

# **CAN EASTERN EUROPE CATCH UP?**

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## **Abstract**

The plausibility of catching-up with Western Europe by six Eastern European countries is assessed by examining a hypothetical growth scenario. Per capita GDP in Western Europe is chosen as an benchmark. The requirements for convergence are then examined, with particular reference to population, capital stock, investment, trade and "technical progress". The growth rates suggested by a successful convergence process for East-Europe turn out not be unrealistic, but nevertheless rather ambitious. Future institutional developments seem to hold the key to success.

## CAN EASTERN EUROPE CATCH UP?\*

Economic disparities within Europe — its division into Europe A and B — have long been perceived as a source of tension and instability in the international system. In a seminal report prepared during World War II for the Royal Institute of International Affairs, P.N. Rosenstein-Rodan expounded the importance of raising the economic status of “the whole area between Germany, Russia and Italy”. “It is generally agreed,” he wrote, “that industrialization of internationally depressed areas like Eastern and South Eastern Europe ... is in the ... interest not only of those countries, but of the world as a whole.” Consequently, he proposed, a large scale program should be undertaken with Western assistance to industrialize the area so it “would fit ... into the world economy.”

Rosenstein-Rodan’s (1943, pp.1,2) also warned that if “Eastern and South Eastern Europe should industrialize... on the ‘Russian model’ ... the building up of heavy industries ... at a great sacrifice would only add to the world’s excess capacity of heavy industry and would constitute ... a waste of resources”. As it happened, this was exactly what the communist governments did.

Following the collapse of communism, and more than half a century since the publication of the Rosenstein-Rodan’s proposal, the problem of the East European economies (hereafter, the EE’s) has not been fully resolved. Their role in the world economy is still open to question. Two polar views have emerged. An optimistic scenario emphasizes the assets: an educated labor force, ingrained industrial culture, an infrastructure that can be significantly improved within a short period of time, and to boot, a favorable location next to one of the world’s industrial hubs. According to this view, once the institutional reforms are carried out, the EE’s could join the OECD countries relatively soon as an important force in the global economy.

According to a more pessimistic approach, however, the EE’s display a number of structural features that render success in the foreseeable future unlikely. Among them are: heavy external debt, trade vulnerability, weak managerial and production-oriented *élites*, ambiguous property rights assignments.

In their extreme form, both views are bound to prove off the mark. The heterogeneity within the EE’s group dictates a more nuanced approach. Indeed, since the *annus mirabilis* of

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1989 the attitude towards the EE's has become more skeptical, and the emphasis has gradually shifted away from uncritical acceptance of the neoclassical view of an (unconditional) convergence process. More attention is being devoted to institutions. Successful transition from an institutional viewpoint - it is stressed - would allow EE's to reduce the "efficiency gap"<sup>1</sup> and increase the speed with which the development gap can be covered<sup>2</sup>. Put differently, successful convergence depends on success in the area of institutional change.

In this paper however, we do not deal at length with the kind of institutional framework that should be realized; nor do we offer any guesses regarding the way institutions are going to evolve in the EE world. Rather, the scope of what follows is to provide a rough estimate of what the convergence process implies for the EE economies (section 1.). The plausibility of the underlying hypotheses is analyzed in section 2., whereas section 3. compares the performance required for convergence with the actual economic achievements in recent years. Finally, section 4. explores the robustness of the results and draws some conclusions.

## 1. Growth for Successful Convergence

Regardless of the availability and quality of the data, and the methods applied, a forecast of the future is only a guess. Forgoing techniques and detail which strike us as incommensurate with the task, we make ours simply. First, the OECD growth is extrapolated to establish a benchmark; then, putative catch-up growth rates are calculated for the EE's starting from 1992, i.e. the time when the political regimes following the collapse of communism were more or less secured. All growth rates are exponential.

### 1.1 *A Projection of Growth in Western Europe*

Before a benchmark for the comparison can be established two decisions must be made: which countries to include, and for how long a period to extrapolate. Since on the other side of the comparison we deal with Eastern Europe, it is appropriate to narrow down the "OECD

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<sup>1</sup> This term defines the proportional gap between potential and actual steady-state GDP. That is, in all economies some degree of inefficiency is unavoidable. The efficiency gap differs across countries, but it is assumed that it remains constant once the institutional setting has been suitably transformed and the catching-up process completed. Hence, it will not be necessary to distinguish between steady-state growth with reference to potential or to actual income.

<sup>2</sup> The development gap refers to the difference between the level of income associated to the steady-state growth rate and actual income. Thus, according to this terminology, the total difference between potential income and actual income is equal to the efficiency gap, plus the development gap.

group” to its West European core. Arbitrarily, we take it to mean: Austria, Belgium, Denmark, Finland, France, Germany, Holland, Iceland, Ireland, Italy, Luxembourg, Norway, Spain, Sweden, Switzerland and the United Kingdom. These sixteen countries had in 1992 a total population of 359 million. In *per capita* GDP (1990 US \$), they ranged in the same year from a low of \$11.8 thousand for Ireland to \$20.7 thousand for Switzerland, with an average of \$15.7 thousand for the group as a whole. In every respect, most of these are highly advanced countries, setting international standards. They are certainly so regarded by the EE’s.

Given the difference in economic levels, as well as the inevitable industrial restructuring of the EE’s, and the all-encompassing scope of their intended reforms, the time dimension of our projections extends for a generation. A shorter period is manifestly unrealistic. A longer one verges on science fiction, conceivably germane here, but beyond our purview. We therefore venture to divine the potentialities of the next few decades, specifically the years 2000, 2010, 2020 and 2030. Treating Western Europe as a whole, we extrapolate for each of these years the *per capita* GDP (in 1990 US \$) by assuming an average yearly growth rate equal to that registered for the 1964-92 period (2.28%). Table 1 below summarizes the results.

