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Corruption, *fatigued* democracy and bad governance: Are they co-determinants of poverty risk and social exclusion in Europe?
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Abstract

Using a macro panel of 31 European countries, this paper explores the hypothesis that cross-country differences in the exposition to the risk of poverty or social exclusion (as defined by the Europe 2020 anti-poverty strategy) are strongly affected by countries' political, institutional and legal characteristics and particularly by the level of perceived corruption in the public and political sectors. As expected, the results show that economic growth, income distribution, public expenditure and investment, as well as education but not technical development, have strong effects on poverty reduction. This notwithstanding, results indicate that corruption and poor institutional quality significantly interact with economic cofactors and threaten the positive effects of growth on poverty. Altogether, the results signal the need for reassessment of the Euro 2020 strategy, which mainly relies on economic instruments alone.

Keywords: Poverty, Social Exclusion, Corruption, Governance
JEL classification: D72; D73; O15

1. Introduction

The Europe 2020 strategy promotes social inclusion, in particular through the reduction of poverty, by aiming to lift at least 20 million people out of the risk of extreme poverty and social exclusion. This indicator corresponds to the share of persons in a country who are at risk of poverty, severely materially deprived or living in households with very low work intensity. At risk of poverty are persons with an equivalized disposable income below the risk-of-poverty threshold, which is set at 60% of the national median equivalized disposable income (after social transfers). Material deprivation covers indicators relating to economic strain and durables. Severely materially deprived persons have living conditions harshly constrained by a lack of resources and experience at least 4 out of 9 of the following deprivation items. They cannot afford i) to pay rent or utility bills, ii) to keep their home adequately warm, iii) to face unexpected expenses, iv) to eat meat, fish or a protein equivalent every second day, v) to go on a week holiday away from home, vi) to own a car, vii) to own a washing machine, viii) to own a color TV or ix) to own a telephone. People living in households with very low work intensity are those aged 0-59 living in households where the adults (aged 18-59) worked less than 20% of their total work potential during the past year.

Understandably, the fulfillment of the above ambitious 20-million-people program requires a thoughtful analysis of how future income growth, educational levels, technical development and any other economic improvements can generate social inclusion and poverty risk reduction. However, economic expansion is not the exclusive set of factors that can curb poverty and reduce social exclusion. Political and institutional accountability – which is a reflex, among other things, of the quality of politics, social participation in institutions' governance and the repression of corruption – are of great importance as well. What is not clear, however, is how the above economic and non-economic factors interact as co-determinants of poverty risk and social exclusion. To gain some empirical macro understandings of the above relationships, this paper investigates how factors such as the quality of institutions, the specific characteristics of the democratic political organization of each country and the level of public sector corruption can affect, alongside economic factors, the risk of poverty and social exclusion in European countries and thus potentially buttress or threaten the achievement of the Europe 2020 strategy. We propose this specific contribution to the existing literature and analyze a sample of 31 European countries whose data cover the 2002 – 2011 time period to test the hypothesis that public

sector corruption and the degree of institutional quality have both autonomous and interactive adverse effects on the exposition to the risk of poverty and reduce the potentially positive effect that income growth can have on poverty and social exclusion. We employ different estimation strategies and show that economic growth, public expenditure/investment, and education but not technical development, have strong effects on the reduction of poverty. Corruption and poor institutional quality, however, significantly reduce those positive effects. Corruption alone increases exposition to extreme poverty (a one percent increase in corruption produces on average an increase in poverty risk four times as high) and reduces the favorable impact of democracy (the democracy-estimated coefficients for countries with long democratic history significantly reduces when interaction with corruption is allowed). Altogether, the results signal that the Euro 2020 antipoverty lacks some economic and political instruments to fulfill its goals and seems to be grounded in an incomplete analytical framework.

The rest of the paper proceeds as follows. Sections 2 and 3 contain a brief discussion of the expected effects of income growth and income distribution on the exposition to poverty risk and social exclusion, as defined by the Euro 2020 program. We show that income growth and distribution alone cannot explain the level of risk of poverty in Europe and the lack of poverty convergence among European countries. This justifies the quest for other explanatory factors of poverty risk and lack of poverty convergence. Among such factors, we include institutional quality and, particularly, corruption in the public and political sectors. Section 4 illustrates the main statistical properties of the data set and then formulates and discusses three hypotheses regarding the effects of corruption on poverty risk to be empirically tested. Section 5 presents the estimation strategies (BE and FE panel) and the empirical results and contains a discussion of the possible policy implications for the Euro 2020 strategy. In light of the above results, a brief section 6 concludes.

2. Income, Poverty Risk and Poverty Convergence in Europe

We use a sample of 31 European countries with data recorded from 2002 to 2010 to start analyzing the relationships among income, poverty and inequality (the data are described in detail later). The first three scatter diagrams that follow plot initial income vs. income per capita growth (Fig. 1), growth of income per capita vs. poverty risk growth (Fig. 2) and initial poverty risk vs. the annualized growth of poverty risk (Fig. 3). Two prominent stylized facts about development economics reported by Ravallion (2012) indicate that (a) countries with a low initial income

have higher rates of economic growth (*advantage in backwardness*) and that (b) higher income per capita tends to be correlated with a lower incidence of poverty (*advantage of growth*). If one disregards the initial level of poverty, the combination of these two facts imply that, over some time interval, we should observe a tendency towards poverty convergence: countries starting out with high incidence of absolute poverty should enjoy a higher proportionate rate of poverty reduction (Ravallion, 2012, 504) and vice versa, to such an extent that all countries should eventually show a similar (and lower than initial) poverty rate.

Unfortunately, for our sample of 31 European countries, the evidence suggests more moderate enthusiasm. Lower values of initial pc-income are associated with higher levels of growth, but the relationship between initial income, income growth, poverty and distribution is much more intricate. Admittedly, Fig. 2 shows that a higher increase in pc-income is associated with lower or negative growth of poverty risk, and Fig. 3 shows that countries starting with a high level of poverty risk have higher (negative) growth rates of poverty risk increase, which is a sign of convergence. However, at similar initial rates of poverty, we can find several corresponding values of poverty growth. This implies that for those countries (i.e., the overwhelming majority in our data set), the systematic *beneficial* effect of having a high initial level of poverty on the proportionate rate of poverty reduction is negligible[1]. The combined effects of advantage in backwardness and advantage of growth alone do not generate poverty convergence, which is something, one may wonder, that seems to be missing from the analysis.

An important missing element in the above analysis might be the degree of concentration in income distribution. The critical role played by income distribution in poverty reduction is spelled out in several studies, including both country-specific papers (Datt et al., 1992 and Kakwani, 1993 among others) and comparative cross-countries analyses (Ali et al., 2000). Low (high) values of Gini coefficients should be associated to a more (less) uniform income distribution and ultimately to a smaller (higher) value of absolute poverty risk[2]. Indeed, Fig. 4 shows the relation

[1] Robust regression results for the entire set of countries are the following: Poverty Mean Growth = 0.42 – 0.15 (Log of Mean Initial Poverty Risk), with *z.* stat. = –2.61. (N = 31).

[2] The Spearman rank correlation coefficient is 0.62, and the robust regression results for the entire set of countries are the following: Log (Poverty Risk) = – 2.97 + 0.15 (Log of Gini Index), with *z.* stat. = 9.99 (NT = 186). This is similar to the majority of the findings presented by the literature. Fosu (2010) obtains opposing results (reduction in inequality that raises poverty) but for very poor developing countries only.

between Gini Index and poverty risk. As expected, the more unequal a society, the higher is its exposition to the risk of high absolute poverty. At the same time, one expects that high initial values of the Gini index should be associated with higher reduction of the Gini index over time, due to the favorable effects on income growth that the advantage in backwardness should transmit to income distribution. However, Fig. 5 shows that this hypothetical relation is not consistent with our data[3]. The growth of the Gini index and the growth of poverty risk are simply unrelated, as shown by Fig. 6 despite the fact that the Gini Index varies inversely with pc-income[4], as shown by Fig. 7, and, to a much lesser extent, by Fig. 8.

<< Fig. 1 to 8 here>>

Hence, reference to inequality does not offer additional conclusive explanations for the persistence of high poverty risk levels and differences. Therefore, although the data indicate that inequality is an important mediating factor in the transformation of growth into poverty reduction and that some convergence in pc-income can be observed in the data set[5], the dominating fact is still the persistence of high poverty risk levels and a lack of poverty convergence. The latter is attributable,

[3] Robust regression results for the entire set of European countries (excluding Malta) are the following: Gini growth = 0.62 – 0.19 (Initial Gini value), with *z.* stat. = –1.46. (N = 30). World Bank Gini data source is http://databank.worldbank.org/data/reports.aspx?source=2&country=&series=SI.POV.GINI&period=#

[4] Robust regression results for the entire set of European countries are the following:
Log of Gini Index = 4.22 – 0.08 (Log of pc-income), with *z.* stat. = –5.35. (NT = 250) and Gini Growth = – 0.13 + 0.01(Log initial pc-income), with *z*-stat. = 0.42 (N = 30). Malta excluded. The Gini Index seems to be negatively associated with income in a statistically significantly way, but the initial value of pc-income does not significantly affect the "speed" of the change over time of Gini Index, which is at odds with the advantage in backwardness hypothesis. Forbes (2000) and Li et al. (1998), however, found a positive relationship between income and inequality.

[5] Two-way Fixed Effects (country and period) estimates for our 31 European countries are the following: Log ($GDPN_{it}/GDPN_{it-1}$) = 2.12 – 0.21 (Log $GDPN_{it-1}$) with *t*-stat. = –8.23. Redundant effects tests reject at usual levels the null of single and joint effects redundancy. NT = 279. The Hausman test for an alternative random effects specification is available upon request. $GDPN_{it}$ is pc-income in country *i* at time *t*.

among other things, to the absence of any systematic effect on poverty reduction of a high initial level of poverty.
In summary, the advantage in backwardness should produce (a) the *spontaneous* (market driven?) result that higher rates of growth should be generated by countries starting out with low pc-income (and high Gini Indexes) and (b) that the previous effect should induce poverty *and* inequality convergence, given the high correlation between poverty and inequality recorded in our data set. However, of the two aforementioned hypotheses, only the first seems consistent with our data; the second is certainly not[6].
Hence, our 31 European capitalist economies observed from 2002 to 2011 simply do not realize the celebrated prophecy, "*blessed are the last who will be first*," not even in its possible lessened form, *blessed are the last who will be middle* (*class*). The first question is why this is so, and the second is whether this tendency towards poverty (and poverty differences) persistence might jeopardize the Europe 2020 strategy.

