SESSION 2 – FINANCING OF THE INFRASTRUCTURE

CONTRIBUTION

“TRENDS IN TRANSPORT INFRASTRUCTURE INVESTMENT 1985-2000”
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INTRODUCTION

This report is a follow-up to the report “Investment in Transport Infrastructure 1985-1995”. As is obvious from what is presented here, the data availability at the national level is still less than satisfactory. For some countries transport infrastructure investment data are still not available. The data contained in this report have been checked for consistency. Some data had to be excluded as they are based on unusual definitions of the statistical variables.

The report will give time trends of aggregate transport infrastructure investment for a major part of ECMT Member countries. The presentation of the data will distinguish 3 groups of countries defined by their relative stage of development and data availability. A first group comprises the longstanding Member countries, a second the extended group of accession countries and a third one is composed of Eastern European and Balkan countries. While statistical information on transport infrastructure investment is nearly complete for the first group, data for the second group are more fragmented and data series contain breaks due to the structural changes following from the initiation of the transition process at the beginning of the nineties. Data for the third group are scantier and not yet of a quality that allows immediate use.

For all parts of the report the impetus is to obtain an understanding about the importance of the physical transport infrastructure for the functioning of the transport sector and the overall economy. Therefore emphasis will be put on real rather than monetary figures. Moreover, the report tries to go as far as possible to achieve an international comparability in the sense of the physical importance of the transport infrastructure. To this end, real values in national currencies will be made comparable by making use of purchasing power parity conversion factors rather than official exchange rates. This avoids distortions of exchange rates due to cyclical movements of national economies and national exchange rate policies being translated into the transport infrastructure figures.

Macroeconomic Background

The first part of the report will give the macroeconomic background of the economies studied. It will consist in showing the time trends of per capita income figures and an analysis of the relationship between aggregate income levels and growth performance. The latter serves as the backdrop to a discussion of the role transport infrastructure investment might have for regional catching up processes within and between the country groups defined above. The first part will also report the overall development of public households over the reporting period. Within the groups there is a high degree of parallel macroeconomic development, associated with a strong tendency towards convergence, i.e. the tendency towards higher rates of growth associated with lower levels of initial income. The discussion of the macroeconomic background is complemented by presenting some broad evidence on the possibilities for governments to finance transport infrastructure investment. It is based on the indicator of claims on the government budgets as a percentage of tax revenues.
Time Trends of Overall Transport Investment

The second part of the report will compare the overall time trends of transport infrastructure investment. In accordance with the observations on the macroeconomic development, investment in transport infrastructure (relative to the development of GDP) have been highly correlated within country groups but associated with major differences between the long standing Member countries and the extended group of accession countries. By and large the Western European countries have seen an increase in transport infrastructure investment relative to GDP at the beginning of the nineties and a decline, or a substantially reduced increase at the end of the decade. In most countries of the extended group of accession countries the share of transport investment of GDP continued to increase.

Time Trends of Modal Split

The third part will study the time trends of the modal split of national transport infrastructure investment. In contrast to the above results there is no strong correlation between countries like in the overall trends. Even within the group of long standing Member countries the trends suggest a strong pro-railway bias (e.g. in the case of the UK) while other countries clearly seem to favour the road sector (e.g. Spain, Italy). The smaller the countries studied in the second group the more difficult it is to derive a political emphasis on rail or road from the investment figures, as the strong fluctuations reflect investment in individual projects. Longer time series are required to obtain a more informative picture.
MACROECONOMIC BACKGROUND

Introduction

This section gives a picture of the macro-economic background of the countries for which the trends in transport infrastructure investment will be analysed. The ECMT Member countries have been sorted into three groups, according to their general development situation which corresponds to data availability:

- the long standing Member countries of ECMT,
- the extended group of EU accession countries,
- the CIS countries, and
- the Balkan countries.

