Extreme cases play only a marginal role when summed up in formulas (1) and (2), because very high a_{ij} (b_{ij}) are scaled down by multiplication with correspondingly low weights $ln(1/a_{ij})$ ($ln\ (1/b_{ij})$), and for low a_{ij} (b_{ij}) the product with the weights $ln(1/a_{ij})$ ($ln\ (1/b_{ij})$ retains a low value because of the first term. On the other hand, medium and rather equally distributed a_{ij} (b_{ij}) values correspond with medium $ln(1/a_{ij})$ ($ln\ (1/b_{ij})$) values and their products count relatively more in sum (1) or (2).

While the name „entropy“ and the relevant formula are taken from information theory and applied here mainly in terms of usefulness, this application may also be justified by interpreting trade flows as messages conveying information according to Marwah (1995: 10). In this perspective, a_{ij} (b_{ij}) can be seen as the probability of the reporting country being integrated into the international business community by individual trade relations with partner country *i*, whereby the information content $ln(1/a_{ij})$ ($ln\ (1/b_{ij})$) of this probability will be higher if *i* is not a unique case.

b. Baltic Trade Entropies

Applying this entropy formula, the geographical trade dispersion of the three Baltic states during the nineties is computed and compared with corresponding

figures for Germany as a benchmark, a country well integrated into the international division of labour. The results given in Table 4 need some additional comments:

- The entropy index for Baltic trade relations (both exports and imports) is computed with three different groups of countries: (1) Total Europe which also comprises the former Soviet Union and its various parts, and two sub-groups of this entity, (2) EU-15, and (3) the Baltic Sea Region (BSR). With respect to these subgroups different developments seemed plausible.

- Complementary to absolute entropy its relation to the maximum entropy value in each case is computed; a relative entropy value of 1 would mean even distribution, The reason for the calculation of relative entropies is that the value of I_m and I_x in case of maximum absolute entropy increases with the number of observations, in the given case with the number of trade relations.[20] Intertemporal or international comparisons would become difficult, in particular if the number of reported trading partners differs over time or between national trade statistics. Some of these difficulties arose in the given data set: (1) the number of potential trading partners in Europe changed over time in the early 1990s due to the break-up of both the former Soviet Union and former Yugoslavia, (2) the various statistical offices of the reporting countries reacted differently on these events with respect to disaggregating trade data series, (3) the general regional pattern offered by

[20] This may again be explained by the information theory roots of this formula: If for three cases (i = 3) the equal distribution is given by the probabilities 0.34, 0.33, and 0.33, the corresponding information content of these messages is substantial. But if we imagine ten cases with equal probabilities of 0.1 then the expected information content is even higher because there is more uncertainty due to the lower probabilities (Theil 1971: pp. 640).

Table 4 — Trade Integration of the Baltic States into the European Division of Labour: Trade Entropy Indicators

Partner Countries	Reporting Countries			
	Estonia	Latvia	Lithuania	Germany
I. Import Entropy[a]				
(1) Trade with Europe[b]				
1991	0.48 (1.66)	0.65 (2.26)[e]	0.39 (1.36)	0.80 (2.61)
1993	0.62 (2.25)	0.63 (2.28)	0.50 (1.79)	0.76 (2.73)
1995	0.62 (2.23)	0.73 (2.62)	0.69 (2.50)	0.76 (2.76)
1997	0.67 (2.40)	0.73 (2.64)	0.71 (2.55)	0.77 (2.79)
1999	0.68 (2.47)	0.75 (2.72)	0.74 (2.67)	0.78 (2.82)
(2) Trade with EU-15				
1991	0.70 (1.86)	0.65 (2.26)[e]	0.64 (1.69)	0.86 (2.21)
1993	0.64 (1.69)	0.72 (1.90)	0.72 (1.90)	0.88 (2.25)
1995	0.65 (1.71)	0.79 (2.07)	0.78 (2.07)	0.88 (2.25)
1997	0.72 (1.90)	0.81 (2.14)	0.78 (2.07)	0.88 (2.25)
1999	0.72 (1.91)	0.82 (2.16)	0.81 (2.14)	0.89 (2.27)
(3) Trade with Baltic Region[c]				
1991	0.43 (0.94)	0.70 (1.54)[e]	0.29 (0.63)	0.97 (1.74)
1993	0.76 (1.67)	0.76 (1.67)	0.45 (0.99)	0.83 (1.83)
1995	0.73 (1.59)	0.86 (1.89)	0.73 (1.61)	0.84 (1.85)
1997	0.78 (1.72)	0.88 (1.93)	0.74 (1.63)	0.85 (1.86)
1999	0.80 (1.76)	0.90 (1.98)	0.79 (1.74)	0.85 (1.86)
II. Export Entropy[a]				
(1) Trade with Europe[b]				
1991	0.39 (1.33)	0.72 (2.50)[e]	0.39 (1.33)	0.80 (2.61)
1993	0.64 (2.31)	0.67 (2.40)	0.64 (2.31)	0.75 (2.71)
1995	0.68 (2.45)	0.71 (2.56)	0.73 (2.63)	0.75 (2.73)
1997	0.69 (2.48)	0.71 (2.55)	0.70 (2.53)	0.77 (2.79)
1999	0.69 (2.49)	0.76 (2.74)	0.77 (2.77)	0.77 (2.78)
(2) Trade with EU-15				
1991	0.49 (1.29)	0.78 (2.07)[e]	0.78 (2.06)	0.87 (2.23)
1993	0.63 (1.67)	0.76 (2.00)	0.78 (2.05)	0.87 (2.24)
1995	0.68 (1.78)	0.80 (2.11)	0.78 (2.05)	0.87 (2.24)
1997	0.70 (1.85)	0.78 (2.05)	0.81 (2.14)	0.88 (2.26)
1999	0.70 (1.86)	0.79 (2.09)	0.81 (2.14)	0.88 (2.26)
(3) Trade with Baltic Region[c]				
1991	0.35 (0.77)	0.72 (1.59)[e]	0.30 (0.66)	0.95 (1.70)
1993	0.82 (1.80)	0.70 (1.53)	0.67 (1.48)	0.82 (1.81)
1995	0.86 (1.89)	0.79 (1.74)	0.78 (1.72)	0.83 (1.82)
1997	0.87 (1.91)	0.78 (1.70)	0.74 (1.63)	0.84 (1.85)
1999	0.86 (1.90)	0.89 (1.96)	0.86 (1.89)	0.83 (1.83)

