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Economic Institutions and Economic Growth
in the Former Soviet Union Economies

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Abstract

The aim of this paper is to assess the importance of economic institutions, measured by an index built from the E.B.R.D. (European Bank for Reconstruction and Development) indicators, for the pattern of economic growth. Though it focuses on a particular set of transition economies, it is also related to the literature on institutional development and economic growth. Indeed it draws on the literature on the economics of transition, looking at the breakdown of the U.S.S.R. as an extremely powerful "natural" experiment.

From an empirical point of view, the study takes into consideration the period between 1991 and 2008 for fifteen countries, namely the Former Soviet Union economies, and is performed by means of a panel model. The first part of the econometric analysis sees our index as the only independent variable. A static model and a dynamic one are specified and different estimation techniques used. The second phase includes other covariates, among which the classical determinants of growth, to test whether the institutional environment, that is to say, the economic institutions index, maintains the magnitude and has a major impact on the pattern of economic growth.

JEL classification*: C10, C23, C51, E02, E60, O11, O43, P20, P30.*

Keywords*: economic growth, economic institutions, economic policy, Former Soviet Union economies, static and dynamic models, panel analysis.*

1. Introduction

When the U.S.S.R. dissolved in 1991, the Soviet Socialist Republics that formed it in its final years gained independence. These Former Soviet Union Republics are Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan. U.S.S.R. was the successor to the Russian Empire of the Tsars and was established on December 1922. Its seventy years history is a "story" of systematic cohesion among political system, economic policy and economic structure, and gives the perspective to understand what happened to these economies after the breakdown.

Generally speaking, this paper is related to two strands of literature. It is related to the literature on the growth experiences of transition economies and to the literature on institutional development and economic growth[1]. Its focus is just on the FSU economies, unlike the literature about "transition", especially on the path of their economic performance dictated by the evolution of a set of economic institutions, because we believe they are an extremely powerful experiment of institutional change. Thanks to their unique starting point and past common experience, it is possible to explain more accurately which dimensions of institutions are involved, thus avoiding the often pointed out drawback of very different meanings related to the word "institutions", and to put forward a panel model analysis, thus following each country over several years. This approach is new for both strands of literature because it allows to disentangle the effects of a *radical* change of institutions, to improve the quantitative methods not only for the panel data analysis carried out but also for the development of a dynamic approach, to show conceptually the close relationship between economic policies and economic institutions necessary for a market economy, and to think back to the meaning of the word transition.

The choice of Former Soviet Union countries is based not only on historical considerations. They are very different from the Central Eastern European (CEE) countries. The former are heritage of the Soviet Union, the latter are also called the Eastern bloc, i.e. countries that have experienced "communism". The former have had a common[2] history, the latter a common soviet influence, although in different times and ways. Due to this, we can't think the CEE countries have lived central planning in the same radical way. The central planning and its distortions are known to have affected the economic environment and if we are minded to believe in the existence of the proved link between economic growth and institutions, then the extremely explanatory power of the FSU countries can not be unrecognised. Thus, the focus on these economies is justified by looking at their past homogeneity in terms of direction, management, organization and control. At that very moment, they experienced the same institutional change: the authoritarian and highly centralized system ceased to be. Therefore, the Soviet breakdown is their common exogenous starting point.

From this exogenous point, new institutions had to be created. More specifically, we define these new institutions as *institutions necessary for a market economy*, that is, private ownership, governance and competition policy, banking and financial institutions, trade and foreign exchange institutions, price liberalisation. In this sense, they are *economic institutions*. Attempts to establish these institutions have been done for several years. This paper explores, by means of an index, their impact on the path of economic growth over a period of eighteen years (1991-2008), at the end of which many countries still remain poor. How much important have these institutions been for economic outcome? Have they been important along the all time horizon? Have they been the only force shaping the economic path? What can be said about the word transition?

From the empirical point of view, we approach in two steps. We first study their importance for the economic pattern in a static dimension, being careful about the statistical features of our dataset and the consequent problems for the estimated coefficients. Different estimation techniques are used and the model proves to be coherent. After establishing the effect of institutions according to this

[1] For a comprehensive review, see "*What do we know about the link between growth and institutions?*"

[2] The three Baltic Republics can partly be seen as an "exception".

specification, we like studying the same relationship in a dynamic framework. We explore the autoregressive structure of the model, establish the number of lags of the dependent variable, apply different estimation techniques and show the supremacy of the Arellano Bond estimator. Then the magnitude and sign of our index of economic institutions are tested via a robustness analysis.
This paper is organized as follows. In the next section, we trace and identify the key elements that can be seen as background for these countries. Section 3 is an overview of the previous research on transition. Section 4 explores the data, describes the variables used as institutional indicators and what they mean according to our analysis. Section 5 carries on with the econometric analysis. Section 5 shows the results of the robustness analysis, defines the variables used and, where necessary, how they have been constructed. Section 6 concludes.

2. The common background

Following the events started with 1917 Revolution, a few months after coming to power in 1918, the new regime initiated a series of unprecedented measures intended to destroy all vestiges of private property and inaugurate a centralized communist economy. These measures, named "War Communism" in 1921, had two strictly linked objectives: to nationalize the private ownership of the means of production (which provided the basis of political power) and to establish a centralized and planned economy.
"War Communism" entailed four sets of measure:

- the nationalization of all the means of production and transportation;
- the abolition of money and its replacement by barter tokens as well as free goods and services;
- the imposition on the national economy of a single "plan";
- the introduction of compulsory labour.

In the first years of this new regime, all but the smallest industrial enterprises were nationalized. Agricultural land, the main source of national wealth, was for the time being left at the disposal of peasant communes, with the understanding that sooner or later it would be collectivised. Private ownership of urban real estate was abolished. The state became the sole owner of the country's productive and income-yielding assets. Management of this wealth was entrusted to a gigantic bureaucratic organization, the Supreme Council of the National Economy, which was to allocate human and material resources in the most rational manner. Money was effectively destroyed by the unrestrained printing of banknotes, which led to an extraordinary inflation. Citizens lost their life savings. Barter and issuance by government agencies of free goods replaced normal commercial operations. Private trade, whether wholesale or retail, was forbidden. All adult citizens were required to work wherever ordered. The independence of trade unions was abolished and the right to strike against the nationalized enterprises outlawed.
Except for a temporary compromise with capitalism (the program that came to be known as the *New Economic Policy*), during the decades following the Bolshevik Revolution and especially under Stalin, a complex system of planning and control had been developed, in which the state managed virtually all production activity. In the late 1920s, Stalin sought to rapidly transform the Soviet Union from a predominantly agricultural country into a modern industrial power. Between 1927 and 1929 the State Planning Commission worked out the *First Five-Year Plan*, which called for rapid industrialization of the economy, with particular growth in heavy industry. The economy was centralized: small-scale industry and services were nationalized, managers strove to fulfil Gosplan's[3] output quotas, and the trade unions were converted into mechanisms for increasing

[3] State Planning Committee. Under party guidance, it was primarily responsible for creating and monitoring five-year plans and annual plans.

Figure 1: Soviet Union Administrative Division

worker productivity. With the greatest share of investment put into heavy industry, widespread shortages of consumer goods occurred, and inflation grew. To satisfy the state's need for increased food supplies, the *First Five-Year Plan* called for the organization of the peasantry into collective units that the authorities could easily control. This collectivisation program entailed compounding the peasants' lands and animals into *collective* farms and *state* farms. This heavily centralized and bureaucratised system of administration has characterized Soviet agriculture since Stalin's campaign of forced collectivisation.

From 1928 till 1990, there have been twelve Five-Year Plans to set the directions of the economy. The Plan has been the main instrument of strategic development, and the annual plan its short-term operational translation. From 1928 to 1985, the Soviet growth has followed a pattern called *extensive* growth[4]: its main characteristic has been in generating growth mostly through the expansion of inputs and only marginally through rises in productivity. The growth of fixed capital and the use of raw materials substantially exceeded the growth of national income, while the growth of the work force surpassed the growth of labour productivity.

Along these years, on the whole, the regime established its economic priorities through central planning, a system under which administrative decisions rather than the market determined resource allocation and prices. As a result, the Soviet Union of the 1980s had the largest centrally directed economy in the world founded on "socialist ownership of the means of production" (as declared on 1977 Constitution), where two forms of socialist ownership were recognised: state ownership, in which all members of society are said to participate, and various types of collective or cooperative ownership. The country's economic resources were, of course, largely state owned. The central government controlled directly or indirectly aspects of the labour force, the retail and wholesale distribution system, trade, and the financial system.

[4] See Gur Ofer and G.I.Khanin.

In particular, the banking system was highly centralized; it formed an integral part of the management of the economy. The State Bank, *Gosbank*, issued currency and established its official gold content and thus its exchange rate with foreign currencies. The real value of the *ruble* for purchase of domestic consumer goods in comparison with the United States dollar was very difficult to determine because the Soviet price structure, traditionally established by the State Committee on Prices, was dictated by many considerations other than supply and demand. The banking system was owned and managed by the government. *Gosbank* was the central bank of the country and also its only commercial bank. It handled all significant banking transactions, including the issuing and control of currency and credit, management of the gold reserve, and oversight of all transactions among economic enterprises. Because it held enterprise accounts, the bank could monitor their financial performance. It had main offices, in each union republic, and many smaller branches and savings banks. The banking system also included the Foreign Economic Activity Bank and the All-Union[5] Capital Investment Bank.

Using CPSU[6] directives concerning major economic goals, planning authorities formulated short-term and long-term plans for meeting specific targets in virtually all spheres of economic activity. Economic plans had the force of law. Traditionally they had been worked out down to the level of the individual economic enterprise, where they were reflected in a set of output goals and performance indicators that management was expected to maintain. Annual plans underlay the basic operation of the system. They covered one calendar year and encompassed the entire economy. Targets were set at the central level for the overall rate of growth of the economy, the volume and structure of the domestic product, the use of raw materials, labour and their distribution by sector and region, the volume and structure of exports and imports. Annual plans were broken down into quarterly and monthly plans, which served as commands and blueprints for the day-to-day operation of industrial and other economic enterprises and organizations. The Five-Year Plan provided continuity and direction by integrating the yearly plans into a longer time frame. Although the Five-Year Plan was duly enacted into law, it contained a series of guidelines rather than a set of direct orders. At each congress, the party leadership presented the targets for the next Five-Year Plan. Thus each plan had the approval of the most authoritative body of the country's leading political institutions. In economic policy matters, it was the Central Committee of the CPSU and, more specifically, its *Politburo* (the Political Bureau, which combined legislative and executive powers) that set basic guidelines for planning. The planning apparatus of the government was headed by the Council of Ministers[7] and, under it, the State Planning Committee (*Gosplan*). *Gosplan* combined the broad economic goals set forth by the Council of Ministers with data supplied by lower administrative levels regarding the current state of the economy in order to work out a set of control figures. When the control figures had been established by *Gosplan*, economic ministries drafted plans within their jurisdictions and directed the planning by subordinate enterprises. The control figures were sent in disaggregated form downward through the planning hierarchy to production and industrial associations (various groupings of related enterprises) or the territorial production complex[8], for progressively more detailed elaboration. Individual enterprises at the base of the planning pyramid were called upon to develop the most detailed plans covering all aspects of their operations[9]. As the individual enterprise formulated its detailed draft production plans, the flow of information was reversed. The draft plans of the enterprises were sent back up through the planning hierarchy for review, adjustment, and integration. This process entailed intensive bargaining, with top authorities pressing for maximum and, at times, unrealisable targets, and enterprises seeking

[5] National, with purview throughout the entire territory of the Soviet Union.

[6] Communist Party of the Soviet Union.

[7] The highest executive and administrative body of the Soviet Union, according to the Constitution. In practice, its members directed most day-to-day state activities.

[8] An economic entity consisting of various economically related industrial and agricultural enterprises in a particular geographic area.

[9] In agriculture, individual collective farms and state farms worked under the supervision of local party committees.

assignments that they could reasonably expect to fulfil or even over fulfil. Ultimate review and revision of the draft plans by *Gosplan* and approval of a final *all-union* plan by the *Council of Ministers*, the *CPSU*, and the Supreme Soviet were followed by another downward flow of information, this time with amended and approved plans containing specific targets for each economic entity to the level of the enterprise. A parallel system for planning existed in each union republic and each autonomous republic. The state planning committees in the union republics were subject to the jurisdiction of both the councils of ministers in the union republics and *Gosplan*.

At the all-union level, another agency formed the planning apparatus of the government: the State Committee for Statistics (*Goskomstat*), which assisted the State Planning Committee (*Gosplan*). The reliability of the *Goskomstat*'s data has been brought into question several times. Kudrov (1993) observes that from the time of the First Five-Year Plan, a "large-scale, systematic distortion of reality in published statistical information from top to bottom" began. From above, it was initiated by the ruling elite interested in demonstrating the success of its leadership and the superiority of central planning and of socialism as a social system. From below, there were distortions in statistics at enterprise level. These distortions, included in the statistical data, were somewhat dependent on that highly bureaucratised system. They hindered to determine the character and depth of the economic problems and reliable rates of growth. To this regard, these distortions applied basically to the production indices. According to official methodological explanations of *Goskomstat* of former USSR, total industrial output as a whole and within individual branches is determined as the sum of data on the volume of output of individual industrial enterprises, calculated according to the factory method. Kudrov outline four sources of distortion. First, statistics on industrial output in the USSR were based on gross output, not on value added. In this indicator there is an enormous degree of double counting due to the fact that the value of the same raw materials is counted in all stages of their manufacture. And if the organizational structure of industry changes in the direction of the fragmentation of large enterprises and the creation of a larger number of independent enterprises, the share of repeat counting grows, and consequently, if the number of links in the technological chain of processing raw materials increases, the growth of industrial output is artificially inflated. Second, the gross output indicator in the USSR was calculated entirely on the basis of complete reporting. In the factories, *over reporting*, the deliberate exaggeration of output to obtain additional bonuses and other rewards for winning in the "socialist competition", the concealment of unfavourable facts became widespread. Third when enterprises evaluated the volume of their gross output, they used as comparable prices the prices of a remote base year that made it impossible to take into account changes in product mix and quality, and the advent of new types of products that did not in general have comparable prices. As a result, the industrial production index was greatly overstated. In practice, the inflation component entered into the calculation of industrial production indices. On the whole, calculations of utilized, like produced, national income of the former USSR contain enormous potential for distortion.