This report aims at reviewing the available evidence with respect to the importance of infrastructure investment for the real economy. Therefore all data are presented in real terms, 1996 being the base year. To account for international price differences, local currency units are converted into purchasing power parities. This conversion takes account of the fact that, after converting expenditure flows in different countries into a common currency, say the dollar, using exchange rates, the dollar prices are not the same in different countries. While changes in expenditure flows for a single country between two time periods can be decomposed into changes of quantities and changes of the price level, in international comparisons, the ratio of the values of expenditure flows between any two countries have to be split into three components

- the exchange rate
- the volume ratio, and
- the price ratio.

The Purchasing Power Parity is the rate of currency conversion at which a given amount of currency will purchase the same volume of goods and services in two countries. The data have been converted into international dollars by using World Bank data, which are based on the UN International Comparison Project.

In this chapter we show the macro-economic development of the ECMT Member countries.
Long standing Member countries

This section focuses on the macro-economic background of the long standing Member countries of ECMT.1 With few exceptions there has been a rather homogeneous development of per capita incomes. For the majority of countries the growth rates have been stable at a rather low level. The growth situation has rather worsened after the year 2000. With respect to public budgets there is little room for a general fiscal expansion in the current situation as public deficits have widened and are expected to reach a level of more than 3 per cent of GDP in 2003. As can be seen from Figure 2, most of the long standing Member countries had relatively low growth rates after the weak growth period 1993-1994, with the exceptions of Ireland, Finland and Denmark. As we will see later, the cyclical pattern of income growth is reflected in the pattern of overall investment in transport infrastructure.

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1. The long standing Member countries are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom. Iceland, Liechtenstein and Luxembourg will not be considered in this study in view of their particular geographic situations.
Among the long standing Member countries of ECMT there has been a clear tendency to catch up, as can be seen from Figure 3. Disregarding the exceptional cases of Ireland and Greece there is a strong negative correlation between the real per capita income of 1985 and the average growth rate over the entire period from 1985 to 2000. The initial income – average growth rate points of all other countries almost lie on a straight line. Given the strong correlation between transport demand and per capita income we can expect a particularly strong growth of transport demand in countries with relatively low income. Consequently, demands for transport infrastructure investment can be expected to be particularly strong in these countries with a relatively low level of economic development and relatively high per capita income growth rates.
To highlight the financial pressures of the public sector, Figure 3 depicts the time trends of the financial claims on governments and other public entities relative to the tax revenues. To make the chart more informative, Figure 3 excludes Greece which had a strong increase in claims on public funds up to 1994, reaching more than 400 per cent in 1994 and declining continuously to about 200 per cent in 1999. For the other long standing Member countries of ECMT there is not much evidence of a tighter fiscal situation. The most favourable situation holds for Norway, with net claims on the private sector, and Belgium with a very low ratio of claims on government households and other public entities to tax revenues. For France and Germany, the indicator of the public finance situation has considerably worsened after the downturn of the business cycle at the mid-nineties. As will be seen below, this had no immediate consequences for their expenditures on transport infrastructure.
Extended Group of Accession Countries

For the extended group of accession countries the macro-economic situation of the nineties was much more diverse than for the long standing Member countries. It was characterised by a marked downturn of the economies as a consequence of the transition from planned to market economies at the beginning of the nineties. Behind the downturn lie the efforts to stabilize the new market economies, the enormous institutional change in the economies and the structural adjustments following from the changes in relative prices.

Some of the countries belonging to the group of extended accession countries experienced a rapid and strong upturn after the initial phase of adjustment to the market economy. Their development corresponds to the expectation of a “J-curve” development as a consequence of the shock of the switch to a market economy. By and large, the strength of the recovery is strongly correlated with the initial per capita income of the respective economy. A strong and clear increase in per capita income can therefore be observed for Slovenia, the Czech Republic, Hungary and the Slovak Republic. Estonia is the Baltic country with the strongest rebound in per capita incomes. In contrast to the general correspondence of the initial per capita incomes and the recovery in the second half of the nineties, Poland has experienced a remarkable increase in per capita income after 1992/1993. For Latvia and Lithuania we observe a relatively weak recovery while it is even weaker for Bulgaria and Romania. Turkey, differing from the other countries as it did not need to overcome the shock of change of its economic system, had a continuous while relatively moderate increase in its per capita income.

