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Capital Needs and Investment Financing

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Summary

The collapse of the political and economic system of the former East bloc has induced a series of quick estimates concerning the growth potential and the associated long-term capital requirements of the countries concerned. Such estimates differ in their way in which they view initial conditions and policy targets. They are in general based on grossly simplifying assumptions, e.g., constant capital-output ratios, and are not always precise on the possible sources of finance of the investment needs suggested.

Independent of the specific assumptions employed, the cost of reconstructing the Eastern economies turns out to be huge. It also appears that these countries cannot catch up to Western standards without major financial support provided by the West.

This paper evaluates previous estimates and reconsiders empirically the long-term capital needs of Eastern countries. The discussion starts with arguments of growth theory and with their implications for medium to long term capital requirements. It concentrates on growth paths between steady-states rather than on steady-state equilibria.

In the empirical estimates developed here, the usual time horizon of ten years used in previous estimates is extended to 2005, allowing for an initial no-growth period until the mid 1990s. Capital requirements are estimated on the basis (a) of an implicit production function which permits variations over time in the capital-output ratio, and (b) of a target rate of growth which allows for some reduction in the income gap between East and West. For the period 1995-2005, annual investment needs in the five Eastern European countries considered (CSFR, Hungary, Poland, Bulgaria and Romania) are estimated at some $ 169 billion. The annual investments required to achieve similar results in the former Soviet Union amount to some $ 465 billion.

It would be anything but realistic to assume that these financing needs might be covered by net transfers from industrial countries. Drawing on the historical experience of the newly-industrializing countries, it can be concluded that financing would overwhelmingly have to rely on internal savings. Growth targets may only be achieved if savings can be attracted, and investments induced, by rapidly establishing conditions of legal, institutional and economic stability. If domestic savings could be maintained at 20 per cent of GDP, annual capital inflows of some $ 54 bn in Eastern Europe and $ 147 bn in the FSU would on average be required to meet the estimated investment needs.

1. Introduction

In Eastern countries, capital is currently the limiting factor of production, while labor is available in sufficient numbers (though perhaps not in all qualifications). Therefore, we will argue, high rates of growth in these economies depend on new physical capital at a sophisticated technological level. By concentrating on this aspect of economic transition, the obvious need to improve also on human capital is neglected.

When estimating the investments required during the transition process, the following *basic questions* will have to be dealt with: (1) What is a suitable aggregate production function to describe the transformation process? (2) What are the revealed policy targets concerning the level and growth of income? (3) What are the initial values of per capita income and the capital stock? (4) What can be assumed about the savings behavior in transition economies? And thus, what amounts of foreign capital are necessary to support the target rate of growth?

In the following Section 2, models of growth and their implications for capital accumulation in transition economies will briefly be discussed. In Section 3, published estimates of the cost of reconstruction and of the desired Western contribution are reviewed. A new empirical assessment is provided in Section 4. It is argued that a no-growth period of some years should be allowed for before a regular growth path can be resumed. Capital productivity is seen to rise as the amount of technology implemented accumulates. In Section 5, it is asked what amounts of external financing will be necessary and available given, on the one hand, the domestic savings potential in Eastern Europe and the competing investment opportunities in the world, on the other.

2. Models of Growth and the Accumulation of Capital

In an economic environment where growth is restricted by insufficient quantity or quality of capital, the **Harrod-Domar growth formula** with fixed coefficients may serve as an approximate starting guide to capital requirements. According to the following *tautology*, the growth rate of real GDP ($g \equiv \Delta Q/Q$) is equal to the ratio of the investment (or saving) share in GDP ($s \equiv I/Q$) to the incremental capital-output ratio ($v \equiv \Delta K/\Delta Q$):[1]

$$g \equiv \frac{\Delta Q}{Q} = \frac{\Delta Q}{\Delta K} \cdot \frac{\Delta K}{Q} = \frac{I}{Q} \cdot \frac{\Delta Q}{\Delta K} = \frac{s}{v} \tag{1}$$

Harrod and Domar developed this equation into a *theory of growth* by interpreting g as the rate of growth of output that maintains full utilization of capital (the "warranted" rate of growth). They assumed s to be exogenous and v to represent some fixed technical relationship

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1) This is the formula for a closed economy where saving and investment are identical. In a small open economy, the savings ratio may be different from the investment ratio, the difference reflecting the deficit on current account as a share of GDP.

in the production process.[2] In long-run equilibrium, g is proportional to the investment share, the proportionality factor being the marginal productivity of capital (1/v). The Harrod-Domar model describes an economy where capital is fully employed[3] and savings are smoothly transformed into productive investments.

In current *Eastern Europe* the assumption of a constant v may only be consistent with the situation towards the end of the adjustment phase. For the transition period itself, it may be conceived that a certain minimum level of productive capital must be accumulated before production can be conducted efficiently. As the productive capital stock mounts, capital productivity should rise to a maximum and diminish thereafter. Thus, the *capital-output ratio may be variable,* declining sharply during the initial phase and slowly rising thereafter.[4]

In the **basic neoclassical growth model,** continuous substitutability between the physical capital stock (K) and labor (N) implies that marginal factor products are positive, but declining. As a consequence, the (marginal and average) *capital-output ratio will rise over time.* In Figure 1 this is demonstrated in terms of a *linear homogenous* production function which implies *constant returns to scale.* Written in per capita form (and disregarding the effects of total factor productivity),

$$q = f(k), \quad \text{with } Q/N \equiv q, \quad \text{and } K/N \equiv k, \quad f' > 0, \quad f'' < 0 \tag{2}$$

it says that income per head increases with the capital intensity of the economy.

[Figure 1]

In long-run equilibrium, both output and capital grow at the same rate as the labor force. Thus, the capital-labor ratio remains constant at k*, and the capital-output ratio at V*.[5] Equilibrium growth does not depend on the savings behavior. However, an (exogenous) *increase in the savings ratio* does have a *transitional effect on income growth,* as it raises the equilibrium level of capital per head and thus also equilibrium income per head (in Figure 1, k* would move to the right).[6]

The neoclassical growth model with constant returns to scale and full employment may be an adequate description of growth conditions in industrial countries, but may not be suitable for developing countries or transforming *Eastern countries.* The latter are likely to experience *increasing returns* to the q scale as k increases, perhaps due to the accumulation of "social overhead capital" in the form of infrastructure investments.

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2) There is no explicit production function in the Harrod-Domar model which otherwise may be viewed as a forerunner of post-Keynesian growth theory (Robinson 1956, Kaldor 1957) as well as of neoclassical growth theory (Solow 1956).

3) For labor also to be fully employed, the "warranted" rate of growth would have to equal the "natural" rate of growth (of the labor force).

4) For industrial countries it was suggested that the average capital-output ratio ($V \equiv K/Q$) is constant in the long run, maintaining levels somewhere between 2 and 4 (see, e.g., Streissler-Streissler 1986: 277).

5) V* meets the Harrod-Domar condition of Equation (1): $V^* = s/g$.

6) This model is consistent with the convergence hypothesis, according to which poor countries grow faster than rich countries because the capital intensities of all countries tend to converge.