This scenario of central planning, administrative decisions, management and control of the economy, started with the Revolution and maintained and evolved during the years of the authoritarian-dictatorial regime, is the common background of the fifteen countries studied. The last years of the USSR were characterized by the tasks of *perestroika*, that is, changing and restructuring economic mechanisms. This transformation, this restructuring, not aimed at "undermining the Soviet system but at making it more efficient", according to many scholars[10], disorganized economic relations: it destroyed the administrative system without forming market relations. The economy entered a state of deep crisis and this was the key reason for the USSR's collapse, engendering a historical change, that entailed a transition from something, the past, to something else, the new realities formed, and the creation of new institutions. From this common

[10] See for example Blanchard (1997) and Khanin (1991).

background, that can be analytically conceived as exogenous, each former soviet socialist republic started its own new economic pattern.
After a brief overview of the literature on transition, we define which kind of institutions we are thinking of, discuss their importance and how they have been measured.

3. An overview of previous research on "transition"

The empirical literature on transition considered starts in 1996. This literature focuses basically[11] on the members of the Warsaw Pact until 1991 and on some other Central Eastern European countries. The term *Eastern Bloc* was used to refer to the former Communist states of Eastern and Central Europe, including the countries of the Warsaw Pact, along with Yugoslavia and Albania which were not aligned with the Soviet Union after 1948 and 1960, respectively. These countries now can be either new nation states, member of decentralized states or core countries of centralized federal states.
From a general point of view, this literature can be divided in two groups.
The first deals with different forces in explaining output performance:

- the role of reforms and reform strategies
- the role of initial conditions
- the role of (a broadly concept of) institutions

The second focuses on more specific characteristics for the transition economies:

- the importance of trade reform
- the determinants of corruption
- the unofficial economy as a consequence of political control

Due to the essence of the transition, namely a transit to a market economy, the role of reforms is given remarkable attention. De Melo, Denizer and Gelb (1996) study the role of liberalization over the 1989-1994 period. They develop an index, used later in many other papers, which is a weighted average of the rankings of liberalisation in internal markets[12], external markets[13] and private sector entry[14], and find that there are cross country relationships between GDP and economic liberalisation, and between inflation and economic liberalisation. Also Fisher, Sahay and Vegh consider reforms. They use the De Melo *et al*. liberalisation index, in a panel of twenty transition countries for 1992-1994, among the forces that are believed to account for the outcome differences. On one side, they consider macroeconomic policy (annual inflation rates and fiscal surpluses), official external assistance, the index of reforms (see De Melo *et al*., 1996), on the other, the growth rate of population, the secondary enrolment rate, and the share of investment in GDP. They find that the key to rapid growth in the transition economies is investment and the policies (macroeconomic policies that produce low inflation and the liberalisation index) that promote it. Later Fischer *et al*. (2000) increase the number of countries (from twenty to twenty-five) and, via three regressions run with panel data, conclude that both macroeconomic stabilization and structural reforms are necessary for growth. Reforms seem to be important also for the process of resource reallocation and the desire to invest in a country. Selowsky and Martin (1997) explore the dynamics of the association between output and reforms (measured by the liberalisation index calculated by De Melo *et al*.) and the dynamic impact of these policy improvements on the flows of foreign direct investment (proxy for the desire to invest). Reforms have a statistically significant impact on

[11] It could be found that the samples contain less than twenty-five countries due to the availability of the data. Mongolia, China and Vietnam can be sometimes included in the sample.
[12] Liberalisation of domestic prices and abolition of trading monopolies.
[13] Liberalisation of the foreign trade regime.
[14] Privatisation of small and large scale enterprises and banking reform.

growth and foreign assistance, but the shape of the response of output to policy is affected by the diversity of initial conditions (e.g. the countries in Central Europe compared with the former Soviet Union ones).

Also the differing initial conditions have been recognized by researchers as forces explaining the growth pattern and included in the regression equations. De Melo, Denizer, Gelbe and Tenev (2001) and Staehr (2005) evaluate the interaction of initial conditions with other determinants. De Melo *et al*. study initial conditions, political change, and reforms in a unified framework covering twenty-eight countries in East Asia, Central and Eastern Europe and the Former Soviet Union. They identify variables to characterize the initial economic conditions of transition economies, initial macroeconomic distortions, and initial geopolitical characteristics. Economic policies are "proxied" by the economic liberalization index (originally developed in De Melo, Denizer and Gelb, 1996). Their regressions show that policy reform, economic liberalisation, depends on initial conditions, political change, and regional tensions. Economic performance, measured in terms of growth and inflation, depends on initial conditions, economic policies, and regional tensions. Adverse initial conditions are associated with slower economic liberalisation. Staehr include initial conditions among different explanatory variables in a panel consisting of annual data for twenty-five transition economies from 1989 to 2001. The independent variables are consumer price inflation, a war dummy, initial conditions (see De Melo *et al*. 2001), and variables to measure reform intensity, the EBRD indices, for which because of multicollinearity they use the principal components methodology. Early reforms in the form of liberalisation and small-scale privatisation have a positive medium term effect on growth even in the absence of other reforms. Liberalisation and small-scale privatisation have a positive effect on growth even if structural reforms are less advanced. A policy of large-scale privatisation and price liberalisation without small-scale privatisation and market opening has a negative impact on growth. Early market opening without other reforms like small-scale privatisation and enterprise restructuring also seems detrimental to growth, at least in the latter part of transition. Bank liberalisation without enterprise restructuring has a negative impact on growth, especially in the later stages of reform. Among initial conditions, the prior economic ones are significant and show a negative sign, while the initial macroeconomic distortions are insignificant. Later (2006), Young-Sun Lee and Hyung-Gon Jeong show that the effect of initial conditions that comprise socialist economic characteristics (repressed inflation, duration of planned economy, economic openness, CMEA trade dependency) and socialist economic performance (pre-reform income level and industrial distortion) is negative while the impact of economic reform on growth is positive. But the negative effect of initial conditions seems to override the positive impact of economic policies.

The first general study of the role of institutions in transition economies is published in 2003. In this paper Havrylyshyn and Van Rooden update their previous regressions on panel data for the period 1991-1998 to include institutional variables (from five different sources[15]). Their basic equation has the growth rate of real gross domestic product as dependent variable, and as independent variables the contemporaneous rate of inflation, to represent macroeconomic stabilisation policies, the contemporaneous and lagged values of the structural reform index (based on EBRD transition indicators), to represent economic liberalisation policies and their possible initial negative impact, two clusters of initial conditions (see De Melo *et al*. 2001), capturing macroeconomic distortions and the level of socialist development and its associated distortions. Their results show that macroeconomic policies and structural reforms are the two most important factors in explaining output developments. The inclusion of the institutional variables adds to the explanation of growth, although its contribution is small. Di Tommaso, Raiser, Weeks (2007) focus on the determinants of

[15] The overall index of economic freedom, the sub indices of property rights and government regulation from the Heritage Foundation. The measures on democratic, economic freedom and the sub indices for rule of law and governance and public administration from the Freedom House. The legal reform index from the European Bank for Reconstruction and Development. The average of responses given in a survey conducted by the World Bank in 1998. The political risk element of the ratings published by Euromoney.

institutional change, over the 1989-2002 period, determined by the ratings on governance and enterprise restructuring, competition policy, banking reform, interest rate liberalisation and securities markets and non banking financial institutions developed by EBRD. Their results say that small scale privatisation and economic liberalisation[16] are positively related to institutional change but only the latter variable is significant; that among the political variables, the Freedom House index[17] of political rights and civil liberties achieves significance; economic inequality is negatively associated with institutional change; neither the political turnover dummy nor the ethnic heterogeneity index are significant; the two dummies for religious affiliation[18] show opposite signs.
Redek and Susjan (2005) use a concept of institutions developed by the Heritage Foundation. Their basic specification for twenty-four countries in the period 1995-2002 includes as regressors institutions, measured by the Heritage Foundation overall freedom index, investment, budget balance, inflation, inward FDI (foreign direct investment). The coefficient on the overall freedom index is positive and statistically significant even after some other variables are added. These other regressors include: dummies for war, initial GDP, and years under socialism as proxy for initial conditions, population growth rate, government consumption, unemployment rate and industrial production. For the same time horizon, Susjan and Redek (2008) develop a panel model of twenty-two economies to show the relevance of the concept of uncertainty. They argue that uncertainty in the economic environment caused by institutional transformation as well as by some other transition specific factors has affected the performance of transition economies. To capture the dimensions of potential uncertainty, using the Heritage Foundation and Freedom House sub-indices, they build one new index and find that higher uncertainty index is associated with poor economic performance. They identify three main sources of growth: availability of growth factors (gross fixed capital per capita, share of secondary school enrolment), short run cyclical factors (inflation, unemployment, budget deficit), uncertainty (their index), other country specific variables (dummies for CEE and FSU). Uncertainty has an impact on economic performance, measured in terms of per capita GDP.
Another dimension of institutions is studied by Pistor, Raiser, Gelfer (2000). They supplement the analysis of the laws on the books with an analysis of the effectiveness of legal institutions measured by three variables: rule of law, an index of effectiveness of corporate and bankruptcy law in transition economies constructed by the EBRD, and survey data on the ability of the legal system to protect private property rights and enforce contracts, which they call the enforcement index. The effectiveness of legal institutions has a much stronger impact on the propensity of firms to raise external finance than does the law on the books, despite legal change that has improved shareholder and creditor rights. Also Hoff and Stiglitz (2004) focus on the importance of the legal institutions and in particular on the political demand for the rule of law. By rule of law they mean well-defined and enforced property rights, broad access to those rights, and predictable rules, uniformly enforced, for resolving property rights disputes. By no rule of law they mean a legal regime that does not protect investors' returns from confiscation by the state, does not protect minority shareholders' rights from tunnelling, and does not enforce contract rights. In going from a command economy, where almost all property is owned by the state to a market economy, where individuals control their own property, an entirely new set of institutions would need to be established in a short period. This paper provides a model in which the economic actions and the political positions of individuals are interdependent. Individuals who control assets make both economic choices, to build value or strip assets, and political choices, by voting over policies that would establish the rule of law, and the equilibrium reached does or does not lead to the establishment of the rule of law.
The last attempt to account for the role of institutions is by Beck and Laeven (2006). This paper is different from the previous ones because it looks for the determinants of institutional quality in a two stages approach. These determinants are identified with natural resources and the historical

[16] Average of price liberalisation index and exchange rate liberalisation index (EBRD).
[17] Average Freedom House score for political rights and civil liberties.
[18] Western Christianity and Orthodox Christianity dummies.

experience of these countries during socialism. They focus on a broad indicator of institutional development, the Kaufman Kraay and Mastruzzi (KKM) indicators of voice and accountability, government effectiveness, rule of law, regulatory quality, control of corruption and political stability. Their main variable, institutional development is the average of these six variables. To capture the historic experience of transition economies during the socialist period and thus the entrenchment of the socialist elite at the start of the transition period, they use the number of years a country has spent under socialism[19]. In the first stage of their cross-country model, they regress institution building on initial raw exports and years under socialism. Institution building is institutional development (average of six principal component indicators voice and accountability, government effectiveness, rule of law, regulatory quality, absence of corruption, and political stability), change in rule of law, change in control of corruption, EBRD reform index (average of reforms in the areas of enterprise reforms, competition policy, banking sector reform, and reform of non-banking financial institutions). Years under socialism and initial raw exports enter negatively and are statistically significant. The second stage relates the exogenous component of institutional development, explained by natural resource dominance and socialist entrenchment, to GDP per capita growth over the period 1992-2004, and shows a positive and significant relationship.

All the papers surveyed look at institutions in very different ways and it should be clearer now why at the beginning we talked about "a broad concept" of institutions. Institutions can be read as the degree of economic freedom, the degree of democratic freedom, the extent of property rights and government regulation, of voice and accountability, government effectiveness, rule of law, regulatory quality, control of corruption, political stability, and as specific indicators more related to the economic reforms and transformation of these countries. The models cover all the transition economies, without distinction between Central Eastern European countries and former Soviet ones, may be cross-sectional with a noteworthy "sacrifice" in terms of number of observations and may be static with very few exceptions.

The characteristics mostly thought as peculiar to countries in transit are corruption, the presence of an unofficial economy and the integration into the world economy due to the membership of these countries in the Council for Mutual Economic Assistance (CMEA).

Goel and Budak (2006) study the effects of government size and country size as dimensions of determinants of corruption for twenty-five transition economies over the period 1998-2002. The size of government can be a deterrent or an inducement to corruption. If a larger government spending entails greater deterrence and enforcement measures, it might lead to lower corruption. But a larger government might signify greater red tape and is likely to result in greater corruption. Country size is captured by the land area. Other things being equal, a larger country has greater difficulty in policing and monitoring its government officials. They regress corruption, measured by the corruption perceptions index from Transparency International, on the Human Development Index, the government expenditure, the land area, the index of transition (EBRD), and a soviet dummy. Greater degree of economic prosperity in a country lowers corruption in all cases, suggesting that as transition nations become wealthier, the level of corruption goes down. A bigger government size seems to reduce corruption in transition countries. It may be that, instead of increasing bureaucratic red tape, government spending in the transition years was aimed at strengthening the monitoring and policing mechanisms. A country's physical area or geographic area is significant in terms of its impact on corruption suggesting that other things being equal, more spread out countries would have a harder time controlling corruption. The magnitude of the effect of area on corruption seems rather modest. The overall index of transition progress suggests that comprehensive transition reforms contribute to lower levels of corruption in these countries. They also find that comprehensive reforms might work best at corruption reduction than piecemeal reforms.

[19] As alternative indicator of entrenchment they use Executive Constraints 1930, which measures on a scale from one to seven the *de facto* political independence of a country's chief executive in 1930.

Another characteristic often associated with countries in transit is the presence of an unofficial economy. Johnson, Kaufmann, Shleifer (1997) think that the size of the unofficial economy is a consequence of politicisation. When profits or potential profits are taken away from firms through regulation, taxation, or corruption, entrepreneurs choose not to start firms or expand less rapidly than they might otherwise. But entrepreneurs can choose to operate unofficially. The movement of production into the unofficial economy has significant consequences for public finance. Since firms in the unofficial sector largely escape taxation, the reallocation of resources into that sector undermines tax collections, and consequently the ability of the government to provide public goods in the official sector. Such public goods include law and order, effective tax and regulatory institutions, and relatively incorrupt public administration. The lack of provision of such market-supporting public goods makes operating in the official sector even less attractive to firms, and can set off the collapse of public finances as more and more firms escape into the unofficial economy. Economies find themselves in either of two very different *equilibria*. In the first, tax distortions and regulations are low, government revenues are high, the provision of public goods in the official sector is sufficient and therefore the unofficial sector is small. This is the case for the countries concentrated in Easter Europe. In the second equilibrium, if in the official sector taxes and regulations are prohibitive, public finances are precarious, public goods provision is inadequate, and as a consequence, much of the economic activity is concentrated in the unofficial sector. This is the case for the former Soviet Union ones. If firms are more productive in the official than in the unofficial sector, the second equilibrium is associated with worse aggregate performance than the first. The key prediction of their model is the potential separation of economies into two distinct groups. In one, the government offers a sufficiently attractive combination of tax rates, regulations, and public goods that most firms choose to stay in the official sector. In this group, government revenues suffice to provide the public goods, and the unofficial sector is small because the government competes against it. In the other group, the government does not offer firms a sufficiently attractive combination of tax rates, regulations, and public goods to keep them operating officially, and hence many of them end up in the large unofficial sector, which offers a more attractive combination. The government budget in these countries does not suffice to offer more public goods, and hence the unofficial sector wins the competition for firms. Their model suggests that in economies where firms are free to move between the official and unofficial sectors, transition is likely to follow one of two paths. Some countries would be characterized by low burdens from taxes, regulation, and corruption; relatively high tax revenues; large quantities of public goods provided by the government; small unofficial sectors; and if the official sector is more efficient high growth rates. Other countries would be characterized by high burdens from taxes, regulation, and corruption: low tax collections; small quantities of public goods provided by the government; large unofficial sectors; and presumably, low growth rates.

