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Exchange Rate Dynamics and Structural Adjustment in Eastern Europe

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Zusammenfassung: Im Kontext der EU-Osterweiterung ergeben sich eine Reihe von Wechselkursfragen. Zunächst der Balassa-Samuelson-Effekt, der auf eine Erhöhung des relativen Preises nichthandelsfähiger Güter im Zuge eines ökonomischen Aufholprozesses hinausläuft; dies bedeutet spiegelbildlich auch, dass der relative Preis für importierte Kapitalgüter sinken wird, was die ökonomische Modernisierung begünstigt. Die Entwicklung des nominalen und realen Wechselkurses wird für die Beitrittsländer aus verschiedenen Gründen wichtig sein, wobei es um Effekte beim Realeinkommen und der Auslandsschuld (sie wirkt wiederum zurück auf den Wechselkurs), Anreize bei Direktinvestitionen, und Impulse für Produktivitätswachstum und Produktdifferenzierung geht. Ausländische Unternehmen aus USA, EU-15 und Japan praktizieren unterschiedliche Ausmaße von Pricing-to-market behavior, was eine unterschiedliche Volatilität der realen Wechselkurse impliziert – je nach Ausmaß der Preisanpassung an die nominale Wechselkursentwicklung; von daher kann die Zusammensetzung der Direktinvestitionen auf die reale Kursvolatilität in Osteuropa einwirken. Aus einer Schumpeter-Perspektive der EU-Osterweiterung ist mit ihr ein Anreiz für die Verlagerung bestimmter industrieller Produktionsbereich von EU-15 in die Beitrittsländer verbunden. Allerdings ergeben sich auf Basis der Unterscheidung der Klodtschen Einteilung in mobile technologieintensive Industrien und immobile Schumpeter-Sektoren differenzierte Verlagerungsoptionen über die Gesamtheit der Sektoren in EU-25 hinweg. Verschiedene mögliche Verbindungen zwischen Wechselkursentwicklung und Innovationsdynamik werden betrachtet, wobei Overshooting-Phänomene ein Problem im Kontext erhöhter Wechselkursflexibilität in den ersten Jahren einer EU-Mitgliedschaft bedeuten könnten. Wir betrachten auch die Rolle alternativer Wechselkursregime im Kontext von Aufholprozessen bzw. Innovation. Schließlich werden einige Modifizierungsmöglichkeiten des Balassa-Samuelson-Ansatzes betrachtet.

Summary: With EU eastern enlargement several exchange rate issues are associated. First, countries that are expected to catch up in terms of per capita income will experience a relative rise of the nontradables price – the well-known Balassa Samuelson effect; this corresponds to a fall of relative tradables prices which could stimulate economic modernization in the context of rising imports of capital equipment. The development of the nominal and real effective exchange rate will be important for accession countries for various reasons, including effects on real income and the real value of foreign debt (the latter has a feed back effect on the exchange rate), the incentive for foreign direct investment inflows and pressure for productivity growth plus product differentiation. Foreign firms from the US, EU-15 and Japan might pursue different degrees of pricing to market behaviour – and this implies certain corresponding real exchange rate changes - so that the composition of FDI inflows will affect real exchange rate volatility in eastern Europe. From a Schumpeterian perspective EU eastern enlargement will stimulate relocation of manufacturing industry towards accession countries, however, using the KLODT's distinction between mobile technology intensive industries and immobile Schumpeter industries one may anticipate asymmetric options for relocation across sectors in EU-25. Several links between innovativeness and exchange rate developments are discussed; overshooting problems are a potential challenge for countries embracing a higher degree of exchange rate flexibility in the early years of EU membership. Moreover, we focus on the role of alternative exchange rate regimes in the course of economic catching up and innovation dynamics, respectively. Finally, some refinements for the Balassa Samuelson approach are suggested.

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1. Introduction

Eastern European accession countries face the problem of choosing an adequate exchange rate regime; and of coping with exchange rate changes that are associated with (net) export dynamics and with switching towards full capital account liberalization in the run-up to EU eastern enlargement. Rising capital inflows – in particular FDI inflows – which may be expected for countries with higher growth than EU-15 could bring about a real appreciation of the currency which would slow down export growth. Under flexible exchange rates high capital inflows would immediately reduce the nominal exchange rate e (real appreciation via nominal appreciation) and thus reduce growth of net exports of goods, while under fixed exchange rates high inflows of capital would force the central bank to intervene and buy foreign exchange so that the money supply would increase in an inflationary way which also reduces the real exchange rate eP*/P (real appreciation via relative increase of the ratio of domestic price level P to foreign price level P*, where * is for foreign variables). Note that a rise in the money supply should bring about a relatively small real appreciation in the sense of reducing eP^T*/P^T (P^T is the price of tradables and the price index P is a composite index in which both the price of tradables and nontradables, P^N, enters) than the first case with an exclusive fall of e. This might explain the typical political preferences in favor of a fixed exchange rate in poor countries which naturally will face a structural current account deficit position.

At the same time one cannot rule out for transition countries that there could be a nominal exchange rate appreciation in the context of a restrictive monetary policy – as was the case in Poland in 2001/2002, when the Polish Central Bank was pursuing a tight monetary policy with high interest rates in order to bring down the inflation rate close to the level of the Euro zone (this exercise which mainly attracts high short term portfolio inflows might be doubtful to the extent that accession countries can be expected to have an inflation rate above EU-15 – in particular due to higher growth rates of nontradables prices).

To the extent that there is a nominal and real appreciation it will negatively affect exports of price-sensitive manufacturing industries – a field crucial for economic catching-up and technological progress. A high real appreciation could undermine sustained economic growth. The only short term advantage of a real appreciation is that the burden of foreign debt is falling. However, the situation is more complex if one also takes into account trade in intermediate products, as an appreciation of the currency will make the import of such intermediates cheaper.

EU accession countries basically face four different nominal exchange (e_{ij}) rates of particular relevance. First, this is the nominal exchange rate vis-à-vis the Euro zone (12 countries in 2003), which will enjoy increasing weight in the long run as EU membership reinforces trade with Western Europe. Secondly, the exchange rate vis-à-vis the UK which is not expected to join the Euro zone soon; thirdly, the exchange rate vis-à-vis the US $ which basically stands for competitive global markets outside Europe; and finally the rubel exchange rate which is crucial for trade with the largest East European economy. Bilateral exchange rates of country i with respect to j are the basis for calculating the real exchange rate $RER_{ij}= e_{ij} P_j/P_i$ (where e is measured in price notation, that is for the European case as national currency units per $). An effective real exchange rate index would take into account bilateral real exchange rate developments as well as the respective country weights in overall trade. An alternative definition of the real exchange rate used in the literature is the relative price of tradables and nontrables. According to the Balassa-Samuelson-effect

the relative price of nontrables (eg housing or local services) are cheap in relatively poor countries. By contrast, traded goods are characterized by nearly identical price levels across countries; there is however a certain degree of price differentiation (relatively low prices in poor countries) in markets with monopolistic competition – these markets can indeed be expected to become more important as per capita income is increasing. Since the EU accession countries are expected to catch up with EU-15 the relative price of nontradables will increase in former transition countries and the price gap vis-à-vis EU-15 should narrow over time (EUROPEAN COMMISSION, 2003, pp. 231-243). Policy decisions as well as market forces have influenced nominal and real exchange rates in transition countries (see Appendix).

Traditional specialization of EU accession countries was outside high-technology products so that there was considerable price sensitivity, including sensitivity with respect to the exchange rate. The only exception would be goods which are mainly produced for and sold in domestic markets. As east European accession countries in the field of low technology and medium technology are strongly competing against Asian countries as well as relatively poor countries in EU-15 – such as Portugal, Spain and Greece – we can anticipate that changes in real exchange rates in accession countries will have crucial effects on both other European countries (including east European EU outsider countries) and the EU-15 countries.

In the enlarged EU single market there could also be an increasing competition in medium technology and even in high technology sectors in the long term, provided that high inflows of foreign direct investment will continue to accrue for post-socialist accession countries. If there is relocation of EU-15 production capacities towards accession countries this will mainly stimulate growth in the latter, if inward FDI inflows largely come from the US this might stimulate growth in both accession countries – benefiting from a higher capital stock and technology transfer – and EU-15 since the latter are not suffering from relocation while enjoying export growth linked to output growth in accession countries.

Generally, the choice of the exchange rate regime is not easy for leading OECD countries which face long-term divergence in the relative adjustment speed of increasingly fast financial markets and low adjustment speeds in goods and factor markets – a divergence which raises the risk of temporary Dornbusch-type overshooting under flexible rates. The internet revolution is reinforcing the simultaneous global diffusion of news and this might contribute to uniformly-biased expectation formation which also could raise financial market volatility worldwide. Eastern European accession countries will embrace full external liberalization in the context of the EU enlargement and will also have to accept the elimination of barriers for foreign investors in the field of banking and insurance. To some extent, eastern European accession countries could imitate some of the developments in East Asian countries in the 1980s and 1990s. (At least we will gain some insights for eastern Europe by looking at Asian countries which had been eager in the 15 years prior to the Asian crisis of 1997 to effectively fix nominal exchange rates vis-à-vis the dollar which had the apparent advantage of bringing low nominal and real interest rates to dynamic Asian countries.) Eastern European EU accession countries – heading towards full membership in the EU in 2004 – clearly favor exchange rate stability which in any case will be required as a convergence criterion for later membership in the Euro zone. To the extent that prices in EU accession countries – mainly driven by relatively high growth - should increase faster than in the Euro zone, there will be a real appreciation of the currency which will slow down export growth. Such a slow down would, however, not occur if the rise in the relative price level would only reflect quality upgrading and the

move of accession countries into fields of higher technology intensity and improved quality reputation.

For poor countries catching-up, the decision-making process in the field of exchange rate regimes is complicated by the well-known Balassa-Samuelson effect. The relative price of nontradables is known to increase in countries with high growth rates in per capita income (y). This mainly stems from the fact that productivity growth is relatively low in the nontradables sector while uniform wage dynamics – in all sectors – are determined by the high productivity growth in the competitive tradables sector. At the same time it can be shown (eg MacDONALD, 1997) that the relative price of tradables is linked with the real exchange rate defined as P/(eP*). Several authors have tried to estimate real equilibrium exchange rates for transition countries (eg HALPERN/WYPLOSZ, 1997; MALIZSZEWSKA, 1997; KRAJNYAK/ZETTELMEYER, 1998, DE BROK/SLOK, 2001). According to empirical findings by DE BROK/SLOK (2001), there is clear evidence of productivity-driven exchange rate movements in the postsocialist transition countries in eastern Europe; and the EU accession countries which have already achieved some economic catching-up process can expect to experience further productivity-driven real exchange appreciation – catching up by 1 percent should lead to a real appreciation of 0.4 percent. As regards Asian countries before the Asian crisis of 1997/98, BOORMAN/LANE et al. (2000) conclude that few countries had clear misalignment before the crisis – with misalignment defined as a nominal exchange rate e that is inconsistent with an equilibrium real exchange rate eP*/P required to achieve a manageable current account position. Since we can define – with b in the range 0,1 :

(1) $P=[P^N]^b[P^T]^{(1-b)}$

(2) $P=[P^N/P^T]^b P^T$

one may interprete a rise of P (see equation 2) at a given absolute tradables price as an impulse for reduced export production since at given P^T the rise of P is reflecting a rise in the relative price of nontradables. Alternatively, a rise of P – assuming a given relative price – indicates inflationary pressure which at a given money supply implies a dampening effect on output; the latter effect reflects the money market equilibrium condition in the form of nominal money stock M being equal to nominal money demand $M^d=Pm(Y,i)$ where the real money demand m depends positively on real output Y and negatively on the nominal interest rate i. Misalignment problems have not only played a role in Asia, but also have come up in parts of eastern Europe in the 1990s; in particular in the context of rapid capital inflows in periods of high nominal interest rates, and such inflows led in a system of flexible exchange rates to a nominal and real appreciation of the currency. Note that a given relative price in combination with an overshooting depreciation (under floating) implies a rise of P since arbitrage will enforce that $P^T = eP^{T*}$ and the world market price of tradables is exogenous. Hence mediumterm overshooting along the line of the Dornbusch model can lead to a temporary rise of inflation, which in turn could affect output growth and capacity utilization (the latter will affect inflation, too).