**Table 1**  
***Per capita* GDP FOR WESTERN EUROPE**  
(in thousand 1990 US \$)

Year	Actual	Projection
1964	8.3	—
1970	10.4	—
1980	13.0	—
1990	16.3	—
1992	15.7	—
2000	—	18.9
2010	—	23.7
2020	—	29.7
2030	—	37.3

### *1.2 The Hypothetical Catch-up Growth Rates for the EE’s*

Again we must begin by defining the geography. Our focus is Eastern Europe, that is Bulgaria, the Czech Republic, Hungary, Poland, Rumania and Slovakia. Roughly, but only roughly since we are leaving out a large part of the Balkans and the Baltic countries, this corresponds to the area which, according to the already mentioned Rosenstein-Rodan proposal, was to be the

target of a Big Push, and which, in fact, was the object of communist superindustrialization efforts.

It is in the aftermath of nearly five decades of these efforts that we want to assess the EE's prospect to finally become by year 2030 "Europe A", instead of the backward "Europe B" of the past. This will be done country by country, rather than for the area as a whole.

Using the 2 percent rule for convergence<sup>3</sup>, we stipulate that the point-of-departure (1992) gap in *per capita* output of Western Europe and the EE's will be reduced by one half in 2030. On this basis, the hypothetical catch-up growth rates are calculated for each of the EE's<sup>4</sup>. The results are presented in Table 2 (figures are rounded), as well as visually in the graph below, which includes also the projection for Western Europe.

## 2. The Plausibility of Projections

The question of plausibility deals with two separate issues: (a) are the Western-Europe extrapolations acceptable as predictions of the future? and (b) are the hypothetical growth rates for the EE's realistic? We consider them in turn. The closely related inquiry into the applicability of convergence theory, from which our heuristic catch-up hypothesis arises, is left to the section 4..

### 2.1 *Future growth in Western Europe*

Among others, Stern (1991) rightly noted that "growth theories . . . leave much to be desired in their *explanation of growth experience*" (p.131). All things said, the causalities of the process of growth remain obscure. The number of variables, many of which are qualitative, and the complexity of their interaction, render the mechanism of economic growth virtually a "black box."

A method of prediction that recommends itself under such circumstances is extrapolating the past. We have done just that, using combined data from sixteen different countries for the preceding three decades. Such procedures are open to criticism.

Still, even though we cannot quantify the probability of making a wrong prediction, there are

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<sup>3</sup> According to the literature on the subject, when convergence is successful, it takes place at a speed of about 2% per year. In other words, every year a catching-up economy reduces the GDP gap against its benchmark by 2%. By doing so, it takes some 35 years to cut the gap by half. See Barro and Sala-i-Martin (1991), as well as Mankiw, Romer and Weil (1992).

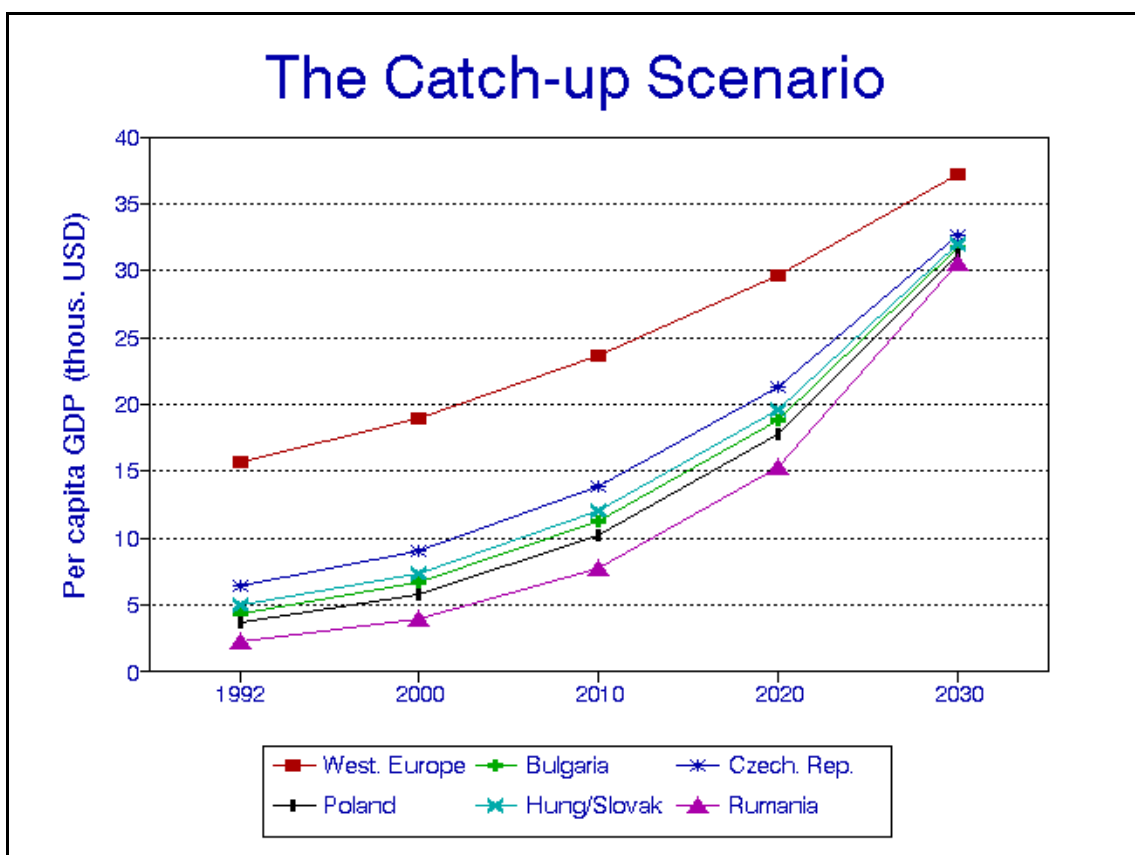
<sup>4</sup> In addition to usual statistical sources (UN, IMF, World Bank), use has been made of estimates by PlanEcon (Washington, D.C.) and by the Institut für Internationale Wirtschaftsvergleiche (Vienna). With the exception of figures in Table 9 of the text, the valuation of GDP is in PPP, rather than at the official exchange rates. Details about the calculations are available from the authors on request.

reasons to hope that the risk is tolerable. At any rate, there is no way to avoid it in dealing with the future.