Figure 1. Standard neoclassical per capita growth model

slope (1/V$_0$)

slope (1/V*)

q = f(k)

q

k

k$_0$

k*

$q = Q/N$
$k = K/N$
$V = K/Q = k/q$
$V_k > 0$
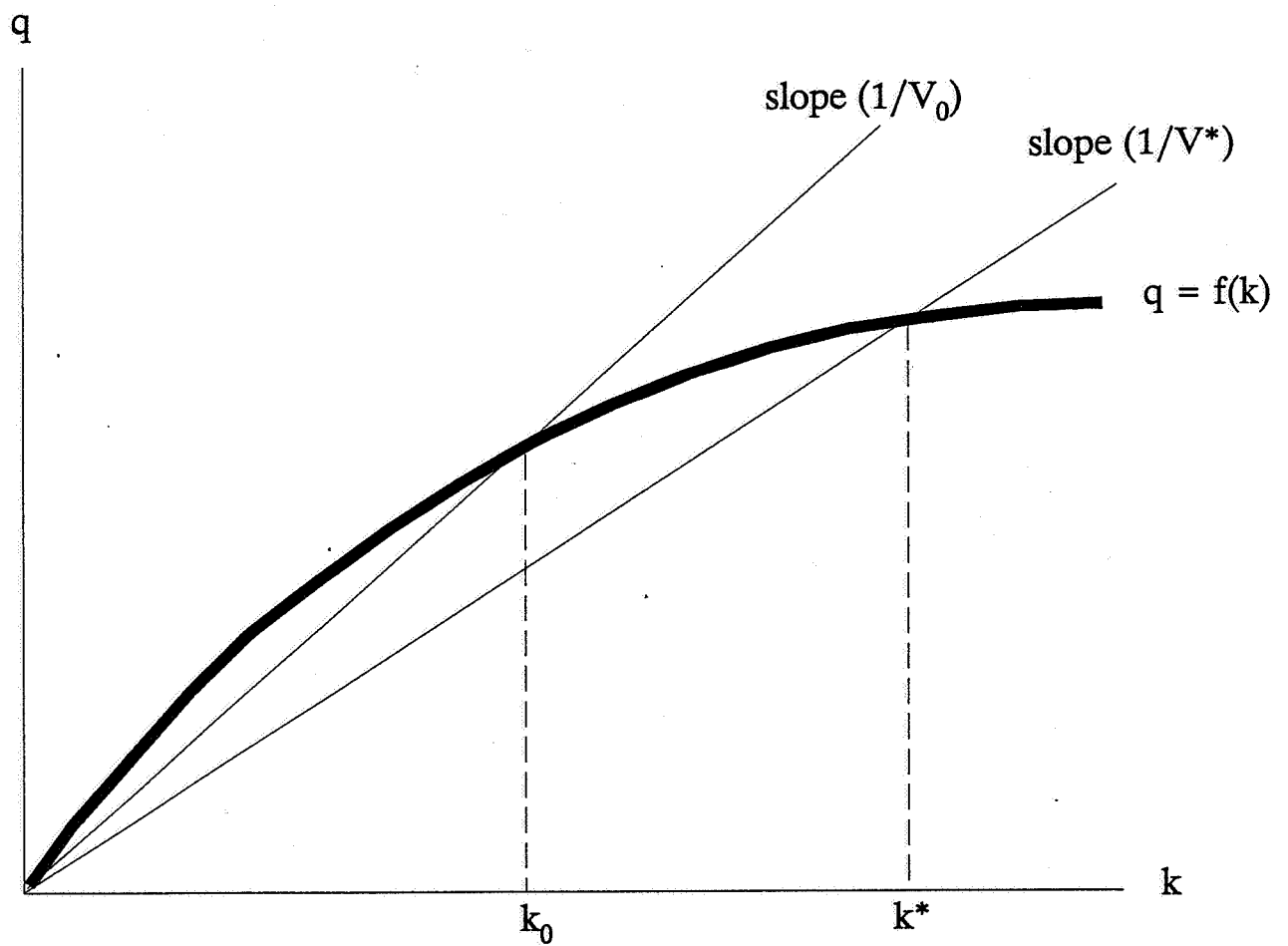
As a remedy, one could think of a **neoclassical growth model with multiple equilibria** (see, e.g., Branson 1972). This model is based on a production function which permits phases of increasing, constant and diminishing returns to scale, as depicted in Figure 2. For low values of k (k < k**), q is growing at increasing returns, for higher levels of k (k > k**) at decreasing returns. However, the lower equilibrium point at k** is unstable, and k tends to fall back to zero for k < k**. To escape such a *"poverty trap"*, the economy must be pushed over the point k** to the right. Towards this end, the capital stock per worker could be raised via capital transfers from abroad or temporary savings and investment incentives. Alternatively, the production function could be shifted upwards by improving on the efficient use of production factors via economic reforms.

[Figure 2]

In the case of Eastern countries, k could be interpreted as an increasing function of time (for k < k*): during the initial phases of reform, k would be low but increasing as the reform progresses. In long-run equilibrium, k* should be comparable to the capital intensity in industrial countries.

Corresponding to the shape of the production function, the *capital-output ratio V varies* over time. At the outset, as long as k is small, V is rather high. As k rises but remains below k_0, V diminishes. For k_0 < k < k*, V rises to approach the (constant) equilibrium level V* at k*.

Another possibility within the framework of the neoclassical model to arrive at a variable V is to rely on *vintage models* where V would depend on the age structure of the capital stock.

The **"new theory" of (endogenous) growth** provides additional arguments in favor of increasing returns which are seen to result either from externalities or from incomplete competition. In the first case, new knowledge, produced by the research sector, increases production possibilities in other sectors and may thus yield, even in competitive equilibrium, increasing aggregate returns to scale (Romer 1986, Lucas 1988). Alternatively, the price taker assumption is dropped and incomplete competition permitted: innovative entrepreneurs develop new technologies or find niches in some other way where little or no competition prevails, at least for some time (Scott 1992). Both arguments could have some bearing on transition economies.

3. Appraisal of Previous Estimates

In the current stage of transformation, various future growth paths can be imagined for the Eastern countries. Therefore, empirical estimates of capital needs differ markedly according to the particular set of assumptions employed, and can at best serve to delineate orders of magnitude. No estimate recently presented in the literature attempts a forecast of

Figure 2. Neoclassical per capita growth model with multiple equilibria
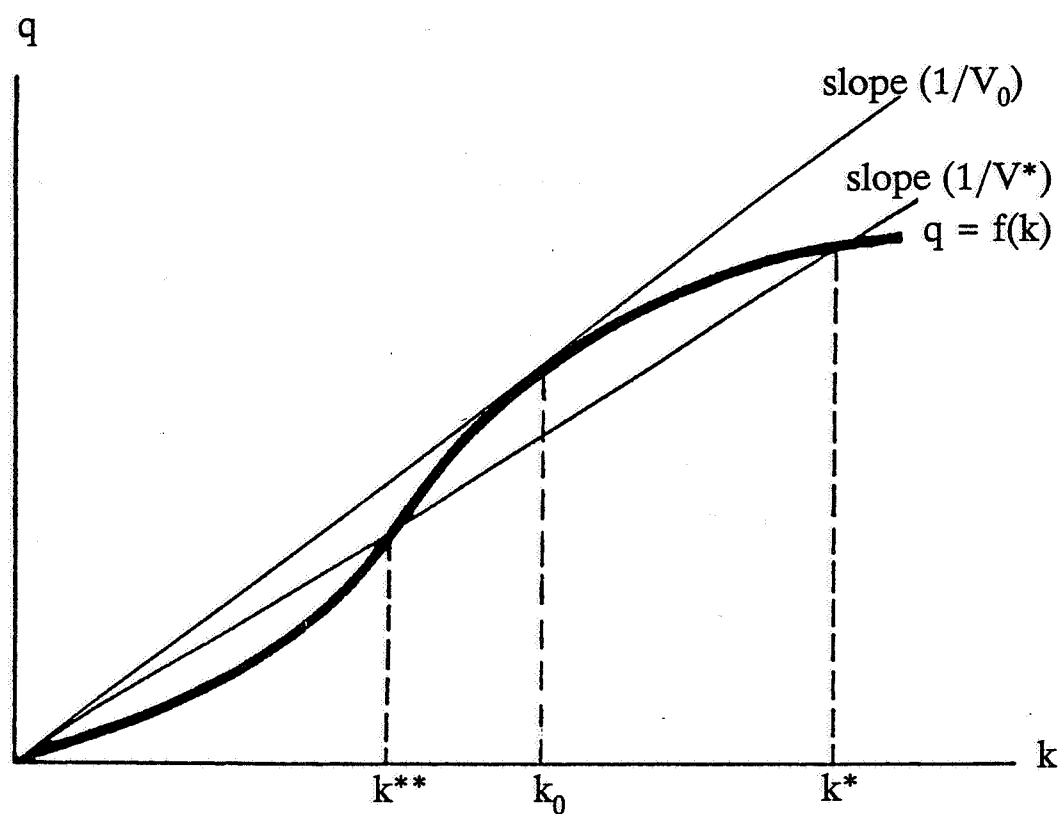
$$V = V(k)$$