Figure 5 clearly shows the heterogeneity of developments among the extended group of EU accession countries. Bulgaria and Romania were among the countries with the lowest per capita incomes in 1994 and their per capita incomes stagnated in the second half of the nineties. While the 1994 income of
Turkey was slightly lower than that of Bulgaria; it had an average growth rate of real per capita income of slightly less than 3 per cent.

Poland had an exceptionally high average growth rate of more than 5 per cent from 1994 to 2000 relative to its initial per capita income, and the same holds for the more than 4 per cent of real per capita income growth of Slovenia. For the other countries of this group there seems to be a close negative functional relationship between the initial income and the growth performance in the second half of the nineties.

Behind the differences in per capita income in 1994 lies a multitude of variation in initial conditions which differ in their impact on the development of transport infrastructure investment: First, trade among the COMECON countries was geared towards an extreme pattern of administered regional specialisation and an almost complete isolation from the forces of the global market place. However, some of the Central European countries had achieved competitiveness in Western markets for at least a few selected goods. The dissolution of the trade arrangements between the countries of the extended group of accession countries therefore affected countries with varying impact. Moreover, the geographical location is likely to have had a major influence on subsequent growth, as the new pattern of trade implied a completely different pattern of transport costs and market access.

The situation of public finance had been dependent on the extent of the monetary overhang inherited from the planned economy period, and the extent of repressed inflation. The need to tighten domestic demand, *inter alia* by contractual fiscal policies was particularly pronounced in Bulgaria and Romania, and much less so in Slovenia, Hungary and the Czech Republic, explaining part of the differences in growth performance during the nineties.
In terms of the claims on governments and other public entities relative to the annual tax revenues of the countries of the extended group of accession countries, the situation was not markedly worse than in Western countries, as can be seen from Figure 7.
Figure 7 excludes the indicator of the fiscal situation of Bulgaria, which had claims on the public sector of more than 500 per cent of its tax revenues for 1993, brought down to levels of less than 15 per cent by 1998. Almost all of the Central and Eastern European countries have decreased the claims on the public sector to low absolute levels, with slight increases for Latvia and Lithuania at the end of the nineties. Only Turkey and the Slovak Republic saw a clear worsening of the indicator for public finance in the second half of the nineties.

CIS Countries

It is shown by Figure 8 that the CIS countries started from much lower levels of real income per capita and have seen pronounced relative declines in economic activity. Georgia had the most dramatic reduction in per capita income had Georgia, with a very weak recovery after 1995. Stronger signals of an economic recovery hold only for Belarus, for the years after 1996, and for the Russian Federation after 1998.

![Figure 8: Real GDP per capita in 1995 international Dollars in CIS countries](image-url)

The weakness or absence of recovery - the “L-curve” development - is also reflected in the average growth figures for the period 1994 to 2000. Moldova and the Ukraine experienced a negative growth rate over that period concealing a weak increase in economic activity after 1998. Disregarding these countries, there is a close negative correlation between the 1994 real per capita income and growth performance. Georgia had the highest average growth, albeit after a fall in the per capita income from almost 140 international dollars per year to less than 20 dollars in 1994. As can be seen from Figure 8, Azerbaijan and Armenia had a slightly weaker recovery than would have been expected, given the average relationship between per capita income in 1994 and the growth rate in per capita income for the group of the CIS countries overall.
It is much more difficult to identify the fiscal situation of the CIS countries. For Armenia and Ukraine there are no data for tax revenues available and, as can be seen from Figure 10, data for the other countries are incomplete. The major jumps in the indicator of the financial situation in the public sector are due to a very high volatility of the tax revenues. The tax revenues of the Russian Federation, for example, tripled between 1998 and 2000.

The macro-economic background differed strongly between the groups of ECMT Member countries studied in this chapter, the long standing Member countries, the extended group of accession countries and the CIS countries.  

Within each group there is a remarkable homogeneity of macro-economic backgrounds. The long standing Member countries grew at rather moderate but stable rates, while the extended group of accession countries went through the J-curve as a consequence of the shock of transition to the market economy. Most of the CIS countries have not progressed beyond the transition crisis, and show an L-curve rather than a J-curve development.