3. Poverty and the *quality* of institutions: Is corruption important?

The issue of cross-country poverty differences and the question whether inequality is detrimental to growth prompted theoretical discussions since at least Smith and Ricardo's time as well as more contemporary empirical investigations. The latter comprise various tests of the inverted-U relationship between income and distribution, which show that less developed countries tend to be poorer and less egalitarian than richer countries[7], and more recent analyses of the causation process link

[6] Similar results are those of Adams (2004), who finds for a set of developing countries that the growth elasticity of poverty is greater for countries with a lower level of inequality. Ravallion (2012) also excludes inequality as an exhaustive factor explaining the lack of poverty convergence.

[7] Empirical observation indicates that less developed countries tend to be less egalitarian than developed ones. Bénabou (1996), Clarke (1995) and Perotti (1996), among others, show that initial inequality is detrimental to growth. As for the inverted-U relationship, we report for completeness the result of a FE regression of the Kuznets hypothesis run with our data set. Gini Index = – 402.41 + 94.43(Log of p-c Income) – 5.08 (Log of p-c Income)^2 with *t*-stats of 2.84 and – 2.94 respectively. Redundant effects tests reject at usual levels the null of single and joint effects redundancy. NT = 250, Malta excluded. The implied level of p-c income corresponding to the turning point of that *would-be* Kuznets curve is 10,830.00 US dollars (2005PPP), a value quite close to the minimum. This very low value gives indications consistent with the findings of Palma (2011) that the "upwards" side of the inverted-U curve has evaporated worldwide and with it also the statistical support for the hypothesis that "things have to get worse

poverty, distribution and growth as mediated by education, factor endowments and sociopolitical mechanisms (Ross, 2001, chap. 10 for a review). The latter approach stems from the idea that in parliamentary regimes, inequality generates political and electoral pressure for redistribution. Inequality and absolute poverty make the median voter worse off relative to the national *well-being* average and provide the middle class electorate with incentives to support redistribution policy measures (taxation, expenditure, SOE interventions and regulation). Various empirical studies exist, but the overall picture emerging from their general findings is inconclusive. The more promising approach is that which links income, poverty and inequality to sociopolitical instability and conflict. An extensive review is in Ross (2001), whereas Bénabou (1996) describes the linkage between poverty, inequality, growth and political conflict. More specific references to institutional and political factors are those reported and investigated in the various essays included in Banerjee et al. (2006), who (2006, 12) stress that among the various alleged causes of poverty are overpopulation, corruption and ethnic conflicts; poorer countries are plagued by these problems, affecting poverty adversely. Ravallion (2012) also stresses the role of the credit market and investment failures and tests for the size of countries' middle classes as a cofactor of income/consumption growth.
In the following, we investigate poverty risk and the lack of poverty convergence in Europe referring to the abovementioned institutional, legal and political features of each country and use them as co-factors that may contribute to the explanation of poverty persistence and poverty differences in Europe.

3.1 Corruption

Among the elements characterizing a country's institutional quality, (a low level of) corruption strongly figures in. Corruption in the public/political sector, commonly defined as the misuse of a public office for a private gain, encompasses unilateral abuses by politicians and government officials, such as embezzlement and nepotism, bribery, extortion, influence peddling and fraud. The result of these activities is that a huge amount of resources is subtracted to potentially productive legal uses and channeled, broadly speaking, into the area of rent seeking.

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before they can get better". He obtains significant cross-sectional evidence of the Kuznets curve only when LA and SA countries are neither excluded nor controlled with dummies (see his Tab. 5). Notice that our LS pooled estimates (not reported) generate less robust results with inverted signs of the coefficients (i.e., a U relationship between income and distribution).

This implies that corruption interferes with efficient allocation decisions and can jeopardize the redistribution policy. Laffont (2006), who discusses some theoretical links between corruption, growth and poverty, explicitly postulates the latter effect. In the last twenty years, the publication of the indexes of (perceived) corruption has fueled a vast empirical economic literature that analyzed the causes and consequences of corruption as well as the determinants of cross-country differences (see Bosco et al., 2014 for a survey and Bosco, 2015 for some estimates). Several authors have shown that corruption *i*) negatively affects both *GDP* and *GDP* growth, *ii*) deteriorates the investment climate and tends to reduce both domestic and foreign investment, *iii*) distorts public expenditure decisions and *iv*) prejudices loans operations and forces countries perceived as more corrupt to pay a higher risk premium when issuing bonds or to encounter more difficulties when they introduce fiscal stimulus packages aimed at targeting future budget consolidations. There is also evidence that bureaucratic corruption leads to the misallocation of resources, reduces productivity and service quality, diminishes expenditure in education and distorts private sector activities by giving rise to shadow economy and tax evasion. On the contrary, low corruption and good social infrastructure favors TFP growth and international productivity convergence. As for the correlation between corruption, government deficits and decentralization, some empirical findings show that decentralization mitigates the adverse effects of corruption on public deficits: corruption increases deficits when fiscal decentralization is low, which means that decentralizing public finances in highly corrupted countries is more likely to reduce government deficits.

The relationship between corruption and equality in resource distribution has received less attention than that reserved to the adverse effects on allocative efficiency. Gupta et al. (2002) analyze a sample of developing countries and find that corruption increases income inequality (Gini coefficient) and is associated with a decrease in the governmental provision of education and health care. Building on a framework developed by Murphy et al. (1991, 1993), Li et al. (2000) find that corruption affects inequality in a non-monotonic way: inequality in countries with an intermediate level of corruption is higher than that in countries with little or rampart corruption. Corruption also accounts for a substantial portion of the Gini coefficient differentials between industrial and developing countries (Li et al., 2000, 177) and seems to be a positive determinant of the accumulation of extraordinary private wealth and of the proliferation of billionaires worldwide (Torgler et al., 2013). Gyimah–Brempong et al. (2006) find, on the other hand, that in

spite of significant regional differences in the growth and distributional impacts of corruption, high levels of corruption are usually associated with high-income inequality measures.
Unfortunately, the effects of corruption on absolute poverty cannot be inferred from the above-mentioned analyses of inequality because one cannot conclude that a reduction/increase in inequality (evaluated by any measure satisfying the usual Pigou-Dalton criterion) will reduce/increase poverty. The results from Fiszbein et al. (2014: 170-1) concerning the differential impact of social protection programs on inequality and poverty (measured by the poverty gap, i.e., by shortfalls of poor peoples' income from the poverty line fixed at the standard of $1.25/day) worldwide indicate, for instance, that the relationship between the scale of inequality reduction and the poverty gap reduction after the implementation of social protection programs is close but far from being one-to-one. These results even further support the view that reliable implications of corruption on poverty are difficult to discover from the reaction of inequality measures to increased corruption. In addition, even when a specific reduction (increase) in inequality does imply a reduction (increase) in poverty, the change in the measure of inequality can be a poor guide to the *quantitative* impact of corruption on poverty. Hence, a specific analysis of the effects of corruption on poverty and on poverty differences appears to be necessary to fill the above gap and to test the hypothesis that the effect of public sector corruption on the exposition to the risk of poverty is, as we expect, adverse, i.e., that higher corruption induces higher exposition to poverty risk and that countries' differences in corruption can help explain poverty persistence and poverty differences in our European data set. However, given the strong link between poverty, distribution and income discussed at length in section 2, a preliminary but closely related question is whether corruption affects the risk of poverty directly or whether it has an initial adverse impact on income – and/or governance factors – and then, via a change in income and governance, to the exposition of the population to poverty risk. Hence, this "direct vs. indirect effect" hypothesis will be tested as well.

4 Data and hypotheses to test

To conduct our analysis, we used a panel data of 31 European countries, including Turkey, with a time period extending from 2002 to 2011. The list of the countries appears in Tab. 4A in the appendix, where information about anti-corruption institutions in each country are also included. The sample consists of countries belonging to West and East as

well as to North and South Europe; with Republican or Monarchy Constitutions; with decentralized or a more centralized administration; with a Parliamentary or Presidential government; with Anglican, Catholics, Muslim (Turkey), Orthodox or Protestant religious orientation or simple "social convention"; with a long or more recent *liberal* democratic tradition; with different endowments of natural resources; different demographic structure and different overall economic and social conditions, some of which are observable and others of which are unobservable. Almost all countries in the sample set were Member States of the EU, of which there were 27 members in 2011. The Czech Republic is also included, although it joined the EU in 2013. Of these 28 countries, some have adopted the common Euro currency and others have retained their own national money. The sample also includes Norway, Switzerland and Turkey because of their strong links with the EU.

