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DISCUSSION PAPER

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Ten Years After: What is Special About Transition Countries?

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Abstract

Most countries commonly classified as ‘in transition’ are still recognisably different from other countries with a similar income per capita in some respects: a larger share of their work force is in industry, they use more energy, they have a more extensive infrastructure and invest more in schooling. However, in terms of the ‘software’ necessary for a market economy, two groups emerge: the countries that are candidates for EU membership seem to have partly completed the transition. By contrast, the countries from the former Soviet Union that form the CIS and the BALKAN countries, are still lagging behind especially in terms of the enforcement of property rights and the development of financial markets.

1. INTRODUCTION

The economics of transition has become a sizeable cottage industry in the profession and there is even a special international financial institution, the EBRD, which is supposed to look after the special problems of countries in transition. Ten years after the start of reforms it is time to ask whether this special treatment is still justified.

A number of existing studies analyze the prospects of transition economies to catch up with developed market economies. Some have concentrated on estimating the time required by transition countries to converge to the Western European level of development using a growth regression approach (Barbone/Zalduendo, 1996); Fischer et al. (1997, 1998) and Fischer/Sahay (2000) assess the "distance" of the CEECs from Western market economies in terms of macroeconomic indicators such as inflation, budget deficit, etc., whereas Krkoska (1999) examines whether the macroeconomic fluctuations in transition economies are similar to those in Western European economies. The EBRD assesses regularly the progress of reform in each of the CEECs (EBRD various years) and provides a quantitative evaluation in a number of important areas (e.g. enterprise reform, market liberalization, financial and legal institutions).

However, the existing literature takes much richer Western European OECD countries as a model and implicitly assumes that all the characteristics that distinguish transition economies (in Europe) are due to their past as centrally planned economies. This is unlikely to be the case, because many of the indicators according to which transition countries differ from OECD countries are known to be related to the development level of an economy. In other words one should ask the question: Has central planning under communist rule left a heritage that, even after ten years, differentiates post-communist economies from other countries with a comparable income per capita?

The starting point for any post-transition Rip van Winckle would be those of the well known characteristic traits[1] of centrally planned economies that might have left a mark on economic structures because they could not be changed quickly:

1. Central planners had a marked preference for industry, especially heavy industry and tended to neglect services.
2. Central planners also organised very high rates of investment, both in physical and human capital.

1 For a list of the variables used see appendix A.3.

3. Under central planning there was no need for a financial system to allocate savings to investment (done by the plan, usually without assigning a value to time).
4. Under central planning there was no need for the legal and institutional framework underpinning a market economy.

This list leaves out many other elements that distinguish a centrally planned from a market economy, for example the control over prices, non-market exchange rates and artificial trade patterns to name but a few. However, these elements could be, and indeed have been changed almost immediately and would thus today be unlikely to distinguish an economy in transition today, ten years later.

The method proposed here starts from the observation that most of the elements in the potential characteristics of economies in transition are in general related to the level of development or income per capita.[2] For example, the demand for services tends to increase with income. Richer countries therefore generally have a larger services sector. More developed economies also have a much denser infrastructure than poorer ones. The same can be said of the financial system, which is generally much more developed in richer countries. Finally, it is a fact of life that in poorer countries the legal system tends to be under-developed, and that the public sector tends to work less efficiently. The main reason for this might simply be that the administration of the highly complex framework developed in the rich capitalist part of the world relies on a public sector with a strong human capital base. However, it has also been argued that weak enforcement of property rights impedes growth (Dabla-Norris/Freeman, 1999). Whichever way the causation runs is of no significant concern to the purpose of our analysis.

The results presented here strongly confirm the general observation that most of the elements that might distinguish an economy in transition are related to development. GDP per capita (whether measured in PPP or in current $ terms) can alone explain between 40 to 70 % of the variance of the indicators for the legacy of transition in simple cross-section regressions. This suggests a simple research strategy. Formerly centrally planned economies could be said to be different if they are systematically outliers in regressions that link indicators like the importance of industry, energy use, etc. to GDP per capita.

2 See also Easterly (1999).

The next section briefly describes the indicators and data sources used. Section 3 then presents the results. While section 3.1 discusses the sector-specific results and presupposes that the CEECs are different by testing for the significance of regional dummy variables, section 3.2 derives an overall assessment of the CEECs' location vis-à-vis the rest of the world. In contrast to the previous one, this section does not assume any a priori particularities, but lets the data find the outliers itself. Section 3.3 briefly comments on the issue of the transition economies' adjustment towards the benchmark since 1990. Section 4 concludes.

2. DATA

The data was taken from the World Bank Development Indicators data base which contains income per capita and a number of structural indicators for 148 countries. In this sample the transition countries mostly fall under the classification 'Middle Income Developing Countries'.

Most regressions were run on two transformations of the raw data: first, using the natural logarithm of all variables and, second, using standardised values, i.e. by subtracting the mean and then dividing by the standard deviation. As both sets of results were very similar; only the results using logarithms are reported here. Income per capita can be measured and compared in a common currency (the US-$) or in purchasing power parity (PPP) terms. The results presented here are based on GNP per capita in PPP, as this measure is commonly used in cross-section comparisons. The results were again similar using GNP in US-$ terms. This is not surprising since there is close correlation between these two measures of development. In a regression of one on the other the R-2 is over 96 % and the transition countries do not constitute outliers. This is a first indication that their economies are not fundamentally different.

Four regional dummies were used throughout. Three for transition countries: CEE8 (Central Europe), encompassing the most advanced 8 countries, which are the most serious candidates for EU membership (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic, and Slovenia), BALKAN, including Albania, Bulgaria, Croatia, Macedonia, and Romania, and the CIS countries (Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyztan, Moldova, Russia, Tajikistan, Turkmenistan, and Ukraine).

