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**Working Paper**

## Speed and sequencing of transition reforms and income inequality: A panel data analysis

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Arbeiten aus dem



# OSTEUROPA-INSTITUT REGENSBURG

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Arbeitsbereich Wirtschaft, Migration  
und Integration

Working Papers

No. 302 October 2011

## **Speed and Sequencing of Transition Reforms and Income Inequality: a Panel Data Analysis**

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## **Abstract**

An extensive literature has analysed the economic effects of transition patterns in Central and Eastern European and former Soviet Union countries. With few recent exceptions, analysis of the impacts of speed and sequencing of reforms has not concerned the dynamics of income inequality. In this paper we analyse the heterogeneous effects of transition reforms on inequality by explicitly considering their speed and sequencing. To this aim we identify seven transition models in which the 27 countries considered can be classified. The dynamic panel econometric analysis for the period 1989–2006 reveals that balanced transition patterns, which favoured a coordination of reforms especially in specific fields, were relatively less pro-inequality.

*JEL Classification:* D31, C23, P21, P36

*Keywords:* Inequality; Transition; Reform speed and sequencing; Dynamic panel models.

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## **1 Introduction**

A general feature accompanying transition of formerly planned economies has been a raise in economic and social inequality. Although some forms of disparities existed also before transition (Milanovic, 1998), the shift towards market economies allowed existing visible and hidden inequalities to develop, and new inequalities to unfold. Distributional patterns in the 90s for the Central and Eastern European and post-Soviet Union countries proceeded at a quite different pace, attaining (and in some cases stabilising at) diversified levels after two decades of reforms.

The drivers of inequality are in general very difficult to discern since distributive outcomes are the converging point of the many economic, demographic and structural forces into play. This complexity is of course enhanced by the massive institutional and structural change occurred in formerly socialist countries. The aim of this paper is to investigate whether and to what extent inequality dynamics can be attributed to the different reform approaches adopted.

An extensive literature has analysed the economic effects of alternative patterns of transition towards market economy. However, in cross-country analyses, the impacts on income inequality have received much less attention compared to growth performance. Distributional aspects in transition, on the other hand, have been largely and deeply analysed and discussed, either in theoretical terms or empirically. In this paper we analyse the effects of reforms on inequality explicitly considering their speed and sequencing. To this aim, we assembled a panel dataset of 27 transition economies from Central and Eastern Europe (CEE) and the former Soviet Union (FSU) for the years 1989–2006. Income inequality measures are regressed against a set of control variables and indicators of speed and sequencing of transition reforms derived by the European Bank for Reconstruction and Development (EBRD) transition scores.

The paper is organised as follows. In the next section we provide the conceptual and theoretical background of our study, reviewing the main antecedent attempts to identify, classify and measure the various patterns of transition implemented in (CEE) and in (FSU) countries (section 2.1). In section 2.2 we briefly report on the most important and influential contributions on income inequality dynamics during transition. In



Section 3 we provide descriptive evidence on inequality in the countries and years considered and describe the approach adopted to identify the various models of transition. Section 4 presents the empirical model relating reform patterns to inequality, the econometric approach and the outcomes. Section 5 concludes.

## **2 Theoretical and Empirical Background**

### **2.1 Transition Patterns: Speed and Sequencing of Reforms**

While economic and political theory was familiar with the causes and the processes of transformation of capitalist societies into centrally planned systems, the reverse direction of change has largely taken economists and policy makers by surprise. As a result, actual transition patterns at the beginning of the 90s turned out quite diversified and were classified by the early and subsequent extensive literature into two main groups which, under different labels, basically reflected the pace of reforms (e.g., Murrell, 1992; Popov, 2000). However, as transition proceeded, scholars became increasingly aware that the emphasis on the speed of reforms only (gradualism – or incremental, versus shock therapy – or big bang approach) would have been a too narrow and limited perspective (Roland, 2000 and 2001), since transition involved many other dimensions, related to complementarity/substitutability of reforms, their possible reversibility in view of needed adjustments, and political economy sustainability (Marangos, 2005). Starting from mid-90s, the debate has indeed started to increasingly centre also upon which sequencing of reforms was more desirable, even though the focus on their speed remained largely prevalent especially in growth studies. We will refer here mainly to these contributions since we are not aware of papers directly considering the impact of speed and sequencing of reforms on income inequality. Among the very first contributions, Fischer *et al.* (1996) and de Melo *et al.* (1997) used a cumulative liberalisation index (averaging progress in price and trade liberalisation, privatisation and banking reforms) in growth regressions, concluding that more speedy reforms were beneficial to growth. The use of this index, which basically does not separate the effect of the reform levels and of earlier reforms, received various criticisms (e.g., Staehr, 2005). Subsequent attempts to provide more accurate measurement of the speed of reform were, for

example, Berg *et al.* (1999), Wolf (1999), Heybey and Murell (1999) and Godoy and Stiglitz (2006). We will consider this literature more in depth in section 3. Aspects related to sequencing were far less dealt with (Havrylyshyn, 2001), also due to the difficulties to proxy it. Only a few studies addressed these aspects explicitly, for example by comparing the effects of aggregate and single reform indicators (Havrylyshyn *et al.*, 1998); including in the regressions interaction terms of reform indicators (Zinnes *et al.*, 2001); measuring bundling/unbundling of reforms with their standard deviation (Lora, 2000); or by using principal component analysis to identify sets of reforms implemented simultaneously (Staehr, 2005). One recent paper directly measuring how the probability of reform progress in one area is affected by progress already achieved in other fields is Barlow and Radulescu (2005).

Although we are not aware of studies explicitly considering the effects of reforms speed and sequencing on income inequality patterns, the vast literature on others aspects of transition inherently touches distributive aspects and provides useful insights. For example, in the optimal speed of transition (OST) literature (Aghion and Blanchard, 1994; Blanchard and Kremer, 1997; Boeri, 2000) it is the wages decline resulting from the shrinking of the public sector that busts the profit prospects of potential newcomers and their entry into the private sector. Therefore, the speed of transition drives the size of the unemployment pool and the extent of wages decline; at the same time, the final equilibrium, as well as the net distributive outcomes during transition, also depend on the countervailing role played by the social support granted to unemployed in the first place. Similarly, the literature supporting gradualism via political economy arguments in a median voter environment, maintains that reform patterns should also care to preserve acceptable levels of social cohesion and to avoid excessive inequality, which are most likely to create aversion to further reforms, feed pressures for redistribution, or generate political instability (Roland, 2001). This latter argument implies that not only speed, but also an appropriate sequencing should be designed to avoid inequality outburst, which is likely to prevent further steps forward of the reform process, therefore envisaging the possible endogeneity of reforms with respect to inequality.

## 2.2 Income Inequality in Transition

Although at the early stages of transition inequality received relatively less attention compared with other aspects (Roland, 2001) an extensive literature has been developing on this field in more recent years. We only aim here at recalling the main contributions with empirical cross-country contents and those more relevant to the aims of the paper<sup>1</sup>. Undoubtedly, the first comprehensive work on the subject was the book by Milanovic (1998). Among many insights, his main general findings were that: (a) inequality increased remarkably during transition but with significantly different patterns and rates across countries; (b) increasing wage inequality was everywhere the main driver of income inequality surge; (c) private income sources other than wages contributed little to inequality with the exception of a few countries; (d) social transfers played a minor countervailing role, with pensions that were paradoxically pro-inequality in some countries of Central Europe and in especially in Russia. Similar outcomes were provided in Milanovic (1999). A comparably extensive work was that by Flemming and Micklewright (2000), who equally concluded for a generalized increase of inequality during transition; however, while most of countries stabilized at OECD average levels (at the end of 90s), Russia and other former Soviet Union countries went far beyond. Both these works also emphasized the great difficulty in obtaining comparable data, and this explains the fact that, also in ensuing years, only a limited literature dealing with cross-country analysis has developed. Among the most important ones, Grün and Klasen (2001) provide an international and intertemporal analysis of well-being during transition, accounting for distributive patterns. They conclude that well-being levels in the scrutinized countries fell sharply during transition since generalized output decline was accompanied by increasing income inequality. The same authors (Grün and Klasen, 2011) also found that well-being levels after two decades of transition stabilized at levels similar or lower than those under central planning. Another recent paper considering well-being rankings in European transition countries *vis-à-vis* the old EU members, but

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<sup>1</sup> Comprehensive and reference theoretical models of inequality in transition can be found in Ferreira (1999) and Aghion and Commander (1999). An extensive empirical literature on inequality dynamics in single European or former Soviet Union countries has been emerging in the last decade. See Aristei and Perugini (2011) for a review.

using a multidimensional approach and country specific estimates of inequality aversion parameters, is that by Aristei and Perugini (2010). As regards subjective well-being, Selezneva (2011) provides a comprehensive review about happiness and satisfaction studies on income, work and family life in transition countries.