$$V_k \begin{cases} < 0 \text{ for } k < k_0 \\ > 0 \text{ for } k > k_0 \end{cases}$$

future growth. Rather, each study relies on either some convergence argument or on some other references. A further key assumption relates to the present efficiency and the potential efficiency gains in Socialist countries. Most studies confine themselves to the average development up to a certain point in time (usually 10 years from now).

The idea that foreign financing will provide a boost to Eastern European catching-up is often inspired by Western European post-war growth assisted by US Marshall aid. Here an **actualisation of the Marshall plan,** based on Collins-Rodrik (1991), is provided, for nothing more than a possible historic reference. Between 1948 and 1951 the Marshall plan provided $ 12.4 bn to 16 Western European countries in form of grants and concessionary loans. An update of these figures can be achieved by adjusting for inflation ($ 65.4 bn), or by keeping the aid share of recipient countries constant (at roughly 2% of Western Europe's GDP this would amount to $ 192 bn, equivalent to 2% of GDP of Eastern Europe plus FSU), or by keeping the cost constant in relationship to the donor country's GDP (at 1% of OECD countries' GDP this would amount to $ 544 bn).

Begg et al. (1990) assume that countries of "Eastern Europe", excluding the former Soviet Union (FSU), Yugoslavia and East Germany, strive for doubling their GDP per capita within 10 years which implies an average annual rate of growth of about 7 per cent. For the required capital stock at the end of the period, a *lower limit* is derived by assuming a (constant) average capital-output ratio of 2.5. Alleging that present capital is worthless, average annual net investment needs amount to some $ 103 bn. To arrive at an *upper limit,* the capital-output ratio is set at 4, and the initial level of aggregate GDP is assumed to be one third higher than in the lower-limit scenario. Average annual investment needs would then amount to $ 226 bn. The study postulates that all net investments will be financed externally.

Fitoussi-Phelps (1990) model the demand for new capital in Eastern countries by a sudden increase in the world's labor force (by addition of the East to the "world") at a given capital stock. As a consequence, capital is reallocated to the East, real interest rates rise and real wages fall. The postulated target for the 5 countries considered ("E5", i.e. CSFR, Hungary, Poland, Bulgaria and Romania) is to arrive after 10 years at an average productivity of labor which is about as high as in Germany or France today. In these two countries, the average 1980-86 gross stock of fixed capital (excluding housing and public non-marketable capital) by employed person was some $ 71500 (at prices and end-year exchange rates of 1980), net capital per head some $ 44600. Inflating these figures to prices of 1990 (a rise by roughly 30 per cent), the required aggregate capital stock in the E5 countries at the end of the assumed 10-years adjustment period would be some $ 3580 bn (gross) and $ 2230 bn (net). Given that existing capital is not completely worthless, but also that adjustment is likely to take more than 10 years, Fitoussi-Phelps see annual investment needs only around half the figures calculated (some $ 180 bn gross and $ 110 bn net). These amounts would partly become available through domestic savings.

McDonald-Thumann (1990) assess the capital needs that would permit East Germany to reach within 10 years the current productivity level of West Germany. Employing a CES production function, initial conditions are formulated for the *FRG* concerning the productivity level and the value of the capital stock. Supply conditions in *East Germany* are based on the same production function, but labor productivity is assumed to be only 30-35 per cent of West Germany's. Further assumptions are made concerning labor's share in net national product (0.675) and actual vs. potential factor use as an indicator of general factor inefficiency (0.8). From these initial conditions, current capital stock in East Germany is estimated at some $ 390 bn. Given the productivity target, cumulative net investments between 1991 and 2000 would be in the range of $ 90-120 bn p.a. (in 1990 prices). The more moderate target of attaining only 80 per cent of the FRG's labor productivity would necessitate investments of some $ 60-80 bn p.a.

Collins-Rodrik (1991) first of all provide an update of the Marshall plan aid, as mentioned earlier. Alternatively, they formulate a productivity target and a growth target. In the *productivity approach* they assume that, in a Cobb-Douglas production function, the share of capital in total income is 1/3, and labor productivity in the East is at present only half of that in the West. Then, capital intensity in the West is currently eight times as high as in the East ($ 85900 versus $ 10700, respectively). Putting the average capital-output ratio in the West at 2.5, the present capital stock is estimated to be $ 601 bn in Eastern Europe and $ 2265 bn in all Eastern countries. If in Eastern countries labor productivity is to attain the Western level in 10 years, the capital stock would have to increase sevenfold, implying annual net investments in Eastern Europe of some $ 420 bn (and $ 1600 bn if the FSU is included).

This approach assigns to capital the major explanation for observed income differentials, and leaves out of the picture the value of the human capital stock and the disorganization of the economy. The productivity approach is extremely crude, and the results are very sensitive to the assumed existing labor productivity differential - of which we know little -, the assumed production function and the implied target to close that productivity gap.[7]

In the second case, a *growth target* of 7 per cent p.a. would increase real GDP in Eastern countries from $ 700 bn in 1991 to some $ 1400 bn 10 years later. Assuming that the capital-output ratio will fall to about 2.5 by then, the capital stock required to augment that production level would amount to $ 3440 bn for Eastern Europe and to $ 5710 bn for the FSU. Given initial capital stocks as above, annual required net investments would be some $ 284 bn in Eastern Europe and $ 405 bn in the FSU.

Gros-Steinherr (1991) ask how much capital would be required to bring Eastern European economies close to the average income of the EC. Because Eastern European

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7) Had it been assumed that labor productivity in the East were only one third, the capital-labor ratio were only one-twenty-seventh of the Western value.

countries aim at becoming members of the EC, this seems to be a useful benchmark. More realistically, and even taking into account the impatience widely felt about achieving a convergence of living standards, the countries of Eastern Europe will be doing well if they can achieve in the next ten years the average standard of living enjoyed by the EC countries in 1990.