Table 4 (continued)

[a] Import entropy indicators (based on Marwah, Klein (1995a, b)): the given values indicate relative import entropy $rI_{m_i}\left(=I_{m_i}/\max I_{m_i}\right)$ while values in parentheses indicate absolute import entropy I_{m_i}; with

(1) $I_{m_i}=\sum_j\left(a_{ij}\ln\left(1/a_{ij}\right)\right),\ a_{ij}=M_{ij}/M_i,\ \sum_j a_{ij}=1;$

(2) $\max I_{m_i}=\ln J,\ J=1/a_{ij};$

where M_i are the total imports of the reporting country i from a selected region comprising J countries; M_{ij} is the trade flow from a partner country j to the reporting country i; the import market share is a_{ij}. — [b] Including Cyprus but without the Caucasian states; without the Yugoslavian successor states and with Czechoslovakia in 1991; for this year the German trade statistics only include data on the trade with the Soviet Union as a whole, not with Soviet successor states. —[c] Included are Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Norway, Poland, Russia and Sweden. — [d] In analogy to *footnote a* export entropy indicators (also based on Marwah, Klein (1995a, b)) indicate values of the relative export entropy $rI_{x_i}\left(=I_{x_i}/\max I_{x_i}\right)$, values in parentheses indicate absolute export entropy I_{x_i}:

(1) $I_{x_i}=\sum_j\left(b_{ij}\ln\left(1/b_{ij}\right)\right),\ b_{ij}=X_{ij}/X_i,\ \sum b_{ij}=1;$

(2) $\max I_{x_i}=\ln J,\ J=1/b_{ij};$

with total exports X_i, exports from i to j X_{ij} and export market share b_{ij}. — [e] 1992.

Source: Statistical Office of Estonia [a]; Central Statistical Bureau of Latvia [a]; Statistics Lithuania [b]; Statistisches Bundesamt [a]; own calculations and compilation.

national trade statistics varied from country to country anyway, and (4) the three subsets of Europe meant three different maximum entropy values.

Turning to the results in Table 4, one is inclined to conclude that the degree of integration of the three Baltic countries into the European division of labour has substantially increased between 1991 and 1999, both in intertemporal comparison and in relation to the benchmark of Germany, as one could expect. The process of disintegration from the old Soviet type of distribution of labour should result in a greater dispersion of trade contacts (i) to a greater variety of countries and (ii) to more evenly distributed shares of trade flows with the partner countries.

In particular Estonia and Lithuania exhibit great increases in most of their relative import and export entropies[21]. In contrast, in four of six cases Latvia takes the lead in the even distribution of its import or export relations in 1999 — for imports from the BSR Latvia even reaches 0.90 — sometimes even outperforming Germany. In general, the difference in the degree of integration to the benchmark of the well integrated Germany is not significant. Interestingly, among the three Baltic states Estonia tends to lag behind the two others with respect to Europe as a whole and the EU-15 (it does not so with respect to the BSR). This indicates that Estonia still has a more distinct pattern of trade partners in these two regional groupings than Latvia or Lithuania. Given the high entropy value for Estonia's trade relations with the BSR the country appears to be better integrated into this region than in the rest of Europe.

Comparing the three different concepts of European trading partners the subsets EU-15 and BSR exhibit greater relative entropy values for each year than Europe as a whole. The largest values are obtained for imports from and exports to the BSR indicating the great opportunities and relatively low spatial transaction costs in this area of integration: While trade relations to the East were not abandoned completely new trading partners could be found at arms' length just a few nautical miles away along the long established shipping lines across the Baltic Sea. Not surprisingly, trade facilitated by the Europe agreements is focussing on the neighbourhood regions rather than on „far-aways" like Spain or Portugal.

Summing up, the degree of integration of the three Baltic countries into the European division of labour as measured by entropy indicators obviously increased during the nineties, thus completing the picture of progressing integration drawn in the section before. At least with respect to the European

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[21] With the exceptions of Estonian imports from and Lithuanian exports to the EU-15.

division of labour, the Baltic states have reached a fair degree of even distribution of their trade relations although trade appears to be concentrated to a certain degree. However, the entropy values do not answer the question which actual regional preferences exist. In particular, the trade entropy indicator is one-dimensional, it ignores distances and suggests that trade flows from and to nearby countries should receive the same weight than those from and to far-away-countries. Or, as Ghemawat (2001: 138) and Venables (2001: pp. 4) have put it: Distance still matters in the design of international trade patterns, even in the era of new information and communication technologies and e-commerce. Hence, entropy results should not be taken at face value: trading with everybody regardless of the partner's location is rather unusual and a 100 p.c. entropy would mean a dimensionless world market without transport costs.[22] Instead, distances should be explicitly taken into account in order to qualify entropy findings as it is done in gravity models which will be applied in the next section.

3. A Gravity Model to Explain Baltic Trade Relations

a. The Merits of the Gravity Model Approach

Gravity models are widely used in various economics disciplines to assess and forecast the impact of distance on the intensity of economic relations. Applications range from international economics, where trade patterns of countries (or groups of countries) are being explained by the gravitational forces of high incomes and population concentrations being located in relative

[22] Already Weber (1922) and again Isard (1949) have pointed to the fact that foreign trade theories generally ignore distance and transport costs as shaping factors. But models of new trade theory which are associated with Krugman (1991a, 1991b) under the heading of "geography and trade" do not have these deficiencies.

proximity,[23] over regional economics, where the relative locational quality of a region within the overall network of transport, exchange and trade is to be assessed,[24] down to urban economics with analyses of purchasing power flows in local retailing markets.[25] Some researchers have claimed in the past that the application of the gravity model to economic interchange and trade would be without any foundation from trade theory[26], but this view no longer holds. Deardorff (1995: pp. 9) found the gravity model to be consistent with a wide range of trade models including the Heckscher-Ohlin-model, either with frictionless or with impeded trade.