Ivaschenko (2002) finds that, during the 90s, development level was associated with higher inequality in Eastern Europe, but with lower inequality in former Soviet Union countries. Beyond hyperinflation and systemic change driven by liberalizations, privatizations and deindustrialization are found to raise income inequality throughout the whole transition region, as well as war episodes. The distinctive feature of the work by Mikhalev (2003) is instead the focus on the distributive consequences of the new capitalistic social structure, driven by assets and goods property, and professional positions. More recently, Mitra and Yemstow (2006) provide empirical evidence on the variety of components, patterns and size of inequality growth, and summarizes the findings of the existing literature into six drivers of inequality in transition: (i) wage decomposition and growth of the private sector; (ii) restructuring and unemployment; (iii) changes in government expenditure and taxation; (iv) price liberalization, inflation and arrears; (v) asset transfer and growth of property income; (vi) technological change and globalization.

Hölscher (2006) finds that while in Czech Republic, Hungary, Poland inequality remained relatively stable in the 90s, it increased remarkably in Russia, where in particular the share of profits declined as opposed to the share of transfers, the importance of wage having remained relatively stable. Emphasis is also posed on the possible role of informal economy on the true dynamics of inequality (on this point, see also Rosser *et al.*, 2000).

Lastly, we briefly report on three recent papers that explicitly deal with the distributive impact of policy measures. Giammatteo (2006) shows that state transfers and taxes played a vigorous and comparatively stronger role in Poland and Hungary during transition, allowing their governments to contain inequality during the most turbulent years. However, some components of state transfers (e.g., retirement benefits or child and family allowances) proved to be inequality enhancing. Ivanova (2007) provides

descriptive empirical evidence for Hungary, Poland and Bulgaria and points out that the weak social policies, which accompanied reforms strongly biased towards growth concerns, led to a remarkable decline in socioeconomic equality. Milanovic and Ersado (2011) is in our knowledge the only attempt to directly link transition reforms to inequality in a cross-country perspective. A panel approach (years 1990–2005, 26 formerly planned economies of the Soviet bloc) is employed to identify the effects exerted on decile income shares by progress in reforms towards full market economies, as measured by the EBRD transition indicators. The analysis reveals that in general reforms were strongly pro-rich and anti-poor. However, if the transition trajectories are considered separately, a statistically significant pro-inequality role is only played by large-scale privatization and infrastructure reforms, whereas small-scale privatization seems beneficial for the income share of the bottom deciles. Various insights for future research on inequality are drawn by the authors, the most intriguing ones being the importance of discriminating the various transition components and considering their possible interactions. Our attempt here is to develop this line of research.

### **3 Inequality Dynamics in Transition and Reform Patterns**

In this section we first present a brief description of the data used and a snapshot on income inequality patterns during transition (3.1). Then we discuss the approach used to represent quantitatively the various transition patterns (3.2) and their expected effects on inequality (3.3).

#### **3.1 Data and Descriptive Analysis on Inequality Dynamics**

Our empirical analysis refers to 27 transition countries for the period 1989–2006. For descriptive purposes we classify these countries into the following groups: (a) New EU Member Countries (NEUM), which joined the EU between 2004 and 2007; (b) Former Soviet Republics (FSR), which are full or associate members of the Commonwealth of Independent States; (c) Western Balkan Countries (WBK) (see Table A1 in the appendix for the list of countries and acronyms used). Our main data sources are: (i) the World Income Inequality Database (WIID), provided by the United Nations

University – World Institute for Development Economic Research (UNU – WIDER), for the Gini coefficient of income inequality (*gini*)<sup>2</sup>; (ii) the World Development Indicators (WDI) dataset, provided by The World Bank, for the macroeconomic and structural variables<sup>3</sup>; and (iii) the Transition Indicators database, provided by the EBRD, for the variables describing progress of reforms in the various fields<sup>4</sup>. In order to consider the effects of political and economic stability, we also included a dummy variable (*war*) that is equal to 0 if the country, in a given year, was not at war and 1 otherwise<sup>5</sup>. Too many missing values prevented the inclusion of other possible reform or institutional proxies (e.g., the OECD labour market institutions indicators). Although we address econometrically the problem of this missing information by exploiting the panel nature of our data, this should be kept in mind when interpreting the outcomes. Table A2 in the appendix lists the variables used, their abbreviations and source.

Data for the Gini index in the countries considered for the years 1989 to 2006 are reported in Table A1. As a reference, average OECD countries Gini coefficient increased from 29.3% in the mid-80s to 31.3% in the mid-2000s, whereas for the western EU countries it increased from 27.7% to 29.3% (OECD, 2008). The NEUM countries at the outset of transition were characterized by inequality at around 20–25 Gini points, with the exception of the Baltic Countries, and experienced remarkably different rates of inequality increase. The Czech and the Slovak Republic, in particular, were able to keep their inequality growth at a minimum; to a lower extent this was also the case for Hungary and

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<sup>2</sup> The WIID dataset combines measures of inequality from a number of primary datasets and this usually poses comparability problems. In our case the source is, with a few exceptions, the Transmonee project, which assures an acceptable homogeneity of the data. More information at: [http://www.wider.unu.edu/research/Database/en\\_GB/database/](http://www.wider.unu.edu/research/Database/en_GB/database/)

<sup>3</sup> More information at: <http://publications.worldbank.org/WDI/>

<sup>4</sup> Progress in transition is measured against the standards of industrialized market economies, and refers to nine areas: Large Scale Privatization (LSP), Small Scale Privatization (SSP), Governance and Enterprise Restructuring (GER), Price Liberalization (PL), Trade and Foreign Exchange System (TFE), Competition Policy (CP), Banking Reform and Interest Rate Liberalization (BR), Securities Markets and Non-bank Financial Institutions (SFI), and Infrastructure (I). More information at <http://www.ebrd.com/country/sector/econo/stats/index.htm>. We are aware of the limitations and drawbacks of using EBRD indicators (see EBRD, 2010 and Besley et al. 2011); however, differently from de facto indicators, they offer the advantage of completeness and full cross-country coverage over the whole transition period.

<sup>5</sup> The variable is provided by the Centre for the Study of Civil War (CSCW) and available at: <http://www.prio.no/CSCW/>.

Slovenia. In the remaining countries income inequality rose more sharply, in a few cases exceeding 35% (Romania, Estonia and Lithuania) and approaching 40% in Latvia.

In the FSR, with the only exceptions of Belarus and Ukraine, pre-transition inequality was relatively higher and has been growing dramatically during the 90s, exceeding 40% for most of the countries and approaching 50 Gini points for the Russian Federation, Georgia, Azerbaijan and Tajikistan. With the only exception of Belarus, inequality levels in the FSR remain high in the final year available.

Lastly, as far as the Western Balkan Countries are concerned, the uneven patterns of inequality probably also reflects the specific historical events of each country, which also affected heavily their data availability. However, in these countries, the tormented 90s and the first half of the 2000s did not mean remarkable increases in inequality, which remained in 2006 at about 30% in Albania and Croatia, and below 40% in Bosnia & Herzegovina, Macedonia and Serbia.

### **3.2 Identification of Transition Reform Patterns**

The EBRD indicators, largely used as measures of progress in transition, are usually collapsed into one indicator, obtained as the unweighted average or the sum of the specific indices. This choice, which implies perfect substitutability between reform areas, relies on the high correlation between the indices and assumes that the single reform patterns progressed at the same speed. This view cannot be considered as satisfactory: correlation is indeed high, but far from being perfect (and ranges from 0.63 to 0.88) and if we look at the reform patterns for single countries, they are far from overlapping (see diagram A1 for some examples; diagrams for the remaining countries are available upon request). Many studies identify countries such as Russia or Poland as examples of shock therapy strategies and Hungary and Slovenia as gradualist approaches (e.g., Lavigne, 1999). However, transition patterns were indeed very country specific, and none of them can be at the end characterized as a full “shock therapy”. Lin (2005) uses Poland as an example in which although prices were liberalized, large scale enterprises privatisation lagged behind (p. 241).