The authors assume initial GDP levels and different growth paths for some Eastern countries over a time horizon of 10 to 15 years (Table 1). Taking the example of the FSU, for which a rather low initial income level was assumed ($ 2500 per capita in 1990), and postulating an average growth of 3 per cent per year over the next 10 years, income per capita by the year 2000 would be $ 3350 (at constant 1988 prices), or only slightly more than 20 per cent of the current income of the European Community. To reach the EC's current income by 2000, the annual growth rate would need to increase to an unattainable level of 19.5 per cent. Over a horizon of 15 years, the required rate of growth would still be 12.5 per cent (Column 4 of Table 1). Although not impossible in the light of East Asian experience, such a growth rate is very unlikely. A *lesson* that emerges from this exercise, therefore, is that catching up will require more than one generation, even for the most advanced Eastern European countries. This lesson has considerable importane for the question of whether and when these countries can be integrated into the European Community.

[Table 1]

Column 5 of Table 1 exhibits the *net capital needs* (neglecting depreciation) for the growth paths of Columns 3 and 4. This computation assumes a constant incremental capital-output ratio of 2, which corresponds to the average capital-output ratio for productive investment in the EC. It thus neglects depreciation, social investment, and the cost of an environmental cleanup, but also neglects the potential efficiency gains from reforms through better use of existing resoures. These may offset each other.

To accumulate the amounts of capital shown in Column 5, a corresponding amount of domestic savings or foreign investment is required. *Domestic savings ratios* for the period 1985-89 range from 24 per cent (CSFR, Hungary) to 30 per cent (Poland, FSU), but they are likely to fall from their forced levels in spite of possibly safer and higher returns. So far, these declines have not been dramatic, as the precautionary motive for saving plays a more significant role in a market economy. Increased uncertainty and insufficient state provisions for old age, sickness, and unemployment are bound to induce people to save. Taking a savings ratio of 20 per cent, Czecho-Slovakia could finance the investment required to catch up in 10 years and could even achieve a slight surplus. Hungary would require 12 years, and Poland 15 years. The FSU would need much more time, or foreign investment of more than $ 1.3 trillion accumulated over 15 years.

These computations suggest that there is a fundamental difference between the FSU and the other Eastern countries. Catching up with Western Europe's present income level

Table 1. Capital needs according to Gros - Steinherr

	(1) GDP per capita in 1990	(2) GDP per capita in 2000 at 3% growth	(3) Required rate of growth to catch up by 2000	(4) Required rate of growth to catch up by 2005	(5) Net capital needs per capita	(6) Savings at 20% of GDP per capita (accumulated)
	US $, at 1988 to 1990 prices and exchange rates					
USSR	2,500	3,350	19.5%	12.5%	24,000	19,500 (15 years)
Czecho-Slovakia	6,000	8,060	9.5%	6.5%	15,600	16,200 (10 years)
Hungary	5,000	6,720	11.5%	7.5%	18,000	18,400 (12 years)
Poland	3,500	4,700	15.5%	10.5%	21,600	23,000 (15 years)

Source: Gros - Steinherr (1991), Table 6.

over the next 15 years is feasible for the CSFR and for Hungary, less so for Poland, but out of reach for the FSU. Furthermore, the FSU can get close to this level only if its present income is grossly underestimated and if foreign-capital contributions are significant. The size of the problem, however, may far exceed the capacity of the West, even if it is willing to support reform for political reasons.

The scenario by Gros and Steinherr does not suggest that *foreign capital* will not be necessary for the Eastern European countries. It does suggest that even a scenario of high growth will not require much of an increase in foreign debt over the period as a whole if domestic savings can be maintained at a reasonable level. This is an important conclusion because some of the countries are already heavily indebted, and foreign agents are still reluctant to invest, given the uncertainies. However, foreign direct investment will be necessary to effect the transfer of technology and management skills and to assist in reallocating national resources.

Foreign funds will also be particularly useful during the initial years to finance the takeoff and to offset income losses generated by the shock of restructuring. This is very clearly evidenced by the Polish and Soviet experiences. Unfortunately, it is most difficult to borrow abroad at the beginning of a regime change, and it is therefore of utmost importance to establish credibility and creditworthiness as rapidly as possible. As long as foreign investors are not confident about a future return to stable growth with open borders, they will either not invest or invest only in projects with very short payback periods.

Ochel (1991) sets out from rather pessimistic growth assumptions. In the period 1989-95, Eastern Europe (excluding former Yugoslavia) is seen to grow at average annual rates between 0 per cent and 2.5 per cent, and the FSU between -1 per cent and +1 per cent. The corresponding rates in the second half of the 1990s are some 4 to 5 per cent and 3 to 4 per cent, respectively. Because of low wage rates, capital-output ratios are considered extremely low, 1.45 in Eastern Europe and 1.26 in the FSU. Ochel calculates separate *sectoral* forecasting scenarios for the business sector, the public infrastructure and the housing sectors. Overall annual gross investment needs are estimated at some $ 75-98 bn in Eastern Europe and $ 106-116 bn in the FSU.

Korolev-Lushin (1992) also attempt a *sectoral* estimate of capital requirements in the FSU. Confining themselves to non-residential capital accumulation over the period 1991-1995, they ask for the "minimal investments needed to keep the economy's production potential in workable condition". They estimate these needs to be, at constant 1990 prices, some $ 300-320 bn annually. Domestic funds would suffice these needs, if the traditionally recorded share of gross savings in GDP of some 25-30 per cent could be maintained. For some time to come, however, the gross savings ratio may not exceed 10-15 per cent of GDP which would necessitate external funding of some $ 120-180 bn annually.

Similar to McDonald-Thumann, **Boote (1992)** uses a CES production function which is parameterized on the EC. Targets to be achieved within 10 years are set in terms of GDP per head relative to that projected for the EC by 2002 (two thirds for Hungary and the CSFR, one half for Bulgaria, Poland and Romania). This requires an average growth rate of 12.6 per cent p.a., ranging from 7.7 per cent for the CSFR to 16.8 per cent for Romania.

Essentially, the model is assumed to apply in Eastern Europe (excluding former Yugoslavia) in 1992 with two inefficiency factors, g (general efficiency) and h (labor specific efficiency). These two, together with the estimated starting GDP (at purchasing power parities), the assumed labor share, and parameter f (the elasticity of labor services with respect to the capital-labor ratio) determine the starting capital stock. For future years, projections are based on country-specific estimates of the employed labor force which are in turn based on projections of the active labor force, a uniform unemployment rate in 2002 of 9 per cent and a half-percentage point decline a year in the participation rate.

The approach of the model emphasizes the importance of movements in *efficiency factors* over the 1992-2002 period in determining the likely capital needs associated with any growth path. Thus, for Eastern Europe as a whole, assuming g=h and the absence of efficiency gains from the 1992 starting position,[8] an average annual growth rate of some 12 1/2 per cent would require cumulative investments of over $ 17 trillion. This would imply investment-income ratios in excess of 100 per cent and a capital-labor ratio by 2002 nearly twice the EC average, which is clearly implausible.

Alternatively, if all inefficiencies (by comparison with the EC) were eliminated by 2002 (i.e., g=h=1), cumulative investment needs for the region would be around $ 2 1/2 trillion or 30 per cent of projected GDP. The impact on individual countries varies according to whether efficiencies are assumed to improve equally across countries or there is some general catching up by the less efficient countries (Romania, Poland).

The dominant effect on the cumulative investment needs is the movement of the efficiency factors over the projection period, rather than the starting position. In part this is a reflection of the small size of the initial capital stock, which is unlikely to exceed $ 1 1/2 trillion for the region, compared to investment needs required to meet the postulated growth targets. The lower the initial capital stock is assumed to be (i.e., the higher the initial general efficiency g), the lower are, ceteris paribus, subsequent investment needs consistent with a given growth target.

