INVESTMENT BEHAVIOUR, POPULATION STRUCTURE AND LONG-TERM GROWTH IN EASTERN EUROPE AND RUSSIA

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Introduction: short-term crisis and long-term growth in the European economies in transition

It is now amply documented that in most of the former socialist countries of Europe, the transition to the market economy entailed large short-term growth and welfare losses (UNICEF 1994, Cornia 1996, Milanovic 1998). Much less is known about the long-term impact of the transition to the market economy. In this paper we attempt to fill, if only in part, this gap. We are interested in particular to examine the long-term impact on growth and welfare of recent changes in: (i) saving ratios and the accumulation of physical capital; (ii) the stock of human capital; (iii) and demographic variables. After discussing recent changes in each of these areas, we combine this information in a simple simulation model to assess the long-term impact of changes in these areas.

1. Capital accumulation and long-term growth

Long-term growth in transitional economies will be affected by changes in the rate of capital accumulation, and in particular: by the extent of the fall in the capital stock during the initial phase of the transition; future saving and investment behaviour; and the improvement in capital efficiency induced by marketization. The first two points are discussed hereafter and the third in section 5.

1.1 An initial sharp fall in capital stock

One factor affecting negatively long-term growth and welfare is the sharp decline in the stock of physical capital experienced during the first reform years in all Eastern European countries. This 'one-off disaccumulation' was mainly due to the physical obsolescence and ecological hazardousness of a substantive part of the capital stock inherited from the socialist era. In many sectors of the economy, machinery and equipment was older than in other industrial countries (Table 1), was often non-operational, demanded constant repairs and was kept 'in service' due to the limited importance attached to production efficiency and safety at work. In addition, some of the equipment in 'good working conditions' was extremely hazardous, and its

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utilization was allowed because of the lax environmental standards prevailing during the socialist era. With the advent of liberalization, this equipment has been withdrawn from service.

Table 1 - AGE PROFILE OF EQUIPMENT IN SOVIET INDUSTRY, 1970-89

	1970	1980	1985	1989
% of equipment with an age of:				
– less than 5 years	41.1	36.0	33.7	31.6
– 6-10 years	29.9	28.9	28.5	28.6
– 11-20 years	20.9	24.8	25.5	26.2
– over 20 years	7.8	10.3	12.3	13.7
Average age of equipment, years	8.3	9.3	9.9	10.3
Average service life, years	24.0	26.9	27.9	26.2

Source. Narodnoye Khozyaistvo SSSR (various issues).

In addition, price liberalization and the removal of production subsidies rendered a substantial amount of the old capital stock non-productive, despite large falls in the wage rate. Possibly, the largest impact was due to the rise in the domestic prices of oil and raw materials. With their gradual realignment to international prices, a large profitability crisis surfaced, and capital stock that could produce positive value-added at subsidised input prices became unprofitable.

Profitability was influenced also by large devaluations of the exchange rate, the adoption of import regimes characterised by low rates of protection, the absence of quantitative restrictions and the vanishing of preferential trade agreements with the members of the Comecon. These changes sharply affected the structure by origin/destination/commodity composition of both exports and imports. Enterprises with strong exports to Comecon countries, suddenly lost these markets and were forced to compete on the international market. Altogether, industrial branches (such as light consumer goods) that were comparatively efficient in the planned economics suddenly became unproductive.

Estimation of the initial write down of the 'unproductive capital stock' is problematic. Official statistics on real capital stock are not dependable, as they are generally computed on the basis of the book value of assets deflated by little reliable price indices. A seemingly more logical way to assess the share of capital stock involved in inefficient production is to estimate for the socialist era 'shadow profit rates' on the basis of input-output tables and world market prices. However, this approach yields results that are not consistent with either common sense or the recent performance of particular industries. For instance, an analysis of 110 industrial branches for the former Soviet economy by Senik-Leygonie and Hughes (1992)

arrived at negative long-term 'shadow profit rates' for agriculture, food and wood products industries, but positive rates for the machinery and equipment, textiles and footwear. Yet, the post-1992 output fall was most pronounced in light industry and engineering, and much less so in agriculture and the wood industry. Thus, this approach cannot be safely used to estimate the recent reduction in capital stock.

Data on capacity utilization provide better guidance to the evaluation of the actual reduction in the stock of fixed capital during the transition. In the former Soviet Union, the measurement of capacity utilization suffered from considerable problems (Shmelev and Popov, 1989). Actual capacity utilization was far from the 85-90 per cent reported by official statistics (Table 2), and possibly reached only 60-70 per cent. Whatever data source is used, it may be safely assumed that the sharp decline in the capacity utilization registered in recent years reflects the actual decline of real capital stock due to inability to use it profitably under the new conditions.

Table 2 - CAPACITY UTILIZATION RATE IN RUSSIAN INDUSTRY, 1980-96

	1980	1990	1991	1992	1993	1994	1995	1996
– Goskomstat data	87.3	86.1	78.6	63.9	54.2	39.8	36.9	...
– Survey data	...	...	78.0[a]	73.0	74.0	61.0	60.0	54.0

Source: Goskomstat (1996).
Note: [a] unweighted average of 17 types of capacities (77 types for 1995).

Official statistics suggesting a decline of over 50 percentage points in capacity utilization (Table 2) may be more meaningful than the results of surveys of industrial enterprises (which suggest a fall of about 25 percentage points), since managers are likely to consider non-working capital as 'non-existent capacity', whereas official numbers are still based on 'passport capacity'. We may therefore assume that – in the case of the countries part of the former Soviet Union – the initial fall in the industrial capital stock has ranged between 30 and 50 per cent. This is obviously a crude estimate, subject to considerable variation depending on the country considered, the assumption made and the time series used.

1.2 A medium-term decline in saving and investment rates.

Capital accumulation and long-term growth have also been affected by the sharp fall in investment rates observed in practically all transitional economies during the first reform years. In the centrally planned economies, investment rates (the ratio of gross fixed investment to GDP), were substantially higher than in the market economies: over 1980-89, the unweighted average investment rate in the socialist economies was 30.6, while it was 21.8 per cent in the OECD group, and 23.1 per cent in the middle-income economies (World Bank 1993b).

Since the onset of the transition, these comparatively high investment rates have declined in all the region (Table 3). The fall was particularly sharp in the initial years of the transition, but has continued also in the subsequent years. However, while the Central European countries have been able to reverse this trend by 1993-5, in several republics of the former Soviet Union, investment rates have continued falling. There is evidence that investment has declined more rapidly in the 'tradeable sector' (agriculture, mining and manufacturing), remained broadly constant in the construction sector, and rose somewhat or fell less in the 'non-tradeable sector' (trade, telecommunications, finance, other services and housing) i.e. activities which were suppressed during the socialist era (EBRD 1995).

