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Introduction

Maria Rosaria Carillo and Vincenzo Lombardo

Annals of CRISEI 2017 – Volume 1 comprises the first group of selected contributions of some scholars of the Centro di Ricerca Interdipartimentale in Sviluppo Economico e Istituzioni (CRISEI) for the year 2017. This year the research activity carried out by CRISEI scholars has covered a variety of topics, including policies for immigration and industrialization, monetary and fiscal policies, foreign aid and corruption, as well as political economy analysis of voting behavior. Therefore, the important role played by policies in fostering institutional quality to enhance economic development represents the common theme of this volume.

Nowadays, strong emphasis is given to the inflows of immigrants in EU countries, especially in Italy. The first contribution *"Immigrants' integration and income. Evidence from Italy"* by Carillo, Lombardo and Venittelli investigates investigate the relationship between identity and earned income of migrants living in Italy. The authors show that integrated immigrants gain a wage income higher than that of assimilated and separated ones, while they find no statistically significant differences between people who assimilate and separate. These results suggest the helpfulness of implementing a model of integration that supports both and contemporaneously the attachment to the host and home country to foster the social-economic inclusion of foreigners in Italy.

The second contribution *"Convergence of welfare provision in Europe: An assessment of the Monetary Integration effects"* by Bonasia and De Siano investigates the impact of the monetary integration on the convergence of national welfare provisions looking at the European countries social spending in the period 1980-2013. The analysis of total social expenditure and its relative main functions for 16 Western Europe countries reveals the presence of conditional convergence patterns and an increase of its speed after the monetary integration, with the sole exception of labour policy spending. The authors arguments that this is probably due to the achievement of a coordination among European social policies favoured by an agreement on the objectives of a European Social Model.

The recent waves of economic crises have made evident the high vulnerability to external shocks of developed and developing countries. Diversification of production and export has been advocated as a possible strategy to build resilience to shocks. As a reaction to this state of affair, there has been an increasing commitment of Governments to support industrialization as part of a broader agenda to diversify the economy through industrial policy. The third contribution *"Heterogeneous entrepreneurs, government quality, and optimal industrial policy"* by Di Maio, Fabbri and Lombardo presents a theoretical model exploring the effects of industrial policy (IP) when entrepreneurs are characterized by different ability levels and sectors are heterogeneous as for their profitability and

social externalities generated. The optimal structure of IP in terms of monetary transfers is shown to crucially depend on the distribution of entrepreneurs abilities. In an extension of the model, the authors consider the case in which the Government can use also the provision of business training to entrepreneurs as an additional instrument of IP. Based on these results, policy implication for industrial policy in developing countries are discussed.

In recent decades, the effectiveness of aid has been strongly questioned not only because of its doubtful efficacy in boosting the economic development of recipient countries, but also its perverse effects on corruption. The fourth contribution *"The influence of parliamentary gender composition on Aid-Corruption linkages: Evidences from African countries"* by Carillo, Chiariello and De Siano investigates whether the share of women in parliaments of recipient countries may influence the impact of aid on corruption in recipient countries. By observing a sample of African countries, results reveal that, bringing their social preferences into the political process, women may raise the effectiveness of foreign aid by reducing cases of corruption because of closer correspondence between their social preferences and the aims of aid. This is particularly true in less developed countries, where aid mainly concern social objectives such as health, education, gender gap, childcare, and water sanitation. Moreover, the positive effect of women' involvement is greater where the pre-existing level of corruption is higher.

The final work *"Explaining voting behaviour in the 2016 Italian constitutional referendum"* by Del Monte, Moccia and Pennacchio looks at a crucial constitutional reform rejected by referendum in Italy, at the end of 2016. The object of this paper is to investigate whether and to what extent socio-economic, demographic and political factors influenced voting behaviour. The analysis shows that political and socio-economic variables were the main drivers of the referendum result. Demographic variables had a weaker effect. These findings suggest that the merit of the constitutional reform proposal had little relevance in explaining voting behaviour. The political reasons were common to the whole country. Other determinants of the referendum outcome varied in different geographical areas. In particular, demographic variables were more important in Northern and Central Italy. Socio-economic aspects were less relevant, although statistically significant, in the South.