This stylized production function model does not provide definitive answers to the capital needs of Eastern Europe. It rather provides a framework for illustrating the importance of factors which determine these needs. Given that the approach *assumes* the application of an EC production function in Eastern Europe and *assumes* efficiency

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8) g = h implies higher labor inefficiency than capital inefficiency, as both g and h apply to labor. This is plausible as capital has been implicitly adjusted to Western values. The cumulative investment flows are not particularly sensitive to the precise starting configuration of g and h.

parameters applicable to such a function, there is inevitably little economic grounding for either the initial value or the subsequent movement of these parameters.

Nonetheless, the approach underscores the importance of improving economic efficiency. If average EC efficiency levels can be achieved in 10 years, growth close to the targets postulated is potentially achievable with investment-income ratios around 30-40 per cent. In the absence of such substantial efficiency improvements, the growth targets would appear unrealistic. The *policy message* is clear: rapid growth requires the rigorous implementation of reform policies such as liberalizing markets, establishing effective ownership and institution-building in such areas as legal, statistical and accounting systems. Such reform policies are essential both to promote efficiency gains and investment, particularly foreign direct investment which is likely to be an important medium for the transmittal of efficiency gains.

Giustiniani et al. (1992) match each Eastern European country with a Western group of reference countries, considered as a relevant target. The FRG serves as a reference country for the former GDR; Greece and Portugal for Romania and the FSU; Greece, Portugal and Spain for all others except Czecho-Slovakia, which obtains a high target through the inclusion of Austria in its reference set.

The authors assume that the reference countries grow at a certain rate so that catching up does not mean with present but with future income levels of countries below the average income of developed economies. Assuming Cobb-Douglas technology, an initial labor productivity level one-third of Western countries, and an adjustment function for the differences in labor productivity and of total factor productivity, they obtain a dynamic simulation model that generates investment needs. According to their results, capital stock and GDP would grow in the range of 9-10 per cent, and the time required to catch up would range from 14 years for the former GDR to 23 years for Poland and the FSU. Making now the rather implausible assumption that savings ratios remain at their level of 1989 - thus ranging from 22 percent in the former GDR to 34 per cent in Romania -, they obtain an estimate of foreign financing needs. Inclusive of debt service, accumulated debt would reach a maximum of $ 4.8 trillion after 20 years before declining thereafter. Net-import requirements would accumulate over 16 years at average annual rates of some $ 300 bn ($ 85 bn for the E5 countries, $ 149 for the FSU and $ 65 for the former GDR).

Recently the **OECD (1992)** has provided a scenario for a "plausible upper limit" of external finance to Eastern Europe (excluding former Yugoslavia). Assuming 5 per cent p.a. productivity growth in the period 1995-2015, the region would reach 46 per cent of average OECD productivity by 2015 (compared with 23 per cent in 1990). Much of the improvement should be due to growth in total factor productivity. If savings ratios increased only slightly, external financing would have to rise from some $ 20 bn in 1995 to more than $ 40 bn in 2015 (in 1990 prices). Average annual capital flows to the region would amount to $ 25 bn.

[Table 2]

Table 2 **summarizes** the estimates discussed above. The large discrepancies between the results underscore how *sensitive* they are to the particular assumptions concerning (a) the initial size of GDP (per capita), (b) the initial value of the capital stock, (c) the specific targets chosen, (d) the length of the adjustment period, and (e) the shape of the underlying production function.

Particularly striking are the markedly differing *target growth assumptions,* ranging rom 4-5 per cent p.a. (Ochel) to more than 12 per cent (Boote). Even when disregarding the initial reform phase with output declines, it seems unlikely that double-digit growth rates could be maintained for a decade or longer. The experience of the newly industrializing countries (with little international indebtedness) would also not support that assertion.[9] A frequent *policy message* of the calculation exercises is that growth targets are achievable only if the accumulation of physical capital is accompanied by substantial efficiency gains. These will only materialize if, in order to attract foreign direct investment at sufficient scale, the implementation of market-oriented legal and institutional structures continues unabatedly.

4. How to Improve on Empirical Estimates?

4.1 Initial GDP and Target Growth Assumed

Some of the differences between the various estimates provided in the past are due to divergent assumptions on **initial GDP per capita.** Conversions based on observed *exchange rates* are subject to frequent and substantial price changes. The less erratic *purchasing power parities* are likely to yield more realistic "market value" estimates of output. Havlik (1992) prefers comparison based on *welfare indicators* which, however, refer to inputs more than to outputs and partly disregard differences in product quality. In our view, they yield implausibly high per capita income values. Joining arguments with, e.g., Gulde and Schulze-Ghattas (1992), we base our initial GDP per capita estimate (for 1990) on the PPP method used by PlanEcon (1990), and project these data with actual and estimated developments to arrive at values for 1992.

Most previous estimates consider a ten-years period of growth, commencing immediately. The current adjustment crisis suggests, however, the introduction of a **"no-growth" period** of up to and including 1995 before significant growth effects of the reforms implemented can be expected to surface.[10]

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9) According to World Bank (1991), the highest annual average growth rates over the period 1965-89 were achieved in the Republic of Korea and in Singapore (7 per cent each). However, double-digit growth rates have occurred over shorter periods, e.g., in Taiwan during the mid to late 1970s.

10) Such a development resembles a "J-curve of transition", as suggested by Long-Siebert (1991) and Siebert (1991).

Table 2. Estimated investment needs of Eastern Countries

Source	Regional coverage	Sector level	Policy target	Growth period (years)	Capital – output ratio	Value of existing capital stock	Average annual investment needs (billion US $)	Of which annual external financing (billion US $)
Begg et al. (1990)	E5	National	Doubling GDP per capita (7 % p.a. average GDP growth rate)	10	2.5 (constant)	0	103 (net)	103
					4.0 (constant)	0	226 (net)	226
Fitoussi – Phelps (1990)	E5	National (excl. housing and non-marketable capital)	Average labor productivity as high as today in FRG and France	10	–	Non-zero	180 (gross) 110 (net)	Partly
McDonald – Thumann (1990)	Former GDR	National	Attaining labor productivity as in FRG	10	–	390	90 – 120 (net)	–
Collins – Rodrik (1991)	E7	National	Average labor productivity as in the West	10	2.5 at end of period	E5: 600 FSU: 1,700	E5: 421 (net) FSU: 1,164 (net)	Partly
			7 % p.a. average GDP growth rate	10	2.5 at end of period	0	E5: 344 (net) FSU: 571 (net)	Partly
Gros – Steinherr (1991)	CSFR, Hungary, Poland and FSU	National	Average GDP per capita of EC in 1990	10 – 15	2.0 (constant)	–	E3: 126 (net) FSU: 687 (net)	Partly
Ochel (1991)		Sectoral	4 – 5 % p.a. average GDP growth rate	Second half of 1990s	1.45 (constant)	–	75 – 98 (gross)	–
	FSU	Sectoral	3 – 4 % p.a. average GDP growth rate	Second half of 1990s	1.26 (constant)	–	106 – 116 (gross)	–
Boote (1992)	E5	National	Productivity level relative to EC (implicit GDP growth 12½ % p.a.)	10	3.2 (average of country group, ranging from 2.6 to 4.0)	1,300	260 (gross)	–
Giustiniani et al. (1992)	E5, FSU, former GDR	National	Catching up with Western reference countries (9 – 10 % p.a. average GDP growth rate)	14 – 23			–	85 (E5) 149 (FSU) 65 (former GDR)
Korolev – Luschin (1992)	FSU	Sectoral	Maintain production level	1991 – 1995			299 – 321 (gross)	122 – 182
OECD (1992)	E5	National	5 % p.a. GDP per capita growth after 1995	25	Stable at current level		–	25

Abbreviations: E3 ...... CSFR, Hungary, Poland.
E5 ...... CSFR, Hungary, Poland, Bulgaria, Romania.
E7 ...... CSFR, Hungary, Poland, Bulgaria, Romania, former Yugoslavia, former Soviet Union.
FSU ..... Former Soviet Union.