**Table 2**

**CATCH-UP GROWTH RATES**  
Per capita GDP (in thous. 1990 US \$)

Country	1992	2030	growth per year
Bulgaria	4.4	31.7	5.2%
Czech Rep.	6.4	32.7	4.3%
Hungary	5.0	32.0	4.9%
Poland	3.7	31.3	5.6%
Rumania	2.2	30.6	6.9%
Slovakia	5.0	32.0	4.9%



## 2.2 *Catching-up by Eastern Europe*

In trying to assess whether the hypothetical growth rates are at all attainable, we are turning the question around. Rather than guessing the outputs of a given “black box,” we are making conjectures about the kind of a “box” it would take to produce certain outputs. There is a logic behind this reversal of procedure. Western Europe has, among other features, an established institutional framework, a developed system of incentives, a continuity of proven practices, and a production structure geared to a relatively stable demand. Although we are not quite clear about the working of the mechanism (or as the case may be, the organism) of growth, something of a considerable degree of coherence and effectiveness is presumably at work, ensuring efficiency, capital accumulation, technical progress, and also, evolutionary adjustments of various kinds. More than two centuries of successful development testify to this.

It is not so with the EE’s. Almost everything is in flux. Institutions and practices are being radically changed. New attitudes and behavior patterns must be instilled against the forces of habit and entrenched interest. In addition to all changes — legal, organizational, sociological and what-not — production structures must adapt to still unknown demands. Doubtless, it will take much time before things settle down; the post-communist transformation is of generational, in some countries perhaps even trans-generational duration. To judge if in spite of it, the EE’s can within the next few decades be expected to significantly narrow down the gap that separates them from the benchmark group of advanced countries, is admittedly perilous. Ultimately, we must recognize that the question is historical, which means it can only be conclusively answered *ex post*.

Even so, some of the more obvious required characteristics of the EE’s “black box” can be identified and even quantified, so as to narrow the focus of the analysis. Population, which is a key variable in the aggregate growth equation, presents the least difficulty. With much less confidence, we can make conjectures about accumulation and depreciation of capital, both crucial. Conditional estimates of trade potential can be made as well, shedding more light on the EE’s growth requirements. Finally, we can—it is more appropriate to say, we must—speculate on technical progress and the conditions likely to propitiate it.

### (i) **Population**

We adopt here the projections of the World Bank (shown in Table 3 below)<sup>5</sup>, although

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<sup>5</sup> Source: The World Bank, ~~World Population Projections 1992-1993 edition~~ and ~~Historically Planned Economies: A Guide to the Data, 1993 Edition~~. No separate projections for Czechoslovakia’s successor republics are available. Projected totals were divided in the same proportion as the actual population in 1992.

we realize that they should be treated with extreme caution<sup>6</sup>. Interpolations for intermediate years are our own.

**Table 3**  
**POPULATION PROJECTIONS FOR THE EE'S**  
(in millions)

Country	1992 (act)	2000	2010	2020	2030
Bulgaria	8.8	8.7	8.6	8.6	8.7
Czech Republic	10.4	10.6	11.0	11.4	11.7
Hungary	10.4	10.2	10.0	9.9	9.9
Poland	38.5	39.8	41.6	43.4	44.9
Romania	23.4	24.1	25.1	26.1	27.1
Slovakia	5.3	5.4	5.6	5.8	6.0

**(ii) Capital Stock**

The uncertainties of demography pale into insignificance when compared with estimating capital stock. The evaluation of the EE's existing assets presents a special challenge. The usual heterogeneity and vintage problems have in this case been greatly complicated by arbitrary pricing in the communist past. Not only that; there have been several different pricing regimes resulting in sharp discontinuities of historical data. Government statisticians kept adjusting the numbers to somehow achieve comparability, but in spite of their labors, there are as yet no meaningful data on the EE's capital stock. Because of the breakdown of the COMECON trade patterns and the increasing exposure to world market forces, it is not even clear how much of the EE's industrial plant can be legitimately described as "capital". Some believe that in a great many cases its net worth may actually be negative. In view of all that, we have no choice, but through a *tour de force* of assumptions and simplifications, to construct an "imputed" capital stock series.

For this purpose, we first assume for all the EE's a uniform 1992 capital-output ratio of 3.5. Further calculations are based on this figure, but the consequences of alternative values — specifically, 3.0 and 4.0 — are considered too (see section 4.). Given the arbitrariness of the basic capital-output assumptions, we can only aspire to the crudest estimates possible of future

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<sup>6</sup> How large the forecast errors can be even within one decade is exemplified by the figures for 1990. Earlier projections for this year were systematically overshooting the actual figures shown in Table 3: from 1 percent in the case of Poland to 4 percent for Bulgaria. See for instance Baldwin (1981).

capital requirements. Even so, these tentative estimates may well bear a closer relationship to a theoretically correct measure of capital stock—the present value of future returns—than firms’ balance sheets.

The EE’s *per capita* growth figures are from section 1.2 above — a set of flawed but nevertheless suggestive measures of comparative macroeconomic performance. We also assume summarily, without further distinctions, that labor input is proportional to population and that two thirds of the productivity growth will come from “technical progress” i.e. not from more capital. Under an additional assumption of a Solow-type production function with constant returns to scale, and the share of capital,  $\hat{\alpha}$ , equal to the customary one third, we can calculate the required  $k$ ’s<sup>7</sup>. Table 4 below presents the results.

**Table 4**  
**REQUIRED STOCK OF CAPITAL PER HEAD\***  
(in thousand of 1990 US \$)

Country	1992	2000	2010	2020	2030
Bulgaria	15.5	23.4	39.4	66.1	111.0
Czech Republic	22.4	31.6	48.5	74.5	114.4
Hungary	17.4	25.8	42.1	68.6	111.9
Poland	12.8	20.2	35.4	62.3	109.6
Romania	7.8	13.5	26.9	53.7	107.1
Slovakia <sup>a</sup>	17.5	25.9	42.2	68.7	112.0

### (iii) Depreciation

We are treading on slippery terrain also in the case of depreciation of capital. In theory, the depreciation is defined as “the loss of value through the passage of time” (Dixit (1976), p.69). In practice, it is actually determined by accounting rules set by the government. Again, rather than using available data, we are better off postulating some plausible figures.

