The Effect of Skilled Migration on Institutional Quality of Italian Provinces.

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Abstract:

The paper aims at investigating the relationship between internal migration and institutional quality across the Italian provinces. In most studies, the potential determinants of migration have been investigated, while the effect of these flows of individuals has received less attention. In particular, within the migration literature focused on the consequences of migration, there is a larger gap concerning the relationship between migration and institutions. Using a panel data during the time period 2004-2012, the authors tested if the skilled-emigration flows, distinguished by educational level, had an effect on institutional quality. In order to control both the issue of heterogeneity and the spatial dependence between spatial related units, the paper implements a fixed-effects spatial lag.

The findings show that skilled emigration flows have a positive impact on the quality of political and economic institutions of Italian provinces. However, these results seem to be driven by the positive effects of human capital emigration from the Central-Northern provinces. Indeed, when we test the relationship validity for the Southern provinces the effects do not appear statistically significant. Therefore, the paper confirms a persistent dualism between the Centre-North and the 'Mezzogiorno' also in term of political and economic institutions.

Keywords: Institutional quality, skilled-emigration, Italian provinces.

Introduction

During the last few decades the economic literature has shown a growing interest both on the importance of institutions for economic development (Acemoglu et al., 2005a; Rodrik, 2007; Rodrìguez-Pose, 2013) and on the relationship between human capital and institutions (Glaeser, 2004; Acemoglu et al., 2005b). Furthermore, in an era when the human capital mobility is becoming more intensive (over 20 million high-skilled individuals who live in the OECD area are migrants) the economic attention, from both researchers and policymakers, is paid on the causal effect of this high-skilled mobility on institutional quality.

The institutions represent the "rules of the game in a society; (and) more formally, (as) the humanly devised constraints that shape human interaction" (North, 1990 p. 477). Acemoglu et al. (2005a) contributes to this definition by operating a distinction between *economic* and *political* institutions. While the former affect the technological change, the organization of production and physical and human capital accumulation, the latter includes the *de jure* political power and the *de facto* political power. This hierarchy of institutions seems to justify a possible different impact of human capital mobility on *economic* and *political* institutions

In this paper, by making use of recently available datasets, the causal nexus between skilled-emigration and the quality of *political* and *economic* institutions is tested.

The theoretical and empirical literature has paid considerable attention to the role of brain drain in institutional development and has shown that a high level of skilled outflows increases the institutional quality in the sending places (Li et al., 2016; Beine and Sekkat, 2013). There are several channels through which the skilled-emigration could affect the institutional quality. Li and McHale (2006) describe these channels by separating the impacts on *political* institutions from those on *economic* institutions. However, the final effect of skilled-emigration is ambiguous and depends on the magnitude of each different channel. Barro (1999) and Glaeser et al. (2004), for instance, show that the differences of human capital endowment, besides affecting the level of democracy, are also able to explain the disparities in terms of institutions.

However, all of these studies are focused on the effects of international emigration on institutional quality by considering the country as unit of analysis. The literature, indeed, beyond having demonstrated the importance of skilled individuals in explaining the institutional quality and the existence of feedback from emigration to the origin place, present a gap concerning the potential effect on institutional quality of these flows of individuals at the regional level. Moreover, different authors have demonstrated the increasing role of institutions for the regional development that in most cases is greater than those related to the traditional factors such as human and physical capital (Acemoglu et al.

2001). Streeck (1991) and Rodriguez-Pose (1999) shed light on the positive relationship between the regional institutional composition and the dynamic of growth by affirming that the organization abilities of institutions work better at the regional level with respect to the national scale where institutions are "too distant, remote and detached in order to be effective in mobilizing organizations" (Rodriguez-Pose, 2013 p.1037)

Given the recognized importance of institutions as a key factor to promote regional growth and the capability of skilled-emigration to promote institutional quality, the present paper attempts to fill the literature gap by exploring if and to what extent the flows of skilled individuals have an effect on the quality of *economic* and *political* institutions in the sending region once we control for a number of important variables (degree of regional openness, the stock of regional human capital, the ethnic fractionalization and the R&D intensity) that have been shown to determine institutions (Spilimbergo, 2009; Beine and Sekkat, 2013; Doquier et al., 2016).

The econometric analysis is carried out by merging the ISTAT's dataset on bilateral migration flows by educational level among the Italian provinces during the period 2004-2012 and the dataset of Nifo and Vecchione (2014) on institutional quality. Nifo and Vecchione (2014) aggregate twenty-four elementary indexes into five different variables (voice and accountability, government effectiveness, regulatory quality, rule of law, and control of corruption), each of which is able to capture a particular dimension of institutions according to the definition proposed by Kaufmann et al. (2010). This measurement of different institutional dimensions enables us to identify the *political* and *economic* institutions according to the hierarchy of institutions hypothesis proposed in literature (Acemoglu et al., 2005a).

The massive brain drain from the Southern regions to the Central-Northern regions and the persistent internal economic and institutional dualism between the Centre-North and the "Mezzogiorno" make the Italian case an interesting national context to analyse. Fratesi and Percoco (2014) point out the contribution of migration to the human capital accumulation in the host region. The underlying idea is that migration affects the destination place by not only increasing its labour force, but also changing the way human capital is distributed and, as a consequence, the economic performance.