The paper is organized as follows. In section 2, we focus on some basic issues, while section 3 takes a look at basic Schumpeterian issues of structural change and the exchange rate. Section 4 takes a look at the exchange rate development in selected transition countries in eastern Europe and also covers part of the relevant literature. Section 5 explores theoretical issues and presents some new ideas about the alternative of raising the relative nontradables price via strong absolute price increases versus aiming at a nominal

appreciation of exchange rate and an adequate real appreciation – there is an important link with structural change and the capital market which is stated here in an innovative perspective. Section 6 also presents some new ideas on the Balassa-Samuelson effect and reports selected empirical evidence.

2. Basic Perspective

One may wonder whether there are clear criteria for which exchange rate regimes are adequate for various groups of countries catching up and which special problems should be emphasized at the turn of the century. We will argue first offer a conventional argument, namely that rather small countries should peg the exchange rate and thus pursue a monetary policy consistent with a fixed exchange rate regime; by contrast, large countries have a real choice and could opt for a system of fixed or flexible rates –just to mention the two polar options. In the paper we emphasize, however, that small countries can form a group – thus constituting in effect a larger synthetic country – and establish a Regional Monetary System. This has the advantage of offer a richer variety of exchange rate regimes and such a "monetary policy club" indeed might wish to establish fixed rates within the group but have a high (or low) exchange rate flexibility vis-à-vis the rest of the world. We will point to empirical evidence that large countries benefited from flexible exchange rates in the form of reduced output variability so that the creation of more regional monetary systems might help to reduce global output variability and achieve higher economic growth.

Real exchange rates of poor countries catching-up with leading OECD countries should – according to the BALASSA-SAMUELSON theorem – be characterized by a long-term appreciation. In contrast, with every regional currency crisis (Mexican/Latin American crisis, Asian crisis) a very sharp real depreciation occurred which might be explained in terms of a short-term loss of confidence on the side of financial investors worldwide in the respective countries. If the real depreciation of some 30% in several Asian NICs in 1997/98 would reflect misalignment it will nevertheless affect short-term and medium-term market transactions. Cumulated disequilibrium transactions will then affect future equilibrium conditions – simple as it is: disequilibria matter for future output, inflation, trade and employment.

As the presumed long-term appreciation trend of NICs and postsocialist transition countries' catching-up is concerned, there is no evidence that the respective countries would return to the initial appreciation trajectory. Economists' belief that poor countries which grow fast will have a real appreciation in the long run might not help to avoid financial market investors anticipating a sharp (transitory) devaluation and therefore launching a corresponding speculative attack. Interestingly, the Asian countries also caused negative international spillover effects in the sense that some EU accession countries in eastern Europe plus Russia were also obviously affected by a loss of confidence in 1997/98, although domestic fundamentals had hardly changed. Poland and Hungary were not strongly affected by the Asian crisis.

Given high "initial" inflation rates in relatively poor countries - in eastern Europe and some Asian countries in the early 1990s - a critical question is which exchange rate regime (eg fixed exchange rate versus crawling peg) will help to avoid destabilizing expectations

in foreign exchange markets while avoiding long-term misalignment. The choice of an adequate exchange rate regime might depend on per capita income and the role of economic catching-up to some extent; in this regard Asian NICs and eastern European countries are similar. Moreover, a currency crisis in eastern Europe (Asia) could have spillover effects on Asia (Eastern Europe).

Why is avoiding excessive real depreciation important for poor countries? Part of the answer is associated with the typical external debt of such countries. An excessive real depreciation will cause additional FDI inflows (with some positive supply-side effects) and a rise of the real external debt burden leading to higher taxes or inflation rates or reduced imports of capital goods such that the growth rate of GDP will fall; even worse, the ratio of GNP to GDP will fall as a consequence of effective international debt-equity swaps occurring in any major currency crisis.

Should countries in postsocialist countries in eastern Europe and Asia – especially those eager to catch up with advanced countries – adopt relatively flexible exchange rates? More nominal exchange rate flexibility will bring about more real exchange rate flexibility as is known from the eposides of Canadian floating and many other countries. GOSH/GULDE/OSTRY/WOLF (1996) have argued that the relationship between exchange rate regimes and economic growth seems to be rather weak, which would suggest that it does not matter much whether a fixed exchange rate or floating is adopted.

When a country opts for a fixed exchange rate it must chose an anchor country (or focus on a basket of countries and currencies, respectively). Choosing the anchor country A versus B implies – mainly depending on the respective country's monetary policy and pattern of the economic cycle – a distinct volatility of the exchange rate. The choice of the anchor country makes a crucial difference in any case. Changing the anchor country reduces real exchange rate volatility vis-à-vis the new anchor country and raises it vis-à-vis the old anchor country. This was amply demonstrated by Ireland which gave up pegging vis-à-vis the Pound in 1978 in order to establish a new peg with the Deutsche Mark, which dominated the newly joined European Monetary System, in January 1979.

Exchange Rate Volatility and Output Volatility

Flexible exchange rates brought less net export volatility for Canada, Japan, the UK and the US, while output volatility clearly increased in the UK and Canada in the period of flexible exchange rates compared to the period of fixed exchange rates (LEDUC, 2001). By contrast, large economies such as Japan and the US have experienced reduced output volatility in the period of flexible exchange rates. It seems that for small open economies the issue of fixed versus floating exchange rates thus matters more than for large countries. The fact that larger nominal exchange rate volatility in a regime of flexible exchange rates has only a rather limited impact on the volatility of economic aggregates has been explained by pricing-to-market behavior of firms according to which firms acting in a setting of heterogeneous product competition will differentiate prices according to price elasticities of demand in the respective countries, and adjust prices only partly in response to nominal exchange rate movements (KRUGMAN, 1987; FROOT/KLEMPERER, 1989). However, it is important to notice that Japanese companies practiced pricing-to-market behavior in the US and the EU, but obviously less so in East Asia; in Asia to a very large extent, Japanese firms did not pursue pricing-to-market behavior, so that nominal exchange rate changes quickly translated into price adjustments (TAKAGI, YOSHIDA, 1999). If a similar result would apply to US firms and EU firms in Asia and eastern Europe, respectively, the implication would generally be that higher nominal exchange rate

flexibility will translate into higher volatility of real output which is certainly not welcome in any country or region (perhaps, except for Las Vegas).

As a by-product of overshooting in the devaluation crisis in Latin America and Asia, the respective countries were facing permanent deterioration in their net asset position where in the course of crisis management and IMF involvement, respectively, private foreign debt in effect is replaced by official foreign debt. As will be shown subsequently a deterioration of the new asset position fundamentally requires real devaluation. Moreover, there is the problem that once countries which have overcome the crisis quickly return to formal or informal exchange rate pegging and combine this with a stability-oriented monetary policy there is no easy way to achieve a real appreciation in the country – rising unemployment is a doubtful way here because falling aggregate demand is likely to cut the relative demand for nontradables. However, rising unemployment could contribute to a real depreciation in the sense of a falling relative price of nontradables – and a falling output price level – if high unemployment in a world of monopolistic competition reduces the demand elasticity for tradables relatively strongly so that importers will sell foreign products at reduced absolute prices.

The real world gives no clear evidence that poor countries are catching-up easily with advanced industrial countries which all are Schumpeterian economies in the sense of showing high rates of innovation and high rates of patent applications per capita, respectively. We will subsequently argue that there are enormous international differences in terms of innovativeness, and that the strong rise of US patent applications in the 1990s might have contributed to the high real appreciation of the dollar in that period. Accelerated innovativeness stands for higher profits in the future which in turn should raise stock market prices which in turn stimulate capital inflows into the US. As much as a spurt in US innovativeness – partly fuelled by rising civilian shares in overall R&D expenditures after the end of the Cold War –might have fundamentally required a real devaluation of Euroland countries by 10-20% in the second half of the 1990s, it might have required a high devaluation in NICs whose R&D-GDP ratio typically is close to 1% (except for Korea which is close to 3% and thus even slightly ahead of most EU countries).

The above reasoning leads to several questions:

- How can we explain the real equilibrium exchange rates in countries catching-up with the US and EU countries?
- Which role is innovativeness playing for the trend in development of the real exchange rate?
- How could unemployment be taken into account within a disequilibrium approach to real exchange rate determination?
- To which extent is the exchange rate regime dependent on the income gap vis-à-vis the US/EU?

It is unclear whether market forces will bring about a fundamental equilibrium exchange rate as a starting point of economic development, and one cannot rule out that exchange rate overshooting (or magnification effects) will bring considerable temporary deviations from the equilibrium exchange rate. For countries with high foreign debt, any excessive temporary depreciation is naturally rather dangerous, and – depending on expectation dynamics – such temporary depreciation might indeed trigger massive nominal devaluations for one country or several countries in the region and a sustained real depreciation. Economists have little to say in theoretical terms whether 7 steps of an annual real depreciation of 5% is better or worse than a single 50% real depreciation in the middle

of the seven-year period. The intuition is that a massive one-off devaluation is a serious problem for the economy since normal adjustment steps in goods and factor markets are single digit and often less than 5% p.a. What happens if an economy which normally faces a trend appreciation is suffering a massive one-off depreciation?

3. Schumpeterian Perspectives of Structural Change in Open Economies

Structural change in open economies cannot be analyzed without taking into account the role of foreign direct investment (FDI). Discussing options for international relocation of output in a European East-West context we can draw on the existing literature about North-South foreign direct dynamics and structural change. A dynamic approach to structural change in open economies (KLODT, 1992, p. 110) suggests there are different ranges of options to relocate industries, where one should distinguish between mobile Schumpeterian industries and immobile Schumpeterian industries. Schumpeterian in Klodt's approach is identical with technology-intensive in production, for which he suggests limits for geographical relocation in response to international wage differentials: In immobile Schumpeterian industries – eg airspace industry or non-electrical machinery – where one cannot easily separate R&D and production, the fact that R&D in technology intensive sectors is typically conducted in high income countries lets one expect that firms will not relocate major elements of production to low wage countries once they open up for trade and FDI. Moreover, there will be very limited technology cycle trade of the type envisaged by VERNON (1966; 1979) in a North-South dimension of the world economy.