Rather, EBRD data reveal that each country followed an own path of transition and highlight ex-post country-specific models of speed and sequencing of reforms. The two concepts (speed and sequencing) cannot be distinguished if one aims at considering the complexity of reform patterns since, from this perspective, speed in one dimension cannot be considered separately from what happened for the other ones. Of course a summary indicator of progress of reforms provides an idea of timing of the transition process, but a variety of possible combinations of single reforms may lay behind. The limited specific literature available provides insights into the inequality effects of single reforms (Milanovic and Ersado, 2011) emphasizing their effects on both wages and profits. Our contention is that their effect cannot be easily identified if each single reform is not considered in connection with the other ones. For example, privatization processes are generally expected to drive inequality upwards, via creation of unemployment pools and increase in wage dispersion (Milanovic, 1998 and 1999; Ivanova, 2007). However, this effect will be lower in those context in which new entries of businesses is relatively easy and therefore partially able to offset unemployment; this, in turn, depends on the competition policy implemented and on the development of financial markets. Provided that transition increased inequality, our concern here is to find out whether different speeds and sequencings of reforms favoured a relatively stronger acceleration of inequality, or not.

As already mentioned, the only previous attempt to consider the inequality effects of transition reforms in a cross-country perspective is Milanovic and Ersado (2011) panel analysis. However, they simply use the 9 EBRD indicators jointly in their regressions (with a serious threat of multicollinearity, not dealt with in the econometrics), and do not address explicitly speed and sequencing aspects. This is instead done by Staehr (2005), but in order to assess transition reforms effects on growth. In this study speed and sequencing are kept separate, which is questionable for the reasons explained earlier: in addition also the empirical approach to represent the sequencing seems unsatisfactory. He indeed carries out principal component analysis on 8 EBRD indicators and derives 8 principal components; the first one, which explains nearly 80% of the variance, is interpreted as the indicator of general progress of reforms. The seven remaining



ones are interpreted as sequencing pattern, according to their correlation with EBRD indices. Due to their low explanatory power and ambiguous interpretation, this approach seems far from being optimal.

In this work, in order to detect similarities across the countries considered in terms of co-movements and synchronies/asynchronies between reforms, we first identify the progress in transition in each reform dimension over a number of sub-periods (arbitrarily set at 4), interpreted as subsequent transition phases. The outset of transition ( $T_0$ ) is set in the year before the first EBRD indicator departed from 1 in each country<sup>6</sup>. The progress in reforms is identified through the levels of each EBRD score in the five points over time ( $T_0$  to  $T_4$ ), which define the transition period. Once the 27 (countries) x 45 (9 EBRD dimensions x 5 time points) matrix is obtained, we implement a cluster analysis in order to detect possible similarities between countries in terms of movements of EBRD indicators in the different phases of transition. This approach allows considering simultaneously the speed of each reform dimension and its temporal interrelation with the others. Methodologically, we use a combined approach by employing both hierarchical and non-hierarchical methods and obtain a optimal partition into seven clusters<sup>7</sup>. Each of them provides a different profile of transition/sequencing pattern (Figure 1).

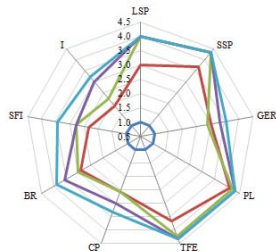
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<sup>6</sup> The transition indicators range from 1 to 4.33 (or 4+), with 1 representing little or no change from a rigid centrally planned economy and 4.33 representing the standards of an industrialised market economy. The choice of using the “transition”, instead of the calendar, time is not unusual in the specific literature about speed and sequencing of reforms (see, e.g., Berg *et al.*, 1999), and in our opinion is strongly preferable. The duration of the first three periods is 5 years: since the beginning of transition varied between countries, the length of the last period is shorter for latecomers, since our time span ends in 2006. EBRD data are available starting from 1989, when some countries had already undertaken some reforms and showed higher than one scores. For them (Bosnia & Herzegovina, Bulgaria, Croatia, Estonia, Hungary, Lithuania, Poland, Serbia, Slovenia, FYR Macedonia)  $T_0$  was set in 1989. Similarly,  $T_0$  was set in 1989 for Albania, Czech Republic, Latvia, Romania, Russian Federation and Slovak Republic, since the first EBRD indicators movement was recorded in 1990.  $T_0$  is instead 1990 for Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Tajikistan, Ukraine, Uzbekistan; and 1992 for Turkmenistan.

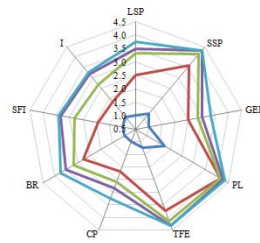
<sup>7</sup> We first implement the cluster analysis using the Ward linkage method and obtain a seven clusters partition using the usual dendrogram inspection and cluster cutting rules. Then we check the stability of these outcomes with the K-means method, setting the number of clusters to 7 and using the Ward-clusters centroids as seeds. This second analysis provides a partition of the countries identical to the previous one, confirming the stability of the hierarchical clustering.

**Figure 1: Transition Speed and Sequencing: EBRD Scores Changes in the Four Phases of Transition**

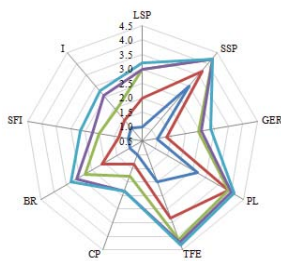
**Cluster 1**  
*Czech Republic, Slovak Republic, Estonia*



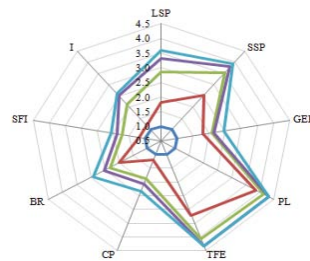
**Cluster 2**  
*Hungary, Poland, Latvia, Lithuania*



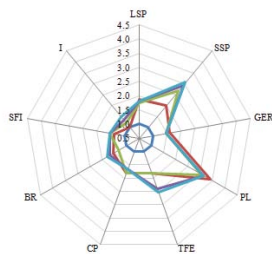
**Cluster 3**  
*Croatia, Slovenia, FYR Macedonia*



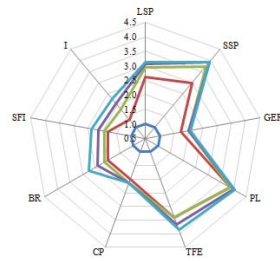
**Cluster 4**  
*Romania, Bulgaria, Albania, Armenia, Georgia*



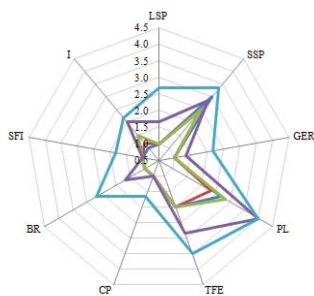
**Cluster 5**  
*Azerbaijan, Belarus, Tajikistan, Turkmenistan, Uzbekistan*



**Cluster 6**  
*Russian Federation, Kazakhstan, Kyrgyz Republic, Moldova, Ukraine*



**Cluster 7**  
*Serbia, Bosnia & Herzegovina*



— T0 — T1 — T2 — T3 — T4

Notes:

LSP: Large Scale Privatization;

SSP: Small Scale Privatization;

GER: Governance and Enterprise Restructuring;

PL: Price Liberalization;

TFE: Trade and Foreign Exchange System;

CP: Competition Policy;

BR: Banking Reform and Interest Rate Liberalization;

SFI: Securities Markets and Non-bank Financial Institutions;

I: Infrastructure.

A first important piece of information emerging from the cluster analysis is the polarization of the new Central European EU members and the Baltic countries into two groups (1 and 2), with the exception of Bulgaria and Romania classified in cluster 5 along with Albania, Georgia and Armenia. All the remaining FSU countries are in clusters 4 and 6, and those of former Yugoslavia in groups 3 and 7.

### **3.3 Models of Transition: Discussion and Expected Impacts on Inequality**

Clusters one and two contain all the Central and Eastern European countries which joined the EU in 2004, plus the Baltic countries. Cluster 1 includes the Czech Republic, the Slovak Republic and Estonia, which in fact had a very similar pattern of transition as revealed by the EBRD data, with a fast pace of reforms being implemented early in all fields simultaneously (with some gradualism in infrastructure reforms only). This suggests that the implementation of those reforms (in particular privatizations, enterprise restructuring, price liberalization) typically associated to increasing inequality via shrinking of the state sector, unfolding of unemployment and wage decompression, marched in step with other dimensions which may have played a counteracting role on inequality. We refer in particular to progress in competition policy which, along with exposure to international competition (TFE), may have prevented the formation of monopolistic positions or eroded the existing ones; to the early development of financial and banking sectors, which may have favoured new entries into the most dynamic sectors and therefore the creation of employment and the improvement in competitive conditions (lower prices, lower rents and profits). Progress in development of financial markets is also usually expected to be pro-equality (Li *et al.*, 1998), increasing the possibility of worse-off agents to undertake investments (first of all education), which could drive upwards their relative income position. In other words, this balanced approach may have helped, comparatively to other reforms patterns (see below), in containing the unavoidable adverse distributive effects of transition.