The application of the gravity model in trade and integration analysis runs as follows: Gravitational forces to undertake economic interaction stem from high per-capita-incomes and population figures of trading partners, because these two features promise high revenues from business deals with numerous economically potent clients. But transport costs which vary with distance can be expected to impede the impact of the gravitational forces on the intensity of trade relations. Gravity models allow for testing the impact of various forms of distance: among them not only real geographical distances measured either by space or time, but also „virtual distances“ as exerted by tariff- or non-tariff-trade barriers, different languages, diversities in business cultures, traditions or economic systems. In technical terms, trade volumes are regressed on income, population and distance, with coefficients for the former variables normally being positive and negative for real or virtual distance. Empirical studies unanimously confirm that distance

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[23] Cf. Deardorff (1995: pp. 5) who points out that the idea of applying gravity models to trade analyses originates in Tinbergen (1962) and has a long tradition since then. Venables (2001: pp. 4) cites impressive evidence that gravity models are not confined to analysis of trade flows. They can likewise be applied to foreign direct investment flows as well as to technology transfer.

[24] See Keeble et al. (1981, 1982).

[25] A recent example can be found in van Suntum (2000).

[26] Deardorff (1995: 1) refers to this arguments without citing names.

still matters in global trading while lowering real or virtual distance barriers intensifies mutual integration of markets. Even the rapid decline of information and telecommunication costs did not result in a "death of distance" (Ghemawat 2001: 138).[27]

Gravity models for the Baltic Sea Region have been put forward in particular by Byers et al. (2000: pp. 78) and Cornett and Iversen (1998: pp. 7). Byers et al. (2000) estimate hypothetical coefficients from recent trade data of the Scandinavian countries in order to predict future trade volumes and country shares of the Baltic countries. They argue that in historical comparison there are many similarities between Scandinavian and Baltic countries in the interwar-period, including trade patterns and income levels. Cornett and Iversen (1998) try to estimate future trade in the Baltic Rim by relying on the complete sample of bilateral trade relations between the European Union and Central and Eastern European accession candidates. They control for different phases of integration in order to differentiate between various forms of trade barriers typical for the different forms of bilateral trade links. Both studies are rather convincing in explaining trade in the BSR by the trading partners' attractiveness (incomes and population), proximity and PTA's. Encouraged by these promising results of gravity models for the BSR, the following analysis tries to explain existing Baltic countries' trade patterns by the different forms of real and virtual distance.

On the one hand, the Baltic countries' progress to integrate into the European Union is evident. Estonia is — by virtue of its distinct transformation progress — member of the first group of applicant countries the EU started negotiations with.

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[27] Browsing through recent integration literature reveals a great variety of applications of different specifications of the gravity model to issues of integration and disintegration. A random choice may be given by the works of Baldwin (1994), Bayoumi and Eichengreen (1995), Eichengreen and Irwin (1996), Soloaga and Winters (1999), Djankov and Freund (2000), and Fidrmuc and Fidrmuc (2000).

Latvia and Lithuania have been rated somewhat below but they were invited to join the second group of candidates. Since all three countries lowered their institutional trade barriers and now have rather liberal trade regimes vis-a-vis the EU — again Estonia has settled the most liberal regime in this group — the virtual distance to EU members was reduced significantly. Whether this development is reflected in actual trade flows can be analysed by a gravity model with an appropriate design.

On the other hand, although trade relations with the CIS lost importance old ties and acquired knowledge on market conditions and business culture may qualify the Baltic states for still more than negligible trade contacts with the East — thus forming a bridge to the CIS. Keeping in mind the findings of Eichengreen and Irwin (1996) that historical ties in trade relations may last rather long and are able to create path-dependencies, another subject of the gravity analysis is to assess the field of tension between „going westward“ and „keeping tied to the East“.

b. Gravity Model Specification

The model specification follows conventional paths in the literature. Dependent variable are trade flows, either imports M_{ij} or exports X_{ij}, of the Baltic countries (with subscript i indicating the Baltic countries and j their trading partners). The import and export equations in logarithmic form read as follows (with r, s representing the error terms):

$$(1)\ \ln M_{ij} = Const_m + m_1 \ln GNPPC_i + m_2 \ln POP_i + m_3 \ln GNPPC_j + m_4 \ln POP_j + m_5 \ln DIST_{ij} + m_{5+k} \ln DUM_k + \ldots + r.$$

$$(2)\ \ln X_{ij} = Const_x + x_1 \ln GNPPC_i + x_2 \ln POP_i + x_3 \ln GNPPC_j + x_4 \ln POP_j + x_5 \ln DIST_{ij} + x_{5+k} \ln DUM_k + \ldots + s.$$

The independent variables cover the Baltic countries’ and their trading partners’ per-capita-incomes and population figures ($GNPPC_i$, $GNPPC_j$, POP_i, POP_j) as

gravitational forces, and the real distance $DIST_{ij}$ between the Baltic capitals and the capitals of the trading partners as impeding transportation costs factor. Moreover, up to six dummy variables are included to control for different kinds of virtual distances or proximities (e.g. common border[28], EU agreements and other trade agreements) (see also Box 1).

The choice of the dummy variables reflects the specific situation of the three Baltic countries with respect to the different dimensions of distance:

- INTRABALT can be expected to capture (1) the impact of the common border, (2) the common past within the former Soviet type of division of labour, and (3) the early free trade agreements between Estonia, Latvia, and Lithuania.

- With FORMSOV the hypothetical path dependency in trade relations of Estonia, Latvia, and Lithuania with the former Soviet Union, i.e. now the CIS, is depicted.

- BALTSEA refers to the location of a country in the BSR.[29] This variable is a specific contiguity dummy because trade in the BSR has ever been different

[28] A common border normally facilitates trade, because trade between neighbours is less impeded by transaction costs if no transit via third countries with additional bureaucratic procedures is required (Fidrmuc and Fidrmuc 2000: 4). The common border dummy usually is referred to as „contiguity“ (Eichengreen and Irwin 1996: pp. 15).

[29] In order to create profile-free dummy series, the Russian Federation was not incorporated in BALTSEA because its impact is already measured in FORMSOV.