What explains this fall or slow recovery in investment rates? The main hypotheses dominating the literature are reviewed hereafter, with the aim of evaluating investment trends over the medium-long-term:

1.2.1 The fall in output

The accelerator theory explains changes in the level of domestic investment on the basis of changes in the level of aggregate output (Precious 1987) It could thus be surmised that the fall in investment was driven by the large fall in output which took place during the 1990s. Empirical evidence for selected OECD countries for the post-war period confirms, for instance, that investment trends were highly correlated with changes in national income and output, but that the fluctuations in investment were 2.5 to 4.8 times greater than for output (see Burda and Wyplosz 1993, Kydland and Prescott 1990, Blackburn and Ravn 1992 cited in Rostowski 1995). Rostowski (1995), however, shows that this hypothesis does not explain satisfactorily the recent changes in investment rates in the European economies in transition. Contrary to expectations, in most of Eastern and Central Europe, the decline in investment has been only moderately greater than the decline in output. This is true at both the aggregate and sectoral level. For instance, an analysis of sectoral investments in Poland and Hungary confirms that the 'accelerator hypothesis' does not explain satisfactorily changes in sectoral investment (ibid). Similar results were found when analyzing changes in output and investment over 1990 3 for 32 industrial sectors in Romania (EBRD 1995).

Our cross-country data (Table 3) point to the same conclusion. If investments were determined according to the accelerator theory (including to its 'flexible accelerator' formulation), the investment/GDP ratio should show much more pronounced falls during the years of recession, and more pronounced increases during those of recovery. This is however not borne out by the data (see Table 3). In addition, the country with the fastest recovery of output (Poland), is that with paradoxically – the second lowest rate of investment in 1994. And several of the most depressed economies (Russia, Belarus and Lithuania) show medium to high investment rates. As this hypothesis finds little support in the data, other causes for the recent fall in investments must be sought.

Table 3 - REAL GDP, INVESTMENT RATE AND SAVINGS RATE IN SELECTED TRANSITIONAL ECONOMIES

	Real GDP (1989 = 100)		Gross Domestic Investment/GDP[b]		Gross Domestic Savings/ GDP	
	1993	1997	average 1980-9	1994	Average 1980-9	average 1993-5
Czech Rep.	80	90	25.5	27.0	31.2	20.2
Hungary	81	89	24.1	20.0	27.8	16.0
Poland	88	110	20.7	16.0	29.3	17.3
Slovakia	77	94	29.6	26.3	29.5	26.9
Slovenia	84	99	38.5	21.0	39.6	21.5
Visegrad countries[a]	*82*	*96*	*27.7*	*22.1*	*31.4*	*20.4*
Bulgaria	73	63	26.9	18.0	34.0	18.8
Romania	75	87	30.4	16.2[c]	36.6	23.4
Southern Eastern Europe[a]	*74*	*75*	*28.7*	*17.1*	*35.3*	*21.1*
Estonia	66	76	27.6	23.0[c]	23.6	19.4
Latvia	52	542	9.4	16.4	34.9	20.7
Lithuania	39	44	33.4	20.4	22.7	14.3
Baltic states[a]	*52*	*58*	*30.1*	*19.9*	*27.8*	*18.1*
Belarus	76	66	26.3	28.0	35.9	19.2
Moldova	57	57	27.8	7.3[c]	26.8	-2.2
Russia	65	57	32.2	21.0	33.4	29.9
Ukraine	59	37	27.7	9.0	28.7	14.7
Slavic FSU[a]	*64*	*54*	*28.5*	*16.3*	*31.1*	*15.4*
All countries	*69*	*71*	*28.8*	*18.8*	*31.01*	*8.8*

Source: CCET Short-term Economic Indicators 1996, EBRD 1996, World Bank 1995b, 1996b, 1997.
Notes: [a] Unweighted averages; [b] fixed investment only; [c] 1993.

1.2.2 The fall in savings

In the neoclassical approach, the level of investments is strongly influenced by the level of savings. An empirical analysis of the relationship between these two variables provides interesting results. In spite of the liberalization of the financial sector and the move to real interest rates, i.e. factors that should have led to an expansion in financial services and incentives to save (Khan & Zahler 1987), large falls in household incomes led to large declines in savings rates in most transitional economies. Table 3 shows that in none of the 14 transitional economies has the savings rate increased during the past six years. In most cases, the decline of savings was accompanied by a quasi-commensurate decline in investment, suggesting that the fall in the former might have played an important role in the decline of the latter.

In most cases, the two variables appear correlated. However, the patterns of differential falls between savings and investment vary substantially across groups of countries. In a first group of countries (e.g. Slovenia) the decline in savings and investments is broadly proportional. In contrast, in a second group (the Czech Republic and Hungary) one observes a shift from a pre-transition situation where savings exceeded investments, to a post-transition one in which investments exceed savings – possibly because of FDI inflows, international borrowing, and the return from abroad of capital flights. In a third group of countries (Russia and Latvia) there was a shift to the opposite situation (savings are now higher than investment). In these cases, the decline in savings rate alone is not a sufficient explanation for the fall in investment, and other explanations must be found. Among the factors that may help explaining the differential patterns of change in investments and savings between the pre- and post-transition period, we discuss hereafter those related to the establishment of property rights, FDI, trade liberalization, and public investment.

1.2.3 Uncertainty about property rights

Lower investment than savings rates (as in Russia and Latvia) can be explained by slow progress in establishing unambiguous property rights (of whatever type these are). Countries that proceed in a swift manner with the establishment of indisputable property rights and the promotion of a properly regulated private or co-operative sector are expected – ceteris paribus – to attract more investments than countries where these reforms remain unachieved.

This might explain why investment rates in Central Europe have on average declined moderately during transition despite a sharp fall in savings. The private sector development indices (Table 4, second column) are the highest in the Czech and Slovak Republics, i.e. which recorded limited falls in investment rate. Also in Hungary and Poland, where private sector development has been comparatively positive, investment rates have declined slower than saving rates. In other countries, in contrast, incentives to invest have been reduced by uncertainty about property rights and lack of liberalization. In these countries, investment rates have fallen faster than saving rates. Also this explanation, however, does not adequately clarify the rise of the investment rate in Belarus, a country with a low level of liberalization and privatization.

1.2.4 Foreign Direct Investments (FDI)

The hopes for a rapid increase of FDI following economic liberalization appear to have been broadly betrayed. Failure to create a stable economic and political environment and institutional problems (see above) might have reduced the prospects for massive inflows of FDI in the region despite its favourable economic fundamentals (comparatively low wages, plentiful supply of skilled labour, relatively good infrastructure, closeness to Western markets and so on) of many of these

Table 4 - POLICY CHANGES AFFECTING SAVINGS AND INVESTMENT BEHAVIOUR
IN SELECTED TRANSITIONAL ECONOMIES 1990-94

	Private sector development index[a]	Liberalization of external markets[b]	Dollarization of the economy (%)[c]
CzechRep.	3.7	3.5	10
Hungary	3.0	4.8	20
Poland	3.6	4.7	30[d]
Slovakia	3.5	3.5	10
Slovenia	3.2	4.7	45
Bulgaria	1.4	4.4	35
Romania	1.6	2.5	35[e]
Estonia	2.3	3.1	10[d]
Latvia	1.7	2.5	35
Lithuania	2.2	2.6	30[d]
Belarus	1.1	1.1	...
Russia	1.8	1.9	40
Moldova	1.2	1.8	...
Ukraine	0.8	0.6	35

Source: de Melo et al. (1995); IMF (1994); World Bank (1993a).
Notes: [a] sum of annual indicators (each given as index numbers ranging between 0 and 1) measuring the development of private sector and banking reform over 1990-94. [b] Sum of annual indicators (each given as an index number between 0 and 1) measuring the liberalization of foreign trade regime and currency convertibility over 1990-94. [c] The ratio of foreign currency deposits to broad money at the end of 1994. [d] indicates a falling trend in dollarization. [e] indicates a rising trend in dollarization.

economies. Thus, expectations were hardly met (Table 5), with the exception of Hungary, the Czech Republic, Estonia and Latvia. In only these countries, the aggregate value of FDI since 1989 approached or exceeded 10 per cent of their 1995 GDP. When compared with the FDI flows to countries of South East and East Asia, even these values appear modest.