This kind of investigation has several important identification issues. First, when we look at the effect of migration on institutional quality at the provincial level (NUTS3), the heterogeneity and dependence of institutional quality and the spatial spillovers between spatially related units must be accounted for. Second, the vast majority of empirical works are not able to measure the human capital endowment of migration. Finally, Acemoglu et al. (2005b) highlight how, in this context, the relationship between education and institutions could be driven by omitted factor able to affect both the variables. Therefore, a cross-section or a pooled cross-sectional regression could lead to biased estimation results.

The present paper is simultaneously able to investigate the role of skilled-emigration on institutional quality and to account for all the previously discussed issues. The analysis is carried out by implementing a panel data econometric model in order to account for the provincial characteristics. We use the five-year lagged explanatory variables since the relationship between education and institutions operates with very long lags and institutions need time to adjust (Li et al., 2016). Furthermore, the spatial interactions across spatial units are solved by introducing a spatially lagged dependent variable. Finally, with respect to skill selectivity, the ISTAT's dataset provides a subdivision of migration flows in terms of educational level, which enables us to disentangle the different migrant's skills by using the level of education of migration flows.

The remainder of the paper is organized as follow. Section 2 provides the literature empirical background. In section 3 and 4, the descriptive analysis and econometric model will be specified and the results will be presented. Finally, in the last section, we provide the main conclusions of the analysis.

2. Emigration and Institutions: a general assessment

There is a large consensus concerning the role of institutions as a crucial factor able to affect the economic development in modern economies. Different studies have defined the institutions as an important source of economic growth through their ability to influence the technological innovations. The economic literature has pointed out how institutions operate at different levels with political institutions strongly related to the ability of citizens in improving the honesty and the responsibility of politicians. In particular, the higher the information accessibility for the citizens is, the lower the likelihood that politicians act as free-riders in terms of corruption and inefficiency is. Therefore, a well-informed electorate is necessary to increase the quality of *political* institutions (Adserà et al., 2003). On the other hand, *economic* institutions represent all the contract enforcement, control of corruption and property rights, which make it possible to provide public goods and services (Li et al. 2016).

In line with these theoretical considerations, Barro (1997) found that the level of governance represents an important driver able to explain the economic disparities among countries. Moreover, the institutions exert a key role as a joining link between R&D investment and economic growth. The growing importance of institutions has raised the interest of scholars about the mechanisms able to improve the quality of governance. In particular, greater attention was

paid to the link between human capital endowment and institutions. Barro (1999), indeed, adds to this literature by investigating the relationship between standard of living, gdp per capita and the level of education of the resident population. The author found, through a panel data over the period 1960-1995, that all of these elements exhibit a positive influence on the democracy level. Glaeser et al. (2004) contribute to the debate on the importance of human and social capital of a given country by affirming that the greater the educational attainment of the population is, the greater the institutional opportunities are.

Furthermore, beyond having demonstrated the essential role of institutions as a source of economic growth and the contribution of human capital accumulation to the growth of institutions (Acemoglu et al., 2005b; Rodrik, 2007; Rodrìguez-Pose, 2013), the economic literature has also considered the human capital mobility an important determinant of institutions.

How does emigration affect institutional quality? Li and McHale (2006) depict a framework of possible effects through which the emigrants affect the level of institutions. Table 1 summarizes this theoretical framework. Most obviously, if the more educated are also those who have a higher degree of political participation, the migration of these individuals, besides affecting the growth dynamics, could contribute to modify the quality of institutions. Fortunately, this is not the only mechanism. The possibility to emigrate, indeed, can increase the bargaining power of the most skilled individuals and this, in turn, could force the governments to improve the quality of services in order to avoid a massive emigration of the most educated individuals. Moreover, a recent literature strand suggests how the prospect of emigration due to the higher return abroad can foster the actual investment in human capital formation and if at the end of this process only a proportion of these mostly educated individuals would emigrate then the remaining human capital would increase (Mountford, 1997; Beine et al., 2001).

Also, the ability of the emigrants to create stable networks in terms of "political groups or social movements" (Chauvet and Mercier, 2014 p. 631) in the place of origin can contribute to develop more modern institutions by increasing the political participation in the domestic politics.

Furthermore, when the institutional quality is too low, most likely because the public decisions are inspired to criteria too far from the optimal social well-being, the emigration could be a sort of silent revolution aimed at overturning the existing political structures and to incentivize better institutions. Clearly, given these different channels through which skilled-emigration can contribute to modify the institutional quality, the final effect will depend on the magnitude of these previous effects.

The literature has also examined the nexus between human capital mobility and the quality of institutions from an empirical perspective. In particular, in a seminal empirical study on this topic, Spilimbergo (2009) investigates the consequences on democracy of return migration. In particular, the author analyses the effect of a sample of individuals, which have attained their education abroad, on the institutions of their home country. The results explain that foreign-educated individuals promote democracy in their home country, but only if the education is acquired in countries with high level of democracy. Unfortunately, the author is unable to disentangle the sample of foreign-traded students between who are still abroad and who returned and this makes it impossible to know if the final effect is due to the return migration or to who live in another country.