The use of three different dummies was motivated by the fact that these groups of countries differ markedly with respect to the extent of progress they have achieved in terms of reforms towards a market economy. The CEE8 countries are generally perceived as the most advanced country group, while the BALKAN countries have at least started reforms earlier than the CIS countries did.

As a control group a dummy variable was added for ASEAN countries, which are also widely perceived to have relied heavily on industrial expansion during their development process.[3]

The EBRD transition indicators were not used here for a simple reason: they are available only for transition countries and are thus not useful to check whether transition countries are different from other countries with a similar level of development.

3. RESULTS

Section 3.1 presents the results of our methodology described above using a cross-section of up to 148 countries with data from 1997 (in most cases). Each sub-section examines the respective indicators in turn. In section 3.2 we derive a summary measure of the countries' location relative to the world-benchmark by aggregating the residuals of a representative range of indicators. Finally, in section 3.3 we add a time dimension to our perspective by examining whether the CEECs have been adjusting towards the benchmark during their transition path.

3.1 A snapshot after(?) transition

The following sections comment on the results given in table A1. As described in section 2, these are taken from the following type of regression:

(1) $$\text{Indicator}_i = \alpha + \beta\, \text{GNPpc}_i + \chi\, (\text{GNPpc}_i)^2 + \phi\, \text{CEE8} + \gamma\, \text{BALKAN} + \eta\, \text{CIS} + \varphi\, \text{ASEAN} + \varepsilon_i$$

with 'i' as the country-subscript, 'Indicator' as the respective variable that is related to per capita income ('GNPpc'), 'CEE8', 'BALKAN', 'CIS' and 'ASEAN' as the country dummies described above, and 'ε' as the error-term. All variables are in natural loga-

3 The ASEAN dummy comprises: Indonesia, Laos, Malaysia, Myanmar, Phillipines, Singapore, Thailand and Vietnam.

rithms so that the coefficients can be interpreted as elasticities. The square term of per capita GNP was added to allow for a non-linear relationship. When the coefficient of the per capita GNP square term was not significant at the 10%-level, this variable was dropped from the equation.

Occasionally, the classification of the dummies may disguise underlying country heterogeneity. In order to control for such cases, we supplemented the results from table A1 with CEEC-country-specific results by running the following regressions:

(2) $\text{Indicator}_i = \alpha + \beta\ \text{GNPpc}_i + \chi\ (\text{GNPpc}_i)^2 + \nu\ \text{COUNTRY} + \varepsilon_i$

Specification (2) differs from (1) only in replacing the four regional dummies by a single dummy named 'COUNTRY', which includes but one transition country in each single regression. All other transition countries are left out of the entire sample, so as to ensure that the benchmark is not distorted by the (allegedly) distorted transition economies. Given that there are 24 transition economies in our sample and 18 regressions in table A1, we had to run 18*24=432 regressions to get the coefficients for all transition countries for all indicators examined in table A1 alone. The results of this exercise are summarised in table A2, which contains the coefficients of the respective CEEC as well as their heteroscedasticity-consistent t-values. Whenever these country-specific results add to the informative value of the dummy coefficients under specification (1), they are referred to in the text below.

3.1.1 Industrial structure

The preference of central planners for industry suggests the question whether post communist economies today are still characterized by more industry (and less services) than would be 'normal' given their level of income.[4] One would expect that the share of industry initially increases as a country grows richer, because the work force typically shifts out of agriculture into the secondary sector. At high levels of income, i.e. when mainly services expand, further increases in income should not lead to more employment in industry, so that the relationship between income and employment in industry should resemble an inverted J. Therefore, the square of income per capita was added to the explanatory variables in the following regressions.

4 This approach rests ultimately on the „Chenery-Hypothesis" (Chenery 1960), according to which sectoral growth within an economy is linked to its per capita income level. For an earlier application to Eastern Europe, but with a different focus than ours, see Doehrn/Heilemann (1991).

The importance of industry in an economy can in principle be measured by the share in employment or in economy-wide value added (GDP). Both indicators were used here.

a) Employment shares:

As for employment shares the evidence is strong, but the latest available data set is based on the most recent available data from the years 1990-97. Unfortunately, the data for the CEECs are usually no later than from 1994, which is still only five years after the start of transition. There is a very close correlation between GNP per capita and the share of industry in employment in the non-linear way described above, but the transition countries clearly do not fit this line. The dummy variables for the three groups of transition countries are positive and highly significant. The point estimates (between 0.5 and 0.8) indicate that the share of industry in employment in transition countries is between one half and about twice as large as one would expect given their income.

b) Value added shares:

Interestingly, the results are quite different if we look at the share of industry in value added, i.e. GDP. The dummy variables for the three groups of transition countries turn out to be insignificant for all transition dummies.[5] It is interesting to note that the dummy for ASEAN becomes significantly positive, which it is not for employment shares.[6]

The results on services are not reported because they represent, as one would expect, a mirror image of the ones for industry: the employment share of services is clearly lower for CIS countries, but much less for the CEE8 and BALKAN. As for the shares in value added neither dummy is significant.[7]

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5 Unfortunately, the value added regression shows a comparatively poor overall fit.

6 Somewhat surprising the results concerning the share of manufacturing in value added were different: the dummy variables for both groups of transition countries are large and highly significant. Unfortunately, no employment data are available for manufacturing.

7 This conclusion is in some contrast to the results of the recent Transition Report (EBRD, 1999), which identifies two adjustment patterns: In a first group of countries, including Central Europe, the Baltic states and the western parts of the CIS, the employment share of industry has declined, while the share of services – market services in particular – has increased. By 1997, this group had virtually closed the 'service gap' relative to a benchmark of 41 developing and developed market economies amounting to around 10% of total employment at the start of the transition. In the remaining group of countries, including south-eastern Europe, the Caucasus and Central Asia, the reallocation has been mainly from industry to agriculture, though in some of these countries, services have increased their share as well. Relative to the benchmark, the share of industry in total employment

The difference in the results for shares in employment and GDP suggests that most transition economies still have a problem with structural adjustment. The number of workers in industry is still much higher than one would expect, but their productivity is relatively low, so that the share of industry in GDP is about normal.