1.2.5 Impact of trade liberalization on consumption

Saving and investment behaviour might have been influenced also by trade liberalization. In the former socialist economies, high savings where often the result of shortages of consumer durables. Trade liberalization increased the supply of goods, and affected the allocation of household income between consumption and savings. Thus, purchases of consumer durables, scarcely available during the socialist era, increased sharply despite a fall in household incomes. The clearest example of this general pattern was observed in Poland over 1990-2. More generally, there seem to be some evidence that index of liberalization of the external markets (Table 4, third

Table 5 - FOREIGN DIRECT INVESTMENT IN SELECTED TRANSITIONAL
ECONOMIES

	1989	1991	1993	1995	1996[a]	1989-96[a]	1989-96 as % of 1995 GDP
Bulgaria	0	56	40	115	100	425	3.6
Czech Republic	316	511	517	2500	1264	7120	14.8
Hungary	215	1459	2328	4410	1986	13260	30.3
Poland	84	117	580	1134	2741	5398	4.2
Romania	18	37	87	417	210	1186	4.0
Slovak Rep.	10	82	134	180	177	623	4.4
Slovenia	9	41	112	144	180	743	3.9
Belarus	0	0	7	7	75	167	0.5
Estonia	0	0	160	205	110	735	17.6
Latvia	0	0	49	216	230	644	9.7
Lithuania	0	0	31	41	152	285	4.3
Moldova	0	0	0	64	56	161	4.3
Russia	400	-100	682	920	2040	5843	1.5
Ukraine	0	0	198	148	500	1270	1.5

Source: UN ECE (1996).
Note: [a] Taken from EBRD (1997).

column) is highest in countries where the savings rate declined more than proportionately in relation to the investment rate.

1.2.6 A slow down in public investment

There is some initial evidence that the decline in overall investments was more pronounced in countries where public investment fell more rapidly. Available evidence suggests, that public investment does not crowd out private investment one to one, but only by 25-50 per cent (Schmidt-Hebbel et al. 1996). A rise in public investment, therefore, raises overall investment while a fall in public investment tends to cause a contraction in total investment.

Unfortunately, in most transition economies public investment rates declined faster than the private ones, and in most cases are now closer to those of the OECD countries rather than to those of the emerging market economies. Faced with declining tax revenue and increasing social transfers, several countries in the region opted for radical cuts in public investment programmes. Over 1992-95, only in the Czech Republic, Hungary and Romania public investment amounted to five percent or more of GDP (EBRD 1995; UN 1996). These are precisely the countries which managed to sustain relatively high overall investment rates (Figure 1). In contrast, I

the Baltic countries, Russia and Bulgaria, public investment remained low or declined, and the overall investment rate fell markedly. The problem appears to be particularly acute in countries which experienced drastic falls in tax revenues.

Figure 1 - RELATION BETWEEN THE INVESTMENT RATE IN 1993-96 (EXPRESSED IN TERMS OF ITS 1989-90 LEVEL) AND THE PUBLIC INVESTMENT RATIO IN 1992-5
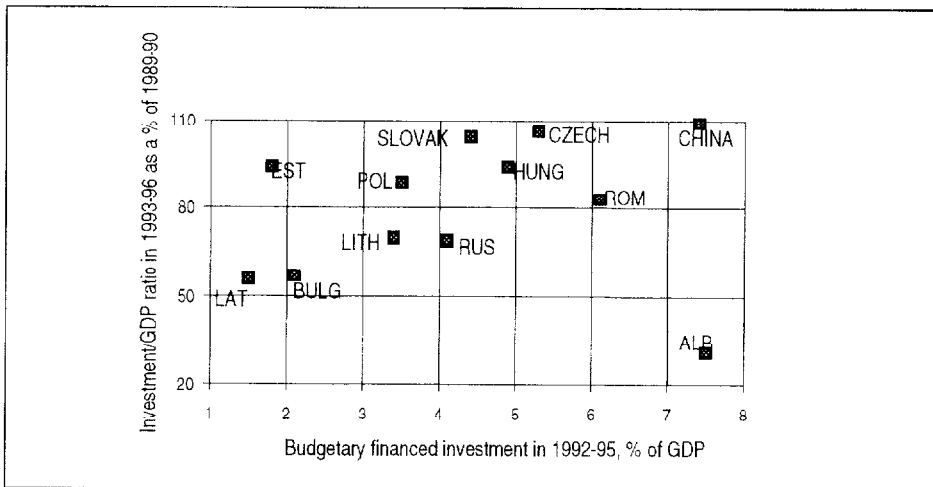
To conclude, the high savings and investment rates typical of the former socialist economies of Europe have fallen sharply in all the region, in some cases to very low levels. Evidence that this fall is due to the functioning of an accelerator mechanism is weak. In contrast, there seems to be some indication that the slump in investment is correlated with the decline in savings, lower than expected inflows of FDI, and a contraction of public investment. These factors are of structural nature and are unlikely to disappear with the slow economic recovery witnessed so far in most of the region, thus suggesting that capital accumulation might remain at a comparatively low level in the years to come.

1.2.7 A slow overall capital accumulation?

The initial sharp write off of the capital stock is estimated at close to 30 in the Visegrad countries, 50 per cent in the CIS countries and at 50-66 percent in the former GDR (EBRD 1995). In addition, in most countries of the region, the capital stock is likely to rise over the long-term at a slower pace than in the past. For the reasons given above, in the countries of the former Soviet Union, gross investment ratios of 15-20 per cent of GDP are likely to prevail for the next several years, and the pre-transition level of capital stock not to be reached soon (Figure 2).

In contrast, the capital stock in the Visegrad countries suffered a less dramatic initial write-off, and is expected to grow over the long-term at faster rates than in the former Soviet Union because of higher saving formation, vanishing impact of trade liberalization, and higher public investments (see later). In these countries, the 5-6 points average decline in the investment rate experienced in the first years of transition is not expected to last for long. The high investment rates of the planned economies will likely not be recovered but, because of the need for the modernization of the industrial structure, gross investment rates may rise again at a slightly higher level than in Western Europe. Also in these countries, however, the cumulative effect of the initial write-off and of several years of low investments, will cause the volume of capital stock to remain for several years below its 1989 level.