The development from 1991 through 1995 is based on estimates provided in Gabrisch et al. (1992) and on information gathered at the 1991 Vienna Conference on "Medium-Term Economic Assessment". This is supplemented by own estimates to yield the more or less stylized picture presented in Table 3[11] which, however, may not yet sufficiently allow for the very dim prospects that have recently emerged for the FSU.

[Table 3]

During the initial phase of steep decline in income, the prevailing high investment risks will keep capital intensity low. A stable relationship between capital and growth will prevail only from the second half of the 1990s, when the adjustment crisis is supposed to have ceased.

If the economies of Eastern countries are to catch up to the Western industrialized nations, they must over the medium term **grow significantly faster than the West.** Although national growth rates will vary according to economic structure, sequence of reforms chosen, and political stability, the following scenario is for expositional purposes based on a *uniform growth rate of 7 per cent per annum.*

By 2005, the most advanced CSFR would reach a per capita GDP in 1990 prices ($ 12700) which is just half the projected GDP per head in the European Community.[12] At the other end of the scale lies Romania ($ 4500) with only 18 per cent of projected EC income. Significant relative advances will be made only by Czecho-Slovakia, Hungary and Poland (Table 2). If these assumptions are viewed as growth or income targets underlying the estimated capital needs, they are clearly very modest given the political pretentions in the East.

4.2 Marginal Capital-Output Ratio and Investment Needs

As argued above, the capital-output ratio is likely to vary over time: assuming that existing capital stocks are more or less obsolete, large investments in new productive capital will be required to set the growth process in motion. During this initial phase, the *marginal capital-output ratio (v)* is likely to be high due to the pent-up demand for investment in new machines and buildings and by the need to establish organizational efficiency.[13] As the deficiencies in the system and the economic crisis are by and by overcome, v can be expected to fall markedly.

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11) Background data and projections concentrate on the "core" group of the E5 countries. Mechanistic calculations are also presented for the FSU and former Yugoslavia, although initial conditions and likely future developments in these two countries are much more uncertain than for the "core" group.

12) Using the assumption of Boote (1992), according to which EC economies may on average grow by 2 1/4 per cent p.a.

13) Investments in housing as well as for general infrastructure and environmental purposes should perhaps be excluded from the calculation of a capital stock which directly serves as an input in the production process. This is explicitly taken into consideration by Ochel (1991) whose marginal capital-output ratios are accordingly rather low.

Table 3. Initial GDP and growth assumptions

	CSFR	Hungary	Poland	Bulgaria	Romania	E 5	Former Yugoslavia	FSU	E 7
Population 1990 (mill. persons)	15.66	10.57	38.21	8.85	23.23	96.52	23.94	289.70	410.16
GDP per head 1990 (PPP, in US $)	7,940	5,920	3,910	5,430	2,950	4,692	5,140	5,060	4,978
Growth assumptions (percentage changes against previous year)									
1991	-16	-10	-9	-23	-13		-20	-10	
1992	-7	-2	-1	-10	-10		-10	-16	
1993	-4	1	2	-1	-1		-5	-5	
1994	4	3	2	0	0		0	0	
1995	4	3	3	2	1		2	2	
GDP per head 2005 (in US $) [a]	12,664	11,006	7,426	7,475	4,543	7,979	7,054	7,292	7,440
Relative GDP per head [b]									
1990	0.43	0.32	0.21	0.30	0.16	0.26	0.28	0.28	0.27
2005	0.49	0.43	0.29	0.29	0.18	0.31	0.28	0.28	0.29

E5 ... CSFR, Hungary, Poland, Bulgaria, Romania.
E7 ... CSFR, Hungary, Poland, Bulgaria, Romania, former Yugoslavia, former Soviet Union.
FSU ... Former Soviet Union.

Sources: PlanEcon Report (Dec.1990); Gabrisch et al. (1992).

[a] Assuming constant populations and 7% p.a. average GDP growth from 1996 to 2005.
[b] GDP per head of respective Eastern country relative to average EC GDP per head in 1990 ($ 18,365) and 2005 ($ 25,641). The latter figure is based on the assumption of Boote (1992) of a 2¼% p.a. real growth of EC GDP per head.

In the exercise presented in Table 4 it is assumed that the capital stock is worthless in 1996, at the beginning of the accumulation period. In this year, the marginal capital-output ratio v is set to be $7^{14)}$; in the years thereafter it falls linearly to reach 2.5 by the year 2005. Only after 2005, v is expected to remain level or follow the slightly rising trend that has been observed for industrial countries.

What this time-path of v implies for the *average capital-output ratio (V)*, depends on the value of the initial capital stock. If it is worthless as assumed, V increases continuously. At the same time, the average *ratio of investments to GDP* continuously falls from 45.8 per cent in 1996 to 16.4 per cent in 2005.

[Table 4]

The approach used here[15] yields estimates of the net capital accumulation over the period 1996-2005. For the 5 Eastern European countries considered (E5), it would amount to roughly *$ 169 bn per year*, for the FSU to *$ 465 bn per year* (Table 4). Since the current capital stock is assumed negligible, replacement investments may be disregarded. Net investments would then equal gross investments.

5. Are Large Financial Transfers to Eastern Countries Necessary?

5.1 Private Investment Demand

The fundamental force driving the process of economic reform in the previously centrally-planned economies of Eastern Europe is the aspiration of their populations for improved living standards. The achievement of satisfactory rates of economic growth in the not too distant future may thus prove crucial to the sustainability of the reform effort. The behavior of private investment holds the key to the rate at which these economies can move to a sustainable path of healthy economic growth. And the behavior of savings determines the feasibility of high growth and fixes the required foreign financing.

The most serious obstacle to the emergance of strong **private investment demand** is the extent of uncertainty that accompanies the reform process. The irreversibility of many types of capital investment makes it optimal from the standpoint of individual investors to wait before committing funds to new activities, except in the case of projects with very high expected yield. This effect is likely to prove especially strong when it can be expected that much of the uncertainty will be resolved in a span of a few years, as currently in Eastern Europe. The failure of each individual to invest worsens the credibility problem and decreases

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14) According to Debs et al. (1991: 13), the marginal capital-output ratio in the 1980s was 10 in the CSFR, 18 in Hungary, 7.3 in Bulgaria, 7.4 in Romania and 55.7 in Yugoslavia. Gros-Steinherr (1991) quote the following ratios for the 1985-89 period: CSFR 12, Hungary 20, Poland and FSU 13, Greece 10 and Portugal 6.

15) Since target growth assumptions are rather rough, the effects of population growth may be disregarded in the current context. Boote (1992) sets average population growth in Eastern Europe to be 0.3 per cent p.a.

Table 4. Net investment requirements

| | Cumulative 1996 to 2005 | |
| | Total | From abroad [a] |
	Bill. US $ at 1990 prices	
CSFR	436	138
Hungary	256	81
Poland	624	198
Bulgaria	146	46
Romania	232	73
E 5	1,694	536
Former Yugoslavia	371	118
Former Soviet Union	4,646	1,470
E 7	6,711	2,124

E5 ... CSFR, Hungary, Poland, Bulgaria, Romania.