Cluster 2 (Hungary, Poland, Latvia and Lithuania) is similar to the previously described one in the sense that various reforms dimensions (SSP, GER, PL, TFE, BR) remarkably progressed in the initial period. Some other reforms, such as large-scale privatization, securities and non-banking financial sectors intermediation, and especially competition policy, were instead implemented more smoothly compared to cluster 1.

Cluster 3 groups three countries which, at the very beginning of the 90s, already showed progress towards market-based economic systems in important institutional dimensions, particularly price liberalisation, trade and foreign exchange systems and the scale of small firms privatisation. From this point of view, some distributive effects of transition may have unfolded during the late 80s and partly absorbed at the beginning of the period considered. This is confirmed by the relatively high Gini coefficients for Croatia and Macedonia in 1989 (see table A1). In the ensuing years, reforms have gradually progressed in basically all fields, reaching advanced stages at the end of the period considered with the only exceptions of enterprise restructuring and competition policy. In summary, this represents a gradual approach which was still under completion in 2006.

The pattern of transition revealed by the fourth group of countries (Albania, Armenia, Georgia, Bulgaria and Romania) is characterized by a very fast price and trade and foreign exchange liberalization during the first stage of transition, accompanied by only a weak progress in competition policy, large enterprises privatization, firm restructuring and financial sectors development. In the following phases, reforms proceeded smoothly in all fields, even though competition policy, enterprise restructuring and development of non-banking financial institutions were still not completed in 2006. This could be identified as a model that allowed, at the early stages of transition, the owners of the gradually privatized small and medium enterprises to take advantage of price liberalization, without suffering too much the forces of competition (weak competition policy and poor development of banking and financial markets, which did not encourage new entries). A poor initial development of financial markets may also have reduced the emergence of further competitive pressures. This approach may have favoured, *ceteris paribus*, the positions of

the few who were able to take advantage of monopolistic power in the small private sectors. At the same time, the gradual shrinking of the state sector (slow privatization and enterprise restructuring) may have smoothed wages decompression in the initial stage of development, partially compensating the rise in inequality.

Cluster 6, which includes the Russian Federation and other FSU countries describes a transition picture similar to group 4. However, some reform dimensions, namely competition policy and banking sector development proceed more slowly and at the end of the period were much further from being completed. In addition, across the whole period, progress in privatisations and enterprise restructuring was remarkably weak.

Cluster 5 puts together countries of the FSU in which transition was still lagging behind at the end of the period considered. The only steps forward were undertaken in price and trade liberalisation and in small scale privatisation. Other dimensions of reforms were instead, still at the end of the period considered, not far from the starting point.

Lastly, clusters 7 includes countries that for various reasons underwent important transition discontinuities, related to war episodes and political instability. Progress in reforms was quite uneven across the various fields, with the exceptions of price and trade liberalisation; a certain advancement in the other dimensions was only implemented in the last period considered.

## **4 Speed and Sequencing of Reforms and Inequality: Empirical Evidence**

In this section we show the approach used to test empirically the impact of reform patterns on inequality. In paragraph 4.1 we discuss how the information about transition approaches derived in the previous section are included in the empirical model and describe the other control variables considered. Section 4.2 illustrates the econometric methods, while in Section 4.3 the results obtained are presented and discussed.

#### **4.1 The Empirical Model: Reform Related Variables and Other Control Variables**

As far as the information about reform patterns is concerned, we include in the regressions a summary indicator of transition (named EBRD and computed as usual in the literature averaging the 9 transition indicators), along with the interaction variables obtained as the product of EBRD and the dummy variables (CL1, ..., CL7) associated to the seven speed/sequencing models identified. The interpretation of the six interaction terms simultaneously introduced in the regression is straightforward: each of them represents the additional specific (negative or positive) effect produced by a certain pattern of reforms on inequality compared to the reference group (the sixth model/cluster). The identification of the reference group is of course arbitrary and uninfluential on the outcomes: the choice of cluster 6 is motivated by the fact that it includes the Russian Federation and is therefore an informative benchmark case.

Along with the variables representing reforms speed and sequencing, we obviously include a set of controls accounting for the remaining possible factors affecting inequality during transition. The choice of these explanatory variables and their ability to represent the intended effects are severely limited by data availability. For example, a crucial role might have been played by the approach followed to implement privatisation processes, an aspect not captured by the EBRD data and difficult to include in our cross-country approach. Following Milanovic and Ersado (2011) we included among the regressors: the growth rate of the economy (*growth*), inflation (*inflation*), government spending as a share of GDP (*govshare*), industry structure (*agrshare*), and a control for war episodes (*war*).

Deriving expectations about the effects of these variables on inequality is a difficult task in general and in particular when specific time periods (such as transition) are considered. For example, the effects of growth clearly depend on the type of growth that has taken place (neutral, relatively more pro-poor or pro-rich) and the existing literature is controversial. Results from Milanovic and Ersado (2011) and Kimenyi (2006) support the idea that growth was pro-inequality, even though the absolute in-

come levels of the poor increased. Other studies provide opposite outcomes (e.g., Ivanschenco, 2002; Verme, 2006).

Both the specific (e.g., Milanovic and Ersado, 2011; Ivanschenco, 2002) and non-specific (Bulir, 2001) literature on transition supports the idea that high inflation increases inequality, since worse-off people are less able to protect themselves from prices growth. However, the empirical evidence is mixed (see Galli and van der Hoeven, 2001, for a review). The countervailing (inequality-reducing) force – i.e., inflation pushing upwards wage earners into higher tax brackets –, however, may not be too powerful in the case of transition countries. This is not only because tax evasion has been very high, but also because progressivity in tax structures is relatively weak (Aristei and Perugini, 2010). In our case the inflation variable is also a control for the pace and strength of the stabilization policy imposed externally (i.e., by World Bank and International Monetary Fund).

*Govshare* is instead used to control for the possible cushioning effect provided by government spending and welfare state provisions. A negative relationship of *Govshare* is expected considering the available literature (e.g., Keane and Prasad, 2002), even though for some countries social transfers were found to increase market income inequality (Milanovic, 1998). Our indicator is too general to capture the direct effects of social transfers. However, higher government spending may also correspond to an aggregate demand stimulus, often beneficial to low-skilled sectors (e.g., construction industry), and this may also represent a buffer to widening inequality.

We also include in the analysis an indicator of the industry structure (*agrshare*) in order to account for the structural change not already captured by the other variables (reforms, growth, macroeconomic developments), but which may control, for example, for demand driven factors, such as the industry mix changes related to unconstrained consumer preferences. The control for civil wars (*war*) is expected to impact positively on inequality.

A final set of control variables accounts for the differences in the characteristic and methods used in the different surveys from which inequality measures are derived. They are basically dummy variables controlling for the survey (i) using persons rather than households as units of analysis (*Dpers*); (ii) calculating inequality on the basis of

income, gross earnings (*Dearn*), or consumption (*Dcons*); (iii); using equivalence scales (*Deqs*) or not; (iv) and covering the whole population (*Dpop*) or not.

The inclusion of these control variable, along with time-specific effects and the use of a panel approach, should assure correct identification of the effects of the reform patterns, which remain the focus of the paper.

## 4.2. Econometric Methods

In order to assess the impact of transition reforms on income inequality we consider the following dynamic model:

$$gini_{i,t} = \alpha_i + \tau_t + \gamma gini_{i,t-1} + \beta_1 growth_{i,t} + \beta_2 inflation_{i,t} + \beta_3 govshare_{i,t} + \beta_4 agrshare_{i,t} + \beta_5 war_{i,t} + \delta EBRD_{i,t} + \sum_{j=1}^6 \varphi_j EBRD_{i,t} \times CL_j + \varepsilon_{i,t} \quad [1]$$

where subscripts  $i$ ,  $t$  and  $j$  refer to countries, years and clusters, respectively ( $i = 1, \dots, 27$ ;  $t = 1989, \dots, 2006$ ;  $j = 1, \dots, 7$ );  $\alpha_i$  and  $\tau_t$  are the country and the time specific effects and  $\varepsilon_{it}$  the error terms. The acronyms indicate the variables as described in the previous sections and in Table A2.

