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Christa Hainz

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VORWORT

Außenwirtschaftliche Fragen und die Heranführung der ost- und südosteuropäischen Staaten, insbesondere der Aufnahmekandidaten, an die EU und den EURO-Raum bilden zentrale Fragen der Integrationspolitik für ein erweitertes Europa in den nächsten Jahren. Diesen Fragen geht im Rahmen des Forschungsverbundes forost vor allem die Gruppe I nach, die sich mit der TRANSFORMATION VOR DEM HINTERGRUND DER OSTERWEITERUNG DER EU befasst. Innerhalb der Gruppe beschäftigen sich vor allem zwei Projekte mit diesem Thema. Die Schwerpunkte liegen dabei bei den Problemen der Währungsbeziehungen und der Rolle der Banken beim Annäherungsprozess.

Kapitalfehlallokation und Vernachlässigung der Infrastruktur waren zumindest in der Endphase ihrer Existenz Kennzeichen der sozialistischen Wirtschaften. Mit der Transformation entstand daher ein hoher Kapitalbedarf sowohl für die Umstrukturierung der Wirtschaft, als auch für den Ausbau der vernachlässigten, überalterten und vielfach fehlenden modernen Infrastruktur. Die Kapitalbildung stellt die Führung der Transformationsstaaten jedoch vor gewaltige wirtschaftspolitische Herausforderungen, da gleichzeitig hohe Anforderungen im Bereich der Sozialleistungen gestellt werden und der nach dem Systemwechsel gesunkene Lebensstandard gesteigert werden soll. Eine gewisse Abhilfe in diesem Dilemma stellt der Kapitalimport dar.

Der Kapitaltransfer in die Transformationsstaaten kann dabei verschiedene Formen annehmen. Portfolioinvestitionen sind unter gewissen Bedingungen mit hohem Risiko für die Wechselkurs-, die Geld- und Finanzpolitik verbunden, wie verschiedene Krisen (zuletzt die russische Krise von 1998) deutlich vor Augen führten. Direktinvestitionen bedürfen eines besonders vertrauenswürdigen Umfelds. Daher eignen Sie sich in den meisten Transformationsländern bisher kaum für sehr langfristige Engagements außerhalb der betrieblichen Sphäre. Dies gilt insbesondere für Investitionen in die Infrastruktur, die überdies sehr stark von politischen Entscheidungen beeinflusst werden. Aber auch bei betrieblichen Projekten werden vielfach andere Finanzierungsinstrumente als Direktinvestitionen oder reine Bankkredite erforderlich. Hier kommt dann meist die Projektfinanzierung zum Zuge, bei der in der Regel internationale Finanzinstitutionen und private Bankenkonsortien zusammenarbeiten. Charakteristisch für diese Art der Finanzierung ist, dass auf weitgehende Kreditsicherheiten verzichtet wird.

In ihrer theoretisch angelegten Studie zur Projektfinanzierung in Transformationsländern untersucht HAINZ (Projekt: SCHNITZER/HAINZ, *Die Rolle des Bankensektors für die Unternehmensfinanzierung und -restrukturierung in den Transformationsländern*) daher die unter den beschriebenen Bedingungen entstehenden Anreizprobleme für das Management der Banken wie der kreditnehmenden Unternehmen. Die Untersuchung zeigt, dass Projektfinanzierung bei Investitionen, die mit einem hohen politischen Risiko behaftet sind, gewählt werden sollte. FRENSCH (PROJEKT: CLEMENT/CZECH, FRENSCH, *Perspektiven der Währungsbeziehungen zwischen der Europäischen Währungsunion [EWS] und den mittel- und osteuropäischen EU-Beitrittskandidaten*) geht in zwei Beiträgen zum einen der Frage nach, welchen Einfluss die Einbindung einer Volkswirtschaft in die Weltwirtschaft und insbesondere die EU (Offenheit der Volkswirtschaft)

auf die makroökonomische Entwicklung der Aufnahmekandidaten und Kroatien hat. Es wird der Beitrag der zunehmenden Offenheit bei der Rückkehr zu einem Wachstumspfad analysiert. Dabei wird auch der Versuch unternommen, den kurzfristigen, relativen Einfluss auch der Wechselkursveränderungen zu analysieren. Es wird dabei untersucht, inwieweit die Konjunkturverläufe sich mit der verstärkten Handelsintegration zwischen EU und den Beitrittskandidaten synchronisieren. Nachgegangen wird insbesondere der Frage nach dem Einfluss des Außenhandels auf das Wachstum in der Erholungsphase der ostmitteleuropäischen Volkswirtschaften während der Transformationsphase und nach der Russlandkrise von 1998. Zusätzlich wird der Einfluss der realen Wechselkursveränderungen auf die kurzfristige Outputentwicklung in den Beitrittskandidaten analysiert.

Zum anderen geht Frensch in einem zweiten Beitrag der Frage nach, welchen Einfluss Importzölle unter bestimmten Bedingungen auf die Wohlfahrt einer Volkswirtschaft haben. Er kommt zu dem Ergebnis, dass, wenn der Terms of Trade Effekt geringer als der Effekt der internationalen returns to scale ist, auch ein niedriger Zollsatz negative Auswirkungen auf die Wohlfahrt einer Volkswirtschaft hat.

Alle drei Beiträge wurden bzw. werden in international anerkannten Publikationen veröffentlicht. Sie stellen damit wertvolle Beiträge für die wissenschaftliche Diskussion von Fragen der Heranführungsstrategie und der Entwicklung der Beitrittskandidaten während der Annäherungsphase an die EU dar.

München, Juli 2002 Hermann Clement

INHALT

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Richard Frensch

TARIFFS IN MONOPOLISTIC COMPETITION MODELS WITH LEISURE-CONSUMPTION TRADE-OFF**

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PROJECT FINANCING IN TRANSITION ECONOMIES

Christa Hainz

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Richard Frensch[*]

ABSTRACT

This note investigates the relationship between trade and macroeconomic fluctuations, focusing on the national income accounts concept of trade in goods and services for eleven East European and Baltic economies (i.e., the ten current EU candidate countries plus Croatia), hereafter referred to as the EE-11. The first section documents the increasing international openness of these economies and is followed by an account of the role of international trade as a catalyst for recent recoveries. After a brief review of trade and output variables over the cycle, an attempt is made to identify the relative influence of exchange rate changes and foreign activity on exports over the short run.

1. REFORM, OPENNESS AND INTEGRATION

Transition and liberalization, unprecedented in scale and speed, have facilitated an increasing degree of openness (measured as the sum of real exports and imports of goods and services relative to real GDP) in most transition economies with tangible effects on the geographic orientation and commodity composition of foreign trade. As a result, external liberalization *ceteris paribus* has significantly enhanced the rates of economic growth of the transition economies.[1] Chart 1 provides evidence for this growing role of international trade. With the exception of Slovenia,[2] EE-11 countries have increased their openness since the early nineties, some of them to a considerable degree.

Openness to international trade does not necessarily imply integration into one particular economic area with an identifiable business cycle. In fact, the short-term gains from openness derive from diversifying trade to a range of countries, all with different

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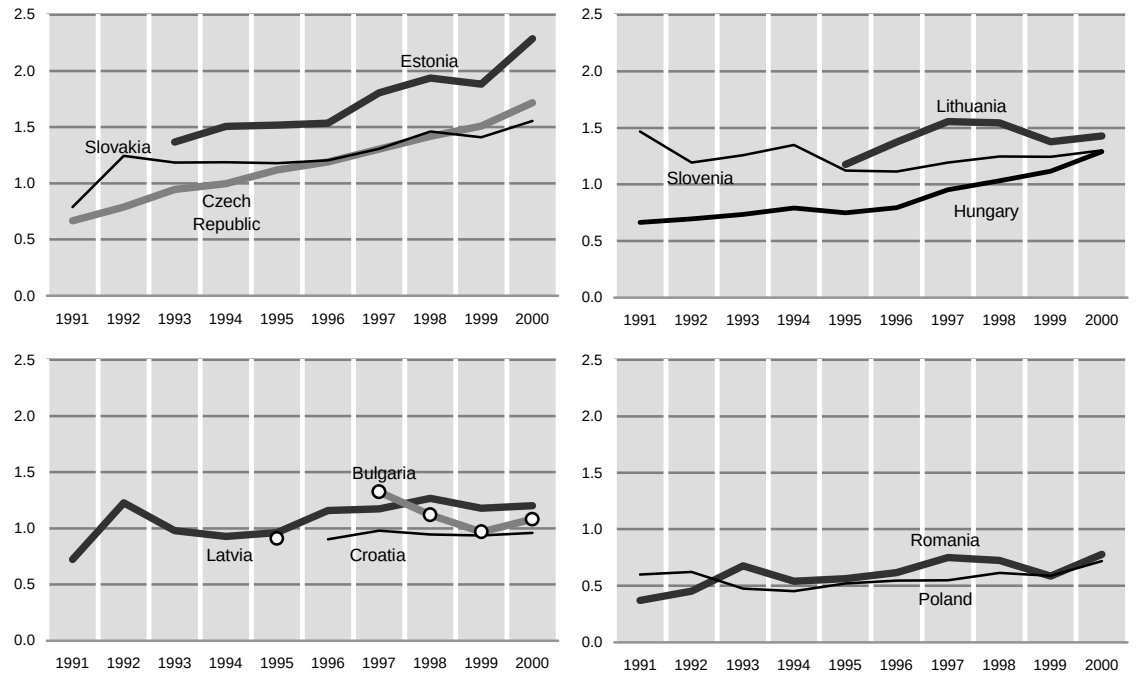
[1] The growth effects of external liberalization have been estimated to be of the same order of magnitude as those of privatization and institutional reforms (i.e., price liberalization and competition). S. Fischer, R. Sahay and C.A. Végh, "From Transition to Market: Evidence and Growth Prospects", *IMF Working Paper No. 98/52*, (Washington, D.C.), April 1998.

[2] This notable exception might be taken as a hint to the formidable role of FDI in facilitating export capacity and openness, as this country has so far featured one of the lowest cumulative FDI shares in GDP in the region. Cf. "Economic Growth and Foreign Direct Investment in the Transition Economies", in: UNECE, *Economic Survey of Europe 2001*, No. 1, Ch. 5, especially Table 5.2.2 on page 190.

cycles, while an increasing synchronization of business cycles across countries reduces the likelihood of trade having a significant influence on the domestic cycle. In the case of the EU candidate countries, increasing openness has naturally been mainly with the European Union.[3] However, "… trade links alone do not ensure the convergence of business cycles if countries are not sufficiently similar".[4] As a result, although the East European countries enjoy considerably close trade links with the EU, their respective

Chart 1

The openness of 11 east European and Baltic economies, 1991-2000
(Ratio)



Source: UNECE Common Database.

Note: Openness is defined as the ratio of the sum of real exports and imports to real GDP.

[3] Already at the end of the nineties the trade intensity of some of these countries with the EU was almost matching intra-EU trade. UNECE, *Economic Survey of Europe*, 1998, No. 1, p. 134.

[4] J. Fidrmuc, "The Endogeneity of Optimum Currency Area Criteria, Intraindustry Trade and EMU Enlargement," *BOFIT Discussion Paper, No. 8/2001*, (Helsinki, Bank of Finland), 2001, p 23. Integration of dissimilar countries will simply enforce specialization according to comparative advantage resulting in susceptibility to quite dissimilar shocks. Intra-industry trade (IIT), however, has been demonstrated to be an important measure of structural similarity and thus a factor for inducing harmonization of business cycles within the OECD. Within the logic of theoretical IIT models, however, it should be *horizontal* rather than *vertical* intra-industry trade that qualifies as a proxy for similarity. For evidence on horizontal versus vertical IIT between EE-11 and the EU see section 3.5 (iii).

synchronization with the European business cycle differs greatly: most findings[5] conclude that the Hungarian cycle is quite well correlated, as is the Slovenian and perhaps the Estonian. This holds to a much lesser extent for the others, possibly indicating that a significant asymmetry of shocks between the EU and accession countries still prevails. Recent work on this has arrived at some rather clear results: the correlation of supply shocks with the euro area differs greatly from country to country,[6] with Hungary and Estonia exhibiting the highest correlation, as high as for many current EMU members. Hungary also has a high correlation of demand shocks, which is much lower for the others, even for advanced reformers such as Estonia and Slovenia,[7] or the Czech Republic, while demand shocks are even negatively correlated for Latvia and Lithuania. In addition, still perceived as "emerging markets," East European economies also suffer from different exchange-rate shocks than the EMU. This suggests that foreign trade, especially with the EU, may have a significant influence on short-term output fluctuations in the East European economies, both via foreign activity and exchange rate channels.