Immigrants' integration and income. Evidence from Italy

Maria Rosaria Carillo, Vincenzo Lombardo and Tiziana Venittelli

Abstract

We investigate the relationship between identity and earned income of migrants living in Italy, by using the Berry's acculturation model to identify the foreigners' identity choices. In particular we estimate an OLS model and an ordered probit model in order to take into account the nonlinearity in the relationship "integration-income". With both models we find evidence that integrated immigrants gain a wage income higher than that of assimilated and separated ones, while there are no statistically significant differences between people who assimilate and separate. Our results would suggest the helpfulness of implementing a model of integration that supports both and contemporaneously the attachment to the host and home country to foster the social-economic inclusion of foreigners in Italy.

Keywords: Ethnic identity, National identity, Integration, Acculturation, Income

JEL classification: F22, J15, Z13

1 Introduction

In the last decades, the phenomenon of immigration in Italy has grown at impressive rate. According to recent data published by the Initiatives and Studies on the Multiethnicity (ISMU) Foundation, at the beginning of 2014 the number of foreigners living in Italy either legally or illegally was about 5.5 million, increasing of about 600 thousand with respect to the previous year. The rapid expansion has not occurred uniformly throughout the country and has involved massive presences from countries that are culturally more distant from Italy with respect to the past, hindering the process of integration with the local communities. There is a growing evidence showing how integration processes affect the foreigners' well-being.

A number of studies, as for example those related to Germany, UK, Sweden, USA or Canada, have shown that people who assimilate to the culture and the community of the destination country outperform people who reject them (Islam and Raschky, 2015; Drydakis, 2013; Bisin et al., 2011; Battu and Zenou, 2010; Casey and Dustmann, 2010; Nekby and Rodin, 2010 Constant and Zimmermann, 2008; Pendakur and Pendakur, 2005; Mason, 2004).These studies measure the foreigners' integration in the host country focusing on the notion of identity, i.e., "the aspect of the acculturation process based on the subjective sense of belonging to a group or culture and that becomes salient when immigrants come to a new society" (Phinney, 1990).

According to the Berry's model (Berry, 1997) when immigrants settle in a new country have to choose simultaneously how to stay firmly anchored to their origin ethnic group and how to relate to the larger majority group of the new society. Based on this, they can choose among four identity choices: "the integration", which implies the migrants' strong attachment to both the ethnic and majority groups; "the assimilation", typical of foreigners who choose to give up their origin culture while adopt that one of the new society; "the separation", through which immigrants retain a strong ethnic identity, rejecting the culture of the majority group; finally "the marginalization", which implies low identification with either the origin and the destination country. It is not clear, however, whether the proposed model can be applied for the Italian case and in which way the strategies proposed by the model contribute to the foreigners' economic performance in Italy. Indeed the empirical evidence is scant. Few studies have focused on the determinants of the immigrants sense of identification to the host country (de Palo et al., 2006), on the economic performance explained by variables other than their identity (Mazzanti et al., 2009), and on the wage gap between foreigners born abroad and those born in Italy (Faini et al., 2009).

The objective of this paper is to investigate the relationship between identity and income of immigrants who live in Italy. Using cross-sectional data collected by the ISMU Foundation in 2008

and building up measures of foreigners' identity as in Berry (1997), we find that integrated immigrants gain a higher earned income than that earned by assimilated and separated ones, while we do not find statistically significant differences between assimilated and separated foreigners. The results we obtain are very interesting because they seem to suggest that, in spite of the evidence and the attitude actually prevailing in Europe, the policies that support immigrants complete assimilation to the host country, neglecting or even hindering the worship of own culture of origin, might not be effective.

The paper is structured as follows. In Section 2 we describe the empirical strategy, and the measures of identity choices; Section 3 contains the data and some descriptive statistics; Section 4 contains the results of estimations; finally Section 5 concludes.

2 Empirical strategy

To investigate the relationship between immigrants' identity and income, we estimate the following model:

$$Income_{icn} = \beta_0 + \beta_1 Identity_{icn} + X_{icn}\delta + W + \epsilon_{icn} \qquad (1)$$

where the subscript *i*, *c* and *n* indicate the individual, the Italian city where currently lives and the nationality of origin, respectively. *Income* represents the foreigner's earned income class - in a scale from 0 to 7, where 0 is "no income" and 7 corresponds to "more than 2000 euros". *Identity* is a vector of dummies for the immigrant's status of integrated, assimilated and separated - identifying those who have at least an identity-, as described in the next subsection. The *X* and *W* vectors contain a set of control variables for all the individual and environmental characteristics that affect the relationship "income-identity".