The dynamic specification [1] allows accounting for the fact that within-country income inequality is characterized by high inertia and can be viewed as a time-persistent phenomenon (see, among others, Mookherjee and Ray, 2003). However, the presence among the right-hand side variables of  $gini_{i,t-1}$ , which is correlated with the composite error ( $\alpha_i + \varepsilon_{i,t}$ ), leads to inconsistent parameter estimates also when country heterogeneity is accounted for by means of conventional fixed- or random-effects estimators (Baltagi, 2001). Moreover, specification [1] can be characterized by the presence of other endogenous regressors and reverse causality issues. A large body of literature has analysed the effect of inequality on growth pointing out that a possible problem of reverse causality may arise. Although the specific features of transition (namely the output dynamics driven by structural and systemic changes) suggest that such a possibility can be ruled out (Ivanschenko, 2002), a recent study has provided support for inequality being detrimental for growth in transition countries (Sukiassyan, 2007). Simi-



larly, a concern of inverse direction of causality may arise between transition reforms and inequality, as emphasised by political economy literature: in transition (see section 2.1) distributive patterns may have affected the pace of reforms. However, other authors (e.g., Milanovic and Ersado, 2011) emphasise that transition dynamics was in most cases dictated from outside (e.g., by WB or IMF constraints) and that therefore the role of inequality could be considered irrelevant. Lastly, concerns of reverse causality can be raised, as already discussed, with respect to the link between economic inequality and government spending.

To deal with all these issues simultaneously, Generalized-Method-of-Moments (GMM) estimation techniques can be employed. Firstly, the first-difference GMM estimator proposed by Arellano and Bond (1991), which is based on first-differencing the regression equation to eliminate the country-specific effect and uses lagged dependent variables as instruments, can be considered. For the aim of the present analysis, the main issue of using this estimator is related to the specific nature of inequality persistency: the cross-sectional variation embodies a large part of the information since within-country inequality is quite persistent. In this respect, although the first-difference GMM estimator allows controlling for possible measurement errors, country-specific heterogeneity and endogeneity bias, it does not exploit the variation in levels. Thus, ignoring cross-sectional variation may affect the precision of the estimates and give rise to estimation biases, especially if most of the variation in the data is due to cross-country differences<sup>8</sup>. Moreover, as pointed out by Blundell and Bond (1998), the lagged levels of the explanatory variables are weak instruments for the variables in differences when explanatory variables are persistent<sup>9</sup>.

The system GMM estimator (Arellano and Bover, 1995; Blundell and Bond, 1998) allows to address these shortcomings, exploiting the cross-country variation in the data. In the system-GMM approach specifications in first-differences and in levels are combined.

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<sup>8</sup> Deininger and Squire (1996) and Li et al. (1998) show that in non-transition countries most of the variation in inequality (close to 90%) is usually due to variation across countries. For transition economies the time dimension is more relevant, but cross-country variability still remains a substantial source of the variation in the period considered.

<sup>9</sup> Bond et al. (2001) show that in small samples such weak instruments issue further translate into a large finite sample bias.

First-differencing eliminates the fixed effect in the model and controls for unobserved heterogeneity and time-invariant measurement errors, while adding the original equation in levels preserves the cross-country dimension, which is lost when only the first differenced equation is estimated. The system GMM estimator uses internal instruments (i.e., lagged values of the endogenous explanatory variables) and thus requires a more stringent set of restrictions than the difference GMM. The equations in levels are, in fact, instrumented with the lagged first differences of the corresponding explanatory variables and, in order to consider these additional moments as valid instruments for levels, the identifying assumption that past changes of the explanatory variables are uncorrelated with current errors in levels is required (Roodman, 2009). If the moment conditions are valid, Blundell and Bond (1998) show that the system GMM estimator performs significantly better than the first difference GMM estimator. The validity of the moment conditions can be tested by means of the test of overidentifying restrictions proposed by Sargan (1958) and Hansen (1982) and by testing the null hypothesis of no second order serial correlation in the error term. Furthermore, the validity of the additional moment conditions associated with the level equation can be tested with the difference Sargan/Hansen test.

Specification [1] can be further extended by introducing lagged regressors to control for the existence of a time persistent relationship between income inequality and some potential endogenous regressors, like GDP growth and government spending. We then obtain:

$$\begin{aligned}
 gini_{i,t} = & \alpha_i + \tau_t + \gamma gini_{i,t-1} + \beta_{1k} \sum_{k=0}^q growth_{i,t-k} + \beta_2 inflation_{i,t} + \beta_{3k} \sum_{k=0}^q govshare_{i,t-k} + \beta_4 agrshare_{i,t} \\
 & + \beta_5 war_{i,t} + \delta EBRD_{i,t} + \sum_{j=1}^6 \varphi_j EBRD_{i,t} \times CL_j + \varepsilon_{i,t}
 \end{aligned} \tag{2}$$

In the application, due to data constraints, we will include only one lag of *growth* and *govshare* (i.e.,  $\beta_{2k} = \beta_{3k} = 0$  for  $k > 1$ ) as additional regressors. This also provides a robustness check for the empirical model as it allows to verify whether the inclusion of additional lagged controls substantially changes empirical results.

System GMM estimation requires several specification choices. In particular, given the structure of our panel, in which  $N$  is only slightly larger than  $T$ , we use the

one-step estimator<sup>10</sup> and correct the standard errors to take account for small-sample bias and heteroschedasticity, by applying the Huber and White robust variance estimator. Furthermore, Roodman (2009) discusses the problem of the overfitting bias caused by instrument proliferation in dynamic panels. In fact, system GMM uses all available instruments and the number of instruments increases quadratic to the number of time points. To overcome this issue, we use a combined strategy obtained by collapsing instruments (i.e., creating one instrument for each variable and lag distance only, with 0 substituted for any missing values) and restricting the number of lags used as instruments. By doing this the number of instruments used turns to be invariant in  $T$ .

As in most empirical studies on inequality, the estimation of models [1] and [2] is based on an unbalanced and unequally spaced panel dataset, described in Section 3.1. It is worth remarking that, although in the empirical application we have aimed at properly addressing the main issues arising from the structure of the dataset, all the data limitations discussed should be kept in mind in interpreting the results. In particular, the use of a panel of unequally spaced spells, while allowing to keep the sample size reasonable high, could lead to an over representation of countries with a large number of observation and to inconsistent estimates if one period in the theoretical model has to perfectly correspond to a certain time span in empirical data (Tamm *et al.*, 2007).

### 4.3. Outcomes and Interpretations

Outcomes of the estimation of equations [1] and [2] are reported in Table 1. These specifications (as well as all the remaining ones presented) include time-specific effects and controls for the features of the surveys from which inequality measures are obtained, whose estimated coefficients are not reported. In the estimations we treat growth, the share of government spending on GDP and transition reform index as endogenous variables. The instruments set used includes: levels of the explanatory variables lagged two periods and further lags until four for the differenced equation; and explanatory variables in first differ-

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<sup>10</sup> As pointed out by Roodman (2009), in the two-step variant the number of elements to be estimated for the optimal weighting matrix is quadratic in the number of instruments and quartic in  $T$ . Moreover, the optimal weighting matrix has a rank of  $N$  at most and therefore, if the number of instruments exceeds  $N$ , it is singular and the two-step estimator can be computed only by means of a generalized inverse of the weighting matrix, which significantly affects the asymptotic efficiency of the two step estimator.

ences lagged one period for the level equation. The first two columns of Table 1 show estimation results for the dynamic model [1], while the last two present the estimates of the augmented specification [2], which includes further lagged regressors. All the specifications pass the Sargan test for over-identifying restrictions, the test for the overall significance of the regression and the Arellano-Bond tests for serial correlation<sup>11</sup>. As it can be noticed comparing the two sets of estimates, the lagged values of *growth* and *govshare* have no statistically significant impact on income inequality<sup>12</sup>, while the significance of all the other coefficients remains unchanged (with the only exception of inflation) and their size substantially unaltered. Since the two countries belonging to cluster 7 (Serbia and Bosnia & Herzegovina) represent very peculiar cases, we also tested the robustness of our results to their exclusion. Estimations reported in table A3 in the appendix highlight that the outcomes presented in table 1 have high stability.