Barlow's paper (2006) focuses upon the importance of trade reform and studies its role in a dynamic panel model for twenty-one transition economies. The measure of openness of an economy used is indices of the policy stance. All data are taken from the transition report produced by the EBRD. They use indices for trade reform, privatisation and internal market supporting policies. The internal market index is calculated as the arithmetic average of the indices of restructuring and corporate governance, banking and competition policy. The privatisation index is the weighted average of the indices of large scale and small-scale privatisation. The trade reform index is the EBRD's transition scores for foreign exchange and trade liberalisation. The dependent variable is the growth rate of GDP, the independent variables the index of trade policy, the privatisation index, the index of internal market reforms, the percentage rate of inflation. For the specification over the full sample with year dummies, trade policy has a significantly positive effect in both the level and difference. Internal market reforms have a statistically significant negative effect and privatisation has insignificantly negative effect. The results show the importance for trade reform as a determinant of GDP growth but the effect is clearer for the early transition and the Western group. For the Eastern group trade reform only becomes a significant determinant of growth in the

presence of interaction terms, maybe because of the fact that Eastern countries rely on natural resources or agriculture or both. In early transition, trade reforms raise growth and privatisation seems to have little influence. In the later period, it is privatisation that raises growth. One potential reason the coefficients cannot be trusted is the co-linearity among the indices used.
The literature has succeeded in establishing the importance of initial conditions and reforms. Also the role of the various indicators chosen as institutions has been shown.
However, a number of issues remains open. Due to the problems of definition pointed out before, it happens that some indicators are used both as reform measures and as institutional measures; more work should be devoted to discern among the available variables. It often happens that the reasoning underlying their usage as well as the needed documentation on the construction of the indices used are not disclosed. The role of economic policy has been marginally considered and it should be explained its meaning and position with respect to institutions and reforms for the case of transition economies. Moreover, despite the presence of Soviet dummy and of different set of initial conditions, all this literature doesn't make any formal distinction between Central and Eastern European countries and Former Soviet Union ones. More emphasis should be placed upon the historical perspective, which may help out with finding conceptually a new key for the meaning of reforms, institutions, and economic policy. From an empirical point of view, in order to study the path of growth and the forces that shape it, efforts that attempt to put forward dynamic approaches are needed and longer time horizons should be observed.

4. Definition and Measure of Institutions

After the collapse of a specific typology of economic institutions, new institutions, as already emphasized, had to be established. To understand which measure of institutions were more coherent, we concentrated on the features that have "branded" the Soviet economic system: fixed prices and wages, trade carried out by centralized organizations, all property belonged to the state, and a mono-bank system, whereby a single state bank functioned as a country's central bank as well as a nationwide commercial and investment bank.
At the beginning of the 1990's, Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan needed, following our reasoning, a set of institutions, that allowed them to get on to a market economy. Before we called these institutions, *institutions necessary for a market economy*. Indeed, in a market economy, prices and wages are not controlled, private property is not forbidden, trade is free, to a certain extent enterprises compete, there are independent banks and non-banking intermediaries, and all this, of course, is accompanied by an "appropriate" regulatory infrastructure. For this reason, the eight EBRD (European Bank for Reconstruction and Development) indices of small and large-scale privatisation, governance and enterprise restructuring, price liberalisation, trade and foreign exchange system, competition policy, banking reform and interest rate liberalisation, securities market and non bank financial institutions, serve our purpose. These indices are concretely related to the economic structure because they assess whether private ownership, market prices, a financial discipline at enterprise level, a clear foreign exchange regime, a free trade, a developed financial system, and an effective unrestricted entry to the markets and enforcement of competition policy, are present. In this sense, they are *economic institutions*, and their values not only measure the degree of development reached in a particular year but also, in last instance, allow us to think of the quality of the economic policies behind them.
The fact that data on institutions could not be based on objective criteria is often debated. However, although rationally a certain degree of judgement, on the part of the various sources, should be taken into account, what really matters and has to be checked is the existence of a methodological coherence through countries and years.

The E.B.R.D. grades, on a scale of 1 to 4+ (4.33), each country in a given year along these eight dimensions[20]. Because the institutional indices are highly correlated[21], our measure of economic institutions is a composite index. For each country, we sum the value of each indicator in one year and normalize the aggregate index obtained, so that it ranges from 0[22] to 1. This procedure, known in literature[23], gives an immediate sense of the level of these economic institutions, with 0 meaning persistence of the characteristics of the former Soviet economic system and 1 suggesting standards of the more advanced market economies.

Figure 2 presents the values of the economic institutions index for the former Soviet Union economies in selected years. Countries with low values of the index have low quality institutions, more similar to the Soviet system; countries with high values of the index have better institutions. If we look at the 1991 values, the starting point values, among the economies with high institutions index are Estonia (the highest), Latvia, Lithuania, and Russia (the lowest). Among the economies

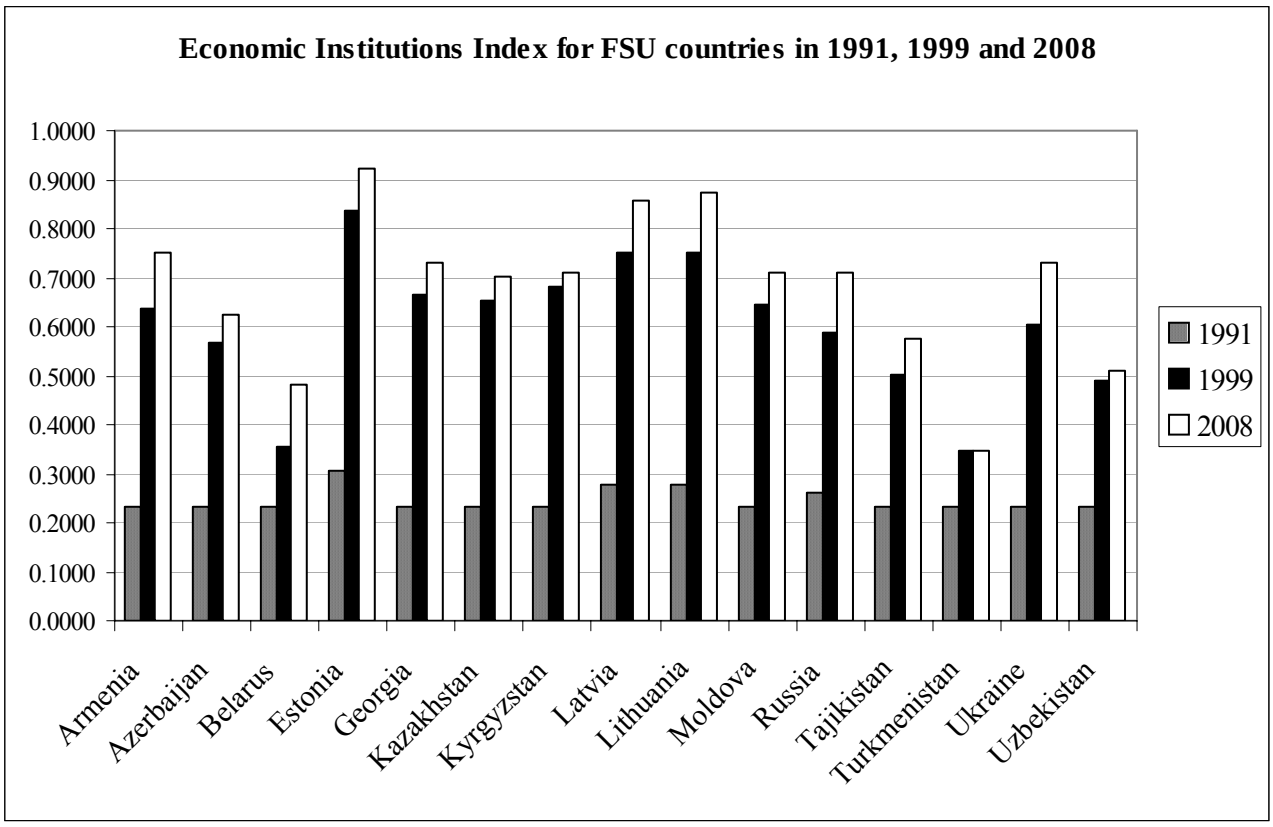

Figure 2: Economic Institutions Index for selected years
Source: Author's calculation

with low values, all the others. After some years, in 1999 and 2008, all the countries have moved away from their lowest level, but only a few of them have made substantial progress in reaching advanced standards. These are Estonia, Latvia, Lithuania with values appreciably greater than 0.85. Armenia, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, and Ukraine show values around 0.7. Azerbaijan, Belarus, Tajikistan and Turkmenistan stand among those with lower values of the index (less than 0.63).

[20] EBRD methodology is shown in Appendix B.
[21] See Appendix A.
[22] The minimum value is 0.2309468822.
[23] See for instance Hall and Jones (1998).

4. Econometric Analysis

In this section, we empirically investigate the importance of economic institutions for the pattern of economic growth. The analysis takes into account eighteen years, from 1991 to 2008, and fifteen countries. Economic institutions, as said in the previous section, are estimated by a composite index built from the EBRD indicators, while the economic performance is measured by GDP. Purchasing power parity per capita GDP (constant 2005 international $) values are taken from the World Development Indicators database.
However, before starting with an in-depth econometric analysis, let us first proceed with a graphical examination in order to have a better understanding of the path of the economic performance of these countries.
The next graph (Figure 3) shows the path of the values of GDP, expressed in logarithmic terms. In the years immediately after 1991, all countries experienced a "fall".

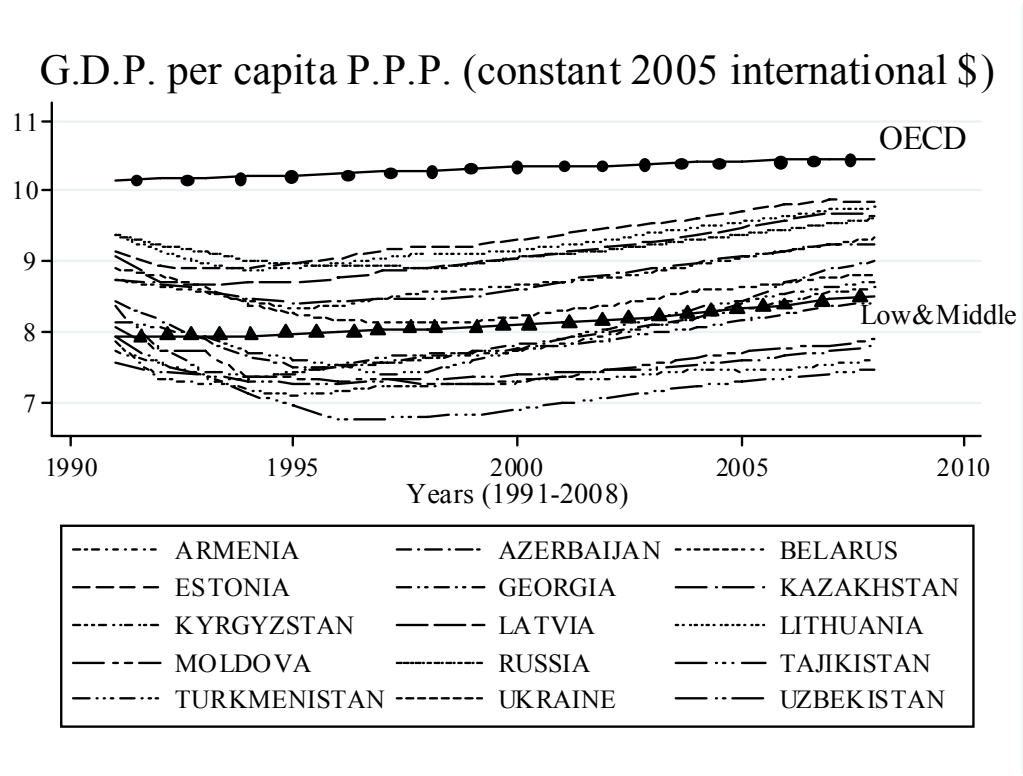

Figure 3: Pattern of Economic Performance in FSU countries (1991-2008)

This fall for some of them lasts till 1996, for some others until 2000. Among the first group there are Armenia (1994), Azerbaijan (1996), Belarus (1996), Estonia (1994), Georgia (1995), Kazakhstan (1996), Kyrgyzstan (1996), Latvia (1994), Lithuania (1995). Among the second, Moldova (2000), Russia (1997), Tajikistan (1998), Turkmenistan (1998), Ukraine (1999), Uzbekistan (1997). The reasons underlying this fall can be found in the "feeling" of confusion, uncertainty, and disruption that followed the breakdown. Numerous economic relationships, enforced by the coercive power of the central planner, didn't exist anymore.
Referring to the all time horizon, three points stand out. The first one, maybe more "expected", is that we can distinguish among countries looking at their GDP values starting from 2004. Estonia, Latvia, Lithuania, and Russia, show values (in logarithmic terms) greater than 9; Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Turkmenistan, Ukraine show values between 9 and 8; Kyrgyzstan, Moldova, Tajikistan, Uzbekistan values smaller than 8. Second, they all have had low growth rates since the "recovery". Third, there is *path dependence*. The series show a clear

persistence; a sort of "brake", "anchor", with respect of the previous values. This evidence suggests that a dynamic approach is unavoidable. Lastly, to see the world "position" of these countries, the series for the *OECD* countries and the *low and middle* income ones are added. While the distance between the former and the most "prosperous" FSU countries is appreciable, that between the others and the low income ones is not significant. Indeed, Armenia, Azerbaijan, Georgia, Kyrgyzstan, Moldova, Tajikistan, Turkmenistan, Ukraine, Uzbekistan are classified either as lower middle income or as low income countries.[24]
Since our goal is to evaluate the significance of the index of economic institutions for these countries from the breakdown, to establish whether there is any relationship, we perform a simple correlation analysis, according to which, as Figure 4 reveals, there is positive correlation.