Also Chauvet and Mercier (2014) are interested in the effect of return migration on their country of origin. In particular, they explore the relationship between return migration and the transfer of political norms, which is proxied by the participation rate and by the electoral competitiveness of the origin country. Once they have instrumented the return migration, by using historical and distance variables, the authors find a positive effect of this kind of migration on political outcomes.

Docquier et al. (2016) overcome the difficulties included in Spilimbergo's data and assess the role of international migration on the quality of institutions during the period 1985-2010. Differently from the paper of Spilimbergo (2009), the authors consider not only the foreign students but all migrants. The authors, by implementing three different methodologies in order to account for the endogeneity between migration and institutions, highlight that international emigration is an important determinant of home country institutions. In particular, countries with a higher level of emigration rate are also those that experience the main improvements in terms of institutional quality.

Another important contribution to this kind of literature is provided by Beine and Sekkat (2013). The authors examine two different effects of international migration on home country institutions. They analyse both the impact of emigration on the quality of institutions and consequently they try to find if and to what extent the emigration contributes to the transfer of norms between host and home country. The results depict a positive effect of emigration on the change in institutions. Moreover, when the authors test the role of skilled-emigration, the relationship is reinforced. Therefore, the educational level of migrants represents an important element that is able to affect the institutional quality in the sending countries. Finally, if the emigrants are located in countries with a higher level of institutions, the benefits for the home country are greater.

By using data at individual level, Mahmoud et al. (2013) investigate how the diffusion of knowledge through the migration process affected the political preferences in Moldova. The effect on institutions, measured in terms of electoral outcomes, is strongly related to the emigration episodes that took place from the beginning of the 1990s. It could be carefully argued that the diffusion of ideas and social norms through the pattern of international migration and human interaction is able to affect the evolution institutions. Nowadays, this process is reinforced by the globalization of the world economy that has facilitated flows of people, flows of ideas and in particular the so-called "social remittances".

The paper mostly related to our purpose is that of Li et al. (2016). In their contribution, the authors distinguish the mobility effects of the most skilled individuals on *economic* and *political* institutions once they control for the domestic human capital. The results show a positive relationship between the brain drain and the country's *political* institutions. On the contrary, the outflows of human capital exert a negative impact on *economic* institutions.

In summary, all of these studies were interested in investigating, in different ways, the effects of international emigration on institutional quality of the country of origin. On the contrary, even with the growing attention paid to the sub-national level dynamics, to the best of our knowledge, there is no evidence provided in literature on the effect of interregional human capital mobility on the quality of institutions. The difficulties most likely arise both to measure the quality of governance at provincial level and to compare the results with other national contexts. Fortunately, the dataset of Nifo and Vecchione (2014) measures different dimensions of institutional quality at the provincial level (NUTS3) in terms of voice and accountability, government effectiveness, regulatory quality, rule of law, and control of corruption which, in turn, allows us to aggregate these multiple variables into the most suitable definitions of *political* and *economic* institutions.

The Italian case is particularly interesting for three reasons. First, the provincial inequality is among the highest in Europe and reflects a persistent internal dualism between the Centre-North and the South (Crescenzi et al., 2013; Gitto and Mancuso, 2015; Mastromarco and Woitek, 2006); Secondly, as pointed out by Fratesi and Percoco (2014), the human capital mobility contributes to increasing the Italian economic disparities by enriching the Central-Northern regions with an out-flow of skilled individual from the South of the country. Finally, the empirical evidence has highlighted how this process of selective migration is reinforced by the differences between the two Italian macro-areas in terms of institutional quality, criminality rate and university quality (Etzo, 2008; Ciriaci, 2014; Nifo and Vecchione, 2014). In particular, among the migration choice, Dotti et al. (2014) specify how the university students (in Science and Technology) leave the Southern regions to study in the Northern universities with a more efficient labour market.

The next section will focus on the data analysis and on the econometric specification used to examine the impact of internal skilled-emigration on the quality of institutions of the sending region.

3 Data analysis

3.1 Institutional quality

This section presents a definition and an analysis of the main variables used in the econometric model. The institutional quality represents the dependent variable and, in particular, the paper uses the Nifo and Vecchione (2014) data set, which includes 6 indicators of governance for all the 103 Italian provinces, each of which represents the aggregation of different elementary indexes. The first indicator is "voice and accountability" which measures the ability of provincial's citizens to select the governing class. The second indicator is the "rule of law" and represents the degree of crime and violence as well as tax evasion and legal system. Then, the dataset of Nifo and Vecchione (2014) presents an index, which measures the government ability to promote the private sector ("regulatory quality"). The fourth is "government effectiveness" and represents a synthetic indicator of the quality of public services and policy implementation. Finally, the extent to which corruption affects the public function is included in the indicator named "control of corruption".

Nevertheless, our attention is given to the potential different impact of skilled-emigration on *political* and *economic* institutions at the regional level (NUTS3) and, thus, it is necessary to correlate the five dimensions measured by Nifo and Vecchione (2014) with the hierarchy of institutions emphasized by Acemoglu et al. (2005b) who distinguish between *political* and *economic* institutions. This aggregation represents a necessary step that allows us to compare our analysis with the main results obtained from the economic literature. In particular, according to the consolidated literature, the level of voice and accountability is able to proxy the *political* institutions. On the other hand, the *economic* institutions of a given country or region seem to be mostly related to the government effectiveness, the regulatory quality, the rule of law, and the control of corruption. The institutional outcomes are standardized and, thus, included between a maximum and a minimum level equal to 0 and 1, respectively. In particular, the higher the institutional scores, the better the level of institutions of the considered province. Starting with the *economic* institutions (econ_inst) the annual average value during the whole period is equal to 0.56 with a standard deviation among the Italian provinces

equal to 0.13. The results in terms of *political* institutions are lower and, indeed, the average outcome is 0.41 with a higher standard deviation (0.16).