A first remarkable piece of information emerging from the outcomes is the positive and highly significant effect of the lagged dependent variable, which is a clear-cut indication and confirmation of the high persistence of income inequality and of the appropriateness of a dynamic approach. The results related to the control variables reveal that both *govshare* and *growth* have a negative impact on inequality. This suggests that higher government shares of GDP may have played a buffer role towards the inequality generated and fed by other forces. Similarly, the results for GDP growth support the idea that output growth has been relatively more pro-poor (or that output collapse affected relatively more the better-off segments). The industry structure variable (*agrshare*) is significant and the positive effect suggests that, for those countries in which de-industrialization took place more intensively, the effects on the labour market hit the poor relatively more. Also the dummy variable *war* is significant and, in line with the findings of Ivaschenko (2002), supports the evidence that civil conflicts and war are associated with rising income inequality.

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<sup>11</sup> Estimations consistency requires that the error term must be serially uncorrelated. If  $\varepsilon_{i,t}$  are serially uncorrelated, then  $\Delta\varepsilon_{i,t}$  are correlated with  $\Delta\varepsilon_{i,t-1}$ , but they will not be correlated with  $\Delta\varepsilon_{i,t-k}$  for  $k \geq 2$ . Thus if the model is correctly specified, we expect to reject the null hypothesis of no first order autocorrelation and to not reject the hypothesis of no second order autocorrelation.

<sup>12</sup> The Wald tests for the joint significance of the two lagged regressors are equal to  $\chi^2_{(2)} = 0.32$  (p-value = 0.8520) and  $\chi^2_{(2)} = 2.17$  (p-value = 0.3377) for the specifications reported in columns 3 and 4, respectively.

On the other hand, inflation (*inflation*) is prevalently non-significant; this is contrary to the evidence provided by Milanovic and Ersado (2011) and Bhattacharya et.al. (2005), but in line with other empirical findings (Gustafsson and Johansson, 1999; Nikoloski, 2010).

Lastly, it is worth remarking that time dummies are jointly significantly different from zero and, among the variables controlling for the surveys differences, *Dearn* and *Dpers* proved to be steadily significant.

**Table 1: The Effect of Transition Reforms on Inequality: Dynamic GMM Models**

Variable	Dynamic model GMM-SYS		Dynamic model GMM-SYS	
	(1)	(2)	(3)	(4)
Gini <sub>(t-1)</sub>	0.504 <sup>***</sup> (6.15)	0.399 <sup>***</sup> (4.75)	0.551 <sup>***</sup> (6.60)	0.367 <sup>***</sup> (4.18)
Growth	-0.099 <sup>***</sup> (-2.37)	-0.114 <sup>***</sup> (-2.77)	-0.088 <sup>**</sup> (-1.97)	-0.121 <sup>***</sup> (-2.88)
Growth <sub>(t-1)</sub>	-	-	0.012 (0.31)	-0.030 (-0.85)
Govshare	-0.314 <sup>***</sup> (-2.80)	-0.301 <sup>***</sup> (-3.10)	-0.295 <sup>***</sup> (-2.43)	-0.310 <sup>***</sup> (-2.94)
Govshare <sub>(t-1)</sub>	-	-	0.041 (0.47)	0.106 (1.23)
Agrshare	0.195 <sup>***</sup> (4.47)	0.100 <sup>***</sup> (3.71)	0.198 <sup>***</sup> (4.37)	0.105 <sup>***</sup> (3.80)
Inflation	-0.960 <sup>**</sup> (-2.04)	-0.257 (-0.50)	-0.785 (-1.67)	-0.150 (-0.28)
War	3.123 <sup>***</sup> (3.54)	2.341 <sup>***</sup> (2.96)	3.839 <sup>***</sup> (4.12)	3.278 <sup>***</sup> (4.05)
EBRD	3.277 <sup>***</sup> (2.84)	7.663 <sup>***</sup> (3.78)	3.787 <sup>***</sup> (2.94)	9.370 <sup>***</sup> (4.50)
EBRD*CL1	-	-2.820 <sup>***</sup> (-4.52)	-	-3.393 <sup>***</sup> (-5.26)
EBRD*CL2	-	-2.641 <sup>***</sup> (-4.60)	-	-3.010 <sup>***</sup> (-5.22)
EBRD*CL3	-	-2.020 <sup>***</sup> (-4.66)	-	-2.337 <sup>***</sup> (-5.25)
EBRD*CL4	-	-1.478 <sup>***</sup> (-4.13)	-	-1.458 <sup>***</sup> (-3.91)
EBRD*CL5	-	1.709 <sup>***</sup> (2.20)	-	2.202 <sup>***</sup> (2.58)
EBRD*CL7	-	1.096 <sup>*</sup> (1.79)	-	1.238 <sup>**</sup> (2.13)
Time dummies	Yes	Yes	Yes	Yes
[joint significance]	[0.001]	[0.000]	[0.004]	[0.000]
Controls for survey differences	Yes	Yes	Yes	Yes
No. of Obs.	269	269	253	253
Wald test	[0.000]	[0.000]	[0.000]	[0.000]
A-B AR(1) test	-4.04 [0.001]	-4.44 [0.000]	-4.12 [0.000]	-3.77 [0.000]
A-B AR(2) test	-0.13 [0.898]	-0.01 [0.991]	-0.68 [0.532]	-0.96 [0.335]
Sargan over-identification test	13.30 (12) [0.347]	10.45 (13) [0.657]	18.90 (14) [0.169]	17.25 (15) [0.304]

Notes:

*t* statistics are based on robust standard errors and reported in brackets.

A-B AR(1) and AR(2) are tests for first- and second-order serial correlation in the first-differenced residuals (Arellano and Bond, 1991)

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Turning to the analysis of the effects of reforms on inequality, the indicator summarizing transition reforms (EBRD) has a positive and significant impact on inequality, revealing that the reforms associated with the transition process, once fundamental macroeconomic factors are controlled for, led to an increase in income inequality. However, the main interest here is the analysis of the different patterns of reforms speed and sequencing, which we conjecture to have heterogeneous impacts on inequality. In particular, in columns 2 and 4 we present the results obtained by including interactions between the average EBRD index and dummies for groups of countries as identified by the cluster analysis. The estimated coefficients of these interaction variables should be interpreted as the difference in the average impact of reforms on inequality with respect to the omitted group (cluster 6), which includes the Russian Federation.

Results reveal remarkable heterogeneity in the estimated effects of reform approaches on inequality. First of all, the impact of reforms was significantly less pro-inequality in the countries identified with clusters 1 and 2, in which the various transition dimensions marched relatively more in step. This could be interpreted as empirical evidence of the countervailing role hypothesised for specific reforms (financial sectors development, competition policy, exposure to competitive pressures) implemented simultaneously with those typically inequality enhancing. Also the difference in the coefficients size between the two groups addresses towards this interpretation, since the stronger inequality-curbing role of reforms in the countries of cluster 1 may be connected to the relatively more coordinated timing of reforms in competition policy and financial sector (with respect to other transition dimensions and compared to cluster 2). The evidence of such a remarkable role of reform patterns in containing inequality particularly in the Czech and the Slovak Republic is, in our opinion, a distinctive outcome of our study, since it helps in shedding light on the causes of the surprisingly small rise in inequality observed in these countries during transition.

Results also indicate that the countries belonging to cluster 3 undertook a reform approach relatively more pro-inequality compared to early EU members and Baltic countries, but still weaker compared to the benchmark group. We have already commented on the fact that in the countries classified in cluster 3 some distributive effects

could have unfolded before the beginning of the period considered here as a result of privatisations and liberalisations previously implemented; afterwards, the resulting unbalanced reform pattern could have produced distributive outcomes more unequal compared to those in clusters 1 and 2.

The transition model identified with cluster 4 is the one most similar to benchmark group (number 6); and confirms the stronger pro-inequality effects of reforms compared to the first three clusters. This could be justified with the remarkably weaker and later role played by some reform dimensions (namely financial sector and competition policy development), as explained in section 3.3. However, the transition impact of this approach is still significantly different and lower compared to the benchmark case. This might depend on the fact that in Russia, and in the remaining countries classified in cluster 6, the possibly inequality-compensating reforms proceed even more slowly and at the end of the period were much further from being completed. In addition, across the whole period, progress in privatisations and enterprise restructuring was really weak and this favoured the well-known stagnation of large sections of the economy in low-productivity/low-wage traps, not triggering any dynamism of the private sector which has normally compensated, in later stages of transition, the initial rise in inequality associated to entering into market systems.