In contrast, mobile Schumpeterian industries – defined as technology intensive sectors where R&D and production can be uncoupled across space – can relocate production to low wage countries relatively easily. They can indeed be expected to do so as long as firm internal transaction costs are not exceeding the respective international wage differential. From this perspective, the opening up of post-socialist transition countries in eastern Europe and the EU-accession, respectively, imply for mobile Schumpeterian industries that relocation of production of high wage EU-15 countries to eastern Europe will take place relatively quickly. From an EU-15 perspective there is therefore no reason to worry about relocation only in sectors which are immobile Schumpeterian industries. Another subset of sectors hardly subject to much competition from imports and which is a fortiori uncritical to FDI outflows in these sectors concerns those fields in which transportation costs play a relatively important role (SCHUMACHER, 1997).

In the perspective of EU eastern enlargement, a Klodt-type approach also makes sense. We can clearly anticipate product cycle trade in the field of mobile Schumpeterian industries so that a first stage of enlargement will go along with rising FDI inflows into eastern European accession countries followed by rising technology intensive exports from eastern Europe. In a strict sense, the products exported by firms in eastern Europe will fall in the range of medium and even high technology as the overall share of R&D expenditures in the value of sales will be relatively high; however, as regards the nature of value-added in postsocialist transition countries we will mainly see assembling processes and a low share of R&D in accession countries. In this perspective it is true that product cycle trade and FDI inflows into eastern Europe will mainly stimulate labor-intensive

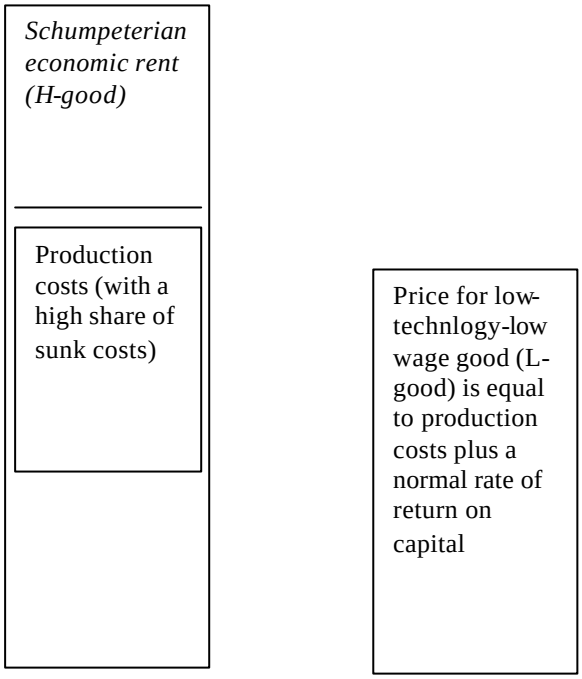
production. Taking a look at the more long-term dynamics, we may expect that relative per capita income in eastern Europe will increase, the ratio of R&D expenditures to GDP increase and several waves of Klodt-Vernon product cycle trade will take place. Firms in EU-15 countries will increasingly specialize in technology intensive products while relocating in every new product cycle production of mobile Schumpeterian goods to advanced countries of eastern Europe such as Hungary, Poland, Czech Republic, Estonia and Slovenia. As regards EU-15 there could be major problems if immobile Schumpeter industries dominate national wage bargaining: such key bargaining would undermine prospects for mobile Schumpeter industries to reduce the outflow of FDI through wage moderation.

As the average share of technology intensity in exports from eastern Europe will increase over time and since the size of Schumpeterian rents (extra margin) in the price of the respective product can be assumed to be positively correlated with technology intensity, relative wages of the tradables sector will increase over time at given per capita income. However, as per capita income will rise over time income elasticities also enter the dynamics. If the income elasticity in the demand for nontradables should exceed that of trdables the development of the relative wage ratio is unclear. If, however, the income elasticity of the demand for tradables exceeds that of nontradables, one can clearly expect a relative increase in the tradables wage. It is indeed also plausible that a medium term rise in the technology intensity of tradables and exports, respectively, will go along with a relative rise of capital intensity on the one hand and of the share of skilled workers on the other hand. One should therefore expect in the tradables sector a capital intensity effect and a wage premium effect associated with the gradual change in the ratio of skilled labor to unskilled labor. In the long run there will be a uniform wage increase for unskilled labor and skilled labor, respectively, in both sectors. As productivity-enhancing pressure from import competition will raise productivity particularly in the tradables sector, unit labor costs in the nontradables sector will increase, which in turn will drive up the relative price of nontradables. It is the ratio of tradables price to nontradables price which – as we will discuss subsequently – has an important impact on the real exchange rate.

If the expansion of capital intensive industries should go along with a move towards a technological upgrading of products, one may anticipate a rising demand for skilled labor. This, however, could lead to a rise of unskilled unemployment to the extent that wage bargaining is rather inflexible with respect to wage differentiation; or if retraining incentives and activities are insufficient.

There is a link between the real exchange rate development and innovation. This link may be stated conveniently for the polar case of a low wage-low technology product as opposed to a high technology product whose production requires much skilled labor. We assume that the market for skilled labor is fully competitive so that skilled labor is rewarded in accordance with the respective marginal product; moreover, we assume that high technology products are characterized by relatively high sunk costs (innovation costs, marketing costs) whereby barriers to entry exist. In contrast, low technology products are produced in firms in which trade unions fix wages in certain stages of economic development above the marginal product. Moreover, there are no sunk costs on the side of producers so that markets are very competitive. The following graph shows value-added for the Schumpeterian H-good which is more expensive than the low technology, low-wage good (L-good).

Fig. 1: Exchange Rate Determination in a Schumpeterian Perspective



We take the low technology-low wage good as a benchmark good and consider a two country model. Assume that both countries initially produce identical low technology-low wage goods under autarchy. Opening up would lead via arbitrage to a uniform price as suggested by the strict arbitrage condition $p_i=ep^*_i$. Next we assume that country II (foreign country) still is producing only the L-good while country I is producing a mix of goods, namely a certain quantity of L-goods and a certain quantity of H-goods. A foreign exchange diagram for the currency of country II would now show an upward shift of the forex supply curve as export proceeds of country I will have increased. This will bring about a fall of the nominal and the real exchange rate. While one may argue that the ratio eP^*_{II}/P_I has not necessarily fallen since the price level P* of country II is composed (with weight a for the share of expenditures spent on L-goods) of the price p^L of the L-good and p^H of the Schumpeterian H-good capital mobility certainly would trigger increasing net capital imports as the extra-profits expected in Schumpeterian sectors will attract inflows of foreign capital so that the nominal exchange rate of country II will fall more strongly as P_I increases. One should emphasize here that the rise of PI is not an inflationary phenomenon but a Schumpeterian price level change which does not require depreciation in order to eliminate arbitrage opportunities!

Typically, for a country it will be possible to raise the share of technology-intensive value-added only if the share of skilled labor in overall employment is increasing. Such a long-term change in the skill composition will be possible only if on the one hand mobile Schumpeterian producers are attracted in the medium term and there is sufficient upgrading of human capital through the education system and retraining (assuming initial endowment with unskilled labor only); and if on the other hand the country is able to generate sufficient research and development in the long run so that immobile Schumpeterian sectors also will exist.

Note that the above diagram also is useful for a broad definition of competitiveness: In a two country two goods world competitiveness for firms in country I that initially is producing only L-goods an adequate definition would be – ability to profitably produce the existing types of goods and to successfully move into fields of higher technology (H-good). If we consider a heterogenous one-sector two-country model we can state the Schumpeterian perspective for the case of a static home economy and a dynamic foreign country – with continuous product innovations – as follows:

(3) $?P^T = eP^T*$

(4) $e = ?P^T/P^T*$

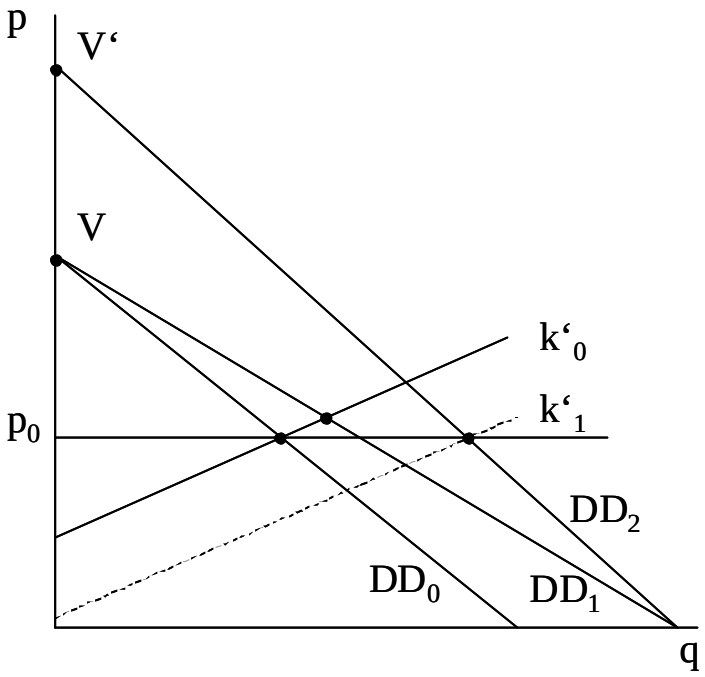
The variable ?(t) (>0) will increase if the foreign rate of product innovation is higher than in the home country; take the example of country I producing standard PCs, while country II – an innovation leader – is producing new innovative PCs every period. Assuming a given price of tradables in the home country importers will have to pay a multiple (? >1) of the domestic goods price if they want to import the more advanced foreign PCs. If the technology parameter ? is increasing – reflecting a rising gap of country I vis-à-vis II in terms of product innovativeness – the home country must devalue according to this Schumpeterian version of the arbitrage condition (in the standard literature, ? is interpreted rather to reflect protectionist forces or regulatory impact).

In reality it is often difficult to distinguish between various impacts:

- process innovations which are reflected by a downward shift of the marginal costs curve (k') – to stay as simple as possible;
- network effects often relevant in new technologies, namely an endogenous outward rotation (in point V in the following diagram) of the initial demand curve (DD_0), reflecting the fact that early network users will benefit from a broadening of the user network so that their marginal willingness to pay will rise (DD_1);
- product innovation effects that are reflected by a steeper demand curve (DD_2) indicating a higher top marginal utility among some users.

As one can see there can be a constellation when the price is the same in t_o and t_1 while there have been both cost cuts, network effects and product innovations in country II; by contrast, the situation in country I has remained the same in both periods. The product innovation in country II - along with the other two effects - then will not be reflected in a change of the tradables price. Rather there will be a real exchange rate effect through a rise of ?; this parameter could be considered to be a function of the relative per capita ratio y*/y provided that the rate of product innovation is positively correlated with y/y*. A relatively higher rate of product innovation should go along with a higher growth rate.