2. TWO RECENT RECOVERIES

The increased role of foreign trade in the East European economies has thus improved their prospects both for long-term growth (via FDI, technological spillover etc.) and for short-term recoveries via trade-led expansions. One would therefore expect to find – assuming some kind of adequate normalization – that trade had a larger and faster impact on the transition economies' recovery from the Russian crisis, that hit the region during the summer and fall of 1998,[8] than from the transformational recession during the early nineties. For the purpose of this comparison, the contribution of exports and net exports to cumulative real GDP growth over a period of four to twelve quarters from the business cycle trough is measured by holding everything else constant. Over a *j*-period horizon starting with *t*, this measure is defined as

$$\begin{aligned} CG(X_{t,j}) &= (X_{t+j} - X_t)/GDP_t \\ &= (1 + w_{GDP(t+j,j)})x_{t+j} - x_t, \end{aligned} \qquad (1)$$

with w_{GDP} denoting the cumulative GDP growth rate, X stands for exports or net exports, and x is the ratio of exports or net exports to GDP.

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[5] Summarized in I. Korhonen, "Some Empirical Tests on the Integration of Economic Activity between the Euro Area and the Accession Countries", *BOFIT Discussion Paper No. 9/2001,* (Helsinki, Bank of Finland), July 2001.

[6] J. Fidrmuc and I. Korhonen, "Similarity of Supply and Demand Shocks between the Euro Area and the CEECs", *BOFIT Discussion Paper, No. 14/2001,* (Helsinki, Bank of Finland), 2001.

[7] These two countries' similarity with EU cycles might therefore be related to the *absence* of major shocks, rather than to their correlation with shocks to EU output, especially when considering the short time horizon of these studies.

[8] While Hungary, Poland, Slovakia and Slovenia did not in fact suffer an actual output loss as a result of the Russian crisis, all of them had to cope with a perceptible negative deviation from their trend rates of growth.

Table 1

Contributions of exports and net exports to cumulative real GDP growth during two recent recoveries in eastern Europe and the Baltic states
(Percentage points)

Cumulative growth contributions of exports

T = trough of transformational recession					*t* = trough during the Russian crisis			
T		*T*+1 year	*T*+2 years	*T*+3 years	*t*		*t*+4 quarters	*t*+8 quarters
					1998QIII	Bulgaria	2.0	11.4
					1998QIV	Croatia	1.5	3.2
1992	Czech Republic	6.7	7.5	15.8	1998QIV	Czech Republic	9.3	26.7
1993	Hungary	4.3	7.4	10.6	1999QI	Hungary	11.1	22.4
1991	Poland	3.3	-5.2	-3.8	1999QI	Poland	7.5	6.7
1992	Romania	11.0	8.0	10.9	1999QI	Romania	7.2	19.2
1993	Slovakia	8.1	10.0	10.5	1998QIV	Slovakia	1.6	13.8
1992	Slovenia	0.4	8.2	-0.9	1999QI	Slovenia	7.7	15.0
1994	Estonia	3.9	5.6	28.9	1999QI	Estonia	28.7	47.1
1995	Latvia	9.5	16.9	20.0	1998QIV	Latvia	1.9	6.8
					1999QIII	Lithuania	8.7	20.1

Cumulative growth contributions of net exports

T = trough of transformational recession					*t* = trough during the Russian crisis			
T		*T*+1 year	*T*+2 years	*T*+3 years	*t*		*t*+4 quarters	*t*+8 quarters
					1998QIII	Bulgaria	3.6	8.9
					1998QIV	Croatia	-2.0	-2.3
1992	Czech Republic	-2.0	-7.9	-10.7	1998QIV	Czech Republic	-0.5	-2.4
1993	Hungary	0.5	9.7	10.4	1999QI	Hungary	0.6	0.7
1991	Poland	2.8	-1.0	2.1	1999QI	Poland	0.4	1.6
1992	Romania	-1.4	4.1	3.2	1999QI	Romania	1.2	-2.1
1993	Slovakia	10.2	6.6	-4.1	1998QIV	Slovakia	8.3	6.1
1992	Slovenia	-9.5	-10.3	-9.2	1999QI	Slovenia	0.5	5.4
1994	Estonia	-0.4	-5.0	-8.4	1999QI	Estonia	2.4	0.9
1995	Latvia	-4.6	-1.5	-11.2	1998QIV	Latvia	2.4	3.1
					1999QIII	Lithuania	3.9	5.7

Source: UNECE Common Database.

Note: Troughs *T* (years) and *t* (quarters) were identified as the largest negative deviations from national GDP trends during the relevant time periods. The time elapsed since the Russian crisis does not allow for more than eight quarters of data, while for the transformational recession quarterly data are not available. Data availability restricts analysis of the recovery following the transformational recession to eight countries.

When interpreting Table 1, it should be borne in mind that the causes of and the recoveries from the two crises differed a lot: the transformation recession was caused by a number of massive real shocks on the supply and demand side, i.e., the dismantling of the central planning system, the disorganisation of production, and the collapse of CMEA trade, with implications far beyond those of a cyclical downswing. The beginning and duration of that recession varied greatly across countries, and so did the external environment at the time of each recovery: during the Polish recovery (1992–4), the GDP of the European Union grew by 3.6 per cent cumulatively, with aggregate East European GDP falling slightly by 1 per cent. In contrast, during the Hungarian recovery

(1994–6), the EU grew by 7.1 per cent, with East European GDP increasing by 14.2 per cent. The Russian crisis led to contagion effects and resembled much more a cyclical downturn. During the recovery external demand conditions were favourable for all countries, and real exchange rate developments were less dramatic (with cpi-based real effective exchange rate appreciation within the first eight quarters of each recovery averaging 4.6 per cent) than during the recovery from the transformational recession (when cpi-based real effective exchange rate appreciation during the first two years of recovery averaged almost 14 per cent for the same eleven countries).[9]

Furthermore, in the light of liberalization, it might be expected that strong positive impulses from the external sector for East European countries recovering from their recent recession would significantly exceed the experience of 'normal' economies recovering from 'normal' business cycle troughs. To make such a comparison, OECD countries' most recent recoveries up to the mid-nineties, again over a recovery period of 8 quarters,[10] can be used as a benchmark. Charts 2 and 3 show the cumulative real growth contributions of exports and net exports of goods and services for OECD and East European countries against their respective degrees of international openness.

Charts 2 and 3 first of all confirm that the – mostly very small – EE-11 economies are now more open than during their recovery from the transformational recession, and on average are significantly more open than the OECD economies. Table 1 and Chart 2 indicate that exports have made sizeable and significant contributions to the cyclical recoveries of GDP growth, although their extent differs across countries. The average magnitude of these contributions is clearly linked to the openness of the economy. Accordingly, the contributions of exports to East European countries' economic growth, although varying across countries, was significantly larger during the post-Russian crisis recovery both in comparison with their recovery from the transformational recession and with the OECD countries' recent experience.[11]

As for the recovery from transformational recession, it might be thought *a priori* that external sector liberalization would necessarily result in a rapid and large contribution of the export sector to real economic growth. However, as already indicated, the transformational recession varied greatly across countries in timing and in the external environment. [12]

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[9] Aggregate East European growth figures and real exchange rate data are taken from the UNECE database and National Banks of UNECE member countries.

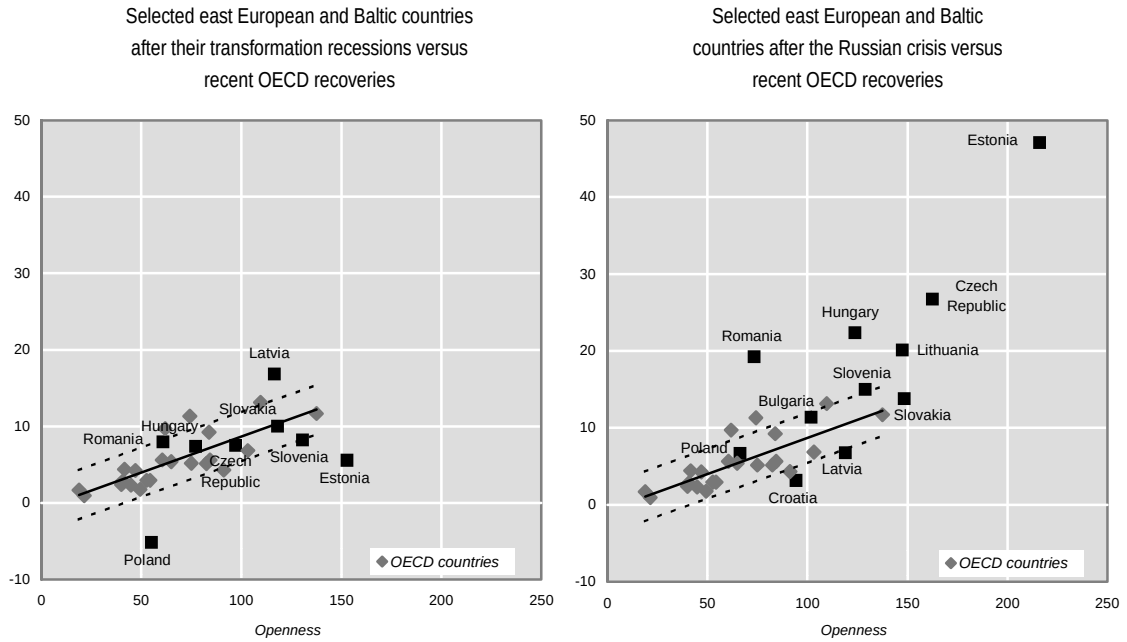
[10] E.S. Prasad and J.A. Gable, "International Evidence on the Determinants of Trade Dynamics", *IMF Staff Papers*, Vol. 45, No. 3, September 1998, pp. 401–439.

[11] Including the EE-11 economies in their post-transformational recession recovery does not significantly alter the slope of the OECD regression line in chart 2, but reduces the constant. Including the EE-11 economies in their recovery from the Russian crisis both reduces the constant and significantly increases the slope of the same regression line.

[12] R. Frensch, "Internal Liberalization as a Barrier to Export-led Recovery in Central European Countries Preparing for EU Accession", *Comparative Economic Studies*, Vol. 42, No. 3, Fall 2000, pp. 31–47.

Chart 2

The contribution of exports to cumulative real GDP growth and openness in eastern Europe and the Baltic states
(After two years, percentage points)



Source: UNECE Common Database. OECD data supplied by the IMF directly to UNECE secretariat.

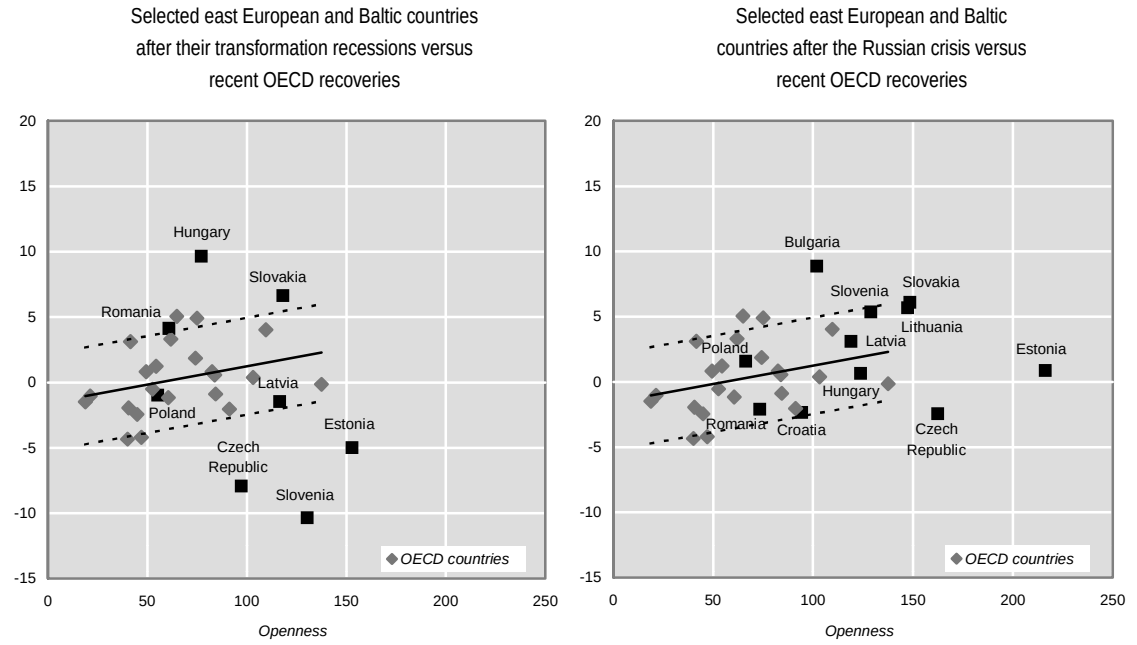
Note: For the east European and Baltic countries, the chart compares horizons of two years after their transformational recessions to eight quarters after the Russian crisis. For each OECD country the recovery denotes the first eight quarters after its most recent cyclical trough; the OECD sample covers 22 countries that have been members since 1970; accordingly, recently admitted east European countries are excluded from the OECD sample, in which Japan has the lowest (20 per cent) and Belgium the highest (140 per cent) degree of international openness. Openness is defined as the average percentage ratio of the sum of real exports and imports to real GDP over the respective time period. The regression lines and ±1.5 standard deviation lines in the figures are based only on the OECD sample.