Our dependent variable is the *Eurostat* Index of people at risk of poverty or social exclusion (AROPE) which measures the share of the population being in *at least one*[8] of the following conditions: a) at risk of poverty, i.e., living below the poverty threshold; b) in a situation of severe material deprivation (lacking at least four out of nine material deprivation items identified in the "economic strain and durable" dimension; c) living in households with very low work intensity, as calculated by dividing the sum of all of the months actually worked by the working age members of the households by the sum of the workable months in the household. To compute the AROPE indicator, at-risk-of-poverty are those persons with an equalized disposable net of direct taxes income below the risk-of-poverty threshold, which is set at 60% of the national median equalized disposable income (after social cash transfers). In 2012, 124.2 million people, 24.8 % of the population, in the EU-28 were at risk of poverty or social exclusion, compared with 24.3 % in 2011. The AROPE figure for the EU-28 average, calculated as a weighted average of national results, masks considerable variation between Member States. At one extreme, the Member States with the highest AROPE rates in 2012 were Bulgaria (49.3 %), Romania (41.7 %), Latvia (36.2 %), Greece (34.6 %), Lithuania, Hungary and Croatia (all three at approximately 32.0 %). At the other extreme, the share of the population at risk of poverty or social exclusion was the lowest in the Netherlands (15.0%), the Czech Republic (15.4%) and Sweden (15.6%). The overall AROPE rate has slightly increased at the EU-28 level between 2011 and 2012 (+0.5 percentage points). The

[8] Using the terminology of Bossert et al (2013), AROPE is a multidimensional index resulting from the *intersection* method of identification of the poor. See Bossert et al. (2013) as well for a discussion of the axiomatic property of EU-SILC, a type of parental antecedent of AROPE.

risk of poverty or social exclusion rose by 3.6% in Greece and 2.5% in Cyprus, decreasing by more than 3% only in Latvia (-3.9%). Looking at each of the three elements contributing to being at risk of poverty or social exclusion, 17.0% of the population in the EU-28 in 2012 was at-risk-of-poverty after social transfers, meaning that their disposable income was below their national at-risk-of-poverty threshold. At-risk-of-poverty rate has overall remained almost stable in the EU-28 compared to 2011. The highest at-risk-of-poverty rates were observed in Greece and Romania (23.1% and 22.6%, respectively), Spain (22.2%) and Bulgaria (21.2%), and the lowest were in the Czech Republic (9.6%), the Netherlands (10.1%), Denmark (13.1%), Finland and Slovakia (both 13.2%). It is important to note that the at-risk-of-poverty rate is a relative measure of poverty and that the poverty threshold varies greatly between Member States. The threshold varies also over time, and, in a number of Member States, it has fallen in recent years due to the economic crisis[9].

Our hypothesis is that AROPE depends upon both economic and governance factors, as well as corruption. The former group includes the following:

1) *GDP per capita*. We use the PPP Converted *GDP* Per Capita (Laspeyres) at 2005 constant prices. The data source is Penn Tables[10]. Given the discussion of section 2, the justification for the use of this variable is almost redundant. The hypothesis is that income reduces the exposition to the risk of poverty or social exclusion.

2) *Total Public Expenditure.* This is measured as a percentage of *GDP* in each country. It partially represents the "weight" of the public sector in each economy. Data are from IMF Statistic and Eurostat. The existence of large public sectors is frequently viewed as an indicator that an extensive welfare system is in operation. We will also include an indicator of the quality of the public activity (*Government Effectiveness*, see below), and we will test the combined effect on AROPE of the level and the perceived *quality* of the public sector expenditure. The hypothesis is that these variables reduce the exposition to the risk of poverty or social exclusion.

[9] See Bárcena-Martin et a. (2013, 3) for a test of the reliability of the items included in the AROPE as good proxies of the underlying deprivation concept. The overall estimated Cronbach's α was 0.718 and was considered a satisfactory level of reliability in most countries analyzed in their paper.

[10] Source: https://pwt.sas.upenn.edu/php_site/pwt71/pwt71_retrieve.php

3) *Local expenditure as a percentage of GDP*. This represents the extent to which the expenditure power is distributed among central and regional/local governments in each country[11]. Combining this with the total public expenditure as a share of *GDP*, we obtain the "local" share of total public expenditure. This incorporates in our estimations an indicator of the degree of decentralization of the public administrative machine but clearly not of the distribution of *tax/expenditure* powers between central and regional/local governments. Consequently, it is not a proper measure of *fiscal federalism* in each country. The hypothesis is that when the share of local public expenditure increases relative to central expenditure, the exposition to the risk of poverty or social exclusion also increases because a highly decentralized administrative machine with autonomous expenditure powers introduces local differences in social policy that may jeopardize the government overall national anti-poverty policy. This would be in accordance with the Musgrave (1959: 182) intuition that the "distributional branch requires primary responsibility at the central level".

4) *Index of State Enterprises and Investment*[12]. Data on the number, composition and share of output supplied by State-Operated Enterprises (SOEs) and government investment as a share of total investment are used to construct the 0–10 ratings. Countries with more government enterprises and government investment received lower ratings. When there were few SOEs and government investment was generally less than 15% of the total investment, countries were given a rating of 10. When there were few SOEs other than those involved in industries where economies of scale reduce the effectiveness of competition (e.g., power generation) and government investment was between 15% and 20% of the total, countries received a rating of 8. When there were, again, few SOEs other than those involved in energy and other such industries and government investment was between 20% and 25% of the total, countries were rated at 7. When SOEs were present in the energy, transportation and communication sectors of the economy and government investment was between 25% and 30% of the total, countries were assigned a rating of 6. When a substantial number of SOEs operated in many sectors, including manufacturing, and government investment was generally between 30% and 40% of the total, countries received a rating of 4. When numerous SOEs operated in

[11] Source: http://epp.eurostat.ec.europa.eu/portal/page/portal/government_finance_statistics/data/database

[12] Source: Gwartney J., R. Lawson and J. Hall (2013)

many sectors, including retail sales, and government investment was between 40% and 50% of the total, countries were rated at 2. A rating of zero was assigned when the economy was dominated by SOEs, and government investment exceeded 50% of the total investment. The hypothesis we want to test is whether an increase of SOE (to simplify, an increase in privatization of state activities) increases poverty risk.

5) T*echnological progress*. High technological progress should make the industrial and service sectors more efficient and productive. However, in developed countries, technological change tends to increase the productivity of higher-qualified workers relative to the lower qualified, and the demand for the former workers may raise at the expense of the latter. Hence, technical progress might increase exposition to the risk of poverty or social exclusion of the less qualified segments of the working population, and through this effect, it may increase the poverty risk. To test this hypothesis, we use the number of *Patent Applications* per million inhabitants of each country as an indicator of the average level of the country's technological level (source: Eurostat).

6) *Duration of unemployment*. We test the hypothesis that when there is a high quota of long-term unemployment, the risk of poverty and social exclusion increases. We use the Index measuring the Incidence of Long-term Unemployment as a Percentage of Total Unemployment[13] as a measure of the quota of people unemployed for at least 12 months. We expect that long-term unemployment increases the risk of poverty and social exclusion.

The *governance* variables we employ are the following:

1) *Corruption in the public sector*. We use the *Corruption Perception Index* (*CPI*) developed by Transparency International and first released in 1995. It ranks countries on the basis of how corrupt the public sector is perceived to be[14]. *CPI* is a composite index, drawing on corruption-

[13] Source: www.cesifo-group.de/DICE/fb/34rAW2LL7

[14] Other indexes may be used for control of the results. We decided to use *CPI* since it is a specific index of perceived corruption in the public and political sectors. Note, however, that all of these indexes are strongly correlated in levels and ranks (Ahmad, 2001; Fisman et al., 2002). Our results do not change in any significant way by using other indexes. Results are available upon request. However, as an aggregate corruption indicator from different sources, *CPI* is viewed (Serra, 2006, 229) as more reliable than single corruption perception indexes. See also Bosco (2015). Still, one should bear in mind that the corruption perception index is based on absolute

related data from expert and business surveys carried out by a variety of independent and reputable institutions. All sources measure the overall extent of corruption (frequency and/or size of bribes) in the public and political sectors, and all sources provide a ranking of countries. During our sample period (2002–2011), *CPI* ranges between 0 (highly corrupt) and 10 (very clean) and seems to better approximate the relevance of the phenomenon we want to incorporate in our study, i.e., corruption in the public and political sectors. We test the hypothesis that corruption directly increases the exposition to the risk of poverty or social deprivation.

2) *Government Effectiveness*[15] released by the Word Bank. This variable reflects the perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation and the credibility of the government's commitment to such policies. The units in which this explicatory variable is measured follow a normal distribution with a mean of zero and a standard deviation of one in each period. This implies that the scores range between approximately –2.5 (weak) and 2.5 (strong) government performance. In our estimations, this variable will interact with the *Total Public Expenditure* to allow us to evaluate the effect on the exposition to poverty risk of both the pure *size* of the public budget (in terms of expenditure) and its perceived *quality*, i.e., the citizens' evaluation of the "value for them" of the government policies implemented using those resources.

3) *Rule of Law*[16]. This reflects perceptions of the extent to which agents have confidence in and abide by the rules of society and, in particular, the quality of contract enforcement, property rights, police activity and the courts, as well as the likelihood of crime and violence. The units in which the control of corruption is measured follow a normal distribution with a mean of zero and a standard deviation of one in each period. This implies that the scores range approximately between –2.5 (weak) and 2.5 (strong) government performance.

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rather than relative values (number of answers per thousands of inhabitants) and so will tend to be biased upward for larger countries (Donchev et al., 2013).

[15] World Bank, Worldwide Governance Indicators (WGI) http://info.worldbank.org/ governance/ wgi/index.asp.

[16] World Bank, Worldwide Governance Indicators (WGI) http://info.worldbank.org /governance/wgi/index.asp .

The expectation is that estimates of AROPE against the above governance variables should produce negative coefficients because an increase in these variables should signal an evolution of society and economic mechanisms that could be favorable to a reduction of the exposition to poverty risk. At the same time, and for the opposite reasons, we expect that corruption increases AROPE.

We also use the following control variables:

i) The *Education Level* of each country. The variable we use is the *percentage of people aged between 30 and 34 years holding a tertiary-level degree*[17]. We have chosen this specific generational cohort under the assumption that people of that age are the most dynamic, talented and perhaps aggressive agents in the labor market and may have more incentives to increase their income at the start of their professional life or business. Hence, the more educated young people are, the less likely that they would fall into a condition of poverty. If this is the case, our education variable should determine a reduction in the conditional expectation of poverty[18]. Note that we do not include in the regression the level of public expenditure on education in each country, which might be affected by corruption because corruption can influence the composition of public expenditure and, particularly, reduce education and health expenditures (Mauro, 1998).

ii) Uninterrupted Democracy. We construct a [0,1] dummy variable to incorporate in the analysis the evolution of the political regime of each country included in the sample: 1 corresponds to the condition of having been (without interruption) a parliamentary democracy since the end of World War II, and 0 corresponds to the opposite case of having experienced other forms of political regimes. We use this dummy not to test for the effect on the exposition to poverty of the actual or perceived *level* of democracy in each country but to evaluate whether the risk of poverty is lower in countries that have maintained democratic political institutions for a longer time. In other words, we test for the effects on poverty risk of a long-standing *habit* to pluralistic political democracy.