In particular, the *X* vector contains all the individual controls. Firstly, we account for differences between men and women and young and adult people, including the foreigner's gender and age. While, to capture different attitudes toward income and identity that depend on cultural aspects and on the specific human capital of the respondent, we consider the religion she professes, her education [1] and the proficiency in the local language - a variable that indicates the migrant's knowledge of the Italian language in an increasing scale ranging from 1 to 5. We also consider the respondent's marital status, the presence of children and their residence status - that informs on

[1] The level of educations are represented by four dummies: no education, compulsory, high school and BA degree or plus.

whether they are in Italy or not - as additional controls: indeed, married foreigners who have children living with them in Italy may have different incentives to work and to integrate in the host country than migrants who are single or live abroad away from their family. Finally, to take into account past work experiences that contemporaneously affect the migrant's identity strategy and her current income, we add the number of years that she has spent in Italy at the time of the interview.

The W vector represents a set of dummies that control for all the environmental characteristics influencing the relationship "identity-income", including: the city in which the respondent lives, her nationality and the economic sectors in which she works, that take into account cultural aspect prevailing in the home country, different local labour market features, cross-cities differences in natives' attitude toward immigrants and any other differences linked to local jurisdiction and environment. Furthermore, the vector contains several interaction dummies between the foreigners' nationality and the city in which they reside, with which we identify the groups of foreigners of each nationality that reside in a specific municipality, i.e. a measure of the ethnic concentration in a particular place. Indeed, the agglomeration of people with common ethnicity in a given area may represent a typical source of endogeneity; on the one hand, the likely presence of economies of scale in the production of ethnic goods and the network effects, through which immigrants may benefit from hospitality at arrival and from receiving information about labour opportunities, may support potential job-seekers. On the other hand, a large ethnic agglomeration may reduce the availability of houses and rise the aversion of natives towards that ethnic group, which in turn increase labour market discriminations. The ethnic concentration in a local area is also strictly related to the foreigners' identity, the relationship running in two ways. On the one hand, the ethnic concentration may determine the individual choice of identity. Konya (2005), for example, shows that when the initial size of the ethnic group is small a model of full assimilation may occur, while when it is large a full separation equilibrium could prevail. On the other hand, it captures also the externalities due to the positive attitudes of the members of an ethnic group towards all people perceived as "in-group". Hence it captures an effect of the identity choice.

Finally, we consider also some "survey fixed effects", represented by a series of dummies that control for the week and the place of interview, to net out the effect from potential seasonality - the probability of finding a job may differ during a year and from the fact that respondents may give different answers to the questionnaire according to where they have been interviewed. Furthermore, we include the interviewer fixed effect to account for the fact that the migrant's level of trust, so the quality of the answers to the questionnaire, may also change according to the interviewer type.

2.1 Measuring Identity

We set up a measure of identity that is based on the Berry's acculturation model (Berry, 1997) according to which migrants are grouped as integrated, assimilated, separated and marginalized, according to their level of self-identification with both the host and the home country. More particularly, immigrants with a high selfidentification with the culture of both the host and the home country are classified as "integrated", while a strong identification with the country of destination joined with a low sense of belonging to the country of origin identifies people as "assimilated". The reverse case is defined as "separated", typical of foreigners firmly tied to the home country's values and customs but with low feeling toward the host country culture and traditions. Finally, the lack of self-identification with both countries describes "marginalized" immigrants. To build up our identity indicators, we consider the two questions "How much do you feel to belong to the host country?" and "How much do you feel to belong to the home country?", at which respondents can answer choosing among four options: "Far Too Little", "Little", "Enough" and "Very Much". To capture the acculturation strategies a` la Berry (1997), we create 4 dummies: a dummy identifying integrated immigrants, which is equal to one if the respondent answers "Enough" or "Very Much" to both questions and zero otherwise; a dummy for assimilated immigrants equal to one if the respondent answers "Enough" or "Very Much" to the former question and "Far Too Little" or "Little" to the latter. The dummy for separated immigrants corresponds to the reverse case, in which the variable takes value one if the respondent reports as "Far Too Little" or "Little" her sense of self-identification with the host country and as "Enough" or "Very Much" her sense of self-identification with the home country; finally, the dummy for marginalized immigrants identifies the case in which the respondent answers "Far Too Little" or "Little" to both questions.

For the empirical analysis we verify whether differences in terms of earned income exist exclusively among people who have at least one identity. To do this, we will consider only the sub-sample of migrants who declare to feel of belong to at least one group (integrated, assimilated and separated), excluding those who do not feel of being attached to any social categories (marginalized). However, concerns about potential sample selection are negligible, considering the very low number of foreigners that adopt the strategy of marginalization, represented by 2.5% of the whole sample (see Table 1 in the next section).