Box 1 — The Gravity Model: Explanations of Variables

$GNPPC_i$	GNP per capita of Estonia, Latvia, Lithuania
POP_i	Population of Estonia, Latvia, Lithuania
$GNPPC_j$	GNP per capita of trading partners
POP_j	Population of trading partners
$DIST_{ij}$	Distance "as the crow flies" between Estonia, Latvia or Lithuania and trading partner
INTRABALT	Dummy variable, = 1, if trade flow between Estonia, Latvia, and Lithuania, = 0, if not
FORMSOV	Dummy variable, = 1, if trading partner was member of the Former Soviet Union (excluding Estonia, Latvia, and Lithuania), = 0, if not
BALTSEA	Dummy variable, = 1, if trading partner belongs to Baltic Sea Region (excluding Russian Federation), = 0, if not
FEEDERWEST	Dummy variable, = 1, if trading partner participates in Baltic Sea transport feedering network (excluding Russian Federation), = 0, if not
SCAND	Dummy variable, =1, if trading partner is either Denmark, Norway, Sweden or Finland, = 0, if not
ARAHBHH	Dummy variable, = 1, if trading partner is either Belgium, the Netherlands, or Germany, = 0, if not
RESTEU	Dummy variable, = 1, if trading partner is member of EU15, but not already covered by FEEDERWEST, = 0, if not
ACCCEEC	Dummy variable, = 1, if trading partner is EU applicant from Central and Eastern Europe (excluding Estonia, Latvia, and Lithuania), = 0, if not

from other regions due to the Baltic Sea as a natural transport resource. The Baltic Sea as an intensely utilized device for saving transport costs should have an impact on regional integration.[30]

- With the alternative dummy FEEDERWEST, this potential influence of the Baltic Sea is depicted in an even more pronounced manner. Going beyond the group of BSR countries in BALTSEA these dummies take also the value of 1 if the trading partner is the Netherlands or Belgium. This is motivated by

[30] For details see Böhme et al. (1998) and Böhme (1987, 1988).

recent structural change in Baltic Sea maritime transport.[31] To account for this change the dummy FEEDERWEST is included instead of BALTSEA. In order to differentiate between trade flows to and from the Scandinavian countries and the other Western participants of this feeder system the profile-free dummy series SCAND and ARAHBHH were alternatively introduced.

- As a consequence of the Europe Agreements trading barriers between the Baltic countries and the EU were lowered substantially. To control for this effect RESTEU was added to the equation: it comprises all trade flows with those EU-members which are not already included in the BALTSEA, FEEDERWEST, SCAND or ARAHBHH series.

- Moreover, trade agreements between the various EU-applicants are spreading out rapidly (Byers et al. 2000: pp. 83). In particular for the intra-applicant trade one should expect some momentum from the ongoing institutional integration and the Europe agreements. To capture this effect the dummy ACCCEEC was added to the equation.

- In contrast to other gravity model estimates, in particular for larger samples of countries, no language dummy was included as is usually done to control for transactions costs savings due to the common use of widely spoken languages as national language.[32] Due to the lack of significant linguistic similarities between the Baltic countries and their neighbours such a dummy would not have any explanatory power.

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[31] Since the political turnabout in Eastern Europe the pattern of maritime services in the Eastern Baltic Sea has changed considerably. Direct liner services between former COMECON ports and the rest of the world have been substituted more and more by transshipment of containerized cargo (“feeder services”) via North Sea ports (Hamburg and Bremen in Germany and their Benelux counterparts in the so-called ARA-range (Amsterdam, Rotterdam, Antwerpen)) a pattern which has emerged in the Western Baltic Sea much earlier (Böhme et al. 1998: pp. 51).

The estimation has been processed in subsequent steps beginning with equation (1) which refers to the BALTSEA dummy. In subsequent steps BALTSEA was substituted first by FEEDERWEST, afterwards by SCAND and ARAHBHH. This procedure served at the same time as a kind of stability analysis.

c. Data Set

Trade flow data have been taken from the same sample as the one which was deployed in the preceding paragraphs, i.e. from Baltic countries' national statistical offices' trade data (see sources of Tables 1 and 2). Estonia's and Lithuania's trade data are collected according to the concept of "general trade", whereas Latvia applies the concept of "special trade". In this paper a joint database of the three countries' statistical offices is used in which Latvian data are recalculated according to the "general trade"-concept in order to achieve comparability. "General trade" is the more comprehensive concept because it also covers goods which are only imported to customs warehouses in order to be transhipped to other countries without processing them. This is the reason why in these trade figures a fraction of Russian trade is covered because the Baltic ports are important transit points for Russian sea-borne trade as already illustrated for the case of Latvia (see Chapter II).[33] However, a comparable database according to the "special trade"-concept was not available.[34]

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[32] Such cultural dummies are included by Soloaga and Winters (1999: 5) or by Fidrmuc and Fidrmuc (2000: pp. 4).

[33] This may be illustrated by the fact that in 1990: 30 per cent of Russia's international seatrade was handled through Baltic ports. The share of Russian transit cargo in Baltic ports' turnover ranged in the 1990s from 60-65 p.c. in Estonia to 85-90 p.c. in Latvia, with Lithuania lying in-between this range (Böhme et al. 1998: pp. 43 and 49).

[34] It should be noted that international trade data bases, such as IMF's direction of trade statistics or UN trade handbook report only the national statistics, i.e. "general trade" for Estonia and Lithuania and "special trade" for Latvia. Using these sources would mean to compare apples with pears. With respect to Estonian foreign trade statistics the methodology changed in 2000: since January 1st foreign trade data are generally published in accordance with the special trade system.

For trading partners on distant continents only those trade flows were incorporated which were above 1 mill. US-$ and which could clearly be identified at the country level whereas „rest of ...“-files were skipped because no country-specific distance could be assigned to them. But the regional coverage remained high anyway as can be seen from Table 5. Two years were selected: 1995, the first year for which more or less reliable and comparable data in sufficient regional disaggregation could be obtained, and 1999 with the most recent data. It was expected that the results would improve from 1995 to 1999 because (1) trade statistics should have become more reliable in the course of transformation and association to the EU and (2) the progressing institutional change in the course of transformation process should make the Baltic economies more receptive to the gravitational forces of free trade.

Per-capita-incomes and population data have been taken from “The World Bank Atlas” (World Bank var. iss.); for the distance matrix the “Bali Indonesia Travel Portal” (http://www.indo.com/distance/index) was used which provides a fast and comprehensive distance calculator for a great variety of towns and locations worldwide or, alternatively, for exact latitudes and longitudes of any place in

Table 5 — Share of Baltic States’ Imports and Exports Covered by Trading Partners’ Sample for Gravity Model Estimates (p.c.)