Depreciation charges against gross output ordinarily amount to 10 to 12 percent. With a capital-output ratio of 3.5, as assumed here for the base year of 1992, this would be 2.9 to 3.4

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<sup>7</sup> Given our numerical assumptions,  $g_y = \alpha g_k + g_{TP}$ , (with the  $g$ ’s standing for the growth rates of *per capita* output, capital and “technical progress”) yields  $g_k = g_y$ ; hence, the values for the  $k$ ’s.

percent of the capital stock, implying a capital turnover period of 29 to 34 years. Under the conditions of the EE's, this strikes us as much too slow. Allowing for a high degree of obsolescence in addition to physical decay due to disrepair, and in view of intensified competition that the EE's will face in coming decades, we normatively opt for a quicker turnover (and renovation) of capital stock—25 years. This means a depreciation rate of capital stock rate of 4 percent annually.

#### (iv) Investment

The arithmetic of growth allows us to gauge the investment cost of a hypothetical catch-up by the EE's. Combining the already calculated capital stock per head with the population forecasts,  $P$ , and the postulated depreciation rate,  $d$ , yields the gross investment totals for each year according to the formula:  $I_t = P_t (\Delta k_t + dk_{t-1})$ . Table 5 summarizes the results.

**Table 5**  
**GROSS INVESTMENT REQUIRED, 1993-2030\***  
(in billions 1990 US \$)

Country	2000	2010	2020	2030	Total	
					1993-2030	Per Year <sup>a</sup>
Bulgaria	18	30	50.5	85	1,447	38.1
Czech Republic	27	43	68	108	1,980	52.1
Hungary	22.5	36	58	95	1,698	44.5
Poland	74	137	251	456.5	7,018	184.7
Rumania	34	70	146	302	4,026	105.9
Slovakia	12	20	34	57	976	25.7
EE's Total	187.5	337	607	1,103	17,139	451.0

\* All figures rounded; may not add up to the total.

<sup>a</sup> Arithmetic mean calculated as:  $1/38 \sum I_t$ .

To complete this part of the exercise, we calculate the relative burden of investment, i.e. the gross investment/GDP ratios.

Net investment in year (t+1), for  $t = 0, 1 \dots 37$  is:

$$i_{t+1}^n = k_{t+1} - k_t = k_t(e^{g_y} - 1)$$

Gross investment is:

$$i_{t+1} + dk_t = k_t(e^{g_y} - 1 + d)$$

Since output is defined as  $y_{t+1} = y_t \exp(g_y)$ , the gross investment/output ratio is:

$$\frac{i_{t+1}}{y_{t+1}} = \frac{k_t(e^{g_y} - 1 + d)}{y_t e^{g_y}} = \frac{k_t}{y_t} \bullet \frac{e^{g_y} - 1 + d}{e^{g_y}}$$

The figures in Table 6 of the text, are for  $I/Y = P_i/P_y = i/y$ . By virtue of our assumptions, the ratios remain constant throughout the catch-up period.

**Table 6**  
**GROSS INVESTMENT/GDP RATIOS (in percent)**

Country	Ratios *
Bulgaria	31
Czech Republic	28
Hungary	30
Poland	32
Rumania	36
Slovakia	30

\*Rounded;

A critical dimension of the EE's hypothetical catching up with their more advanced neighbors, indeed a measure of feasibility, is reflected in these tentative estimates. We will yet return to this issue later. Here, we put our calculations in perspective by juxtaposing them in Table 7 to statistics of the communist period<sup>8</sup>.

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<sup>8</sup> Sources: U.S. Congress Joint Economic Committee, Economic Developments in Countries of Eastern Europe. A Compendium of Papers, U.S. Government Printing Office (Washington, D.C., 1970), p. 59 and U.S. Congress Joint Economic Committee, East European Economic Assessment. Part 1. Country Studies, 1980, U.S. Government Printing Office (Washington, D.C., 1981), pp. 262, 590.

**Table 7**  
**GROSS INVESTMENT/GDP (percentage) RATIOS IN COMMUNIST EE'S**

Country	Year(s)	Ratio(s) <sup>a</sup>
Bulgaria <sup>a)</sup>	1956-60	23.0
	1961-65	34.6
	1966-70	41.8
Czechoslovakia <sup>b)</sup>	1950	29.9
	1955	33.9
	1960	41.8
	1965	40.9
	1967	41.3
Hungary <sup>b)</sup>	1950	33.1
	1955	35.2
	1960	34.0
	1965	35.1
	1967	40.2
Poland <sup>a)</sup>	1950	25.1
	1955	31.4
	1960	34.2
	1965	39.2
	1967	39.7
Rumania <sup>b)</sup>	1951-55	17.6
	1956-60	16.0
	1961-65	24.3
	1966-70	28.8
	1971-75	34.1

a) Recalculated at “comparable prices”.

b) Recalculated at “constant prices”.

Changes in national accounting and pricing make comparisons with an earlier period of communist forced-draft industrialization suspect, but from all available evidence it appears that the share of investment was higher then — probably more than 35 percent. One should also remember the very high military budgets during the period of communism, a circumstance that - one may hope — will not encumber the EE's future advancement. Altogether, it appears that with respect to the required investment effort, a catch-up would be rather less demanding than the exertions that were forced on the EE's in the communist past, possibly with the exception of Rumania. Given proper institutions and an efficacious financial system, the EE's should be in the position to carry out a capital accumulation on the scale required by the hypothetical catch-up. This is a prospect for the long run. In a shorter period there may be considerable difficulties both in sustaining the volume of investment, and in generating the required, especially domestic, sav-

ings<sup>9</sup>.

Whether or not the necessary investment program will actually prove feasible, however, depends not only on the seemingly sustainable saving ratios. Since a large part of the output growth is to come from “technical progress”, a broad modernization program is a must. This means massive imports of equipment, foreign credits and, preferably, also substantial foreign investments. The importance of the latter would be difficult to exaggerate.

In view of that it is disappointing that the capital influx into the EE’s has so far fallen short of expectations. Cumulatively, in the years 1989-1996, the aggregate direct foreign investment in the six countries amounted to (current) US \$27.5 billion, of which half went to Hungary<sup>10</sup>. Even though the prolonged Western recession that contributed to this outcome is certain to give way, maybe soon, to more favorable business conditions, the experience of the recent years points to the extreme vulnerabilities of our catch-up scenario.