As is evident from Chart 3, all this does not hold to the same extent for net exports: for both the OECD and the transition economies, there is no convincing evidence that net trade has on average contributed to recovery within 8 quarters of their respective troughs.[13] However, at least the variance of EE-11 economies' deviations from average OECD experience has decreased between the recoveries from the transformational and Russian-crisis recessions, probably due to more neutral external conditions during the latter. As a corollary of the above, there is no correlation between cumulative export and net export contributions to real GDP growth: very open economies (such as Estonia and the Czech Republic) were exceptional in terms of the export contributions to GDP growth after the Russian crisis, but the net export contributions to growth during both recent recoveries were small or even negative.

[13] The regression line in Chart 3 describes a very weak (and not significant) cross-country relationship, which in fact disappears altogether for the OECD countries after 12 quarters. Accordingly, Prasad and Gable (loc. cit., p. 402) find that quite contrary to exports "… surprisingly … the trade balance … has in fact played only a limited role in business cycle recoveries in the OECD economies."

Chart 3

The contribution of net exports to cumulative real GDP growth and openness in eastern Europe and the Baltic states
(After two years, percentage points)



Source: As for chart 2.
Note: As for chart 2.

Accordingly, examination of charts 2 and 3 raises the question as to whether exports or net exports are the 'true' international trade catalyst for cyclical recoveries. While net trade appears to be more appropriate within the conceptual framework of the national income accounts, the logic of recovery rather points to exports: increasing exports trigger the recovery by stimulating domestic demand including import demand.[14] An examination of trade and output variables over the cycle might help to answer this question.

3. TRADE AND THE BUSINESS CYCLE

A recent study of OECD experience points to the following general conclusions:[15] net exports behave anti-cyclically, largely driven by the strong pro-cyclical behaviour of imports, while export behaviour in this respect varies widely across countries, due to

[14] Prasad and Gable, loc. cit., p. 411.

[15] Prasad and Gable, loc. cit., p. 410.

Table 2

Simple correlations between trade ratios and GDP in eastern Europe and the Baltic states, 1995QI-2001QII

	Exports/GDP, GDP						
	-4	-2	-1	0	1	2	4
Bulgaria	0.17	-0.11	0.03	-0.42	-0.02	0.15	0.47
Croatia	-0.12	-0.45	0.34	-0.61	0.24	-0.13	0.33
Czech Republic	-0.24	0.06	0.15	-0.08	0.15	-0.35	-0.12
Hungary	-0.27	0.12	0.21	-0.39	0.20	0.12	-0.25
Poland	-0.43	0.08	-0.24	0.23	-0.11	0.11	0.31
Romania	0.69	-0.24	0.20	0.40	-0.34	-0.69	0.08
Slovakia	-0.26	0.23	-0.26	-0.49	0.36	-0.29	-0.09
Slovenia	-0.44	-0.58	0.40	-0.07	–	0.16	0.76
Estonia	-0.09	0.20	0.43	0.35	0.14	0.16	-0.27
Latvia	0.13	0.09	-0.05	0.21	0.32	0.16	-0.07
Lithuania	0.57	0.42	-0.18	0.44	0.09	-0.22	-0.41
	Imports/GDP, GDP						
	-4	-2	-1	0	1	2	4
Bulgaria	-0.44	-0.25	-0.05	0.20	-0.40	0.47	0.07
Croatia	-0.14	-0.15	-0.02	0.33	0.10	-0.33	-0.38
Czech Republic	-0.32	-0.38	0.60	-0.40	0.43	-0.31	–
Hungary	0.30	0.11	0.39	0.08	0.12	0.15	-0.04
Poland	-0.20	0.10	-0.15	0.12	-0.13	0.29	0.09
Romania	0.21	-0.07	0.48	0.42	-0.38	-0.65	-0.01
Slovakia	0.25	0.14	-0.06	-0.30	0.50	-0.07	-0.13
Slovenia	0.27	0.23	-0.65	0.88	-0.91	0.87	-0.07
Estonia	-0.21	-0.03	0.61	0.42	0.45	0.10	-0.42
Latvia	0.03	-0.18	-0.16	-0.06	0.34	-0.16	0.04
Lithuania	0.06	0.24	-0.06	0.26	0.08	-0.12	-0.10
	Net exports/GDP, GDP						
	-4	-2	-1	0	1	2	4
Bulgaria	0.53	0.12	0.08	-0.59	0.36	-0.30	0.43
Croatia	-0.03	-0.29	0.27	-0.66	0.12	0.09	0.53
Czech Republic	0.16	0.58	-0.65	0.47	-0.43	-0.02	-0.18
Hungary	-0.52	0.04	-0.16	-0.57	0.11	-0.02	-0.29
Poland	-0.32	-0.02	-0.17	0.19	0.02	-0.23	0.36
Romania	0.29	-0.10	-0.57	-0.27	0.34	0.40	0.18
Slovakia	-0.57	0.02	-0.16	-0.05	-0.35	-0.18	0.10
Slovenia	-0.30	-0.29	0.67	-0.85	0.88	-0.77	0.55
Estonia	0.16	0.24	-0.31	-0.11	-0.42	0.08	0.18
Latvia	0.03	0.24	0.14	0.18	-0.17	0.26	-0.08
Lithuania	0.37	0.08	-0.08	0.08	–	-0.06	-0.21

Source: UNECE Common Database.

Note: Correlations are based on quarterly rates of change with different leads (–) and lags (+) of trade variables. All EE-11 countries (except Romania, starting only in 1996) have been publishing quarterly real GDP since at least 1995, although mostly they are not seasonally adjusted. These data, however, are not always accompanied by a breakdown in expenditure, thus not allowing a truly consistent analysis of GDP and trade variables since 1995 for all countries: the respective series start only with 1996 (Bulgaria), 1997 (Croatia), 1998 (Romania) or even 1999 (Slovenia). If not published as such, all data have been seasonally adjusted by applying a X-12 filter.

different levels of foreign activity and exchange rate developments. The results in Table 2 are not quite in line with this conclusion: there are significant differences in export as well as import behaviour among the transition countries.[16] Contemporaneous imports are anti-cyclical in Latvia, and above all in both the Czech Republic and in Slovakia, and pro-cyclical only with a one quarter lag. Also, the contemporaneous import response generally appears to be weaker than in the OECD countries. Accordingly, net exports are not anti-cyclical in Poland, Latvia, Lithuania, or, again especially, in the Czech Republic.

Table 3

Correlations between quarterly rates of change of exports and imports in eastern Europe and the Baltic states, 1995QI-2001QII

	Full sample	*1998QI – 2001QII*
Bulgaria	0.47	0.59
Croatia	-0.04	0.04
Czech Republic	0.64	0.88
Hungary	0.50	0.79
Poland	0.81	0.77
Romania	0.84	0.84
Slovakia	0.73	0.77
Slovenia	0.60	0.60
Estonia	0.71	0.88
Latvia	0.44	0.19
Lithuania	0.51	0.47

Source: UNECE Common Database.

Note: For data constraints, see note to table 2.

These differences from OECD experience in the behaviour of the trade variables – together with a higher correlation of contemporaneous export and import changes[17] than in the OECD – suggest that the import response in the East European countries is less a reflection of a 'normal' consumption and investment demand reaction to output changes (e.g. induced by exports), typical of the OECD countries, than of the particular nature of their trade which favours outward processing, subcontracting and other 'import for export' arrangements resulting in large import content of exports. On the other hand, according to Table 2, exports signal GDP changes much more consistently than net exports over the short run (of one to two quarters). Thus, the evidence from Tables 2 and 3 is insufficient to allow for much more than the conclusion that the import content of

[16] Analyzing trade ratios to control for size effects has the advantage that they can be analyzed like 'normal' trade variables, while at the same time coming close to the 'growth contribution' concept discussed above. The correlation between changes in trade variables and trade ratios is very high over the sample period for each country, typically above 0.9, as trade variables are much more volatile than output.

[17] 0.46 on average for all EE-11 countries over the whole sample, but perceptibly increasing over time for some countries, especially for Bulgaria, the Czech Republic, Hungary, and Estonia. See Table 3.

exports in EE-11 is larger than in the OECD economies. In particular, the evidence does not suggest a qualitatively different pattern of trade behaviour over the cycle. This justifies treating exports, rather than net exports, as the true catalyst through which trade influences GDP in the short run. The 'effectiveness' with which export stimuli are translated into GDP growth, however, are determined by the degree to which the import response is export-related, i.e. by the import content of exports, which differs across countries.

4. FOREIGN ACTIVITY VERSUS EXCHANGE RATE CHANNELS

Long-run developments in the trade shares of GDP follow trends in trading costs which are influenced *inter alia* by the relative size of the economy, liberalization policies, and the intertemporal aspects of consumption smoothing. The conclusion to be drawn from the previous section, however, is that to describe short-run trade behaviour over the cycle appropriately the effects of both external activity and real exchange rate behaviour have to be included.

The available data[18] do not allow the estimation of rigorous multivariate econometric relationships between these variables across countries in a meaningful and comparable way: the availability of quarterly GDP data by expenditure varies greatly among the East European countries so that there is a trade-off between coverage and length of series, which in turn largely determines the methodology used to analyse the series. The choice made here has been to favour breadth of coverage and comparability across countries at the obvious cost of analytical depth.

A first attempt at assessing the influence of foreign, especially EU, activity on EE-11 export fluctuations involves some basic principal components analysis. For nine of the eleven countries (except the two with the weakest trade links with the EU, i.e. Bulgaria and Lithuania), there exists a common set of factors, expressed as the first principal components vector, accounting for 43 per cent of the variance of their export ratios (in terms of quarterly rates of change). This vector, in turn exhibits a statistically significant correlation coefficient of 0.47 with the quarterly rates of change in European Union GDP, which can be taken as evidence for a relationship between East European export fluctuations and European Union activity.[19]

In addition, as a rough assessment, Chart 4 presents the partial correlations between export ratios, (lagged) real exchange rates and (contemporaneous or lagged) foreign activity variables over the short run. The *a priori* expectations are that exchange rate changes are negatively and foreign activity is positively correlated with changes in ex-

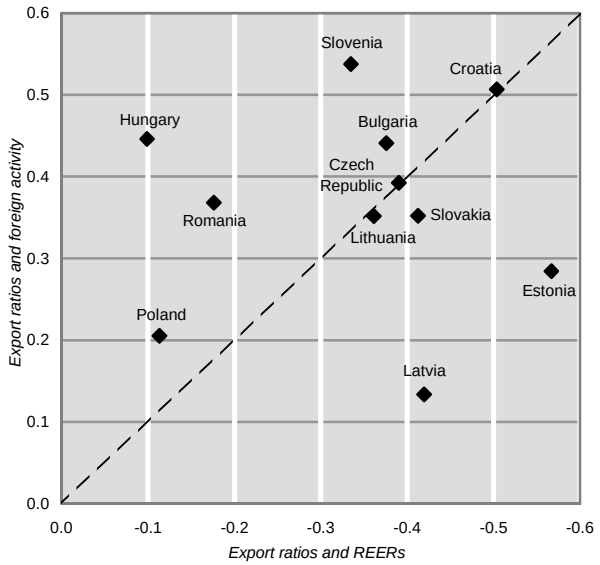
[18] See notes to Table 2.