	Imports		Exports	
	1995	1999	1995	1999
Estonia	99.1	97.5	99.3	98.6
Latvia	98.6	99.6	99.1	98.7
Lithuania	98.7	96.8	99.5	99.4

Source: See Table 1; own calculations.

the world;[35] information on the scope of trade agreements of the Baltic countries have been taken from Schrader and Laaser (1998a, b, c; 1999); the dummies BALTSEA, FEEDERWEST, SCAND, and ARAHBHH have been constructed according to the information provided in Böhme et al. (1998).

d. Results of the Gravity Model

The estimates for the import and export equations for the two years 1995 and 1999 are presented in Tables 6 – 9. The intention was to find out if or to what extent a gravity model can explain the Baltic trade flows in the first years of their 'return to Europe' as it is a common practice for other industrialized countries. Hence, the results in Tables 6 – 9 should give an answer to the question whether the Baltic countries' trade relations are adjusting themselves to patterns which can be found for other countries in the course of an integration process. It should be noted that in all cases the logarithmic form of the equations proved to provide a much better fit to the data than an alternative formulation with absolute values.

1995: Dominance of Specific Determinants

Looking at the Baltic countries' imports in *1995*, it can be observed that in the different configurations (1) to (3) the coefficients of per capita incomes $GNPPC_j$ and population POP_j of the trading partners and the distance variable $DIST_{ij}$ show the correct sign and prove to be highly significant (at 1 per cent error level) (Table 6)[36]. The coefficients are by far larger for per capita incomes of trading partners than for population figures[37] thus revealing that imports of the Baltic countries originate mainly from rich trading partners. Estonia, Latvia and

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[35] According to Byers et al. (2000: 80) the underlying data stem from the University of Michigan.

[36] In Tables 6–9 t-values are White-corrected.

[37] Please note that the coefficients of log variables can be interpreted as elasticities, which allows to compare their size irrespective of scale factors.

Lithuania can be thought upon being in a phase of catching-up with normal trade relations with the wealthy industrial nations. But even in this process economic distance plays its usual role as can be inferred from the $DIST_{ij}$ coefficient of –0.7 to –0.8.

It is no surprise that the (relatively low) income and population figures of Estonia, Latvia and Lithuania themselves turned out to be insignificant.[38] However, the INTRABALT dummy for trade relations between the three Baltic countries shows an extremely high elasticity of 5 to 6 at a high significance level, thus indicating close ties between these countries. Moreover, the FORMSOV dummy has a high elasticity of above 4 which displays that the traces of the former Soviet division of labour are still present in the Baltic

[38] An attempt not documented here to skip both variables from the equation decreased the adjusted R^2 somewhat without improving the overall fit.

Table 6 — Results of Gravity Model Estimates for Baltic States' Imports 1995 – Logarithmic Equation[a]

Independent Variable[b]	Equation No.					
	(1)		(2)		(3)	
	Coeff.	(t-value)	Coeff.	(t-value)	Coeff.	(t-value)
Constant	-22.54	(-2.11)**	-22,67	(-2.15)**	-22.99	(-2.18)**
$GNPPC_i$	0.66	(0.51)	0.66	(0.52)	0.66	(0.52)
POP_i	0.47	(1.36)	0.48	(1.42)	0.48	(1.43)
$GNPPC_j$	2.34	(11.13)***	2.23	(10.84)***	2.24	(10.84)***
POP_j	0.87	(11.16)***	0.86	(10.95)***	0.87	(10.90)***
$DIST_{ij}$	-0.83	(-4.09)***	-0.71	(-3.38)***	-0.68	(-3.12)***
INTRABALT	5.63	(8.48)***	5.93	(8.78)***	6.02	(8.59)***
FORMSOV	4.30	(7.11)***	4.37	(7.26)***	4.42	(7.24)***
BALTSEA	1.68	(3.77)***	—	—	—	—
FEEDERWEST	—	—	1.98	(4.56)***	—	—
SCAND	—	—	—	—	2.24	(4.04)***
ARAHBHH	—	—	—	—	1.75	(4.82)***
RESTEU	0.07	(0.24)	0.36	(1.07)	0.38	(1.12)
ACCCEEC	2.25	(4.47)***	2.47	(4.79)***	2.52	(4.77)***
$\overline{R}^2$	0.63		0.64		0.64	
F-value	33.34***		34.59***		31.37***	
Number of observations	192		192		192	
Jarque-Bera test	71.27***		80.27***		81.07***	

t-values in brackets are corrected according to the White heteroskedasticity concept:

*** statistically significant at 1 p.c. error level

** statistically significant at 5 p.c. error level

* statistically significant at 10 p.c. error level

+ statistically significant slightly above the 10 p.c. error level

[a] Dependent variable: lnM_{ij} (= Imports of Estonia, Latvia or Lithuania from trading partners)

[b] Independent variables, with exception of dummies, in natural logarithms (ln).

Source: See Table 1; own calculations.

countries' import patterns; energy imports are of major importance in this respect.[39] Another finding is that the two contiguity (or common border) dummies, BALTSEA and its refined version FEEDERWEST, are highly significant and show high coefficient values in equations (1) and (2). Obviously the Baltic countries' imports are dominated by short-distance regional trade both in the Baltic Sea Region and in the Baltic/North Sea maritime feeder system. The alternative dummies BALTSEA or FEEDERWEST must be interpreted as the refined versions of the standard common border dummy in other gravity regressions. The relatively high coefficients and high significance levels indicate that the Baltic Sea — and even more the Baltic/North Sea feeder system — must be regarded as a less hampering barrier than a normal land border between two countries. The above cited notion of the Baltic Sea being an efficient link between the countries on its shore rather than a barrier to trade is mirrored by the data.[40]

Furthermore, it appears to be interesting that the dummy for the other EU members RESTEU is insignificant. Apparently, the EU integration of the Baltic countries was realized via the Baltic Sea neighbourhood in 1995. In contrast to this lack of integration, significant import links existed with the other Central and Eastern European applicant countries as the ACCCEEC dummy reveals.