The legacy of the preference of central planners for heavy industry is more difficult to measure since it is difficult to define heavy industry precisely and there is very little consistent cross-country data on the composition of industrial output. However, the fact that heavy industry in general is more intensive in energy suggests an indirect way to measure its importance, namely by measuring the energy intensity of the economy.[8] The best indicator available in this respect is commercial energy use (which eliminates the part of energy used by households, which could be affected by climate). The square of income per capita was again added to the explanatory variables for the reasons outlined above.[9] The square term was highly significant, but the size and significance of the dummies for transition countries was not affected by this addition.

As for this indicator the results are unequivocal: in either group of transition countries commercial energy usage is much higher than expected. The three dummy variables are highly significant and the magnitude of the point estimate (around 0.8 for CEE8 and CIS) indicates that transition economies consume about twice as much energy per unit of GDP as one would expect. The fact that the BALKAN dummy is smaller and less significant is due to the influence of Albania consuming significantly less than expected energy.

Could the higher use of energy in transition countries be due to the large industrial sector? This does not seem to be the case. The size and significance of the dummies for the transition countries does not change if the share of industry in value added is included.[10]

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remains high in most countries, but has fallen below the benchmark level in the Caucasus and in Central Asia.

8 It is well documented that the Soviet model of industrialisation, as it had been adopted by all former CMEA countries, lead to excessive energy intensity (see Gray, 1995).

9 At high levels of income, i.e. when only services expand, further increases in income should not necessitate more energy, so that the relationship between income and commercial energy use should resemble an inverted J

10 See table A.3. As one would expect, the share of industry in employment is not significant in predicting commercial energy use. However, it is only in this respect that transition countries are over-industrialised.

3.1.2 Capital investment

Central planners organised very high rates of investment, both in physical and human capital.

a) Physical capital:

The heavy investment in physical capital might have left a legacy in terms of the part of infrastructure that depreciates very slowly, like roads and rail networks. This is indeed the case. The quality of road network (proxied by the length of all paved roads as a share in surface area[11]) and the extension of the rail network (in km per surface area), are both closely related to income. But the countries in transition obviously constitute outliers in the sense that the dummy variables are highly significant and their point estimates suggests that they have a rail network that is approximately twice as extensive as one would expect.

b) Human capital:[12]

As for human capital, the strong investment seems to have continued. In regressions with gross secondary and tertiary enrolment ratios the dummy for the transition countries are highly significant and the point estimates suggest again that, given their income levels, countries in transition are characterised by enrolment ratios that are substantially higher than (more than twice as high as) suggested by their development level.[13] In all these cases the dummy for ASEAN countries is not significant, suggesting that investment in infrastructure and human capital was not a particularly strong point of these economies.

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11 For similar evidence on the cross-country relationship between road infrastructure and income see Querioz/Gautman (1992) and Ingram/Li (1997). For the rail-income relationship see also Canning (1999).

12 Human capital – measured by school enrolment rates – ranks among the most robust determinants of economic growth according to Levine/Renelt (1992).

13 Beside education, health constitutes an important element of human capital. As several authors have shown (e.g. Pritchett/Summers, 1996; Suhrcke, 1999) it is also closely related to per capita income across countries. Running the same regressions as above, but for various health input and output measures, reveals a very similar pattern as for the education variables: All transition dummies suggest a significantly better level of health, mainly due to significantly more resources devoted to the health sector.

3.1.3 Financial system

Under central planning there was no need for a financial system to allocate savings to investment. Everything used to be done by the plan, largely without assigning a value to time. The size of the financial sector is captured by two indicators: the ratio of M2 to GDP (to measure the size of the banking system) and the ratio of credit to the private sector to GDP (to measure the financing available for investment in the private sector).[14]

At first sight, the M2/GDP ratio only partly confirms the impression that transition countries are characterised by less developed financial systems. Only the dummy variable for the CIS countries is very significantly negative[15], while the other transition dummies are insignificant, but still negative. Closer examination of the country-specific differences reveals that in the case of the CEE8 dummy the Czech and the Slovak Republic have a larger than expected banking sector whereas the opposite is true for the others.[16]

The second indicator (credit to the private sector as a % of GDP) might be more relevant as it does not include financing of the government. It confirms that CIS countries' financial systems are clearly less developed than other countries at similar income levels. In this case again, the dummy for the BALKAN countries is much smaller than that for the CIS, but yet greater than the CEE8 dummy.[17] In contrast to the M2/GDP regression, all transition dummies are negatively significant at conventional levels.

The spread between lending and deposit rates may serve as an adequate indicator of the *efficiency* of the financial system. In the CIS countries this spread is significantly higher than one would expect, whereas the insignificant results for the other two dummies do again hide substantial country-specific differences. As for BALKAN, a relatively low spread in Albania accounts for this result, while the picture is very mixed among the CEE8 countries. Hungary seems to have an extra-ordinarily efficient financial system

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14 The importance of the financial sector for economic growth has been demonstrated by Levine (1997). For a similar approach as ours, see EBRD (1998).

15 The 1997 data used here does not even incorporate the effects of the 1998 crisis in Russia.

16 Apart from Albania, which biases the significance upwards, financial indicators have only been available for two other BALKAN countries, i.e. Bulgaria and Croatia. The results here are broadly similar to those given in EBRD (1999).

17 Qualitatively similar results obtain for indicators measuring capital market development, such as the stock market capitalisation as a share in GDP, where the point estimate of the dummy coefficients is even larger.

compared to its income level, whereas Estonia, Latvia and Slovenia is significantly worse off, and the Czech Republic, Lithuania, Poland and Slovakia appears to fit well into the world pattern.