Fig. 2: Interaction of Process Innovations, Product Innovation and Network Effects



One may order the SITC goods – at the 3 digital level (and the same for NACE) – in a simple way: from low-technology goods to medium technology goods to mobile Schumpeterian technology goods and finally immobile Schumpeterian technology goods. Schumpeterian rents accruing can be assumed to be proportionate to the technology intensity of value-added (not of the product exported!). This implies then that the world's leading high technology country – the US – benefits from the fact that it exports a relatively large share of high-technology value-added products. At the same time product cycle trade and FDI abroad imply that relatively high profit transfers in favor of the US will occur; and finally, there will be relatively high capital imports reflecting the fact that the US stock market represents the cream of the global crop in terms of highly profitable firms. To the extent that in a two country model both country I and country II would produce both types of goods, changes in the nominal exchange rate would finally end as for the composite export bundle the modified purchasing power parity must hold.

Taking the US as the global technology leader other countries will experience a real long term appreciation to the extent that the respective country successfully is catching up in terms of technology. Japan was a prime example in the 1960s, 1970s and 1980s – with the latter two decades shaped strongly by US pressure on Japan to nominally appreciate the currency which, however, did not have the result the US government anticipated, namely a reduction of the bilateral Japanese export surplus. In terms of Fig. 1 this is not surprising since the political pressure for nominal and real appreciation stimulate Japanese firms to move over time into more technologically advanced fields which brought rising Schumpeterian profit rates in technology intensive production/exports and hence savings for Japan. Our innovative explanation of this process is fully consistent with the standard macroeconomic approach to net exports of goods and services X^{net} which is determined by

(5) $S + (T-G)-I = X^{net}$

where S stands for savings, T for tax revenue, G for government consumption and I for investment. S in turn is the sum of household savings – they are assumed to be proportionate to the sum of wage income WL (W is nominal wage, L is labor) and disbursed profits (there is a uniform tax rate t on household income) - plus reinvested earnings by firms which retain a fraction v of profits O: (we assume reinvested earnings are not taxed)

(6) $S = s\{WL+(1-v)\ O:(1-t)\} + vO:$

Aggregate profits are assumed to positively depend on the share of technology-intensive Schumpeterian production ? – positively depending on past appreciation pressure as proxied by dq^*_{t-t}/dt ($q^*=P/[eP^*]$ and the international technology gap V*/V (eg measured by ratio of high technology patent applications per capita V* abroad to those at home V), the scope of scale intensity in capital intensive production ?, and the ratio s of unit export value to unit labor costs which leads to an equation that can be analyzed empirically:

(7) $O_t = O_t\ (?_t\ (dq^*_{t-t}/dt, V^*/V), ?_t, s_t)$

The exchange rate-driven technological upgrading process worked as long as Japan's innovation system was elastic enough to respond to the exchange rate changes with sufficient innovative dynamics which in the 1970s and 1980s in effect mainly stood for technological catching-up with the US. Japan ran into trouble when it had roughly caught up with the US in the early 1990s and further nominal appreciations could not be remedied mainly by imitation but rather required that Japan would be a co-leader in global innovativeness; however, US patent applications started to accelerate in the mid-1990s. For various reasons, Japan failed to become such a leader where part of the problem was that the US achieved a period of high growth in the 1990s that were driven by high technology dynamics and expansion of the information and communication technology sector which reinforced productivity growth (WELFENS, 2002; AUDRETSCH/WELFENS, 2002; BARFIELD/HEIDUK/WELFENS, 2003).

As regards eastern European countries they are certainly far away from a global technology leader status. From this perspective they might well benefit from continuous modest real appreciation. However, one can only warn that governments or central banks in eastern European EU accession countries would conduct policies that bring massive nominal and real appreciations. The supply side elasticity of transition countries is rather limited (LANE/ODING/WELFENS, 2003) and the share of R&D expenditures relative to GDP is only around 1% or even lower which is only ¼ of the figure of Sweden, the OECD leader in terms of the ratio of R&D expenditures to GDP at the beginning of the 21st century. In the context of EU eastern enlargement one may expect that the share of capital intensive production in eastern Europe will increase as this region will attract high FDI inflows. Export unit values in most accession countries have increased in the 1990s (EUROPEAN COMMISSION, 2003).

4. Development, Trade and Exchange Rate Flexibility: Some New Aspects

While traditional theories with a focus on standard fundamental variables such as output growth and interest rates (KRUGMAN, 1989; FLOOD/GARBER, 1984) might contribute to the understanding of past exchange rate crises of the type experienced in Mexico in the 1980s or in Asia in 1997/98, it is not clear that all the important aspects have really been considered. This already has become clear from our Schumpeterian approach in the section above.

The role of relative international innovativeness might have been an important neglected aspect of the Asian crisis, and it is also crucial for eastern European accession countries – this at least will be argued in the following paragraphs. A particular hypothesis is that the end of the Cold War has raised the share of civilian R&D expenditures in overall R&D expenditures in the US so that US patent applications per capita have rapidly increased thereby raising expected future profits and therefore raising US stock market prices in real terms (relative to the output price level). From a theoretical point of view this implies an appreciation of the US, and relative real stock market prices were indeed found to be empirically significant in explaining the dollar-euro-exchange rate (WELFENS, 2000).

In a world economy with an increasing share of Schumpeterian trade – that is, exports of technology-intensive goods – Schumpeterian aspects could become increasingly important for exchange rate dynamics. The propensity to innovate, measured by per capita patent applications (at the US or European Patent Office) is relevant for future trade balance developments and hence the country's net asset position since a rise in patent applications will bring about an improvement in the trade balance with a certain time lag. From an empirical perspective there is clear evidence for the link between patenting and export growth (GRUPP/JUNGMITTAG, 1999). With more innovations and a rising share of R&D relative to GDP international market shares can be increased and unit export values be raised. The Schumpeterian factor in exchange rate dynamics is rarely treated in modern exchange rate literature (on different innovation rates in Euroland see WELFENS, 2000), and we will discuss only a few aspects here. Recent analysis of the Euro exchange rate dynamics (CLAUSEN, 2000) is generally useful as a reference point in the discussion of the pros and cons of fixed exchange rates plus common monetary policy (monetary union) which is an important topic for west and east European countries – and, in a distant future, also for Asian countries.

It is not obvious how to determine the factor intensity of products produced in eastern Europe and to draw adequate conclusions for equilibrium exchange rate adjustment. Already the 1990s have witnessed an increase in the production of technology intensive products in Poland, Hungary, the Czech Republic and some other transition countries – at least if we define the degree of technology intensity by the final products produced (or exported). This, however, is not an adequate approach if one takes into account that investment of many MNCs in EU accession countries is in industries where the core intermediate inputs are imported from abroad and the main activity is assembling. If technology intensity of value-added is adequately defined, one can clearly conclude that most new production in MNC subsidiaries in eastern Europe in the 1990s is labor intensive, at least in the sense that a high share of all people employed in those factories are unskilled workers or low-skilled workers. This can only change gradually over time as an improved education and training system generates more skilled workers.

For (postsocialist transition) countries economic catching-up and hence the proper mix of fiscal policy, monetary policy, exchange rate policy and growth policy is crucial. Trade liberalizations contribute to growth at first through Heckscher-Ohlin trade. With full international convergence in terms of per capita incomes this trade should end; however we do not observe declining trade as (some) countries are successfully catching up. Rather we observe more trade in differentiated products and in technology intensive products – the latter undermining the familiar assumption from the HOS model that technology is the same at home and abroad. With economic catching up, trade in innovative and technology-intensive products will increase so that price elasticities in international intra-OECD trade should decrease. Therefore the nominal exchange rate can help to correct current account imbalances only if exchange rate changes are allowed to be larger than in the previous stage of (OECD) development and convergence; this in turn reinforces the potential role of future markets and medium and even long term hedging. Per capita income and the structural composition of output and trade therefore should have an influence on exchange rate flexibility; this is a neglected aspect of the optimum currency theory. Moreover, not only misalignment can be a problem, misanchoring (inadequate choice of anchor country) is also crucial.

As NICs are catching up with advanced OECD countries, they also need – for obvious reasons – more exchange rate flexibility. However, pegging to a currency of a leading OECD country will obviously indirectly bring too much "external" exchange rate flexibility. Thus the choice of anchor country is important, and that country's per capita income is one of the important aspects. The size of the countries pegging also matters to the extent that effective real exchange rate variability can be defined as: ß σ^d + (1-ß) σ^i, where ß is the share of domestic sales in total sales (domestic sales plus sales abroad) and (1-ß) the share of international sales; σ^d is the standard deviation of the domestic "real exchange rate" (P^i/P, where P^i is the price level of regions i), while σ^i is the standard deviation of the international real exchange rate. Regional σ will depend – among other factors – on the type of regional technological specialization and the degree of Schumpeterian dynamics in the respective dominating sector.

The Balassa-Samuelson effect will naturally play a role in the course of economic catching up, where it is not easy to model an equilibrium real exchange rate of transition countries (MALISWZESKA, 1997); and premature exchange rate fixing seems to be doubtful for various reasons (eg KRÖGER/REDONNET, 2001)

5. Postsocialist and Other Countries Facing Exchange Rate Instability

Many countries in post-socialist transition countries in eastern Europe have, following high inflation or hyperinflation in the early transition stage, adopted a fixed exchange rate as an anchor for domestic monetary policy before moving – after monetary stabilization – towards a regime of more exchange rate flexibility (see details below). Some transition countries, have, however, tightened the exchange rate regime and even introduced a currency board: e.g. Estonia in 1992 based on the DM and later the Euro, Lithuania after 1994 on the basis of the US dollar, Bulgaria since mid-1997 based on the DM and the

Euro, respectively. Inflation rates in all three countries were positive and higher than in the US and Euroland in the 1990s so that there has been a real appreciation of the currency (exception is Lithuania which had very low inflation in 2000/2001) which should not create a problem as long as the annual real appreciation is in line with the Balassa-Samuelson equilibrium adjustment path corresponding to relative economic catching up with advanced countries. As long as the tradables sector is characterized by high productivity gains – based on restructuring, high investment of domestic entrepreneurs and high FDI inflows – and trade unions are not imposing excessive nominal wage rates which would lead to a rise in real unit labor costs, modest inflation in poor countries with high growth is not a serious problem; unless there was no high unemployment rate initially.

With their currency boards, Bulgaria, Lithuania and Estonia forego the option of devaluation even in an international environment of rising innovation rate differentials within the OECD countries where the US and some EU countries raised the number of patent applications per capita strongly in the 1990s; the US was even able to achieve a sustained lead in labor productivity in the high technology sector vis-à-vis the EU after 1992 which clearly calls for a real appreciation of the dollar – a disaster for all countries which have embraced dollarization or a currency board but have a much weaker innovation record than the US and an unstable banking system. Restoring full employment and external equilibrium (or an adequate trade balance surplus necessary to service foreign debt) would require a real devaluation which is rather difficult in a currency-board regime. One of the biggest advantages of devaluation is that it reduces wages – expressed in dollars – in the export industry of NICs relative to competitors abroad. At the same time it improves the chance to attract high FDI inflows since a real devaluation will bring about additional investment from abroad (FROOT/STEIN, 1990).