[19] To create a common sample size starting with the first quarter of 1996, some annual data for Croatia, Romania and Slovenia had to be re-estimated on a quarterly basis, cf. notes to Table 2. Leaving out the data for these countries increases the share of the variance accounted for by the first principal components vector.

ports.[20] Chart 4 shows that across countries foreign activity (especially EU GDP) and real exchange rate effects vary in their importance as determinants of short-run changes in export ratios. Among the higher correlations, changes in foreign activity do not in general appear to outweigh real exchange rate effects, except for Slovenia, Hungary, and Romania, while real exchange rate effects seem to dominate for Latvia and Estonia (in terms of deviations from the 45° line in the chart).

Chart 4

Partial correlation coefficients between export ratios and real effective exchange rates (REERs) versus the partial correlations between export ratios and foreign (EU) activity, 1996QI-2001QII



Source: UNECE Common Database and national banks of ECE member countries.

Note: The correlations are between quarterly seasonally adjusted rates of change. The partial correlation coefficients have been adjusted for bivariate correlations between foreign activity and real exchange rate developments. For data constraints, see note to table 2. Foreign activity is proxied by EU GDP except for Bulgaria and Lithuania, for which an index of trade-weighted GDP of EU, eastern Europe, the Baltic states and Russia is used. Real effective exchange rates are producer-price based and trade weighted.

However, while there seems to exist a perceptible effect of foreign – especially EU – activity on export activity in the short run for most countries, the high import content of exports in some of them presumably dampens the influence of foreign activity upon output fluctuations, more so than the real exchange rate influence, which has an additional impact on direct imports over and above the impact on imports for exports. This

[20] Lag selection for the real effective exchange rate and activity indicators was made by preliminary country-by-country ordinary least squares regression of export ratios on differently lagged real exchange rates and activity variables. E.g., chart 4 reproduces the effects of contemporaneous real exchange rate changes for Slovakia and Lithuania, and of lagged changes for the rest except for Hungary, Poland and Romania (lagged twice).

is probably especially true for those countries with a sizeable contemporaneous correlation between changes in exports and imports (see Table 3), i.e., mainly the Czech Republic, Hungary, Poland, Romania, Slovakia and Estonia. Of the countries considered in chart 4, Slovenia, Hungary and perhaps Romania appears to be the countries where foreign (and especially EU) activity may have a more significant influence than the real exchange rate not only on short-term exports but also on short-term variations in output.[21]

5. CONCLUSIONS

A rapidly increasing degree of international openness, on average now much higher than that of the OECD countries, has led to significant contributions of exports to GDP growth during the East European countries' recovery from the regional recession that followed the Russian crisis. At the same time, short-run fluctuations in exports appear to be influenced by both real exchange rate developments and foreign, especially European Union, levels of activity. Considering the close links between exports and imports for many east European economies, a cautious interpretation of the evidence suggests that in general – with the possible exceptions of Slovenia, Hungary, and perhaps Romania – the impact of foreign activity is probably weaker than the influence of the real exchange rate on short-run output fluctuations.

[21] The presence of Romania in this group is noteworthy, as it has one of the lowest degrees of openness in the region (chart 1).

Tariffs in monopolistic competition models with leisure-consumption trade-off

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Abstract

This note introduces a leisure-consumption trade-off into monopolistic competition models resulting in ambiguous welfare effects of tariff protection. A small tariff is welfare reducing when the terms of trade effect is smaller than an international returns to scale effect.

JEL-classification: F12, F15
Keywords: Tariffs, returns to scale, monopolistic competition, intra-industry trade

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1 Introduction

The normative analysis of trade in intermediate inputs or differentiated consumer products suggests that even for a small country a small tariff on imports subject to monopolistic competition is welfare improving [Gros (1987) and Helpman and Krugman (1989, ch. 7)]. So far, this result has been contested on two grounds: Gros (1987) demonstrated that tariff wars between countries are welfare reducing. Markusen (1990) showed that in a two-sector model the positive effect of a small tariff is "due to an arbitrary assumption that the intra-sectoral elasticity of substitution in consumption exceeds the inter-sectoral elasticity" (p. 375).

This paper derationalizes small tariffs on the basis of the traditional assumption that the intra-sectoral elasticity of substitution exceeds the inter-sectoral elasticity, when we assume the second good to be leisure. Following Ethier (1982) and Benassy (1996; 1998, in the endogenous growth context) we disentangle national from international returns to scale in order to clarify the intuition behind the result. Market power based on national returns to scale implies a positive terms of trade effect of tariff protection. International returns to scale in the presence of preferences for leisure have a discouraging effect: the tariff revenue impact reduces labor supply in the tariff-imposing country, and thus the number of producers and the returns to specialization. A small tariff is welfare reducing when the terms of trade effect is smaller than the international returns to scale effect.

2 The free trade model

We apply a two-goods version of the monopolistic competition model of trade between two countries analyzed in Gros (1987) and Helpman and Krugman (1989, ch. 7) in the intermediate input interpretation of Ethier (1982). The two goods are final manufacturing output M and leisure F.

2.1 Demand

A representative country j $(j = 1, 2)$ consumer maximizes his fixed expenditure shares utility function

$$U_j = M_j^{\phi} F_j^{1-\phi} \tag{1}$$

for $0 < \phi < 1$ over his choice of M and F subject to a budget constraint derived from his initial labor endowment $\bar{L}_j$, $Y_j = w_j \bar{L}_j$, where w_j is the wage rate. Denoting the price of manufacturing output by P_j, demand is

$$M_j^d = \phi Y_j / P_j \text{ and } F_j^d = (1-\phi) Y_j / w_j. \tag{2}$$

2.2 Production

Labor is the only input, and from (2) labor supply equals

$$L_j = \bar{L}_j - F_j^d = \phi \bar{L}_j. \tag{3}$$

Production takes place in two stages: first, n_j imperfectly substitutable intermediate inputs (components) are produced in each country by monopolistic competitors with identical technologies: labor input for producing a single component x_j in country j is

$$l_j = ax_j + b, \tag{4}$$

with increasing returns to scale at the level of the firm, i.e. "national" returns to scale. In the second stage, as in Ethier's (1982) original contribution, output of all $n = n_1 + n_2$ components from both countries is assembled into finished manufactures by perfect competitors at the place of consumption without further costs according to the general CES-function $M = n^{\alpha}\left(\sum_{i=1}^{n} x_i^{\beta}/n\right)^{\frac{1}{\beta}}$, which in our two-country world, anticipating symmetry in production, reads

$$M_j = n^{\alpha-\frac{1}{\beta}}(n_1 x_{1j}^{\beta} + n_2 x_{2j}^{\beta})^{\frac{1}{\beta}}, \alpha > 1, \text{and } 0 < \beta < 1, \tag{5}$$

$\beta = 1 - 1/\sigma$; σ is the constant elasticity of substitution between any pair of components and x_{ij} is the amount of output of a country i component producer assembled into the final manufacturing good in country j.

For equal size x of component output assembled in country j, (5) simplifies to $M_j = n^{\alpha-1}(nx)$, illustrating the significance of $\alpha - 1$ for measuring the degree of increasing returns to scale external to the assembling firm. As these external returns are in a fundamental sense connected to the total number of component producers, but independent from "national" returns as described in the first production stage, Ethier (1982) terms them "international" returns to scale. As is easily verified for $\alpha = 1/\beta$, i.e., for tying international returns to scale to component producers' market power based on imperfect substitutability, and again for equal size x, (5) reduces to the standard monopolistic competition model specification $M_j = n^{(1/\beta)-1}(nx)$: while most authors have used this standard specification, " ... it is by no means generic and the original formulation of such production functions in Ethier (1982) clearly separated the returns to specialization and the monopolistic markup" [Benassy (1998, p. 63)].

Due to perfect competition between assemblers, the price of the manufacturing good in country j equals the minimum average cost of assembling components and is therefore the dual price index to M_j, i.e.

$$P_j = n^{\frac{1-\alpha\beta}{\beta}}\left(n_1 q_{1j}^{\frac{\beta}{\beta-1}} + n_2 q_{2j}^{\frac{\beta}{\beta-1}}\right)^{\frac{\beta-1}{\beta}}, \tag{6}$$

where q_{ij} denotes the price of a country i component assembled into the final manufacturing good in country j. Profit maximization subject to (5) and subsequent aggregation determines country j's assembling firms' total demand for a single home or foreign component[1]

$$x_{ij} = n^{\frac{1-\alpha\beta}{\beta-1}} \left(\frac{q_{ij}}{P_j}\right)^{\frac{1}{\beta-1}} \frac{\phi Y_j}{P_j} = \frac{q_{ij}^{\frac{1}{\beta-1}} \phi Y_j}{n_1 q_{1j}^{\frac{\beta}{\beta-1}} + n_2 q_{2j}^{\frac{\beta}{\beta-1}}}. \tag{7}$$

Monopolistic competition among component producers and perfect competition on the labor market as well as between manufacturing assemblers ensures that each component producer's marginal revenue from selling components to assembling firms equals his marginal costs in the short run such that from (4) and (7) $\beta q_{ji} = a w_j$, implying identical prices q_j at home and abroad for components produced in country j. By free entry and exit of component producers prices equal average costs, i.e. $q_j = \frac{w_j l_j}{x_j}$. Both conditions together with (4) define a constant scale of operation of component producers in both countries, $\bar{x}$, as depending upon the degree of their market power, and imply that wages in terms of component prices remain constant and equal in both countries throughout, i.e.,

$$\bar{x} = \frac{\beta}{a}\bar{l} = \frac{b}{a}\frac{\beta}{1-\beta} \quad \text{and} \quad \frac{w_j}{q_j} = \frac{\bar{x}}{\bar{l}} = \frac{\beta}{a}. \tag{8}$$

2.3 Equilibrium

Production constraints $\bar{x} = x_{11} + x_{12} = x_{21} + x_{22}$ and component demand (7) determine (denoting free trade equilibrium by a '*')

$$x_{11}^* = x_{21}^* = \frac{n_1^*}{n^*}\bar{x} \quad \text{and } x_{12}^* = x_{22}^* = \frac{n_2^*}{n^*}\bar{x}. \tag{9}$$

From (3) and (8) we derive the number of component producers,

$$n_j^* = L_j/\bar{l} = \phi \bar{L}_j/\bar{l} \quad \text{and} \quad n^* = n_1^* + n_2^* = \frac{\phi}{\bar{l}}(\bar{L}_1 + \bar{L}_2). \tag{10}$$

As M is assembled at its place of consumption and F is non-tradable, trade takes place only in components. Setting q_2, the price of country 2 components, equal to 1 for the rest of the analysis, balanced trade requires

$$n_1 q x_{12} = n_2 x_{21}, \tag{11}$$

and the free trade equilibrium terms of trade are $q^* = \frac{n_2^* x_{21}^*}{n_1^* x_{12}^*} = 1$, implying equal prices for manufacturing output in both countries via (6).

[1] Equation (7) is a straightforward extension of demand functions in monopolistic competition models in the standard specification where $\alpha = 1/\beta$; see, e.g., Helpman and Krugman (1985, pp. 117ff).

3 Small tariff effects

3.1 International returns to scale

Country 1 now levies a small *ad-valorem* tariff on component imports such that assemblers in country 1 pay $(1+t)$ for one unit of country 2 components. Assuming that tariff revenues $T = tn_2x_{21}$ are redistributed, $Y_1 = w_1\bar{L}_1 + T$, changing country 1 labor supply from (3) to

$$L_1 = \phi\bar{L}_1 - (1-\phi)T/w_1, \tag{3a}$$

while country 2 labor supply continues to be described by (3). With $L_1 = n_1\bar{l}$, (3a) together with (8), (10) and (11) determines the number of country 1 producers in the presence of a small tariff implicitly as

$$n_1 = n_1^* - (1-\phi)t\frac{n_1x_{12}}{\bar{x}}. \tag{12}$$

In the neighborhood of free trade, (12) together with (9) implies

Lemma 1 *A redistributed small ad-valorem tariff raises country 1 disposable income, implying a reduction in the supply of labor and consequently a decrease in the number of country 1 component producers according to*

$$\frac{dn}{dt} = \frac{dn_1}{dt} = (\phi-1)\frac{n_1^*n_2^*}{n^*} < 0. \tag{13}$$

In the presence of international returns to scale, this effect is welfare reducing.