3 Data and descriptive statistics

Data are collected by the ISMU Foundation in 2008. Respondents are 12,049, both men or women, coming from EU and non-EU countries, aged 18 or older and living in 32 Italian provinces[2]. There are many advantages of using this dataset. One is the higher number of observations with respect to the data collected by other official institutions. Also, given the main goal of the ISMU Foundation to support studies that allow a complete and real understanding of the landscape of immigration in Italy, the survey collects not only the official information but also that regarding the irregular phenomenon. Moreover, to the best of our knowledge, this is the first survey that specifically focuses on the immigrants' integration in Italy, including proper information on the foreigners' feeling of belonging to the host and home country. In addition to the specific questions on the immigrants' identity, the survey provides information on the respondents' socio-cultural and economic conditions, allowing us to deeply examine the complex phenomenon of immigration in Italy.[3]

To the empirical analysis, we select only respondents that, at the date of the interview, work or are in working age (85% of the sample), and exclude those in retirement age, housewives and students (in other words, those that declare not to be in a professional situation). The final sample we use is represented by 8,971 observations - almost 75% of the original sample, of which about 44% is represented by women and 56% by men.

Table 1: Descriptive Statistics

	Obs.	Mean	St. Dev.	Min	Max
Income classes	10487	2.347	1.836	0	7
Integrated	11626	0.486	0.500	0	1
Assimilated	11626	0.069	0.253	0	1
Separated	11626	0.420	0.494	0	1
Marginalized	11626	0.025	0.156	0	1
Years in Italy	11943	8.184	6.093	0	61
Italian language knowledge	11958	3.421	1.046	1	5
Male	11990	0.522	0.500	0	1
Age	11990	36.037	10.115	18	82

[2] The provinces are dislocated in 13 Regions: Piemonte, Lombardia, Trentino-Alto Adige, Veneto, Emilia-Romagna, Toscana, Marche, Abruzzo, Lazio, Campania, Molise, Puglia and Sicilia.

[3] A detailed description of the data is available in Cesareo and Blangiardo (2009).

No education	11702	0.077	0.267	0	1
Compulsory school	11702	0.323	0.468	0	1
High school	11702	0.417	0.493	0	1
BA degree +	11702	0.182	0.386	0	1
Marital status	12049	0.517	0.483	0	1
Children	11946	0.527	0.499	0	1
Children in Italy	12049	0.327	0.469	0	1
Muslim	11619	0.385	0.487	0	1
Catholic	11619	0.238	0.426	0	1
Orthodox	11619	0.198	0.399	0	1
Coptic	11619	0.004	0.059	0	1
Evangelical	11619	0.023	0.151	0	1
Other Christian	11619	0.021	0.143	0	1
Buddhist	11619	0.035	0.185	0	1
Hindu	11619	0.016	0.125	0	1
Sikh	11619	0.006	0.075	0	1
Other	11619	0.010	0.099	0	1
No religion	11619	0.064	0.245	0	1
Industrial sector	11495	0.142	0.349	0	1
Commercial sector	11495	0.167	0.373	0	1
Firm services sector	11495	0.080	0.271	0	1
Family services sector	11495	0.231	0.421	0	1
Agricultural sector	11495	0.036	0.185	0	1
Other sectors	11495	0.123	0.328	0	1

According to the summary statistics in Table 1, almost 50% of the people in the sample is *Integrated*, while slightly more than 40% is *Separated*. A little bit less than 7% of the sample is *Assimilated* and, as expected, a very low percentage (2.5%) is *Marginalized*. Not surprisingly, immigrants living in Italy are younger than native people; they are 36 on average and mostly married with children (over 50%) - even if only 33% of them reside in Italy with their children. Surprisingly, instead, the percentage of those with at least a high school degree is about 60% (of this 60%, those with a BA

degree or a higher level of education are the 18.2%). According to our data, almost 50% of the sample declares to be Christian and 38% to be Muslim (the rest are Buddhist, Hindus, those professing other religions or not religious). People belong to 128 different nationalities: the most of foreigners comes from Eastern Europe (especially from Albania, Romania and Ukraine) from Northwest Africa (especially from Morocco, Senegal and Tunisia) and, finally, from Asia (especially from China and Bangladesh). The respondents usually spend many years in Italy (they say to have been living in Italy for 8.1 years on average) and this explain their high level of knowledge of the Italian language (on average they reach a score of 3.4 in a scale ranging from 1 to 5).