As regards East European post-socialist countries, it is obvious that there should be considerable opportunities for economic catching-up where domestic policy changes plus economic restructuring could contribute to at least as much growth as static and dynamic efficiency gains from economic opening up. However, economic opening up entails certain risks which concern the foreign exchange market on the one hand and the banking system and financial markets on the other, as was evident in the Asian crisis. There are obviously many similarities between some of the critical indicators for Asia and eastern Europe. Most of the countries in the two regional groups face high foreign debt figures relative to GDP and a high share of short-term foreign debt relative to the stock of foreign exchange reserves so that these countries are vulnerable to adverse short term capital shocks.

However, there are also clear differences between Asian countries and eastern Europe. In the late 1990s, Asian countries suffered real depreciation while countries in eastern Europe recorded real appreciation. Poland had a very strong real appreciation which came close to 25% over three years; this appreciation might have partly been justified by the modernization of the capital stock and the rising export-GDP ratio which partly reflects the modernization process (by contrast there was no clear reason for Argentina to appreciate by 15%, and that clearly was dangerous as Brazil had a real depreciation of -20% at the same time). Another difference concerns dependency on the US market, which has been very high for most Asian NICs and rather low for EU accession countries.

Tab. 1: Key Variables in NICs and Transition Countries, end of 2000 (fall of real exchange rate means depreciation)

	Foreign debt as % of exports[1)]	Budget balance as % of GDP[2)]	Short-term debt[3)] as % of reserves	Current-account balance as % of GDP	Exports to US as % of GDP	Real exchange rate[4)], % change since 97
China	47	-2,8	11	0,9	4,7	13
Hong Kong	19	-0,3	11	3,6	28,7	0
Indonesia	186	-4,6	108	2,7	6	-43
Malaysia	39	-7	20	6,3	23,9	-19
Philippines	108	-3,8	55	9,3	16,1	-32
Singapore	5	1,7	3	21,4	26,2	-8
South Korea	60	-0,4	38	2,8	8,2	-16
Taiwan	24	-6,3	22	3,5	11,2	-14
Thailand	86	-3	53	4,7	13,1	-20
Argentina	423	-2,9	96	-3,2	1	15
Brazil	332	-4,7	95	-4,1	2	-20
Chile	167	-0,7	44	-2,2	4,4	4
Colombia	228	-4,4	48	-1,7	10,6	-14
Mexico	93	-0,6	65	-3,6	24,7	40
Peru	351	-2,2	68	-2,9	3,8	2
Venezuela	117	-2,7	27	4,7	14	55
South Africa	66	-2,1	268	-0,6	2,6	-10
Turkey	197	-14,5	100	1,7	1,4	9
Czech Republic	51	-5,2	61	-5,8	2	6
Hungary	87	-2,8	33	-4,4	5,3	11
Poland	169	-3,6	29	-4,9	0,7	24
Russia	148	-0,1	39	11,8	3,3	-13

1) Goods and services

2) 2000 3) Disbursed external debt having an original maturity of up to 1 year, 4) J.P.Morgan trade-weighted index

Source: The Economists, July 21st 2001

McKINNON (2000) has shown that most countries in Asia have returned after the Asian crisis 1997/98 to informally pegged dollar exchange rates. Hong Kong which was the only Asian country that had declared an official exchange rate parity against the dollar maintained its parity during the Asian crisis without resorting to capital controls. China which has full current account convertibility but no capital account convertibility unified

its exchange rate in the mid-1990s and kept the dollar exchange rate practically constant at 8.3 yuan to the dollar. China does so on the basis of high growth and a high current account surplus which implies that its net asset position vis-à-vis the rest of the world is improving over time. However, it is unclear whether China can and should maintain its exchange rate policy. Other countries in Asia devalued in nominal and real terms during the Asian crisis, Malaysia by about 50% while then adopting a new parity within a new regime with capital controls. Real exchange rate devaluations in 1997/99 reached up to 30%, which is a rather serious problem for countries with low supply elasticities, high import elasticities or high external debts.

In the literature it is argued that Asian countries have used the dollar pegging before the Asian crisis and after the Asian crisis as a strategy to provide a common, nominal anchor for the domestic price level (REINHART, 2000). However, McKINNON (2000) points out that such a price level anchor does not require the type of short-term high frequency exchange rate pegging observed in Asian economies. He supports the "original sin" view of EICHENGREEN/HAUSMANN (1999, p.3) that such high frequency pegging is implemented because the domestic currency cannot be used to borrow abroad or to borrow long term – at home or abroad; with such incompleteness of financial markets "financial fragility is unavoidable because all domestic investments will have either a currency mismatch (projects that generate pesos will be financed with dollars) or a maturity mismatch (long-term projects will be financed by short-term loans)...The incompleteness of financial markets is thus at the root of financial fragility." McKINNON (2000) argues whenever there are large interest rate differentials between the center country and satellite countries, merchants face high opportunity costs of hedging for foreign trade transactions so that much trade will be unhedged; a similar argument applies to banks which accept dollar deposits to finance domestic currency loans.

Lack of hedging thus leaves countries exposed to exchange rate shocks so that McKINNON advocates introducing prudential supervision which would impose the rule on banks of having daily zero net foreign exchange positions. McKINNON (2000, p. 226) argues, "...regulators (should) also consider indirect as well as direct foreign exchange liabilities. For example, if a bank accepts dollar deposits but then on-lends to domestic firms in dollars, ist balance may look square. But the nonbank domestic borrower may now be exposed to currency risk and could default if the domestic currency is devalued. Exchange risk is translated into default risk and then into banking risk. Similarly, banks may undertake off-balance-sheet transactions in derivatives that increase their foreign exchange exposure and are had to detect." According to McKINNON a system of short-term exchange rate pegging helps to avoid the lack of hedging opportunities – the original sin syndrome therefore makes fixed exchange rates popular in developing countries and NICs (and possibly also in eastern European transition countries).

6. Broader Theory and Some Refinements of Balassa-Samuelson

The choice of an exchange rate regime has four aspects:

1. choice of anchor country if a fixed exchange rate regime is desired;
2. choice of partner countries which should join the desired regime;
3. choice of initial nominal exchange rate;
4. choice of band for a parity if fixed exchange rate system is desired.

Rarely (1) and (2) are seriously considered. Both excessive short term volatility and misalignment are typically discussed as problems in the literature; the impact of exchange rate developments on output, prices and asset accumulation as well as government budget is analyzed.

Misalignment and Mispricing of Risk under Fixed Rates and Flexible Rates

For two, fast growing – initially identical – economies, real exchange rate appreciation might take different forms. For country A with flexible exchange rates, there might be faster real exchange rate appreciation than in country B which has fixed exchange rates and therefore relies on domestic prices of nontradables to increase faster than the tradables price to bring about an equilibrium real exchange rate consistent with the Balassa-Samuelson effect. Country A may be assumed to move towards the equilibrium exchange rate faster than country B because prices – doing the job in B – are sticky variables. This advantage of country A might be offset by the disadvantage of having a larger risk of misalignment because in a system of flexible exchange rates there always will be episodes when the nominal exchange rates move temporarily in the "wrong" direction – which would be a temporary appreciation for a currency of a country which has an inflation rate higher than the rest of the world (we are assuming identical growth rates at home and abroad in order to eliminate the Balassa-Samuelson effect here). Given slow wage adjustment as a typical phenomenon of reality and increasing sunk costs in investment – due to a long term global trend of rising R&D expenditure-GDP ratios and rising marketing-GDP ratios –, temporary misalignment can be a serious problem since investment projects are undertaken that will turn out to be unprofitable ex post so that there are considerable negative welfare effects of misalignment.

However, as the Asian crisis has amply borne out, the risk of fixed exchange rates is that an incipient loss of international confidence in a country cannot translate into a gradual signaling, namely a stepwise depreciation of the currency. Rather there is an implosion of the formal or informal parity with large quasi-discretionary depreciations which generate very serious economic and social problems. A bias towards inadequate pricing of country risk is the main problem of fixed exchange rates – at least to the extent that one can largely rule out a very pro-inflationary monetary policy in countries with a fixed exchange rate (certainly a problem in many developing countries). Had Thailand suffered several episodes of a nominal depreciation in the 1990s, international investors would have imposed an adequate risk premium on Bhat denominated bonds and on debt instruments denominated in foreign currency. Firms and banks in Thailand would have more willingly considered hedging once they were aware that any period of modest depreciation can suddenly be followed by a larger depreciation. Inadequate pricing of risk can lead to

overinvestment, followed by massive economic and social crises. Even if the GDP growth rate would be more modest under flexible exchange rates than in an ideal world of fixed rates, it is crucial to see that a sudden large (non-PPP-consistent) depreciation raising foreign debt massively will reduce the future growth rate of real GNP considerably, as even in an ideal setting of a V-type recession – that is fast return to the initial growth path – the real burden of debt service has increased. Reality typically is bleaker. During crisis, millions of people lose their job as thousands of firms go bankrupt.

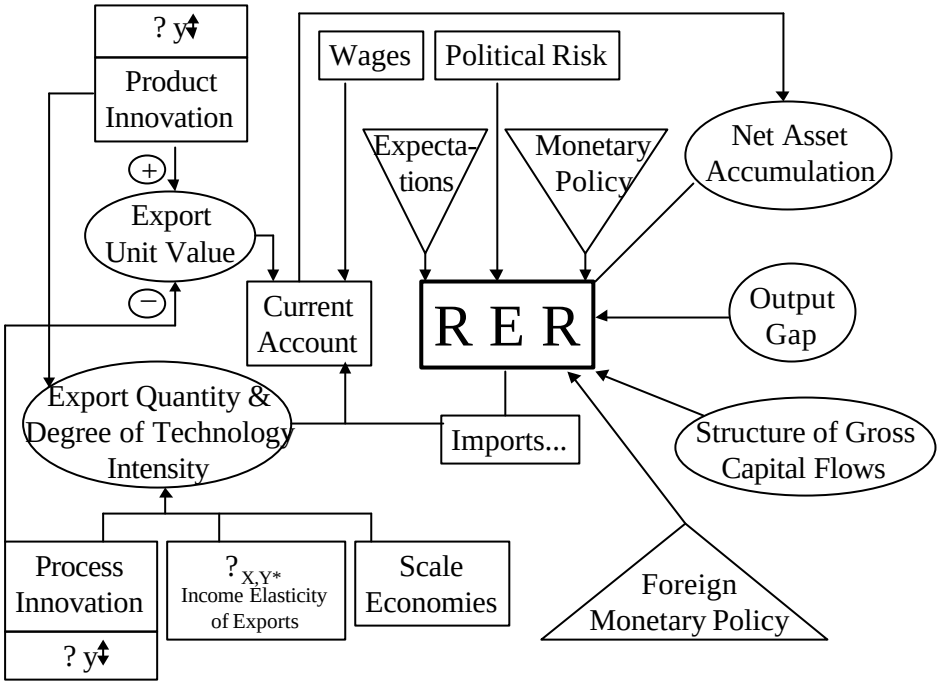
However, politicians might have a biased choice since having a short-time horizon – typical for many politicians – would suggest ignoring the rare case of a future crisis and accepting the problem of underpricing of investment risk; that is, enjoy the good times of overinvestment as long as possible. The moral hazard argument can be made that not only international investors hope for bailing out by the IMF or X, but so do governments eager to pursue high growth policies.