These statements must be qualified on several accounts: first, the estimation of capital stock involves the choices of an appropriate 'set of prices' for the capital goods. Since the transition, these prices have changed drastically, though we do not know exactly by how much. Second, the issue of the destination of the capital stock can not be ignored. It may well be argued that part of the capital stock written-off during the initial phase of the transition was utilised for purely unproductive uses and that its scrapping will have no impact on growth. It is equally true, however, that substantial capital stock has been written-off because of a phenomenal collapse of domestic demand and premature import liberalization. Third, liberalization is expected to bring about substantive improvements in capital and total factors productivity, a fact that will be duly accounted for in our numerical simulations. Our estimates are therefore to be considered as purely illustrative; they only aim at

Figure 2 - HYPOTHETICAL REPRESENTATION OF THE TREND OF CAPITAL STOCK
          IN THE EUROPEAN ECONOMIES IN TRANSITION
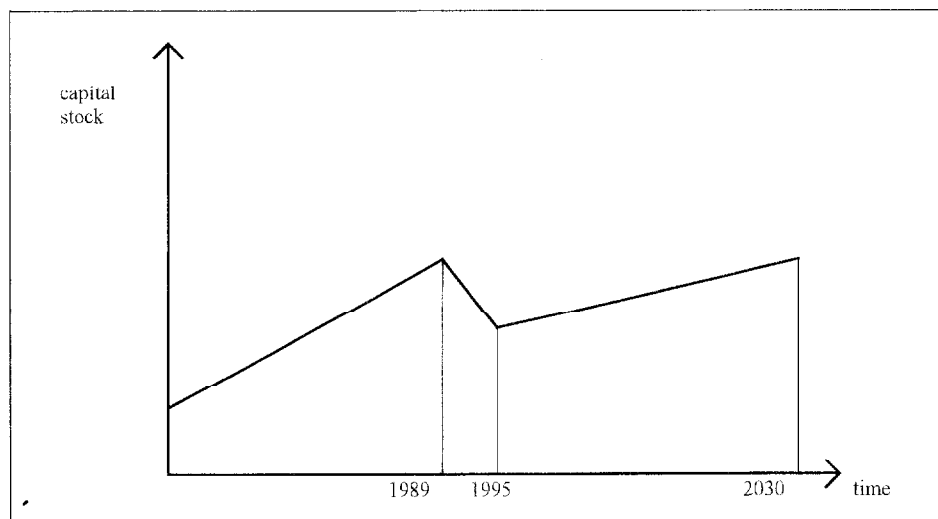
stressing the key (but broadly ignored) issue of capital accumulation in the debate on long-term growth and welfare in the region.

2. Erosion of the human capital stock and long-term growth

Few would argue that investment in human capital is a less important development factor than investment in tangible assets. In the Western countries, for instance, the stock of human capital is now no less significant than that of fixed capital: while in the 1920s, in the US, the value of the latter was over 2 times larger than the investment in education, health care and labour programmes, in the 1970s the two stocks were valued roughly equally. In some sense, human capital appears to be as, or more, important for economic development than the stock of machinery, equipment, buildings and structures. The best prove of this statement is offered by the reconstruction in Germany (and other war-torn countries) after World War II. While by mid-1945, Germany had lost the major part of its fixed capital, its large stock of human resources had suffered smaller losses and allowed in only five years to recover pre-war output levels. Both old and recent theoretical developments (we refer here to the 'human capital theory' and to the 'theory of endogenous growth') point in the same direction. Empirical estimates of the contribution of human capital to overall growth tend to suggest that the output elasticity of this factor is almost as high as that of physical capital, and that its importance tends to raise with the level of development (Mankiw et al. 1992; see also Table 10).

How large was the human capital stock inherited from the socialist era? How much can it contribute to future growth and welfare? Prior to the transition, most countries of the former Soviet bloc enjoyed a relatively high international standing in this area. In the USSR, for instance, illiteracy was almost liquidated before World War II. Already in the late 1950s, was full enrolment in primary and secondary education achieved. As a result, the number of employees with 8 or more years of education per 1000 increased from 123 in 1939 to 921 in 1989, while the number of employees with university diplomas per 1000 increased over the same period from 13 to 143 respectively. Professional training was a high priority. The number of students in vocational training, technical colleges and universities, and under re training grew from 12 million in 1940-41 to 55 million in 1989-90. Meanwhile, the number of university students per 10,000 inhabitants rose to 177 in 1989-90. Similar trends were observed also in the other Soviet republics and in Central Europe.

In 1989-90 Russia had more university students per 10,000 inhabitants than most OECD countries, and substantially more than the developing countries. Only the US and Canada had higher tertiary enrolment rates. Soviet university education in maths and physics was considered to be among the best in the world; while university education in chemistry, biology and social sciences did not meet world standards, it still had some strong points. The commission of the US. Congress that analysed the reasons of Soviet technological break-through (e.g. the satellite launch of 1957) came

to the conclusion that the single most important contributing factor was the high standard of Soviet educational system.

At present, Eastern Europe still has higher secondary and tertiary enrolment indices than most developing countries in fact, they are only somewhat lower than those of mature market economies. However, in the past many secondary institutions for vocational training provided skills now often considered obsolete. In addition, the high share of students in natural and applied sciences should not be necessarily viewed as an advantage, since it reflects primarily a weak emphasis on business and law. Finally, the emphasis of education in the former socialist countries was less oriented to problems-solving than in the market economies.

Prospects for the future development of human capital in Eastern Europe are uncertain. Since the onset of the transition, enrolment rates in pre-primary education (essential for school preparedness) have fallen. While primary education has been unaffected, rates in secondary education have eroded except for Central and Eastern Europe (Table 6). The quality of education may have deteriorated even faster, due to large cuts in public expenditure which have led to widespread shortages of inputs and teaching equipment, and to large falls (often below 'efficiency wages') in teacher's salaries, which might have adjusted downward the amount of time spent tutoring their pupils.

Finally, during the last six years a considerable number of scientists has left the region, thus causing a decline in the human capital stock somewhat similar to that observed in the case of the physical capital stock. The 'brain-drain' from Russia gained momentum as restrictions to emigration were lifted and living standards deteriorated: a good 30 percent of the new math professors hired by French universities in 1992 were from Russia; there were thirty thousand ex-Soviet specialists working in 1993 in the USA and Israel and 4 thousand in Germany. In 1991-92 alone 0.8 percent of the R&D personnel of the Russian Academy of Sciences emigrated and by the end of 1992 another 2.8 percent was employed on long-term contracts abroad. As a whole, over 5 percent of the R&D personnel of the Academy of Sciences is currently working abroad. In the field of mathematics, general and nuclear physics, astronomy, biophysics and biochemistry, the situation is worse. Already by December 1992, 12 percent of the researchers of the Mathematics Department of the Academy worked abroad.