[17] Source http://epp.eurostat.ec.europa.eu/portal/page/ portal/cohesion_ policy_ indicators/ documents/edat_lfse

[18] A recent Eurobarometer (2013) survey shows that propensity toward corruption in Europe is inversely related to the age of people included in the sample.

Tables reported in the appendix summarize the main statistics of the above variables. With the above caveats in mind, we identify the hypotheses we want to test as follows.

> *First Hypothesis*: Poverty risk is reduced by economic development (measured by the log of *GDP* per capita) and education but is increased by technological progress, corruption (measured by *CPI*) and bad governance (various variables). These factors affect corruption in an independent way: corruption and bad governance increase poverty risk at any level of per-capita *GDP* and technology.

We study whether the above three factors act jointly or in a separate way (i.e., with or without significant interactions) and whether poverty risk is affected by corruption independently of income level and technology.

> *Second Hypothesis*: Poverty risk decreases with the overall *size* of the public sector (measured by total public expenditure as a share of *GDP* and by a high quota of *Social Expenditure*), but, at the same time, it also decreases when the perceived *quality* of the public action (index of government effectiveness) is high. Simultaneously, we test the hypothesis that when *local expenditure* increases, the exposition to poverty risk or social deprivation also increases (the *Musgravean* effect of local finance).

Our claim is that the perception of a good quality of public policy reduces exposition to the risk of extreme poverty. We will also test the statistical significance of the interaction between the size and quality of public expenditure and the magnitude of decentralization of expenditure powers to consider how poverty risk is associated with each of the above three aspects of public expenditure, namely *volume*, *quality* and *institutional responsibility*.

> *Third Hypothesis*: At first sight, poverty risk may be expected to be lower in countries with longer *democratic traditions* because voters have more experience and can support parties with prominent distributional platforms. However, corruption can weaken the positive impact of a long-standing habit to political democratic mechanisms and jeopardize distributional programs. Hence, we test the hypothesis that corruption interacts with democracy and that the interaction

adversely affects poverty risk. We also test whether this adverse effect occurs in different ways in old and new European (*market-oriented*) democracies and contributes to the explanation of poverty differences and persistence across countries.

This hypothesis implies that democracy reduces the risk of falling into extreme poverty for the reasons discussed above. However, because political (and electoral) corruption hampers and distorts a free and massive participation to political life through the democratic institutions, the hypothesis also implies that a reduction of poverty risk is larger when political corruption is low. Hence, we expect that the favorable effect of democracy diminishes when corruption is high because corruption makes the distributional impact of the above massive political participation less effective[19]. Therefore, we expect the interaction between democracy and corruption to produce statistically significant adverse results to poverty risk.

5. Specifications of the empirical model and results

5.1 A preliminary analysis

Implementing the empirical strategy discussed at the end of section 3, in this section, we evaluate whether corruption affects poverty risk as a direct factor or if the effect is "channeled" by income or governance variables. To conduct the test, we estimated the following (linear) relations

$$PovRisk_{it} = a_1 + b_1\left[Log(GDPN)\right]_{it} + u_{it} \text{ and then } \hat{u}_{it} = c + b_2 CPI_{it} + \varepsilon_{it}$$

where $\hat{u}_{it}$ are the estimated residuals generated by the first model. H_0 is that b_2 is not significantly different from zero, and if H_0 is accepted, the implication is that *CPI* does not affect *PovRisk* through per capita income. We replicate the same analysis for the two governance variables, *GEffect* and *Rule of Law*. Note that the relationship between the dependent variable and the regressors is explicitly assumed as contemporaneous (no lags are used). Results are reported in Tab. 5A. In the all three of the cases, we accept H_0 that the slope coefficient is not significantly different

[19] If a poor voter accepts a bribe to vote for *liberistic* parties of any kind … then he/she will probably remain poor. The political history of Italy is plenty of examples and anecdotes.

from zero and conclude that *CPI* does not affect *Povrisk* (our AROPE variable) via income or governance variables.

5.2 A cross-section between analyses

We start the analysis with a cross-section between estimation of the following cross-section linear between models

$$\overline{APOVRISK}_i = \alpha + \sum_{1=1}^{31} \beta_i \overline{x}_i + u_i \qquad (1)$$

where u_i is a zero mean and constant variance error term, $\overline{POVRISK}_i = \sum_{t=2001}^{T=2011} POVRISK_{it} / 10$ and each regressor x_i is computed as $\overline{x}_i = \sum_{t=2001}^{T=2011} x_{it} / 10$. This specification has the advantage of reducing the endogeneity problem generated by per-capita income (Serra, 2004) but obscures inter-individual differences in the coefficients' estimations. Tab. 1 reports results from different versions of model (1). The first column shows the results of a restricted version of the model in which no governance variables are included and the rest of the table reports estimated coefficients of different versions of a model that includes governance covariates.

<<Tab. 1 here >>

Robust (SEs) results (with 50 bootstrap v.e.c.) show that the risk of poverty and social exclusion decreases with per-capita income but increases with corruption. It decreases with both total and social public expenditure but increases with local public expenditure (a high share of local expenditure apparently reduces the extent of uniformity of the national social antipoverty public measures and partially jeopardizes the results of central government policy). Poverty decreases with education (education remains a social escalator and plays as a sort of personal insurance against economic downturns) and increases with corruption. As for the latter, more comments are reported in the next section. Exposition to poverty also decreases with democracy and technology. When *Democracy* interacts with *CPI* (this variant of the model is estimated only in the between case), the coefficient is negative. Therefore, when D = 0 (no long time consolidated democracy) the effect of corruption on poverty is measured only by its estimated *CPI* coefficient and is always negative. On the contrary, when D = 1 (longstanding democracies) the estimated interaction coefficient should be subtracted from the *CPI* coefficient. Hence, contrary to *naïf*

expectations, an increase in corruption (a reduction of *CPI*) can have stronger effects on poverty risk in countries with a longer history of democracy. However, pessimistic that result might appear, one should bear in mind that estimates show that when D = 1, the longstanding "democratic" political and administrative process seems more equipped to provide a well-spread series of occasions for corrupted practices. As it happens, in those countries, the "democratic" decision process had been more efficiently adapted to a corrupted environment; therefore, corruption and democracy coexist better at the expense of the less fortunate portion of the population. Partial relief from the above pessimism comes from the estimations of governance variables: the two governance variables (used as alternative covariates) are both statistically significant and have the expected sign. *Government Effectiveness* has a higher impact on poverty risk than *Rule of Law* (not reported). Poverty risk is alleviated, ceteris paribus, by the (perhaps illusory) perception of good government. The following table reports the values of linear predicted marginal variations of Poverty Risk for some models' specifications w.r.t. to *Cpi* and *Democracy* when interactions are allowed.

Linear predictors

	dy/dx	SE	z	P>|z|	95% Confidence Interval	
Cpi	- 3.10	1.27	-2.45	0.014	- 5.59	- .62
Democracy	6.34	2.62	2.42	0.019	- .74	11.43

As one can see, predictors are statistically significant and show that poverty risk reduces with democracy, but corruption strongly reduces this effect when D = 1. The overall effect of honesty is lower when D = 1 with respect to the opposite case.

5.3 Panel data estimations

We now turn to panel data estimations to incorporate in the analysis time and individual effects as well as inter-individual differences. The information provided by time-constant individual effects and by country-constant time effects might signal that i) idiosyncratic unobserved factors can affect exposition to poverty risk in different ways at the country level and ii) that a common (across countries) time effect might explain persistence or similar variations of poverty risk over time for the entire set of countries under study. Estimation of all of these effects

permits evaluation of the inter-temporal dependence of the events generating exposition to poverty and a better understanding of what the sources (structural or spurious) of persistence in poverty risk in each country could be. Hence, using panel data, one can exploit both dimensions of the data set and control for individual heterogeneity generated by the presence of country-invariant and time-invariant unobserved factors.
We estimate the following FE panel data models (*i* indicates countries and *t* years) where α_i is a (time constant) individual effect and β is the vector of parameters to be estimated:

$$POVRISK_{it} = \alpha_i + \beta X_{it} + u_{it} \qquad (3)$$

As for the log of per-capita income, a one period lagged value is employed to reduce the above-discussed endogeneity problem. Equation (3) has also been estimated for the entire set of 31 countries and for two sub-groups of countries clustered according to the Democracy criterion. Results are reported in tables below and commented upon with respect to each explanatory factor.

<< Tab. 2 here>>

<< Tab 3 and 4 here>>

Per-capita GDP

As expected, countries' per capita income strongly affects exposition to poverty risk or social exclusion. Coefficients are always negative and statistically significant, and their absolute values range from 13.40 (*New* Democratic countries with no Time/Country effect and no governance variables, Tab. 4 first column) to 6.68 (*New* Democratic countries with Time/Country effects and *Rule of Law* as governance variable, Tab. 4 last column). In any specification of the model, coefficients tend to be smaller when Time/Country effects and governance variables are included. Our results do not accord with Dell'Anno et al. (2013), who propose an overall index of social exclusion for European countries and analyze its relationship with economic growth. They find that Granger causality runs one way from social exclusion to the growth rate of GDP per capita and not the other way around. On the contrary, our results accord with Whelan et al. (2012) and Bárcena-Martin et al. (2013), who find that country differences with respect to (frequency-based) material

derivation levels are explained by differences in the characteristics of individuals (micro-level perspective) as well as by country-specific factors (macro-level perspective) including (total) GDP.
Table 1 reports estimated coefficients of initial Gini Index. High initial inequality is positively associated with poverty (see section 2), and, as in Kalwji et al. (2007), Gini elasticity is smaller than income elasticity. Although our results are not always statistically significant, the above finding implies that initial distribution is a significant factor in the explanation of poverty risk differences in Europe. The same comment applies to the estimated coefficient of initial poverty.