Disregarding political aspects, does economic analysis offer clear criteria for choosing a certain degree of exchange rate flexibility? As we all are aware of the MUNDELL and McKINNON arguments of fixed exchange rates – depending on labor mobility, the degree of openness and diversity in production/exports – we can easily state that very small open economies should have a fixed exchange rate regime, since Estonia, Singapore or Luxembourg are such small countries that labor mobility effectively is high and that export-GDP ratios will be very large. The KENEN criterion – countries with a diversified output and export basis (so that random shocks will tend to cancel out) – requires a certain caveat, since small countries will find it difficult to diversify in production. The three criteria might need, some modification, however, namely if we consider poor versus affluent (leading) countries. The standard three criteria mentioned have been developed in the context of OECD countries. However, for fast growing poor countries the Balassa-Samuelson effect raises some additional aspects to consider.

Determining the Real Exchange Rate

The real exchange rate P/(eP*) is determined by the interplay of nominal exchange rate dynamics, technological forces and monetary policy at home and abroad, if we assume a stability-oriented monetary policy abroad. In the following graph, we have the technological forces in the form of scale economies and process innovations plus product innovations; depending on the capital account the net asset position of the country, this will improve or deteriorate. The familiar BRANSON model tells us that an increase in net asset position will bring about a nominal appreciation. A major political influence is monetary policy, which can raise the real interest rate – at a given exchange rate – by bringing about an inflation rate higher than in the rest of the world.

Fig. 3: Determinants of the Real Equilibrium Exchange Rate (RER)



In transition countries and NICs opening up to capital flows, there could be a winner's curse in the case of fixed exchange rates. High capital inflows – FDI or other capital flows – will force the central bank to intervene in the forex market and thereby raise the money supply; this will raise medium term inflation and thus increase the real exchange rate. To the extent that nontradables' prices are increasing relatively strongly – and hence tradables prices modestly – this could nevertheless be preferable against a system of full exchange rate flexibility and stronger nominal and real appreciation via exchange rate appreciation.

With a flexible exchange rate, one has the advantage of full monetary policy autonomy. As long as the central bank is not politically independent and guided by the main goal of price stability, however, it might still pursue an inflationary policy. Therefore a move towards more exchange rate flexibility should be accompanied in poor countries with measures to raise the autonomy of the central bank and with the adoption of the explicit goal of price stability. Clearly, such a policy is not credible if the domestic banking system is dominated by state-owned banks and if state-owned firms play a crucial role in the economy – possibly in combination with a kind of full employment guarantee by government which amounts to creating a soft budget constraint which was typical of eastern Europe and might be a problem in some Asian countries in the future (possibly including China and Vietnam).

Should a country adopt a flexible exchange rate regime in the form of managed floating – that is having an implicit exchange rate target –, there is the risk that high capital inflows, possibly triggered by institutional reforms and improved prospects for rising profits in the tradables sector, drive up the nominal and real exchange rate beyond what would be justified in the long term. In such a situation government could cooperate with the (autonomous) central bank in order to correct the excessive real appreciation by a combination of government expenditure reduction and restrictive monetary policy causing

unemployment to rise. This policy mix is designed to bring about a fall of the output price level in the medium term; alternatively, government could try to stimulate productivity growth and to bring about a reduction of supply prices through falling unit labor costs. From this perspective, FDI inflows – bringing with them productivity growth – are always better than pure portfolio capital inflows. The temporary rise of the unemployment rate is dangerous since it naturally undermines any strategy of budget consolidation. Moreover, it creates the risk of social conflicts and political instability. Socialist transition countries in eastern Europe faced various problems as is well known, including excessive devaluation in early transition and excessive appreciation in the context of high investment inflows in countries combining privatization with an FDI-promoting policy – for the latter problem Hungary is an import example.

6.1. Postsocialist Transition Economies

Changes in the real exchange rate will affect the trade balance, output and the structure of capital flows. As regards the latter, ORLOWSKI (2000) argues that real appreciations following the depreciation in transition countries is likely to have stimulated short term portfolio capital inflows, possibly at the expense of foreign direct investment and other long term inflows. Following the arguments of FROOT/STEIN (1990), who emphasize the role of imperfect capital markets for FDI inflows, a real depreciation will raise the probability that foreign firms successfully bid for acquiring a firm in the prospective host countries. The appreciation of the investor's currency means that he will come up with rather high equity capital, measured in terms of the host country's currency, and high equity amounts reinforce the prospects of obtaining loans in the host country to finance the acquisition.

Real exchange rate fluctuations in postsocialist countries could be influenced by nominal shocks (e.g. changes in money supply, nominal interest rates, oil prices and the nominal exchange rate) and by real shocks (e.g. changes in productivity, relative prices, export structure). The higher the inertia in prices and wages, the more policymakers have an option to influence the real exchange rate via adjustment of nominal variables.

After a strong initial depreciation, transition countries faced high inflation – except for Hungary and the Czech Republic – so that a phase of real appreciation followed earlier depreciation (BRADA, 1998). Poland's real exchange rate changes were characterized rather by nominal shocks while Hungary's development was dominated by real shocks (DIBOOGLU/KUTAN, 2000). Institutional and economic differences were large across transition countries in the late 1990s.

For transition countries, the real exchange rate was a potentially important instrument to correct imbalances in the current account; with economic opening up and modernization of the capital stock the demand for imported goods increased strongly so that a current account deficit problem was looming as soon as export competitiveness could not be increased adequately or when rising government demand – and correspondingly rising budget deficits – created an excess demand in the tradables market. Government deficits were influencing the real exchange rate in Hungary, Poland and Romania (NEMENYI; 1997; DIBOOGLU/KUTAN, 2000) and to a lesser extent in the Czech Republic. In the crisis of the Czech Republic in 1997, prior political tensions within government (and between the government and the central bank) plus a high current account deficit of 9% in 1996, reflecting excessive investment – largely financed by government-owned banks – and a fall in savings rate, contributed to a crisis which led to devaluation and a regime

switch from pegging to a managed float in 1997 (HORVATH/JONAS, 1999). Strong wage increases contributed to rising unit labor costs in the early 1990s; lack of restructuring contributed to low productivity growth. In May 1997, the Czech Republic gave up basket pegging (DM 65%, US$ 35%) and adopted managed floating. What stands out in the following table showing east European exchange rate regimes is the considerable institutional instability over time, except for the Baltic countries.

Tab. 2: Exchange Rate Regimes in Eastern Europe in the 1990s

Features	Remarks	Countries
Currency board, pegged to the euro/Deutsche Mark.	Formally introduced on 1 July 1997. National legislation provides that the euro will replace the Deutsche Mark upon the introduction of the euro banknotes in 2002 at the latest.	**Bulgaria**
Managed floating (the euro is used informally as a reference currency).	In May 1997 the peg, with a ±7.5% fluctuation band, to a currency basket (Deutsche Mark (65%) and US dollar (35%)) which had been introduced in February 1996 was abandoned; the peg to a currency basket had been introduced in 1991.	**Czech Republic**
Currency board, pegged to the euro/Deutsche Mark.	Introduced in June 1992.	**Estonia**
Crawling fluctuation band, pegged to the euro. ±2.25% pre-announced crawling fluctuation band, currently witha 0.4% monthly depreciation rate.	Introduced in March 1995. The monthly rate of depreciation of the central rate and accordingly that of the crawling fluctuation band have been frequently reduced over time. Forint became fully convertible in 2001.	**Hungary**
Pegged to the special drawing right.	De facto peg to the special drawing right since February 1994, formalised in 1997.	**Latvia**
Currency board, pegged to the US dollar.	Introduced in April 1994. The Bank of Lithuania has announced its intention to re-peg the litas to the euro in the second half of 2001.	**Lithuania**
Pegged to a currency basket: euro (56.8%), US dollar (21.6%), pound sterling (21.6%) ±0.25% fluctuation band.	Currency basket peg in effect since 1971. The euro was substituted for the ECU, with effect from 1 January 1999.	**Malta**
Crawling fluctuation band, against a currency basket: US dollar (45%), euro (55%). ±15% pre-announced crawling fluctuation band currently with a 0.3% monthly depreciation rate.	The currency basket peg was introduced in May 1991, with the basket weights remaining unchanged until 31 December 1998 (US dollar 45%, Deutsche Mark 35%, pound sterling 10%, Swiss franc 5%, French franc 5%). The crawling band around the peg was introduced in May 1995. The rate of the crawl has since been gradually reduced and the band has widened. Since 1 January 1999 the basket has comprised only the euro and the US dollar.	**Poland**
Managed floating (the euro is used informally as a reference currency).	Since August 1992. In recent months the exchange rate has become the prevailing anchor for monetary policy. A change of strategy has not, however, been announced.	**Romania**
Managed floating (the euro is used informally as a reference currency).	Between 14 July 1994 and 1 October 1998 the Slovak crown was pegged to a basket of two currencies (60% Deutsche Mark and 40% US dollar). In 1996 the fluctuation band was widened from ±1.5% to ±7%. On 2 October 1998 the system of pegging was abolished and replaced by managed floating; on 1 January 1999 the Deutsche Mark was replaced by the euro as a reference currency.	**Slovak Republic**
Managed floating (the euro is used informally as a reference currency).	Since 1992 the exchange rate has remained within an unannounced narrow band against the Deutsche Mark (the euro since 1 January 1999).	**Slovenia**

Source: ECB Monthly Bulletin . February 2000; press releases.

At the beginning of 2000, the 27 transition countries had relatively more capital controls – except in the field of FDI (and backup facilities) – than developing countries. Due to the requirements of EU accession, namely enforcing capital control liberalization, 10 of the 27 countries will have no capital controls in place in 2010, except for real estate transactions (see Tab. 3). With east European countries joining the EU, they will have to create an independent central bank and will have to accept EU monitoring of fiscal policy. While national consensus brokering in favor of central bank independence could take decades in many postsocialist countries the political will to join the EU brings about crucial central bank independence en passant and quickly.

A crucial problem with premature exchange rate fixing could be that countries would allow monetary conditions to become biased in an expansionary way (KRÖGER/REDONNET, 2001). To see this, take a Monetary Condition Index in the form often used in the literature; that is, MCI as a weighted average of the real interest rate and the real exchange rate. With eastern EU accession countries probably joining EMS II as a kind a transition regime on the way to eurozone-membership, there would be exchange rate pegging vis-à-vis the euro and therefore monetary policy convergence and later nominal interest rate convergence. The Balassa-Samuelson effect will bring about relatively high inflation rates in countries with high medium term growth rates (in EU accession countries), and this implies very low or even negative real interest rates which will distort the investment process and thereby slow-down long term economic growth.