Figure 1: Structure of Political and Economic Institutions
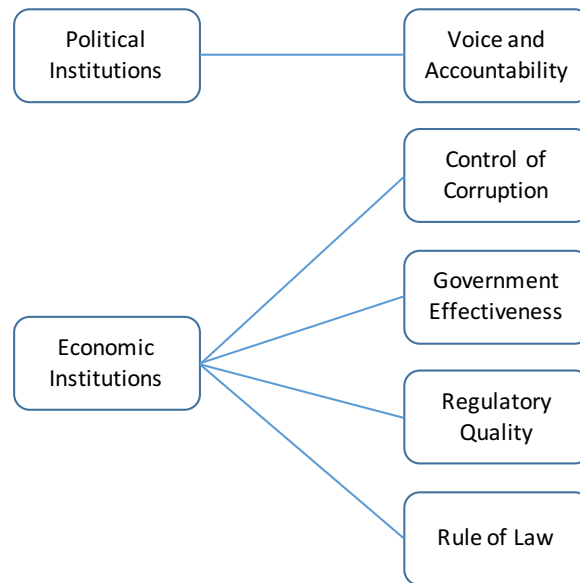
Source: own elaboration. Nifo and Vecchione (2014) data.

It is worth noting the spatial distribution of *political* and *economic* institutional quality among the Italian provinces (NUTS3). This information is given by the following figure 2 where the institutional outcomes both in terms of *economic* and *political* institutions for 2012 is provided with a geographical information system (GIS) map. The results exhibit a strong correlation among spatially related provinces. In particular, the best performance both in *political* and *economic* institutions are obtained from the Centre-North regions while on the contrary the southern regions (the so-called "Italian Mezzogiorno") are lagging behind with performances included almost everywhere in the first quintile. According to Nifo and Vecchione (2014) we are able to derive an important conclusion and, in particular, that the Italian dualism also persists when the attention is paid to the institutional quality. It's not surprising, indeed, that the better institutions of the Central-Northern provinces also reflect a positive growth dynamic, a better quality of services, the development and the efficiency of these areas, and, more generally, a better quality of life of the same provinces.

Figure 2: Political and Economic Institutions Quality Index (2012)
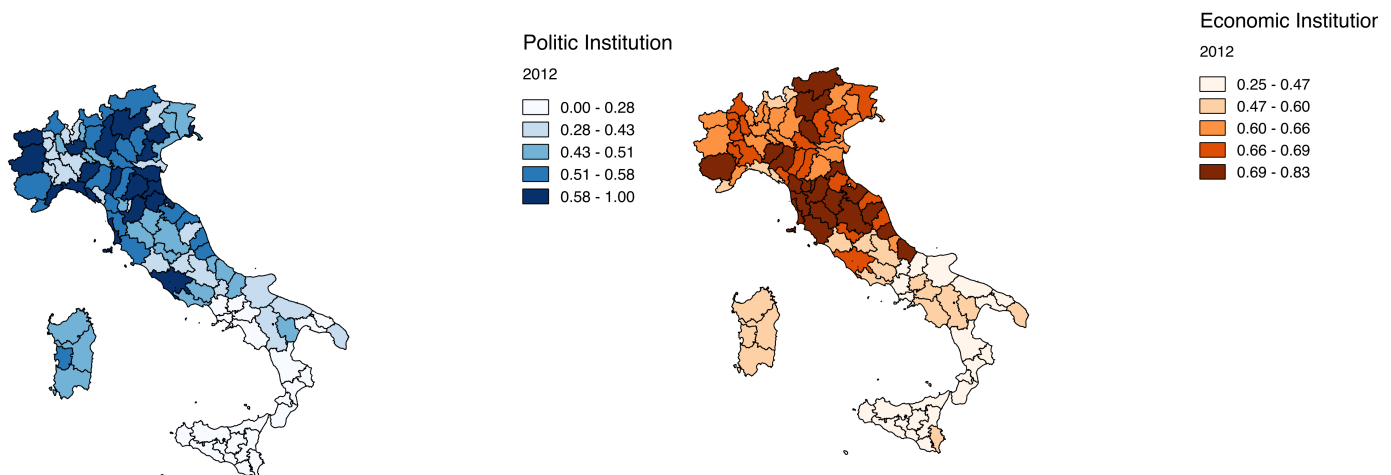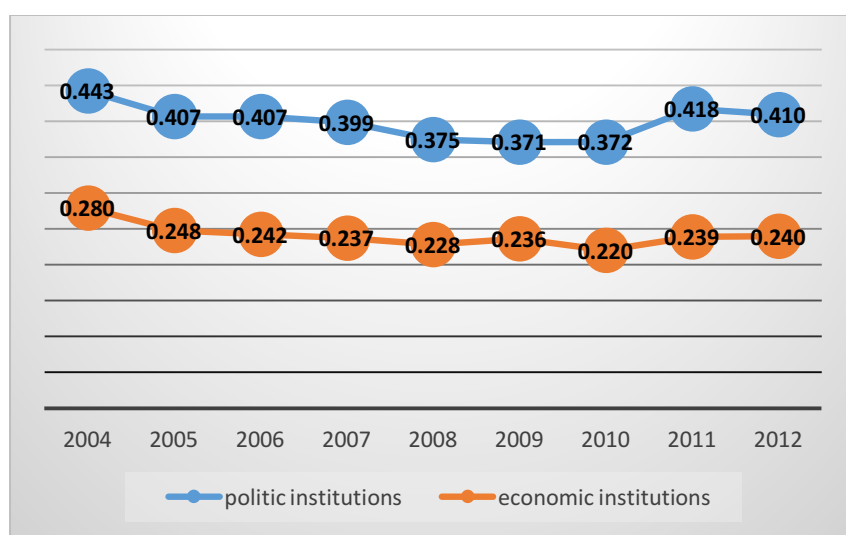