Rosenstein-Rodan suggested that about a half of the capital needed to industrialize Eastern Europe should be provided by the West. Even if this share were to be only one fifth, the sums to come from outside would be enormous: (1990) US \$3.4 trillion or 90 billion per year. Importantly, any inflow of outside capital, whether private or supplied through international agencies, would in effect lower the required saving rate, thus relieving the strain of the catch-up. On the other hand, a large inflow of foreign capital would be unlikely without a marked improvement in the EE’s export capabilities.

#### (v) Trade

At present the EE’s are lagging behind Western Europe in *per capita* volume of trade (see Table 8)<sup>11</sup>. In assessing the EE’s future trade potential, we must however view things in relative terms. Although only twenty years ago a cross section-time series analysis using a Cobb-Douglas type of function led to the conclusion that the EE’s international commerce was seriously underdeveloped<sup>12</sup>, this does not seem to be true any longer (see Table 9)<sup>13</sup>.

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<sup>9</sup> See Borensztein et al. (1992, pp.153-204).

<sup>10</sup> See the EBRD estimate reported in Bod (1997).

<sup>11</sup> Sources: UN, OECD and official national statistics as summarized in *Rocznik Statystyczny 1996*, Part II, Section XXV. Throughout, imports represent foreign trade, although, obviously, the dynamics of exports may differ.

<sup>12</sup> See Brzeski (1979).

**Table 8**  
**THE (ABSOLUTE) TRADE LAG, 1995**

Country	<i>Per capita Import*</i>	
	In US \$	As Percentage of Western Europe
Bulgaria	511 <sup>b)</sup>	10.0
Czech Republic	2,446	48.1
Hungary	1,513	29.7
Poland	753	14.8
Rumania	313 <sup>b)</sup>	6.1
Slovakia	1,577	31.0
The EE's Together <sup>a)</sup>	937	18.4
Western Europe <sup>a)</sup>	5,089	

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<sup>a)</sup>Weighted average.

<sup>b)</sup>1994.

Even if the EE's trade/output ratios are biased because of an undervaluation of their GDP by the use of (in this table only) current rather than PPP exchange rates, there is apparent convergence in this respect. It seems therefore plausible to assume that the volume of trade in EE's will just about keep up with overall growth during the catch-up period.

Combining the rates of population growth (from Table 3) with the hypothetical catch-up rates (from Table 2) yields the average annual rates for the trade expansion:

Bulgaria	<5.2%
Czech Republic	4.6%
Hungary	<4.9%
Poland	6.0%
Rumania	7.3%
Slovakia	5.2%

Table 10 contains the projections resulting from such assumptions<sup>14</sup>.

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<sup>13</sup> Sources: As in Table 8; in addition EBRD data.

<sup>14</sup> Sources: as in Tables 8 and 9.

**Table 9**  
**TRADE/OUTPUT RATIOS, 1995**

Country	Bulgaria	Czech Republic	Hungary	Poland	Rumania	Slovakia	The EE's as a group <sup>b</sup>	Western Europe <sup>b</sup>
Import GDP/- Ratio <sup>a</sup>	0.33	0.63	0.35	0.25	0.20	0.49	0.31	0.30

<sup>a</sup>)Both in current US \$.

<sup>b</sup>)Weighted average.

**Table 10**  
**TRADE EXPANSION, 1995-2030**  
**IN BILLION (1995) US \$**

Country	1995 (act)	2030 <sup>*)</sup>	Ratio <sup>*)</sup> 2030/1995
Bulgaria	4.3	25.4	5.9
Czech Republic	25.3	110.3	4.4
Hungary	15.5	82.0	5.3
Poland	29.0	194.6	6.7
Rumania	7.1	73.2	10.3
Slovakia	8.4	49.9	5.9
EE's (total)	89.6	535.4	6.0

<sup>\*)</sup>Rounded.

It behooves us to mention that according to sundry other estimates, some of them elaborate, the gap between the EE's actual and potential trade remains substantial<sup>15</sup>. If so, one would anticipate as a result of a gradual integration of the EE's into the world economy their commercial expansion at rates exceeding overall growth. Should it actually be the case, so much the better for the EE's. Their prospects for catching up with Western Europe would presumably be improved by additional benefits from trade. We prefer the more cautious figures above (Table 10), in spite of the possible bias in our estimates.

A reorientation of trade is of course a part-and-parcel of the ongoing transformation of the EE's economies. In this respect at least, the recent performance has been encouraging. In fact

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<sup>15</sup> See for instance Hamilton and Winters (1992); Baldwin (1994).

exports were the EE's most dynamic sector, with exports to the Western markets growing especially fast. As a newspaper headline enthusiastically put it, this was a clear case of "export-led growth"<sup>16</sup>. The previous pattern, in which transactions within the COMECON accounted for a lion's share of the EE's trade is gone. But belying dire predictions, several of the EE's have reached new heights in merchandise exports.

A continuing trade expansion can be hoped for mainly as a response to an opening of the EE's economies to the opportunities of comparative advantage. Moreover, the remaining impediments to the EE's exports to Western, especially West European markets are likely to be lessened, and eventually eliminated, as the post-communist countries enter in a closer relationship with the West. Last but not least, trade among the EE's and the former Soviet republics, above all Russia and Ukraine is likely to rebound from its present low level. The conceivable forthcoming upswing in the European economy will add impetus to these developments. Altogether, allowing for the uncertainties that the future holds, foreign trade may turn out to be one of the less problematic aspects of the EE's progression. This could not but enhance the probability of overcoming other obstacles.

**(vi) "Technical Progress"**

We use the term—in quotation marks because of its ambiguity—broadly. Anything that can be thought of as contributing to the so-called residual when both labor and capital are measured in conventional units (man-hours and constant dollars) qualifies. As pointed out in Dixit (1976, p.30), this broad scope contains changes in techniques within a given technology set, as well as changes in the technology set itself. Every kind of "progress" is included: exogenous, endogenous, embodied, factor-augmenting and output-augmenting. Learning-by-doing is certainly a part of it, and so are better organization and management. Inasmuch as education, and other forms of accumulating "human capital" improve performance, we count them—or rather their effects—as a part of the "progress."