In general, all three equations have a sufficient F-record to remain below the 1 per cent error level. The adjusted R^2, with 0.63 to 0.64, is somewhat below the level of 0.8 which can be reached in other gravity regressions but on average this

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[39] However, as has been said in the data section, it cannot completely be ruled out that FORMSOV also captures a fraction of genuine Russian trade flows going not immediately as transit through Baltic ports but are stored in customs warehouses for some time.

[40] If FEEDERWEST is split into its parts SCAND (for Scandinavia) and ARAHBHH (for Belgium, the Netherlands and Germany hosting the main hub ports) as it is done in equation (3) it becomes clear that the closer ties on the Baltic states' import side, however, existed with Scandinavia in 1995.

level seems acceptable.[41] The regressions suffer from not normally distributed residuals according to the Jarque-Bera test. However, this effect can be smoothed down towards insignificance if some polar cases of unusual trade relations are controlled for by dummies or eliminated from the sample.[42] The data sample reveals that these polar cases are largely confined either to Balkan states plagued by war or to some specific Far East trading partners. Hence, without these polar cases the equations appear to render tolerable results.

On the Baltic *export side* a similar picture emerged for 1995 (Table 7). The equations are significant and a slightly greater portion of variations can be explained by the independent variables. The problem of not normally distributed residuals also accrues to the export equation, but result again from some unusual trade relations to Asia and could be controlled by dummies. Per capita incomes $GNPPC_j$ and population POP_j, i.e. market size, of trading partners apparently exercise significant gravitational forces on Baltic states' export flows whereas the distance variable $DIST_{ij}$ exhibits a highly significant normal value of around –1. Compared to imports in the same year the elasticity of $GNPPC_j$ is distinctly lower and that of $DIST_{ij}$ higher. Both observations meet with expectations derived from the state of economic development of the Baltic states: while they import sophisticated products from technological leaders around the world, their exports have not achieved a similar position on world markets yet. The income elasticity of trading partners with values of 1.6 – 1.7 appears to be high anyway compared to average values of below 1.0 in larger samples of countries. However, it should be no surprise that the exports of

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41 See Frankel and Rose (2000) on this issue.

42 The $\bar{R}^2$ also improves in this case that is not reported here.

Table 7 — Results of Gravity Model Estimates for Baltic States' Exports 1995 – Logarithmic Equation[a]

Independent Variable[b]	Equation No.					
	(1)		(2)		(3)	
	Coeff.	(t-value)	Coeff.	(t-value)	Coeff.	(t-value)
Constant	-13.60	(-1.37)	-13.87	(-1.44)	-13.79	(-1.43)
$GNPPC_i$	0.42	(0.37)	0.42	(0.38)	0.42	(0.38)
POP_i	1.00	(3.35)***	1.01	(3.48)***	1.01	(3.47)***
$GNPPC_j$	1.76	(7.34)***	1.64	(7.02)***	1.63	(6.97)***
POP_j	0.74	(8.66)***	0.72	(8,45)***	0.72	(8.29)***
$DIST_{ij}$	-1.08	(-6.69)***	-0.93	(-5.92)***	-0.93	(-5.64)***
INTRABALT	4.80	(7.80)***	5.19	(8.68)***	5.18	(8.24)***
FORMSOV	3.98	(7.77)***	4.08	(8.25)***	4.07	(8.09)***
BALTSEA	1.44	(3.73)***	—	—	—	—
FEEDERWEST	—	—	1.95	(5.26)***	—	—
SCAND	—	—	—	—	1.90	(4.08)***
ARAHBHH	—	—	—	—	1.99	(5.84)***
RESTEU	-0.06	(-0.14)	0.29	(0.69)	0.29	(0.68)
ACCCEEC	1.17	(2.70)***	1.45	(3.39)***	1.44	(3.27)***
$\bar{R}^2$	0.66		0.67		0.67	
F-value	36.05***		38.58***		34.88***	
Number of observations	184		184		184	
Jarque-Bera test	31.45***		38.03***		38.06***	

t-values in brackets are corrected according to the White heteroskedasticity concept:

*** statistically significant at 1 p.c. error level

** statistically significant at 5 p.c. error level

* statistically significant at 10 p.c. error level

+ statistically significant slightly above the 10 p.c. error level

[a] Dependent variable: $\ln X_{ij}$ (= Exports of Estonia, Latvia or Lithuania to trading partners)

[b] Independent variables, with exception of dummies, in natural logarithms (ln).

Source: See Table 1; own calculations.

Baltic states are growing faster than incomes of trading partners: after the long period of autarky under the Soviet system a catching-up process started which is also featured by outstanding export growth rates. Moreover, the intense local integration between Estonia, Latvia and Lithuania as well as the historical ties with CIS states are also corroborated in the export equation with extreme (but somewhat lower) elasticities for INTRABALT and FORMSOV. Again, in the case of Lithuania energy products contribute to this effect significantly.

The dummies BALTSEA and FEEDERWEST again have a high explanatory power and significance level, FEEDERWEST exhibiting an improved performance vis-à-vis BALTSEA. Apparently, the Baltic countries' exports are going primarily to Scandinavia and to the Western members of the Baltic/North Sea feeder system. Finally, the insignificance of the rest of EU-members (RESTEU) and close ties to other applicant countries (ACCCEEC) are once more confirmed by the export equation. Hence, the European integration of the Baltic states in 1995 primarily took place via the Baltic Sea and with applicant countries.