Source: own elaboration. Nifo and Vecchione (2014) data.

However, the previous maps do not allow us to examine if the institutional quality of the Italian provinces is converging or not, while could be interesting to know if the internal dualism, in terms of institutions, is decreasing. Consequently, the

paper tests the existence of this process through the most accepted measure of convergence, the so-called σ-convergence, which occurs when the dispersion around the average institutional quality decreases during the considered period (Barro and Sala-i-Martin, 1991). The σ-convergence is calculated through the coefficient of variation and the results, illustrated in figure 2, highlight that both *political* and *economic* institutional quality have shown a decreasing trend during the whole period. The coefficient of variation, indeed, is diminished and, thus, demonstrating a slight process of convergence of the institutional quality. The process seems to need a long time to effectively reduce the internal disparities among the Italian provinces but the advantages, in terms of economic growth and social well-being, could be enormous. Finally, it is also interesting to note how the main disparities among the Italian provinces concern the political institutions with a coefficient of variation on average equal to 0.40. In other words, the main differences occur within the process of selection of the governing class and all the activities oriented to improve the quality of the political activity. Furthermore, the economic crisis (2007-2008) appears as an exogenous and structural shock also from the institutional point of view. During the last two available years, indeed, fig. 3 shows a growth of the sigma convergence, which indicates that the disparities in both the institutional dimensions seem to be increased. This gives rise to the question on how the economic crisis has had an impact on institutions and, thus, deeply investigates the causal nexus between these two phenomena.

Figure 3: Institutional Sigma-convergence

Source: own elaboration. Nifo and Vecchione (2014) data.

3.2 Skilled-Migration

The interregional migrations are increasingly attracting the attention of the researchers both from the determinant point of view and, in some cases, with a focus on the consequences. Italy has an interesting history of economic and, as we have previously seen, institutional disparities between the North and the South. This situation is also reinforced by a persistent emigration from the less developed provinces of the Mezzogiorno to the more advanced Northern provinces. Furthermore, Fratesi and Percoco (2014) highlight how the skill-intensity of these flows lead to a detrimental process for the South of the country which continue to lose human capital in favour to the Centre-North provinces.

