



Tomasz Mickiewicz y Anna Zalewska

## **Desindustrialización. Lecciones de los resultados estructurales de la transición post-comunista**

### RESUMEN:

Los estudios teóricos y empíricos muestran que la desindustrialización, ampliamente observada en los países desarrollados, es una parte inherente del modelo económico del desarrollo. Sin embargo, los países post-comunistas, con sólo la mitad de ingresos, han hecho también su experiencia de desindustrialización. Sobre la base del modelo desarrollado por Rowthorn y Wells (1987) nosotros explicamos este fenómeno y mostramos que hay una fuerte relación negativa entre la magnitud de la desindustrialización y la eficiencia y consistencia de las reformas de mercado. Demostramos también que las reformas en el sector agrícola juegan un papel en el modelo de desarrollo del país en transición que garantiza la convergencia con las estructuras de empleo de la UE.

**Palabras clave:** Transición económica, estructuras de empleo, desindustrialización, liberalización, convergencia.

## **Deindustrialisation. Lessons from the structural outcomes of post-communist transition**

### SUMMARY:

Theoretical and empirical studies show that deindustrialisation, broadly observed in developed countries, is an inherent part of the economic development pattern. However, post-communist countries, while being only middle-income economies, have also experienced deindustrialisation. Building on the model developed by Rowthorn and Wells (1987) we explain this phenomenon and show that there is a strong negative relationship between the magnitude of deindustrialisation and the efficiency and consistency of market reforms. We also demonstrate that reforms of the agricultural sector play a significant role in placing a transition country on a development path that guarantees convergence to EU employment structures.

**Keywords:** economic transition, employment structures, deindustrialisation, liberalisation, convergence.

**Teléfono** 91-3942404

**Fax** 91-3942499

**Dirección postal**

Papeles del Este, Transiciones Poscomunistas.

Departamento de Economía Aplicada I. Pabellón de 2º Curso.

Universidad Complutense de Madrid. Facultad de Ciencias Económicas y Empresariales.

Campus de Somosaguas. Pozuelo de Alarcón. 28223 Madrid. España.

**Correo electrónico**

Información general: [papeles@ccee.ucm.es](mailto:papeles@ccee.ucm.es)

Administrador de Web: [papeles@ccee.ucm.es](mailto:papeles@ccee.ucm.es)

**DEINDUSTRIALISATION. LESSONS FROM THE  
STRUCTURAL OUTCOMES OF POST-COMMUNIST  
TRANSITION\***

**Tomasz Mickiewicz\*\***

*SSESS-University College London, UK*

**Anna Zalewska\*\*\***

*LIFE-Maastricht University, NL; CMPO-University of Bristol, UK*

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\*\* Tomasz Mickiewicz, SSESS, University College London, Senate House, Malet Street, London WC1E 7HU, UK, email:t.mickiewicz@ssees.ac.uk, phone: +44 (0) 207 862 8606, fax: +44 (0) 207 862 8642

\*\*\* Anna Zalewska, LIFE, Maastricht University, P.O. 616 6200 MD Maastricht, NL, email:a.zalewska@berfin.unimaas.nl, phone: +31(0) 43 388 3637, fax: + 31 (0) 43 388 4875 (corresponding author)

## 1. Introduction

The structural characteristics of employment are one of the main indicators of a country's development in the long run. The share of industry, agriculture and services in global employment, occupational categories, education, human capital and distribution of skills are factors commonly taken as indicators of a country's place on an evolutionary ladder. In addition, in the context of economic transition (either in post communist countries or in 'reformed' communist countries like China), it has been standard to link the process of development to the shifts in employment structures in terms of the public (old) and private (new) sectors. Aghion and Blanchard (1993)<sup>1</sup>, Roland (1994), Rodrik (1995), Ruggerone (1996), Driffill and Miller (1998) and Yin (2001) provide a detailed discussion of economic transition in terms of the structural shift from the state to the private sector, with the possible emergence of unemployment as a side effect. In those models, the efficiency of market reforms is measured by the size of the private (new) sector. It is suggested that if the market reforms are not consistently implemented, then the private (new) sector cannot grow quickly enough to absorb excess labour coming from the shrinking state sector. Moreover, the resultant unemployment has negative indirect fiscal effects on employment creation in the private (new) sector. Consequently, the steady state equilibrium may be sub-optimal.

Although the above mentioned (theoretical) models provide important terms of reference for any discussion of the outcome of economic transition, at least three issues need further consideration:

- *The equilibrium outcome.* All the theoretical models developed so far cause problems for empirical testing since they focus on modelling the dynamics of transition time-paths. The analysis of changes in the economic variables during the transition period brings two problems. First, the concept of transition advancement is difficult to measure and second, the data points are very limited. Hence, we propose to look at the 'after-reform' characteristics instead of modelling transition time-paths.
- *The explanatory power of unemployment.* It has become customary to associate the unemployment rate with the progress of economic transition. The problem is that while the theoretical results are consistent with intuition, they find rather weak support in empirical work. Even where the unemployment rates differed between countries at the beginning of the transition period, the dissimilarity seems to fade over time (Andreff (1999) shows that unemployment rates have become similar among transition economies). In other words, the rate of unemployment cannot be taken as a major factor explaining differences in transition outcomes in the long-run.
- *Sectoral adjustment.* The choice of the 'state versus private sector' dichotomy as a major structural characteristic may be insufficient to explain transition adjustments. The primary problem is that the size of the private sector is seen as a one-dimensional endogenous outcome of other policy variables,

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<sup>1</sup> Another version of this model has been published in Blanchard 1997.

macroeconomic and fiscal policies. However, the speed of privatisation has always been a direct policy decision. Moreover, it was not a one-dimensional choice. Variety in privatisation methods has led to different outcomes in terms of productivity and the dynamics of output. Thus, we argue that it is both more accurate and empirically sound to look at economic transition as a shift from the old to the new industrial structure of output, rather than a transfer from the state to the private sector.

To address the above issues, we analyse the long-term structures of employment emerging from the implementation of market reforms. We divide each economy into industry, agriculture and services. We also shift the focus from unemployment to activity rates, considering unemployment and the economically passive population jointly. As far as we are aware, the theoretical models focused on the employment shares among agriculture, industry and services has not been applied in the context of the post-communist transition.<sup>2</sup> However, such studies are well documented in the more general case of developed and developing countries. It is common knowledge that high-income economies are characterised by high ratios of employment in the service sector. On the other hand, low-income economies are mainly agricultural. In the latter economies, economic development brings in an immediate increase in the share of manufacturing and services at the expense of agriculture. In the later phase of development, the share of industry stabilises, and then falls, while the service sector expands further (Rowthorn and Wells, 1987; Dohrn & Heilemann, 1993, 1996; EBRD 1997, 1999). Moreover, as Crafts (1996) says "...the reversal of deindustrialisation as *per se* good for growth and long-term economic welfare ... would be a serious error". Our theoretical analysis adopts the Rowthorn-Wells (1987) model as a starting point. The Rowthorn-Wells model was developed as a response to the decline of industry share experienced by developed, western economies in the 1970s and 1980s. The model contributed to the extensive debate on the role and optimal speed of deindustrialisation of western economies. The debate continues now including the post-communist countries.

Rowthorn and Wells argue that long-term structural change is driven by two factors:

- improvement in productivity at different rates across sectors (lowest for services),
- differences in income elasticities of demand (with the demand for food being income-inelastic).

These two factors are sufficient to explain the long-term dynamic structural evolution. It first results in the phase of industrialisation (both, the shares of industry and services in employment growing at cost of agriculture) and then in the phase of deindustrialisation (service sector employment growing at the expense of industry).<sup>3</sup>

<sup>2</sup> The only model that is to some extent akin to our approach is the one presented by Grafe and Wyplosz (1998). Their discussion of a linkage between the real exchange rate and structural changes during transition introduces three sectors: an old state sector and two new sectors (traded and non-traded goods), under an assumption of full employment.