Clusters 5 and 7 include the countries whose transition patterns produced inequality effects stronger than the reference group. As discussed earlier, the former puts together countries in which transition is still lagging behind and is almost exclusively identified with price and trade liberalisation; the interpretation proposed to explain the strong pro-inequality effect of transition for the countries of cluster 6 are reinforced here, since no compensating institutional dimensions seems to be entered into force yet. The positive sign of the coefficient associated to cluster 7 could be interpreted in a similar vein, but adding that also social and political instability during the transition process may have played a role.



## 5 Final Remarks

This paper is an attempt to measure the effects of different models of transition on income inequality. The specific original contribution of the paper lies on the identification of common patterns of transition, defined on the basis of the speed of reform of each dimension and on the temporal structure of their implementation. One intermediate outcome of our analysis is that patterns of transition towards a market economy were strongly diversified across countries, both in terms of speed and sequencing of reforms. Consequently, the shock therapy/gradualism juxtaposition can be only considered as a conceptualization useful to providing reference points, whereas the actual reform patterns always implied a complex mix of speed and timing of the single reforms components.

Using a cluster analysis on the dynamics of each of the 9 EBRD transition indicators over four phases of transition, we were able to identify seven different model of transition. These are actual transition patterns occurred in formerly planned economies, as revealed *ex-post* by progress in reforms observed during the 90s and the first half of the years 2000. Our econometric results provide evidence that transition reforms in general have significantly increased income inequality and this corroborates the existing empirical and theoretical literature. Our original result is that different patterns of transition affected inequality at different strengths, in the sense that some model of transition favoured relatively more an increase in inequality, while others did less. In particular, transition was relatively more pro-inequality when price and trade liberalizations and privatization were not accompanied by progress in competition policy and development of financial markets, which lagged behind or were implemented in later stages. From this point of view (i.e., ability to keep inequality growth relatively low), the transition patterns of most of the countries of central and Eastern Europe can be considered more successful compared to those of the Former Soviet Republics and of the Western Balkan countries. Our outcomes suggest that more balanced and coordinated transition approaches were relatively more able in restraining the unavoidable rise in inequality associated to giving up central planning.

From this point of view, this study contributes to the debate on the most desirable patterns of transition, which has been so far almost completely confined to their effects on growth. However, on the policy side, if income inequality affects subsequent growth in some respect (positively or negatively), as emphasized by a very extensive literature, this side effect of transition cannot be neglected. Especially if, as recently shown with specific reference to transition countries (Sukiassyan, 2007), higher inequality may be harmful for growth.

## Appendix

Table A 1: Inequality in Transition Countries (Gini index, 1989–2006)

Group	Country	Acronym	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	
FSR	Armenia	ARM	–	–	29.6	35.5	36.6	32.1	38.1	42.0	–	–	–	48.6	–	35.9	47.4	45.5	43.4	40.0	
	Azerbaijan	AZE	30.8	34.5	–	36.1	–	42.8	45.9	45.8	46.2	46.2	–	30.1	37.3	50.8	–	–	–	–	
	Belarus	BLR	22.9	23.3	–	34.1	39.9	–	24.6	24.1	24.7	24.5	24.1	24.1	24.3	24.5	23.8	24.8	23.8	32.1	
	Georgia	GEO	28.0	29.1	–	36.9	40.0	–	–	–	49.8	50.3	–	–	48.7	46.6	–	–	40.8	–	
	Kazakhstan	KAZ	28.1	–	–	–	32.7	–	–	35.4	–	–	–	–	–	–	35.9	37.0	42.0	41.4	
	Kyrgyz Republic	KGZ	27.0	–	–	30.0	44.5	44.3	39.5	42.8	43.1	38.4	35.8	37.5	36.4	35.9	35.2	38.0	39.3	39.7	
	Moldova	MDA	25.1	26.7	–	41.1	43.7	37.9	39.0	41.4	46.4	42.6	44.1	43.7	43.5	43.6	41.1	42.2	43.0	38.5	
	Russian Federation	RUS	27.1	26.9	32.4	37.1	46.1	44.1	43.9	50.1	–	44.6	–	43.2	42.2	49.1	–	46.9	44.5	45.1	
	Tajikistan	TJK	28.1	33.4	–	–	–	–	–	–	–	–	–	47	–	–	–	32.5	33.6	–	–
	Turkmenistan	TKM	27.9	30.8	–	–	35.8	–	–	–	24.9	20.9	26.5	–	–	–	–	–	–	–	
	Ukraine	UKR	22.8	24.0	–	25.1	36.4	–	47.0	41.3	40.6	39.1	32.0	36.3	36.4	32.7	40.8	41.0	–	41.0	
Uzbekistan	UZB	28.0	31.5	–	–	33.3	–	–	–	–	–	–	–	44.3	–	–	–	–	39.7	–	
NEUM	Bulgaria	BGR	23.3	21.2	26.2	30.9	31.6	35.3	36.8	34.5	34.4	32.1	30.9	30.8	31.4	34.2	32.2	35.8	33.8	31	
	Czech Republic	CZE	19.3	19.7	21.2	20.3	21.5	22.0	21.5	22.9	22.6	22.6	23.8	23.8	22.8	23.2	22.8	23.5	25.8	24.2	
	Estonia	EST	28.0	–	–	–	34.0	–	39.8	35.5	36.2	36.3	35.7	36.7	35.4	35.5	35.0	38.3	36.1	–	
	Hungary	HUN	21.3	29.3	20.3	30.5	22.6	23.0	24.3	24.4	24.5	24.3	23.7	25.0	25.7	24.6	25.2	27.4	27.9	26.2	
	Latvia	LVA	26.0	–	24.7	33.3	28.3	32.5	34.6	34.9	31.5	33.0	31.8	35.0	32.2	34.1	35.9	39.1	36.0	39.0	
	Lithuania	LTU	26.3	–	–	–	33.3	35.0	33.3	34.3	32.3	32.8	32.8	34.7	34.5	33.9	32.4	30.9	36.0	35.0	
	Poland	POL	25.0	26.8	23.2	24.0	31.5	32.6	32.2	32.9	34.0	32.6	33.1	34.2	34.0	34.9	35.2	36.6	36.6	34.0	
	Romania	ROM	23.3	22.9	24.3	25.2	26.2	26.2	31.1	30.5	30.2	29.4	28.7	30.3	35.3	34.9	35.2	35.9	36.1	36.4	
	Slovak Republic	SVK	20.0	21.6	23.3	24.5	23.0	–	–	24.6	23.2	25.6	24.0	24.3	26.2	26.0	25.5	25.4	26.0	24.2	
Slovenia	SVN	21.9	23.2	26.5	25.9	27.6	21.9	23.3	23.9	24.5	24.0	24.5	24.8	24.5	23.5	24.3	–	24.2	30.7		
WBK	Albania	ALB	–	–	–	–	–	–	–	29.3	–	–	–	–	–	28.1	–	31.1	–	–	
	Bosnia	BIH	–	–	32.9	–	–	–	–	–	–	–	–	–	26.0	–	–	–	35.8	–	
	Croatia	HRV	36.0	27.1	26.7	27.5	26.5	–	–	–	24.6	30.4	–	–	31.0	–	29.0	–	29.0	–	
	Macedonia	MKD	32.2	34.9	26.7	23.5	27.2	33.9	35.9	37.0	36.7	30.8	36.7	35.1	36.3	36.6	35.2	36.2	39.1	39.4	
	Serbia & Montenegro*	FRY	32.3	40.3	31.7	34.7	45.6	32.7	28.4	27.3	27.4	27.4	26.1	32.1	28.1	31.1	40.3	39.3	39.3	38.8	

Notes:

\*Serbia only from 2002 onwards. NEUM: New EU Member Countries; FSR: Former Soviet Republics; WBK: Western Balkan Countries

Source: WIID database

**Table A2: List of Variables, Abbreviations and Sources**

<b>Abbreviation</b>	<b>Variable</b>	<b>Source</b>
Gini	Gini coefficient	WIID
Govshare	General government final consumption expenditure as a % of GDP	WDI
Agrshare	Value added of agriculture as a % of GDP	WDI
Inflation	Annual % change of the GDP deflator	WDI
Growth	Annual GDP growth in PPP, constant 2005 international \$	WDI
LSP	Progress in Large Scale Privatization	EBRD
SSP	Progress in Small Scale Privatization	EBRD
GER	Progress in Governance and Enterprise Restructuring	EBRD
PL	Progress in Price Liberalization	EBRD
TFE	Progress in Trade and Foreign Exchange System	EBRD
CP	Progress in Competition Policy	EBRD
BR	Progress in Banking Reform and Interest Rate Liberalization	EBRD
SFI	Progress in Securities Markets and Non-bank Financial Institutions	EBRD
I	Progress in Infrastructure	EBRD
EBRD	Unweighted average of the 9 EBRD transition indicators	EBRD
War	Dummy variable, 1 if the country is at war in a given year and 0 otherwise	CSCW
Dpers	Dummy variable, 1 if the survey calculated inequality with persons as units of analysis and 0 if it used households	WIID
Dearn	Dummy variable, 1 if the survey calculated inequality on the basis of earnings and 0 otherwise	WIID
Dcons	Dummy variable, 1 if the survey calculated inequality on the basis of consumption and 0 otherwise	WIID
Deqs	Dummy variable, 1 if the survey calculated inequality using an equivalence scale and 0 otherwise	WIID
Dpop	Dummy variable, 1 if the survey calculated inequality on the whole population and 0 otherwise	WIID