Tab. 3: Controls on Capital Transactions in IMF Member Countries (as at the end of 1999)

Item	Total	Industrial countries	Developing countries	Transition countries	10 EU Accession Countries in 2010
	Number of countries; of which:[1]				
Countries under review	185	29	129	27	
	Percent of line 1:				
Countries with controls on:					
Capital market securities	67.6	41.4	71.3	77.8	0
Money market instruments	59.5	31.0	62.8	74.1	0
Collective invest-ment securities	55.7	27.6	58.9	70.4	0
Derivatives and other instruments	44.9	24.1	46.5	59.3	0
Commercial credits	58.4	17.2	66.7	63.0	0
Financial credits	61.1	17.2	69.0	70.4	0
Guarantees, sureties and financial backup facilities	50.3	6.9	59.7	51.9	0
Direct investment	79.5	69.0	82.2	77.8	0
Liquidation of direct investments	29.2	3.4	38.0	14.8	0
Real estate transactions	73.5	48.3	75.2	92.6	50%
Personal capital movements	48.6	10.3	54.3	63.0	0
Provisions specific to:					
Commercial banks and other credit institutions	85.4	62.1	87.6	100.0	0
Institutional investors	44.9	69.0	38.0	51.9	0

* Including Aruba, Hongkong (SAR) and the Netherlands Antilles;as at the end of 1999.

[1] Classification of countries by analogy withthat in the World Economic Outlook,May 2001.

Bases: :IMF,Annual Report on Exchange Arrangements and Exchange Restrictions 2000;and the Bundesbank 's own calculations.

Source: Based on Deutsche Bundesbank, Monthly Report July 2001.

It is noteworthy that after a decade of postsocialist transition, countries in eastern Europe seem to stand for a polar development in exchange rate flexibility. The three very small Baltic countries plus Bulgaria support a high degree of pegging and a currency board regime, respectively. Very small countries have very high trade-GDP ratios so that fixing the exchange rate vis-à-vis the largest trading partner makes sense and is also rather credible. A nominal depreciation would translate immediately into a strong rise in tradables prices, which in turn would contribute to a corresponding increase in the wage rate so that a depreciation will not bring about any medium term gain from a policymaker's point of view. Indeed, there are only negative consequences from devaluation if the country has foreign debt.

Poland, Hungary, the Czech Republic, the Slovak Republic and Romania have switched to more external exchange rate flexibility after an early period of relatively fixed exchange rates (see Tab. 4). With more flexible exchange rates, the relative rise of the nontradables price could be brought about faster than is otherwise possible, namely by a nominal (and real) appreciation of the currency. Will such an arrangement bring any special benefits for the country? Yes, to the extent that the expectation appreciation rate will reduce the burden of foreign debt (in terms of the domestic currency) and generate higher capital inflows which in turn will reduce the international nominal interest rate differential; here we assume that the country considered is a poor country which - at a comparable inflation rate - naturally will have a higher interest rate than the US. This will raise the demand for money and could reduce the relative demand for domestic bonds since a given target ratio of financial wealth would be partly achieved by the rise in the real stock of money. The real appreciation of the currency will reduce net exports X^{net} of goods and services unless the country's export specialization is geared towards more technology-intensive goods fetching higher relative prices in world markets and which will also face a lower elasticity of price elasticity abroad. Given the divergence between the social and private return to innovation, it is clearly an issue of government policy whether an approach towards more exchange rate flexibility is associated with sufficient Schumpeterian graduation in the export sector; certainly, promoting foreign direct investment inflows will also be helpful, since FDI will bring about positive technology spillovers (unless there are strong restrictions for foreign majority ownership). If government is not promoting innovation, there is a risk that the real appreciation of the currency will bring about a sustained current account deficit, thereby contributing to a declining net asset position of the country which in turn would require a long-term depreciation. This inconsistent policy strategy would indeed generate high exchange rate volatility.

Tab. 4: Exchange Rate Arrangements in Eastern Europe, the Baltic States and the Russian Federation, 1990-2001

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	01/02
Bulgaria	3	8	8	8	8	8	8	2	2	2	2	2
Czech Republic	3	3	3	3	3	3	6	7	7	7	7	7
Hungary	3	3	3	3	3	6	6	6	6	6	6	4
Poland	3	5	5	5	5	6	6	6	6	6	8	8
Romania	3	7	7	7	7	7	7	7	7	7	7	7
Slovakia	3	3	3	3	3	3	6	6	7	7	7	7
Slovenia			7	7	7	7	7	7	7	7	7	7
Estonia			2	2	2	2	2	2	2	2	2	2
Latvia			8	8	3	3	3	3	3	3	3	3
Lithuania			8	8	2	2	2	2	2	2	2	2
Russian Federation			8	8	6	6	6	6	8	8	8	8

Note: Exchange rate regime description:

1 Dollarisation: no separate legal tender;

2 Currency board: currency fully backed by foreign exchange reserves;

3 Conventional fixed pegs: peg to another currency or currency basket within a band of at most +/- 1 per cent;

4 Horizontal bands: pegs with bands larger than +/- 1 per cent;

5 Crawling pegs: pegs with central parity periodically adjusted in fixed amounts at a fixed, pre-announced rate or in response to changes in selected quantitative indicators;

6 Crawling bands: crawling pegs combined with bands of more than +/-1 per cent;

7 Managed float with no pre-announced exchange rate path: active intervention without precommitment to a pre-announced target or path for the exchange rate;

8 Independent float: market-determined exchange rate and monetary policy independent of exchange rate policy.

Source: for 1990-2000 VON HAGEN/ZHOU (2001); for 2001/2002 own observation/assumption

If banking reforms and prudential supervision are not adequately imposed, eastern European accession countries could face massive instability risk – compared to developing countries – unless adequate financial sector reform reinforces economic growth. Technical and financial support from the EBRD, the IMF and the World Bank are obviously particularly strong in EU accession countries, which might create two groups among the 27 transition countries: one group with improved quality of banking management and supervision, namely the ten EU accession countries, and the other 17 countries with less advanced reforms.

6.2. Real Exchange Rate Analysis: Empirical Results for Eastern Europe

UNECE (2001, p. 238) has tested – approximating the relative tradables price by the ratio of services to consumer goods prices – for the Balassa-Samuelson effect in East European transition countries. Empirical methodology is based on earlier work by DE GREGORIO/GIOVANNINI/WOLF, 1994 and BERGSTRAND, 1991. The results of the following table show that productivity growth in industry raised the ratio of services-to-consumer goods prices. Productivity growth in the services sector had a negative impact. The rise of per capita income had the expected positive relative price effect. Distinguishing in the above table of exchange rate regimes three group of regimes, namely hard peg (I), exchange rate commitment (II) and no commitment (III) the use of adequate dummy variables showed that only the no-commitment-regime had a significant impact; the positive coefficient for the dummy variable indicates that high nominal exchange rate flexibility reinforced the rise of the nontradables price ratio. The impact of the GDP per capita variable, however, became weaker. This is rather surprising as high exchange rate flexibility obviously brought about a stronger Balassa-Samuelson effect in the sense that the tradables productivity variable had a stronger effect on the relative price development than other exchange rate regimes (note that the services sector productivity variable switches sign and remained only marginally significant in the GLS estimation of pooled data).

Tab. 5: Regression Results for the Balassa-Samuelson Effects
(Estimation results on service-to-consumer goods price ratio)

Variables	Base version	Exchange rate regime effect
Constant	2,060734***	1,108583***
Service-to-consumer goods price ration lagged	0,444020***	0,446326
Productivity in industry	0,242327***	0,174235***
Exchange rate effect[a]		0,007960***
Productivity in services	-0,184074*	0,128094*
GDP/capita(PPP)	0,027596**	0,006321
Country specific inflation acceleration variable		
Country effect		
Czech Republic	-0,001539**	-0,002185***
Hungary	0,001177**	,002089***
Poland	-0,003233**	-0,003756**
Romania	0,000553	0,000522*
Slovenia	0,003,63***	0,003482***
Estonia	0,001503**	0,001395**
Latvia	-0,004271***	-0,004174***
Lithuania	-0,000796**	-0,00586***
Russian Federation	-0,006278**	-0,006452**
Sample	1991-1998	
Included observations	8	
Number of cross-sections used	9	
Total panel (*unbalanced*) observations	56	
Adjust R-squared	0,954151	0,954108
Means of dependent variable	4,567562	0,065078
Standard error of regression	0,065048	4,567562
Standard deviation of dependent variable	0,303785	0,303785
Estimation method	GLS[b]	GLS[b]
Czech Republic	1994-1998	
Hungary	1992-1998	
Poland	1992-1998	
Romania	1991-1998	
Slovenia	1993-1998	
Estonia	1993-1998	
Latvia	1992-1998	
Lithuania	1993-1998	
Russian Federation	1995-1998	

a Exchange rate regimes of own currency without any formal commitment.

b Cross-section weights.

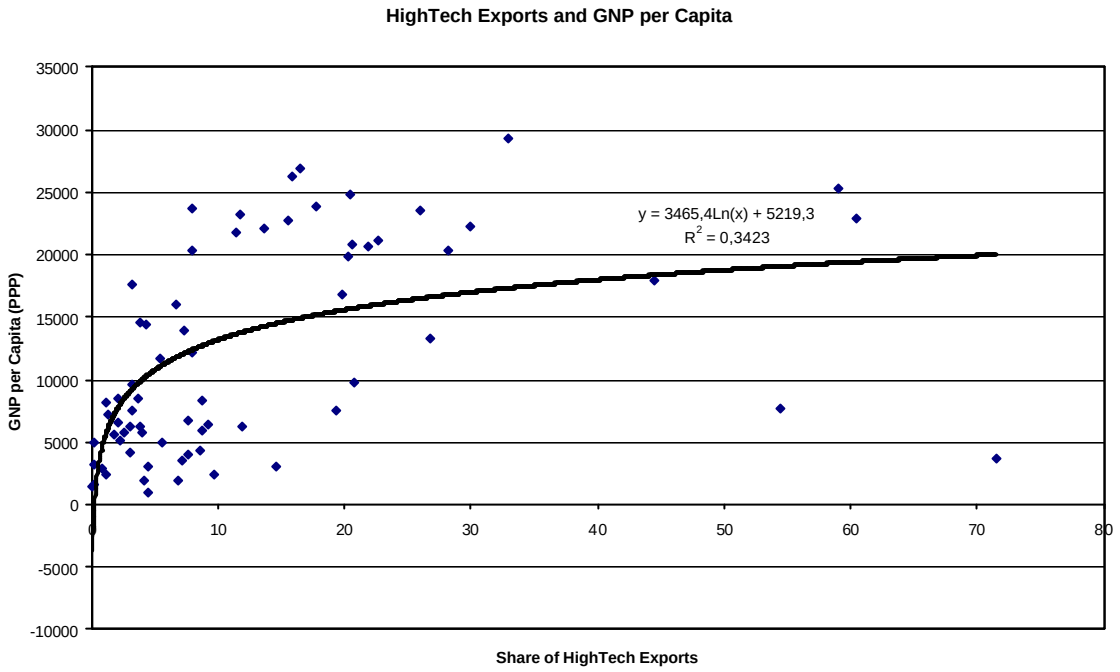
Source: UNECE (2001), Economic Survey of Europe, No., Geneva, ch. 6.