Whereas in the neo-classical approach the 'brain drain' increases world income and welfare in recipient countries without reducing welfare in the countries of origin, it has been shown that migration of skilled workers may reduce the welfare for the non-immigrants in donor countries (Haque and Kim, 1995). Thus, all in all, the 'brain drain' and the recognition of the obsolescence of the some of the skills imparted in the school system for many years have caused a 'one-off' reduction in the pre-transition stock of human capital, while the current qualitative and quantitative

Table 6 - CHANGES IN ENROLMENT RATES IN SELECTED ECONOMIES IN TRANSITION, 1989-95

	Pre-Primary		Primary		Secondary	
	1989	1995	1989	1995	1989	1995
Czech Republic	99.3	88.6	98.5	98.9	79.6[c]	97.4
Hungary	85.7	86.9	99.0	99.1	74.9	91.1
Poland	48.7	44.3[a]	98.1	97.2	78.9	83.1
Slovak Republic	91.5	70.8	97.7	99.5	88.7	91.7
Slovenia	55.0	61.4	95.5	97.5	79.3	82.5
Unweighed average	*76.0*	*70.4*	*97.8*	*98.4*	*80.3*	*89.2*
Bulgaria	75.1	67.5	98.4	93.7	78.2	65.0[a]
Romania	82.9	58.4	97.3	99.5	91.1	76.9
Unweighed average	*78.0*	*62.3*	*97.8*	*96.6*	*84.6*	*70.1*
Estonia	60.0	61.1	97.0	95.6	88.8[c]	78.6
Latvia	62.7	47.1	....	95.6	84.7	81.0
Lithuania	63.9	36.2	91.3	94.9	93.4[c]	85.4
Unweighed average	*62.2*	*48.1*	*94.1*	*95.3*	*89.0*	*81.7*
Belarus	83.3	82.1	91.4	94.3	88.7	84.4
Moldova	61.0	45.0	....	97.0	92.0	82.0[a]
Russia	69.3	54.0	97.1	94.2[b]	96.3	92.0
Ukraine	61.2	44.0[a]	98.7	96.9	62.2	54.8[a]
Unweighed average	*68.7*	*56.3*	*95.7*	*95.6*	*84.8*	*78.3*
Total Unweighted average	71.4	60.5	96.6	96.7	84.1	81.8

Source: UNICEF-ICDC (1996).
Notes: [a] 1994; [b] 1993; [c] 1990.

weakening of the educational system is likely to affect the future additions to such a stock. The liberalization of the system may, however, in part correct for such a problem by allowing a more efficient use of the existing human capital stock.

In our simulation projections we estimate that in Russia, the stock of human capital fell by 20 per cent over 1989-95 and is likely to fall to 66 per cent of its 1989 value by the year 2005. This assumption is dictated by the above data on 'brain drain' and continued deterioration of the quality (and to some extent quantity) of education, and by the duration (of about 10 years) of the current education cycle, which allows only for improvements in the stock of human capital only after long lags, even if a more pro-active education-and-training policy is introduced immediately. After 2005, the stock of human capital is expected to recover and to reach its pre-transition level by the year 2020. The assumptions made for the countries of Central and Eastern Europe are more favourable. Thus, for the Czech Republic, which experienced an

increase in secondary enrolment rates over 1990-95 (Table 6), we assume a reduction of the stock of human capital of about 10 percent over 1989-2003, and a subsequent faster recovery than in Russia.

3. The impact of the recent population crisis on long-term growth

With the exception of Poland, Slovakia, Slovenia and the Czech Republic, the transition to the market economy has triggered a population crisis of unprecedented proportions (Cornia and Paniccià 1996). Between 1989-95, marriage and fertility rates fell up to 50 per cent, while standardised death rates rose by up to 40 per cent in the countries of the former Soviet Union. Males in the 35-55 age group were affected the most in absolute term, and males in the 25-35 years bracket in relative terms. Mortality rates appear to have stabilized in 1995 and started declining in 1996-7, though at present they are still substantially higher than the pre-transition levels.

What will be the growth and welfare impact of these demographic changes over the long-term? The sharp fall in fertility which began in 1990 will lead to a shrinking of the cohorts entering the working age population, starting from the years 2005-2010 (Table 7). In Russia the yearly number of births fell from 2.15 millions in 1989 to 1.39 million in 1995. Thus, the cohort entering the labour market in 2010 (at age 15) will be only two thirds of that which joined the labour force in 2005. In the Czech Republic, the number of births fell from 128 to 96 thousand over the same period and was still falling in 1996 and 1997. Only in Poland, fertility is expected to remain broadly constant at the early 1990s level until 2010 and to decline slowly since then. In no countries, is fertility expected to recover its pre-transition levels. In addition, the 1990-95 increase in mortality recorded in Russia will substantially alter the shape of the upper part of the population pyramid. In particular, from 2010 onwards, the number of elderly in the age group 65-85 should be smaller than that expected on the basis of pre-transition trends. In a similar way, the surviving cohorts of the 55-65 years old (then still part of the labour force) will be smaller, especially for men.

As a result of the demographic turmoil illustrated above (and of changes which occurred before the transition) dependency ratios are expected to rise alarmingly in all three countries, starting around 2010-15. In turn, the size of the working age population is expected to shrink starting from 2010 in the Czech republic and 2015 and 2020 in Russia and Poland.

4. Social policy, public debt and intergenerational equity

Growth and welfare over the long-term will also depend on current and future policies concerning retirement age and 'pension generosity' (which we measure in this paper as the ratio of the average pension to the average wage). Assuming non inflationary financing, growing government expenditure on pensions (due to an

Table 7 - AGE DEPENDENCY RATIOS AND PRODUCTIVE AND POST-PRODUCTIVE
AGE POPULATION IN THE CZECH REP., POLAND AND RUSSIA, UNDER
DIFFERENT RETIREMENT AGES, 1990-2030

Retirement age		1990	1995	2000	2005	2010	2015	2020	2025	2030
Age dependency ratio[a]										
65	Czech	19.11	19.36	19.99	20.07	22.38	27.23	31.92	34.20	36.21
	Poland	15.53	16.93	17.62	18.03	17.62	20.63	24.70	29.12	31.05
	Russia	14.34	17.78	18.04	20.19	18.98	20.01	23.91	26.88	30.17
60	Czech	29.16	28.57	28.16	30.64	36.14	42.36	46.24	49.05	51.73
	Poland	24.77	25.75	25.62	24.80	28.46	34.03	38.60	40.80	41.89
	Russia	24.91	26.94	29.21	26.77	27.99	32.38	38.09	41.94	43.83
Productive age population, 1995 = 100										
65	Czech	99.1	100.0	109.3	110.9	109.9	105.3	101.5	99.7	97.2
	Poland	96.1	100.0	111.6	114.0	115.2	112.6	110.4	108.6	107.8
	Russia	102.7	100.0	109.8	111.2	111.9	109.4	105.3	103.5	113.5
60	Czech	99.1	100.0	102.3	102.0	98.9	94.1	91.5	89.5	87.1
	Poland	96.1	100.0	104.5	107.9	105.5	101.3	99.3	99.6	99.8
	Russia	102.7	100.0	100.3	105.4	104.1	99.1	94.5	93.49	2.5
Post-productive age population, 1995 = 100										
65	Czech	93.1	100.0	76.8	77.8	85.9	100.4	113.2	119.2	123.4
	Poland	93.4	100.0	76.4	79.8	78.8	90.2	105.9	122.9	130.0
	Russia	93.1	100.0	73.5	83.4	78.9	81.2	93.4	103.2	113.5
60	Czech	93.1	100.0	100.9	109.5	125.1	139.5	148.1	154.0	157.8
	Poland	93.4	100.0	103.9	103.8	116.7	134.0	148.8	157.8	162.4
	Russia	93.1	100.0	108.8	104.8	108.1	119.2	133.6	145.4	150.8