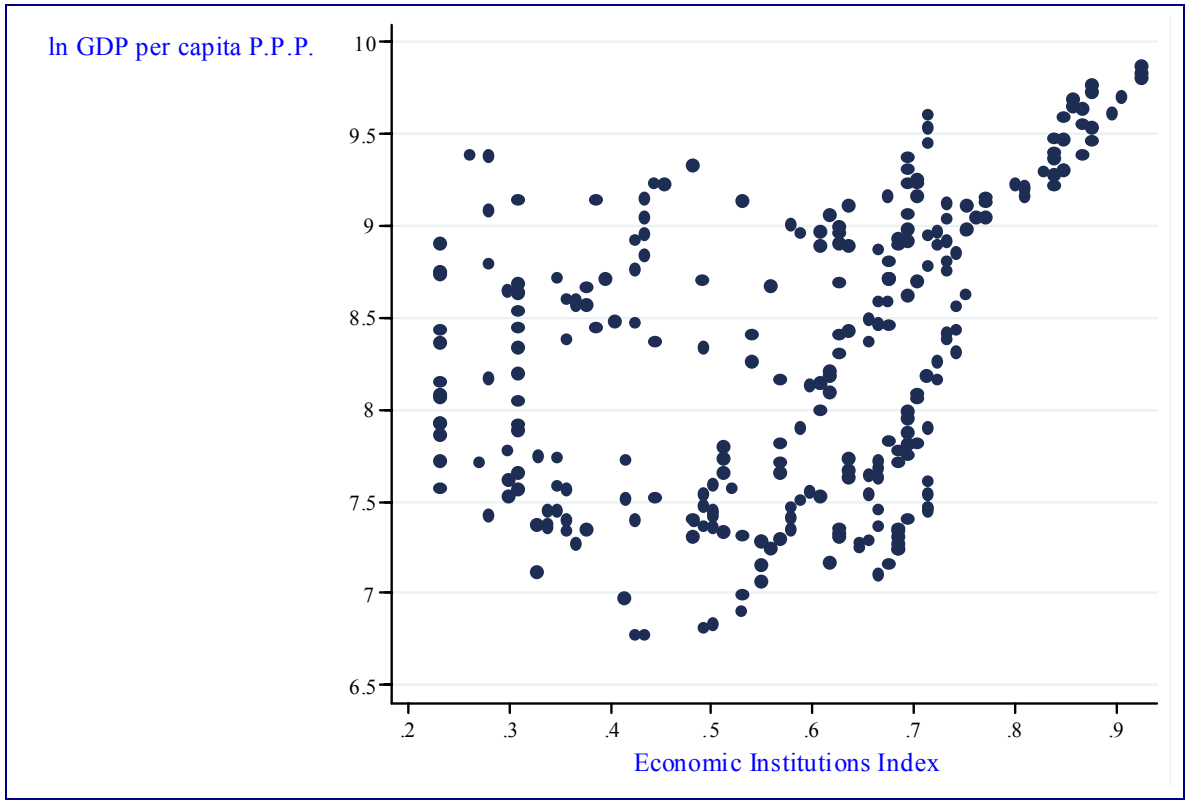

Figure 4. Scatterplot: GDP and Index of Economic Institutions

Although the pattern is clear, this approach is just illustrative and it suffers from several problems. Therefore, to get a more trustworthy picture of this relationship and to see how much of the economic paths of these countries is explained by this specific set of institutions, panel data analysis is needed.

4.1The Static Model

The relationship between the index of economic institutions and per capita GDP is first studied via a static approach. For estimation, the sample consists of the fifteen Former Soviet Union countries observed for the period 1991-2008. Our specification sees purchasing power parity per capita GDP as the dependent variable and the index of economic institutions as the independent one.
Because of the complexity of our task, we decide not to opt immediately for one estimator and hence a specific value for the coefficient of the index of economic institutions. Rather, to estimate the impact of institutions on per capita GDP, we employ different estimation techniques. Our goal is to study the values taken on by the coefficient of our index, according to the estimation methods

[24] Source: Word Development Indicators Database.

employed, and check whether the econometric results and, more generally, our specification are coherent.

We estimate ordinary least squares, robust ordinary least squares, generalized least squares, and two-way fixed effects regressions. Because the number of periods is reasonable (eighteen years), we create a set of time indicator variables[25] and test for their joined significance. Since the result[26] confirms their importance, time dummies are included in all the estimated regressions, eliminating in this way the bias arising from omitted variables that change over time but are the same across countries.

Table 1. Static specification: OLS and robust OLS regressions

	O.L.S. estimator			***robust O.L.S. estimator***		
	Dependent variable: **ln GDP p.c. PPP**			Dependent variable: **ln GDP p.c. PPP**		
	Coefficient	Std. Error	t	coefficient	Robust Std. Error	t
Ecinst	**2.591427*****	.3060928	**8.47**	**2.591427*****	.320644	**8.08**
yr1991	.8528157***	.2796604	3.05	.8528157***	.2863529	2.98
yr1992	.3586713^{ns}	.2669237	1.34	.3586713^{ns}	.2755491	1.30
yr1993	.0552961^{ns}	.2593582	0.21	.0552961^{ns}	.2561929	0.22
yr1994	-.2370729^{ns}	.2540171	- 0.9	-.2370729^{ns}	.261407	-0.91
yr1995	-.575487**	.2471853	-2.33	-.4889738*	.2555338	-1.91
yr1996	-.575487**	.2471853	-2.33	-.575487**	.252802	-2.28
yr1997	-.5858141**	.2464952	-2.38	-.5858141**	.2519804	-2.32
yr1998	-.5516772**	.2465137	-2.24	-.5516772**	.2637011	-2.09
yr1999	-.519397**	.2464756	-2.11	-.519397**	.2642097	-1.97
yr2000	-.4748083*	.2462068	-1.93	-.4748083*	.2653722	-1.79
yr2001	-.4260136*	.2459166	-1.73	-.4260136^{ns}	.2644729	-1.61
yr2002	-.393655^{ns}	.2456303	-1.60	-.393655^{ns}	.2615521	-1.51
yr2003	-.3217466^{ns}	.2455377	-1.31	-.3217466^{ns}	.259823	-1.24
yr2004	-.2495684^{ns}	.2454606	-1.02	-.2495684^{ns}	.2629304	-0.95
yr2005	-.1909303^{ns}	.2453656	-0.78	-.1909303^{ns}	.2665882	-0.72
yr2006	-.1081765^{ns}	.2453366	-0.44	-.1081765^{ns}	.2691487	-0.40
yr2007	-.0274037^{ns}	.2453197	-0.11	-.0274037^{ns}	.2708409	-0.10
constant	7.018683***	.2716897	25.83	7.018683***	.3027604	23.18
N = 270				N = 270		
F (18, 251) = 6.39 (Prob>F = 0.0000)				F(18, 251) = 7.37 (Prob>F = 0.0000)		
R-squared = 0.3142				R-squared = 0.3142		

The dependent variable is GDP per capita, PPP (constant 2005 international $), expressed in logarithmic terms. Superscripts */**/*** denote 10, 5, and 1 percent significance levels. Superscript ^{ns} the absence of significance. Time dummies are included.

Our strategy is to start from the basic and simplest estimator, the OLS one, and little by little to introduce additional complexities. This "regression order" is not casual: it is demanded by the particular structure of our panel dataset and by its statistical "flaws".

Indeed, the assumptions of cross-sectional independence, homoskedasticity, and no serial correlation in the idiosyncratic errors are violated. Both the Pesaran test[27] and Friedman test[28] reject the assumption that the error terms are independent across cross-sections; a Wald test[29] rejects the

[25] Once time effects are generated, they are transformed into centred indicators by subtracting the indicator for the excluded class from each of the other indicator variables. This transformation (see C. F. Baum 2006) expresses the time effects as variations from the conditional mean of the sample rather than deviations from the excluded class (2008).

[26] F(17, 237) = 44.28, Pr= 0.0000

[27] The Pesaran's statistic follows a standard normal distribution. Pesaran's test = 34.437, Pr = 0.000.

[28] The Friedman test uses Friedman's chi-square distributed statistic. Friedman's test = 206.294, Pr = 0.0000

[29] Chi2(15)=133.40, Pr=0.0000

assumption that the error variances are not specific to cross sectional units; and the Wooldridge[30] test rejects the null of no first-order autocorrelation[31].
The results of the OLS and robust OLS regressions are shown in Table 1. The first column lists the regressors, that is, our index *ecinst*, the year dummies and the usual constant term. The first row highlights the estimation strategy employed; the second row, the dependent variable; the third, the estimated coefficients, their standard errors and the t statistic. At the bottom, the number of observations, the F test and a measure of fit are displayed. The OLS estimate of the coefficient of the index of economic institutions, *ecinst,* shows a positive and highly statistically significant effect on the dependent variable. The same happens when we use the Huber-White *sandwich* estimator and obtain standard errors robust to conditionally heteroskedasticity. The GLS regression results can be seen in Table 2. Being aware of the violated assumptions and the results of the tests, we

Table 2. Static Specification: Two-way fixed effects and GLS regressions

G.L.S. estimator				***Two-way fixed effects estimator***		
Dependent variable: **ln GDP p.c P.P.P.**				Dependent variable: **ln GDP p.c. P.P.P.**		
	Coefficient	Std. Error	t	Coefficient	Std. Error	T
Ecinst	**.1276254*** **	**.0364279**	**3.50**	**.5041996*** **	**.1831759**	**2.75**
yr1991	-.3011713***	.0167966	-17.93	-.062897ns	.0985398	-0.64
yr1992	-.5578467***	.0133562	-41.77	-.3588432***	.0849528	-4.22
yr1993	-.6890479***	.0109436	-62.96	-.5188923***	.0760992	-6.82
yr1994	-.8329875***	.0088518	-94.10	-.6867346***	.0693478	-9.90
yr1995	-.8779468***	.0056481	-155.44	-.7658246***	.0619851	-12.35
yr1996	-.8790633***	.0043535	-201.92	-.7828037***	.059857	-13.08
yr1997	-.8353863***	.0035745	-233.71	-.7505508***	.058829	-12.76
yr1998	-.7991389***	.0035696	-223.87	-.7176993***	.0588568	-12.19
yr1999	-.7592237***	.0035074	-216.46	-.6827679***	.0587996	-11.61
yr2000	-.6867112***	.0030962	-221.79	-.6180943***	.0583948	-10.58
yr2001	-.6034978***	.002574	-234.46	-.543872***	.0579553	-9.38
yr2002	-.5281***	.0019372	-272.60	-.4793775***	.0575189	-8.33
yr2003	-.4353828***	.0016387	-265.70	-.3940926***	.0573772	-6.87
yr2004	-.3423423***	.0013527	-253.08	-.3084976***	.0572589	-5.39
yr2005	-.2516679***	.0008748	-287.70	-.2270431***	.0571128	-3.98
yr2006	-.1507282***	.0006148	-245.18	-.1335237**	.0570682	-2.34
yr2007	-.0532458***	.0003724	-142.98	-.0434315ns	.0570422	-0.76
constant	8.914367***	.0258778	344.48	8.444594***	.1314746	64.23
N = 270				N = 270		
Wald chi2(18)=8531049(Prob >chi2 =0.0000)				F(18, 237) = 44.95 (Prob >F=0.0000)		
-				within R-squared = 0.7735		

The dependent variable is GDP per capita, PPP (constant 2005 international $), expressed in logarithmic terms. Superscripts */**/*** denote 10, 5, and 1 percent significance levels. Superscript ns absence of significance. Time dummies are included.

estimate specifying heteroskedastic error structure with cross-sectional correlation and within panels specific AR(1) correlation. This estimation strategy, explicitly handling those "flaws", still shows a positive and significant (less significant than previous cases of Table 1) impact of our index on per capita GDP.
Although time dummies have been included as explanatory variables, the model could suffer from omitted variables bias. Because we are dealing with a close set (namely, a set of countries), our a priori knowledge suggests we might allow for an intercept coefficient that varies both by unit and

[30] Wooldridge, J. M. (2002). *Econometric Analysis of Cross Section and Panel Data.*
[31] F(1,14) = 291.734, Pr= 0.0000

by time, thus controlling the bias that arises both from unobserved variables that are constant over time and from unobserved variables that are constant across countries. To see if our propensity for the fixed effects specification is reasonable according to the data, we implement the Hausman test, whose result, as expected, is the rejection of the null hypothesis[32]: the country-level effects appear to be correlated with the regressors. Therefore, our specification becomes:

$$\text{gdppcppp}_{i,t} = \alpha + \beta \text{ecinst}_{i,t} + \varphi_i + \psi_t + \varepsilon_{i,t} \qquad \textbf{(1)}$$

where $\varepsilon_{i,t}$ are the idiosyncratic errors, while φ_i and ψ_t captures the country fixed effects and the time effects, respectively.

Tabella 3. Static Specification:
Two-way fixed effects regression with Driscoll-Kraay covariance estimator

Two-way fixed effects estimator with Driscoll-Kraay Standard Errors

Dependent variable: **Ln GDP p.c. P.P.P.**

	coefficient	Discroll-Kraay Std. Error	t	P>|t|	[95% Conf. Interval]	
Ecinst	**.5041996**	**.0876637**	**5.75**	**0.000**	.3161797	.6922194
yr1991	-.062897	.03846	-1.64	0.124	-.1453855	.0195914
yr1992	-.3588432	.0301356	-11.91	0.000	-.4234777	-.2942087
yr1993	-.5188923	.0241159	-21.52	0.000	-.5706158	-.4671687
yr1994	-.6867346	.0188858	-36.36	0.000	-.7272407	-.6462286
yr1995	-.7658246	.0116277	-65.86	0.000	-.7907637	-.7408856
yr1996	-.7828037	.0087073	-89.90	0.000	-.8014791	-.7641284
yr1997	-.7505508	.0069189	-108.48	0.000	-.7653905	-.7357111
yr1998	-.7176993	.0069729	-102.93	0.000	-.7326548	-.7027439
yr1999	-.6827679	.0068616	-99.51	0.000	-.6974846	-.6680513
yr2000	-.6180943	.006018	-102.71	0.000	-.6310017	-.6051869
yr2001	-.543872	.0049501	-109.87	0.000	-.5544889	-.5332552
yr2002	-.4793775	.0036004	-133.15	0.000	-.4870995	-.4716556
yr2003	-.3940926	.0030385	-129.70	0.000	-.4006096	-.3875756
yr2004	-.3084976	.002475	-124.64	0.000	-.313806	-.3031892
yr2005	-.2270431	.0015167	-149.69	0.000	-.2302961	-.22379
yr2006	-.1335237	.0010646	-125.42	0.000	-.135807	-.1312404
yr2007	-.0434315	.0006732	-64.52	0.000	-.0448753	-.0419877
constant	8.444594	.0598883	141.01	0.000	8.316146	8.573041

N = 270

F(18, 14) = 33.08 (Prob > F = 0.0000)

within R-squared = 0.7735

The dependent variable is GDP per capita, PPP (constant 2005 international $), expressed in logarithmic terms.