<sup>3</sup> One particular problem, which we ignore in our theoretical section, is that in the Rowthorn-Wells model aggregate value-added is an additive function of sectoral value-added. In a more general framework, we would have:  $V = f(E_1, E_2, \dots, E_n)$ , where  $V$  is value-added,  $E$  corresponds to the share of employment in a sector of

Thus, Rowthorn and Wells conclude that the underlying pace of productivity change in different sectors is the major driving force of structural change. More explicitly, it is not the case that some countries are poor due to an excessive share of employment in agriculture, but rather that this share is excessive due to low productivity in that sector. Obviously, the model implicitly assumes underlying market adjustment of wages and prices. The underlying improvement in productivity leads to an increase in income per capita, which in turn affects the structure of demand and leads to the development of ‘new’ sectors, services in particular. Due to the fact that many services are non-tradable, the structure of production follows domestic demand. Lower productivity in the service sector implies that the share of services increases more than proportionately with an increase in the real income. Therefore, the link between sectoral employment structures and GDP per capita results from a mixture of demand and supply factors. Capital accumulation, enhancement in human capital, infrastructure, and legal and macroeconomic stability all contribute to increased productivity in agriculture, and next in industry. Reallocation of employment to services (deindustrialisation) represents a mixture of a shift towards more efficient production structures and a response to the shifting pattern of demand.

We place the post-communist transition in the broader context of this long-term model taking into account the stylised facts.

First, the communist countries have been characterised by an exceptionally high share of industry compared with the other middle-income economies.<sup>4</sup> Therefore, one should not anticipate a further increase of industry share in total employment to be a prevailing feature of post-communist adjustment. On the contrary, an intensive process of deindustrialisation is to be expected.

Second, while economic reforms (which came as a consequence of the “regime switch”) resulted in an immediate decrease of industry share, the growth of the service sector was not the common situation. In this respect, the post-Soviet bloc was very heterogeneous. There were countries (like the Czech Republic, Hungary, Poland), which seemed to be restructuring their economies successfully. Their case was characterised by a decrease of industry employment share and rapid development of services. At the same time countries like Ukraine or Romania experienced an increase in an agricultural share as a consequence of a decrease in employment in the industry sectors and sluggish growth of their service sectors. These countries are also classified as less successful in terms of reforms and economic growth. This divergence in the transition paths brings to life the issue of whether the structural change associated with transition can be explained by the existing theory.

We demonstrate in our theoretical analysis of structural employment adjustments that the deindustrialisation model developed by Rowthorn and Wells for developed countries can be successfully applied to explain the contraction of the industry sector experienced by post-communist countries during transition. Moreover, as a result of insufficient reforms, different paths of adjustment can be distinguished. In particular,

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economic activity and the function  $f$  may or may not be additive. In the latter case there are complementarities between sectors. For instance, the efficiency of manufacturing may be enhanced by the existence of a developed financial sector, other business-oriented services, transport services and educational system.

<sup>4</sup> For empirical examples and discussion, see for instance Mickiewicz and Bell, 2000, Chapter 3.

we explain the further expansion of employment in agriculture, observed in countries classified as “less successful” in the reforms implementation. We argue that reforms of the agricultural sector, so often undermined by policymakers, play a crucial role in placing a country on a development path. Our theoretical approach is confirmed in empirical analysis. Using EBRD transition indicators and restructuring indexes defined by Jackman and Pauna (1997) we document a strong linkage between the employment structures and the efficiency of reforms. We show that the level of employment in the industrial sector alone does not indicate successful reforms. To assess the restructuring efforts one must inspect the level of employment in agriculture (low) and services (high) and control for the initial endowment in human and physical capital. The paper is organised as follows. Section 2 opens with a model of the long-term relationship between economic development and the structure of employment, and defines the various patterns of structural adjustment during the post-communist transition. It is shown that the post-communist liberalisation can be interpreted in terms of switching onto the ‘normal’ (market determined) path of development but alternative outcomes result from inadequate reforms. Section 3 provides empirical evidence on employment structures in (post-) transition economies and specific countries of the EU. Using simple regression analysis Section 4 documents the link between the efficiency of reforms and the structure of employment. In addition, it provides insight into the significance of various elements of reforms for structural outcomes. The results show consistency between the empirical data and the theoretical model presented in Section 2. Section 5 presents conclusions.

## 2. Theoretical Model of Structural Adjustment

### 2.1. Long-Term framework. The Rowthorn-Wells Model

Based on Rowthorn and Wells’ work (1987) we define labour productivities in agriculture, industry and services as exogenous variables

$$y_a = y_0 e^{\lambda_a k}, \quad y_i = y_0 e^{\lambda_i k}, \quad y_s = y_0 e^{\lambda_s k}, \quad (1)$$

where subscripts  $a$ ,  $i$  and  $s$  relate to agriculture, industry and services respectively. The level of productivity at the beginning of the development path is denoted by  $y_0$  ( $>0$ ).

Parameter  $k$  ( $>0$ ) refers to accumulated human and physical capital, and the  $\lambda$  ( $>0$ ) parameters to the differences in productivities among sectors.<sup>5</sup>

Aggregate employment is given by:

$$L = fN, \quad (2)$$

where,  $N$  represents population and  $f$  is the employment rate interpreted as a percentage of the total population (not of the working age population). This means that  $0 < f < 1$ .

<sup>5</sup> Rowthorn and Wells (1987) provide extensive empirical evidence showing that, in the case of developed countries, productivities of agriculture and industry sectors are considerably higher than productivity of the service sector.

Output in agriculture is proportional to the size of the population. This simplification reflects the fact that the income elasticity for food is low. Therefore, agricultural output and employment are correspondingly given by:

$$Z_a = \gamma N, \quad (3a)$$

$$L_a = Z_a / y_a, \quad (3b)$$

where,  $\gamma$  is a coefficient of demand. Therefore:  $0 < \gamma < y_0/f$ .

Employment and output in services are determined by a second demand condition, which implies that the real output of services ( $Z_s$ , equivalent to real demand) is a constant fraction of total output, that is  $Z_s = cZ$ . This puts a restriction on the corresponding demand coefficient:  $0 < c < 1$ . More formally, employment and output in services can be expressed correspondingly as:

$$L_s = \frac{c(L_a y_a + L y_i - L_a y_i)}{y_s + c y_i - c y_s} = \frac{c L y_i}{y_s + c(y_i - y_s)}, \quad (4a)$$

$$Z_s = L_s y_s. \quad (4b)$$

Finally, employment and output in industry will be determined according to the equations:

$$L_i = L - L_a - L_s, \quad (5a)$$

$$Z_i = L_i y_i. \quad (5b)$$

It follows directly from the model specification that aggregate output  $Z$  is

$$Z(f, \lambda_a, \lambda_i, \lambda_s, \gamma, c, k) = Z_a + Z_s + Z_i = y_0 (\gamma N + L_s (e^{\lambda_s k} - e^{\lambda_i k}) + (L - L_a) e^{\lambda_i k}). \quad (6)$$

Without loss of generality, we can make several assumptions, which significantly simplify the calculations. First, we can standardise  $y_0$  as equal to 1. Moreover, we can normalise labour productivity equations by putting  $\lambda_s = 1$ . Thus equation 1 transforms to

$$y_a = e^{\lambda_a k}, \quad y_i = y e^{\lambda_i k}, \quad y_s = e^k, \quad (1')$$

where, given footnote 5, both  $\lambda_a$  and  $\lambda_i$  are now greater than 1, and equation 6 becomes

$$Z(f, \lambda_a, \lambda_i, \gamma, c, k) = Z_a + Z_s + Z_i = \gamma N + L_s (e^k - e^{\lambda_i k}) + (L - L_a) e^{\lambda_i k}. \quad (6')$$

## 2.2. The Communist past and the Post-Communist Transition

The overindustrialisation of the Soviet bloc is a reflection of the preferences of central planners who transferred resources from the other economic sectors in order to develop the sector that they believed to be both the engine of economic growth and essential for



military build-up. The low preference for agriculture may be explained by the fact that the communist policymakers could achieve low standards of consumption; first, via political terror (the most dramatic example of suppressed consumption is the great Soviet famine during the 1930s) and second, in the latter period, via compressed income structures which resulted in significant numbers being pushed above the poverty level. Similarly, the low share of services in consumption also arose from the compressed income distribution, since a high share of services was taken as an indication of a 'luxury goods' sector.

The employment rates were high in all communist countries and work was presented not only as a right, but also as an obligation. These high employment rates additionally supported overindustrialisation.

The collapse of communism revealed authentic preference structures and resulted in a shift of demand. This in turn induced significant changes in the reallocation of resources. The process of adjustment to market oriented preferences started as soon as the central plan was dismantled, prices were liberalised and market reforms were introduced. As a result, demand for goods became more consistent with the preferences of society. More specifically, this adjustment to 'market' preferences manifest itself in an increase in demand for agriculture and service products, represented by  $\gamma$  and  $c$ , respectively. At the same time a downward shift in the employment rate  $f$  occurred. Changes also occurred on the supply side. However, we do not attribute them to changes in humans and physical capital accumulation  $k$ . Although, in the long run, capital accumulation  $k$  should increase, strong empirical evidence by Berg et al. (1999), Havrylyshyn et al. (1998) and Christoffersen and Doyle (1998) shows that capital accumulation cannot be considered a significant factor affecting production outcomes during transition in the 1990s. Based on this evidence, we treat capital accumulation  $k$  as a constant exogenous variable that has no influence on transition outcomes.