3.2 The terms of trade

Production constraints and (11) imply $\dfrac{n_2}{n_1}\dfrac{1}{q} = \dfrac{\bar{x}-x_{11}}{x_{21}}$. Differentiation yields

$$d\left(\frac{n_2}{n_1}\frac{1}{q}\right) = d\left(\frac{\bar{x}}{x_{21}}\right) - d\left(\frac{x_{11}}{x_{21}}\right). \tag{14}$$

Due to their market power, based on national returns to scale, component producers, even in a small country, are not price takers: evaluating (14) at the free trade equilibrium we obtain

Lemma 2 *A redistributed small ad-valorem tariff always improves country 1's terms of trade according to*

$$\frac{dq}{dt} = \frac{n_1^*}{n^*} > 0. \tag{15}$$

Proof: See Appendix 1.

3.3 Welfare conclusions

International returns to scale and the terms of trade effect interact to determine the welfare effects of a small tariff. Substituting (2) into (1) yields the indirect utility function

$$V_1 = \left(\phi \frac{Y_1}{P_1}\right)^{\phi} \left((1-\phi)\frac{Y_1}{w_1}\right)^{1-\phi}, \tag{16}$$

from which we derive

Proposition 1 *A small tariff decreases welfare if and only if the degree of international returns to scale is greater than the inverse of the expenditure share of leisure, i.e.,*

$$\frac{dV_1}{dt} \lesseqgtr 0 \text{ for } \alpha - 1 \gtreqless \frac{1}{1-\phi}. \tag{17}$$

Proof: See Appendix 2.

To comment on this condition in terms of the two conflicting effects, consider that from Lemma 2 the elasticity of the terms of trade with respect to a tariff, close to free trade, is $\epsilon_{q/t} = \frac{n_1 t}{n}$. Lemma 1 implies an elasticity of the number of country 1 component producers with respect to a tariff of $\epsilon_{n_1/t} = (1-\phi)\frac{n_2 t}{n}$. As the effect of a change in n_1 on manufacturing output and welfare is determined by their share in the world and the size of the international returns to scale $(\alpha - 1)$, we may denote the expression $\frac{n_1}{n_2}(\alpha - 1)\epsilon_{n_1/t}$ an international scale effect. Proposition 1 then says that a small tariff is welfare reducing when the terms of trade effect is smaller than the international scale effect, i.e. when $\epsilon_{q/t} < \frac{n_1}{n_2}(\alpha - 1)\epsilon_{n_1/t}$.

Thus, when disentangling international from national returns to scale and market power, we find that the welfare effects of small tariffs are independent from the degree of market power: the above result would be blurred by the standard assumption $\alpha = 1/\beta$. This would change Proposition 1 to requiring $\frac{dV_1}{dt} \lesseqgtr 0$ for $\frac{1-\beta}{\beta} \gtreqless \frac{1}{1-\phi}$ <=> $\frac{1}{1-\beta} = \sigma \lesseqgtr 1 + (1-\phi)$, while not answering the question whether the welfare implications depend on the market power properties of σ or rather on the returns to scale implications, which are logically distinct. It would, however, make our result more easily comparable to Markusen (1990): for $\alpha = 1/\beta$, Proposition 1 states that for a negative welfare effect of a small tariff the intra-sectoral elasticity of substitution between any pair of components has to be smaller than the inter-sectoral elasticity of substitution between manufacture and leisure plus the expenditure share of leisure.

4 Concluding remarks

While the model above was taken to illustrate the intermediate goods case of the monopolistic competition model of international trade, the same formal structure can be taken to represent a differentiated final goods case in which a sub-utility function U_1 takes the form of M_1 in (5) to feature an "explicit preference for variety" [in the sense of α being independent of β, cf. Frensch (1993, chs. 6 and 7)]. The above condition on welfare reducing tariffs does not seem to be overly restrictive in either case.

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Appendix 1: Proof of Lemma 2

On the RHS of (14), $d\left(\frac{\bar{x}}{x_{21}}\right) = -\frac{\bar{x}dx_{21}}{(x_{21}^*)^2} = \frac{dx_{22}(n^*)^2}{(n_1^*)^2\bar{x}}$, evaluated at free trade via (9). From demand functions (7) and by $\phi Y_2 = n_2\bar{x}$ due to (3) and (8), $x_{22} = \frac{n_2\bar{x}}{n_1 q^{\frac{\beta}{\beta-1}} + n_2}$. Close to free trade, $dx_{22} = -\frac{1}{(n^*)^2}(n_2^*\bar{x})\left(n_1^*\frac{\beta}{\beta-1}dq + dn_1\right) = \frac{n_2^*\bar{x}}{(n^*)^2}\left(\frac{\beta}{1-\beta}n_1^*dq - dn_1\right)$ and $d\left(\frac{\bar{x}}{x_{21}}\right)$ emerges as $\frac{n_2^*}{(n_1^*)^2}\left(\frac{\beta}{1-\beta}n_1^*dq - dn_1\right)$.

Turning to the second term on the RHS of equation (14), we know from (5) that $\sigma = \frac{1}{1-\beta} = \frac{d\left(x_{11}/x_{21}\right)}{d\left(q/(1+t)\right)}\frac{q^*/(1+t^*)}{x_{11}^*/x_{21}^*}$ such that $d\left(x_{11}/x_{21}\right) = -\frac{1}{1-\beta}(dq-dt)$. Combining both terms on the RHS of (14) we obtain

$$d\left(\frac{n_2}{n_1}\frac{1}{q}\right) = \frac{n_2^*}{(n_1^*)^2}\left(\frac{\beta}{1-\beta}n_1^*dq - dn_1\right) - \frac{dt-dq}{1-\beta}. \tag{A1}$$

Expanding the LHS of (14) at free trade gives $d\left(\frac{n_2}{n_1}\right) + \frac{n_2^*}{n_1^*}(-dq) = -\frac{n_2^*dn_1}{(n_1^*)^2} - \frac{n_2^*}{n_1^*}dq$. Multiplying by $(n_1^*)^2$, together with (A1), yields $-n_2^*dn_1 - n_1^*n_2^*dq = \frac{\beta}{1-\beta}n_1^*n_2^*dq - n_2^*dn_1 - \frac{(n_1^*)^2}{1-\beta}(dt-dq)$, such that $\frac{1}{1-\beta}n_1^*n_2^*dq = \frac{1}{1-\beta}(n_1^*)^2(dt-dq)$. This simplifies to $dq/dt = n_1^*/n^* > 0$.

Appendix 2: Proof of Proposition 1

From (16) we define a welfare measure

$$\tilde{V}_1 = \frac{Y_1}{w_1}\left(\frac{w_1}{P_1}\right)^{\phi}, \tag{A2}$$

with $\tilde{V}_1 = V_1/\tilde{\phi}$, $\tilde{\phi} = \phi^{\phi}(1-\phi)^{1-\phi}$. In the presence of redistributed tariff revenues and balanced trade, $Y_1/w_1 = \frac{\bar{l}}{\bar{x}}(\frac{n_1^*\bar{x}}{\phi} + tn_1x_{12})$, by (8), (10) and (11). Reformulating w_1/P_1 using (6) allows to rewrite (A2) as $\tilde{V}_1 = (\frac{\bar{x}}{\bar{l}})^{\phi-1}\left(\frac{n_1^*\bar{x}}{\phi} + tn_1x_{12}\right)n^{\phi\frac{\alpha\beta-1}{\beta}}\left[n_1 + n_2\left(\frac{1+t}{q}\right)^{\frac{\beta}{\beta-1}}\right]^{\phi\frac{1-\beta}{\beta}}$, and, taking logs,

$$\tilde{v}_1 = \ln\tilde{V}_1 = (\phi-1)\ln(\frac{\bar{x}}{\bar{l}}) + \ln\left(\frac{n_1^*\bar{x}}{\phi} + tn_1x_{12}\right) + \phi\frac{\alpha\beta-1}{\beta}\ln n + \phi\frac{1-\beta}{\beta}\ln\left[n_1 + n_2\left(\frac{1+t}{q}\right)^{\frac{\beta}{\beta-1}}\right]. \tag{A3}$$

Differentiating (A3) and evaluating at free trade, using (9), implies

$$d\tilde{v}_1 = dn_1 \frac{\phi}{n^*}(\alpha - 1) + \phi \frac{n_2^*}{n^*} dt - \phi \frac{n_2^*}{n^*}(dt - dq).$$

Incorporating the international returns to scale effect (13) and the terms of trade effect (15),

$$d\tilde{v}_1 = (\phi - 1) \frac{n_1^* n_2^*}{n^*} dt \frac{\phi}{n^*}(\alpha - 1) + \phi \frac{n_2^*(n_1^* + n_2^*)}{(n^*)^2} dt - \phi \frac{(n_2^*)^2}{(n^*)^2} dt. \qquad \text{(A4)}$$

Collecting terms in (A4), we obtain $d\tilde{v}_1 = \phi \frac{n_1^* n_2^*}{(n^*)^2}[1 - (\alpha - 1)(1 - \phi)]\, dt$, which directly implies Proposition 1.

Project financing in transition economies

Christa Hainz*

June 2002

Abstract

International banks often finance investment projects in transition countries through non-recourse project financing, i.e. investments which bear a high degree of political risk. We study the incentive effects of project financing in a double moral hazard model with incontractible effort of the firm's manager and of the bank. We find that the project should be incorporated separately if the firm's manager is benefit-oriented. However, the analysis shows that the incentives of both parties have to be traded off if the manager is cash flow oriented. Accordingly, project financing is used for projects with a high political risk.

JEL-Classification: D82, F34, G21, G34, P34

Keywords: Transition economies, international finance, project financing, double moral hazard

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1. Introduction

Countries in Eastern Europe offer very promising investment opportunities with high returns. Some of them attract huge flows of foreign direct investments. Furthermore, many investment projects of domestic firms are financed by Western banks, often through so-called project financing. This rather new form of financing has the following interesting characteristics: First, many projects are incorporated separately which implies that the bank only has very limited recourse in case of failure. Second, credits are granted by a group of banks, thus credits are syndicated. The group of creditors which finances firms in transition countries consists of different Western commercial banks as well as International Organizations. What is particularly striking for project financing in transition economies is the high political risk of the projects, which are typically in the fields of infrastructure, extraction of natural resources, or telecommunications. The success of these types of projects depends crucially on political decisions, for instance on the policy concerning energy or on regulations.

In this paper we study the incentive effects of project financing. Severe informational problems prevail in transition economies which cause the moral hazard problem of the firm's manager. In international finance the bank can also influence the outcome of the project, e.g. by influencing governmental decisions through using its leverage. Therefore a model of double moral hazard is developed. Generally, a non-recourse credit grants the best incentive to the bank. Our analysis shows that the effect of liability on the firm depends on the preferences of its manager. If the manager is cash flow oriented, the incentives for the bank and for the firm have to be traded off. Accordingly, project financing is used for projects with a high degree of political risk. Alternatively, the manager could receive benefits from being successful. This effect is particularly relevant in a risky environment as can be found in transition economies. Separate incorporation improves managerial as well as bank incentives.

So far project financing has mostly been discussed in a rather informal manner. In this strand of the literature the following motivations for project financing are taken into account: tax considerations of the firm, the allocation of risks among the firms involved in the project and the off-balance-sheet effect for firms since the debts of the project-financed venture do not appear in their balance sheet (Smith and Walter, 1997, and Whitley, 1984). Moreover, in one of the few empirical studies Kleimeier and Megginson (2000) found out that project financing is more likely to be granted to borrowers in riskier countries.

There are only a few theoretical models which explicitly treat project financing. The first model is by Shah and Thakor (1987) who study the optimal capital structure and the optimal incorporation mode for new projects in the presence of a wealth tax. If information on the risk type is symmetric, the project is fully financed by debt. However, with asymmetric information a menu of contracts is

offered: those with a high interest rate and a high level of debt financing and those with a low interest rate and a low level of debt financing. Since the tax advantage of debt increases with the riskiness this constitutes a separating equilibrium, where the riskier firms opt for a higher level of debt financing. Accordingly, projects which are riskier if incorporated separately choose project financing in order to maximize the tax advantage.[1] Shah and Thakor show in their model, which is based on the tax advantage of debt financing, that highly risky projects receive project financing. However, this conclusion is questionable as the default risk of a biotech or internet start-up (which typically receive finance from venture capitalists) is surely higher than the risk of a power plant which is granted project financing. What is more striking is that the project-financed investments bear a high degree of political risk.

A somewhat different definition of project financing is used in the paper by Chemmanur and John (1996): project financing is characterized by the joint incorporation of projects in a firm where the creditors can claim only the cash flows from a specified project. In that model debt reduces the control benefits of the entrepreneur. When control benefits differ between projects, equity and debt are strategically distributed between projects, and therefore project financing is used to minimize the negative impact of debt.