E7 ... CSFR, Hungary, Poland, Bulgaria, Romania, former Yugoslavia, former Soviet Union.

[a] Assuming that investments of about 20% of GDP can be financed from domestic sources.

the attractiveness of investment for all others, so these economies risk getting caught in a stagnation equilibrium. The *message for policy* again is that the reform process must proceed quickly, especially with regard to the "rules of the game" that will govern private enterprise. In addition, there may be scope for well-designed measures that seek to stimulate private investment today by offering temporary benefits to enterprises that undertake investment early in the reform process.

As regards the **short-to-medium term prospects for growth** in Eastern Europe, one should not be too pessimistic. Although it may indeed prove difficult to sustain high levels of investment in these economies over the next few years, reasonably high rates of growth may prove to be attainable with more modest investment rates - certainly much lower than these economies have nominally generated in the past. As was argued before, the reason for this conclusion is that the reform process will contribute to much *greater efficiency* in the investment process and hence to a gradual, but significant, decline in incremental capital-output ratios.

5.2 Domestic Savings Potential

If sufficient investment is forthcoming, it will be necessary to produce adequate levels of saving to avoid the emergence of unsustainable macroeconomic imbalances. In this regard, the main areas of concern will be the need to transform the methods of financing the public sector and the effects of privatization on household saving. In the short run, the availability of foreign saving - or at least its private component - is likely to depend on factors similar to those affecting private domestic investment, since both represent claims on the respective domestic economies.

Past savings in Eastern countries have virtually been wiped out through price adjustments. The accumulation of new household savings will temporarily suffer from the desire to satisfy the long-frustrated demand for consumer goods. During the early phase of reform, household savings may therefore be small, if not negative. In the medium term, however, substantial savings could accrue in all domestic sectors, private and public. Judging from historical experiences in East and West, in later transition stages about one fifth to one fourth of national income could be set aside for investment purposes (see, e.g., World Bank 1991).

If it is assumed that, during the growth period from 1996 to 2005, 20 per cent of GDP can yearly be saved, the calculations presented above imply that in Eastern Europe $ 54 bn would on average still have to be covered from abroad; for the FSU, that figure would amount to $ 147 bn (Table 4). In 1996, 44 per cent of investments would be financed domestically, while no foreign financing would be required as of 2004.

5.3 External Supply of Funds

Can an annual flow of transfers of $ 100 bn and more to Eastern countries, in addition to a transfer of similar magnitude to the ex-GDR, be financed without major strains on world financial markets? A basis for discussion is again provided by the estimates of Collins-Rodrik (1991). They consider three scenarios: a lower-bound scenario of $ 30 bn transfer per year to Eastern Europe, including the ex-GDR and the FSU; an intermediate scenario of $ 55 bn; and a high-level scenario of $ 90 bn per year.

With unchanged transfers to LDCs, these additional flows would **raise interest rates** by 96 basis points (bp), 176 bp and 288 bp, respectively. The sharp increases in interest rates result from the very low interest elasticities of savings and investments as estimated by these authors. Alternatively, increased transfers to the East may crowd out transfers to LDCs, at unchanged interest rates. This would decrease investment as a share of GDP of LDCs by up to 2 percentage points. Of course, if interest rates were to increase, then LDC borrowing would also decline, so that transfers to Eastern Europe would be funded by adjustment both in developed and in less developed countries.

It might be informative to approach this question from another angle. Table 5A gives **regional current account imbalances** in 1990 to 1993 as estimated by the IMF.[16] The major surplus countries in 1990 were Japan, other smaller Asian countries and Germany. For some time to come, the deficit of developing countries is expected to increase, as Africa will be unable to support itself; as Latin America is returning to positive growth; as the Middle East is suffering from a decline in oil prices in real terms and growth will benefit from better peace prospects; and as Asia is growing fast. The US current account deficit is likely to decline but not to disappear. At best, this reduction will be sufficient to offset the increases in the Latin American deficit. Europe's surpluses of the late 1980s have now vanished as a result of the turn-around in the German current account from a large surplus to a deficit. However, most estimates of future trade flows come to the conclusion that larger financial flows to Eastern countries will be reflected in high European and Asian current account surpluses, engineered by increased exports of these countries to the European East (see also Gros-Steinherr, 1991).

[Table 5]

One *immediate lesson* of this analysis is that surplus countries, in particular Japan, should not be induced to reduce their surpluses. Furthermore, it may even become possible for amounts closer to the upper range of the estimated financing needs to materialize without significant increases in world interest rates, if Western excesses and inefficiencies are scaled down. In this context one may think of the recent turnaround of policy perceptions in Italy. Should Italy succeed in cutting budget deficits from currently more than 100 per cent of GDP

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16) One problem of this approach is that the summing-up constraint for current account imbalances is not
   respected. All large geographical areas have a deficit adding up to over $ 100 bn.

Table 5. Regional imbalances

A. Payments Balances on Current Account [a]

	1990	1991	1992	1993
		Bill. US $		
Industrial countries	-97.5	-27.9	-48.5	-67.8
United States	-92.1	-8.6	-53.4	-69.3
Japan	35.8	72.6	93.3	88.1
Germany [b]	47.9	-20.7	-14.1	-9.2
Other industrial countries	-89.1	-71.2	-74.4	-77.3
Developing countries excl. Eastern Europe and former USSR	-7.9	-84.8	-71.1	-72.3
Eastern Europe and former USSR	-22.4	-9.2	...	...
Eastern Europe	-1.4	-6.8	-6.7	-5.8
Former USSR	-21.0	-2.4	...	...
All developing countries	-30.3	-94.0	...	...
By region:				
Africa	-2.2	-5.8	-7.5	-6.4
Asia	-1.0	-13.1	-17.4	-16.2
Europe	-25.0	-10.0	-23.9	-27.7
Middle East	2.1	-45.7	-22.2	-22.9
Western Hemisphere	-4.2	-19.4	-22.4	-23.0

[a] Including official transfers.
[b] Data through June 1990 apply to West Germany only.

Table 5. Regional imbalances

B. Financing

	1990	1991	1992	1993
		Bill. US $		

Eastern Europe

Deficit on goods, services, and private transfers	1.6	6.1	6.0	5.3
Non-debt-creating flows, net	1.1	0.5	1.0	1.9
Asset transactions, net	-2.6	0.7	1.0	-0.6
Net errors and omissions	-	1.0	-	-
Use of reserves	0.9	-2.0	-2.4	-4.2
Net external borrowing	2.3	5.9	6.2	8.2
Reserve-related liabilities	-0.2	3.5	1.6	1.1
of which:				
Net credit from IMF	0.1	3.5	...	...
Other net external borrowing	2.4	2.4	4.6	7.1

Memorandum

Long-term borrowing from official creditors, net	4.3	2.9	4.5	3.6
Net borrowing from commercial banks	0.7	-0.4	-1.1	-0.3
Exceptional financing	10.1	12.7	7.4	3.5

Former USSR

Deficit on goods, services, and private transfers	21.0	2.4	...	...
Non-debt-creating flows, net	-0.7	-0.2	...	...
Asset transactions, net	-	-	...	...
Net errors and omissions	-	-	...	...
Use of reserves	14.2	-2.4	...	...
Net external borrowing	7.5	5.1	...	...
Reserve-related liabilities	-	-	...	...
of which:				
Net credit from IMF	-	-	...	...
Other net external borrowing	7.5	5.1	...	...