The amount of claims on the government sector relative to tax revenues is used as an indicator of the capacity of governments to finance new transport infrastructure investment. For most of the long standing Member countries, financial pressures on the public sector decreased rather than increased. This does not hold for France and Germany. For the extended group of accession countries the absolute value of financial pressures is relatively low and decreasing, largely due to the increase in tax revenues following from the economies' upturn in the second half of the nineties. Only fragmented data are available for the financial situation of the public sectors in the CIS countries. They reveal an unstable situation due to the volatility of tax revenues.

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1 The Balkan countries have been excluded due to the lack of data.
TIME TRENDS OF CAPACITY UTILIZATION

To check to what extent infrastructure investment responds or should respond to developments in consumption of transport services, we would ideally use physical measures that are independent of potential distortions of market prices or valuation conventions. The available data, for example on the length of the road network, however, seem to be unreliable due to inherent difficulties of collecting primary data and subject to drastic redefinitions of statistical categories, as the following Figures show.

Data on the length of the road network show drastic changes in the capacity indicators even for the long standing Member countries with relatively well-developed statistical systems. They indicate a more than fifty percent increase in the length of the road network for Italy between 1995 and 1997 and an even more drastic increase for Spain between 1997 and 1999, while the development is flat otherwise. By contrast, the indicator for Germany decreases by two thirds between 1998 and 1999. These changes seem to suggest drastic changes in the definition of the statistical data, reducing the value of the time series even for individual countries. The breaks in the data series dominate any measure of capacity use, as is shown for the ton-km per km of road network length in the Figure below.

Moreover, the data on transport demand show a high volatility from year to year, suggesting that data collection is subject to inherent reporting difficulties. The decreasing amplitude suggests that
statistical offices are increasingly able to contain these difficulties. However, the time series, as they are, have to be used with caution.
Therefore, rather crude measures have to be used to obtain an idea of the capacity use of the overall transport infrastructure. In the following sections we show the developments of the average ton-km produced in the country groups and contrast it with the average development of the per capita incomes. This indicator illustrates the development of transport intensities in the country groups and shows the capacity utilization if variations in transport intensities translate into variations in intensity of infrastructure use. This, in turn depends on the correlation between transport investment and the development of per capita incomes. As will be seen, there are marked differences between the long standing Member countries, the extended group of accession countries and the CIS countries.
Long Standing Member Countries

Figure 11: Average ton-km and average per capita income, long standing member countries

Figure 12: Average passenger km and per capita income, long standing member countries
As can be seen from Figures 11 and 12, the transport intensities of the long standing Member countries are increasing. There are, however, clear differences between the changes in freight and passenger transport. The average increase in per capita income in this country group is associated with an even stronger increase in freight transport. While the index of real per capita incomes increased by about 40 percentage points, the freight transport index increased by about 85 percentage points. The divergence between the developments of the two indicators has become even stronger in the second half of the nineties. Freight transport demand in the long standing Member countries has not followed the economic downturn of around 1993.

By contrast, the divergence between passenger transport demand and per capita income in the long standing Member countries has been weaker over the period considered and had become considerably smaller by the end of the nineties. Over the entire period the increase in passenger travel demand had been about 9 percentage points higher than the increase of per capita income. The demand for passenger transport has reacted weakly to the slowdown in the increase of per capita incomes of the mid nineties.

The data seem to suggest that the need for new investment in transport infrastructure will be driven by the development demand for freight transport. If the share of expenditures for transport infrastructure investment of national incomes per head does not increase it is to be expected that higher degrees of capacity utilization and an increase in congestion will be observed.

**Extended group of accession countries**

The countries of the extended group of accession countries have seen an even stronger increase in transport intensities than the long standing Member countries over the period 1991 to 2000. In contrast to the observations for the long standing Member countries, the differences between the freight and passenger subsectors are not only of a quantitative nature but show a qualitative difference.
As can be seen from Figure 13, freight transport demand increased rapidly while the countries were still on the downward part of the J-curve after the transition shock. The recovery after 1994 has been associated with clearly stronger increases in transport activities. While average per capita incomes in the extended group of accession countries for 1999 are only 2 per cent above the 1991 value freight transport demand had increased by about 38 percent.