Sources: Russia: Centre for Demography and Human Ecology (1996); Poland: Central Statistical Office of Poland (1996); Czech Republic: Charles University, Department of Social Geography (1996). IDB, Bureau of Census, USA (1996).
Notes: [a] Computed as a percentage of post-productive population to productive population.

increase in the number of pensioners, pension generosity, or both) results in higher deficits and an accumulation of public debt, which – because of its future debt-servicing cost – has a negative inter-generational impact. In addition, in each year, a high pension bill for the final year would have a negative intra-generational effect, as pensions systems are assumed to remain of the 'pay-go' type which is prevailing in the region. Higher pensions would thus likely entail greater quasi-taxation of gross wages by means of higher social security contributions.

In the post-transition period, most of these countries incurred large budget deficits and increases in their public debt/GDP ratios (Table 8). This seems to have been the case, in particular, for Bulgaria, Hungary, Poland, Moldova, Russia and

Table 8 - BUDGET DEFICITS AND DEBT ACCUMULATION OVER 1989-95 IN SELECTED TRANSITIONAL ECONOMIES

	Government budget balance (% of GDP)							Debt/ GDP increment	Average yearly deficit	Domestic debt/ GDP ratio
	1989	1990	1991	1992	1993	1994	1995	1989-95[a]	1989-95[b]	1994
Czech Rep.	-3.8	-0.6	-2.8	-2.2	0.6	-1.3	-1.6	-12.23	-1.7	12.1
Hungary	-1.3	0.9	-3.0	-6.8	-6.7	-8.6	-6.7	-31.53	-4.3	..
Poland	8.0	3.3	6.7	8.0	4.0	2.0	2.7	25.52	-4.2	23.6
Slovakia	-3.8	-0.6	-2.8	-11.9	-7.1	-1.6	-0.4	-27.14	-4.6	..
Slovenia	..	..	2.6	0.2	0.3	-0.2	-0.5	2.19	0.7	..
Bulgaria	-1.4	-2.8	-14.7	-15.0	-15.7	-7.0	-6.0	-63.30	-9.4	50.6
Romania	8.4	1.1	-1.7	-4.6	-0.1	-1.0	-2.5	2.00	0.4	11.3[c]
Estonia	2.8	2.9	5.2	0.3	0.7	1.3	0.3	6.98	1.4	..
Latvia	0.8	2.1	6.3	-0.8	0.6	-4.0	-3.4	3.3	80.5	..
Lithuania	-6.8	-2.6	1.8	2.2	-0.1	-2.0	-1.3	-19.60	0.5	..
Belarus		3.5	2.2	0.1	-4.2	-2.8	-2.6	-7.64	-1.2	12.4[d]
Moldova	2.0	3.0	0.0	-26.2	-7.4	-9.0	-5.5	-62.45	-10.7	..
Russia	..	..	-20.0	-18.9	-7.6	-10.1	-4.8	-80.24	-14.2	..
Ukraine	5.8	2.6	13.5	29.3	10.3	8.8	3.5	109.71	15.5	..

Source: EBRD (1996), IMF (1995).

Notes: [a] estimated as the sum of budget deficits accumulated over the 1991-95 period for the FSU and for 1989-95 for the other countries, expressed as % of their 1995 GDP; [b] 1991-95 for FSU; [c] debt in August 1996/1995 GDP; [d] 1992.

Ukraine. In the last three countries, however, the accumulation of debt has – in reality – been much less pronounced, as a large part of the deficits was financed through monetary emissions and not through the flotation of government paper. While the monetisation of deficits avoids intra-generational and inter-generational problems, it does cause other unfavourable effects on growth ('inflation tax', macroeconomic instability, dollarization of the economy, capital flights and policy uncertainty).

Obviously there will be opportunities in the years to come to control and reduce these deficits and public debts. However, as the rapid accumulation of debt in Italy in the 1980s, Finland in the 1990s and in Hungary and Poland in the initial transition years shows, objective and political economic considerations do not always make it

possible to quickly reverse these trends. In this regard, Table 9 shows that the transition has been accompanied by a massive increase in the number of pensioners. A comparison between the third and fourth columns of Table 10 indicates, in fact, that the increase in the number of pensioners has been much faster than that of the population of over 60 years of age, thus indicating that governments have massively promoted early retirement schemes. Hungary, Poland, Slovenia, Romania and Ukraine are countries where this phenomenon has been most pronounced. Except for Poland, Belarus, Moldova and Ukraine, 'pension generosity' has slightly declined in relation to the 1989 level. The effect of large increases in the number of pensioners combined with a modest decline in pension generosity has thus led everywhere to an increase in government expenditure on pensions (expressed as a share of GDP). In

Table 9 - CHANGES IN THE NUMBER OF PENSIONERS, POPULATION OVER 60 OF AGE, PENSION GENEROSITY AND PUBLIC EXPENDITURE ON PENSIONS OVER 1989-94, IN SELECTED TRANSITIONAL ECONOMIES

	Number of pensioners			Population above 60 years	Average pension/ average wage		Pensions / GDP		
	('000)		Ratio	Ratio	%		Ratio		
	1989	1994	1994/89	1994/89	89-90	93-4	93-94/89-90	89-90	93-4
Czech Rep	2387	2495	104.5	102.0	53.2	48.8	91.7	8.2	8.2
Hungary	2292	2587	112.9	99.6	62.8	58.3	92.8	9.4	10.7[a]
Poland	5471	6872	125.6	108.5	44.6[b]	72.4	162.3	6.5	14.9[c]
Slovakia	1065	1174	110.2	104.2	50.1	45.0	89.8	7.7	9.2
Slovenia	365	452	123.8	111.3	75.2[b]	74.6	99.2	...	...
Bulgaria	2207	2423	109.8	106.2	52.7	45.5	86.3	8.7	9.4
Romania	3348	4994	134.2	109.7	50.7	49.2	97.0	5.7	6.7[d]
Estonia	360	376	104.4	104.1	35.8	36.9	103.1	...	...
Latvia	599	663	110.7	103.0	33.7	32.1	95.2	6.1	10.9
Lithuania	841	899	106.9	107.8	42.3	47.7	112.8	5.2	6.0
Belarus	2299	2635	114.6	109.4	25.7[e]	36.0	140.0	6.2	6.0
Moldova	762	746	97.9	103.4	42.0	58.6	139.5	...	...
Russia	32152	36100	112.3	108.2	34.6	34.3	99.1	5.9	5.9[c]
Ukraine	12583	14477	115.0	103.1	31.6[e]	39.1[c]	123.7	4.4	7.7[c]

Source: Authors' elaboration on UNICEF-ICDC (1996).
Notes: [a] 1992-3; [b] 1989 only; [c] 1993 only [d] 1991-2; [e] 1990 only.