Given these characteristics, it seems to be important to analyse the patterns of migration. As mentioned in the introduction, the skilled-emigration is obtained from the Istat. This data allows us to know the number of graduate individuals who change their residence and are collected with an annual frequency which give us the advantage to examine the short term patterns of migration that are impossible to identify in other official statistics (census data) and that makes this typology of information very useful nowadays (Hierro, 2007; Hierro and Maza, 2010). In particular, the Italian interregional migration trend, besides registering a general growth during the considered period, is also characterized by two main directions. Table 2, indeed, highlights how the individual decisions to re-locate not only occur, as extensively pointed out by the economic literature, from the South to the Centre-North, but also, and this is a main novelty feature, among the Central-Northern provinces. As we can see in the same table, the sum of these two kinds of skilled internal emigration represent in the 2012 the 81.5% of the total skilled-emigration flow. The rate of skilled individuals who on average emigrate from the Italian provinces is among 1.02, which ranges between 0.3629 and 2.59 during the whole period. The weight of skilled-emigration over the total skilled individuals who decide to move from the
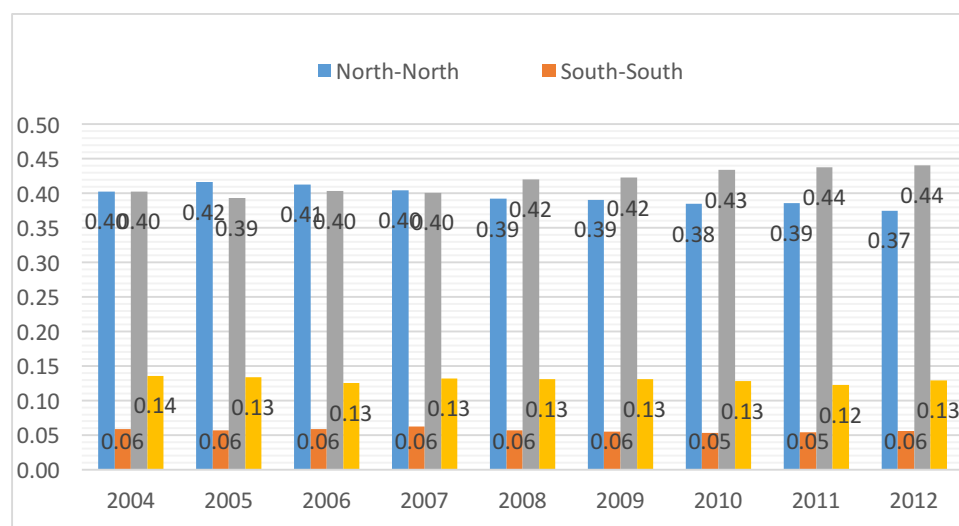
Southern provinces to the Northern ones has shown a positive evolutionary trend while on the other hand the flows from the Centre-North to Centre-North has exhibited a decreasing dynamic with a weight in the 2012 equal to 0,37 with respect to the 0.40 at the beginning of the period (Fig. 4). These findings are also supported by Ciriaci (2014) who, by analysing a sample of graduates in the 2004, found that the Southern regions show the highest emigration rate both *ante-* and *post-lauream*. Ciriaci (2014) also describes a lower percentage of individuals who migrate from the Central-Northern regions, which is line with our results and, indeed, the percentage of graduates who move from the Centre-North to the South is 5-6% during the whole period. Always considering these two macro-areas, Nifo and Vecchione (2014), report a negative migration balance for the Mezzogiorno and, more specifically, almost 25% of the graduates decide to transfer their residence from the South to the Centre-Nord or abroad. On the contrary, the more industrialized Centre-North exhibit a positive balance equal to 11%. These results can also be extended to the *ante-lauream* migration by confirming a negative trend in the Mezzogiorno which lost, in 2004, 3546 student who completed their cycle of degree in a Central-Northern region.

Table 1: Flows of Skilled-Individuals between Italian macro-areas

Origin-Destination	2004	2005	2006	2007	2008	2009	2010	2011	2012
Centre-North to Centre-North	15697	16306	16562	16913	17903	17868	18433	18701	20920
South to South	2294	2225	2372	2604	2592	2523	2542	2627	3131
South to Centre-North	15700	15397	16185	16761	19174	19319	20806	21221	24569
Centre-North to South	5306	5255	5029	5525	5991	6001	6144	5925	7185
Total Flow	38997	39183	40148	41803	45660	45711	47925	48474	55805

Source: own elaboration on ISTAT data.

Figura 4: Weight Skilled-Emigration over the total Skilled-Emigration

Source: *own elaboration on ISTAT data.*

Fig. 4 shows, in a more evident manner, an interesting feature of Italian migration. In particular, by considering the weight of skilled-migration, the flows from the Southern provinces to the Northern ones and the migration among the Northern provinces are 4 or 5 times higher than the other flows of skilled individuals (South-South and North-South). This characteristic would lead to a deeper investigation in order to catch some possible different effects of these two flows (North-North and South-North). Indeed, it could be carefully argued that both from the determinant point of view and from the effect side, the North-North migration and the migration from the Mezzogiorno to the North act in a different way. In other words, both the factors behind the decision to migrate and the consequences can be different.

4 Empirical analysis

4.1 Econometric issues

In this section, the relationship between skilled-emigration and institutional quality is tested through a panel data econometric model. The regression analysis focuses on the impact both on *economic* and *political* institutions. Therefore, the only difference between the two regression models is only with respect to the dependent variable. Each specification also has a set of control variables represented by the degree of trade openness (open), the patent intensity (patent), the regional human capital (hk), and the ethnic fractionalization (ethnic). These variables are in line with multiple studies, which stress the role of these factors in determining the level of institutional quality. Table 3 reports the summary statistics of the two dependent variables (*political* and *economic* institutions) and the descriptive statistics of all the explanatory variables implemented in the econometric model. In particular, the human capital stock shows a wide difference among the Italian provinces. Given the average value equal to 9.29 the human capital varies between 7.81 for the province with the lowest human capital endowments and 11.77 for the province with the highest value. Finally, we report the summary statistics of the other control variables included in the model. In particular, the economic literature has demonstrated how the degree of openness, the ethnic fractionalization, and the amount of R&D, which is proxied by the patent intensity, are important determinants of institutions (Spilimbergo, 1999; Alesina et al., 2003; Beine and Sekkat, 2013; Docquier et al. 2016).

In line with these consideration, the model is formulated as follows:

$$I_{i,t} = \beta_1 skill\_emig_{i,t-5} + \gamma_1 open_{i,t-5} + \gamma_2 patent_{i,t-5} + \gamma_3 fraction_{i,t-5} + \gamma_4 hk_{i,t-5} + \mu_i + \eta_t + \varepsilon_{i,t} \quad (1)$$

where i = 1,2,...,103 is the province and t=2007, 2008 ... 2012 is the time period covered by the data, $\varepsilon_{i,t}$ is the idiosyncratic error term and institution represents both the *economic* and *political* institutions. In the dataset the level of education of the migrants is directly observed and, thus, the skilled-emigration rate is measured as the ration between the number of emigrants with tertiary education over the regional population (skill_emig). The model includes all the time effects (η_t) and the provincial time-invariant characteristics (μ_i). All the variables are expressed as logarithms. β_1 represents the effect of skilled-emigration on institutional quality of the region of origin.