By contrast, as can be seen from Figure 14, the demand for passenger transport and per capita incomes developed in parallel. The index for passenger transport demand was only slightly higher than the index for real incomes per head. This suggests that passenger transport intensity of the countries of the extended group of accession countries stayed constant throughout the decade. In 1999, the index for passenger travel demand was only less than 2 percentage points higher than the index of per capita income.

The developments of the nineties suggest that the required extensions of transport infrastructure will be even more determined by the increase in freight transport with real per capita income than for the long standing Member countries. In fact, almost all of the increase in transport intensity, which could call for an increase in the share of new transport infrastructure investment spending is due to the dramatic increase in freight transport demand.

### CIS countries

The developments in transport demand and transport intensities in the CIS countries do not only differ from the experiences in the long standing Member countries and the extended group of accession countries, due to the persistence of the transition recession, but have a qualitatively different pattern:
Both freight transport demand and passenger travel demand have declined in parallel with real per capita incomes during 1991 to 1995/96. Both continued to decrease after the economies started to pick up again.

**Figure 15: Average ton-km and per capita income CIS countries**

**Figure 16: Average passenger km and per capita income, CIS countries**
TOTAL INVESTMENT IN TRANSPORT INFRASTRUCTURE

We introduce the transport infrastructure investment data by presenting the overall pattern of transport infrastructure investment. The subdivision of all ECMT Member countries will be maintained accounting, for the marked differences in investment behaviour between the groups. For each group the figures of absolute real gross investment levels, made comparable by applying the PPP conversion factors, will be presented. The real values in 1995 prices are converted by making use of the 1995 PPP conversion factor.

Long standing Member countries

To make the figures more informative the group of the long standing Member countries have been split up into two sub-groups according to economic size. As it turns out, size differences among the long standing Member countries are associated with differences in the time trends of the overall total of transport infrastructure investment.
As can be seen from Figure 17, in all of the larger countries (France, Germany, Italy, Spain and the United Kingdom) there was an increase in the overall real resources allocated to transport infrastructure investment at the end of the eighties and the beginning of the nineties. In all of these countries the absolute level of transport infrastructure investment considerably decreased. The greatest reduction from the peak in 1992 to 2000 occurred in the United Kingdom. In Italy, Spain and Germany there was a recovery of transport infrastructure investment expenditures, without leading to a turning point of the average development in the larger countries.

The development of the total transport infrastructure investment in the sub-group of smaller long standing Member countries differs markedly from the experience in the larger countries. A reduction in total infrastructure investment in the second half of the nineties, as was observed for the larger long standing Member countries, is observed for Austria, Sweden and Portugal. Similar to the pattern of the larger economies, the downturn in transport infrastructure investment for Austria and Sweden picked up again in the last years of the period considered. Moreover, the reversal of the upward trend in Portugal occurred as late as 1997 and may represent a reaction to a strong increase in expenditure for transport infrastructure over the period 1987 - 97.

In general, total transport infrastructure investments have been more stable than in the larger countries, associated with a digressive increase, as is shown by the average trendline in Figure 18. This holds on average despite the pronounced reductions in transport investment in Austria and Portugal in the second half of the nineties. On average, expenditures increased by about one third over the entire period 1987 to 2000.
The general decrease in transport infrastructure investment does not only have an absolute dimension but is also reflected in its development relative to GDP. As can be seen from Figure 19, a rather continuous decline for the long standing Member countries can be observed from 1993/1994 onwards, with the exception of a small upturn in 1997/1998.\(^1\)

![Figure 19: Transport investment as share of GDP, long standing member countries, ex Portugal and Switzerland](image)

The downward trend seems to be dominated by the parallel development of absolute and relative figures for some major countries like the UK, Spain and Italy. The increase in absolute transport infrastructure investment, for example in the case of Germany, is only weakly represented in the relative figures, suggesting that the absolute values have been driven by the general economic development.