In sum, even though a few of the more advanced countries in Central Europe may have established a rather developed financial system, the majority is still relatively backward in this regard, not to mention the CIS and most of the BALKAN countries, which are even further off the benchmark.

3.1.4 Legal and institutional framework

Under central planning there was no need for the legal and institutional framework underpinning a market economy. Are countries in transition different because they have not yet been able to create the institutional framework for a market economy?[18]

It is often argued that corruption is an important obstacle to FDI and growth and that many countries in transition have a serious corruption problem. Surprisingly, this is not confirmed by the data. It is difficult to measure how widespread and serious corruption is. There exists, however, an indicator, which is based on a systematic survey by Transparency International. Corruption is apparently tightly related to income. Differences in GDP per capita alone explain 60 % of the variability in the corruption index. However, in terms of the dummy variables used, only the BALKAN countries do constitute negative outliers in this relationship. This suggests that corruption is not a problem that is *specifically* worse for the other transition countries. Regarding the result for CIS we note that this comprises Russia (significantly more corrupt) and Belarus (within predicted range of corruption) turning the overall dummy insignificant, though negative. The picture is even more diverse within the CEE8 countries: The Czech Republic, Estonia, Latvia and Slovakia seem to be significantly worse off, in sharp contrast to Hungary and Poland that are positive outliers in the country-specific regression.

How can one measure the quality of the institutional framework? There are several financial institutions that provide indicators of country risk. These indicators provide a measure of the risks faced by foreign investors (that the local government will interfere, for example with an expropriation, or that contracts will not be respected by local partners). Table A.1 presents the results using the index provided by 'Institutional Investor'.

18 The role of the institutional framework in determining development prospects has increasingly attracted attention within the framework of the economic growth literature (e.g. Knack/Keefer, 1995).

There is again a very strong correlation with income per capita, but a clear distinction between the three groups of transition countries seems to emerge. The dummy for the Central Europeans is not significant, but it is negative and significant for both the BALKAN and the CIS dummy, with a greater magnitude associated with the latter[19].

The indices provided by two other institutions (Euromoney and Political Risk Services) yield slightly different results concerning the CEE8 dummy, which enters with a significantly positive sign. As for the Euromoney country risk index, only Slovakia and Slovenia turn out to be within the expected range, while the remaining CEE8 countries are all better off. The ICRG indicator is only available for a few transition economies.[20]

The dummy for the ASEAN control group is always positive and significant.

A similar results obtains by using the 'Index of Economic Freedom' (Heritage Foundation), which is supposed to measure the degree to which market forces are free to act on their own. This index is again closely related to income per capita, but the BALKAN and CIS countries realise values that are statistically worse than expected taking into account even their low level of income[21]. However, this is not the case for the CEE8s on average.

On average, there does seem to be a clear divide between the more advanced countries that constitute the most serious candidates for EU enlargement and the rest of the region, notably the BALKAN and CIS countries. Certainly for the latter, transition cannot be said to be over.[22]

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19 Again, the widest intra-dummy differences relate to the CEE8 countries: Hungary, Lithuania, Slovenia, and Slovakia fare worse, Estonia and Latvia seem in line with predictions, and Poland appears better than expected.

20 Among the CEE8 countries Hungary, Poland and Slovakia show a better performance than expected, and the Czech Republic seems to fit well into the predicted pattern. The CIS dummy only contains Russia, and BALKAN includes Albania, Bulgaria and Romania, all of which are significantly riskier than expected.

21 In the country-specific analysis of the CIS economies, it is surprising to note that Moldova has established a greater degree of freedom than expected. The grouping again hides striking inter-country differences: The Czech Republic and Estonia have a higher degree of freedom, while Hungary, Lithuania, Poland, Slovakia, and Slovenia are less free then predicted, and Latvia is within the 'normal' range.

22 Another indicator of the extent to which reforms have led to a normal market economy environment could be the importance of trade in GDP. The central planners had a preference for trade within their own block and tried to minimise dependency from trade with capitalist (i.e. OECD) countries. Whether this regional preference has disappeared is difficult to test with the methodology used here as one would have to take into account the vicinity of major markets and other 'gravitational' factors. However, Brenton (1999) confirms the judgement that in this respect the transition is over for

Thus far, we have focused on a sector-by-sector analysis. In the following section, our intention is to derive a summary assessment of the overall location of the CEECs over the indicators presented above and to check whether other countries that seem to be similar to the transition countries.

3.2 A fishing expedition

So far we have started from the knowledge which countries did have a central planning past. But our approach could also be used to provide a fishing net for a hypothetical visitor from Mars who wants to identify countries with a central planning past without any knowledge of earthen history. We will show that all this visitor would need would be some presumption about the preferences of central planners, as outlined above, to identify countries with a central planning past or (see below) present.

In order to provide the fishing net we proceeded as follows: We first selected a smaller, but representative set of indicators from each sector in 3.1[23] (male industry employment, commercial energy use, paved roads, secondary school enrolment, M2 as a share in GDP, interest spread, Euromoney creditworthiness indicator, and the Index of Economic Freedom). We regressed these indicators as usual on GNP per capita and - if significant - its square term. After standardising the residuals of each regression (i.e. subtracting the mean and dividing by the standard deviation), we calculated the average of each country's standardised residual across the selected indicators.[24] This average was again standardised to get our final aggregate measure. Given a standard-normal distribution we were then able to identify the outlier-countries. Table A4 reports those countries in the lower and upper 5% percent of the distribution. The countries in the upper percentile are of most interest to us, since they constitute the country group that tends to have more of the central planning characteristics than their development level suggests. The result is telling: the upper 5% – a total of 13 countries – is largely made up of transition countries, in particular those who are further behind in reforms towards the mar-

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countries in Central Europe. Gravity equations of the distribution of trade of transition countries indicate that the Central Europeans trade approximately as much with their western trading partners as one would expect given income levels and distance. However, this is not the case for countries of the Former Soviet Union countries, which still show a statistically significant bias to trade more among themselves than one would expect from the gravity factors (distance, market size).