Memorandum

Long-term borrowing from official creditors, net	9.1	12.8	...	...
Net borrowing from commercial banks	-6.7	-13.5	...	...
Exceptional financing	4.5	-0.5	...	...

Table 5. Regional imbalances

C. Debt

	1985	1986	1987	1988	1989	1990	1991	1992	1993
					Bill. US $				
Eastern Europe and former USSR									
Total debt	114.2	124.5	141.5	141.4	153.1	169.9	164.8	...	...
By maturity:									
Short-term	20.9	21.7	24.9	29.7	28.7	16.9	8.3	...	...
Long-term	93.3	102.7	116.8	111.8	124.4	153.0	156.5	...	...
By type of creditor:									
Official	47.4	53.3	59.7	57.6	63.2	84.0	92.6	...	...
Commercial banks	55.5	60.4	72.6	70.9	74.5	72.4	56.3	...	...
Other private	11.3	10.7	9.2	13.0	15.5	13.4	15.8	...	...
Eastern Europe									
Total debt	85.3	93.1	102.3	98.4	99.1	108.8	104.8	104.4	110.8
By maturity:									
Short-term	14.0	14.3	16.3	18.5	11.0	9.6	5.9	5.3	5.3
Long-term	71.3	78.7	86.0	80.0	88.1	99.2	98.9	99.1	105.5
By type of creditor:									
Official	36.5	41.4	44.9	41.4	42.8	52.7	48.8	51.7	54.8
Commercial banks	37.5	40.9	48.2	44.1	40.9	42.6	40.7	34.7	3 4.1
Other private	11.3	10.7	9.2	13.0	15.5	13.4	15.2	18.0	22.0
Former USSR									
Total debt	28.9	31.4	39.2	43.0	54.0	61.1	60.0	...	...
By maturity:									
Short-term	6.9	7.4	8.6	11.2	17.7	7.3	2.4	...	...
Long-term	22.0	24.0	30.6	31.8	36.3	53.8	57.6	...	...
By type of creditor:									
Official	10.9	11.9	14.8	16.2	20.4	31.3	43.8	...	...
Commercial banks	18.0	19.5	24.4	26.8	33.6	29.8	15.6	...	...
Other private	-	-	-	-	-	-	0.6	...	...

Source: IMF, World Economic Outlook, May 1992.

to the Maastricht convergence mark of 60 per cent of GDP, savings in the amount of some $ 500 bn would become available for other uses, among these also for investment financing in Eastern Europe. Other EC countries, e.g. Belgium and Ireland, face similar adjustment problems.

Table 5B summarizes the forecasts of the IMF and Table 5C the overall indebtedness. Total indebtedness in Eastern countries, including the FSU and excluding the ex-GDR, has actually declined since 1990 and is estimated to remain nearly stationary to the end of 1993, excepting the FSU.

5.4 Investment Financing in Rapidly Growing Countries

Official Western estimates of external financing needs of Eastern countries for the years to come are rather modest. Is this paucity of likely foreign funding an excessively limiting factor of growth prospects? To provide an answer to this question it may be useful to check the estimates explicitly or implicitly derived from growth models by **historical investment and savings ratios** of countries with rapid-growth periods, particularly of newly industrializing countries (NICs). It should be kept in mind, however, that starting conditions in Eastern countries and in LDCs differ considerably: compared with LDCs, income levels are generally higher in Eastern economies, while high public sector shares, unclear ownership relations, and lack of entrepreneurship make their passage to persistent growth more difficult than for LDCs (Laski 1992).

The success of the NICs can easily be related to a high investment ratio and to balancing investments and savings. Mann (1990) quotes the Republic of Korea as an outstanding example: initially (from 1965 to 1973) investments were largely financed by increasing foreign debt; from 1973 to 1980, gross investment and savings ratios rose sharply (average share in GDP of 31 per cent and 25.7 per cent, respectively); in the course of the 1980s, investments remained boyant, while some of the external debt could be repaid. A very similar investment-savings pattern has occurred in Taiwan (Urban 1992). A strong positive correlation between investment and per capita income growth was also found by De Gregorio (1991) for the fastest growing economies in Latin America.

Presumably the **importance of savings** is not restricted to making capital available. Rather, it is the organization capacity to collect taxes, to attract and collect voluntary savings, to intermediate these savings and to channel them to productive investments. To put it provocatively, a country that is not able to organize the collection and allocation of savings is not ready for growth. Trying to shorten the process by leap-frogging this development and calling upon foreign funds may be quite a waste of resources. There are enough examples available in the foreign aid domain.

At present it is also not clear whether more funds could really be channelled officially into Eastern Europe. International organizations find it difficult to spot **suitable projects** for financing. Also industry is not held back by financial constraint in their investments in Eastern Europe, but rather by lack of projects of the desired quality and by overall uncertainty; such investments as are carried out are modest and resemble more an option-taking than the realization of an investment plan.

6. Concluding Remarks

This report has evaluated the future capital needs of Eastern countries and the potential structure of financing. In assessing the growth potential, it (a) allowed for the current adjustment crisis, and (b) assumed a 7 per cent p.a. real rate of GDP growth after 1995. Under these conditions the gap in the standard of living in relation to the West will be narrowed but marginally. The estimates presented put investment needs at about $ 169 bn per year for Eastern Europe and nearly three times this amount for the former Soviet Union. In drawing conclusions from such figures, one has to be careful, though, as error margins surrounding such empirical estimates are still inadmissibly large. To narrow the uncertainies, evaluations on a disaggregated sectoral basis should further be pursued.

Accelerating the catching-up process beyond the assumptions made above requires more capital in earlier years. On the other hand, we have not allowed for increases in total factor productivity resulting from improvements in motivation, professional training, management skills and the like. Such improvements in efficiency would reduce the need to invest in physical capital. The relative importance of capital and efficiency depends on initial conditions, in particular on the starting value of the capital stock. If this is already high, economic growth may depend on efficiency improvements rather than on additions to the capital stock.

Not all of the financing needs will and can be provided by the West. Recent experience shows that, on the one hand, the absorption capacity of Eastern countries is quite limited, and, on the other, the domestic savings potential is intact. To mobilize new savings as well as investment demand, economic reforms (particularly with regard to privatization, legal and economic stability, financial intermediation) should proceed without delay. If domestic savings could be maintained at 20 per cent of GDP, annual capital inflows of some $ 54 bn in Eastern Europe and $ 147 bn in the FSU would on average be required to meet the estimated investment needs.

Net foreign financing has been insignificant so far and is likely to remain modest in the years to come. This is particularly true for foreign direct investments due to the uncertainties still present in the ongoing reform process. Funding surely will accelerate once these uncertainties are reduced enough to provide a reliable investment climate. Eastern Europe

will then become a major borrower of external funds for which, however, there will be fierce competition. Only solid projects will be able to obtain funding from private capital markets and marginal borrowers everywhere will be crowded out. This means that Eastern European projects will need to offer foreign investors risk-adjusted returns at least comparable to those in developed countries.

Is then the solution official financing? Probably not, and as argued by Schulmann (1992), the real crowding out will occur in official financing. As a percentage of GDP, the official development assistance (ODA) of industrial countries has stagnated at 0.35 per cent for the last 30 years. There is little reason to expect that this percentage will increase dramatically in the near future. Since there are more customers for ODA than ever, competition for official funds - in particular grants and soft loans - will increase sharply in the years to come. As we move towards 200 nation states in the world (a tripling in 50 years), the distribution of official aid will become even more skewed, favoring smaller political units. Paradoxically, this occurs at a time when economic units all over the globe become more integrated and more dependent on one another than ever before.

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