Public expenditure, social expenditure and local expenditure

Results show that poverty reacts to public expenditure in the expected way. This can be attributed to the contribution of public expenditure to the strengthening of human capabilities and reduction of transaction costs. However, estimates obtained using Social Expenditure instead of Total Expenditure are also generally robust, but coefficients show a smaller impact on poverty. These findings may indicate that the poor only partially capture the effects of social expenditures. Explanations may include a reduced efficiency and effectiveness of social expenditure[20] (who does ultimately benefit from this activity and by how much?) or a high complementarity between social expenditure and other sectors' expenditures or simply (in our data set) an overall decline in real per-capita social spending. Similar results are found by Wilhelm et al. (2005) for a small set of developing countries; they emphasize the possibility that spending in sectors that are generally seen as pro-poor in reality tended to benefit the richer quintiles of the population (with the exception of primary education). Data limitations prevent us from conducting such a test, but we suspect that their findings extend to West Europe as well[21]. On the contrary, for developing countries, Mehmood et al. (2010) document a negative relationship between government spending and poverty in Pakistan and mention similar results for other countries.

[20] Estimated coefficients of the interaction terms between Expenditure and Government Effectiveness or Rule of Law (not reported) point to the former as a possible explanation.

[21] Hidalgo-Hidalgo et al. (2013), using EU-SILC data, found that public expenditures in education may have an effect in reducing the probability of being poor as an adult and, particularly, that public spending in *primary* education has a strong effect on raising individuals above the poverty line.

Our results regarding Local Expenditure are also interesting. A high quota of local expenditure over total public expenditure contributes to an increase of poverty. This is not counterintuitive: Musgrave (1959) already stressed the perverse effect of local finance (tax and expenditure) on distribution more than half a century ago.

SOE

Our analysis includes a variable such as SOE for the first time in a study of poverty risk. Whereas public expenditure (and particularly, social) can be seen as instruments of social reproduction mechanisms in capitalistic societies, SOE is a factor directly affecting the sphere of production activity. This covariate measures the share of output supplied by State-Operated Enterprises (SOEs) and government investment as a share of total investment in a country: a high value signals a low share of public investment and SOEs' activity and vice-versa. A finding showing a significant impact of SOE on poverty would be a clue that poverty is primarily generated in the productive sphere of the economy. Positive estimated coefficients imply that an increase of SOE's value (i.e., a reduction of the presence of the public sector in each national economy; to simplify, we might call this *privatization*) produces an increase in the exposition to poverty risk. This is a signal that (broadly speaking) privatization activity all over Europe has generated an increase in the exposition of the population to poverty and social exclusion. A reasonable corollary is that the (feeble) replacement of private for public investment during the period has not contrasted this adverse effect on poverty. No significant differences can be appreciated by contrasting D = 0 vs. D = 1 countries or Catholic/Orthodox vs. Other Religions countries (estimates not reported), which implies that privatization has operated in a uniform and perverse way on poverty *everywhere*. Note that the inclusion of Time and Country Effects does not appreciably reduce (understandably) the estimated coefficients. Privatization in Europe was not a country/time specific feature in our sample: governments obeyed a common overpowering command in a quite synchronic and possibly well-coordinated way.

Corruption

The perception of a high (low) level of corruption in the public sector increases (decreases) the exposition to the risk of extreme poverty and social exclusion. D = 0 countries show moderately higher values of estimated coefficients, but the results do not change much from one

model variant to another. Recalling that the scale of CPI is 0–10, a one percent increase in honesty (i.e., a one percent increase in CPI) would imply, on average, a 12 percent reduction in the exposition to poverty risk, ceteris paribus. This seems to be a strong result. However, even admitting that there is a small degree of overestimation (see discussion in section 3), the results show that high corruption determines high poverty and explains, among other cofactors, countries' differences in poverty trends as well as poverty persistence. However, as stressed by Donchev et al. (2013), perception indices are influenced by absolute (as opposed to relative) levels of corruption, which tends to penalize large countries, and they exhibit diminishing sensitivity to both absolute and relative corruption, indicating that they may better capture differences among countries *with low levels of corruption* than among highly corrupt ones. Individual and firm-level characteristics (such as education, age, employment status, number of competitors) may also influence corruption perceptions, holding experience constant, as well as poverty. Therefore, when individual data are employed and a multilevel analysis is conducted, corruption perception indices may not return statistically significant results. This hypothesis will be tested in further developments of the present study.

Technology

The question about the relationship between technical progress and poverty dates back at least to Malthus and Ricardo (not to mention Saint Thomas' *Summa contra Gentiles* or the Marxian falling rate of profit), and these estimates have no pretense of adding any original element to the discussion. Still, the idea that poverty increases with technical progress is somewhat supported by the present study. Our findings are not clear-cut, however. BE estimates show that technology may increase poverty when no governance factors are included, but these estimates are not strong. FE panel estimates follow the same direction. Overall, the picture that emerges is not entirely in accordance with the view that as technology advances, it correspondingly crates specialized skills that are conducive to its further application. The results are also compatible with the view that technological change may lead to the deskilling of the labor force, thus resulting in the "deskilling" of workers and polarization of their income.

Education

As expected, education diminishes poverty risk by favoring social mobility. However, the estimated effect is significant but not strong. This is not entirely in accordance with an expansive previous literature and deserves additional comments. Recall that our measure of education is not based on primary education, which is widely perceived to have a key role in reducing poverty; to be positively associated with development-related outcomes, such as improving productivity; and is generally acknowledged to be able to break the intergenerational transmission of poverty. Our education variable is based on tertiary education achievements of which the favorable effects on poverty are more diluted. One may say, for instance, that, as poverty is also a result of credit market failures, high-level education can contribute to poverty alleviation by reducing moral hazard and selection problems in the credit market, with an indirect favorable effect on investment and employment.

Democracy

When we allow for interaction between democracy and corruption, Democracy alone has a negative coefficient and generally statistically significant (understandably). However, the estimated coefficient of *Democracy*CPI* is positive and significant. Then, when D = 0 (absence of a long tradition of democracy), corruption increases the risk of poverty. On the contrary, when D = 1 and democracy interacts with corruption, the net value of CPI coefficient is positive. In other words, for those countries where D = 1, the interaction of democracy and CPI lessens the favorable effect on the poverty risk of (reducing) corruption. Hence, a reduction of corruption does not produce fully favorable effects in old democratic countries.

Governance variables and the quality of public action

Governance variables, such as the Rule of Law, produce estimated coefficients that are statistically significant and show the expected signs. The effectiveness of government expenditure can be seen as a proxy of the extent to which the administrative machine fulfills its obligations. A positive perception of the quality of public action (both variables) reduces exposition to poverty risk in any version of the model for both D = 0 and D = 1 countries. However, the most important factor affecting poverty risk is the perception of the effectiveness of government expenditure. Notice that differences in the magnitude of the estimated coefficients between D = 0 and D = 1 countries are higher in a fully

pooled version of the model (estimations not reported), whereas these differences are reduced when country effects are included. This may signal that governance variables represent one of those unobserved factors that explain cross-country differences in exposition to poverty risk. *Geffect*, when interacting with *Total Expenditure* produces positive and statistically significant coefficients. Once again, a small difference between the two groups of countries exists but does not reduce the conclusion that an increase in *Public Expenditure* generates an overall decrease of poverty risk whenever the value of *Geffect* is positive.

Time and country effects

Specific unobservable country conditions appear of great importance in poverty analysis, as was already discussed in section 2. We estimated time and country effects for the all-31 countries as well as from sub-groups of D = 0 and D = 1 countries.

Starting with the time effects (not reported), we notice that poverty risk and social exclusion are not static characteristics of each country, but, due to factors that somehow evolve over time and equally affect all countries, they change during the period analyzed in this study. With respect to the last years included in the sample, an increase in poverty risk due to time effects (usually statistically significant across estimates) seems to be related to the general negative trends of the economy in Europe. This is evident for the 31 countries' pooled estimates and particularly for the subgroup of D = 1 countries. FE estimates for D = 0 countries are somehow different. They produce values showing a smaller time increase of poverty risk. Recall, however, that time effects are likely more correlated with income, which can explain the general trend of the three series of estimates to produce similar results. Altogether, the time effects signal that poverty risk and social exclusion in European countries have been negatively affected by some common time-varying external forces possibly represented by the post-2007 economic crisis.

Country effects require similar considerations. On average, the individual effects for D = 0 countries (all post-Soviets with the exception of Portugal and Spain), when positive, are smaller than those of D = 1 countries. Persisting small differences within each group could be explained by specific country characteristics related, among other things, to the organization of the welfare state in each country or to the persistence of a life solidarity that the socio/political changes have not been able to completely subvert. Still, differences in economic freedom and market competition may also be important factors. However, as recently discussed by Pieroni et al. (2013) evidence in this respect is not clear-

cut. Using micro-data for a group of countries, they found that differences across countries account for a high component of the economic freedom/corruption link, particularly for developing and transition countries. This suggests that market competition reduces corruption (and hence poverty, according to our results) when institutions are weak, which is consistent with their estimated countries effects. Hence, these market factors can be invoked in the interpretation of our results as well. Country effects are reported in Tab. 5, where different estimates are reported for Old (D=1) and New Democratic countries (D=0).

<< Tab. 5 here>>

Some policy implications

Recall that the five targets for the EU in 2020 are 1. employment (75% of the 20- to 64 year-olds to be employed); 2. R&D (3% of the EU's GDP to be invested in R&D); 3. climate change and energy sustainability (greenhouse gas emissions 20% – or even 30%, if the conditions are right – lower than 1990, 20% of energy from renewables and 20% increase in energy efficiency); 4. education (reducing the rates of leaving school early school to below 10%; at least 40% of 30- to 34–year-olds completing tertiary-level education); and 5. fighting poverty and social exclusion (at least 20 million fewer people in or at risk of poverty and social exclusion). These targets have been translated into national targets so that each Member State can check its own progress towards these goals. They are interrelated and mutually reinforcing: educational improvements help employability and reduce poverty; more R&D/innovation in the economy induces more competitiveness and creates jobs; and investment in cleaner technologies combats climate change while also creating new business/job opportunities.