23 The results do carry over two the entire set of indicators, too.

24 Before doing so all residuals had to be arranged so that a positive residual meant a higher actual development level (regarding the respective indicator) than predicted by per capita income. Therefore, the residuals of the interest rate spread and the economic freedom-indicators, which are inversely related to per capita income, had to be multiplied by (-1).

ket, i.e. the BALKAN and CIS countries[25]. Only three non-transition countries, i.e. the Democratic Republic of Congo[26], Cuba, and Guinea-Bissau, seem to be comparable to these 10 transition countries. Notably, two of them are communist states or led by autocratic rule. The probability of such a result (i.e. to find 10 formerly centrally planned economies among the 13 outliers representing the upper 5%-percentile) in a random drawing is approximately[27] $2.4*10^{-11}$.

Except for Kyrgyzstan and Moldova, which are known to be more reform-minded, one can thus identify without any prior knowledge the entire CIS from its central planning past.

The lower 5 % of the distribution did not contain any transition countries.

Considering the transition countries alone, it is interesting to note that the extent of reform efforts is strongly related to the size of the residuals, as it is shown in figure AF1: The more successful a transition country has been in terms of reform policy (measured by the EBRD transition indicator), the more it conforms with the world-wide benchmark.

Hence, this approach - which does not impose any a priori judgement on whether the CEECs are different, but starts only with knowledge about the preferences of the socialist planner - corroborates our findings from section 3.1, that we have derived by a priori assuming that the transition countries were different and by therefore assigning dummy variables to them. Some of the CEECs are indeed still easily recognisable merely by looking at the cross-section of all countries in the world in 1997. This implies that the old legacies have persisted particularly in the less advanced CEECs, which are still far from becoming ‘ordinary’ market economies.

3.3 A note on the adjustment over time

So far, we have only taken a snapshot at one point in time. It would be interesting to see how the legacy of central planning has evolved over time.

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25 The transition countries are: Armenia, Azerbaijan, Belarus, Bulgaria, Georgia, Kazakhstan, Russia, Tajikistan, Turkmenistan and Ukraine.

26 Which is not exactly ‘democratic’ in fact.

27 This is an approximation (using the binomial distribution probability with 13 as the number of independent trials, 10 as the number of successes in trials and 0.05 as the probability of success in each trial) as we are assuming the countries to be drawn independently.

Unfortunately, the limited availability of the indicators for the early years of transition prevents an encompassing comparison of 1990 and 1997. In addition, the physical infrastructure indicators (road and rail network) do not change significantly in such a short time period. For these reasons, we could re-run the regressions only for a limited subset of indicators (i.e. industry employment, industry value added, manufacturing value added, commercial energy use, secondary and tertiary enrolment rates). The results concerning the industry data essentially confirm our earlier results: the 'over-manning' in industry found so far for all transition countries is the result of a divergent evolution of the shares of industry in employment and value added: the value added shares have dropped since the start of transition, but employment has declined very little. The results on energy efficiency reveal an improvement of efficiency over time, hence a move towards the benchmark.

The individual regression results as well as the results on the percentage changes in the respective indicators between 1990 and 1997 are available from the corresponding author upon request.

4. CONCLUDING REMARKS

The question implicit in our analysis was: would it be possible for an economist without any access to time series data to distinguish the formerly centrally planned economies among the over 130 countries in the world? The answer seems to be yes. Even after 10 years, most countries in transition are still characterised by a much higher share of employment in industry and a higher energy use than expected on the basis of their income per capita. They also have a much more extensive physical infrastructure and have a higher proportion of their population in secondary and tertiary education. However, considering indicators that measure the extent to which the institutional framework of a market economy has been put into place leads to more differentiated results. The financial and institutional framework for a market economy clearly is much weaker than one would expect for the CIS and BALKAN countries, whereas this is not the case for the advanced Central European countries. For some of the latter (i.e. the ten candidates for EU membership minus Bulgaria and Romania) there is even some partial evidence that their framework is stronger than one would expect given their still relatively low level of income per capita. Significant differences remain, of course, within this group. But on average it seems that the transition is over in Central Europe.

For these countries, 10 years were enough to upgrade the economic software, even if the hardware is still recognisably from a different era. However, this raises the question why these countries should still be treated differently from other developing countries with a similar income per capita (e.g. Turkey or Brazil), for example by being served by a special development bank, the EBRD. The countries in the CIS (and some from the Balkans) are clearly in a different category. They still have problems with the transition towards credible market based institutions and financial systems. Will they need another decade to catch up?

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Appendix:

Table A.1: Regression Results

	GNPpc PPP	GNPpc^2	CEE8	Balkan	CIS	ASEAN	R2	Obs
1) Industry male employment 97	2.06** (2.5)	-0.10** (2.0)	0.53**** (6.4)	0.60**** (5.9)	0.83**** (11.2)	-0.16* (-1.7)	0.68	131
2) Industry female employment 97	4.31**** (5.1)	-0.23**** (-4.6)	0.85**** (8.3)	1.08**** (6.9)	1.25**** (10.9)	0.37**** (3.3)	0.70	130
3) Industry value added % of GDP 97	1.46**** (3.0)	-0.08**** (-2.9)	0.06 (1.1)	-0.11 (-0.9)	0.07 (0.8)	0.18** (2.4)	0.24	120
4) Manufacturing value added % of GDP 97	1.24** (2.4)	-0.06** (-2.0)	0.34*** (3.7)	0.22*** (3.1)	0.38* (1.8)	0.50**** (6.5)	0.33	110
5) Commercial energy use p.c. kg of oil equivalent 96	0.81**** (18.8)		0.67**** (6.4)	0.36 (1.2)	0.77*** (3.2)	-0.04 (-0.3)	0.76	109
6) Commercial energy use p.c. kg oil equiv. 96	-1.64** (-2.5)	0.14**** (3.8)	0.82*** (6.6)	0.53* (1.7)	0.86**** (3.5)	0.03 (0.3)	0.79	109
7) Paved roadnet (% of all roads) (a)	1.20**** (12.9)		1.50*** (2.8)	1.21**** (9.5)	1.57**** (8.5)	0.44 (0.9)	0.80	117
8) Railnet (km per surface area) (a)	0.71**** (11.3)		1.42**** (11.4)	1.34**** (11.4)	1.08**** (4.8)	-0.97**** (-2.8)	0.73	116
9) Gross secondary enrolment 96	0.58**** (14.5)		0.46**** (5.8)	0.46**** (5.9)	0.96**** (10.2)	0.11 (0.6)	0.76	119
10) Gross tertiary enrolment 96	1.03**** (24.5)		0.56** (2.9)	0.93**** (6.8)	1.56**** (9.3)	0.13 (0.5)	0.81	130
11) M2 % GDP 97	0.41**** (-10.4)		-0.18 (-1.3)	-0.18 (-0.7)	-0.93**** (-6.8)	0.29* (1.8)	0.55	125
12) Credit to private sector % of GDP 97	0.72**** (13.2)		-0.45** (-2.6)	-0.71* (-1.9)	-1.09**** (-4.2)	0.65**** (2.7)	0.63	126
13) Interest rate spread lending – deposit 97	-0.36**** (-6.7)		0.04 (0.3)	0.61 (1.3)	0.66** (2.9)	-0.64*** (-3.1)	0.41	95
14) Corruption (higher value = less corrupt) 98	0.38**** (10.7)		-0.03 (-0.3)	-0.24**** (-5.1)	-0.24 (-1.5)	-0.14 (-1.2)	0.63	80
15) Euromoney country risk index 97	0.38**** (21.4)		0.11**** (3.3)	-0.25* (-1.9)	-0.27*** (-3.0)	0.2** (2.1)	0.77	129
16) Institutional investor country risk index 97	0.48**** (18.4)		-0.04 (-0.6)	-0.32** (-2.0)	-0.52*** (-3.2)	0.32**** (4.2)	0.81	108
17) ICRG country risk index 97	0.12**** (10.1)		0.05** (2.5)	-0.16**** (-7.2)	-0.03** (-2.3)	0.05** (2.5)	0.60	103
18) Economic Freedom 99 (higher value = less free)	-0.16**** (-11.4)		0.03 (0.6)	0.16**** (6.4)	0.18**** (5.3)	-0.02 (-0.2)	0.62	123

Source: own calculations. All variables are in logarithm. All standard errors are corrected heteroskedasticity-consistent. The symbols: *, **, ***, **** indicate coefficients that are significant at the 10%, 5%, 1% and 0.1% level, respectively. (a) Additional explanatory variable: population density. p.c. stands for per capita.

Table A.2: Single country dummies and t-values*

	1 Indu	2 Indu	3 Indu VA	4 Manu	6 Energy	7 Road	8 Rail	9 Second.
Alb	*0.47*	*0.9*	*-0.45*		*-0.38*	*1.12*	*1.21*	*0.2*
	8.8	*10.3*	*-11.2*		*-6.3*	*7.3*	*9.9*	*3.2*
Arm	0.97	1.47	0.22	0.57	-0.2	1.16	1.19	0.97
	17.8	16.5	5.3	9	-3.2	7.9	10	17.4
Az	0.98	1.32	-0.36	0.4	1.28		1.66	1.11
	14.7	15	-7.9	6.8	21.4		13	15.3
Bel	0.62	0.99	0.33	0.83	0.96	0.9	1.21	0.62
	9.4	10.6	7.3	12.3	13.5	9	13.9	16.1
Bul			*-0.17*	*0.15*	*1.25*	*1.35*	*1.53*	*0.56*
			-3.9	*2.2*	*18.1*	*12.5*	*16.3*	*13*
Cro	*0.44*	*0.72*	*-0.23*	*0.21*	*0.42*	*1.2*	*1.5*	*0.48*
	6.72	*7.8*	*-5.14*	*3.1*	*5.9*	*11.5*	*16.2*	*12.7*
Cz	**0.54**	**0.76**			**0.73**	**0.47**	**1.66**	**0.24**
	11.7	**11.1**			**11.8**	**3.7**	**15.7**	**6.5**
Est	**0.66**	**0.9**	**-0.12**	**0.04**	**1.39**	**1.17**	**1.2**	**0.7**
	10.1	**9.8**	**-2.7**	**0.6**	**19.6**	**11.1**	**13.6**	**18.7**
Mac	*0.69*	*1.36*	*-0.11*			*1.13*	*1.29*	*0.48*
	11.7	*14.6*	*-2.5*			*9.8*	*13.1*	*9.8*
Geo	0.9	1.15	-0.18	0.31	-0.54	2.04	1.44	0.96
	16.6	13.4	-4.4	5.2	-9.2	14.3	12.6	15
Hun	**0.41**	**0.73**	**0.06**	**0.38**	**0.68**	**1.21**	**1.68**	**0.46**
	6.64	**8.5**	**1.3**	**6**	**9.9**	**10.9**	**17.3**	**13.4**
Kaz	0.56	0.79	-0.12		1.33	1.68	0.88	0.74
	9.1	8.5	-2.8		19.5	8.8	6.4	16.1
Kyr	0.61	1.07	-0.2	0.28	0.2	1.8	-0.48	0.92
	11.4	12.3	-5	4.6	3.3	13.7	-4.6	15.3
Lat	**0.75**	**1**	**0**	**0.3**	**0.76**	**4.03**	**1.8**	**0.83**
	11.7	**10.6**	**0.03**	**4.4**	**10.8**	**38.8**	**20.4**	**14.8**
Lit	**0.73**	**1.01**	**0.03**	**0.29**	**1.1**	**2.55**	**1.4**	**0.63**
	11.3	**10.7**	**0.6**	**4.3**	**15.6**	**25.1**	**15.8**	**15.2**
Mol	0.98	1.58	0.32	0.85	0.91	2.1	1.95	1.19
	13.9	17.7	6.7	14.6	15	11.5	13.9	16
Pol	**0.51**	**0.5**	**0.2**		**0.86**	**1.17**	**1.62**	**0.5**
	7.9	**5.7**	**4.4**		**12.4**	**10.2**	**16.1**	**14.4**
Rom	*0.84*	*1.15*	*0.37*		*0.89*	*1.09*	*1.54*	*0.52*
	12.9	*12.2*	*8.1*		*12.7*	*9.7*	*15.8*	*12.6*
Rus	0.74	1.02	0.17		1.61	1.23	1.1	0.63
	11.3	10.8	3.8		22.9	7.3	9	15.3
Slk	**0.22**	**0.66**	**0.03**		**0.83**		**1.49**	**0.35**
	3.7	**8.2**	**0.6**		**12.5**		**15.1**	**10.2**
Slv	**0.47**	**0.83**	**0.21**	**0.49**	**0.35**	**-0.47**	**1.04**	**0.08**
	12.2	**13**	**5.1**	**8.3**	**5.8**	**-3.8**	**10**	**2.2**
Ta	0.97	1.47			0.44	1.24	0.29	1.31
	9.6	13.9			6	7.2	2.2	15.5
Tu	0.87	0.99			1.83		1.1	
	12	11			29.8		8.2	
Ukr	1.04	1.46	0.35	-0.81	1.74	1.81	1.86	1.07
	19.5	16.8	8.7	-13.3	29	12.9	16.4	17.6