Given the incontrovertible significance of the individual effects[33] (and of the time dummies, as seen before), we estimate the two-way fixed effects regression for (1). The estimates are displayed in Table 2, where the index *ecinst*, another time, exhibits a positive and statistically significant impact on the path of economic performance. But even if we have eliminated the bias by introducing country and time dummies, the serious problem is that these estimates (the ones in table 2) are not completely reliable because of the flaws of the error structure. Driscoll and Kraay[34] (1998) have developed a covariance estimator that allows to consider an error structure heteroskedastic,

[32] chi2(1) = 10.53, Prob>chi2 = 0.0012

[33] F test that all φ_i=0: F(14, 237) = 314.85, Prob > F = 0.0000

[34] Driscoll, John C. and Aart C. Kraay (1998), *Consistent Covariance Matrix Estimation with Spatially Dependent Panel Data*, Review of Economics and Statistics 80, 549-560.

autocorrelated (up to some lag), and correlated between the panels. The estimates obtained by employing this method are given in Table 3: the standard errors now are robust to forms of cross-sectional ("spatial") and temporal dependence. The effect of *ecinst* on per capita GDP is 0.5041996: the variable of interest is confirmed to be statistically significant and affect positively the path of economic growth.
Our hypothesis, that the "state" of economic institutions affects the economic outcomes, is proved: economic institutions have an annual impact on the level of per capita GDP. The methodology followed testifies that the static specification is on the whole coherent. It also allows to study the behaviour of the coefficient associated with *ecinst* and the values it takes on according to the different estimators used. The first two strategies, the OLS and GLS ones, assess a maximum and a minimum value, 2.591427 and 0.1276254 respectively, that can be thought as benchmarks. The robust two-way within estimator, eliminating the sources of bias and considering the features of the error structure, is able to "locate" it between them. That's the reason, the coefficient estimated, 0.5041996, properly quantifies the impact of institutions.

4.2The Dynamic Specification

An evidence the static specification does not consider is the persistence of the GDP values, as revealed by the patterns shown in Figure 3. This persistence, called *path-dependence*, means that history matters and calls for a dynamic approach.
The first task faced in developing a dynamic model is the choice of the lags of the dependent variable, about which we estimate robust OLS regressions for:

$$gdppcppp_{i,t} = \alpha + \beta gdppcPPP_{i,t-s} + \varepsilon_{i,t} \quad \text{with } i = 1,\ldots,15;\ t = 1991,\ldots, 2008;\ s = 1, 2, 3. \qquad (3)$$

Table 4. AR(1), AR(2), AR(3) Models

	OLS Robust Estimator		
	Dependent Variable: **Ln GDP p.c. PPP**		
Ln GDP p.c. PPP_{t-1}	**1.012159***** (.0074255) (136.31)	**1.586798***** (.0560543) (28.31)	**1.569504***** (.1331366) (11.79)
Ln GDP p.c. PPP_{t-2}		**-.5903984***** (.0564441) (-10.46)	**-.4868536**** (.241396) (-2.02)
Ln GDP p.c. PPP_{t-3}			**-.0882809**^{ns} (.1156588) (-0.76)
constant	-.0836543^{ns} (.0622867) (-1.34)	.0541888^{ns} (.035985) (1.51)	.0707839** (.0320953) (2.21)
N	255	240	225
R-squared	0.9780	0.9944	0.9955
F test	F(1, 253)= 18580.05 (Prob > F = 0.0000)	F(2, 237)= 27590.18 (Prob > F = 0.0000)	F(3, 221)= 22516.00 (Prob > F = 0.0000)

The dependent variable is GDP per capita, PPP (constant 2005 international $), expressed in logarithmic terms.
Superscripts */**/*** denote 10, 5, and 1 percent significance levels. Superscript ^{ns} absence of significance.
From above, the number in parenthesis are robust standard errors and t values.

Looking at the results in Table 4, where per capita GDP is regressed on its past values, the magnitude and the significance of the coefficients of the lagged dependent variable establish the AR(2) model as our benchmark. Usually, an AR(1) model is supposed to have a coefficient associated with the lagged dependent variable smaller than one. The particular structure of our panel dataset, instead, requires to include two lags, to reduce the temporal persistence. In particular, it is worth noting that the overall dynamic effect is less than one.
Having determined the number of lags, in order to quantify the importance of institutions for the economic paths of the Former Soviet Union economies, we methodologically follow a strategy similar to the one before. We estimate robust OLS, robust one-way Fixed Effects and Arellano-Bond GMM regressions for:

$$\text{gdppcppp}_{i,t} = \alpha + \beta\text{gdppcppp}_{i,t-1} + \gamma\text{gdppcppp}_{i,t-2} + \delta\text{ecinst}_{i,t} + \varphi_i + \varepsilon_{i,t} \qquad \textbf{(3)}$$

where φ_i are the country specific fixed effects and i = 1,…15; t = 1991,…,2008.

Table 5. Dynamic Specification: Robust O.L.S. and Robust LSDV Regressions

	O.L.S. Robust Estimator			***One-way Fixed Effects Robust Estimator***		
	Dependent variable: **Ln GDP p.c. PPP**			Dependent variable: **Ln GDP p.c. PPP**		
	coefficient	Robust Std. Error	t	coefficient	Robust Std. Error	t
$\text{LnGDPp.c.PPP}_{t-1}$	**1.551684*****	.0571826	27.14	**1.401749*****	.1204193	11.64
$\text{LnGDPp.c.PPP}_{t-2}$	**-.5609012*****	.0568499	-9.87	**-.4620541*****	.1155239	-4.00
Ecinst	**.0700338****	.030883	2.27	**.3043575****	.122829	2.48
constant	.0584146^{ns}	.0362379	1.61	.3386539***	.093506	3.62
N = 240				N = 240		
F(3, 236) =18176.88 (Prob > F = 0.0000)				F(3, 14) =2678.94 (Prob > F = 0.0000)		
R-squared = 0.9946				within R-squared = 0.9685		

The dependent variable is GDP per capita, PPP (constant 2005 international $), expressed in logarithmic terms. Superscripts */**/*** denote 10, 5, and 1 percent significance levels. Superscript ^{ns} absence of significance.

The regression results with the simple robust OLS and LSDV estimators are shown above. Theoretically, with dynamic panel data model, these estimators are acknowledged to give seriously biased estimates for the coefficients of the lagged dependent variable. Precisely, the OLS estimator gives upwardly biased estimates; the FE estimator downwardly biased ones. Consequently, the "true" overall dynamic effect (namely, the sum of the coefficients of the lagged dependent variable) should lie between the OLS and FE estimates, between 0.9907829 and 0.9396949 respectively. Furthermore, Table 5 allows to study the behaviour of the coefficient of the variable *ecinst*: economic institutions affect positively per capita GDP and are significant at five percent level, according to both regressions.
Econometrically, the dynamic specification is made especially needed by the presence of autocorrelation, strongly documented by the OLS AR(1) model (Table 4). However, the bias in the estimates above requires the adoption of a GMM estimator that should succeed in "placing" the overall dynamic effect in a halfway point and giving a reliable estimate of the impact of the index of institutions on GDP. As equation (3) points out, time dummies are not included. Because the majority of them loses the significance taken in the static case and the temporal-dynamic feature of

the data may be well "captured" by the Arellano Bond estimator[35], that specification was implemented.
The Arellano-Bond GMM regression results are displayed in Table 6. Because of the dimensional structure of the dataset, the so-called *one-step estimator* is used[36]. Economic institutions are highly statistically significant (at one percent significance level) and still affect positively the economic outcomes. The sum[37] of the estimated coefficients of the lagged dependent variable, 0.9631546, follows the rule to be smaller than the OLS estimate and bigger than the FE one. On the whole, the dynamic effects are well pictured.
The Sargan test of overidentifying restrictions does not reject the null of the validity of instruments.

Table 6. Dynamic Specification: the GMM-Difference Estimator

	Arellano Bond one-step Estimator				
	Dependent variable: **ln GDP p.c. PPP**				
	coefficient	Std. Error	t	P>|t|	[95% Conf. Interval]
$LnGDPp.c.PPP_{t-1}$	**1.397501**	.0490924	28.47	0.000	1.301282 1.49372
$LnGDPp.c.PPP_{t-2}$	**-.4343464**	.0468237	-9.28	0.000	-.5261192 -.3425736
Ecinst	**.3272842**	.0722469	4.53	0.000	.1856829 .4688855
constant	.1318742	.1141592	1.16	0.248	-.0918737 .3556222
Number of observations = 225					
Number of instruments = 136					
Wald chi2 (3) = 7312.34 (Prob > chi2 = 0.0000)					
Sargan test: chi2(132) = 125.076 (Prob > chi2 = 0.6527)					
Arellano-Bond test: Order1 z = -6.4612 (Prob > z = 0.0000) Order2 z = 1.3614 (Prob > z = 0.1734)					

The dependent variable is GDP per capita, PPP (constant 2005 international $), expressed in logarithmic terms.
Wald tests the null that the intercept is the only determinant of growth.

Also the Arellano-Bond test for first and second order autocorrelation in the first-differenced errors[38] is good: the test statistic presents strong evidence against the null hypothesis of zero autocorrelation in the first-differenced errors at order 1 and no evidence of serial correlation in the first-differenced errors at order 2.
Moreover, to avoid the problem of biased estimates, caused by the correlation among lagged dependent variable and individual errors, once the number of instruments increases relative to the number of observations, we restrict the number[39] of lags of the dependent variable to use as instruments. These new estimates are shown in Table 7. The Sargan overidentification test, that is proved to over-reject in presence of heteroskedasticity, suggests that our strategy is valid and the

[35] Arellano, M., and S. Bond (199), *Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations*, Review of Economic Studies, 58, 277-297.
[36] The two-step one, in this case, is not reliable because, by downsizing the standard errors, it would make the regressors more significant.
[37] This sum is smaller than one, as it should be.
[38] When the idiosyncratic errors are independently and identically distributed (i.i.d.), the first-differenced errors are first-order serially correlated. Serial correlation in the first-differenced errors at an order higher than one implies the the moment conditions used are not valid.
[39] Differenced Sargan tests have been implemented to this regard.

same goes for the Arellano Bond test. The overall dynamic effect is correctly assessed: the sum of the estimated coefficients of the lagged dependent variable, 0.964423, follows the empirical rule already explained. The economic institutions, from a dynamic point of view, keep on playing a key role: *ecinst* is statistically significant (at one percent significance level) and affects positively the economic paths.
Thus, also this dynamic approach, justified theoretically by the presence of *path-dependence* and econometrically by the structure of the data, corroborates our hypothesis and turns out to be a necessary and crucial tool in understanding the economic fortunes of the FSU countries.
To be more precise, the economic institutions index encompasses eight dimensions: large and small scale privatisation, governance and enterprise restructuring, competition policy, price liberalisation, foreign exchange and trade liberalisation, banking and non banking reforms. Following E.B.R.D. reports, we subdivide our main index in four sub-indices: *privatisation* (including large and small scale privatisation indicators), *enterprise* (including governance and enterprise restructuring, and competition policy indicators), *liberalisation* (including price liberalisation and, trade and foreign

Table 7. Dynamic Specification: the GMM Difference Estimator with limited instruments

		Arellano Bond Dynamic Estimator			
		Dependent variable: **ln GDP p.c. PPP**			
	coefficient	Std. Error	t	P>|t|	[95% Conf. Interval]
$LnGDPp.c.PPP_{t-1}$	1.368678	.0508154	26.93	0.000	1.269082 1.468275
$LnGDPp.c.PPP_{t-2}$	-.404255	.0483564	-8.36	0.000	-.4990318 -.3094783
Ecinst	**.3912972**	.0743789	5.26	0.000	.2455172 .5370772
constant	.08304	.1141326	0.73	0.467	-.1406559 .3067358
Number of observations = 225					
Number of instruments = 92					
Wald chi2 (3) =7282.37 (Prob > chi2 = 0.0000)					
Sargan test: chi2(88) = 102.9093 (Prob > chi2 = 0.1323)					
Arellano-Bond test: Order1 z = -6.2885 (Prob > z = 0.0000) Order2 z = 1.2609 (Prob > z = 0.2074)					

The dependent variable is GDP per capita, PPP (constant 2005 international $), expressed in logarithmic terms.
Wald tests the null that the intercept is the only determinant of growth.

system indicators) and *financing* (including baking reforms and non-banking financial intermediaries reforms indicators).
As before, the grades for each FSU countries in the years studied are summed and the amount obtained normalized, in order to have sub-indexes that range from 0[40] to 1.

[40] The minimum value is 0.2309468822.

We restrict the number of lags of the dependent variable used as instruments, guided by the Sargan and Differenced Sargan tests, and estimate Arellano-Bond GMM regressions for:

$$gdppcppp_{i,t} = \alpha + \beta gdppcppp_{i,t-1} + \gamma gdppcppp_{i,t-2} + \delta\Theta_{i,t} + \varphi_i + \varepsilon_{i,t} \quad \textbf{(4)}$$

where Θ can alternatively be one of the four sub-indices, φ_i are the country specific fixed effects and i = 1,…15; t = 1991,…,2008.

The regression results are presented below. The sum of the coefficients of the lagged dependent variable is smaller than one in each model, as it should be, and the sub-indices, individually, are highly significant and affect positively the levels of per capita GDP. The output of the Sargan test for each model does not reject the null of the validity of the instruments and also the Arellano-Bond tests give the expected results. On the whole, this validates our estimation strategy.

Tabella 8. Dynamic Specification: the GMM Difference Estimator with limited instruments

	Arellano Bond Dynamic Estimator			
	Dependent variable: **ln GDP p.c. PPP**			
$LnGDPp.c.PPP_{t-1}$	1.357115***	1.477799***	1.441392***	1.434281***
	(.0543265)	(.0439161)	(.0424522)	(.0490287)
$LnGDPp.c.PPP_{t-2}$	-.3812476***	-.5064616***	-.4606548***	-.4847458***
	(.0534041)	(.0423482)	(.042988)	(.0436143)
Privatisation	**.2936973*** **			
	(.0596267)			
Enterprise		**.2972566*** **		
		(.0860172)		
Liberalisation			**.2442072*** **	
			(.0524514)	
Financing				**.2803233*** **
				(.0720104)
constant	.0227309ns	.1256079ns	-.009827ns	.3085015ns
	(.1149209)	(.1223151)	(.120155)	(.1271695)
Number of observations	225	225	225	225
Number of instruments	101	101	101	101
Wald chi2 test	Wald chi2(3)=7402.29 (Prob > chi2 = 0.0000)	Wald chi2(3)=6281.03 (Prob > chi2 = 0.0000)	Wald chi2(3)=7032.69 (Prob > chi2 = 0.0000)	Wald chi2(3)=6514.89 (Prob > chi2 = 0.0000)
Sargan test	chi2(97) = 113.37 (Prob > chi2= 0.1226)	chi2(97) = 107.9349 (Prob > chi2 = 0.2105)	chi2(97) = 113.031 (Prob > chi2 = 0.1271)	chi2(97) = 108.9009 (Prob > chi2 = 0.1924)
Arellano-Bond test:	Order1 z = -6.1543 (Prob > z = 0.0000) Order2 z =1.0702 (Prob > z = 0.2845)	Order1 z = -6.5171 (Prob > z = 0.0000) Order2 = 1.5359 (Prob > z = 0.1246)	Order1 = -6.245 (Prob > z = 0.0000) Order2 = 1.42 (Prob > z = 0.1556)	Order1 = -6.3139 (Prob > z = 0.0000) Order2 = 1.4499 (Prob > z = 0.1471)

The dependent variable is GDP per capita, PPP (constant 2005 international $), expressed in logarithmic terms.
Superscripts */**/*** denote 10, 5, and 1 percent significance levels. Superscript ns absence of significance.
The number in parenthesis are standard errors. Wald tests the null that the intercept is the only determinant of growth.