The results indicate that poverty risk and social exclusion are affected by more factors than income alone and that technical progress (and probably higher education, too) should not be overemphasized as is in the above list of goals/instruments. Corruption and institutional quality are of equal importance, as is the effectiveness of public action. However, local expenditure has a perverse effect on poverty, which should suggest specific policy guidelines to member states. The Euro 2020 strategy should also critically reconsider privatizations of public firms or substitution of private for public investment. The estimates show that poverty is significantly affected by the *privatization* of public enterprises, and this may depend upon tariffs and employment policies followed by

privatized firms. The great expectations in this field have turned into a disappointing reality.

6 Concluding comments

Why do we have persistent poverty differences in Europe? Are they generated by income and growth differences alone? What can the Europe 2020 strategy do to improve this situation? In this paper, we have investigated the relationship between poverty risk and social exclusion and economic and non-economic factors. The results in general indicate that political and institutional factors are of significant importance and specifically that the quality of institution, such as the level of corruption, explains poverty differences across countries.

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APPENDIX

Tab. 1A *Summary statistics (Units: 31 European Countries; Time interval: 2002 – 2011)*

	CPI	*EDU*	*T. EXP*	*LOCEXP*	*Pc-GDP*	*PATENT*	*POVRISK*
Range	0 – 10	0 – 100	0 – 100	0 – 100			0 – 100
Mean	6.46	0.84	44.74	10.73	26,674.81	91.32	26.72
Median	6.50	0.85	45.00	9.50	26,177.52	31.31	22.80
Max	9.70	0.99	67.5	37.30	80,215.48	433	73.10
Min	2.60	0.51	18.00	0.50	6,575.16	0.49	2.40
SD	1.97	0.08	6.66	6.65	13,663.08	108.29	12.89
Jarque-Bera	21.39	115.59	22.67	321.71	173.63	83.04	271.17
Observations	310	310	310	310	310	310	310

Tab. 2A *Variance-Covariance matrix (Units: 31 European Countries; Time interval: 2002 – 2011)*

	CPI	*EDU*	*T. EXP*	*Pc-GDP*	*LOCEXP*	*POVRISK*	*PATENT*
CPI	3.80						
EDU	0.071	0.006					
T. EXP	5.35	0.20	46.00				
Pc-GDP	20238	397.47	25604.80	1.86E+08			
LOCEXP	5.31	0.171	18.46	12819.85	44.14		
POVRISK	-17.50	-0.663	-44.70	-112083.0	-13.478	165.74	
PATENT	169	3.09	220.43	934,772	272.59	-729.96	11,689.09

Tab 3A *Average Spearman rank correlation coefficients (t-statistics in parentheses, NT = 310)**

	P-C GDP	**POVRISK**	**GOVERNMENT EXPENDITURE**	**LOCAL EXPENDITURE**	**EDUCATION**	**PATENT**	**CPI**
P-C GDP	1.00						
POVRISK	-0.81	1.00					
	(-24.51)						
GOVERNMENT	0.41	-0.48	1.00				
EXPENDITURE	(7.83)	(-9.60)					
LOCAL	0.13	-0.23	0.35	1.00			
EXPENDITURE	(2.34)	(-4.08)	(6.63)				
EDUCATION	0.46	-0.53	0.32	0.39	1.00		
	(9.134)	(-10.94)	(5.90)	(7.42)			
PATENT	0.25	-0.002	0.0003	-0.001	0.011	1.00	
	(3.98)	(-2.72)	(2.03)	(-1.91)	(2.77)		
CPI	0.85	-0.80	0.41	0.26	0.44	0.89	1.00
	(28.25)	(-23.56)	(8.06)	(4.90)	(8.60)	(34.18)	

* Each year the statistics is computed using cross-country average values of each variable. The table reports the period average values of each annual rank-coefficient

Tab. 4A *Countries included in the analysis (source Bosco, 2015)*

	Long Time Democracy (End WW II) YES = 1 NO = 0	**Religion** Rel1 = Catholic/Orthodox Rel2 = Protestant Rel3 = Muslim	**Existence of a specific anti-corruption legislation**	**Existence of Regulatory Body**	**Are Regular reports published?**	**Are Staff gifts limited or prohibited?**	**Existence of MPs Code of conduct**	**Existence of a Staff Code of conduct**	**Are Lobbies regulated?**
Austria	1	Rel1	YES	YES	NO	YES	NO	NO	NA
Belgium	1	Rel1	YES	YES	NO	NO	NO	NO	NA
Bulgaria	0	Rel1	YES	YES	NO	YES	YES	YES	NA
Croatia	0	Rel1	YES	YES	NO	NO	YES	YES	NO
Cyprus	1	Rel1	NO	NO	NO	NO	NO	NO	NA
Czech Rep.	0	Rel1	NO	YES	NO	YES	YES	NO	NO
Denmark	1	Rel2	NO	NO	NO	YES	NO	NO	NO
Estonia	0	Rel2	NO	YES	NO	NO	NO	NO	NA
Finland	1	Rel2	YES	NO	NO	YES	NO	NO	NA
France	1	Rel1	YES	YES	NO	YES	YES	YES	YES
Germany	1	Rel2	NO	NO	NO	YES	NO	NO	NO
Greece	0	Rel1	NO	NO	NO	NO	NO	NO	NA
Hungary	0	Rel1	NO	NO	NO	NO	NO	NO	NA
Ireland	1	Rel1	YES	YES	YES	YES	YES	YES	NA
Italy	1	Rel1	YES	NO	NO	YES	NO	YES	NO
Latvia	0	Rel2	YES	YES	NO	YES	YES	NO	NO
Lithuania	0	Rel1	NO	YES	NO	NO	NO	NO	YES
Luxembourg	1	Rel1	YES	NO	NO	YES	NO	YES	NO
Malta	1	Rel1	YES	NO	NO	YES	YES	YES	NA
Netherlands	1	Rel2	NO	NO	NO	NO	NO	NO	NO
Poland	0	Rel1	NO	YES	NO	NO	NO	NO	YES
Portugal	0	Rel1	YES	NO	NO	NO	NO	YES	NA
Romania	0	Rel1	NO	NO	NO	NO	NO	NO	NA
Slovak Rep.	0	Rel1	NO	NO	NO	YES	NO	NO	NA
Slovenia	0	Rel1	YES	YES	NO	YES	NO	NO	YES
Spain	0	Rel1	YES	NO	NO	NO	NO	NO	NO
Sweden	1	Rel2	NO	NO	NO	NO	NO	NO	NO
U.K.	1	Rel2	NO	YES	NO	YES	YES	YES	NO
Norway	1	Rel2	YES	YES	YES	YES	YES	YES	YES
Switzerland	1	Rel1	YES	YES	NO	YES	YES	YES	YES
Turkey	1	Rel3	YES	YES	NO	YES	YES	YES	YES

Tab 5A Preliminary analysis[22]. *i*) Dependent Variable: Fitted Balanced Panel Least Squares Residuals of *PovRisk* = a_1 + b_1[*GDPN*)]. *ii*) Dependent variable: Fitted Balanced Panel Least Squares Residuals of *PovRisk* = a_2 + b_2[*GEffect)*]. *iii*) Dependent variable: Fitted Balanced Panel Least Squares Residuals of *PovRisk* = a_3 + b_3[*Law)*]. Sample: 2002-2011 Cross-sections included 31. N×T = 310. *t*-statistics in parentheses.

	i	*ii*	*iii*
Cost	1.76	-0.83	-0.93
	(1.19)	(-0.55)	(-0.61)
CPI	-0.27	0.13	0.14
	(-1.25)	(0.58)	(0.64)
R-squared	0.0050	0.0010	-0.0019
F-statistic	1.5543	0.3335	0.4046
Prob (F-statistic)	0.2134	0.5640	0.5251

[22] I owe this suggestion to Matteo Pelagatti.

Tab. 1 *31 countries bootstrap between estimates. Dependent variable: APOVRISK$_i$. (*** means p <0.01; ** means p < 0.05, *means p < 0.1.)*
t-stat in parenthesis

C	175.14***	111.02***	103.21***	122.02***	107.18***	112.03***	125.72***	111.12***
	(4.90)	(13.41)	(11.40)	(12.11)	(17.19)	(12.91)	(15.47)	(14.40)
Log(Per capita GDP)	-7.59**	-7.10***	-6.80***	-6.98***	-6.02***	-7.32***	-7.18***	-6.98***
	(-2.19)	(-6.15)	(-7.41)	(-7.02)	(-6,42)	(-6.96)	(-7.33)	(-5.03)
TOTAL EXPENDITURE	-0.22	-0.41***	-0.36***					
	(-1.08)	(-4.14)	(-6.44)					
SOCIAL EXPENDITURE				-0.44*	-0.41**	-0.46**		
				(3.06)	(4.98)	(6.03)		
LOCAL EXPENDITURE							0.26***	0.22**
							(4.11)	(2.91)
GINI (2004)	3.76	3.39	2.98	3.05	3.36	2.95	1.01	
	(3.78)**	(2.09)*	(1.97)	(2.99)*	(2.03)**	(2.88)*	(1.80)	
POVRISK (2002)	3.67	2.98	3.04				2.73	
	(3.09)**	(3.07)**	(2.99)*				(3.53)**	
CPI	-3.70**	-1.51**	-1.19**	-1.34**	-0.99**	-1.02**	-1.51**	-1.31**
	(-4.74)	(-2.94)	(-4.12)	(-3.14)	(-5.21)	(-3.12)	(-2.58)	(-2.88)
SOE	-0.041**	0.004*	0.003**	0.001	0.002**	0.001	0.004**	0.004**
	(-0.40)	(2.99)	(2.99)	(1.19)	(2.98)	(1.99)	(3.82)	(3.62)
DEMOCRACY	-30.72**	-0.41**	-0.046**	-0.042**	-0.047***	-0.39**	-0.046**	-0.036**
	(-2.78)	(-5.01)	(-3.45)	(-5.61)	(6.01)	(-3.79)	(-5.10)	(-4.19)
PATENT	0.0009*	-0.01*	-0.01*	0.001*	-0.002*	-0.01**	-0.01*	-0.01*
	(2.04)	(-2.07)	(-2.31)	(2.67)	(2.43)	(3.93)	(-2.31)	(-2.21)
EDUCATION	-27.86**	-9.01**	-7.01**	-9.21**	-4.82*	-9.11*	-10.01**	-9.09**
	(-1.27)	(-3.21)	(-3.23)	(-3.81)	(2.97)	(-2.72)	(-4.13)	(-4.73)
DEMOCRACY*CPI	5.79**	0.04*	0.06**	0.06*	0.08	0.02*	0.09**	0.08**
	(3.84)	(3.28)	(3.73)	(2.98)	(1.95)	(2.17)	(4.20)	(4.29)
Governance Variables								
GOVERNMENT		-0.23**			-0.38**			-0.11**
EFFECTIVENESS		(-3.87)			(3.99)			(-2.37)
RULE of LAW			-0.020**			-0.019**		
			(-3.71)			(3.19)		
SD(u_i + avg(e_i))	2.67	2.64	2.60	2.68	2.63	2.59	2.64	2.66
R^2 (Overall)	0.69	0.68	0.68	0.69	0.67	0.68	0.68	0.67
Cross-Obs.	31	31	31	31	31	31	31	31