Table A.2 continued

	10 Tertiary	11 M2%	12 Credit%	13 Spread	14 Corruptio	15 Eurom.	16 InstInv	17 ICRG	18 Freedom
Alb	*0.74*	*0.65*	*-1.5*	*-0.19*		*-0.55*	*-0.78*	*-0.18*	*0.12*
	10.3	*11*	*-17.3*	*-2.2*		*-16.5*	*-17.1*	*-9.2*	*7.3*
Arm	0.66	-1.29	-1.12	1.23		-0.44			0.09
	9.7	-23.3	-13.7	15.1		-14			5.5
Az	1.6	-0.86	-1.81			-0.26			0.29
	19.4	-12.7	-18.1			-6.7			15.9
Bel	1.29	-1.16	-1.25	0.91	-0.01	-0.56	-0.96		0.3
	22.8	-23.3	-18	12.6	-0.3	-24.1	-31.2		17.9
Bul	*1.45*	*-0.55*	*-0.71*	*1.66*	*-0.23*	*-0.21*	*-0.41*	*-0.18*	*0.2*
	24.4	*-11*	*-9.8*	*22.5*	*-5*	*-8.2*	*-11.7*	*-13*	*12.5*
Cro	*0.81*	*-0.28*	*-0.12*	*0.55*		*0.03*	*-0.11*		
	14.4	*-5.7*	*-0.2*	*7.6*		*1.2*	*-3.6*		
Cz	**-0.17**	**0.3**	**0.25**	**0.11**	**-0.1**	**0.05**		**0.01**	**-0.21**
	-2.8	**5.2**	**3.3**	**1.4**	**-2.5**	**2.7**		**1**	**-8.8**
Est	**1.18**	**-0.41**	**-0.2**	**0.76**	**-0.35**	**0.09**	**-0.03**		**-0.18**
	21.1	**-8.1**	**-2.9**	**10.5**	**8.4**	**3.8**	**-1**		**-10.8**
Mac	*0.83*					*-0.62*			
	13.2					*-21.9*			
Geo	2.12					-0.75	-0.93		0.16
	28.5					-21.5	-19		9.4
Hun	**0.33**	**-0.13**	**-0.57**	**-0.58**	**0.1**	**0.18**	**-0.11**	**0.05**	**0.08**
	6	**-2.5**	**-8.2**	**-7.8**	**2.5**	**9.1**	**4.4**	**4.9**	**3.9**
Kaz	1.29	-1.31	-1.52			0.02	-0.28		
	21.3	-25.7	-20.6			0.7	-7.8		
Kyr	0.82			0.12		-0.59			0.21
	11.4			1.4		-17.6			12.9
Lat	**1.2**	**-0.38**	**-0.89**	**0.3**	**-0.31**	**0.2**	**-0.03**		**0.002**
	20.4	**-7.6**	**-12.4**	**4**	**-6.8**	**8**	**-1**		**0.1**
Lit	**1.09**	**-0.8**	**-1.03**	**-0.06**		**0.17**	**-0.1**		**0.06**
	18.8	**-16.1**	**-14.4**	**-0.8**		**6.8**	**-3**		**3.7**
Mol	2.02	-0.2	-0.55	-0.02		0.13			-0.03
	24.1	-2.8	-5.3	-0.2		3.2			-1.8
Pol	**0.36**	**-0.21**	**-0.72**	**-0.04**	**0.04**	**0.16**	**0.16**	**0.09**	**0.15**
	6.6	**-4.1**	**-10.5**	**-0.6**	**1**	**7.8**	**5.9**	**8.9**	**7.8**
Rom	*0.76*	*-0.65*			*-0.23*	*0.04*	*-0.02*	*-0.12*	*0.16*
	13.2	*-12.9*			*-5.3*	*1.7*	*-0.7*	*-9.6*	*9.6*
Rus	1.34	-0.82	-1.15	0.81	-0.45	0.02	-0.24	-0.03	0.23
	23.2	-16.4	-16.3	11.1	-10.4	1	-7.3	-2.5	14
Slk	**0.08**	**0.33**	**0.03**	**-0.05**	**-0.2**	**-0.02**	**-0.05**	**0.03**	**0.15**
	1.4	**6.2**	**0.4**	**-0.6**	**-5.3**	**-0.8**	**-2**	**3.1**	**7.1**
Slv	**0.14**	**-0.38**	**-0.72**	**0.37**		**0.02**	**-0.45**		**0.23**
	2.3	**-6.2**	**-9.1**	**4.4**		**0.8**	**-18.4**		**9.2**
Ta	2.05					-0.12			0.19
	22					-2.6			9.2
Tu	1.79	-1.18	0.36			-0.25			0.26
	21.1	-17	3.5			-6.3			13.6
Ukr	2.08	-0.82	-1.9	1.27		-0.23	-0.24		0.14
	28.9	-14	-21.8	14.8		-6.8	-5.1		8.9