However, we take into account that sector productivity differentials  $\lambda$ s might change during transition. Moreover, the changes in the differentials should be strongly associated with the quality and consistency of implemented market reforms. If a government successfully restructured both the industry and the agriculture sectors, then the dominant position of these sectors, in the sense of higher productivity, over the service sector would sustain. However, the policymakers might not put enough effort towards modernising those two sectors. It might happen, that either land reforms or manufacturing restructuring were implemented erratically. In this case, the productivity of the 'neglected' sector would be significantly lower than the productivity of the restructured one.

To make the above scenarios tractable within the Rowthorn-Wells framework, we slightly simplify the story (and the notation) and assume that the post-transition sectoral differentials  $\lambda_a$ ,  $\lambda_i$ , will have values either equal to one or  $\lambda$ , which is always greater than one. In contrast,  $\lambda_s$  is always equal to one.<sup>6</sup> More precisely, we consider the following situations:

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<sup>6</sup> Theoretically, there is a possibility that relative productivity of the service sector could increase exceptionally fast to catch up with the other two. However, the practical possibility of this is negligible. Therefore, we do not pay too much attention to this case.

- Case 1: if agriculture and industry retain their productivity advantage as compared with services, then they have equal productivities denoted by  $\lambda > 1$ , i.e.  $\lambda_a = \lambda_i = \lambda$  and  $\lambda_s = 1$ ; this case corresponds to successful industrial and agricultural reforms.
- Case 2: if industry alone remains a leading sector, then  $\lambda_i = \lambda$ , and  $\lambda_a = \lambda_s = 1$ ; we have successful industrial reforms and failed agricultural reforms.
- Case 3: if agriculture alone is a leading sector, then  $\lambda_a = \lambda$ , and  $\lambda_i = \lambda_s = 1$ ; i.e., agricultural reforms are successful and industrial reforms fail.

and in the least optimistic case,

- Case 4: when both productivities of agriculture and industry drop down, then  $\lambda_a = \lambda_i = \lambda_s = 1$ .

The above cases have different implications for the development of the economy as a whole. It is easy to calculate that total outputs (denoted by  $Z_n$  for case  $n$ , where  $n = 1, 2, 3, 4$ ) express as

$$Z_1 = Nf \frac{e^{\lambda k}}{1 - c + ce^{(\lambda-1)k}}, \quad (7)$$

$$Z_2 = N \frac{\gamma(1 - e^{(\lambda-1)k}) + fe^{\lambda k}}{1 - c + ce^{(\lambda-1)k}} = -N\gamma \frac{e^{(\lambda-1)k} - 1}{1 - c + ce^{(\lambda-1)k}} + Z_1, \quad (8)$$

$$Z_3 = N(\gamma(1 - e^{-(\lambda-1)k}) + fe^k) = N\gamma(1 - e^{-(\lambda-1)k}) + Z_4, \quad (9)$$

$$Z_4 = fNe^k. \quad (10)$$

It immediately follows that  $Z_1 > Z_2$ ,  $Z_3 > Z_4$  and  $Z_1 > Z_4$  for any combination of parameters  $f, c, \gamma$  and  $k$  that is independent of the basic demand shift. However,  $Z_1 > Z_3$  when

$$\gamma \left( e^{-\lambda k} + \frac{c}{1-c} e^{-k} \right) < f, \quad (11)$$

and  $Z_2 > Z_3$  when

$$\gamma \left( e^{-\lambda k} + \frac{1+c}{1-c} e^{-k} \right) < f. \quad (12)$$

These inequalities (11 and 12) are satisfied for high values of the indicator of accumulated human and physical capital  $k$  and employment rate  $f$ . This can be assumed in the case of the post-communist countries.<sup>7</sup> Moreover, if inequality 12 holds, then inequality 11 follows immediately, and we have  $Z_1 > Z_2 > Z_3 > Z_4$ . If inequality 12 does not hold, then a weaker condition determines the mutual position of  $Z_2$  and  $Z_4$ . Namely, if

$$\gamma \frac{1}{1-c} e^{-k} < f, \quad (13)$$

then  $Z_2 > Z_4$ . Hence, we can conclude that case 4 is least optimal and leads to the lowest level of GDP (smallest  $Z$ ), and that case 1 achieves the highest level of total output.

As already discussed, overindustrialisation was a common disease of the communist countries and so market reforms brought an unavoidable reduction in the share of industry in employment. If reforms were conducted successfully, then the transfer of the labour force from industry to services should have occurred. However, in the cases 1-4 above the impact of reforms on the development of the service sector is different. To illustrate this we use the joint share of agriculture and services (i.e., one minus share of industry), instead of the total share of industry as a base for our calculations.<sup>8</sup> We define

$$\varphi_n = 1 - \frac{L_{i,n}}{L} = \frac{L_{a,n} + L_{s,n}}{L},$$

where  $n = 1, 2, 3, 4$ , depending on which case is discussed. The results of our calculations are presented in Table 1.

<sup>7</sup> It is interesting to note that  $Z_2 > Z_3$  can hold even for low values of  $k$ , providing preferences for agriculture and services sectors are sufficiently low (low values of  $\gamma$  and  $c$ ) and the employment rate  $f$  is high (as it was during communist).

<sup>8</sup> This provides a significant simplification in calculation.

**TABLE 1**  
**POST-TRANSITION SHARE OF AGRICULTURE AND SERVICES IN EMPLOYMENT**

Case $n$	$\frac{L_{a,n}}{L}$	$\frac{L_{s,n}}{L}$	$\frac{L_{a,n} + L_{s,n}}{L}$
1	$\frac{\gamma}{f} e^{-\lambda k}$	$\frac{ce^{(\lambda-1)k}}{1-c+ce^{(\lambda-1)k}}$	$\frac{\gamma}{f} e^{-\lambda k} + \frac{ce^{(\lambda-1)k}}{1-c+ce^{(\lambda-1)k}}$
2	$\frac{\gamma}{f} e^{-k}$	$c \frac{e^{(\lambda-1)k} + \frac{\gamma}{f} (e^{-k} - e^{(\lambda-2)k})}{1-c+ce^{(\lambda-1)k}}$	$\frac{\gamma}{f} e^{-k} + \frac{ce^{(\lambda-2)k}}{1-c+ce^{(\lambda-1)k}}$
3	$\frac{\gamma}{f} e^{-\lambda k}$	$c(1 + \frac{\gamma}{f} (e^{-k} - e^{(\lambda-2)k}))$	$c + \frac{\gamma}{f} (e^{-\lambda k} + c(e^{-k} - e^{-\lambda k}))$
4	$\frac{\gamma}{f} e^{-k}$	$c$	$c + \frac{\gamma}{f} e^{-k}$

It is clear that the share of agriculture in total employment is lowest when reforms of this sector are successful, i.e., they do not lead to a decrease in the agriculture sector's relative productivity (case 1 and 3). On the other hand, if agriculture is not properly restructured, the sector's employment rate is higher in comparison to the successful restructuring scenario. Changes in demand for agricultural products do not affect the steady state outcome.

The case of the employment share of services is more complex. Here, it is obvious that the case of least consistent reforms (i.e., case 4) leads to the lowest share of employment in the service sector. Moreover, successful reforms of both industry and agriculture (case 1) lead to a higher proportion of employment in services than when only the industrial sector is successfully restructured (case 2). A comparison of cases 1 and 3 also favours the former, providing we assume that inequality 11 holds, which, as argued above, should be expected. In summary, consistent reforms of agriculture and industry lead to the highest share of the service sector in total employment.