Povel (1997) provides an economic motivation for syndicated lending. He argues that banks commit not to rescue by syndicating the credit. If a firm is financially distressed, the banks have to negotiate on how to share debt forgiveness. A failure of these negotiations leads to the liquidation of the firm. This inefficiency can be used as a commitment device by the banks and prevents some firms with bad projects from demanding credit.

Other related strands in the theoretical literature are the analysis of the incentive problems of banks and of double moral hazard problems. In Besanko and Kanatas (1993) a double moral hazard problem arises because the firm's effort and the bank's effort to monitor the effort of the firm are unobservable. They show that due to bank moral hazard firms are financed by a mix of bank credit and external capital. Contrarily to Besanko and Kanatas who focus on the mix of external finance we concentrate on explaining the special features of a bank credit.

Nöldeke and Schmidt (1998) study a hold-up problem when two parties sequentially undertake relationship-specific investments. They show that a contingent ownership structure induces first best investment levels. A comparable result is obtained by Schmidt (1999) for a double moral hazard problem in a venture capital arrangement. The entrepreneur as well as the venture capitalist have to exert effort. Neither pure equity finance nor pure debt financing solve both problems simultaneously. Instead, a convertible security with an appropriately set price gives both

[1] A further motivation for separate incorporation is given: the firm can choose between (1) costly screening and full debt financing and (2) playing a revelation game and only partial debt financing. Then the firm trades off the costs of acquriring information and the loss in tax advantage due to only partial debt financing.

parties an incentive to exert first best effort. In transition economies, however, contingent ownership structures can hardly be used to solve the problems associated with international finance. There it is extremely difficult and often impossible for foreigners to acquire ownership stakes or even more majority ownership.

In the literature different types of bank moral hazard are studied as the bank is attributed different tasks. Rajan and Winton (1995) study the bank's incentive to gather unverifiable information on the future prospects of the firm after credit is granted. If the bank demands a pre-specified additional collateral, the priority of its claim increases. But collateralization also signals to other creditors that the debtor is in difficulty. This increases the probability of a liquidation of the firm. It is shown that the bank's ability to demand additional collateral increases the monitoring incentive.

Manove et al. (1998) get the contrary result. They analyze the moral hazard problem of the bank when their (ex ante) screening effort is not contractible. The perfectly competitive banks grant credit to firms which have different probabilities of success. The entrepreneurs only know their probability of success whereas the bank can find out the type of the project by screening. If screening costs are low enough, there exists a pooling equilibrium where the banks screen all entrepreneurs. For higher screening costs, however, a separating equilibrium obtains where the better entrepreneurs signal their type by accepting a fully collateralized contract and the others choose the contract with the minimal collateral requirement. This equilibrium is socially not optimal since the better firms are not screened and therefore bad projects get financed.[2] The paper focuses on the normative implications of bank moral hazard and suggests to relax creditor protection e.g. through collateral limitations or bankruptcy exemptions.

In contrast to private persons firms can influence their liability to a greater extent. Therefore it is an interesting field to precisely investigate this decision with its implications for the mode of incorporation of different projects and thus for the organizational structure. Both incentive effects – for the bank as well as for the firm – have to be considered. For the analysis we use a double moral hazard problem. A new task for the banks is introduced: foreign banks can exert pressure on the government if it intends to take political decisions which jeopardize the success of the project. The firm's manager influences e.g. the technical realization of the project by exerting effort.

Our study provides some interesting results. With a non-recourse credit the bank has the best incentives. However, limited liability of the debtor does not solve the firm's moral hazard problem caused by the credit financed investment if the manager's behavior is to maximize the expected cash flow. Thus, the opposing incentive effects for the bank and for the firm of the decision on liability have to be

[2] The authors also consider a monopolistic banking model. There the bank has the first best incentive to screen. Schnitzer (1999a) obtains the same result in a model without collateralization.

traded off. If both moral hazard problems are less severe, first best effort levels can be induced by providing the bank with limited recourse. Otherwise a non-recourse credit is granted to solve the incentive problem of the bank if the political risk of the project is high. In contrast to international banks domestic banks generally grant fully collateralized corporate credits because they are less efficient than the firm's manager in increasing the probability of success.

We emphasize that the interaction between incentives depends on the preferences of the firm's manager. Therefore a firm is considered whose manager is not cash flow oriented but receives (private) benefits if the project is successful. In this case separate incorporation increases managerial incentives, too. This effect is due to the better quality of the signal on the manager's success, and should be particularly important for transition economies with their poor institutional and informational environment.

This paper proceeds as follows. In Section 2 the characteristics of project financing in Eastern Europe are described. In Section 3 we model a double moral hazard problem. The incentives of different organizational structures, which determine liability, are analyzed for banks as well as firms. A conclusion is presented in Section 4.

2. Project financing in Eastern Europe

Since the beginning of the transition process countries in Eastern Europe attract growing amounts of foreign capital. The annual total net capital flows have increased more than tenfold – if average flows in 1986 - 1990 are compared with projected data for 1997. In 1997 the inflow is projected to be about 60 billion US dollars. An important source of capital is syndicated lending by commercial banks, which has been growing continuously since 1992. In 1997 (January - August) syndicated lending runs up to approximately 22 billion US dollars.[3] Among this lending is project financing (Lankes and Stern, 1998).

Project financing as a new type of credit emerged in the early 1970s. It has certain particularities which distinguish it from corporate loans (Buljevich and Park, 1999). These characteristics can also be found in project financing in Eastern Europe and are described in this section. The debtors usually have limited liability. The degree of liability can vary: In its purest form a credit is strictly non-recourse. In this case the project is incorporated separately and the banks rely solely on the cash flow of the project. A credit can also be of limited recourse. Then there are risk

[3] Numbers are hard to obtain. Waxman-Lenz (1995, p. 228), a Financial Economist with the U.S. Export-Import Bank, writes: "Those who work in the field are not able to quantify the total increase in value or volume over the past decade. (...) In 1984, sixty-two IFC projects were approved, bringing total financing for that year to $700 million: by 1993, the number of projects approved has tripled, requiring financing of almost $4 billion, of which roughly 20 percent is being used to finance projects in the East-Central European and former Soviet Union region."

sharing arrangements between the bank and firms, that establish the project, where the firms take over different extents of risk. This can be realized by incorporating the project together with other (not perfectly positively correlated) projects or by pledging a collateral which may also take the form of a guarantee. Typically the financed projects are difficult to liquidate in case of failure. This is due to their nature (which is described below).

Existing firms face a high risk of becoming financially distressed or insolvent. They have to bear much more risk than firms in Western countries due to the enormous uncertainty, the heritage of the centrally planned economy with its outdated equipment and machinery as well as the debts, and the risk associated with restructuring.

Project financing is particularly important with projects for infrastructure, extraction of natural resources, telecommunications, and similar fields. In these sectors, which were often owned by the state, decisions of the government are of great importance. Thus these kinds of projects bear a high degree of political risk. In countries in Eastern Europe the political landscape changes very rapidly which leads to instability in many respects. The political risk includes e.g. renationalization and expropriation, changes in taxation and laws, changes in the exchange rate regime (inconvertibility risk), changes concerning pollution control or the estimation of a particular source of energy, or the regulation of telecommunication services.[4]

Table 2.1: Survey results – Obstacles for doing business*

	CIS	World	Developing countries	Developed market economies
High taxes/ tax regulations	80	59	62	50
Policy instability	52	32	36	12
General uncertainty on costs of regulations	44	29	30	17
Crime and theft	48	38	43	11
Corruption	84	47	54	18

* percentage of respondents reporting a 'strong obstacle'

Source (table): Lankes and Stern (1998), p. 22

A survey of the World Bank, where firms worldwide reported the investment deterrents in different regions, confirms that political risk is high in CIS countries. This survey shows that besides corruption policy instability and general uncertainty

[4] Schnitzer (2000) distinguishes between outright expropriation through e.g. nationalization and "creeping expropriation" through e.g. increases in taxes or import/ export duties. She analyzes how the choice of the entry mode of foreign firms, which are licensing and credit financing or foreign direct investment, is influences by the different forms of expropriation.

on costs of regulations are the strongest obstacles which prevent firms from investing in CIS countries. The tax system also reflects the high political risk since tax rates are not only high but taxation is set arbitrarily.[5] Other risk elements, namely technical and to a lesser extent market risk, are comparable with projects in other regions of the world.[6]

Banks grant syndicated credits. Among the group of banks which grant the credits are International Organizations like the EBRD (European Bank for Reconstruction and Development), the IFC (International Financial Corporation, a member of the World Bank Group) or the German KfW (Kreditanstalt für Wiederaufbau).[7] They are called "moral umbrella" as they have a better leverage vis-à-vis the government than a firm.[8] Their bargaining power is due to their special position since they decide on financial aid and are financing many other projects. As a number of banks is financing the investment project, the government owes them substantial amounts of money. Thus, the group of banks together can exert pressure on the government, for instance because they have to agree on a rescheduling of sovereign debt. Also banks from countries of major trading partners possess bargaining power. This "(...) may give banks sufficient implied leverage to constrain adverse political moves." (Smith and Walter, 1997, p. 78)

For political reasons the acquisition of ownership stakes through foreigners is severely restricted or even impossible. This proviso particularly applies for projects described above since they are in strategically important sectors.

Having studied the empirical evidence of project financing in transition economies we provide a theoretical explanation in the next section.

3. A model of double moral hazard

3.1. Model

The firm has to finance a project which yields a payoff of X in case of success and of 0 in case of failure. The project costs I. We assume that the investment project is credit financed. The probability of success p is determined by the effort e of the firm as well as by the effort b of the bank. On the one hand the firm's manager determines for instance the technical realization of the project. On the other hand the bank can increase the probability of success for example by assisting them to get

[5] "As an example, the indefinite nature of tax laws in the oil and gas sector in Russia has caused foreign investors great concern. The Russian government has modified the rules governing the rate of excise tax on consumers of natural resources four times since ratification of law on underground resources in February 1994." Waxman-Lenz (1995, p. 223 FN1)

[6] For a detailed overview of the different risk we refer to Buljevich and Park (1999).

[7] There are other organizations such as the Asian Development Bank, the Inter-American Development Bank or the African Development Bank which play an important role in other regions.

[8] I would like to thank Ursula Hauser for this hint. Buljevich and Park (1999) call it "political umbrella".

access to certain markets or experts like an auditor or by influencing governmental decisions. The banks task could also be to monitor or to screen the firm.[9]

The firm which decides on the realization and financing of a new project has wealth of W. This wealth includes the cash flows which are generated by all other projects of the firm and all assets which could be pledged as collateral. We assume that $W+X > R$, the repayment in case of success, to rule out that the firm is capital constrained. Banks as well as firms are risk-neutral. Furthermore, it is assumed that there is perfect competition in the banking sector.

The timing is as follows: The firm decides whether to incorporate the project within the existing firm or separately. This decision determines the amount of inside collateral. If the project is incorporated separately, it gets a non-recourse credit unless some collateral is pledge. In the latter case the credit is of limited recourse. If the project is incorporated within the firm, a traditional fully collateralized credit is granted. At time 0 the bank offers the credit contract, which specifies the repayment R in case of success and of V in case of failure, where V is the value of inside and outside collateral. Then the contract is signed by the bank and the firms. To keep the analysis as simple as possible we assume that assets are not firm-specific.[10] Afterwards the firm as well as the bank exert effort. If the firm's manager exerts effort e, the probability of success increases from $\underline{p}$ to $\overline{p}$. The bank decides whether to exert effort b and increase the probability of success from p_L to p_H, or not. Accordingly the probabilities of success can be $\overline{p_H}$, $\underline{p_H}$, $\overline{p_L}$, or $\underline{p_L}$. For simplicity we assume that the impact on the probability of success is independent of the action of the respective other agent. At time 1 the payoff of investment (X or 0) is realized and the firm either repays R or the bank gets a return of V. The following table illustrates the timing of events:

The analysis is restricted to welfare increasing projects characterized by the assumption

$$p\left(e,b\right)X - I - e - b \geq 0 \tag{3.1}$$

To establish the incentive problem of the firm we further assume that

$$\left(\overline{p} - \underline{p}\right)\left(X - \frac{I}{\overline{p}}\right) < e \tag{3.2}$$

and

$$s\left(\overline{p} - \underline{p}\right)B < e \tag{3.3}$$

where B is the benefit of the manager in case of success and s the probability that the existing corporation is not financially distressed.

[9] Then in our model it has to be assumed that the bank's acticity only influences the probability of success but not the effort of the firm's manager.