In the specific situation of the EE's, where the institutions, the information system and the structure of incentives are all undergoing dramatic changes, the presumable positive impact of reform is also a part of "progress." By some criteria, this is too inclusive. But we must recognize the centrality of systemic changes in all hopes for better economic performance in the EE's. And we also must acknowledge the futility of attempts to further differentiate between the various sources of "progress" in assessing the EE's growth potential. Suffice to say at this point, that if

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<sup>16</sup> See F. Lemoine, "Europe de l'Est: une croissance tirée par l'exportation", *Le Monde*, May 23, 1995, p. 20.

well established and efficiently functioning private market economies were able to attribute from one-half to three-quarters of their post-war growth to something other than increasing the raw factor inputs, the EE's should in all probability be in the position to meet the two-thirds "target" we have stipulated. If they don't, the scenario of the catch-up, which we are considering here, would certainly be unrealistic.

Changes in the EE's industrial structure must be a part of the transition process of these economies. To catch-up with West-European output levels, the EE's, as already stressed, will need to dramatically boost the rate of "technical progress." This can only happen if (a) the institutional reforms are successful and (b) if there is a very substantial expansion of trade, and especially of foreign investment. The latter, in turn, obviously depends on the success of institutional reforms, and on the vigorous growth of the EE's. And so the virtuous circle must go on. Clearly, under any variant of the catch-up hypothesis, we must assume that, by and large, it will. We make implicit assumptions about the Big Picture as well: international stability and prosperity of the post-Maastricht UE. Although this is another story, it is not entirely separated from ours. For in the end, the West European situation will be affected by the developments in the EE's. The dependence, though more obvious on the EE's side, is mutual — a point acknowledged also by Western writers: *'the driving force behind integration in Western Europe ... may be temporarily exhausted until the ongoing systemic change in Eastern Europe creates new trade patterns in Europe ... New patterns of symmetric trade dependency ... [with] these countries are likely to give renewed momentum to European integration and change its course ....'*<sup>17</sup>. We find the argument convincing.

To reiterate the main point: the assumption of an adequate rate of "technical progress" is decisive for any scenario of significantly narrowing down the gap between Europe's two parts in the foreseeable future. The magnitude assumed here—two-thirds of the increase in *per capita* output—strikes us as feasible. Table 11 supports *prima facie* such a view<sup>18</sup>. It contains estimates of the production function residuals in various advanced countries during a period which in several ways (massive reconstruction, reorientation and reorganization) resembles the situation in the EE's.

With respect to "technical progress," both broadly conceived of, as here, and in the customary narrower sense, the EE's stand to avail themselves of what Gerschenkron described as the advantages of backwardness. Not only is the backlog of technological and organizational

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<sup>17</sup> See Wijkman (1990, p.104).

<sup>18</sup> Sources: Holesovsky (1977, p.299).

improvements in which the EE's can draw very large, their potential for making use of this opportunity — educational levels in particular (see section 4.) — is undeniable.

Once the signals and incentives of the market are allowed to work fully, this happy combination should bring fruit. On the other hand, if the outcome turns out less propitious than we assume, we also consider (see section 3.) the possibilities of a lower rate of “technical progress”.

**Table 11**  
**CONTRIBUTION OF “TECHNICAL PROGRESS” TO GROWTH**  
**1950-1962**

Country	Percentage Share of TP in Growth <sup>a)</sup>
France	75
Italy	72
Norway	70
Belgium	63
West Germany	62
Japan <sup>b)</sup>	60
Netherlands	60
United Kingdom	52
United States	41

<sup>a)</sup>An estimate of total factor productivity (residual) which corresponds to our broad concept of “technical progress.”

<sup>b)</sup>1955-1968.

#### **(vii) Other Considerations**

The matter of capital losses already previously mentioned in (ii), may have direct bearing on the catch-up scenario. Notoriously, the EE's suffered during the early 1990s a dramatic decline in output. The extent of this phenomenon is illustrated in Table 12<sup>19</sup>.

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<sup>19</sup> Source: official statistics as reported in Hunya et al. (1994, p.3). In the case of Poland, the table reflects only partly a downward spiral that began earlier. By 1989, the production had recovered but was still below the 1978 level. In this particular instance probably in others too, though to a lesser degree - official statistics exaggerate the fall in the production. First, the economic meaning of the earlier GDP figures, reflecting the peculiarities of communist priorities and practices, is questionable. In addition, the compensating increases in the production of the private sector have very likely not been fully taken into account. Nevertheless, on the balance the EE's output has undoubtedly shrunk, albeit less than official statistics suggest.

**Table 12**  
**DECLINE IN REAL GDP (1992 compared with 1989)**

Country	Percentage Change
Bulgaria	-27
Czech Republic	-23
Hungary	-25
Poland	-17
Rumania	-29
Slovakia	-20

If a comparable decline occurs as a result of a severe cyclical recession, a period of accelerated output growth follows right afterwards. Equally pronounced, and more prolonged is the acceleration during the recovery from war damages. Examples abound, from Russia's NEP during the 1920s through the various post-World War II booms, in Germany, Japan, and indeed the EE's themselves<sup>20</sup>. Typically, the explanations emphasize that damages to capital stock are relatively easy (and inexpensive) to repair. The incremental output-capital ratios are therefore extremely high during post-war reconstructions. There is also another less frequently discussed factor — a continuity of demand patterns. It is not clear to what extent either of these conditions applies to the situation in the EE's.

For one thing, much of the production plant of the EE's probably has to be replaced. Not only is it obsolete; but the demand it used to serve in the past no longer exists. It has disappeared with the collapse of the COMECON trade, and, more fundamentally, with the breakdown of the highly militarized Soviet-style "input-input economy." On a scale hardly imaginable before, the catastrophe that Rosenstein-Rodan predicted has in effect wiped out a part of the EE's capital stock. The anecdotal reports describing the zero or negative net worth of post-communist enterprises, even whole industries, refer to the consequences.

Inasmuch as currently idle, or under-utilized facilities could again be put to use, the catch-up scenarios may actually be less strenuous than they seem. On the other hand, however, the West-European benchmarks are calculated starting from a low recession base, the year 1992, which of course makes the catch-up appear easier than it might actually be. The net effect is

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<sup>20</sup> See for instance Aldcroft (1993, pp.108-114).

unknown, but it could be slightly in favor of the EE's. Their recovery will include a "normal" cyclical upswing, mainly increased export to the West, in addition to a component due to the special circumstances we have discussed. The benchmark countries, in contrast, will probably have only the cyclical upswing. Whatever the case however, the consequences for the catch-up scenarios cannot but be marginal.