Based on the above analysis we conclude that the share of industrial employment is lower in case 2 than in case 1. Similarly, case 4 has a lower  $L_i/L$  ratio than case 3. Moreover, if inequality 13 holds, then the share of industrial employment in case 2 is lower than in case 4. If inequality 11 holds, then the proportion of workers employed in industry is higher in case 3 than in case 1. This means that a large decrease in industrial employment is not an indicator of successful reforms: the superiority of case 1 over case

2 is evident, even though the share of industry in employment is lower in the latter case.<sup>9</sup>

In summary, we can say that when a country has a relatively high level of human and physical capital (as the post-communist countries do, since they are middle-income economies in terms of GDP per capita), it is critical that consistent reforms are introduced in both industry and agriculture. Concentrating on restructuring just the industry sector is not sufficient to create a proper base for long-term economic development when measured by the level of GDP and the structural shift of the labour force from industry to services.<sup>10</sup>

## 2. Sectoral adjustment in practice

### 3.1 The Communist past

As already discussed, the share of industry in total employment was much higher in all countries of the Soviet bloc than comparator countries with a similar level of income per capita.<sup>11</sup> This is illustrated in Figure 1 below.<sup>12</sup>

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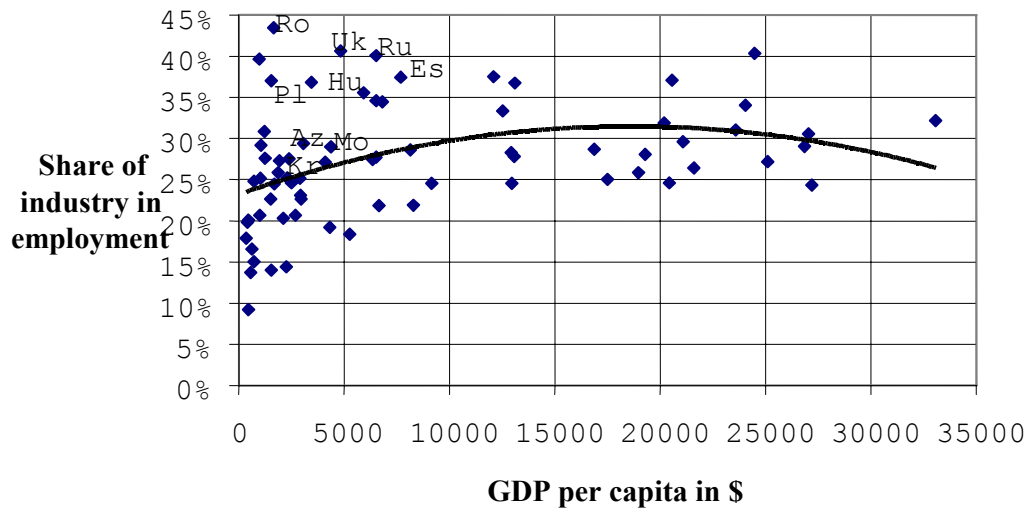
<sup>9</sup> These theoretical results are consistent with Crafts' (1996) analysis of the causes and the scale of the UK deindustrialisation as compared with West Germany and Japan. Crafts gives evidence for low productivity growth (even negative figures for the 1970s) and the deep decline of the industrial labour force (42% in 1973 against 29.4% in 1989) in the UK. He argues that "better design of macroeconomic and labour market policies could and should have made it (*deindustrialisation*) less painful".

<sup>10</sup> The analysis of structural characteristics of the models (i.e. their comparative sensitivity to changes in demand for agriculture and service products, and employment rate) is not reported as it is outside the scope of this paper, however the authors can provide computations on request.

<sup>11</sup> The difference in the employment shares of industry between the Soviet bloc and the rest of world would be even more striking with non-employment added as a fourth sector since employment rates were exceptionally high in the socialist countries (represented by coefficient  $f$  in the theoretical model).

<sup>12</sup> The trend line depicted on the graph includes former communist economies. When the socialist countries are excluded from the sample, the coefficient of determination increases from 0.15 to 0.29.

Figure 1. GDP per capita and share of industry, 1990, 71 countries



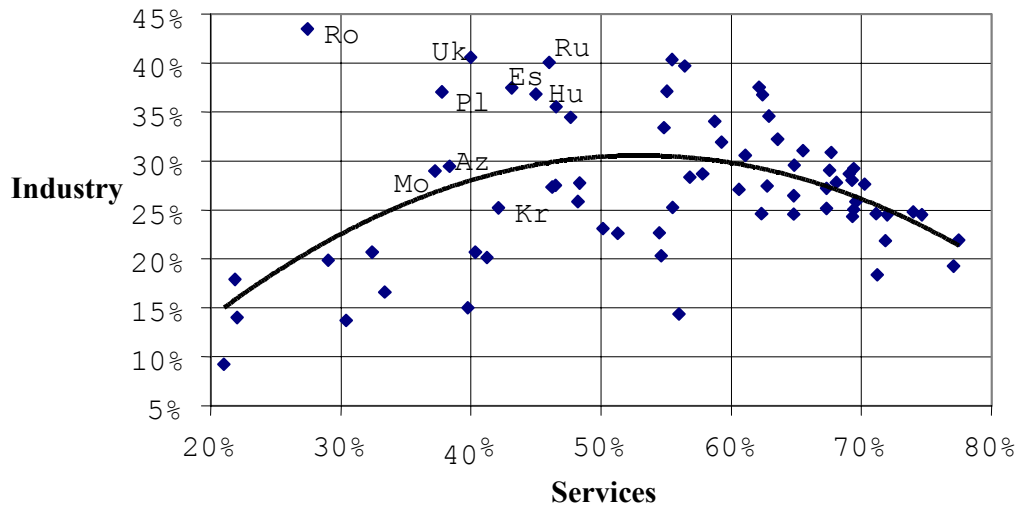
Source: UN, *Statistical Yearbook 1995, New York 1997* and *WIIW database*.

The countries with a value of standardised residuals higher than 1.5 times standard deviation are (in order of magnitude): Romania, Morocco (position not indicated on the graph), Ukraine, Poland, Russia and Hungary. Except Morocco, these are all post-communist countries. Other members of the former Soviet bloc incorporated in the UN data set are also above the regression curve, including Estonia and three former Soviet Union republics: Azerbaijan, Moldova, Kyrgyzstan. The large share of industry is obviously an explicit effect of the imposed pattern of development under communism (EBRD, 1997, p.64).

The high employment in industry in comparison to employment in services is even more striking when we restrict ourselves to a purely structural plan, plotting both industry and services as percentage points (Figure 2). Again, out of six outliers with a positive sign (i.e., standardised residual higher than 1.5), five were post-communist countries (at the time that reforms started).<sup>13</sup> It is clear that the relationship between income per capita and the size of the industrial sector in (post-)Soviet countries does not fit into the standard pattern in the pre-transition period.

<sup>13</sup> As indicated, in order of magnitude: Romania, Morocco, Ukraine, Poland, Russia, and Hungary. Negative outliers, on the other end of the spectrum (standardized residuals lower than -1.5) were: Myanmar, Panama, Thailand and Indonesia. Similarly for Figure 2, when the socialist countries are excluded, the coefficient of determination for the trend line increases from 0.24 to 0.42. In general, the coefficients are higher than those from Figure 1, because employment in services and industry is always negatively correlated (as the shares of both sectors plus agriculture must add to one).

Figure 2. Employment structures, 1990, 71 countries.



Note: Agriculture (=100%-industry-services) corresponds to either ISIC2, division 1 or ISIC3, categories A and B; industry means either ISIC2, divisions 2-5, or ISIC3, categories C-F, while services relate to remaining sections

Source: UN, *Statistical Yearbook 1995*.

However one could argue that the observed anomaly of the communist countries is the result of more general factors, which are not included in the simple picture presented in Figures 1 and 2. Rowthorn and Wells (1987) stress that the phase of the business cycle (as, say, measured by unemployment indicators), and export specialisation are crucial factors affecting the pattern of deindustrialisation in high-income countries. Dohrn and Heilemann (1996) argue that the inclusion of investment, natural resource endowment variables, and the exclusion of low-income countries (for which dispersion around the trend is large), are necessary prerequisites of the analysis.

To discuss these factors in the context of post-communist countries, we should first note that natural resource endowment is correlated with the share of the primary sector in exports. This limits the debate to four, rather than five, possible factors. Moreover, the exclusion of low-income countries is problematic for the problem in hand as it affects the generality of analysis. The extension of the other arguments to the case of communist countries is not straightforward either. Specialisation in exports cannot be responsible for overindustrialisation, because the share of exports in GDP was generally low for communist economies. These countries followed a strategy of semi-autarchic self-sufficiency. Also, the natural resource basis differed significantly within the region, being broad in the former Soviet Union and narrow in Central Europe, hence it cannot explain a common pattern of overindustrialisation.