\(^1\) Figure 19 excludes Portugal and Switzerland as their high values of transport infrastructure investment relative to GDP make the figure uninformative. The trend of absolute values for Portugal is also reflected in the relative trend, i.e. there is a strong downward trend reversal at the end of the nineties, while Switzerland has a stable high relative value for transport infrastructure investment throughout the observation period. The diagrams for the individual countries can be found in the appendix.
Extended Group of Accession Countries

Figure 20 shows that the trends in transport infrastructure investment for the extended group of accession countries differed from those of the long standing Member countries.\(^1\)

![Figure 20: Total transport infrastructure investment extended group of accession countries](image)

In contrast to what was observed for the long standing Member countries, some of the accession countries experienced a decline in the absolute values of transport infrastructure investment. The decrease was rather pronounced for Poland and the Slovak Republic. Given the transition crisis in the accession countries the decrease is less surprising than the increase in others, in particular in Hungary, Slovenia and Romania.

The deviation of average investment from the trendline is greater than for the long standing Member countries and reflects the countries’ macroeconomic developments. The trendline shows a digressive increase of investment throughout the nineties. For the last years actual transport investments have decreased below the trendline but have increased more strongly than what was suggested by the average trend.

As can be seen in Figure 21, the trend increase in investment in the extended group of accession countries was greater than the increase in GDP. This is reflected in a stronger percentage increase in the share of transport investment of GDP than the absolute value, or a greater slope of the trendline of

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\(^1\) There are several reasons for caution when interpreting the figures for the extended group of accession countries. First, the number of observations is smaller than for the long standing Member countries for obvious reasons. Much of the development of transport investment seems to be determined by transport policy decisions that were taken before the transition to the market economy. It might therefore be more difficult to read strategic political commitments into the observed figures. As Figure 22 shows, there was a high volatility among the investment figures in the early nineties which may partly reflect changes to statistical accounting and partly temporary changes to transport policy.
the ratio of transport infrastructure investment and GDP. The increases were particularly strong for Slovenia, the Slovak Republic and Romania. The peaks for some countries like Hungary and Latvia in the early nineties reflect that investment expenditures have been stable or have even increased during the period of the transition recession. The abnormal, strong decrease of gross investment of Poland is at least partly due to peculiar definitions of the statistical categories. As will be seen below, the low figures for gross investment are matched by relatively high values of maintenance expenditure on transport infrastructure.

The relatively high volatility of the transport infrastructure investment share of GDP indicates to some extent the dependence of the figures on individual major investment projects. Figure 22 suggests that the volatility has been due to the dramatic restructuring at the beginning of the transition process and has been far less pronounced at the end of the nineties.

The deviation of average investment from the trend has been even stronger for transport infrastructure investment relative to GDP than for the absolute value, mirroring the pattern described above, i.e. displaying a development below the trend for 1993/1994 and above the trend for 1997/1998.
DISTRIBUTION OF INVESTMENT AMONG TRANSPORT MODES

Similar to the figures on total investment, there are marked differences in the distribution of total transport infrastructure investment between the long standing Member countries and the extended group of accession countries. As can be seen from the country figures in the appendix, investment in maritime transport and airports is of minor importance, except for very small countries where individual airport projects imply substantial changes to the overall figures of transport investment. In any case, relative shares of road transport investment and rail investment by and large mirror each other. The modal split of the overall transport investment is therefore represented by the share of gross road investment relative to gross total investment in transport infrastructure.

Long standing Member countries

In most of the long standing Member countries the ratio of investment expenditure on roads to expenditure on rail has been fairly stable from the mid eighties to the end of the nineties. The United Kingdom stands out as a country with the road share constantly and strongly declining. For other countries like Austria and Norway, there has been a strong decline in the road share in the first half of the nineties with a fairly strong increase in the late nineties. For other countries like Belgium and Italy, the development describes an inverse u-shaped curve. The strongest upward trend is observed for Spain.
Overall, there is a trend decline in the road share of total transport infrastructure investment in the long standing Member countries. While the average road share of the long standing Member countries has been above the average trend for the years 1989 to 1996 it is below for the last years of the decade.