4. The Robustness Analysis

With the purpose to look at a precise sphere of the institutional environment, we have hypothesized that the institutions more related to economic activity, in the sense of being concretely its supporting framework, matter and do affect the pattern of growth of the former Soviet Republics throughout a period of eighteen years and not simply in the first years after the USSR collapse. This hypothesis has been borne out by the results of the previous sections: their importance, through different equation models and estimation strategies, is never doubted.

In this section, we broaden our vision and consider other variables that are typically supposed to influence economic growth. The goal is to discover which of these other dimensions are noteworthy in shaping the development path and test, at the same time, whether the magnitude and the significance of the economic institutions index hold[41]. The covariates added are macroeconomic variables, "geographical" variables, "historical" variables, human capital variables and variables related to the kind of economic activity. More specifically, we include the net inflows of foreign direct investment, the inflation rates, the gross capital formation variable and the degree of openness, as variables describing the macroeconomic conditions; the share of land area that can be defined as agricultural, arable or forest area, as physical variables affecting the "material" conditions; dummies for intra-state wars and terrorism episodes, labelled as historical by virtue of the knowledge required for setting them; human capital proxies, as determinants of economic growth; sector-based kinds of economic activity, as variables describing the country's productive specialization.

Formally, referring to the dynamic specification due to the conceptual (*path-dependence*) and empirical importance (particular structure of our panel dataset) of the lagged dependent values, our specification becomes:

$$\text{gdppcppp}_{i,t} = \alpha + \beta\text{gdppcppp}_{i,t-1} + \gamma\text{gdppcppp}_{i,t-2} + \delta\text{ecinst} + \lambda\Xi_{i,t} + \varphi_i + \varepsilon_{i,t} \qquad \textbf{(5)}$$

where Ξ can alternatively be one of the control variables considered, φ_i are the country specific fixed effects and i =1,...,15. The additional covariates, as it will appear, are included one at a time because the lack of observations for these economies has obliged to consider different time horizons.

Let us start with the first set of control variables, whose estimate results are shown in Table 9.

[41] See for example Acemoglu, Johnson and Robinson (2002, 2005), Acemoglu and Johnson (2004), Easterly (2007), Knack and Keefer (1995), Rodrik (1999, 2002).

Table 9. Robustness Analysis: Inflation, F.D.I., and Capital Formation

Arellano Bond Dynamic Estimator

	Dependent variable: **ln GDP p.c. PPP**			
$LnGDPp.c.PPP_{t-1}$	1.365091***	1.372735***	1.374956***	1.380637***
	(.0502467)	(.0546296)	(.0518772)	(.054154)
$LnGDPp.c.PPP_{t-2}$	-.4101962***	-.384727***	-.4041972***	-.4024089***
	(.0479105)	(.05137)	(.0499393)	(.0525571)
Ecinst	**.4628903*** **	**.4509793*** **	**.3506705*** **	**.4434143*** **
	(.0809216)	(.0843776)	(.0771395)	(.0880123)
Inflation[42]	.000926**			.0009256**
	(.0004076)			(.0004177)
F.D.I. net inflows[43]		-.0295507ns		-.0202134ns
		(.0998475)		(.104114)
Gross Capital Formation[44]			.0716569ns	.0580179ns
			(.076273)	(.0905274)
constant	.1155031ns	-.1428331ns	.0375516ns	-.0770704ns
	(.1132781)	(.1349445)	(.1304818)	(.1468356)
Number of observations	225	209	216	204
Number of instruments	102	67	102	96
Wald chi2 test	chi2(4)= 7358.11 (Prob > chi2 = 0.0000)	chi2(4)= 6376.79 (Prob > chi2 = 0.0000)	chi2(4)= 6376.79 (Prob > chi2 = 0.0000)	chi2(6)=5184.24 (Prob>chi2=0.0000)
Sargan test	chi2(97)=113.3415 (Prob>chi2=0.1229)	chi2(62)=74.93112 (Prob>chi2 =0.1255)	chi2(97)=115.3121 (Prob>chi2 = 0.0990)	chi2(89)=105.794 (Prob>chi2=0.1081)
Arellano-Bond test:	Order1 z = -6.2149 (Prob > z = 0.0000) Order2 z = 1.1668 (Prob > z = 0.2433)	Order1 z = -6.0611 (Prob > z = 0.0000) Order2 = 1.1998 (Prob > z = 0.2302)	Order1 = -6.1902 (Prob > z = 0.0000) Order2 = 1.4784 (Prob > z = 0.1393)	Order1 = -5.9583 (Prob > z =0.0000) Order2 = 1.3737 (Prob >z = 0.1695)

The dependent variable is GDP per capita, PPP (constant 2005 international $), expressed in logarithmic terms.
Superscripts */**/*** denote 10, 5, and 1 percent significance levels. Superscript ns absence of significance.
The number in parenthesis are standard errors. Wald tests the null that the intercept is the only determinant of growth.

[42] Data source: World Economic Outlook Database, International Monetary Fund.
[43] Data source: World Development Indicators. Data are expressed as percentage of GDP.
[44] Data source: World Development Indicators. Data are expressed as percentage of GDP.

The first column of the regression results shows *inflation* and *ecinst* as regressors. Inflation, defined as the annual percent change of the average consumer prices, is positive and statistically significant at 5% level. If the evolution of inflation had followed a "spiral-shaped" pattern, the level of consumption would have fallen and the growth patterns have shown a fall for all the time observed. Actually, this is not what data say (Figure 3). Though there has been a hyperinflation period, that for some countries (Estonia and Latvia) ended before (1994) while for others later (1996, 1997), the estimate result is coherent with a "stable" evolution of prices. The magnitude and significance of the index of institutions is not affected by adding the inflation covariate, and the overall dynamic effect is less than one. The net inflows of investment to acquire a lasting management interest in an enterprise operating in one of these countries (second column of the regression results[45]) are not statistically significant. Net inflows mean that the figures used are inflows minus outflows of money and negative numbers that outflows of investment (or reinvestment of profits outside the country) exceed inflows. Accordingly to the stage of development of these countries, except the 2006 and 2007 values of Azerbaijan, the 2000 value for Kyrgyzstan and the 1995 values of Uzbekistan, the figures are predominantly positive. Nevertheless, the negative sign of the estimated coefficient allows to think that FDI has not produced positive externalities or spillovers and has not spurred economic growth. Our index of economic institutions is still highly statistically significant and affects positively the level of GDP; also the overall dynamic effect behaves properly. The third regression[46] of Table 9 sees gross capital formation as additional explanatory variable. It consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories[47]. This covariate exhibits, as expected, a positive sign although its impact on the path of economic growth is not statistically significant. Also in this case, *ecinst* is confirmed to be of crucial importance and, as it should be, the sum of the coefficients of the lagged dependent variable is smaller than one. Econometrically, as done before, to avoid the problem of biased estimates, we restrict the number[48] of lags of the dependent variable to use as instruments. The bottom rows show the output of the Sargan and Arellano-Bond tests, which suggest the validity of our estimation strategy. The last regression includes all the four covariates. Magnitude, signs and significance are maintained: it is economic institutions which drive economic growth.

Our second set of covariates is about the degree of openness, which is another dimension of particular importance for these economies. As already said, till 1991, trade was carried out by a centralized organization, the Council for Mutual Economic Assistance (CMEA).

Having assessed the importance of dismantling the centralized organization that bore upon trade, captured by the *ecinst* index and the *liberalisation* sub-index, the focus here is to understand whether the extents of the foreign exchanges affect economic growth paths.

[45]The panel is un-balanced over the 1991-2008 period. The results are confirmed when we reduce the time horizon (1994-2007) and make the panel balanced.

[46] The panel is un-balanced over the 1991-2008 period but it lacks a few observations. When we adjust to make it balanced, the number of observations decreases so much that the dynamic approach cannot be adopted.

[47] Fixed assets include land improvements; plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. Inventories are stocks of goods held by firms to meet temporary or unexpected fluctuations in production or sales, and "work in progress." (World Bank national accounts data)

[48] Differenced Sargan tests have been implemented to this regard.

The estimation results are displayed in Table 10[49]. First, we add as regressor, beside our index, the *openness* variable. This variable, quantifying total trade and defined as the sum of exports[50] plus imports[51] divided by GDP, affects positively, with statistical significance, the dependent variable.

Table 10. Robustness Analysis: Degree of Openness

	Arellano Bond Dynamic Estimator		
	Dependent variable: **ln GDP p.c. PPP**		
$LnGDPp.c.PPP_{t-1}$	1.355749***	1.346699***	1.374738***
	(.0518862)	(.0519297)	(.05145)
$LnGDPp.c.PPP_{t-2}$	-.3873889***	-.3816808***	-.401903***
	(.0491977)	(.0490689)	(.0488666)
Ecinst	**.4407337*** **	**.452954*** **	**.4045259*** **
	(.0761088)	(.0761131)	(.0753049)
Openness[52]	.0603472**		
	(.0235934)		
Exports[53]		.1205051***	
		(.0433142)	
Imports[54]			.0753331*
			(.0407135)
constant	-.0382932ns	-.0131561ns	-.0336032ns
	(.1179417)	(.1162677)	(.1200582)
No. observations	222	222	222
No. of instruments	72	72	83
Wald chi2 test	Wald chi2(4)= 7053.49 (Prob > chi2 = 0.0000)	Wald chi2(4)= 7130.75 (Prob > chi2 = 0.0000)	Wald chi2(4)= 6950.66 (Prob > chi2 = 0.0000)
Sargan test	chi2(67) = 82.68574 (Prob > chi2= 0.0937)	chi2(67) = 81.87192 (Prob > chi2 = 0.1044)	chi2(78) = 90.6571 (Prob > chi2 =0.1548)
Arellano-Bond test:	Order1 z = -6.058 (Prob > z = 0.0000) Order2 z = 1.449 (Prob > z = 0.1473)	Order1 z = -6.0391 (Prob > z = 0.0000) Order2 = 1.3372 (Prob > z = 0.1812)	Order1 = -6.2352 (Prob > z = 0.0000) Order2 = 1.4843 (Prob > z = 0.1377)

The dependent variable is GDP per capita, PPP (constant 2005 international $), expressed in logarithmic terms.
Superscripts */**/*** denote 10, 5, and 1 percent significance levels. Superscript ns absence of significance.
The number in parenthesis are standard errors. Wald tests the null that the intercept is the only determinant of growth.

[49] The panel models are unbalanced over the 1991-2008 period. To make it balanced, the time horizon is reduced to 1993-2007 and the results are confirmed.

[50] Exports of goods and services represent the value of all goods and other market services provided to the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude labor and property income (formerly called factor services) as well as transfer payments. (World Bank National Accounts Data)

[51] Imports of goods and services represent the value of all goods and other market services received from the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude labor and property income (formerly called factor services) as well as transfer payments. (World Bank National Accounts Data)

[52] Author's calculation. Data are from World Development Indicators Database and expressed in current US $.

[53] Author's calculation. Data are from World Development Indicators Database and expressed in current US $.

[54] Author's calculation. Data are from World Development Indicators Database and expressed in current US $.

The other two regressions study disjointedly the impact of exports and imports. Indeed, we break the *openness* indicator to obtain an *exports* indicator, defined as exports divided by GDP, and an *imports* indicator, symmetrically defined. Their estimated coefficients are both positive, but *exports* variable is more statistically significant. Our "core" variable continues to be highly significant and keep its magnitude. As before, the number[55] of lags of the dependent variable to use as instruments have been restricted; the Sargan test and the Arellano-Bond one give the expected results. Of course, this analysis does not make any distinction between trade partners. From the economic policy point of view, taking into account their composition and see how much of the FSU economies trade relationships is still "internal" would have interesting implications.
The following table shows another set of additional explanatory variables.

Table 11. Robustness Analysis: Geographical Variables.

	Arellano Bond Dynamic Estimator		
	Dependent variable: **ln GDP p.c. PPP**		
$LnGDPp.c.PPP_{t-1}$	1.391676***	1.387271***	1.364421***
	(.0652541)	(.064499)	(.0676443)
$LnGDPp.c.PPP_{t-2}$	-.4373149***	-.4306972***	-.4220958***
	(.0614932)	(.0609544)	(.0617366)
Ecinst	**.6307655*** **	**.6490633*** **	**.6172301*** **
	(.0979054)	(.0985762)	(.0931882)
Agricultural Land[56]	.0440025ns		
	(.2861044)		
Arable Land[57]		.1329882ns	
		(.2436606)	
Forest Area[58]			2.108469ns
			(1.880511)
constant	-.0053456ns	-.0395487ns	-.3427743ns
	(.283797)	(.2277809)	(.3687031)
Number of observations	165	165	165
Number of instruments	35	35	35
Wald chi2 test	Wald chi2(4)= 3261.85 (Prob > chi2 = 0.0000)	Wald chi2(4)= 3293.73 (Prob > chi2 = 0.0000)	Wald chi2(4)= 3386.05 (Prob > chi2 = 0.0000)
Sargan test	chi2(30) = 34.65451 (Prob > chi2=0.2554)	chi2(30) = 37.39681 (Prob > chi2 = 0.1659)	chi2(30) = 33.00778 (Prob > chi2 = 0.3222)
Arellano-Bond test:	Order1 z = -4.1324 (Prob > z = 0.0000) Order2 z = .46552 (Prob > z = 0.6416)	Order1 z = -4.0798 (Prob > z = 0.0000) Order2 = .4351 (Prob > z = 0.6635)	Order1 = -4.1456 (Prob > z = 0.0000) Order2 = .44683 (Prob > z = 0.6550)

The dependent variable is GDP per capita, PPP (constant 2005 international $), expressed in logarithmic terms.
Superscripts */**/*** denote 10, 5, and 1 percent significance levels. Superscript ns absence of significance.
The number in parenthesis are standard errors. Wald tests the null that the intercept is the only determinant of growth.