Investment is also a doubtful variable. While investment rates were typically exceptionally high in the early stages of communist development, the analysis of data shows that the empirical picture is more complex:

- the typical range of investment share of GDP was 24-38% for communist countries, yet several fast-growing non-communist countries were characterised by similar rates (especially the Far East); on the other hand, one of the most industrialised communist countries, East Germany had notably low rates of investment (Gregory, Stuart, 1995, Chapter 12),
- investment rates decreased significantly in the final stage of communism, in particular during the 1980s in Central Europe. Gomulka (1991) documents that most of those economies faced a dramatic shift in policy around 1980. Between 1978 and 1994, the level of investment in communist Central and Eastern Europe was cut by one third. The change was even more dramatic in Poland and Hungary; the former faced an almost 60% cut in investment and the latter a cut of nearly two thirds. At the same time there was no significant adjustment in employment in the industrial sectors.

Thus, in line with Figures 1 and 2, we argue that overindustrialisation in the communist countries was not just the result of direct impact of capital accumulation, but also of the more fundamental choice of the model of development. The priority given to industry can be traced back to the ideological discussions, which accompanied the origins of the Soviet model in the 1920s. The model, which emerged in the Soviet Union and was subsequently copied in all countries under Russian domination, gave priority to industry over agriculture and services and – within industry itself – to heavy industry at the cost of consumer-oriented branches (Gregory, Stuart, 1995). Overindustrialisation was a consequence of military aspirations and import–subsidisation strategy. In addition, a large part of industrial employment corresponded to labour hoarding, which was presumably greater than in services.<sup>14</sup>

### 3.2 The Post=Communist present

Figure 3 below presents the current structures of employment for the post-communist countries, which will be the core of our regression analysis (ten EU candidate countries, plus Croatia, Moldova and Russia).<sup>15</sup> A simple comparison with Figure 2 shows that the last ten years have brought significant changes in employment structures. In general, we can say that the employment share of services has increased for most of the countries in the group. This is reflected in a shift from the upper-left area of Figure 2 towards the upper-right part of Figure 3. However, this general trend does not apply to Romania and Moldova, which experienced a dramatic decrease in industrial employment (about 15%) without any ‘compensating’ growth in the share of services (indicating growth of agricultural employment). These countries are also known for erratic and unsuccessful implementation of market reform. A more careful look at Figures 2 and 3 provides evidence of big shifts within the main cluster of countries, too. Economies like Hungary and Poland experienced relatively mild deindustrialisation (a decrease of 2-5 percentage

<sup>14</sup> As a result, the post-communist deindustrialisation process may have an additional direct effect on the employment rate, via the elimination of ‘labour hoarding’ (overstaff). The latter phenomenon is a major focus of Yin (2001).

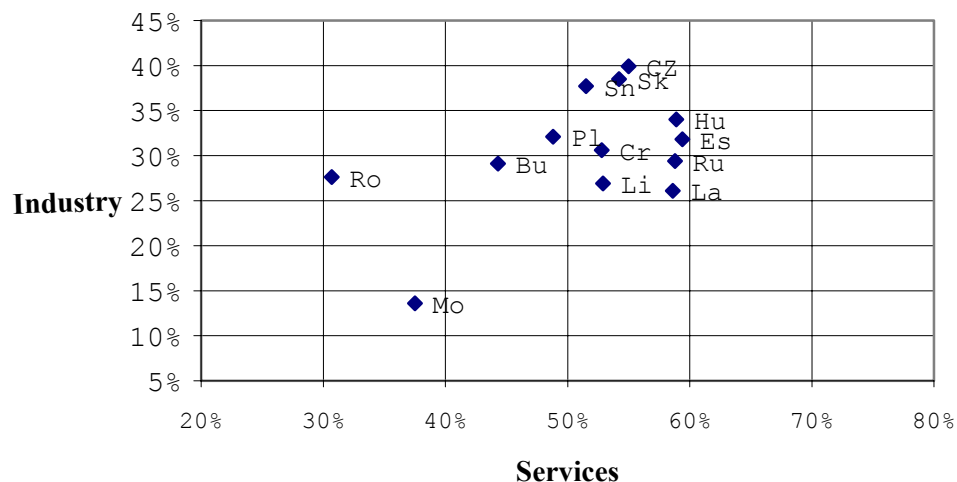
<sup>15</sup> To plot Figure 3 we use International Labour Office data to be consistent with the data used for the regression analysis in Section 4. We used UN data for Figures 1 and 2 purely for illustrative purposes, as they allowed us to construct bigger comparator samples.



points) along with a significant growth of the service sector (above 10%). At the same time, changes of industrial and agricultural employment in Russia seem to offset each other. Again, Russia is a country commonly classified as relatively less consistent in implementation of market reform than the aforementioned countries of Central Europe. All this indicates that, while the structural characteristics of post-reform economies may depend on the initial level of a country's development (as measured by levels of human and physical accumulated capital), they may also be a function of the efficiency and consistency of market reforms.

In the next section we present the results of regression analysis taking the model developed in Section 2 as a reference point. However, we should mention that it is difficult in practice to find an example of a post-communist country that has succeeded in agricultural reforms only (case 3).<sup>16</sup> Industry had such a dominant position before the collapse of communism that the main efforts were concentrated (if at all) on restructuring that sector. If these attempts failed then the reforms of the agricultural sector did not succeed either, typically because the institutional framework of property rights remained inadequate in both sectors (case 4). If the industrial sector was successfully restructured, then reforms of the agricultural sector might succeed (case 1) or not (case 2). In the remaining part of the paper both cases 2 and 4 are commonly referred to as 'inefficient' cases and case 1 is our benchmark 'efficient' outcome. When we discuss reform indices, we also indicate where particular reforms have specific significance for given sectors.

Figure 3. Employment structures, 1999, 13 transition countries



Note: Agriculture (= 100%-industry-services) corresponds to either ISIC2, division 1 or ISIC3, categories A and B; industry means either ISIC2, divisions 2-5, or ISIC3, categories C-F, while services relate to remaining sections

Source: International Labour Office Yearbook of Labour Statistics, 2000.

<sup>16</sup> We focus on Central Eastern Europe, excluding China from consideration.

## 4. Reforms and structures-econometric analysis

### 4.1 Results of separate specifications for the three basic sectors

As discussed already, shifts in the employment structures result from the adjustment process initiated by the implementation of market reforms. The efficiency of this adjustment, that is reaching a more 'advanced' structure of employment (in particular, no regressive increase in the share of agriculture in total employment), depends on the type and quality of the reforms implemented. The deindustrialisation process is less dramatic and painful if it is the result of reforms that help to maintain high productivity of both industry and agriculture sectors. A lag in reforms results in inefficiencies that cause lower levels of GDP, slower development of the service sector, a dramatic drop in industrial employment and even growth in agricultural sector employment.

To illustrate the accuracy of the theoretical model provide in Section 2 we search for empirical evidence on the relationship between the 'quality' of market reforms and structural characteristics of employment *after* the implementation of market reforms. The after-reform share of agriculture in total employment is expected to be negatively correlated with the quality of reforms. Similarly, we expect that the share of services is higher if reforms are successful. Moreover, we expect that the structural position of a (post-) transition economy is affected by the initial level of human and physical capital accumulation  $k$  (we use an initial GDP level per capita as a proxy and denote it '*GDP 1989*' when reporting regression results). In addition, we use two additional control factors that are consistent with the literature (see discussion in Section 3). We include the variation in current levels of economic activity and foreign trade intensity. The potential influence of the current level of economic activity is captured by controlling for the (current) annual rate of change in investment (real fixed capital formation). We call this variable '*Investment*'. The share of foreign trade in GDP is denoted simply as '*Foreign trade/GDP*'.

In our approach to the data, preference was given to quality not quantity. Therefore, instead of merging different sources, including secondary sources and national statistics, which are frequently not compatible, for the employment figures we use International Labour Office data, which is based on consistent methodology. This restricts us to a sample of thirteen transition economies, that is, all ten EU candidate countries from Central and Eastern Europe plus Croatia, Moldova and Russia. However, the choice of the 'after-reform' values is more problematic as the theoretical model refers to the after-transition steady state. It is obvious that the post-communist countries have not reached it yet, but since the reforms have been initiated in the early 1990s, it is clear by now whether the authorities have succeeded in the restructuring job, or not. To have the longest time span we could restrict ourselves to the latest available data, i.e., 1999. However, it would mean 12 data points for our regressions (data for Poland for 1999

was not available at the time of writing the paper). In the light of this we decided to include more years (1997-1999) and create a small panel of 38 observations.<sup>17</sup> Another technical difficulty is that we need to measure the success of reforms implemented in countries in our sample. The theoretical model, for simplification purposes, strictly distinguishes between successful/unsuccessful industrial and agrarian reforms. In the real world, such a 'zero-one' classification is of course impossible. The 'success of reforms' variable is more continuous than discrete.<sup>18</sup> Moreover, it is hard to separate reforms, which have an effect on agriculture from reforms which impact on industry only. For instance, large-scale privatisation or corporate governance reforms are important for industry (dominated by larger firms) as well as agriculture (often characterised by collective farms). In general, we test whether reforms classified as more successful (corresponds to case 1) and less successful (combined cases 2 and 4) have different impact on the new structure of employment. To assess the quality of reforms we employ a widely used aggregate measure of reforms, constructed annually by the European Bank for Reconstruction and Development.<sup>19</sup> We chose the EBRD transition indicators because they have clearly identified components, which provide greater scope for our analysis. However, we choose not to embark on a debate on the precision of transition indicators believing that any indicators of reforms face potential criticism since they are prone to subjective errors of judgement.