1999: Following the Gravitational Forces

Compared to 1995, the results of the gravity model analysis for Baltic trade in *1999* (Table 8: imports, Table 9: exports) corroborate the previous findings. The adjusted R^2 records improved for imports and remained stable for exports compared to 1995. These findings suggest that the regional pattern of Baltic trade slowly adjusts to the gravitational forces which normally shape international trade relations. However, the problem of not normally distributed

Table 8 — Results of Gravity Model Estimates for Baltic States' Imports 1999 – Logarithmic Equation[a]

Independent Variable[b]	Equation No.					
	(1)		(2)		(3)	
	Coeff.	(t-value)	Coeff.	(t-value)	Coeff.	(t-value)
Constant	-18.32	(-1.32)	-18.45	(-1.35)	-18.83	(-1.37)
$GNPPC_i$	0.85	(0.55)	0.86	(0.57)	0.86	(0.57)
POP_i	0.36	(0.42)	0.37	(0.85)	0.38	(0.86)
$GNPPC_j$	1.79	(11.60)***	1.71	(10.81)***	1.71	(10.84)***
POP_j	0.99	(17.02)***	0.97	(16.70)***	0.97	(16.68)***
$DIST_{ij}$	-0.87	(-6.44)***	-0.79	(-5.73)***	-0.77	(-5.36)***
INTRABALT	3.97	(10.09)***	4.20	(10.47)***	4.29	(10.36)***
FORMSOV	2.44	(6.71)***	2.49	(6.90)***	2.52	(6.95)***
BALTSEA	1.33	(4.22)***	—	—	—	—
FEEDERWEST	—	—	1.54	(4.94)***	—	—
SCAND	—	—	—	—	1.79	(4.80)***
ARAHBHH	—	—	—	—	1.30	(4.63)***
RESTEU	0.08	(0.32)	0.29	(1.08)	0.31	(1.15)
ACCCEEC	0.99	(3.14)***	1.18	(3.57)***	1.22	(3.65)***
$\overline{R}^2$	0.72		0.73		0.73	
F-value	51.54***		53.41***		48.56***	
Number of observations	193		193		193	
Jarque-Bera test	32.94***		35.51***		37.31***	

t-values in brackets are corrected according to the White heteroskedasticity concept:

*** statistically significant at 1 p.c. error level

** statistically significant at 5 p.c. error level

* statistically significant at 10 p.c. error level

+ statistically significant slightly above the 10 p.c. error level

[a] Dependent variable: lnM_{ij} (= Imports of Estonia, Latvia or Lithuania from trading partners).

[b] Independent variables, with exception of dummies, in natural logarithms (ln).

[c] No computation possible due to square root of negative number.

Source: See Table 1; own calculations.

Table 9 — Results of Gravity Model Estimates for Baltic States' Exports 1999 – Logarithmic Equation[a]

Independent Variable[b]	Equation No.					
	(1)		(2)		(3)	
	Coeff.	(t-value)	Coeff.	(t-value)	Coeff.	(t-value)
Constant	19.17	(1.44)	19.22	(1.47)	19.17	(1.36)
$GNPPC_i$	-2.89	(-1.98)**	-2.90	(-2.02)**	-2.91	(-1.88)*
POP_i	-1.07	(-2.02)**	-1.06	(-2.03)**	-1.06	(-2.18)**
$GNPPC_j$	1.56	(8.66)***	1.46	(8.09)***	1.46	(8.91)***
POP_j	0.76	(9.02)***	0.74	(8.83)***	0.75	(11.17)***
$DIST_{ij}$	-1.03	(-5.51)***	-0.93	(-5.02)***	-0.92	(-5.52)***
INTRABALT	4.01	(7.77)***	4.31	(8.32)***	4.32	(5.91)***
FORMSOV	2.60	(6.58)***	2.65	(6.88)***	2.66	(7.27)***
BALTSEA	1.35	(3.49)***	—	—	—	—
FEEDERWEST	—	—	1.68	(4.76)***	—	—
SCAND	—	—	—	—	1.73	(3.06)***
ARAHBHH	—	—	—	—	1.63	(2.94)***
RESTEU	0.13	(0.42)	0.39	(1.20)	0.39	(1.07)
ACCCEEC	0.03	(0.07)	0.25	(0.71)	0.26	(0.64)
$\overline{R}^2$	0.65		0.66		0.66	
F-value	37.31***		39.08***		35.34***	
Number of observations	196		196		196	
Jarque-Bera test	34.36***		36.63***		36.55***	

t-values in brackets are corrected according to the White heteroskedasticity concept:

*** statistically significant at 1 p.c. error level

** statistically significant at 5 p.c. error level

* statistically significant at 10 p.c. error level

+ statistically significant slightly above the 10 p.c. error level

[a] Dependent variable: $\ln X_{ij}$ (= Exports of Estonia, Latvia or Lithuania to trading partners)

[b] Independent variables, with exception of dummies, in natural logarithms (ln).

Source: See Table 1; own calculations.

residuals remains in place, which again could be controlled by dummies for countries being in state of war (Yugoslavian successor states) and for exceptional close ties to some partners in Far East.[43]

Again, per-capita-incomes and population of trading partners exhibit positive coefficients and distance a negative coefficient, all highly significant below the 1 per cent error level. The main difference between the results for 1995 and those for 1999 can be found in the smaller coefficients for $GNPPC_j$, INTRABALT, FORMSOV, BALTSEA and FEEDERWEST. Both catching-up in trade relations and local and historical ties are somewhat weakening, although still substantial and significant.

A surprising finding is that the integration with EU members not covered by BALTSEA/FEEDERWEST remained insignificant, although in 1999 the so-called "Europe Agreements" had been effective for 4 years. By the Europe Agreements a state close to free trade between the Baltic countries and the EU members had been realized. This substantial reduction in institutional trade barriers should have been reflected in the data of Baltic trade flows for 1999. Hence, the EU Agreements have up to now not changed Baltic trade patterns in a perceptible manner — neither on the import nor on the export side. In addition, on the export side the ACCCEEC variable covering the ties with other applicant countries became rather weak. Together with the weakening of the other elasticities as mentioned above this may indicate a growing regional trade diversification.

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[43] A second test not reported here was computed without these extreme cases which exhibited normal features and a much higher $\overline{R}^2$ of 0.8. In this test also Luxemburg was excluded, whose trade relations with the Baltic states are surprisingly weak. The reason behind this may lie in the structure of goods which could be exchanged with Luxemburg. For countries on the first stages of industrialization it may be not unusual to have weak trade links to the financial and service capital of Luxemburg.

However, the remaining driving forces FEEDERWEST and FORMSOV are still able to explain a substantial portion of Baltic trade flows for shorter distances in conjunction with normal income, population and distance variables for aggregate trade. Moreover, in 1999 trade with Scandinavia became more important than with Germany, Belgium and the Netherlands — especially on the import side. The conclusion can be drawn that Baltic trade begins to adjust to the normal gravitational forces of income and large markets and the repelling effect of distance to trading partners. Nevertheless specific forces with regional effects are still at work which have to be incorporated into the analysis.