Tab. 2 *31 Countries panel estimates. Dependent variable: $POVRISK_{it}$ (*** means p <0.01; ** means p < 0.05, *means p < 0.1.)*

	FE Panel No Time/Country Effects	FE Panel No Time/Country Effects	FE Panel No Time/Country Effects	FE Panel No Time/Country Effects	FE Panel Time/Country Effects	FE Panel Time/Country Effects	FE Panel Time/Country Effects
C	206.30***	203.40***	204.10***	204.30***	123.40***	112.10***	116.40***
	(17.70)	(12.73)	(10.37)	(12.03)	(12. 32)	(10. 32)	(11.17)
Log(Per capita GDP(-1))	-9.98***	-10.08***	-9.18***	-10.01***	-10.71***	-9.61***	-9.54***
	(-8.28)	(-8.32)	(-8.41)	(-7.53)	(-7.49)	(-7.99)	(-6.01)
TOTAL EXPENDITURE	-0.42***	-0.46***			-0.40**		
	(-6.64)	(-6.22)			(3.91)		
SOCIAL EXPENDITURE			-0.27**				-0.34*
			(-2.72)				(2.96)
LOCAL EXPENDITURE				034*		-0.31**	
				(2.09		(3.41)	
SOE	0.002*	0.001*	0.001	0.0001	0.0002	0.002	-0.001*
	(2.92)	(2.69)	(2.99)	(1.09)	(1.98)	(1.99)	(2.09)
CPI	-1.41*	-1.21*	-1.19*	-1.13*	-1.11**	-1.18**	-1.08*
	(-2.78)	(-3.38)	(-2.41)	(-2.51)	(-3.18)	(-2.48)	(-3.08)
DEMOCRACY	-6.05**	-5.55**	-3.05**	-4.04**			
	(-5.11)	(-5.72)	(-5.72)	(-5.01)			
PATENT	0.002*	-0.001	-0.001	0.001*	-0.001	-0.001	-0.001
	(2.93)	(-1.43)	(-1.83)	(2.20)	(-1.03)	(-1.43)	(-2.17)
EDUCATION	-37.11***	-33.12**	-30.42**	-31.14**	-23.02**	-22.01**	-24.12**
	(-6.43)	(-4.03)	(-4.33)	(-3.09)	(-2.43)	(-2.53)	(-4.53)
DEMOCRACY*CPI	0.004*	0.004	0.003	0.003*			
	(2.99)	(1.99)	(1.97)	(2.19)			
Governance Variables							
GOVERNMENT		-0.65			-0.07*		-0.08
EFFECTIVENESS(-1)		(-1.91)			(-1.99)		(-1.61)
RULE of LAW(-1)						-0.05*	
						(-2.01)	
Pesaran CD test	30.081	30.011	30.011	28.92	30.11	30.11	31.212
Average ρ	0.31	0.30	0.29	0.28	0.29	0.29	0.29
R^2	0.68	0.68	0.68	0.64	0.69	0.69	0.68
Obs.	279	279	279	279	279	279	279

Tab. 3 17 (***Old***) *Democratic Countries panel estimates. Dependent variable: $POVRISK_{it}$ (*** means p <0.01; ** means p < 0.05, *means p < 0.1.)*

	FE Panel No Time/Country Effects	FE Panel No Time/Country Effects	FE Panel No Time/Country Effects	FE Panel No Time/Country Effects	FE Panel Time/Country Effects	FE Panel Time/Country Effects	FE Panel Time/Country Effects	FE Panel Time/Country Effects
C	99.12***	100.02***	101.11***	102.22***	98.72***	101.21***	98.09***	99.77***
	(11.43)	(13.11)	(18.10)	(11.01)	(13.17)	(11.56)	(11.31)	(12.27)
Log(Per capita	-8.41***	-7.49***	-6.82***	-6.91***	-8.10***	-8.01***	-6.42***	-7.80***
GDP(-1))	(-7.33)	(-6.35)	(-7,11)	(-5.92)	(-5.93)	(-6.51)	(-6.71)	(-7.43)
TOTAL	-0.38***	-0.44			-0.29***	-0.35***		
EXPENDITURE	(-6.24)	(-1.74)			(-5.29)	(-6.14)		
SOCIAL			-0.33**				-0.29**	
EXPENDITURE			(4.28)				(5.73)	
LOCAL				0.31*				0.31***
EXPENDITURE				(2.51)				(4.11)
SOE	0.002*	0.002*	0.001*	0.001	0.001*	-0.0001	0.0001	0.002
	(2.72)	(2.38)	(2.29)	(2.09)	(2.29)	(1.78)	(1.09)	(2.01)
CPI	-1.32**	-1.31**	-1.19***	-1.24**	-1.11**	-1.19**	-1.12**	-1.11**
	(-3.28)	(-3.91)	(-5.03)	(-3.97)	(-2.98)	(-3.82)	(3.79)	(-3.58)
PATENT	-0.009*	-0.01**	-0.002*	-0.001*	-0.002*	-0.01	-0.001**	-0.002
	(-2.01)	(-3.01)	(2.83)	(-2.57)	(-3.81)	(-1.31)	(3.44)	(2.01)
EDUCATION	-5.01*	-5.01**	-4.02**	-4.26**	-4.01**	-5.01	-4.11	-3.91*
	(-3.33)	(-3.71)	(3.99)	(-3.88)	(-4.13)	(-1.23)	(-1.72)	(-2.23)
Governance Variables								
GOVERNMENT		-0.19**	-0.17**			-0.29**	-0.12**	
EFFECTIVENESS (-1)		(-3.97)	(3.28)			(-3.91)	(-2.99)	
Pesaran CD test	30.081	31.831	30.011	32.089	31.212	30.011	28.92	30.11
Average ρ	0.31	0.29	0.26	0.30	0.29	0.29	0.28	0.29
R^2	0.63	0.66	0.68	0.67	0.68	0.66	0.70	0.68
Obs.	153	153	153	153	153	153	153	153

Tab. 4 (*14 New) Democratic Countries panel estimates. Dependent variable: $POVRISK_{it}$ (*** means p <0.01; ** means p < 0.05, *means p < 0.1.)*

	FE Panel No Time/Country Effects	FE Panel No Time/Country Effects	FE Panel No Time/Country Effects	FE Panel No Time/Country Effects	FE Panel Time/Country Effects	FE Panel Time/Country Effects	FE Panel Time/Country Effects	FE Panel Time/Country Effects
C	119.32***	108.08***	111.11***	112.12***	111.23***	101.22***	102.19***	103.03***
	(14.43)	(13.51)	(17.80)	(16.00)	(13.51)	(10.87)	(13.31)	(14.07)
Log(Per capita	-13.40***	-11.69***	-7.72***	-7.99***	-8.77***	-8.19***	-6.92***	-6.88**
GDP(-1))	(-6.13)	(-6.05)	(-6,01)	(-5.66)	(-6.01)	(-5.63)	(-6.41)	(-5.43)
TOTAL	-0.29**	-0.34			-0.45***	-0.39***		
EXPENDITURE	(-3.24)	(-1.94)			(-5.11)	(-5.04)		
SOCIAL			-0.31				-0.29	
EXPENDITURE			(1.28)				(2.01)	
LOCAL				-0.28				0.31
EXPENDITURE				(-1.51)				(1.11)
SOE	0.001*	0.001*	0.001*	0.001	0.0001	0.001*	0.0001	-0.0002*
	(2.32)	(3.08)	(2.39)	(2.04)	(1.48)	(2.51)	(1.29)	(-2.61)
CPI	-1.02**	-1.01**	-1.09***	-1.12**	-1.09**	-1.11**	-1.12**	-1.11**
	(-3.78)	(-3.95)	(-5.13)	(-3.96)	(-3.92)	(-2.98)	(3.29)	(-3.68)
PATENT	-0.009**	-0.001*	-0.002*	-0.001*	-0.01	-0.002*	-0.001**	-0.001
	(-3.01)	(-2.01)	(2.63)	(-2.47)	(-1.81)	(-3.61)	(3.33)	(2.01)
EDUCATION	-2.01*	-3.01**	-3.32**	-4.16**	-2.01	-2.01**	-1.11	-1.97*
	(-2.33)	(-2.71)	(3.92)	(-3.58)	(-1.23)	(-2.43)	(-1.92)	(-2.83)
Governance Variables								
GOVERNMENT		-0.19**	-0.20**			-0.10**	-0.11**	
EFFECTIVENESS(-1)		(-4.47)	(3.28)			(-4.17)	(3.33)	
RULE of LAW(-1)				-0.01**				-0.12**
				(-3.13)				(-4.29)
Pesaran CD test	30.101	31.111	30.084	32.021	29.432	31.212	29.172	30.041
Average ρ	0.30	0.28	0.26	0.32	0.28	0.29	0.28	0.30
R^2	0.61	0.64	0.64	0.65	0.64	0.64	0.66	0.67
Obs.	126	126	126	126	126	126	126	126