All regression results are presented in the Appendix. From Table A1, it is apparent that the overall reforms indicator (denoted as '*Average TI*') has a big impact (as measured by standardised coefficient) on the post-transition share of agriculture in total employment. It is also statistically significant, in spite of the limited number of observations and all the controls included. Less successful reforms result in a larger post-reform agricultural sector, as predicted by the theoretical model. We note that the size of the agricultural sector is strongly and negatively affected by the initial level of GDP (our proxy for human and physical capital accumulated level  $k$ ), again consistent with the theoretical model. It corresponds to the basic assumption that the higher income per capita, the lower the expected share of agriculture in employment. Neither, the current level of economic activity (rate of change in investment) nor the share of foreign trade in GDP is significant.

As a further step, we check how important the particular components of reforms for this structural outcome are. To achieve this we replace the aggregate transition index (*Average TI*) by its three components. Those components are: 'enterprise reform', 'markets and trade' and 'financial institutions' denoted correspondingly as '*Enterprises*', '*Markets*' and '*Finance*'. The results are presented in Table A2.

Disaggregation of the reform measure significantly improves the overall results. Both adjusted R square and F statistics are higher. It is also clear that the importance of the

<sup>17</sup> Indeed we have run regressions for 12 observations only (i.e., corresponding to 1999). The results duplicate those presented in the paper. The results are readily available from the authors.

<sup>18</sup> Obviously from an econometric point of view it is better that the market reforms measure has a more 'continuous' character.

<sup>19</sup> EBRD indicators relate to: large-scale privatisation, small-scale privatisation, governance and enterprise restructuring, price liberalisation, trade and foreign exchange system, competition policy, banking reform and interest rate liberalisation, securities markets and non-bank financial institutions. The scores are: 1, 1+, 2-, 2, 2+, 3-, 3, 3+, 4-, 4, 4+. Here, minuses were transformed into -0.333 and pluses into +0.333.

particular reform components for the structural outcomes differ. The block of reforms described under the heading of 'enterprise reform' is most important, both in terms of the value of the standardised coefficient and the significance level. The two other elements of reforms are insignificant at a 5% level. The initial level of GDP retains significance, with the expected sign.

Based on the significance of the 'enterprise reforms' coefficient we focus next on this group of reform indicators and decompose it into second-level components, i.e. 'large scale privatisation', 'small scale privatisation' and 'corporate governance' reforms as explanatory variables. The modification of the model improves the overall fit even further (both adjusted  $R^2$  and F-statistics). In fact, it is one of the two best models out of the twelve we present (A12 is the other). All the reform indicators are significant and with the expected signs. Thus, we may conclude that all the dimensions of the enterprise reforms are important in the process of productivity improvement. Also, the significance of the initial level of GDP is robust to the change in specification. The share of foreign trade is now marginally significant. Overall, the strong link of both the reforms' quality and the initial level of GDP per capita with the size of employment share of the agriculture sector in the 'after-reform' economies is clear. In particular, the robust relationship between the lower share of agricultural employment and successful enterprise reforms is documented. We should stress that corporate governance and privatisation have a strong impact on restructuring both industry and agriculture. However, small privatisation relates stronger to reforms in agriculture than in industry. Thus, our results are consistent with the theoretical model.

We should expect that results relating to services would match those described above for agriculture. Misdirected deindustrialisation leads to a higher share of agriculture in employment and therefore to a lower share of services. Thus, we should expect that the results related to services should mirror those presented in Tables A1-A3, but with the opposite sign.

Indeed, Tables A4-A6 demonstrate that this is the case. The results relating to services correspond closely to those for agriculture. From Table A4, we see that the overall transition index (*Average TI*) is just marginally insignificant (at a 5% level), yet has the expected sign (i.e. positive). The initial level of GDP continues to have a significant impact. The next two tables, A5 and A6, demonstrate that the decomposition of reform indices improves the quality of the model significantly. Again, Model 2, presented in Table A5, highlights the significance of the 'enterprise reform' variable. When the latter variable is decomposed, Table A6, the variable related to small-scale privatisation is most significant. This indicator relates to progress in the privatisation of small-scale properties, including the subsequent tradability of ownership rights.

The results presented confirm that there is a close correspondence between development of the agricultural and the service sector. The 'efficient' structural adjustment after transition is manifest in the increase of services in employment and decrease of agricultural employment. Wherever the creation of productive jobs in the service sector is inhibited, we find the harmful increase in the size of agricultural employment, once the process of downsizing in industry is brought about by transition.

We now turn to the third broad sector of employment, i.e., industry. In the previous sections we have argued that it is the direction of deindustrialisation (i.e. either towards

agriculture or towards services) not the absolute magnitude of changes in industry, which is a critical aggregate indicator of successful post-communist structural adjustment. Thus, we should not expect that the size of industry alone would correspond to unambiguous outcomes. Indeed, that is confirmed by the corresponding tests (Tables A7-A9). Again, we use three specifications, starting with the aggregate measure of reforms and subsequently adopting two levels of decomposition. The results are weaker than for the other two sectors, yet the link between the share of industry in employment and reforms is significant and indicates that economies that were less successful in reforms experienced a more dramatic process of deindustrialisation (Table A7). After the decomposition, only the ‘enterprise reform’ component emerges as significant, with a positive sign. It confirms the previous results and strengthens the argument that successful reforms do not lead to a dramatic reduction of the industrial labour force.

#### 4.2 An alternative approach: aggregate structural indices

So far, we have used separate specifications for the three basic sectors to investigate the link between successful transition programmes and structures of employment. However, the two alternative paths of structural adjustment (i.e. ‘efficient’ with large services and small agriculture and ‘inefficient’ with a small service sector and overgrown agriculture) may also be identified on a more disaggregated level, namely using ISIC-3 categories of employment. ‘Efficient’ structural evolution will now be identified as convergence towards the employment structures of the developed market economies. Because of its weight, the size of the agricultural sector will still remain the dominant factor behind our measure, which makes it consistent both with the three-sector model postulated in Section 2 and with the separate sector specifications discussed in Section 4.1. However, the purpose of this additional exercise is to investigate the use of an aggregate measure of structural similarities as an analytical device.

We interpret ‘efficient’ transition as a convergence towards EU employment characteristics. The definition of the measure of distance between the employment structures of a transition country and of the comparator group, the ‘restructuring index’ (*RI*), is taken from Jackman and Pauna (1997). The *RI* is defined as “a proportion of the workforce in each country which would need to change sector to enable the country to attain the same structure of employment as that of a comparable Western European economy” (Ibid., p.377).<sup>20</sup> Thus, the restructuring index has a straightforward, intuitive interpretation. A lower value of the index corresponds to a more convergent structure. It is also worth stressing that, because the employment structures of comparator economies change over time, *RI* always measures the distance, not the absolute scale of required structural change. Formally, the *RI* for a given country *X* and a comparative structure *Y* is defined as:

$$RI_X = \frac{\sum_m |S_m^Y - S_m^X|}{2}, \quad (15)$$

<sup>20</sup> As characterised by the Northern EU Group in the corresponding year.

where  $S$  relates to shares in employment of sector  $m$ . We consider now all ISIC-3 sectors, instead of our basis three-sector classification.<sup>21</sup>

Following Jackman and Pauna (1997), we use the average of four high-income northern EU economies (Germany, UK, Denmark and Netherlands) as the benchmark. The results of computations are presented in Table 2.

**TABLE 2**  
**RESTRUCTURING INDICES (%): 1997- 1999**

Country	1997	1998	1999
<b>Bulgaria</b>	31.9	31.9	31.3
<b>Croatia</b>	21.5	19.3	20.3
<b>Czech R.</b>	18.0	17.5	16.9
<b>Estonia</b>	18.4	18.1	16.4
<b>Hungary</b>	16.6	17.2	16.0
<b>Latvia</b>	24.0	21.3	20.0
<b>Lithuania</b>	21.7	21.6	22.7
<b>Moldova</b>	42.3	45.9	49.3
<b>Poland</b>	22.6	21.5	n.a.
<b>Romania</b>	42.0	42.5	43.0
<b>Russia</b>	21.4	21.7	22.2
<b>Slovakia</b>	19.9	19.5	18.9
<b>Slovenia</b>	24.1	23.6	21.2

Source: Authors' computations based on ILO, *Yearbook of Labour Statistics*, 1998-2000.