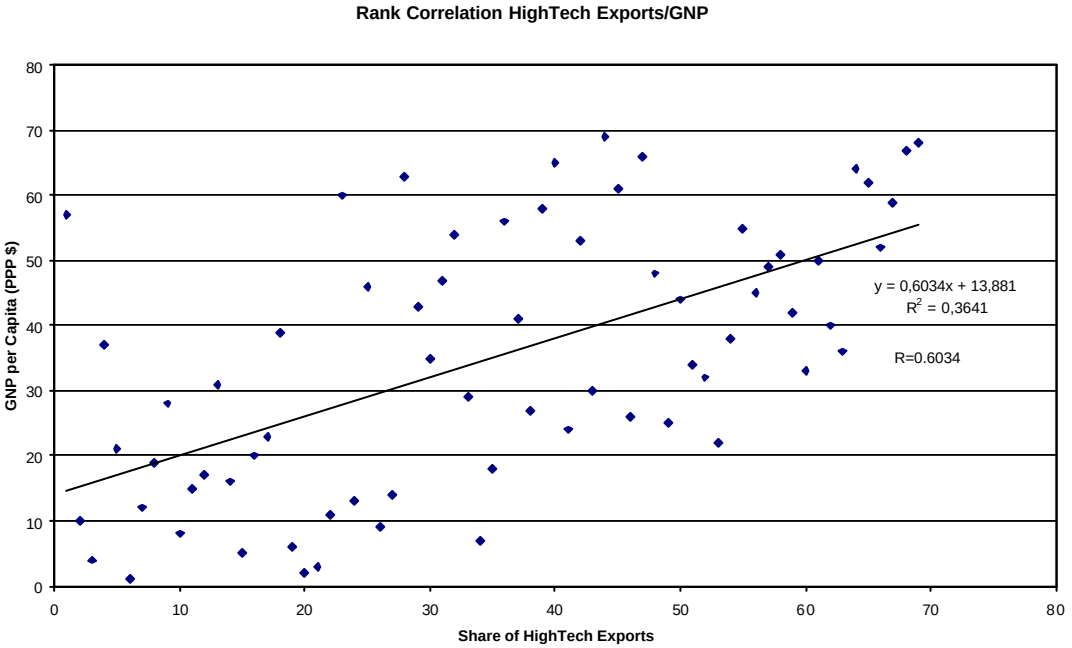
In the long run, we can expect accession countries to record a rising share of high-technology exports, in particular if they are able to attract high FDI inflows. There is a clear and significant positive correlation between per capita income and the share of high technology exports (see appendix). It may be pointed out that one should carefully analyse to which extent the export of high-technology products truly reflect high-technology production in the respective transforming economy or if the crucial high-technology part was an imported intermediate product (eg chip) used correspondingly in an assembling process, which – carefully evaluated – is not a high-technology process. The smaller the share of indigenous high-technology value-added, the more price sensitive and hence wage sensitive the respective stage of value-added. This will hold all the more when scale economies play a role at the same time. Thus, the assembling of PCs might easily be relocated within eastern Europe (e.g. be moved from Poland facing rising wages to the Ukraine, which has much lower wages and unit labor costs respectively).

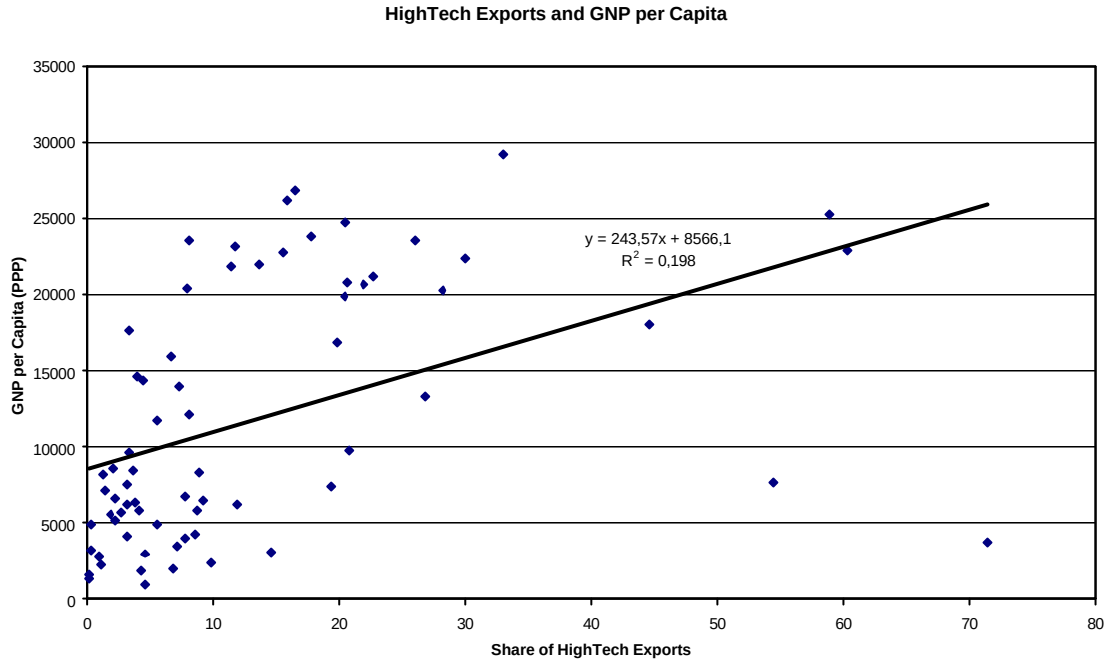
As the dollar is expected to weaken as a consequence of a high current account deficit-GDP ratio at the beginning of the 21st century, one may anticipate that both EU-15 countries and EU accession countries will face medium-term problems with respect to exports in the dollar market. A rapid real appreciation of the currency of EU accession countries could undermine the prospects for sustained economic growth. If structural change in EU accession countries should go along with high long-term unemployment, there could be political and economic instability in accession countries which in turn would translate into a growth-reducing higher risk premium in capital markets.

Finally, one may anticipate that EU accession countries will receive high short-term capital inflows which will make these countries vulnerable to capital flow reversal. This in turn could lead to a more volatile macroeconomic development which in turn will slow down growth, thereby impairing the prospects for creating new firms – a process which is an essential element in structural adjustment and modernization. From this perspective, further long-term economic catching up of eastern Europe will depend on creating a competitive banking system and a diversified production structure. The more diversified the production structure, the less likely a case in which world market shocks would broadly undermine economic growth. Here, governments clearly face a challenge, namely to avoid FDI inflows that concentrate very strongly on only a few sectors. Our analysis also points to the need for adopting a careful strategy in the field of monetary policy and exchange rate policies.

Appendix A: High Tech Exports and GNP per capita (Original data source: World Bank)






HighTech Exports and GNP per Capita
GNP per Capita (PPP)
35000
30000
25000
20000
15000
10000
5000
0
0
10
20
30
40
50
60
70
80
Share of HighTech Exports
y = 243,57x + 8566,1
R2 = 0,198

Appendix B: Exchange Rate Dynamics

Fig. B.1: Nominal Effective Exchange Rates

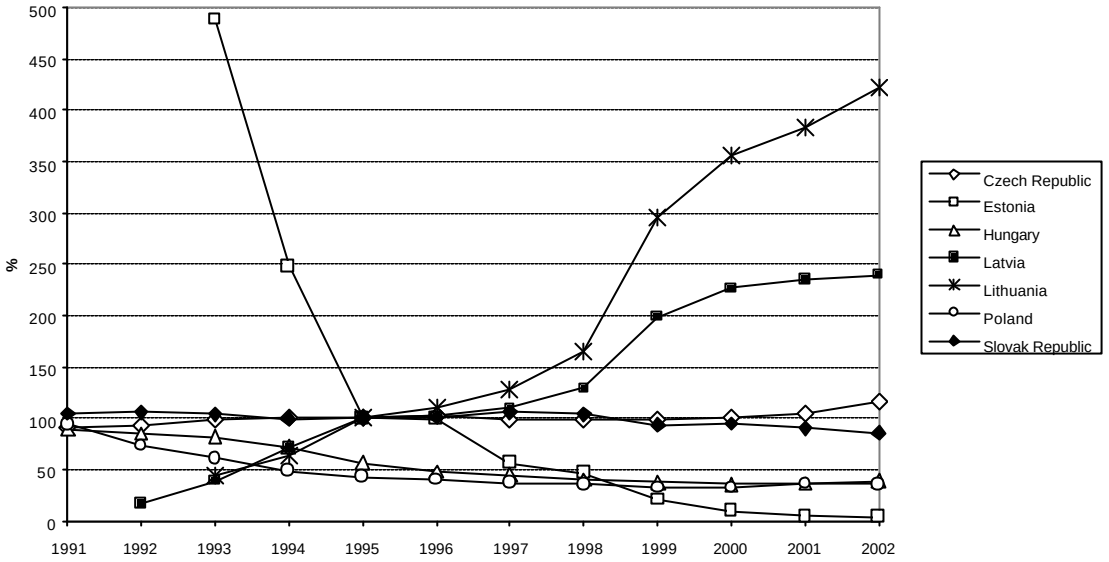
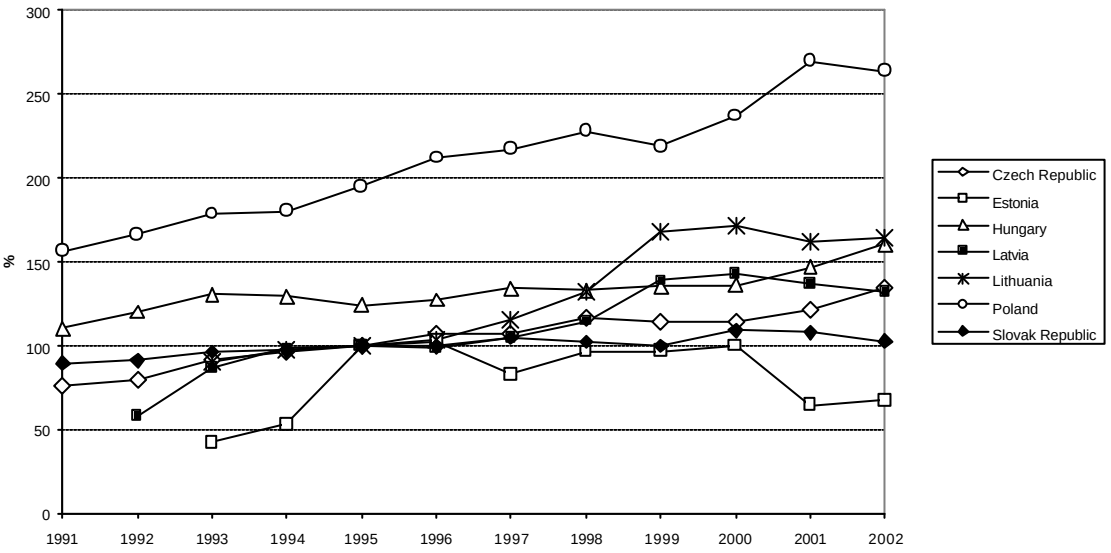


Fig. B.2: Real Effective Exchange Rates



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