[55] Differenced Sargan tests have been implemented to this regard.
[56] Data source: World Development Indicators. Data are expressed as percentage of land area.
[57] Data source: World Development Indicators. Data are expressed as percentage of land area.
[58] Data source: World Development Indicators. Data are expressed as percentage of land area.

Cross-country studies of the link between development and institutions include (for example, see Easterly, Rodrik, and Acemoglu, Johnson and Robinson) geographical variables, such as the distance from equator, *latitude*, or a dummy variable denoting if the country is landlocked. Because these features are constant over time and the associated variables cannot be used in panel models, we look for geographical variables with a certain degree of variability. These variables are those displayed in first column of Table 11[59]. *Agricultural Land*, *Arable Land* and *Forest Area* are not statistically significant, although their estimated coefficients are positive, and their inclusion does not change the significance and the impact of economic institutions on GDP. From the econometrical point of view, the output tests in the bottom rows validate the strategy followed.

Table 12. Robustness Analysis: Historical Variables

	Arellano Bond Dynamic Estimator	
	Dependent variable: **ln GDP p.c. PPP**	
$LnGDPp.c.PPP_{t-1}$	1.376555^{***}	1.367119^{***}
	(.0524128)	(.0638622)
$LnGDPp.c.PPP_{t-2}$	$-.4145408^{***}$	$-.3879474^{***}$
	(.0508506)	(.0595717)
Ecinst	**$.3943806^{***}$**	**$.4144171^{***}$**
	(.0752938)	(.0864238)
War[60]	$.0167024^{ns}$	
	(.0248271)	
Terrorism[61]		$-.0228594^{**}$
		(.0095845)
constant	$.0992613^{ns}$	$-.0470645^{ns}$
	(.1170636)	(.1531778)
Number of observations	225	196
Number of instruments	93	44
Wald chi2 test	Wald chi2(4)= 7160.63 (Prob > chi2 = 0.0000)	Wald chi2(4)= 4851.40 (Prob > chi2 = 0.0000)
Sargan test	chi2(88) = 101.7571 (Prob > chi2=0.1499)	chi2(39) = 43.8392 (Prob > chi2 = 0.2737)
Arellano-Bond test:	Order1 z = -6.2709 (Prob > z = 0.0000) Order2 z = 1.322 (Prob > z = 0.1862)	Order1 z = -5.7054 (Prob > z = 0.0000) Order2 =1.2001 (Prob > z = 0.2301)

The dependent variable is GDP per capita, PPP (constant 2005 international $), expressed in logarithmic terms.
Superscripts */**/*** denote 10, 5, and 1 percent significance levels. Superscript ^{ns} absence of significance.
The number in parenthesis are standard errors. Wald tests the null that the intercept is the only determinant of growth.

Above, we show what happens when our basic dynamic model includes the explanatory variables we have labelled as historical. These are *war* and *terrorism*. The first regression equation[62] embodies the former, a *civil-war* dummy variable, that assigns 1 to the country that in a given year goes through a conflict, and 0 otherwise: the *Azerbaijan vs. Nagorno-Karabakh* war, an armed

[59] The panel is balanced for all the regressions and cover the 1992-2005 period.
[60] Author' s calculations. Data source: Correlates of War Database supported by our knowledge.
[61] Author's calculations. Data source: Global Terrorism Database.
[62] The panel is balanced and cover the 1991-2008 period.

conflict that took place in the small enclave of Nagorno-Karabakh in southwestern Azerbaijan (1991-1994)[63]; the *Georgia vs. Gamsakurdia & Abkaz* war, from 1991 to 1994, a civil war for control of central government, and the 2008 *South Ossetia* war; the *Russia vs. Chechens* war, with its different phases, the first from 1994 to 1996, the second from 1999 to 2008; *Tadzhikistan vs. Popular Democratic Army* war for control of central government, from 1992 to 1997; the 1991-1992 *Moldova vs. Transnistria* conflict. The empirical results say that *war* does not matter for the path of economic growth. Its estimated coefficient, as displayed in Table 12, is positive, but statistically insignificant: the positive sign is soon understood if we think of the spur wars might have given to specific sectors of the industrial production. The other regression[64] studies the effects of terrorist attacks on the level of per capita GDP: the *terrorism* dummy variable is statistically significant and affects negatively the path of growth. The negative sign is expected because terrorism generates fear and increases, to a greater extent, uncertainty for the economic agents. In any case the dependent variable is affected by our index of institutions: they maintain a high statistical significance, magnitude and positive sign. Both the Sargan and the Arellano-Bond tests give the expected results. The Sargan test of overidentifying restrictions on the instruments, restricted, as before, to avoid biased estimates caused by the correlation among lagged dependent variable and individual errors, confirms our strategy; the Arellano-Bond test, that there is no second order autocorrelation in the residuals and inferences are valid.

To understand which role *human capital* has in shaping the path of economic performance and its importance with respect to economic institutions, we use three different proxies: *school enrolment primary*[65] (%gross), *school enrolment secondary*[66] (%gross), *school enrolment tertiary*[67] (%gross). Actually, only the last indicator is commonly used as a skill or human capital proxy, being the first two indicators basically recognised as literacy ones.

Due to the problem of data availability, all the countries are restricted to shorter time series, covering the 1999-2007 time horizon, and the sample is reduced to fourteen countries[68]. For this, the dynamic specification cannot be implemented because of the small sample bias and the static approach explained before is to be followed.

Looking carefully at the data[69] (Table 13), two facts are noticed: these countries have very high enrolment rates for the primary and secondary education; the *between* standard deviation of the

[63] It started in 1988; before our reference time horizon.

[64] The panel is balanced and cover the 1991-2007 period. Turkmenistan is excluded because of unreliable data: the only "sure" terrorist event is the attack vs. President Nyazov, November 2002. (Source: US Department of State).

[65] Gross enrollment ratio is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown. Primary education provides children with basic reading, writing, and mathematics skills along with an elementary understanding of such subjects as history, geography, natural science, social science, art, and music. Source: United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics. Note: Break in series between 1997 and 1998 due to due to change from International Standard Classification of Education (ISCED76) to ISCED97. Recent data are provisional. (source: World Development Indicators)

[66] Gross enrollment ratio is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown. Secondary education completes the provision of basic education that began at the primary level, and aims at laying the foundations for lifelong learning and human development, by offering more subject- or skill-oriented instruction using more specialized teachers. Source: United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics. Note: Break in series between 1997 and 1998 due to due to change from International Standard Classification of Education (ISCED76) to ISCED97. Recent data are provisional. (source: World Development Indicators)

[67] Gross enrollment ratio is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown. Tertiary education, whether or not to an advanced research qualification, normally requires, as a minimum condition of admission, the successful completion of education at the secondary level. Source: United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics. Note: Break in series between 1997 and 1998 due to due to change from International Standard Classification of Education (ISCED76) to ISCED97. Recent data are provisional. (source: World Development Indicators)

[68] Turkmenistan has been excluded because of absence of data.

[69] Data source: World Development Indicators.

tertiary education is greater than the *within* standard deviation, meaning that more advanced levels of education are very different among the former soviet socialist republics.

Table 13. Education Summary Statistics

Variable	Mean	Std. Deviation	Minimum	Maximum
Primary				
Overall	1.004415	.0549329	.9361035	1.212228
Between		.0321688	.9632928	1.063295
Within		.045334	.8985614	1.153348
Secondary				
Overall	.9006865	.0685229	.7380635	1.033035
Between		.0614509	.7935758	.9940092
Within		.0329186	.8189493	.9785237
Tertiary				
Overall	.4272115	.206088	.0962687	.7645731
Between		.2061059	.1225314	.7044486
Within		.0621053	.2158705	.5816467

Let us focus on the role of the primary and secondary education levels. We regress the per capita GDP values (in logarithmic terms) on the economic institutions index and the school enrolment rates (%gross), following the static specification, shown in Section 4.1, that now becomes:

$$\text{gdppcppp}_{i,t} = \alpha + \beta \text{ecinst}_{i,t} + \gamma \text{schoolenrolment}_{i,t} + \varphi_i + \psi_t + \varepsilon_{i,t} \qquad \textbf{(6)}$$

where schoolenrolment can alternatively be referred to either the primary or the secondary enrolment rate, $\varepsilon_{i,t}$ are the idiosyncratic errors, and φ_i captures the country fixed effects. In this case, the time dummies, although statistically significant, are not added. Indeed, their inclusion would be burdensome in terms of degree of freedom due to the reduced number of observations and the presence of missing values.

The estimation results are displayed in the next table (Table 14).

The estimated coefficient of the primary level of education, first regression, is not statistically significant. This result is totally expected if we recall that each of these economies shows very high primary enrolment rates, as confirmed also by the value of the overall mean in the sample. Therefore, primary education does not affect economic growth. A different result is founded for the secondary level of education. Considering the other regression, last column, the estimate of the coefficient linked to the education aiming at laying the foundations for lifelong learning and human development is found to have a positive and statistical significant impact on the dependent variable. This is expected too, because the countries, on average, exhibit lower rates, and also the overall mean value, as well as the values of the related summary statistics, are definitely smaller. The importance of *ecinst* is confirmed once again, even over a different span of years (1999-2007). The coefficient is always positive and highly statistically significant.

Table 14. Robustness Analysis: Literacy

Two-way fixed effects estimator with Driscoll-Kraay Standard Errors		
	Dependent variable: **Ln GDP p.c. P.P.P.**	
Ecinst	**6.925274***** (.8368069)	**6.187115***** (.5417887)
Primary[70]	.8159668^{ns} (.5152589)	
Secondary[71]		1.397197*** (.3451335)
constant	2.949465** (.993907)	2.979699*** (.5781753)
N	125	122
Within R-squared	0.7534	0.7752

The dependent variable is GDP per capita, PPP (constant 2005 international $), expressed in logarithmic terms.
Superscripts */**/*** denote 10, 5, and 1 percent significance levels. Superscript ^{ns} absence of significance.
The number in parenthesis are standard errors.

The summary statistics above highlight the "anomaly" of the FSU countries: they have very high enrolment rates and even low income countries (Kyrgyzstan, Tajikistan and Uzbekistan), that are "expected" to be less literate, exhibit high rates with respect to primary and secondary education. The scenario seems to be considerably different for the rate of investment in human capital. For the *tertiary* education, because of these differences among the countries, we split the sample in two subgroups and thus distinguish between *low human capital-intensive* countries and *high human capital intensive* ones. It being understood that a *caveat* must be placed upon the resulting number of observations of the new samples, this particular dataset structure implies that it is worth studying whether the impact of human capital on economic development is different for the *low human capital intensive* countries and the *high human capital intensive* ones.

From the methodological point of view, we calculate the mean of the time series of the school enrolment rates for each country and label as *low tertiary* those countries with an average rate smaller than 42% (the overall mean). They are Armenia (27.08%), Azerbaijan (15.58%), Georgia (39.84%), Kazakhstan (41.36%), Kyrgyzstan (39.26%), Moldova (34.83%), Tajikistan (15.81%), Uzbekistan (12.25%). The *high tertiary* countries are Belarus (59.82%), Estonia (61.49%), Latvia (66.98%), Lithuania (64.66%), Russia (70.44%) and Ukraine (60.94%). Although the former group may be seen as "non homogenous", since there is a certain degree of variation between the countries[72], we prefer this choice anyway. Indeed it is the more coherent, considering the necessity of a clear benchmark and that the alternative strategy to "move" Kazakhstan (the *low tertiary* country with the greatest mean value) in the *high tertiary* group would not reduce markedly the between variation of the *low tertiary* group[73], but would lead to pick out also Georgia and Kyrgyzstan as "bordering" countries. Consequently, this would call for the definition of another subgroup, which cannot be done because of the limited number of observations.

To assess the impact of human capital, proxied by the tertiary school enrolment rate, we follow the model equation defined in (6). For both the high tertiary and low tertiary group, *ecinst* is positive and statistically significant at five and one percent significance levels, respectively. Economic institutions are again the major determinant of the economic patterns. Human capital, as hypothesized, behaves very differently, in terms of the impact on economic outcomes. It matters (at

[70] Data source: World Development Indicators.
[71] Data source: World Development Indicators.
[72] The between standard deviation for the low tertiary sub-sample is equal to 0.122.
[73] The between standard deviation for the low tertiary sub-sample, once Kazakhstan is moved, is equal to 0.1188.

five percent level) only for countries with skills below the average rate. When countries are more human capital intensive, the coefficient for the tertiary school enrolment rate, although positive, does not have a statistically significant impact for the path of economic growth.

Table 15. Robustness Analysis: Human Capital

Two-way fixed effects estimator with Driscoll-Kraay Standard Errors		
	Dependent variable: **Ln GDP p.c. P.P.P.**	
	High Tertiary Group	Low Tertiary Group
Ecinst	**4.854598****	**8.532123*****
	(1.509393)	(1.061628)
Tertiary	.3420076^{ns}	.6113308**
	(.5381865)	(.2658141)
constant	5.451743***	2.241539***
	(.7427204)	(.5912529)
N	50	72
Within R-squared	0.8599	0.7588

The dependent variable is GDP per capita, PPP (constant 2005 international $), expressed in logarithmic terms. Superscripts */**/*** denote 10, 5, and 1 percent significance levels. Superscript ^{ns} absence of significance. The number in parenthesis are standard errors.

The last set of additional covariates considered includes those variables quantifying the government expenditure[74] and the country's productive specialization (we study the role of four sectors: the net output of agriculture[75], industry[76], manufacturing[77] and services[78], following the International Standard Industrial Classification). From a strictly quantitative point of view, the data[79] available demanded attention. These variables are measured either in monetary terms or as a percentage of

[74] General government final consumption expenditure (formerly general government consumption) includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditures on national defense and security, but excludes government military expenditures that are part of government capital formation. (source World Development Indicators)

[75] Agriculture corresponds to ISIC divisions 1-5 and includes forestry, hunting, and fishing, as well as cultivation of crops and livestock production. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The origin of value added is determined by the International Standard Industrial Classification (ISIC), revision 3. (source: World Development Indicators)

[76] Industry corresponds to ISIC divisions 10-45 and includes manufacturing (ISIC divisions 15-37). It comprises value added in mining, manufacturing (also reported as a separate subgroup), construction, electricity, water, and gas. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The origin of value added is determined by the International Standard Industrial Classification (ISIC), revision 3. (source: World Development Indicators)

[77] Manufacturing refers to industries belonging to ISIC divisions 15-37. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The origin of value added is determined by the International Standard Industrial Classification (ISIC), revision 3. (source: World Development Indicators)

[78] Services correspond to ISIC divisions 50-99 and they include value added in wholesale and retail trade (including hotels and restaurants), transport, and government, financial, professional, and personal services such as education, health care, and real estate services. Also included are imputed bank service charges, import duties, and any statistical discrepancies noted by national compilers as well as discrepancies arising from rescaling. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. The industrial origin of value added is determined by the International Standard Industrial Classification (ISIC), revision 3. (source: World Development Indicators).