Table 2 shows that the restructuring indices differ significantly among countries, e.g., 16% for Hungary and as much as 49.3% for Moldova in 1999. A comparison of years 1997-99 suggests a downward slopping trend of the *RI* for 9 out of 13 countries. However, countries like Romania, Russia, Moldova and, surprisingly, Lithuania manifest a divergence of the employment structures from the four EU comparators' structures.

We use the restructuring indices presented in Table 2 as the new dependent variables and repeat the regressions as described in Section 4.1. The results are presented in Tables A10-A12.

Table A10 shows that the EBRD's measure of reform implementation remains a highly significant determinant of structural distance between the transition economies and the comparator Northern EU economies. The initial level of GDP matters as well. Both variables have the expected signs. The trade intensity variable is not significant. Again, as the next step, we explore how the results change when we disaggregate our measure of reforms into three components. The results are presented in Table A11.

<sup>21</sup> Jackman and Pauna (1997) do not provide a computational formula for their index, but it is easy to derive using their Table A.

Here, the initial level of GDP remains strongly significant and foreign trade intensity remains insignificant. However, as with the one-sector specifications of Section 4.1, the most interesting result relates to the differences between the three aspects of reforms. There is a dramatic disparity between the first cluster of reforms ('enterprise reform') and the two other clusters, which relate to market and price liberalisation, and the financial sector. The effect of the first cluster strongly dominates, which is reflected both in the value of its standardised coefficient and its significance level.

As in the previous section, the cluster of 'enterprise reform' may be further disaggregated into the three components: 'large scale privatisation', 'small scale privatisation', and 'corporate governance'. The results are shown in Table A12. This time the explanatory power of the regression increases even further, in fact it is the best model in this respect. Both small privatisation and the quality of the corporate governance framework are highly significant, emphasising yet again the significance of agrarian reforms. This is because a slow process of privatisation in agriculture and/or constraints imposed on private property rights to land may result in lower productivity of agriculture. This in turn may have wider implications both for GDP levels and patterns of structural evolution. As hypothesised, the initial level of GDP remains significant. The current activity control variable, *Investment*, remains statistically irrelevant. The second control variable, foreign trade intensity, is now significant. One possible explanation for the latter result is that we now exclude the 'markets reform' indicator, highly correlated with trade intensity, from the regression.

## 5. Conclusions

Until the early 1990s deindustrialisation was seen as a trend characteristic of high-income countries only. However, the collapse of communism resulted in a significant reduction of the share of industrial labour force in countries, which at best are classified as middle-income. This development revives the discussion of the factors that determine the outcome of deindustrialisation.

To answer the above question we diverge from the (already) classical literature on transition, which looks at the transition as a transfer between the old (state) and newly created (private) sector(s). We introduce three sectors (industry, agriculture and services) to the debate. Based on the findings of Rowthorn and Wells (1987) we formalise a theoretical model of the long-run structural adjustment, taking sectoral productivities differentials as the driving force of structural changes. We link the high productivity of a sector with its successful restructuring. We conclude that there are two possible outcomes of structural transformation. An "efficient" outcome is one where the restructuring takes place in both the industrial and agricultural sectors, i.e. productivities of both sectors are high. In this case deindustrialisation is not dramatic. Moreover, the service sector grows and the agricultural sector decreases. A country following this path changes its employment structure towards those observed in developed countries. In contrast, a country which followed the "inefficient" path of structural adjustment (caused by low productivity of agriculture and/or industry as a result of badly implemented reforms) is characterised by the lower size of the service sector as compared with the "efficient" case (taking controlling factors into account). Deep deindustrialisation and an increase in employment in the agriculture sector follow. Both

of those theoretically defined structural development outcomes are observed in the post-communist world. An analysis of country statistics shows that the division of the post-communist bloc into “efficient” and “inefficient” structural adjustment groups is justified. For instance, the Visegrad (Central European) countries follow the “efficient” path, whereas Romania, Moldova, and Ukraine, and to smaller extent Bulgaria and Russia, give evidence of inefficient structural outcomes. The latter group, widely known for inconsistent implementation of market reforms, is characterised by a big slump of GDP, deep deindustrialisation and a larger share of agriculture in the total employment. Regressions linking both the size of individual sectors and the aggregate restructuring index with different measures of structural reforms developed by EBRD show that the higher the quality of reforms the deeper is the structural adjustment towards more efficient labour allocation. From these regressions we also conclude that the EBRD “enterprise reform” cluster of indicators exhibits a high explanatory power. Corporate reforms and privatisation create the potential for microeconomic adjustment and that, in turn, induces the needed structural adjustment on a macro level.

To summarise, we disagree with the naïve view of economic transition as a process of ‘creative destruction’ (in particular in relation to an overgrown industrial sector) that should proceed as fast as possible. Deep deindustrialisation is not an indicator of the optimal path of transition. We argue that it is the direction, not the magnitude of change that matters. In particular, if dismantled industry is transformed into new ‘rust belts’, where former workers revert to survival-type agriculture, the outcome is obviously inefficient. We believe that our research highlights the importance of the link between reforms and micro and macro restructuring and that the lessons can be extended beyond the group of ‘transition economies’.



## APPENDIX: REGRESSION RESULTS

TABLE A1. DETERMINANTS OF POST-TRANSITION SHARE OF AGRICULTURE IN EMPLOYMENT:  
MODEL 1

Variables	Coefficients	Standardized Coefficients	T	Significance Level	Collinearity Statistics	
					Tolerance	VIF
<b>(Constant)</b>	0.797		6.218	0.000		
<b>GDP 1989</b>	-0.031	-0.427	-2.914	0.007	0.658	1.520
<b>Investment</b>	0.001	0.180	1.280	0.210	0.716	1.396
<b>F. Trade / GDP</b>	-0.102	-0.155	-0.799	0.430	0.375	2.667
<b>Average TI</b>	-0.142	-0.687	-3.170	0.003	0.301	3.326

*R square: 0.563; adjusted R square: 0.478. F statistics: 6.644, significance level: 0.000.*

TABLE A2. DETERMINANTS OF POST-TRANSITION SHARE OF AGRICULTURE IN EMPLOYMENT:  
MODEL 2

Variables	Coefficients	Standardized Coefficients	T	Significance Level	Collinearity Statistics	
					Tolerance	VIF
<b>(Constant)</b>	1.112		7.539	0.000		
<b>GDP 1989</b>	-0.026	-0.359	-3.886	0.001	0.444	2.252
<b>Investment</b>	0.000	0.004	0.045	0.964	0.596	1.677
<b>F. Trade / GDP</b>	0.108	0.165	1.439	0.161	0.289	3.457
<b>Enterprises</b>	-0.345	-1.103	-10.113	0.000	0.318	3.141
<b>Market</b>	0.076	0.176	1.300	0.204	0.206	4.864
<b>Finance</b>	0.015	0.066	0.493	0.625	0.214	4.682

*R square: 0.890; adjusted R square: 0.860. F statistics: 29.356, significance level: 0.000.*

**Table A3. Determinants of Post-Transition Share of Agriculture in Employment: Model 3**

Variables	Coefficients	Standardized Coefficients	T	Significance Level	Collinearity Statistics	
					Tolerance	VIF
<b>(Constant)</b>	1.399		15.026	0.000		
<b>GDP 1989</b>	-0.031	-0.431	-5.717	0.000	0.634	1.578
<b>Investment</b>	0.001	0.089	1.205	0.238	0.666	1.502
<b>F.Trade /GDP</b>	0.173	0.263	2.469	0.020	0.317	3.151
<b>Large privat.</b>	-0.089	-0.339	-3.947	0.000	0.488	2.050
<b>Small privat.</b>	-0.166	-0.543	-5.698	0.000	0.396	2.525
<b>Governance</b>	-0.077	-0.283	-2.325	0.027	0.243	4.111

*R square: 0.946; adjusted R square: 0.867. F statistics: 31.135, significance level: 0.000.*