[10] The impact of asset specificity on the credit market is studied in more detail in Hainz (1999).

Figure 3.1: Time structure

In a first best world with symmetric information the effort levels of the firm as well as that of the bank can be observed, verified by the court and can therefore be fixed by a contract. In practice these effort levels are not contractible. Thus the credit contract has to be designed in a way that both parties, the firm and the bank, have an incentive to exert effort.

3.2. Moral hazard problem of the bank

By exerting effort b the bank can increase the probability of success, e.g. in the bargaining process with the government. It decides to do so if

$$\begin{aligned} p_H R + (1 - p_H) V - b &\geq p_L R + (1 - p_L) V \\ (p_H - p_L)(R - V) &\geq b \end{aligned} \qquad \text{(IC-B)}$$

where R is the repayment in case of success and V in case of failure. The incentive compatibility constraint of the bank is more easily fulfilled if the difference in the bank's state-contingent payoffs is high. Thus increasing R and simultaneously decreasing V improves the bank's incentive to exert costly effort. We restrict our analysis to parameters which fulfill the following condition $(p_H - p_L) I - p_L b > 0$ because otherwise the bank does not participate.

Proposition 1: *The moral hazard problem of the bank can always be solved by granting a non-recourse credit, i.e.* $V = 0$.

Proof: Depending on the parameter constellation two cases can be distinguished:

- *Case A*
  $(p_H - p_L)(R - V) - b \geq 0$ for $V > 0$
- *Case B*
  $(p_H - p_L) R - b \geq 0$ for $V = 0$

In Case A a non-recourse credit solves the incentive problem. But the credit has not necessarily to be non-recourse, also limited recourse ($V > 0$) solves the moral hazard problem. In Case B the bank needs higher powered incentives since the impact of effort on the probability of success $(p_H - p_L)$ is not as easily obtained – either because effort b is more expensive or not as powerful. Thus, the bank's incentive is best if the project is incorporated separately and therefore the firm is not liable at all in case of failure. Q.E.D.

3.3. Moral hazard problem of the firm

3.3.1. Cash flow oriented manager

The firm's manager also has to decide whether to exert effort e or not. Therefore the management considers the expected payoff which is influenced by the probability of success, the repayment R in case of success and V in case of failure. Effort is exerted if

$$\begin{aligned} \overline{p}\,(W+X-R)+(1-\overline{p})\,(W-V)-e &\geq \underline{p}\,(W+X-R)+\left(1-\underline{p}\right)(W-V) \\ \left(\overline{p}-\underline{p}\right)(X-R+V) &\geq e \qquad \text{(IC-F)} \end{aligned}$$

By inspecting the incentive constraint of the firm more closely we get the following implication for the organizational structure of the firm and hence for its liability.

Proposition 2: *If the firm's manager is cash flow oriented, the moral hazard problem of the firm can always be solved by making the debtor fully liable, i.e.* $R = V$.

Proof: As for the bank the design of the optimal contract depends on the parameter constellation, the following cases have to be distinguished:

- *Case 1*
  $\left(\overline{p}-\underline{p}\right)(X-R+V) \geq e$ for $R > V$
- *Case 2*
  $\left(\overline{p}-\underline{p}\right)X \geq e$ for $R = V$

In Case 1 the first best solution can be reached with limited liability of the debtor. The reason is that either a high difference in state-contingent payoffs (which is $X-0$) or a strong influence of e on the probability of success $\left(\overline{p}-\underline{p}\right)$ already provide good incentives. But full liability also solves the problem. In Case 2 full liability is necessary to induce the firm's manager to exert effort e. By increasing the debtor's liability the payoff in case of failure is reduced and thus the difference in state-contingent payoffs increases. Q.E.D.

The effect of collateralization that increases the debtor's liability on the firm's incentive has already been studied in the seminal paper of Stiglitz and Weiss (1981). They use a model with risk-neutral debtors and argue that the debtors has an incentive to choose riskier projects with a higher probability of bankruptcy if the interest rate increases. The reason is that the payoff in case of success decreases and the debtor can increase the expected payoff by opting for a riskier project with a higher probability of failure. Increasing collateral, however, has a positive effect on the investment decision since less risky projects are selected. A similar argument is made by Holmström (1996). In his paper two investments are compared where only one investment is socially efficient, but the other investment yields private benefits

for the entrepreneur. Through collateralization the incentive problem of debt finance can be mitigated provided that the entrepreneur is not capital constrained. As in our model there is only the choice between two projects. Consequently collateral has to reduce the payoff in case of failure such that the difference in state-contingent payoffs is high enough to give the appropriate incentive to the entrepreneur.

However, the incentive of the management might not only be determined by the cash flow it can control. Another possible incentive effect is studied in the next section.

3.3.2. Benefit oriented manager

The reputation, which a manager can acquire, could be his motivation for exerting effort. In transition economies there is currently a tremendous lack of managerial know-how. This allows a manager to earn substantial benefits in the future if he can show that he has been successful in the past. These benefits are not only higher expected incomes but can also be non-monetary benefits such as social status. But it is difficult to get reliable information on the manager's former achievements. Up to now the managers mostly operate in huge corporations which undertake a variety of projects. In case of joint incorporation the manager's individual performance is not truly observed but overshadowed by the performance of the firm as a whole.

To model this situation we assume that there exists a corporation which is successful with probability s. With probability $(1 - s)$ it fails in the sense that it becomes financially distressed or even bankrupt. As the risk which a firm faces is much higher in transition economies s is considerably smaller than in Western economies. It is assumed that the payoffs of the project and the firm are statistically independent. Observers get a positive signal if the firm as well as the project are successful. However, if either the firm or the project fails, the joint payoff is zero. For failure of both, the firm and the project, the joint payoff is negative. In these last two cases observers get a negative signal as we assume that they cannot distinguish whether the payoff is zero or negative.[11] This assumption seems reasonable because in both cases observers get the impression that the firm is financially distressed but the extent of the problem is unobservable.

At the time when the manager of the new project decides to exert effort he does not know the type of the firm. He expects to get a benefit of B if there is a positive signal. For separate incorporation the signal is positive if the (new) project is successful, i.e. if the payoff is X.

The structure of the game is summarized in the following figure. For separate incorporation the game starts either at the "+" or "-"node.

[11] It is implicitely assumed that the firm's and the project's returns are of about the same magnitude(?). If the firm is huge compared to the project, the firm's manager would never exert effort in case of joint incorporation.

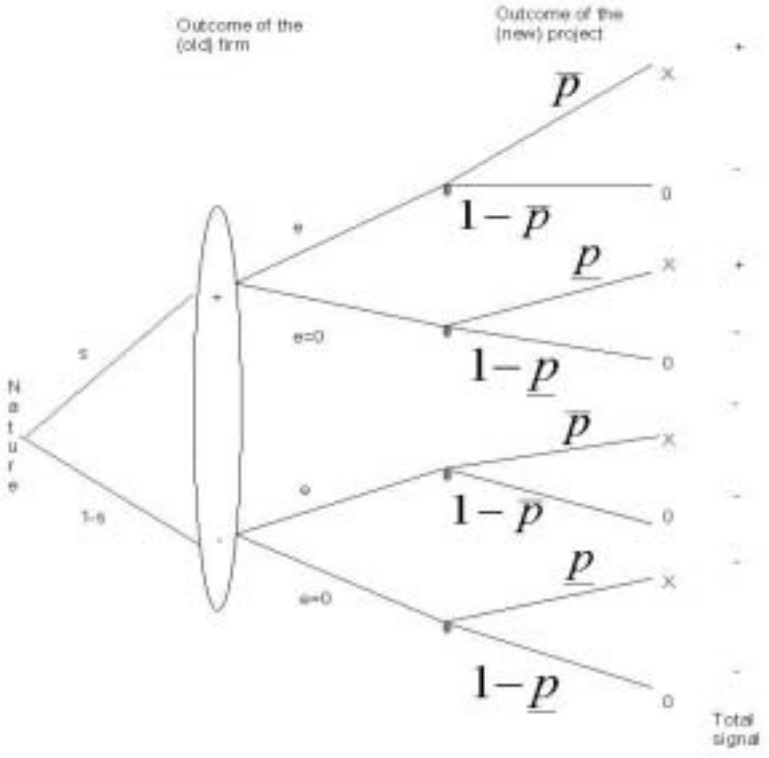

Figure 3.2: Game structure

Proposition 3: *If the firm's manager is benefit oriented, his incentive to exert costly effort e increases through separate incorporation of the new project, i.e.* $V = 0$, *provided* $\left(\overline{p} - \underline{p}\right) B \geq e$.

Proof: The manager's incentive to invest in effort if the projects are jointly incorporated is:

$$\begin{aligned} s\overline{p}B - e &\geq s\underline{p}B \\ s\left(\overline{p} - \underline{p}\right) B &\geq e \end{aligned} \qquad \text{(IC-M)}$$

A higher s increases the expected benefit which gives the manager a better incentive to exert effort. Separate incorporation means that $s = 1$. If $\left(\overline{p} - \underline{p}\right) B < e$, even with separate incorporation the benefits are not high enough to induce the manager to exert effort. Q.E.D.

This analysis shows that separate incorporation increases the manager's incentive by improving the quality of the signal. Through joint incorporation the quality of the signal suffers. The lower the probability of success of the existing corporation the worse the quality of the signal, and therefore the lower is the incentive for the manager. In transition economies many of the existing corporations are in

financial troubles. Accordingly, the signal is much noisier when projects are jointly incorporated. Therefore separate incorporation improves managerial incentives.

In Western economies the incorporation mode should be of minor importance for the manager's incentive because the risk of failure of an existing corporation is low. Thus the mode of incorporation has little influence on the quality of the signal. Furthermore, the operation of a firm is much more transparent to outside observers because the reporting requirements are strong and firms have to deliver e.g. segment reporting on single lines of business etc.

3.4. Double moral hazard

The empirical facts suggest that both parties, banks and firms, have to contribute effort for the success of an investment project.

3.4.1. Cash flow oriented manager

From Propositions 1 and 2 we know that the debtor's liability influences both the bank's as well as the firm's incentive to exert costly effort: Limited liability increases the bank's incentive. However, limited liability has a negative impact on the firm's incentive. In this section we inspect in more detail how both moral hazard problems can be addressed. The solution depends on the parameter constellations. In Case 1 and Case A there exist parameter constellation where both problems can be solved.

Proposition 4: *If the firm's manager is cash flow oriented and both incentive problems are less severe, i.e. for* $(\overline{p_H} - \overline{p_L})\, X \geq \frac{\overline{p_H}-\overline{p_L}}{\overline{p_H}-\underline{p_H}} e + b$ *in Case 1 and Case A, limited recourse for the bank, i.e.* $R > V > 0$*, solves both problems.*

Proof: See Appendix.

If the incentive problems are not severe, the credit contract specifies $\left\{ R = X - \frac{e}{(\overline{p_H}-\underline{p_H})} + V; V = I - \overline{p_L} X + \frac{\overline{p_L} e}{(\overline{p_H}-\underline{p_H})} \right\}$. Thus $X - \frac{e}{(\overline{p_H}-\underline{p_H})}$ is the necessary difference between the state-contingent payoffs which induce the manager of the firm to exert effort. Whether the bank is willing to participate depends on the size of V which determines the payoff for the bank. However, it also depends on the size of V whether the bank's incentive is strong enough to exert b. Consequently, there also are parameter constellations as in Case 1 and Case A that contain cases where only one incentive problem can be solved. For all other parameters it is impossible to induce both parties to exert effort.

Proposition 5: *If the firm's manager is cash flow oriented and the project bears a high degree of political risk, i.e.* $\left(\underline{p_H} - \underline{p_L}\right) X - b > \left(\overline{p_L} - \underline{p_L}\right) X - e$*, it is optimal to solve the incentive problem of the bank by separately incorporating the new project and granting a non-recourse credit, i.e.* $V = 0$*.*

Proof: See Appendix.

For most parameter constellations it is not possible to design a contract which gives both parties appropriate incentives. Therefore the optimal contract solves the incentive problem of the party whose effort has a relatively higher impact on the probability of success as described by $\left(\underline{p_H} - \underline{p_L}\right) X - b > \left(\overline{p_L} - \underline{p_L}\right) X - e$. For example, if e and b have the same size and b increases the probability of success more than e, then it is optimal to give the bank an incentive to exert effort. To induce the bank to exert effort the difference in state-contingent payoffs has to be high which is reached by separately incorporating the new investment project. Then the bank gets no profit in case of failure as the payoff of investment is 0 and there is no recourse on the assets of the corporation which "sponsors" the project.