**Extended group of accession countries**

As can be seen from Figure 24, the time trends of the modal split in the extended group of accession countries differed in many ways from those of the long standing Member countries. First, the road investment shares of this group have a much higher variance than those of the long standing Member countries. The road investment share of Latvia, the lowest share in that group, increased from about 12 percent to roughly 25 percent. By contrast, Slovenia allocated more than 90 percent of its overall transport investment in the road sector.

Secondly, after an average decline in the road share, there was a strong increase in relative expenditures for roads in a number of countries such as Romania, the Slovak Republic, Latvia and Lithuania. In almost all of the countries there has been a high volatility for the investment share of roads, and therefore also for the railway’s share of infrastructure investment. It therefore seems to be difficult to interpret the observed investment patterns as an indication of strategic behaviour in order to achieve the political objective of changing the modal split.
Thirdly, in contrast to what was observed for the long standing Member countries, there is an average upward trend for the roads’ share of overall investment, indicating a trend increase of about 10 percentage points over less than a decade. As for the total investment and absolute investment figures, there is a relatively high volatility of the annual road investment share around the trend. Average investment shares for the road sector have been above the trend at the beginning and end of the nineties, with shares below the time trend from 1994 to 1996.
EXPENDITURE ON MAINTENANCE

In contrast to the importance of maintenance expenditure for maintaining the value of the infrastructure and achieving efficiency of the transport sector, there seems to be a lack of the respective data in many of ECMT’s Member countries. Moreover, the data reported show drastic differences between the individual Member countries, even after subdividing the total sample into long standing Member countries and the extended group of accession countries. This suggests that the harmonization of the definitions of statistical variables is particularly difficult to achieve for the maintenance expenditures. To highlight the differences between the data of individual countries we present figures for the ratio of road maintenance expenditure to gross road investment and rail maintenance expenditure relative to gross rail investment.

Long standing Member countries

The data for relative road maintenance expenditures are shown in Figure 25. They suggest that Sweden and Denmark have much greater relative maintenance expenditure than the rest of the long standing Member countries. The available data indicate that maintenance expenditures have been more than three times as high as gross investment in the road sector in Denmark at the end of the eighties and more than twice as high in Sweden at the beginning of the nineties. The figures for Swedish maintenance expenditures relative to gross investment have gone down drastically from the peak at the end of the eighties to a still high but more plausible 80 to 90 per cent at the end of the nineties. A weaker reduction in relative maintenance expenditure is reported for Denmark, with a decrease from the top 252 per cent to about 148 percent.

Figure 25: Road maintenance expenditure as share of road investment, long standing Member countries
As is brought out more clearly by Figure 26, excluding Denmark and Sweden, the highest relative maintenance figures are then reported for the Scandinavian countries Finland and Norway. While their respective values are close to 80 percent, the other countries have values of less than 50 percent. Portugal stands out as a country that reports maintenance expenditure relative to gross investment in the road sector of around 10 per cent throughout the nineties.
Extended group of accession countries

As can be seen from Figures 28 to 31, even more erratic data are reported for the relative maintenance expenditure of the extended group of accession countries. Lithuania has reported an increase in maintenance expenditure from about 250 percent in 1993 to more than 900 percent in 1997, decreasing thereafter to slightly more than 200 percent relative to gross investment in the road sector. The data points reported for Estonia are also more than double the average values. Most of the other countries report relative road maintenance expenditure of between 50 to 100 percent. The Polish data indicate a dramatic increase in maintenance expenditure by more than 200 percentage points between 1993 and 1999 to more than 250 percent of its gross road investment. Decreasing and very low values are reported for the relative road maintenance expenditure for Slovenia and the Slovak Republic, possibly due to the strong increase in gross investment in both countries.
Figure 28: Road maintenance expenditures relative to road investments, extended group of accession countries

Figure 29: Road maintenance expenditures relative to road investments, extended group of accession countries ex Latvia
The relative rail maintenance data show an even more erratic pattern, as can be seen from Figures 30 and 31. Extremely high peak values are reported for the first half of the nineties for Lithuania (almost 16 times the gross investment) in 1994, Poland in 1992 (more than 600 percent) and Romania in 1994 (more than 800 percent). They all rapidly dropped to about 200 percent, which seems to be due to the collapse of railway investment and the continuation of maintenance services.
All of the relative rail maintenance figures strongly decrease, except for Slovenia where they have been at very low levels throughout the nineties, and for Estonia.