* For each country, coefficients appear in first line, t-values in the second. The dummy coefficients for each country stem from a regression, which only contains the respective transition economy (for which a dummy is defined) plus the rest of the world (without all the other transition countries). Italics indicate BALKAN countries, bold letters refer to CEE8, and the rest is part of the CIS-dummy.

Table A.3: Robustness test for commercial energy use

	GNPpcPPP	GNPpc^2	Indu VA	Indu Empl. (male)	CEE8	BALK	CIS	R2
Commercial energy use p.c. kg of oil equiv. 96	-2.32**** (-3.3)	0.18**** (4.6)	0.51**** (3.1)		0.82**** (5.3)	0.61** (2.2)	0.80 (3.0)	0.80
Commercial energy use p.c. kg of oil equiv. 96	-1.82*** (-2.5)	0.15**** (3.7)		0.08 (0.6)	0.78**** (5.6)	0.25 (0.8)	0.80**** (3.1)	0.79

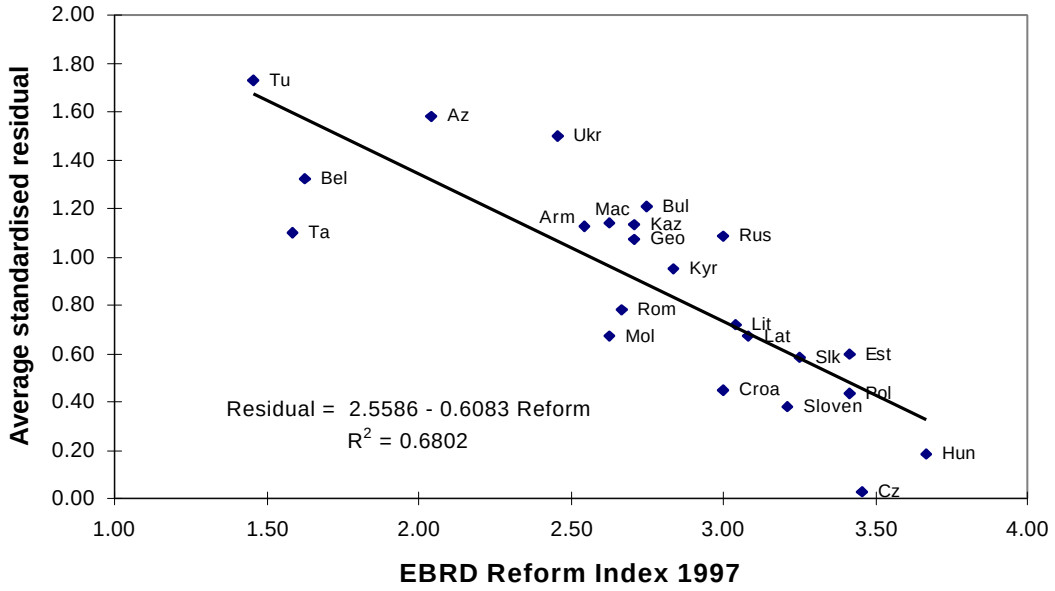
N.b.: See the notes to table A.1. Results for ASEAN dummy not reported here.

Table A4: Overall outliers*

Lower 5%	Upper 5%
Burkina	*Armenia*
Hong Kong	*Azerbaijan*
Ethiopia	*Belarus*
Mali	*Bulgaria*
	Congo Dem Rep
	Cuba
	Georgia
	Guinea-Bissau
	Kazakhstan
	Russia
	Tajikistan
	Turkmenistan
	Ukraine

*Given a standard normal distribution, the countries that realise residuals greater than +1.64 or smaller than –1.64 belong to the upper respectively lower 5% of the distribution.

Figure A.F1: CEE outliers and reform progress



Source: Own calculations and EBRD (1998)

A.7 List of variables

World Bank data:
Male employment in industry as share in male labour force, 1990-97
Female employment in industry as share in female labour force, 1990-97
Industry value added as share in GDP, 1997
Manufacturing value added as share in GDP, 1997
Commercial energy use p.c. kg of oil equivalent, 1996
Gross secondary school enrolment 1996
Gross tertiary school enrolment 1996

Infrastructure:
Paved roadnet (km of paved roads per km^2 of country size) 1996 (World Road Statistics 1998)
Railnet (km of rail per km^2 of country size) 1996 (CIA Factbook 1998)

Financial sector: based on International Financial Statistics from the IMF:
M2 as a share in GDP, 1997
Credit to private sector as share of GDP, 1997
Interest rate spread: the rate charged by banks on loans to prime customers minus the interest rate paid on deposits, 1997

Institutional framework for market economy:
Corruption Index 1998 (Transparency International)
Euromoney country credit-worthiness rating, September 1997
Institutional Investor credit rating, September 1997
Composite International Country Risk Guide (ICRG) rating, December 1997
Index of Economic Freedom 1999 (Heritage Foundation)

Complete list of variables and definitions available upon request.