In international finance bank effort has a high impact on the probability of success relative to managerial effort when the political risk of the project is high. In this case Western banks together with International Organizations can use their leverage vis-à-vis the government to prevent the government from taking decisions which jeopardize the success of the financed investment project. Therefore projects with a high degree of political risk receive project financing.

In domestically financed projects the bank might have to monitor an existing credit arrangement or screen a project before it is undertaken. This incurs some cost for the bank, but increases the probability of success. However, banks in transition economies are not yet very experienced in these activities, therefore exerting effort is either expensive or not very effective in terms of increasing the probability of success. Thus, on domestic credit markets we mostly observe (fully collateralized) corporate credits (Bratkowski et al., 2000; Cornelli et al., 1998). This is predicted by our model if the impact of managerial effort on the probability of success is high relative to that of the bank.

3.4.2. Benefit oriented manager

As was argued above the manager's behavior is not necessarily influenced by the available cash flow but may depend on his success as e.g. his job market opportunities improve. Then the optimal organizational structure is as follows:

Proposition 6: *If the manager is benefit oriented, incorporating the project separately and granting a non-recourse credit, i.e. $V = 0$, solves the incentive problem of the firm as well that of the bank.*

Proof: This result is straightforward from Propositions 1 and 5 as both parties obtain the best incentives through separate incorporation.

If managers orientate themselves on their future benefits, there is no conflict in solving both moral hazard problems. By limiting liability the bank gets the best incentive as the difference in payoffs is high, and the manager's incentive improves through a better signal. This result is in contrast to our previous finding where the incentives of the parties involved have to be traded off.

4. Discussion and conclusions

Having studied the empirical evidence in transition economies we found that banks grant project financing to separately incorporated projects that give the banks limited or no recourse. This finding is puzzling if one takes into account that the institutional environment is as problematic as in most countries in Eastern Europe and thus the bank's risk exposure is high compared to Western economies. Our model develops the following explanations: Limited liability of the debtor improves the incentive for the bank to exert effort. Also managerial incentives improve provided that the manager receives benefits from being successful. Otherwise, if the manager is cash flow oriented, managerial incentives suffer.

In a traditional moral hazard model of the firm with a cash flow oriented management limited recourse is chosen to solve the incentive problem of both parties if their incentive problems are less severe. A non-recourse credit is granted if the political risk of a project is high. Then it is optimal to solve the moral hazard problem of the bank as international banks have an advantage compared to firms: bargaining power vis-à-vis the government. By exerting pressure on the government banks can influence certain governmental decisions which otherwise would lead to project failure. However, the effort necessary to influence the government positively is incontractible. Therefore banks have to be given an incentive to exert this effort. With a traditional, fully collateralized corporate credit banks face no risk and thus have no incentive to exert effort. But financing a separately incorporated project which has a very low (or no) payoff in case of failure gives the banks the best incentive to put pressure on the government.[12]

The leverage banks have on governmental decisions depends on their bargaining power. They become more powerful if not only one bank but a group of banks grants the credit. A further increase in bargaining power is reached through the involvement of International Organizations. Furthermore, syndication allows to raise large amounts of capital for a single project (Waxman-Lenz, 1995).

In this paper we have also shown that it is essential to carefully study the preferences of the firm's management. Managers may not only be cash flow oriented but they could also receive benefits from undertaking a successful project. Therefore the managers want to signal their success. Due to the high risk of failure of existing corporations signals on jointly incorporated projects are rather noisy in transition economies. In this case managers prefer separate incorporation. In reality their utility functions will consist of both components. Probably owner-managers are more oriented toward the available cash flow whereas employed managers put more emphasis on their reputation.

[12] Fahrholz (1998, p. 257), CEO of Dresdner Bank, one of the leading German banks active in project financing, therefore describes project financing as follows: "(...) the creditors (non-recourse) rely solely on the cash flow and the assets of the project alone. Thus they in fact partially take over entrepreneurial risk." (own translation)

Our model refers to problems of international finance. Could the results be transferred to domestic bank credits? We argued that the effect which the effort of domestic banks has on the probability of success is low compared to the effort of the firm's manager because banks have little experience and expertise in e.g. screening and monitoring investment projects. Furthermore, banks in transition countries – in contrast to Western banks – are often undercapitalized and they would not be able to bear the risk which is associated with project-financing huge investments (Bonin and Wachtel, 1999).

Project financing allows the contracting parties to constrain politically adverse moves. Another way to solve this problem would be a sovereign guarantee from the government. But this solution comes not without costs. Since governments change quickly in transition countries the political successors may have totally different preferences concerning investments. This can alter the cost-benefit calculation of the government when it compares different investment opportunities and it might indeed be optimal for the government to stop a project despite the financial penalty caused by the sovereign guarantee. Furthermore, these countries can face problems in repaying their sovereign debt. Then the guarantee would be no longer of value for the bank.

5. Appendix

5.1. Proof of Proposition 4

A parameter constellation as in Case A and Case 1

$$\begin{aligned} \textit{Case A}: \quad & (p_H - p_L)(R - V) - b \geq 0 \qquad \text{for } V > 0 \qquad (5.1) \\ \textit{Case 1}: \quad & \left(\overline{p} - \underline{p}\right)(X - R + V) - e \geq 0 \qquad \text{for } R > V \qquad (5.2) \end{aligned}$$

contains the cases in which both incentive problems can be solved simultaneously since limited liability solves the firm's problem and the positive payoff for the bank in case of failure does not destroy the bank's incentive.

The optimal credit contract specifies R and V according to the solution of the following optimization

$$\max_{R,V,e,b} \overline{p_H}(W + X - R) + (1 - \overline{p_H})(W - V) - e$$

$$\begin{aligned} \text{s.t.} \quad \left(\overline{p_H} - \underline{p_H}\right)(X - R + V) - e &\geq 0 \qquad \text{(IC-F)} \\ (\overline{p_H} - \overline{p_L})(R - V) - b &\geq 0 \qquad \text{(IC-B)} \\ \overline{p_H} R + (1 - \overline{p_H}) V - I - b &\geq 0 \qquad \text{(PC-B)} \end{aligned}$$

The resulting terms of the credit contract are:

$V = I - \overline{p_L} X + \frac{\overline{p_L} e}{\left(\overline{p_H} - \underline{p_H}\right)}$

$R = I + (1 - \overline{p_L}) X - \frac{(1 - \overline{p_L}) e}{\left(\overline{p_H} - \underline{p_H}\right)} = X - \frac{e}{\left(\overline{p_H} - \underline{p_H}\right)} + V$

Thus, for R, V optimally chosen (5.1) always holds. Thus (5.2) provides the condition which has to hold to solve both problems simultaneously which is the case if $(\overline{p_H} - \overline{p_L}) X \geq \frac{\overline{p_H} - \overline{p_L}}{\overline{p_H} - \underline{p_H}} e + b$. Q.E.D.

5.2. Proof of Proposition 5

In the following cases it is always impossible to solve both incentive problems.

- *Case 1 and Case B:*
  Due to the incentive problem of the bank it is necessary that $V = 0$. This implies for Case 1 that $\left(\overline{p} - \underline{p}\right)(X - R) - e > 0$ where $R \geq \frac{I}{\underline{p}}$. This is, however, ruled out by assumption as in this case there would be no incentive problem of the firm.

- *Case 2 and Case A or Case B:*
  Case 2 requires $R = V$. But this cannot solve the bank's incentive problem as $(p_H - p_L)\,0 - b > 0$ is not fulfilled.

The firm maximizes its profit by solving the moral hazard problem which has the higher return.

(1) Return of managerial effort
To solve this problem the contract has to specify $R = V$. Thus the effect of e is:

$$\begin{aligned}
&[\overline{p_L}\,(W+X-R) + (1-\overline{p_L})\,(W-V) - e] - \left[\underline{p_L}\,(W+X-R) + \left(1-\underline{p_L}\right)(W-V)\right] \\
&= \left(\overline{p_L} - \underline{p_L}\right)(X - R + V) - e \\
&= \left(\overline{p_L} - \underline{p_L}\right) X - e
\end{aligned} \tag{5.3}$$

(2) Return of bank effort
To solve this problem the contract has to specify $V = 0$ and R where R is such that $pR - I - b = 0$. Thus the effect of b is:

$$\begin{aligned}
&\left[\underline{p_H}\left(W + X - \frac{I+b}{\underline{p_H}}\right) + \left(1 - \underline{p_H}\right) W\right] - \left[\underline{p_L}\left(W + X - \frac{I}{\underline{p_L}}\right) + \left(1 - \underline{p_L}\right) W\right] \\
&= \left(\underline{p_H} - \underline{p_L}\right) X - b
\end{aligned} \tag{5.4}$$

Depending on which expression is higher, the firm's manager decides which incentive problem to solve:

$$\left(\overline{p_L} - \underline{p_L}\right) X - e \lesseqgtr \left(\underline{p_H} - \underline{p_L}\right) X - b \tag{5.5}$$

If $\left(\overline{p_L} - \underline{p_L}\right) X - e > \left(\underline{p_H} - \underline{p_L}\right) X - b$, the firm's incentive problem should by solved by a credit contract specifying $R = V$. For parameters like in Case 1 the contract might also specify $R > V$.

If $\left(\overline{p_L} - \underline{p_L}\right) X - e < \left(\underline{p_H} - \underline{p_L}\right) X - b$, the bank should be granted an incentive to exert effort by a credit contract specifying $V = 0$. In Case A the bank also gets the first best incentive when it has limited recourse, $V > 0$. Q.E.D.

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Forschungsverbund Ost- und Südosteuropa (forost): Orientierung auf dem Weg in die Osterweiterung

Mit der Osterweiterung kommen auf die Beitrittsländer, auf Europa, Deutschland und Bayern vielfältige Herausforderungen zu. Die EU-Regularien geben dafür einen Rahmen vor, aber das Projekt der Integration Europas leisten Menschen. Viel unterschiedliches Know-How ist dafür notwendig: ökonomischen, juristisches, kulturelles, politologisches und soziologisches Wissen ist ebenso notwendig, wie Regional- und Sprachkenntnisse.

Auf beiden Seiten bestehen Ängste und Vorurteile, die nur durch gegenseitiges Vertrauen und Verständigungsbereitschaft abgebaut werden können.

- forost bietet Wissen und Orientierung auf dem Weg in die Integration.
- forost knüpft und festigt vielfältige Kontakte zu Institutionen und Wissenschaftlern im Inland und in den osteuropäischen Partnerländern.
- forost regt interdisziplinäre Diskussionen und neue Kooperationsformen an
- forost fördert den Austausch und die Kommunikation zwischen Wissenschaftlern und Praktiker
- forost sucht Wege Forschungsergebnisse in konkreter Zusammenarbeit mit Unternehmen umzusetzen.

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Gemeinsame Treffen und Kolloquien, Austausch von Daten, methodische Erfahrungen und die Organisation interdisziplinärer und internationaler Veranstaltungen garantieren die fach- und projektübergreifende Kommunikation und Kooperation.

In drei thematischen Schwerpunkten werden sowohl Zahlen und Fakten, wie auch Fragen der Wahrnehmung und Verhaltensregeln analysiert und kombiniert, um auch komplexen Problemstellungen gerecht werden zu können.

1. **Transformation**: Die erfolgreiche Einführung von Demokratie und Marktwirtschaft in den Ländern Ost- und Südosteuropas erfordert in vielen konkreten Details Veränderungen: in Banken und Gerichten, Schulen und Ausbildungsplätzen muss das bisherige (sozialistische) Regelwerk in gesamteuropäische Normen und Werte umgewandelt werden.
2. **Kulturen**: Auch in den Gefühlen und Köpfen der Menschen vollzieht sich der Identitätswechsel: das Individuum in der Zivilgesellschaft, Konfliktpotenziale und Vorurteile – Veränderungen und Probleme der Anpassung müssen erkannt und abgebaut werden, in Ost- wie in Westeuropa, wenn ein integriertes Europa entstehen soll.
3. **Nationale Identität**: Nur eine differenzierte Kenntnis der rechtlichen Lage und sozialen Situation von Minderheiten und Mehrheiten, von Sprachgewohnheiten und geschichtlichem Hintergrund ermöglicht konstruktive Beziehungen zwischen den ehemals getrennten Teilen Europas. Handbücher, CD-ROMs und Datenbanken stellen das hierfür notwendige Wissen bereits.

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