**SUMMARY**

The report summarizes the data on transport infrastructure collected by ECMT and puts them into a macro-economic and investment policy perspective. The data show marked differences between ECMT’s long standing Member countries and the extended group of accession countries for the period of the analysis, from 1987 to 2000.¹

Both groups had very different macro-economic backgrounds with the corresponding differences in the development of transport demand and the resources available for transport infrastructure investment. The long standing Member countries had a steady but relatively moderate growth throughout the period studied, while the Members of the extended group of accession countries went through the transition crisis in the first half of the nineties with a moderate to strong growth in the second half.

The development of the ratio of claims on governments’ resources to tax revenues does not suggest that the financing possibilities of the public sector have considerably worsened during the nineties. Exceptions among the long standing Member countries are France and Germany and among the accession countries the Slovak Republic.

The strong growth of freight transport in the long standing Member countries as in the accession countries suggests that

Absolute total transport infrastructure investment has differed among two subgroups of the long standing Member countries. In the larger countries the development has taken an inverse u-shape, while for smaller countries there was a clear average upward trend. Transport infrastructure investment as a share of GDP has increased on average in the first half of the nineties and decreased in the second half. By contrast, both absolute and relative values for the extended group of accession countries show an upward movement on average.

What the split of the transport investment between the road and the rail sector is concerned, the long standing Member countries have seen a downward trend of the share of the road sector in overall investment. The variance of the developments of the modal split of investment expenditures between the different long standing Member countries is relatively small. These time trends are much more heterogeneous for the extended group of accession countries. For none of the countries a clear downward movement of the road share can be observed. Overall the average share of the road sector in the allocation of transport investment resources has increased by about ten percentage points.

Data for maintenance expenditures are scanty and obviously difficult to compare. Maintenance expenditures for road and rail have been particularly high for Scandinavian countries but have strongly decreased throughout the nineties. For all the other long standing Member countries they have been fairly stable and between 40 and 60 percent for both roads and rail. For the group of accession countries relative maintenance expenditures started from relatively high values at the beginning of the

¹ There are no investment data yet for the CIS and the Balkan countries.
nineties and have substantially decreased throughout the period studied. They remain, however, higher on average than those of the long standing Member countries.
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APPENDIX A: Total Investments in Transport Infrastructure in 1995 International Dollars

Long Standing Member Countries

Transport Infrastructure Investment Austria

Transport Infrastructure Investment Belgium
Transport infrastructure investment Norway

Transport infrastructure investment Portugal
APPENDIX B: Modal Split of Transport Infrastructure Investment

Long Standing Member Countries

Modal split of transport infrastructure investment Austria

Modal split of transport infrastructure investment Belgium
Modal split of transport infrastructure investment Netherlands

Modal split of transport infrastructure investment Norway
Modal split of transport infrastructure investment
United Kingdom

Year
Percent
0 10 20 30 40 50 60 70 80 90 100
Road share
Rail share
Airport share
Maritime share
Extended Group of Accession Countries

Modal split of transport infrastructure investment Czech Rep

Modal split of transport infrastructure investment Hungaria
Modal split of transport infrastructure investment Latvia

Modal split of transport infrastructure investment Lithuania
Definitions

Series: Claims on governments and other public entities (current LCU) (FM.AST.GOVT.CN)

Claims on governments and other public entities (IFS line 32an + 32b + 32bx + 32c) usually comprise direct credit for specific purposes such as financing of the government budget deficit or loans to state enterprises, advances against future credit authorizations, and purchases of treasury bills and bonds, net of deposits by the public sector. Public sector deposits with the banking system also include sinking funds for the service of debt and temporary deposits of government revenues. Data are in current local currency.