We must also consider that the institutional quality is influenced by other variables. Hence, a series of control variables are included in the regression. γ_1 is the coefficient associated to the degree of openness (open), γ_2 shows to what extent the patent intensity (patent) could affect the institutional quality, γ_3 is the parameter related to the ethnic fractionalization (fraction) and, finally, γ_4 allows us to capture the effect of the regional human capital stock (hk).

The analysis shows the presence of regional fixed-effects (μ_i) that make the ordinary least-squares estimator unreliable. For this reason, the paper performs the Hausman specification test in order to verify if the distribution of the individual heterogeneity is deterministic or stochastic. The result confirms that the fixed-effects model is the most suitable estimator to the data. Indeed, the null hypothesis of this test (i.e. the random-effects model is consistent and efficient with respect to the fixed-effects estimator which is only consistent) is rejected at a significance level of 0.10.

Although the specification is able to control for the time-invariant, different provincial characteristics, which represent the unobservable heterogeneity, the fixed-effects model does not allow us to capture the spatial dependence among neighbouring institutions. As a result, the estimated coefficients through a static panel approach, such as fixed-effects or random-effects, could be biased. The paper, in order to account for the spatial dependence, extends the previous model (1) by including a spatial lag of the dependent variable. In this way the spatial lag model is given by the following equation:

$$I_{i,t} = \rho \sum_{j=1}^{R} \omega_{ij} I_{it} + \beta_1 skill\_emig_{i,t-5} + \gamma_1 open_{i,t-5} + \gamma_2 patent_{i,t-5} + \gamma_3 fraction_{i,t-5} + \gamma_4 hk_{i,t-5} +$$
$$\mu_i + \eta_t + \varepsilon_{i,t} \quad (2)$$

where ω_{ij} is an element of the RxR spatial weights matrix Ω. In this way the model incorporates an additional problem of endogeneity due to the inclusion of a dependent variable, which is spatially lagged and correlated with the error term. By implementing a maximum likelihood estimator, we are able to overcome this simultaneity bias and to estimate a fixed-effect spatial lag model. In this panel data setting the spatial dependence and the time invariant provincial characteristics are controlled simultaneously and this allows us to separately investigate the spatial dependence and the spatial heterogeneity and thus to properly examine the role of skilled-migration on institutional quality within the Italian country.

Table 2: Descriptive statistics of the variables

Variable	Description	Obs.	Mean	Std. Dev.	Min.	Max.
econ_inst	economic institution quality index	618	0.5686872	0.1340459	0	1
politic_inst	political institution quality index	618	0.4142445	0.1654636	0	1
skill_emig	skilled emigration rate	618	1.02834	0.3251976	0.3629866	2.599682
hk	human capital	618	9.29071	0.6174746	7.81194	11.77925
open	degree of openness	618	0.2125453	0.1464699	0.0043825	0.9855302
ethnic	ethnic fractionalization	618	49.50207	14.77481	13.27	84.76
patent	patent intensity	618	65.64204	63.84192	0	332.048

Source: own elaboration on ISTAT and Nifo and Vecchione (2014) data. Legend: econ_inst (score of *economic* institutions, resulting from the average value between the indexes of government effectiveness, the regulatory quality, the rule of law, and the control of corruption), politic_inst (outcome in terms of *political* institutions measured through the voice and accountability index), skill-emig (skilled-emigration rate measured as the ration between the individuals with a bachelor or a master degree over the population of origin), hk (human capital stock proxied by the number of skilled individuals of the region of origin over the total population of the same region), open (the share of export over GDP), patent (the number of patent per thousand of inhabitant), ethnic (the foreign born population over the total population).

4.2 Econometric results

Table 4 shows the result of the model estimated with the fixed-effects estimator (columns 1 and 2) and by including a spatially lagged dependent variable (columns 3 and 4). By focusing on the variable of interest, the first two specifications highlight a positive effect of skilled-emigration both on *political* and *economic* institutions. The greater the out-migration of tertiary educated people is, the greater the level of institutional quality. Moreover, the slight difference between the coefficient associated with the two coefficients of emigration indicates a stronger effect of emigration of skilled individuals on *economic* institutions (0.88) than *political* institutions (0.57). The models also include a set of control variables that have been shown to contribute to determining the institutional quality. In particular, the level of technology innovation proxied by the patent intensity, besides showing a low coefficient, is an element able to positively affect the institutional outcomes. Otherwise, the stock of human capital of the sending region positively affects only the *political* institutions with a coefficient equal to 0.025. Furthermore, according to Alesina et al. (2003), the ethnic fractionalization exerts a different impact on the two typologies of institutions. In particular, the authors show that the quality of *political* institutions is inversely related to the foreign born population. If a society presents a higher level of fragmentation, some groups can impose restrictions on the other groups. Otherwise, mainly homogeneous societies can be easily ruled as well as increase the possibility to monitor possible conflicts (Alesina et al., 2003). On the other hand, a greater fractionalization is not always synonymous with a negative effect on *economic* institutions. Alesina et al. (2003) show how heterogeneous the effects of ethnic fractionalization on *economic* institutions are. Finally, although the positive coefficient is associated to the degree of openness, the standard errors are not statistically significant.