[79] Data source: World Development Indicators.

GDP. Because the monetary series, although in constant prices, lack several observations and further are not expressed in the same unit of measurement as the dependent variable, we choose to use the ones expressed as percentage of GDP. But again, the estimate results of the static and dynamic specification with the alternated presence of these covariates (expressed as percent of GDP) were doubtful, due to the presence of a certain degree of correlation. Thus, considering also that the within standard deviation of each variable is rather small[80], we decide to study the effect the initial[81] composition of a country's production and the initial (1991) level of government expenditure have had on the subsequent growth path.

To keep including the country fixed effects, whose importance has been largely attested, and to avoid that our time invariant covariates were dropped, which of course would happen with the adoption of the LSDV estimator, we perform an OLS robust regression, where the dependent variable is per capita GDP (in purchasing power parity as usual) and the regressors are our index of economic institutions and, agriculture, government expenditure, industry, manufacturing and services added one at a time. Table 16 shows the estimate results when only country dummies are included; Table 17, the results whit both country and time dummies.

Table 16. Robustness Analysis: kinds of economic activity and government expenditure

OLS Robust Estimator with time-invariant variables

Dependent variable: **ln GDP p.c. PPP**					
Ecinst	.5392379***	.5392379***	.5392379***	.5392379***	.5392379***
	(.1723934)	(.1723934)	(.1723934)	(.1723934)	(.1723934)
Agriculture	-.056926***				
	(.0030305)				
GovExpenditure		.0547216***			
		(.0080039)			
Industry			.0522089***		
			(.0070946)		
Manufacturing				.0259873***	
				(.0035314)	
Services					.0928696***
					(.0052123)
constant	9.666539***	6.596006***	6.227073***	7.699521***	5.011282***
	(.1360067)	(.159356)	(.2816756)	(.1188481)	(.2020533)
Country dummies	yes	yes	yes	yes	yes
Time dummies	no	no	no	no	no
N	270	270	270	270	270
F test	F(15,254)=147.85 Prob >F=0.0000	F(15, 254)=147.85 Prob > F = 0.0000	F(15, 254)=147.85 Prob > F = 0.0000	F(15,254)=147.85 Prob > F = 0.0000	F(15,254)=147.85 Prob > F = 0.0000
R-squared	0.8539	0.8539	0.8539	0.8539	0.8539

The dependent variable is GDP per capita, PPP (constant 2005 international $), expressed in logarithmic terms.
Superscripts */**/*** denote 10, 5, and 1 percent significance levels. Superscript ns absence of significance.
The number in parenthesis are robust standard errors.

[80] Agriculture: .0721463; Government Expenditure: .034549; Industry: .0694635; Manufacturing: .0552209; Services: .0961473.

[81] The first observation of the Manufacturing variable for Georgia is the 1996 one, for Moldova is the 1993 one, for Russia the 2002 one, for Turkmenistan the 1993 one, for Ukraine the 1992 one and for Uzbekistan the 1994 one. For Kazakhstan the observations for all these variables start 1992.

Table 17. Robustness Analysis: kinds of economic activity and government expenditure

OLS Robust Estimator with time-invariant variables

Dependent variable: **ln GDP p.c. PPP**					
Ecinst	.5041996**	.5041996**	.5041996**	.5041996**	.5041996**
	(.2219737)	(.2219737)	(.2219737)	(.2219737)	(.2219737)
Agriculture	-.0569555***				
	(.0015006)				
GovExpenditure		.054372***			
		(.0043056)			
Industry			.0529639***		
			(.0052142)		
Manufacturing				.0263631***	
				(.0025954)	
Services					.0932304***
					(.0040781)
constant	10.13731***	7.063168***	6.6629***	8.156641***	5.472162***
	(.1729279)	(.1517358)	(.1397967)	(.109806)	(.1518513)
Country dummies	yes	yes	yes	yes	yes
Time dummies	yes	yes	yes	yes	yes
N	270	270	270	270	270
F test	F(32, 237)= 412.64 Prob > F = 0.0000	F(32, 237) = 412.64 Prob > F = 0.0000	F(32,237)= 412.64 Prob > F = 0.0000	F(32,237)=412.64 Prob > F= 0.0000	F(32,237)= 412.64 Prob > F = 0.0000
R-squared	0.9650	0.9650	0.9650	0.9650	0.9650

The dependent variable is GDP per capita, PPP (constant 2005 international $), expressed in logarithmic terms.
Superscripts */**/*** denote 10, 5, and 1 percent significance levels. Superscript ns absence of significance.
The number in parenthesis are robust standard errors.

Both estimation strategies give evidence of the significance and importance of economic institutions, which maintain sign and magnitude. The initial level of *agriculture*, as theoretically expected, has affected negatively and significantly the subsequent pattern of economic development. The other sectors, *industry*, *manufacturing*[82], and *services*, as well as the consumption expenditure of the government, have had instead a positive and statistically significant impact on the evolution of the economic outcome.

[82] The inclusion of manufacturing is somewhat redundant because the industry sector, as defined before, include the manufacturing one.

5. Conclusion

Studying the economic growth of the former Soviet Socialist Republics was a real challenge. It has required special efforts to collect and manipulate data, which were sometimes lacking, sometimes affected by price distortions, to find and understand how to outline, in an exhaustive way, the historical features delineating their common background. To our knowledge, this is the first attempt to study the economic growth paths of these countries, and we choose them because, "thanks" to their unique experience, are an extremely powerful example for the analysis of the role of institutions.

Conceptual problems are often ascribed to the existing research strategy about the causal link between institutions and growth. In particular, these are closely related to the use of generic and not precisely defined assessments of institutional outcomes, to the fact that, of course, it is impossible to conduct an experiment and see what would happen if an exogenous event occurred and the institutional set of a country changed, and that the institutional variables chosen are not read as the result of the policy makers' manipulation.

Former Soviet Union economies, we believe, offer an empirical "case" that goes in the direction to deal with these problems. First, the historical study of their past allows to focus on a well precisely defined set of institutions, the ones we have defined as *necessary for a market economy*, captured by the economic institutions index (*ecinst*). Second, the 1991 breakdown entails the collapse of a specific institutional arrangement, that is not our task to "call", and the passage to a market economy system: this makes a radical institutional change happen and thus history gives us an experiment similar to the ones typical of the natural sciences. Third, the institutional indicators used, selected by virtue of the historical considerations made, allows to explicitly think about the hand of the policy makers and the role of the economic policy. It is clear that the degree of development of the financial system, for instance, but the same may go for all the other institutional dimensions considered, depends on the actions of the policy maker.

Our first hypothesis is that the economic institutions index, built from the EBRD indicators, has affected the economic paths of these countries since 1991. This, tested via a static and a dynamic approach, is always borne out. Because of the particular structure of our panel dataset, we have adopted multiple estimation strategies to find the estimator able to assess the coefficient at best: in the static framework, the two-way fixed effects estimator with Driscoll-Kraay Standard Errors is preferred; in the dynamic context, the GMM-difference estimator. All the regression equations agree and generate the same result: economic institutions are a great determinant and drive the economic development pattern. Our second hypothesis concerns the role of these economic institutions. More precisely, due to the specific condition of the FSU countries, we have hypothesized that economic institutions are the major force shaping the economic outcomes. To this regard, with the additional goal to understand which other forces have influenced the time behaviour of the per capita GDP, we have performed a robustness analysis, where the economic institutions index is compared with macroeconomic variables, the "classical" determinants of growth, historical dummies, variables representing foreign trade relationships and the kinds of economic activity. Using the dynamic model approach, we have been able to show the persistence of the magnitude and significance of our core covariate and which, among the other control variables, have played a role. Whatever regressor is added, *ecinst* is confirmed to have a strong effect on GDP.

The results of this paper are not the generic statement "institutions do matter". We say something more than the importance of a generic set of institutions for a particular set of countries and we believe that replicating the reasoning on an enlarged scale of countries, provided that economic institutions assessments are available, would prove very fruitful.

Indeed, we have shown neither the importance, for instance, of the security of property rights, nor of economic freedom, but the importance of a specific set of institutions for a set of countries, assumed to have come into existence, to a certain extent, in 1991. This set matters for the all time

horizon and not only for the first years after the breakdown. The former Soviet Union Economies are still classified as transition economies because they have experienced central planning. But transition, as the word says, cannot last eighteen years or more. From the economic point of view, transition started when the USSR collapsed and ended when the Soviet Socialist Republics became autonomous and organized the economic activity accordingly to a market economy system. To this regard, they needed a set of institutions, whose evolution matter for the economic outcome. That's the reason underlying our results.

However, the degree of the quality of that institutional framework can vary. We have said that this measure of institutions lets think about the hand of the policy makers. If institutions matter and are read as shaped by the economic policy, we must conclude that economic policy matters for growth. Future research on this area should be devoted to discover the determinants of the economic policies implemented.

APPENDIX A

Table A1

Correlation among E.B.R.D indices across F.S.U. countries and time (1991-2008).

	LargePriv	SmallPriv	Enterprise	PriceLiber	TradeForeign Exchange	Competition Policy	Banking Reform	NonBanking Reform
LargePriv	1.0000							
SmallPriv	0.8917	1.0000						
Enterprise	0.8556	0.8159	1.0000					
PriceLiber	0.7445	0.8141	0.7126	1.0000				
Trade Foreign Exchange	0.8409	0.8800	0.7885	0.8250	1.0000			
Competition Policy	0.7026	0.7114	0.7603	0.5817	0.6475	1.0000		
Banking Reform	0.8144	0.8214	0.9133	0.7139	0.8402	0.7634	1.0000	
NonBanking Reform	0.6917	0.6732	0.7596	0.4973	0.6089	0.8131	0.7887	1.0000

Source: Author's calculation

APPENDIX B

EBRD Methodology

(source: EBRD)

Large-scale privatisation

- 1=Little private ownership
- 2= Comprehensive scheme almost ready for implementation; some sales completed.
- 3= More than 25 per cent of large-scale enterprise assets in private hands or in the process of being privatised (with the process having reached a stage at which the state has effectively ceded its ownership rights), but possibly with major unresolved issues regarding corporate governance.
- 4= More than 50 per cent of state-owned enterprise and farm assets in private ownership and significant progress with corporate governance of these enterprises.
- 4+= Standards and performance typical of advanced industrial economies: more than 75 per cent of enterprise assets in private ownership with effective corporate governance.

Small-scale privatisation

- 1= Little progress.
- 2= Substantial share privatised.
- 3= Comprehensive programme almost ready for implementation.
- 4= Complete privatisation of small companies with tradable ownership rights.
- 4+= Standards and performance typical of advanced industrial economies: no state ownership of small enterprises; effective tradability of land.

Governance and enterprise restructuring

- 1= Soft budget constraints (lax credit and subsidy policies weakening financial discipline at the enterprise level); few other reforms to promote corporate governance.
- 2= Moderately tight credit and subsidy policy, but weak enforcement of bankruptcy legislation and little action taken to strengthen competition and corporate governance.
- 3= Significant and sustained actions to harden budget constraints and to promote corporate governance effectively (for example, privatisation combined with tight credit and subsidy policies and/or enforcement of bankruptcy legislation).
- 4= Substantial improvement in corporate governance and significant new investment at the enterprise level, including minority holdings by financial investors.
- 4+= Standards and performance typical of advanced industrial economies: effective corporate control exercised through domestic financial institutions and markets, fostering market-driven restructuring.

Price liberalisation

- 1= Most prices formally controlled by the government.
- 2= Some lifting of price administration; state procurement at non-market prices for the majority of product categories.
- 3= Significant progress on price liberalisation, but state procurement at non-market prices remains substantial.
- 4= Comprehensive price liberalisation; state procurement at non-market prices largely phased out; only a small number of administered prices remain.
- 4+= Standards and performance typical of advanced industrial economies: complete price liberalisation with no price control outside housing, transport and natural monopolies.

Trade and foreign exchange system

- 1= Widespread import and/or export controls or very limited legitimate access to foreign exchange.
- 2= Some liberalisation of import and/or export controls; almost full current account convertibility in principle, but with a foreign exchange regime that is not fully transparent (possibly with multiple exchange rates).
- 3= Removal of almost all quantitative and administrative import and export restrictions; almost full current account convertibility.
- 4= Removal of all quantitative and administrative import and export restrictions (apart from agriculture) and all significant export tariffs; insignificant direct involvement in exports and imports by ministries and state-owned trading companies; no major non-uniformity of customs duties for non-agricultural goods and services; full and current account convertibility.
- 4+= Standards and performance norms of advanced industrial economies: removal of most tariff barriers; membership in WTO.

Competition policy

- 1= No competition legislation and institutions.
- 2= Competition policy legislation and institutions set up; some reduction of entry restrictions or enforcement action on dominant firms.
- 3= Some enforcement actions to reduce abuse of market power and to promote a competitive environment, including break-ups of dominant conglomerates; substantial reduction of entry restrictions.
- 4= Significant enforcement actions to reduce abuse of market power and to promote a competitive environment.
- 4+= Standards and performance typical of advanced industrial economies: effective enforcement of competition policy; unrestricted entry to most markets.

Banking reform and interest rate liberalisation

- 1= Little progress beyond establishment of a two-tier system.
- 2= Significant liberalisation of interest rates and credit allocation; limited use of directed credit or interest rate ceilings.
- 3= Substantial progress in establishment of bank solvency and of a framework for prudential supervision and regulation; full interest rate liberalisation with little preferential access to cheap refinancing; significant lending to private enterprises and significant presence of private banks.
- 4= Significant movement of banking laws and regulations towards BIS standards; well-functioning banking competition and effective prudential supervision; significant term lending to private enterprises; substantial financial deepening.
- 4+= Standards and performance norms of advanced industrial economies: full convergence of banking laws and regulations with BIS standards; provision of full set of competitive banking services.

Securities markets and non-bank financial institutions

- 1= Little progress.
- 2= Formation of securities exchanges, market-makers and brokers; some trading in government paper and/or securities; rudimentary legal and regulatory framework for the issuance and trading of securities.
- 3= Substantial issuance of securities by private enterprises; establishment of independent share registries, secure clearance and settlement procedures, and some protection of minority shareholders; emergence of non-bank financial institutions (for example, investment funds, private insurance and pension funds, leasing companies) and associated regulatory framework.

- 4= Securities laws and regulations approaching IOSCO standards; substantial market liquidity and capitalisation; well-functioning non-bank financial institutions and effective regulation.
- 4+= Standards and performance norms of advanced industrial economies: full convergence of securities laws and regulations with IOSCO standards; fully developed non-bank intermediation.

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