An Attempt to Explain Baltic Trade Patterns

To tell the story behind these results means to consider several components which coincide and reinforce each other:

Baltic imports and exports both for 1995 and 1999 are receptive to the appeal of incomes and population of trading partners and decrease with growing distances. But residual problems suggest that the gravitational forces have not yet taken over full control. Moreover, a significant share of Baltic trade cannot be explained with the standard notion of common borders; specific explanations are needed to cover the impact of proximity and low barriers to trade.

One of these specific explanations is the temporal proximity to close trade relations in the past. As Eichengreen and Irwin (1996) observed, historical trade relations leave their traces in trade patterns for longer periods than usually expected. According to their findings path dependencies are a common feature of many countries' regional trade patterns. [44] Although the historical component in

[44] Eichengreen and Irwin (1996: pp. 21) analyse (a) the bilateral trade patterns of a greater number of countries with each other and (b) capture the historical component by introducing lagged trade data from previous decades as additional independent variables.

this paper is less sophisticated than in the Eichengreen/Irvin approach, the results demonstrate that the forced integration in the Soviet division of labour after World War II still has a substantial and lasting influence on Baltic trade patterns despite the shrinking shares of CIS trade. The smaller trade shares in conjunction with the high coefficient of FORMSOV indicate that the impact of CIS trade is quite substantial compared to the low income levels of these trading partners; in the special case of Lithuania the impact of energy exports and imports is decisive.

The other specific variable, representing geographic proximity, can be found in the BALTSEA/FEEDERWEST/SCAND/ARAHBHH dummy family. These dummies are a more sophisticated expression of the standard distance variable. Taking into account (i) the intensively utilized system of Baltic Sea maritime transport, (ii) the by far lower unit transport costs in maritime transport than in land or air transport,[45] and (iii) the rather short travelling times across the Baltic Sea, one may well interpret these dummies as representatives of the notion that the Baltic Sea is a spot without any substantial geographic expanse. In other words: trade relations across the Baltic Sea may be regarded as coming close to standard textbook models of international trade which generally ignore distance and transport costs as shaping factors. Trade relations of the Baltic countries with their Baltic Sea neighbours appear to be as intense as if these countries were located just a nautical mile off the territorial waters of their trading partners on the Baltic rim.

Another finding is that the FEEDERWEST dummy, which also covers trade with Belgium and the Netherlands in addition to Baltic Sea trade, outperformed the BALTSEA dummy. The Baltic Sea/North Sea feedering system from/to the hub

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[45] According to empirical results referred to in Venables (2001:12) transport on overland routes is on average 7 times more expensive than on sea routes.

ports in the ARA range, Bremen and Hamburg mainly serves the intercontinental transport needs of all the Baltic rim countries. It could be possible that this system directs trade of the Baltic states to those trading partners where these hub ports are located. The relatively small volume of Baltic states' own exports and imports — as compared to Russian or Scandinavian trade flows which mainly benefit from the feeder system — might be transported on this feeder system as by-loads on the same vessels at more or less marginal costs also beyond the immediate Baltic Sea Region to the Benelux countries. In other words, the Baltic Sea Region comprises all countries in which the vessels of the feeder system are making port calls, not only the countries on the Baltic rim. The existence of a well organized transport system permitting fast and low costs transport relations seems to shape the Baltic countries' trade flows.

Finally, it is of major interest that the process of EU association was not reflected in the regression. Instead, regional determinants clearly dominated the results despite the expectation that the trade agreements with the EU would have fostered Baltic-EU trade flows in general. But trade with the Non-Baltic Sea members of the EU was much weaker than with Baltic Sea members (Germany, Denmark, Sweden and Finland) even after controlling for market size and distance. Hence, one may conclude that in the case of the Baltic countries (i) the process of European integration mainly runs via their Baltic Rim neighbours, (ii) the Baltic Sea is a major integrating device for Estonia, Latvia, and Lithuania and (iii) the transport system dominates the trade regime by shaping trade flows in this region.

V. Summary and Conclusions

The analysis of the Baltic export and import performance by regions already made clear that the Baltic states' integration into the Western European of labour progressed significantly during the nineties. This development reminds on the

period soon after World War I when the Baltic states had become independent from Russia and started an integration process directed towards Western Europe. In this respect EU integration means reintegration into regional markets to which a historical affinity exists. But history also matters with respect to the period of Soviet occupation: traces of the Soviet division of labour are still visible in the Baltic trade patterns; and the Russian transit trade via Baltic ports contributes a major share to the value added of these countries' service sectors. These findings give rise to the impression that the Baltic states could serve as a bridge between the two Europes, having the stronger pier on the Western shore.

The trade entropy analysis for the Baltic export and import flows corroborates the finding that during the nineties the degree of integration into the EU and the Baltic Sea region increased. This picture of European integration with a regional centre of gravity is confirmed by the gravity analysis which in addition took real and virtual distances into account. The gravity model estimates suggest that Estonia's, Latvia's and Lithuania's trade flows with the rest of the world are starting to develop along the usual lines as in other regions of the world. More and more they follow the gravitational forces that generally shape trade relations. But in the specific case of these three countries regional integration is much more intense than it is normally observed. With their ports being important transit points for Russian foreign trade, the transport cost saving potential of the Baltic Sea is much more important for shaping their regional trade pattern than the institutional integration into the EU via the association agreements. In this particular case the transport system's influence seems to dominate the trade regime's influence.

Nevertheless, regardless of this specific dimension of economic integration Estonia, Latvia, and Lithuania have made considerable progress on their road to Europe. Their regional trade patterns already have undergone substantial changes. This result raises additional questions for further research, in particular

for the qualitative dimension of the integration process and for the Baltic states' specific role in the network of international trading relations: Do the Baltic states have the potential to qualify for the role of attractive production sites, either being workbenches for standardized products or gaining ground in the production of technologically more advanced commodities? Is internal structural change sufficient to provide options for a greater variety of internationally competitive products? To what extent will these changes affect the Baltic states' function as a bridge towards the large markets of the Russian Federation, a role which geography suggests? These issues seem to be crucial for assessing Estonia's, Latvia's, and Lithuania's progress properly. They will be addressed in a separate paper.

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