As we have seen in the data analysis section, the institutional outcomes, both in terms of *political* and *economic* quality, are spatially related among neighbouring provinces. In order to account for this spatial dependence, the model is estimated by introducing a spatial lag of the dependent variables. Starting with the control variables, the inclusion of a spatially lagged explanatory variable does not affect the previous results both in term of the coefficients and concerning the statistical significance. This means that the estimates are robust to the spatial control. Also, the coefficient associated with the variable of interest (skilled-emigration) is in line with the previous results. Definitively, the estimates suggest the importance of the skill-intensity of migration flows as a key factor able to promote the regional institutional quality.

However, if the results display a positive mechanism generated by the high-skilled out-migration, which positively affect the institutional quality of the sending region, it is also true that these processes do not explain a divergence process but on the contrary a decrease of the disparities in terms of institutions. In other words, this most likely means that the lagging regions have primarily benefited from the high-skilled emigrations. Indeed, if the Southern regions were characterized, on average, by higher skilled-emigration rates with respect to the Central-Northern regions, it could be carefully argued the existence of a slight process of convergence in terms of institutional quality.

Clearly, these analyses cannot be compared with previous studies focused on the relationship between international migration and democracy. In particular, the aforementioned studies, focused on this relationship, have generally demonstrated that the mobility of individuals exerts a positive effect on institutions and this process is also reinforced when the high-skilled migrants are considered. Among these studies, for instance, Docquier et al. (2016) displayed that countries with high levels of emigration rate are also those that obtain a higher level of institutional quality.

Therefore, within the framework of the effect of skilled-emigration on institutional quality, it could be carefully argued that our results underline a positive effect of internal migration both on *political* and *economic* institutions. However, the lack of contributions at the regional level and the difficulties that arise in comparing the levels of education among countries prevents us from evaluating the net effects on institutional quality. Nonetheless, the significance of this topic could encourage further empirical analysis in the future.

Table 3: Estimation results

Variables	econ_inst (1)	politic_inst (2)	econ_inst (3)	politic_inst (4)
skill_emig	0.088*	0.057***	0.050*	0.032**
	(-0.0337)	(-0.0141)	(0.0247)	(0.0112)
open	0.222	0.076	0.175*	0.028
	(-0.1311)	(-0.0906)	(0.0804)	(0.0364)
patent	0.000*	0.001***	0.001	0.001***
	(-0.0002)	(-0.0002)	0.0002	(0.0001)
ethnic	0.003*	-0.001*	0.003***	-0.001**
	(-0.0013)	(-0.0005)	(0.0008)	(0.00035)
hk	0.019	0.025*	0.007	0.013*
	(-0.0205)	(-0.0104)	(0.014)	(0.0063)
constant	1.772***	0.14		
	(0.0000)	(0.0000)		
rho			0.416***	0.478***
			(0.0434)	(0.0399)
NxT	618	618	618	618
N	103	103	103	103
R^2	0.46	0.47	0.91	0.87
Time dummies	Yes	Yes	Yes	Yes
Loglikelihood			-297.96	187.96

Source: own elaboration. Istat and Nifo and Vecchione (2014) data.

Note: * statistically significant at the 5%; ** statistically significant at 1% *** statistically significant at 0.1%. Standard errors clustered by region (NUTS3) are given in parenthesis. The estimation procedure is the fixed-effects model (first and second column) and the fixed-effects spatial lag approach (third and fourth column). Both estimation include time fixed-effects, time dummies and control variables. The dependent variables both in the fixed-effects model and in the fixed-effects spatial lag model are the *political* and *economic* institutions. The log-likelihood is also reported as robustness check.

5 Preliminary conclusion

The economic literature has paid growing attention to the mechanisms able to affect institution development. Among these factors, the human capital mobility plays a key role as a potential source of institutions. However, the difficulties that arise to measure the institutional quality at provincial level has led to an absence of empirical contributions on the impact of the interregional mobility of skilled individuals on institutional outcomes.

The present paper tries to fill this gap by empirically investigating the relationship between skilled-emigration and institutional quality in a large sample of Italian provinces during the time period 2004-2012 with the aim of extending the results to other national contexts through innovative features. If a consolidated literature has shown the existence of the link between international emigration flows and institutional quality, analogous consequences are also found when interregional mobility is taken into consideration. The results depicted in the econometric section have shown how provinces with a higher degree of skilled-emigration (measured as the number of graduate over the total population of

the sending place) can increase their *political* and *economic* institutions. Moreover, the results hold when we introduce a spatial autoregressive term in order to control the spatial correlation among neighbouring institutions.

This result must be seen from two complementary perspectives. The higher human capital emigration from the southern provinces has surely contributed to increase the economic disparities due to the human capital accumulation that has favoured the Central-Northern provinces, which in turn has contributed to arise the economic disparities (Fratesi and Percoco, 2014). However, *not all evil comes to harm*, indeed, when we paid the attention on the institutional effects the massive brain drain from the Italian "*Mezzogiorno*" seems to contribute to reduce the institutional disparities among provinces.

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