Poland, for instance, this ratio rose from 6.5 per cent to 14.9 per cent in only five years and it contributed heavily to the recent 24 points increase in the debt/GDP ratio noted in this country (Table 8). Obviously, continuation of this trend over the long-term will entail large debt servicing burdens and lower levels investment, growth and net wages.

5. A mini-model to simulate changes in welfare over the long-term

We now bring together prior discussion about physical and human capital accumulation, changes in population structure and pension policy to assess – in a very hypothetical and preliminary way – the effect of the changes illustrated above on growth and the level of welfare over the period 1995-2030. Welfare is measured as the net wage after transfers for the 'pay-go financing' of current pensions and the servicing of the accumulated stock of debt (that we assume here to be related only to pension expenditure over this period). We intend to emphasize in particular are:

– The long-term effect of the 1989-95 decline in human and physical capital, and of their expected slow growth. This negative effect is offset, in part, by the increase in efficiency due to marketization and liberalization.
– The long-term effect of the population crisis of 1989-95 on dependency ratios and labour supply.
– The effect of policies in the field of pensions. In our model, greater expenditure on pensions implies lower capital accumulation and growth.

The model described hereafter (in which many variables are expressed in index numbers with 1995 = 100; see the legenda) includes the following four main blocks of equations:

- *DEFINITION OF INPUTS FOR THE PRODUCTION FUNCTION*
(1) $IGDP(t) = SGDP(t) - PSBR(t)/GDP(t) - \delta \cdot CAPITAL(t-1) / GDP(t)$
(2) $INV(t) = IGDP(t) \cdot GDP(t)$
(3) $CAPITAL(t) = CAPITAL(t-1) + INV(t)$
(4) $CAPITAL\_H(t) = CAPITAL(t) / CAPITAL(t-1) - 1.$
(5) $HC(t) = \alpha_1 + \alpha_2 \cdot T + \alpha_3 \cdot T^2$
(6) $EFF(t) = EFF(0) \cdot (1 + \epsilon)^t$

- *GROWTH OF POTENTIAL OUTPUT*
(7) $GDP\_H(t) = [CAPITAL\_H(t) \cdot \beta + LABOUR\_H(t) \cdot \gamma + HC\_H(t) \cdot \lambda]$
          $+ EFF\_H(t)$
(8) $GDP(t) = GDP(t-1) \cdot [GDP\_H(t) + 1]$

- *DISTRIBUTION AND DEBT ACCUMULATION*
(9) $WAGE(t) = [GDP(t) \cdot \gamma] / LABOUR(t)$
(10) $PB(t) = WAGE(t) \cdot \pi \cdot PPPOP(t)$

(11) $PSBR(t) = \rho \cdot DEBT(t-1) + \tau \cdot [(PB(t) - 5/GDP(t)]$

(12) $DEBT(t) = DEBT(t-1) + PSBR(t)$

- *DEFINITION OF WELFARE (THE NET WAGE)*

(13) $WELFARE(t) = [WAGE(t) \cdot LABOUR(t) - PB(t) - PSBR(t)] / LABOUR(t)$

Legenda:
All variables are expressed in index numbers (1995 = 100) unless otherwise specified
A suffix_H means Rate of Change

Endogenous Variables:

IGDP	= Net Investment/GDP ratio
CAPITAL	= Capital Stock
EFF	= Total Productivity Factors
WAGE	= Average Wage
PSBR	= Public Sector Borrowing Requir.
WELFARE	= Welfare Index (Net Wage)
INV	= Net Investment
HC	= Human Capital Stock
GDP	= Maximum Produceable GDP
PB	= Pension Bill
DEBT	= Public Debt

Exogenous Variables:

SGDP	= Saving/GDP ratio
PPPOP	= Post-Productive Population
LABOUR	= Working Age Population
T	= Time

Exogenous Parameters:

δ	= Capital depreciation rate
β	= Capital share
λ	= Human capital share
ρ	= Interest rate
ϵ	= Annual rate of growth of total factors productivity
γ	= Labour share
π	= Pension generosity coefficient
τ	= Percentage of pension bill financed through public borrowing

- Equations (1-6) define the growth rate of the stock of physical capital, human capital and Hicks-neutral total factors productivity (ϵ). The latter is assumed to rise by 0.75 per cent a year. In a sense, this assumption, which influences substantially the growth rate of GDP, can be considered somewhat optimistic, particularly in the case of Russia. Past analyses (Easterly and Fisher 1994)

indicate that, from the 1950s, the rate of growth of total factors productivity in Russia (calculated by means of a Cobb-Douglass production function with labour and capital shares of .6 and .4) declined steadily to reach 0.4-0.7 for the material sector and negative values (from -0.8 to -1.2) for the whole economy. The value assigned to ε is also comparatively high when compared with the values found over the long-term for the US economy. Denison (1988) found that total factor productivity rose by 0.34 percent a year during the difficult 1929-41 period, by 1.11 per cent during 1941-48 and 1.38 during the 'golden age' of 1948-73. In the 1973-78 the rate fell back to about 0.11 per cent a year.

Growth of human capital is defined exogenously on the basis of the discussion in section 2, while the growth of the labour force depends on semi-endogenous population projections, and that of physical capital on exogenously given saving and depreciation rates (section 1). Alternative policies are simulated about pension generosity and retirement age (which affect investment through a 'crowding out' type of relation);

– Equations (7) is an extended Cobb-Douglas production function with constant return to scale, where the growth rate of output depends on the growth in physical and human capital (defined in equations 1-6), on the expected changes in the size of the labour force, and the growth rate of total factors productivity due to the move to the market. The coefficients of the production factors are parameterised on the basis of the results provided by the literature. Following the traditional literature on industrialized countries, in a first set of simulations b,g_and_l are set respectively equal to 0.2, 0.7 and 0.1 (Table 10). These parameters tend to reflect the situation of countries affected by labour shortages and with a fairly abundant supply of capital. We therefore selected a second set of parameters which reflects more closely the findings of the recent literature on endogenous growth (Mankiw et al 1992). Though other estimates (Islam 1995) provide results substantially different from those of Mankiw et al. (1992) they are less robust and are therefore disregarded. The estimates by Mankiw et al. (1992) assign a greater value to the parameter of human capital (l) than the traditional literature, a lower one to that of labour (g), and about the same to that of capital (b). The second set of values selected for the simulation of our model are the average of those estimated by Mankiw et al. (1996) for the intermediate countries and the OECD.

– Equation (9-12) define the wage bill (the labour share, g, is assumed to be equal to 0.7), the pension bill (which depends on the simulated pension/wage ratio – p – and of the number of pensioners at time t obtained from the population projections), the public sector borrowing requirements (which depend on the cost of the servicing the public debt given a fixed real rate of interest, r, and the current pension bill).