### 3. The Slow Start

As a matter of record, there has been no post-recessionary surge in the EE's *tempo*. Here, we must address the fact that our projections for years 1993-1997 have been overtaken by time. Statistics have replaced guesses. Table 13 provides an overview<sup>21</sup>.

**Table 13**  
**THE BEGINNING FIVE YEARS: PROJECTIONS AND REALITY**

Country	Cumulative Growth in <i>per capita</i> Output 1993-1997 (in percent)		
	Projected	Actual	Shortfall*
Bulgaria	29	-13	42
Czech Republic	23	2	21
Hungary	27	10	17
Poland	31	28	3
Rumania	40	13	27
Slovakia	27	19	8

\* Shortfall = (projected perc. growth) - (actual perc. growth).

Poland alone seems to be on schedule, close to our projections. Other EE's are definitely behind. Some, Bulgaria in particular, are far behind. Does this change the outlook? Is the optimistic scenario irredeemably doomed by the performance of the past five years? We do not think so. Several considerations lead us to believe that while the prospect of catching up, as we repeatedly stated—is far from certain, and the sluggish beginning does not help, the overall picture changes little. First, the hypothetical catch up rates are averages. They outline a trend. Initial slow growth does not necessarily preclude adequate progress in the future, as long as the institutional features are or become satisfactory. A small increase in the hypothetical growth rates during the remaining thirty-three years is enough to make up for the earlier shortfall.

Besides, catching up with Western Europe may be successful even if the EE's fail to attain

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<sup>21</sup> Sources: OECD, Economic Outlook; EBRD, Transition Reports; official national statistics.

by the year 2030 the level of *per capita* output which serves as a benchmark of our projections. This is because rather than growing 2.3 percent annually, as assumed, Western Europe has been stagnating throughout the 1990s. Consequently, in spite of their slow growth, the EE's — excepting Bulgaria — may have actually increased their chances of cutting in half the gap separating them from the West.

Whether the EE's can in fact accomplish such a feat, is a question that only the future can answer. But in trying to foretell, we must consider various possibilities. Among them, are the implications of the unreliability of some statistics on which we base our projections. Conceivably, indeed quite likely, the crucial 1992 GDP figures for the post-communist countries — except again the Czech Republic — are grossly understated. By how much, no one really knows. Yet it would not at all be surprising if the figures we willy-nilly used, were by one third lower than the “true” values of *per capita* output. If so, the EE's hypothetical growth rates in Table 2 are overstated by more than 1 percent<sup>22</sup>.

#### 4 Concluding remarks

##### *4.1 Varying the assumptions*

Although the assumptions of our exercise do not seem implausible, they admittedly are arbitrary. In a test of the robustness of our conclusions, we must explore some variants. In addition to the “standard” version of our projections which was based on the initial (1992) capital-output ratio of 3.5, the rate of technical progress (or total factor productivity)  $g_{TP}/g_Y = 2/3$  and the depreciation rate of 4 percent, we are also considering the alternative (1992) *k/y* ratios of 3.0 and 4.0, technical progress rates of 1/2 and 3/4, as well as depreciation rates of 3 and 5 percent. Altogether, this gives rise to 27 possible versions, including the “standard” one.

Of course, the most favorable catch-up scenario combines the lowest initial (1992) *k/y* ratio and depreciation rate, *d*, with the highest rate of technical progress. The least favorable case combines the highest (1992) *k/y* rate and the highest depreciation rate, with the lowest rate of technical progress. Table 14 is a synopsis.

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<sup>22</sup> In particular, if the true GDP per-capita were 1.5 times those we used in Table 2, then the required catch-up growth rates would be from one fifth to one fourth lower than those presented in Table 2.

**TABLE 14**  
**A SYNOPSIS OF VERSIONS**

Coefficient				
Variant	$k_0/y_0$	$g_{TP}/g_y$	$g_k$	d
Best	3.0	0.75	$0.75g_y$	0.03
Standard	3.5	2/3	$g_y$	0.04
Worst	4.0	0.5	$1.5g_y$	0.05

The critical difference between the two versions lies in their respective investment requirements. The comparison between the net investment is straightforward. For the best variant (with the subscripts 0 and T standing for the base year 1992 and the year 2030):

$$\frac{I^B}{I} = \frac{k_0^B}{k_0} \cdot \frac{e^{38(0.75g_y)} - \frac{P_0}{P_T}}{e^{38g_y} - \frac{P_0}{P_T}}$$

Similarly, we obtain the investment ratio for the worst variant. Substituting the catch-up rates for the  $g$ 's, and the numerical values for the  $P$ 's, given the ratios for the  $k$ 's:  $k^B/k = 6/7$  and  $k^W/k = 8/7$ , we calculate the differences between the required net investment. Table 15 contains the comparison.

If the "standard" assumptions allow us to view the catch-up hypothesis skeptically, but not as outright impossible, the best variant adds buoyancy to this outlook. With the possible exception of Rumania, all the EE's would in this case probably succeed in halving the gap separating them from Western Europe by 2030. On the other hand, the worst variant, by sharply increasing the capital requirements, and consequently, saving ratios, would inevitably doom the EE's efforts, even for the Czech Republic.

#### 4.2 *Summing Up the Projection Exercise*

Predictably the prospects for catching up in the foreseeable future look best for the more advanced EE's. The Czech Republic and Hungary are in this group. These countries are more

productive to begin with; they have a smaller lag to make up. They also have a relatively more developed trade, and more foreign investment. Most important of all, they have achieved early a measure of success in institutional transformation and macro-stabilization.