*Notes:*

*WIID: World Income Inequality Database, United Nations University – World Institute for Development Economic Research*

*WDI: World development Indicators, The World Bank*

*EBRD: European Bank for Reconstruction and Development*

*CSCW: Centre for the Study of Civil War*

**Table A3: The Effect of Transition Reforms on Inequality (Restricted Sample, not Including Serbia and Bosnia & Herzegovina)**

Variable	Dynamic model GMM-SYS		Dynamic model GMM-SYS	
	(1)	(2)	(3)	(4)
Gini <sub>(t-1)</sub>	0.447 <sup>***</sup> (5.15)	0.359 <sup>***</sup> (4.28)	0.491 <sup>***</sup> (5.62)	0.353 <sup>***</sup> (4.16)
Growth	-0.121 <sup>***</sup> (-2.91)	-0.154 <sup>***</sup> (-3.65)	-0.105 <sup>***</sup> (-2.43)	-0.133 <sup>***</sup> (-3.17)
Growth <sub>(t-1)</sub>	-	-	0.056 (1.63)	0.013 (0.39)
Govshare	-0.246 <sup>***</sup> (-2.60)	-0.263 <sup>***</sup> (-2.73)	-0.277 <sup>***</sup> (-5.21)	-0.316 <sup>***</sup> (-3.19)
Govshare <sub>(t-1)</sub>	-	-	0.021 (0.27)	0.094 (1.18)
Agrshare	0.220 <sup>***</sup> (5.41)	0.117 <sup>***</sup> (4.46)	0.223 <sup>***</sup> (5.21)	0.124 <sup>***</sup> (4.66)
Inflation	-1.114 <sup>***</sup> (-2.41)	-0.808 (-1.54)	-0.966 <sup>*</sup> (-1.86)	-0.388 (-0.74)
War	4.390 <sup>***</sup> (4.82)	3.339 <sup>***</sup> (4.00)	5.440 <sup>***</sup> (5.79)	4.184 <sup>***</sup> (4.91)
EBRD	3.304 <sup>***</sup> (2.85)	5.998 <sup>***</sup> (2.66)	3.453 <sup>***</sup> (3.17)	8.606 <sup>***</sup> (4.13)
EBRD*CL1	-	-2.424 <sup>***</sup> (-3.75)	-	-3.079 <sup>***</sup> (-4.93)
EBRD*CL2	-	-2.143 <sup>***</sup> (-3.48)	-	-2.717 <sup>***</sup> (-4.82)
EBRD*CL3	-	-1.788 <sup>***</sup> (-4.15)	-	-2.135 <sup>***</sup> (-5.05)
EBRD*CL4	-	-1.179 <sup>***</sup> (-3.22)	-	-1.322 <sup>***</sup> (-3.77)
EBRD*CL5	-	1.174 (1.36)	-	1.951 <sup>**</sup> (2.29)
Time dummies	Yes	Yes	Yes	Yes
[joint significance]	[0.002]	[0.000]	[0.002]	[0.000]
Controls for survey differences	Yes	Yes	Yes	Yes
No. of Obs.	259	259	244	244
Wald test	[0.000]	[0.000]	[0.000]	[0.000]
A-B AR(1) test	-3.39 [0.001]	-3.97 [0.0000]	-3.87 [0.000]	-3.62 [0.000]
A-B AR(2) test	0.20 [0.838]	0.29 [0.773]	-0.17 [0.865]	-0.40 [0.687]
Sargan over-identification test	18.56 (13) [0.137]	10.68 (11) [0.470]	22.70 (16) [0.122]	16.10 (15) [0.375]

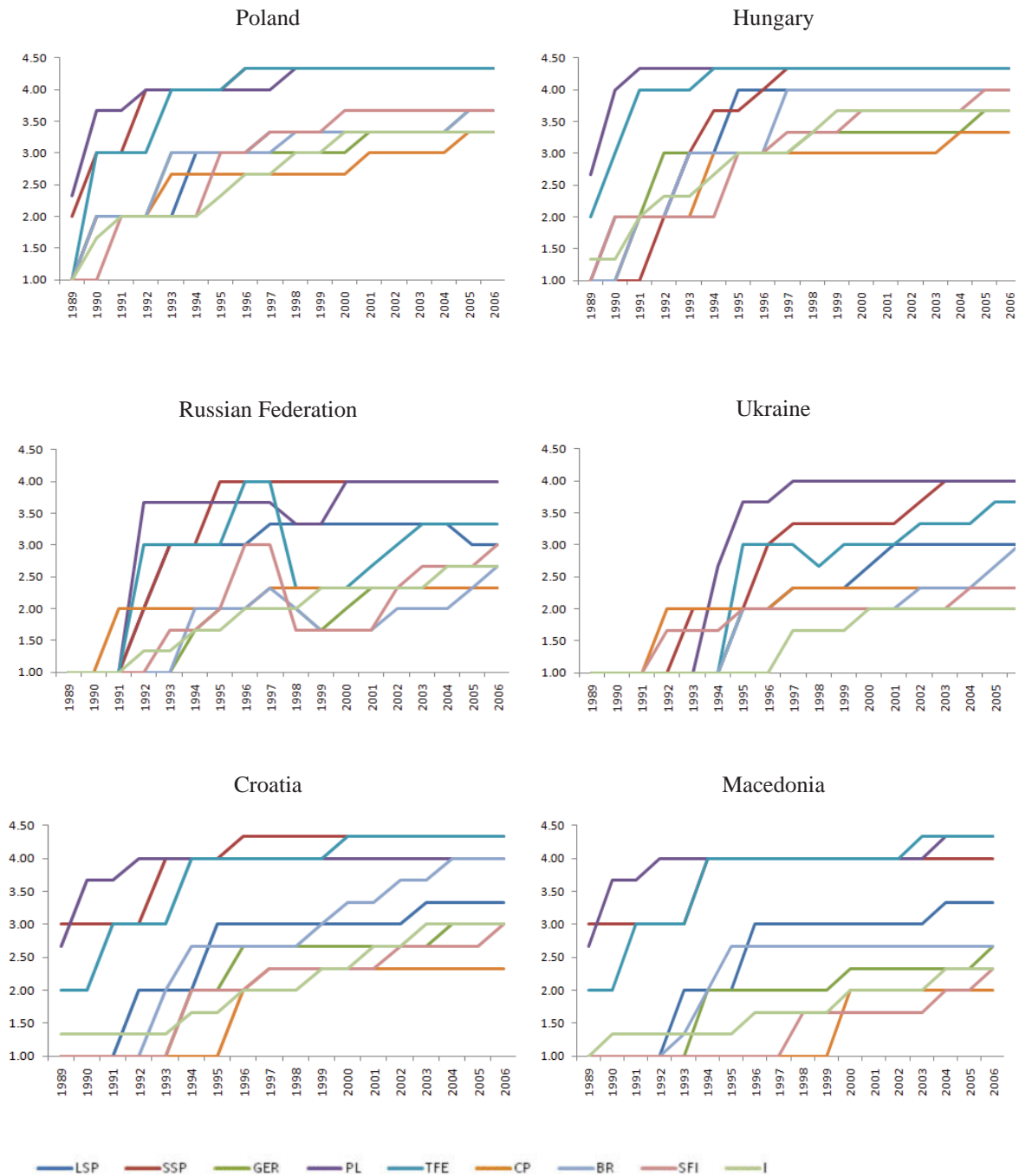
Notes:

*t* statistics are based on robust standard errors and reported in brackets.

A-B AR(1) and AR(2) are tests for first- and second-order serial correlation in the first-differenced residuals (Arellano and Bond, 1991)

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Figure A1: Transition Reforms Patterns by Country, EBRD Indicators (Selected Countries)



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