Tab. 5 *31 Countries Estimated Individual Effects (*** means p <0.01; ** means p < 0.05, *means p < 0.1.)*

	Country Effects	
	D = 0	**D = 1**
Austria		-0.12**
Belgium		0.13**
Bulgaria	0.92*	
Croatia	0.80*	
Cyprus		-1.01
Czech Rep	-0.69*	
Denmark		0.11**
Estonia	1.01*	
Finland		0.09*
France		0.12*
Germany		0.21**
Greece	1.08*	
Hungary	0.99	
Ireland		0.81*
Italy		0.79**
Latvia	1.02*	
Lithuania	0.99	
Luxembourg		0.11*
Malta		0.40*
Netherlands		0.11*
Poland	1.03**	
Portugal	1.01*	
Romania	1.05**	
Slovak Rep	0.99*	
Slovenia	-0.87*	
Spain	0.28**	
Sweden		0.09*
UK		0.40*
Norway		-0.12*
Switzerland		0.14**
Turkey		1.21*

Fig. 1 *Initial income and income growth (log values of income)*

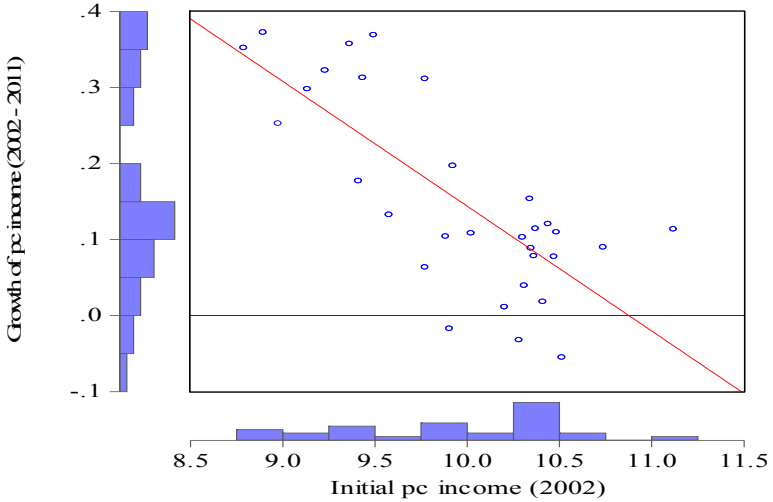

Fig. 2 *Growth of income per capita and poverty risk growth*

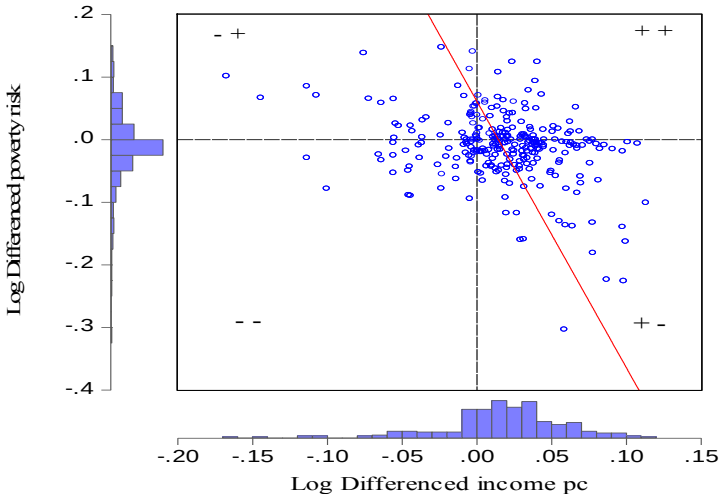

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Fig. 3 *Initial poverty risk and poverty risk growth*

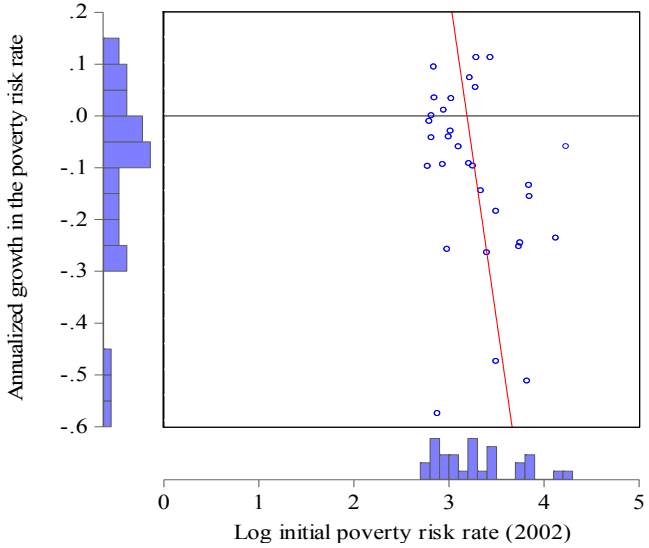

Fig. 4 *Gini vs. poverty risk*

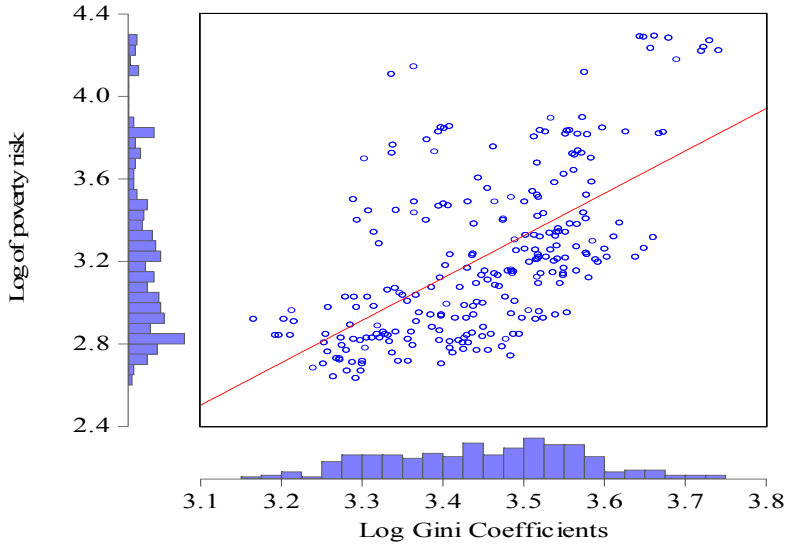

Fig. 5 *Growth of Gini Index and Gini initial values*

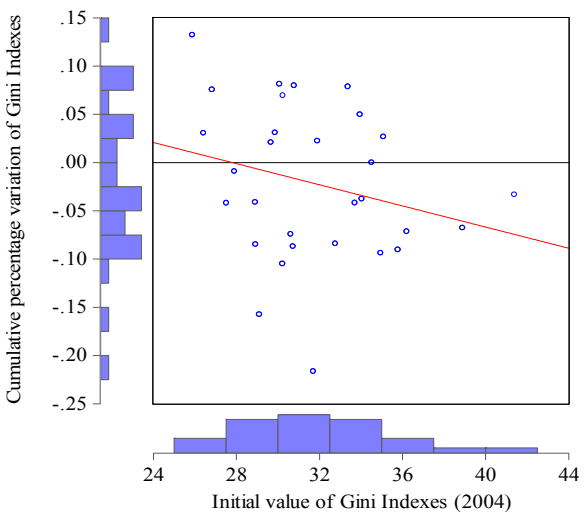

Fig. 6 *Growth of Gini Index and poverty growth*

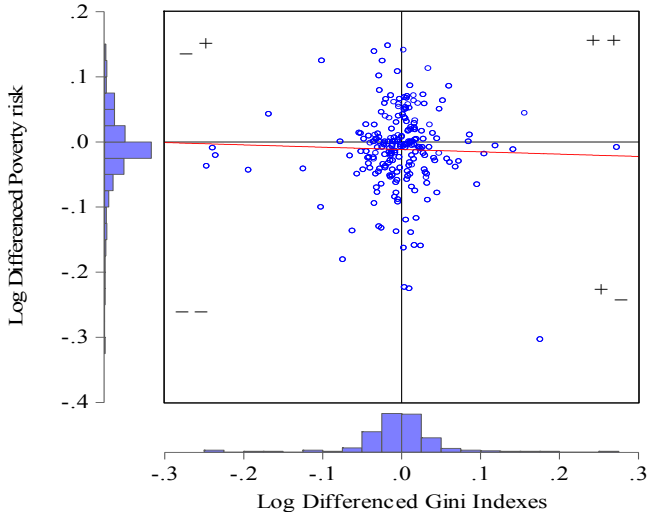

Fig. 7 *Pc-income vs. Gini Index*

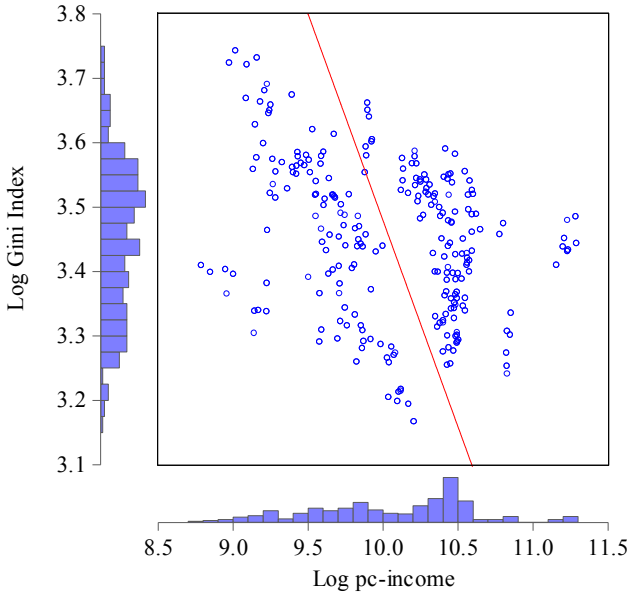

Fig 8 *Initial pc-income vs. growth of Gini Index*