**TABLE 15**  
**NET INVESTMENT IN THE THREE VERSIONS**

Country	Net Investment as Percentage of the Standard Requirement	
	Best Variant	Worst Variant
Bulgaria	46	337
Czech Rep.	51	289
Hungary	47	324
Poland	54	358
Rumania	42	445
Slovakia	49	317

The prognosis is less promising for the other EE's. Table 16 below contains two quantitative measures of "difficulty" entailed in cutting in half the gap that separates the EE's from Western Europe: the required saving rate and the required rate of trade expansion. Deriving the average ranking for each country (last column), we ranked the EE's in order of decreasing "difficulty," along the two dimensions. It confirms the prevailing opinion: provided the institutional framework develops satisfactorily, the Czech Republic will find it easiest and Rumania most difficult to overcome their relative backwardness in the European context.

**Table 16**  
**MEASURING THE DIFFICULTY OF THE CATCH-UP\***

Country	Required Saving Ratio		Required Trade Expansion Rate		Average Rank <sup>a</sup>
	Percent	Rank	Percent	Rank	
Bulgaria	31.0	3	<5.2*	3	3
Czech Rep.	28.0	1	4.6	1	1
Hungary	30.0	2	<4.9*	2	2
Poland	32.0	4	6.0	4	4
Rumania	36.0	5	7.3	5	5
Slovakia	30.0	2	5.2	3	2.5

\* The less difficult the catch-up, the higher the rank.

<sup>a</sup> Arithmetic mean of the three rankings.

A host of statistics which may be thought of as determinants (or indicators) of what Abramovitz (1986, pp.108-114) considers “social capability” give additional support to our assessment. These statistics are shown in Table 17<sup>23</sup>. Joint rankings are derived in this case too (last row).

It would seem that the EE’s are less differentiated in this respect than they are in their distance from the West-European production level. Moreover, the determinants (or indicators) of “social capability” are not very much behind those of Western Europe. The three examples in the table illustrate this.

**Table 17**  
**HUMAN DEVELOPMENT INDICES**

Country	Life Expectancy at Birth (1992)	Adult Literacy Rate Percent (1992)	Mean Years of Schooling (1992)	Ranking			
				LEB	ALR	MYS	Average <sup>a</sup>
Bulgaria	71.9	94.0	7.0	2	3	5	3.3
Czechoslovakia <sup>b</sup>	72.1	99.0	9.2	1	1	2	1.3
Hungary	70.1	99.0	9.8	4	1	1	2.0
Poland	71.5	99.0	8.2	3	1	3	2.3
Rumania	69.9	96.9	7.1	5	2	4	3.7
France	76.6	99.0	12.0				
Germany	75.6	99.0	11.6				
Italy	76.9	97.4	7.5				

<sup>a</sup> Arithmetic mean of the ranking for each country.

<sup>b</sup> Separate data for the two successor states not available.

Naturally one should not make too much of the apparent near equality of conditions determining (or indicating) “social capability” for growth. But one cannot overlook it either. It is important *per se*. Even so, in the consideration of the EE’s prospects for catching-up with Western Europe, we concentrated on a single dimension — the *per capita* output which conveniently summarizes material achievement. The theory of economic growth cannot tell us if and when the EE’s will catch-up with the avant-guard. But it puts the issue in an interesting

<sup>23</sup> Sources: UN, ~~Human Development Report 1994~~, New York: Oxford University Press, 1994, pp. 129-30.

perspective, and poses a number of questions that must be explored. To this we devote our last comments.

### *4.3 On the role of institutions*

Once more, it should be emphasized that we are fully aware of the fact that the relevance of convergence as a theory for growth is debatable, especially from the empirical viewpoint<sup>24</sup>. Nevertheless, we do believe that the concepts of catching-up and convergence can be useful in evaluating progress in transition economies.

In particular, we believe that although the EE's prospects for future growth are undoubtedly linked to the quantity of equipment available, and to the quality of the labour force, they will be determined by other factors. Much will depend on the criteria according to which resources are allocated, as well as on the attitudes of the labour force (including the management); and, last but not least, on the priorities and skills of the policy makers. The role of the political framework in creating an environment favourable to sustained growth needs no elaboration. With the communist state relegated to the garbage heap of history, and the Asian-style authoritarian dirigisme proved wanting, the advantages of a more liberal political order are becoming self-evident.

Only in such an order, it seems, are the "rules of the game" conducive to high and efficient investment, including the all important category of human capital. And only such an order permits, and even encourages the necessary institutional adaptations, so that the well-known learning process described by Arrow (1962) can be enhanced. Individuals are being encouraged to speed up their learning process; and new capital-incorporated technology creates more opportunity for "learning". Put differently, markets are allowed to do the job of conveying price signals, and the agents feel secure that the rules will not undergo arbitrary changes permitting creation and extraction of rents. On the other hand, if the process of institutional reform is at a standstill (or incomplete), precious learning abilities are likely to be lost, economic performance lags behind expectations, and the political *élite* loses legitimacy. As a consequence, with the political situation becoming unstable, and the institutional context being characterized by the absence of "rule of law", the agents' time horizon is inevitably shortened, and the country's chances for growth hurt.

It has been questioned whether the long-term prospects of the EE area can be deemed as similar to those of a typical OECD country or, rather, of an LDC. We think that a convincing answer can only come from viewing the EE performance through the prism of a "learning" model,

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<sup>24</sup> See Colombatto (1994) for a detailed discussion.

which describes productivity as a cumulative process (past knowledge and experience are relevant), heavily influenced by institutions. In this context, a waste of learning abilities locks the country into a "transition trap", in which today's difficulties should be considered permanent. Fluctuations around a failed-transition path are thus to be foreseen. Contrary to some authors<sup>25</sup> who maintain that transition becomes more attractive as the situation deteriorates, we claim that delays in the transition process are likely to reduce the chances of success. As one of us has pointed out, although the danger of social/political turmoil may indeed speed up the process, the room for manoeuvre is restricted<sup>26</sup>.

In conclusion, we incline to the view that two categories of "transition economies" are bound to emerge in the next few years. One will follow some kind of fast-learning, accelerated convergence process, which will lead them to join the lower cluster of the so-called advanced countries. The other will be trapped in the LDC status, presumably characterized by repeated efforts to launch reforms, each of them doomed to fail, one way or another. Finding out which country belongs to which category is of course an empirical matter, for which the previous sections have tried to provide some kind of benchmark for future evaluations.

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<sup>25</sup> See for instance Krueger (1993).

<sup>26</sup> See Colombatto (1994).

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