**TABLE A4. DETERMINANTS OF POST-TRANSITION SHARE OF SERVICES IN EMPLOYMENT: MODEL 1**

Variables	Coefficients	Standardized Coefficients	T	Significance Level	Collinearity Statistics	
					Tolerance	VIF
<b>(Constant)</b>	0.174		1.768	0.087		
<b>GDP 1989</b>	0.023	0.480	2.832	0.008	0.658	1.520
<b>Investment</b>	-0.001	-0.108	-0.663	0.512	0.716	1.396
<b>F. Trade /GDP</b>	0.039	0.089	0.397	0.694	0.375	2.667
<b>AverageTI</b>	0.068	0.493	1.966	0.058	0.301	3.326

*R square: 0.413; adjusted R square: 0.300. F statistics: 3.641, significance level: 0.008.*

**TABLE A5. DETERMINANTS OF POST-TRANSITION SHARE OF SERVICES IN EMPLOYMENT: MODEL 2**

Variables	Coefficients	Standardized Coefficients	T	Significance Level	Collinearity Statistics	
					Tolerance	VIF
<b>(Constant)</b>	0.109		0.771	0.447		
<b>GDP 1989</b>	0.017	0.350	2.631	0.013	0.444	2.252
<b>Investment</b>	0.001	0.109	0.947	0.352	0.596	1.677
<b>F. Trade /GDP</b>	-0.121	-0.277	-1.683	0.103	0.289	3.457
<b>Enterprises Market</b>	0.224	1.081	6.883	0.000	0.318	3.141
<b>Finance</b>	-0.131	-0.454	-2.323	0.027	0.206	4.864
	0.013	0.088	0.460	0.649	0.214	4.682

*R square:0.772; Adjusted R square: 0.709. F statistics: 12.292; significance level: 0.000*

**Table A6. Determinants of Post-Transition Share of Services in Employment: Model 3**

Variables	Coefficients	Standardized Coefficients	T	Significance Level	Collinearity Statistics	
					Tolerance	VIF
<b>(Constant)</b>	-0.262		-2.781	0.009		
<b>GDP 1989</b>	0.026	0.527	4.592	0.000	0.634	1.578
<b>Investment</b>	-0.000	-0.049	-0.440	0.663	0.666	1.502
<b>F. Trade / GDP</b>	-0.175	-0.400	-2.470	0.020	0.317	3.151
<b>Large privat.</b>	0.047	0.272	2.082	0.046	0.488	2.050
<b>Small privat.</b>	0.112	0.550	3.795	0.001	0.396	2.525
<b>Governance</b>	0.048	0.269	1.452	0.157	0.243	4.111

*R square:0.758; adjusted R square: 0.692. F statistics: 11.372, significance level: 0.000.*

TABLE A7. DETERMINANTS OF POST-TRANSITION SHARE OF INDUSTRY IN EMPLOYMENT:  
MODEL 1

Variables	Coefficients	Standardized Coefficients	T	Significance Level	Collinearity Statistics	
					Tolerance	VIF
<b>(Constant)</b>	0.029		0.364	0.718		
<b>GDP 1989</b>	0.008	0.197	1.171	0.250	0.658	1.520
<b>Investment</b>	-0.001	-0.198	-1.225	0.230	0.716	1.396
<b>F. Trade /GDP</b>	0.063	0.175	0.785	0.439	0.375	2.667
<b>Average TI</b>	0.074	0.657	2.636	0.013	0.301	3.326

*R square: 0.421; adjusted R square: 0.309. F statistics: 3.753, significance level: 0.006.*

TABLE A8. DETERMINANTS OF POST-TRANSITION SHARE OF INDUSTRY IN EMPLOYMENT:  
MODEL 2

Variables	Coefficients	Standardized Coefficients	T	Significance Level	Collinearity Statistics	
					Tolerance	VIF
<b>(Constant)</b>	-0.220		-1.333	0.193		
<b>GDP 1989</b>	0.009	0.232	1.224	0.231	0.444	2.252
<b>Investment</b>	-0.001	-0.138	-0.848	0.404	0.596	1.677
<b>F. Trade /GDP</b>	0.013	0.035	0.150	0.882	0.289	3.457
<b>Enterprises</b>	0.121	0.706	3.156	0.004	0.318	3.141
<b>Market</b>	0.054	0.228	0.821	0.418	0.206	4.864
<b>Finance</b>	-0.028	-0.227	-0.832	0.412	0.214	4.682

*R square: 0.538; adjusted R square: 0.411. F statistics: 4.229, significance level: 0.002.*

**Table A9. Determinants of Post-Transition Share of Industry in Employment: Model 3**

Variables	Coefficients	Standardized Coefficients	T	Significance Level	Collinearity Statistics	
					Tolerance	VIF
<b>(Constant)</b>	-0.138		-1.260	0.218		
<b>GDP 1989</b>	0.006	0.148	0.919	0.366	0.634	1.578
<b>Investment</b>	-0.000	-0.102	-0.648	0.522	0.666	1.502
<b>F. Trade /GDP</b>	0.002	0.005	0.023	0.982	0.317	3.151
<b>Large privat.</b>	0.041	0.289	1.572	0.127	0.488	2.050
<b>Small privat.</b>	0.054	0.325	1.590	0.123	0.396	2.525
<b>Governance</b>	0.028	0.191	0.732	0.470	0.243	4.111

*R square: 0.521; adjusted R square: 0.389. F statistics: 3.939, significance level: 0.003*

**TABLE A10. DETERMINANTS OF RESTRUCTURING INDEX: MODEL 1**

Variables	Coefficients	Standardized Coefficients	T	Significance Level	Collinearity Statistics	
					Tolerance	VIF
<b>(Constant)</b>	0.737		7.650	0.000		
<b>GDP 1989</b>	-0.024	-0.428	-2.954	0.006	0.658	1.520
<b>Investment</b>	0.000	0.073	0.522	0.605	0.716	1.396
<b>F. Trade /GDP</b>	-0.035	-0.070	-0.365	0.717	0.375	2.667
<b>Average TI</b>	-0.120	-0.764	-3.560	0.001	0.301	3.326

*R square: 0.571; adjusted R square: 0.488. F statistics: 6.879, significance level: 0.000*

TABLE A11. DETERMINANTS OF RESTRUCTURING INDEX: MODEL 2

Variables	Coefficients	Standardized Coefficients	T	Significance Level	Collinearity Statistics	
					Tolerance	VIF
<b>(Constant)</b>	0.902		7.097	0.000		
<b>GDP 1989</b>	-0.02	-0.355	-3.381	0.002	0.444	2.252
<b>Investment</b>	-0.001	-0.110	-1.214	0.234	0.596	1.677
<b>F. Trade /GDP</b>	0.131	0.263	2.021	0.053	0.289	3.457
<b>Enterprises Market</b>	-0.246	-1.038	-8.384	0.000	0.318	3.141
<b>Finance</b>	0.080	0.244	1.580	0.125	0.206	4.864
	-0.022	-0.126	-0.831	0.413	0.214	4.682

*R square:0.858; adjusted R square: 0.819 F statistics: 21.975, significance level: 0.000*

TABLE A12. DETERMINANTS OF RESTRUCTURING INDEX: MODEL 3

Variables	Coefficients	Standardized Coefficients	T	Significance Level	Collinearity Statistics	
					Tolerance	VIF
<b>(Constant)</b>	1.182		18.872	0.000		
<b>GDP 1989</b>	-0.025	-0.447	-6.693	0.000	0.634	1.578
<b>Investment</b>	0.000	0.031	0.472	0.640	0.666	1.502
<b>F. Trade /GDP</b>	0.189	0.378	4.013	0.000	0.317	3.151
<b>Large privat.</b>	-0.025	-0.127	-1.665	0.107	0.488	2.050
<b>Small privat.</b>	-0.144	-0.619	-7.334	0.000	0.396	2.525
<b>Governance</b>	-0.098	-0.474	-4.400	0.000	0.243	4.111

*R square:0.918; Adjusted R square: 0.896 F statistics: 40.651, significance level: 0.000*

*Notes on Tables:*

*Number of observations: 38.*

*Fixed year effects not reported.*

*Data on shares of employment: ILO Yearbook, 1998-2000.*

*Average TI: average of eight EBRD Transition Indicators, source: Transition Reports 1997-2000. GDP 1989: GDP per capita, source: UN Statistical Yearbook 1995*

*Investment: annual change in real gross capital formation, computed on the basis of: UN Economic Survey of Europe, No. 2-3, 2000, p.161*

*Foreign Trade/GDP: foreign trade in goods as % of GDP, source: World Bank (World Bank Atlas 1999-2001, World Development Indicators 1998*

*RI: restructuring index; authors' computations based on ILO, Yearbook of Labour Statistics, 1997-2000.*

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