Table 10 - PARAMETERS OF ENLARGED COBB-DOUGLAS PRODUCTION FUNCTIONS

Parameters	Non-oil developing	Intermediate countries	OECD	Our 1st choice	Our 2nd^^ choice
Mankiw-Romer-Weil (1992)					
– capital (β)	.31	.29	.14	.20	.22[c]
– human capital (λ)	.28	.30	.37	.10	.33[c]
– labour (γ)	.41	.41	.49	.70	.45[c]
– technical progress (ε)	1.30[a]	1.80[a]	2.00[a]	.75[b]	.75[b]
Islam (1996)[d]					
– capital (β)	.68	.69	.54	n.a.	n.a.
– human capital (λ)	.23	.13	.11	n.a.	n.a.
– labour (γ)	.09	.18	.35	n.a.	n.a.
– technical progress (ε)	1.10[a]	1.20[a]	1.90[a]	n.a.	n.a.

Source: Mankiw et al. (1992); Islam (1995); and authors' elaboration on Mankiw et al. (1992).
Notes:- [a] refers to labour productivity; [b] refers to the total factors productivity; [c] computed as the average of the estimates of Mankiw et al. for the intermediate and OECD countries; [d] based on the cross sectional estimates.

- Equation (13), defines a welfare index (or net wage) by subtracting from the gross wage rate (which is determined by GDP, the share of labour in GDP and the number of workers), the current transfers necessary for the payments of the pensions (equation 10) and those due to the servicing of the stock of accumulated debt (equation 11).

6. Simulation results

We have carried out three simulations from the base year 1995 to year 2030 for Poland, Russia and the Czech Republic. The (baseline) simulation assumes for all three countries that 'pension generosity' (the ratio of the average pension to the average wage) and retirement age remain the same as in 1994-5; and that the saving rate remains at current levels. Other assumptions (unchanged in all scenarios) concern the yearly real rate of interest on the public debt (3 per cent); that half of the pension bill in excess of 5 per cent of GDP is funded through the recourse to public borrowing; and, that the 'market dividend' allows for a total factor productivity gain of 0.75 per cent a year.

In a second more favourable scenario, pension generosity is assumed to drop while retirement age rises in all three countries to 65 years. This scenario is tested under two hypotheses the first assuming the same saving rate of 1995, the second assuming an increase of this rate to 20 per cent of GDP in Russia and to 25 per cent in the other two countries. All other assumptions remain unchanged. In a third less

favourable scenario we assume an increase in pension generosity in relation to the base year and no changes in retirement age (60 years). Also in this case the model is simulated under the above two hypotheses about the savings rate. All other assumptions remained unchanged.

The results of the three simulations (the numerical results being omitted for reasons of space; they can be consulted in Cornia et al. 1996) point to:

(i)   A slow growth of potential output. On the basis of the (rather realistic) assumptions about the growth of production inputs, it appears that potential output will increase at low-to-moderate rates. Only in Poland is potential GDP expected to rise faster than 2 per cent a year. The range of average yearly growth rates of potential output over the period 1995-2030 is 0.6-2.2 a year.

(ii)   The difficult case of Russia. Even under the most optimistic scenario (comparatively high saving ratio and retirement age, and comparatively low pension generosity), potential GDP is expected to rise at about 1 per cent a year, and to remain for long below its pre-transition level. In the worst scenario, potential GDP by 2030 will be only 30 per cent above its 1995 level and 35 per cent below its pre-transition level. Demographic factors, the quasi stagnation in the stock of physical capital, the fall in human capital stock (until 2015), and the slow rise, followed by a fall, in the labour force are responsible for this dismal state of affairs.

(iii)   Time profile of growth: 2010-20 is the most difficult period. The problem of slow growth will be particularly acute during the above decade, particularly the 2010-15 quinquennium. Growth is expected to accelerate between 2025-30. In all three countries under consideration, unless drastic (and unpopular) changes in pension policy are introduced during this period, the pensioners population and pension bill will increase rapidly, and the working age population decline perceptibly, thus affecting negatively capital accumulation and labour supply. For instance, between 2005 and 2020, in the Czech Republic, the population over 60 of age will rise by about 35 per cent while the working age population will decline by 10 per cent.

(iv)   Increases in saving rates have a comparatively modest effect on growth (i.e an elasticity of 0.10). Indeed, our model shows that an increase in potential GDP and wages triggered by the increase in savings causes a simultaneous offsetting effect on capital accumulation, as pensions rise in line with wages, while the related increase in the pension bill depresses investment. The slow effect of capital accumulation is due also to the low value (0.2) of the output elasticity of the stock of physical capital. Thus, to obtain a greater growth impact of an increase in savings, one would have to assume that government deficits rise slowly, even in the presence of an increase in the pension bill, that the rate of

depreciation of physical capital falls, and that the output elasticity of the capital stock increases.

(v)   Net wages rise even slower than potential GDP. The real net wage (after transfer to fund pensions and debt servicing obligations) rises at half the speed of potential GDP in the case of the Czech Republic, and at about 35-40 per cent in the case of Poland and Russia. In the less favourable scenario (rising pension generosity and unchanged retirement age), the net wage stagnates over the entire 1995-2030 period in both Russia and the Czech Republic, and drops marginally in Poland (where pension generosity is already high). Even in the most favourable scenario, the net wage is expected to rise by only 1 per cent a year in the Czech Republic and Poland, and by two thirds of a point in Russia. Thus, long-term prospects are for a slow growth in wage earnings, and their stagnation between 2010 and 2020.

(vi)   The large welfare impact of demographic variables. The recent transition's mortality and fertility crisis, and the expected changes in demographic variables appear to have a perceptible medium-term welfare impact. This is an important observation, rarely voiced in the debate about the short-term effect of the transition. Thus, the recent population crisis might reduce in a non-negligible way the social and efficiency benefits expected from the move to the market economy.

(vii)   Pension policy changes have a strong intra- and inter-temporal welfare effect. While the slow growth of production factors and adverse changes in dependency ratios expected in over the next thirty years will exert an important negative influence on the potential growth of output and welfare, these are also dependent on current and future decisions about pensions generosity and, particularly, retirement age. Barring dramatic rises in pension generosity (like those which occurred in Poland in 1991-2), gains in long-term welfare could be obtained through a gradual increase in the pensionable age.

7. In lieu of conclusions

The above discussion, model and simulations are only a modest and vastly imperfect attempt to draw the attention of the policy makers to the long-term implications of the recent changes in capital accumulation, population structure and quality, and social policy. These elements are hardly emphasized in the current transition debate. While much of the empirical data – most obviously that relating to the future is somewhat arbitrary, the direction of trends described in this paper is less disputable. In this paper, we illustrate not only the standard inter- and intra-generational trade-offs faced by countries with rapidly ageing populations. We also place this problem in the context of the recent recession and of the uncertain prospects for physical and human capital accumulation.

The results of the simulations illustrate what might happen if the current trends are allowed to continue for long. Especially in the case of Russia, a policy aiming at reviving the economy over the long-term will require major efforts on the accumulation of production factors, in raising overall efficiency and in containing the growth of public debt, including more persistent efforts at tax collection. Growth can also be accelerated by gradually rising the retirement age (in line with increases in life expectancy) so as to improve the supply of labour and contain the public expenditure on pension transfers. Otherwise, Russia may not be able to recover for long its pre-transition level of GDP

Note

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