Descriptive statistics by foreigners' identity in Table 2 highlight some distinctive characteristics of migrants depending on their choices of identity. As expected, assimilated and integrated people spend more time in Italy than separated and achieve also better results regarding the proficiency in the Italian language. Moreover, they represent the highest percentage of the sample with an high school diploma or a BA degree and the lowest percentage of those declaring to have "no education" or "compulsory school". Persistent differences also exist in terms of the presence of children living in Italy, whose percentage is higher for people who adopt the assimilation or integration strategy. Finally differences across identities are found in terms of religion.

Table 2: Summary Statistics by identity

	Integrated		Assimilated		Separated	
	Obst.	Mean	Obst.	Mean	Obst.	Mean
Income classes	4956	2.547	715	2.180	4293	2.203
Years in Italy	5602	9.434	786	10.896	4857	6.474
Italian language knowledge	5617	3.660	791	3.959	4848	3.086
Male	5627	0.506	791	0.451	4859	0.552
Age	5628	36.557	792	35.525	4864	35.679
No education	5515	0.062	781	0.060	4744	0.094
Compulsory school	5515	0.291	781	0.269	4744	0.374
High school	5515	0.438	781	0.472	4744	0.387
BA degree +	5515	0.209	781	0.198	4744	0.144
Marital status	5653	0.551	797	0.422	4884	0.506
Children	5612	0.559	782	0.477	4852	0.506

Children in Italy	5653	0.378	797	0.364	4884	0.271
Muslim	5477	0.373	775	0.306	4711	0.414
Catholic	5477	0.249	775	0.302	4711	0.223
Orthodox	5477	0.186	775	0.204	4711	0.204
Coptic	5477	0.005	775	0.004	4711	0.001
Evangelical	5477	0.023	775	0.021	4711	0.023
Other Christian	5477	0.022	775	0.023	4711	0.019
Buddhist	5477	0.036	775	0.031	4711	0.035
Hindu	5477	0.020	775	0.010	4711	0.013
Sikh	5477	0.008	775	0.001	4711	0.004
Other	5477	0.009	775	0.012	4711	0.010
No religion	5477	0.070	775	0.086	4711	0.054
Industrial sector	5420	0.157	761	0.093	4652	0.139
Commercial sector	5420	0.174	761	0.164	4652	0.158
Firm services sector	5420	0.092	761	0.078	4652	0.069
Family services sector	5420	0.225	761	0.212	4652	0.243
Agricultural sector	5420	0.033	761	0.030	4652	0.040
Other sectors	5420	0.121	761	0.148	4652	0.121

4 Results

In Table 3 we report the results of the model in which we regress the income class on the migrant's identity and the other covariates. We show the OLS results in columns (1)-(2) finding that being integrated on average increases the probability of achieving a higher income class by about 13 percentage points in our preferred specification which is the one accounting for the network effect (column 2). We do not find statistically significant differences between assimilated and separated migrants according to our analysis. However, to deal with the potential nonlinearity in the relationship "integration-income" - the dependent variable is not continuous, representing 7 classes of income -, we also estimate an ordered probit model (columns 3-4) that confirms previous results (see also Figure 1 on differences between integrated and separated - a - and assimilated and separated - b - in which we report marginal effects -by each income class- we obtain from column 4 of Table 3).

With regard to the other covariates which have contemporaneous effects on the migrant's identity and her income[4], the time spent in Italy and the knowledge of the local language play a significant role; they are positively related to the outcome. Men seem to perform better than women, while the relationship with age is an inverted "U-shaped". Not surprisingly, we find an influential role of education: an higher level of education improves the foreigner's class of earned income. We also find a positive correlation between the outcome variable and the status of married. The dummy indicating whether the respondent has children is negatively associated with her performance (even if not statistically significant) but the reverse correlation occurs when we consider the dummy indicating whether her children live in Italy with her. Finally, none of the dummies representing the respondent's religion seems to affect the foreigner's earned income differently than Christians (our reference group).

Table 3: Identity and income

	OLS		Ordered Probit	
	(1)	(2)	(3)	(4)
Integrated	0.080**	0.131***	0.062*	0.126***
	(0.036)	(0.045)	(0.032)	(0.040)
Assimilated	-0.044	0.037	-0.062	0.027
	(0.071)	(0.089)	(0.065)	(0.082)
Individual controls	yes	yes	yes	yes
Economic sector FE	yes	yes	yes	yes
Survey & Time FE	yes	yes	yes	yes
Nationality FE	yes	yes	yes	yes
City FE	yes	yes	yes	yes
Nationality x City FE	no	yes	no	yes
R-squared	0.548	0.561	0.240	0.317
Observations	9031	9031	9031	9031

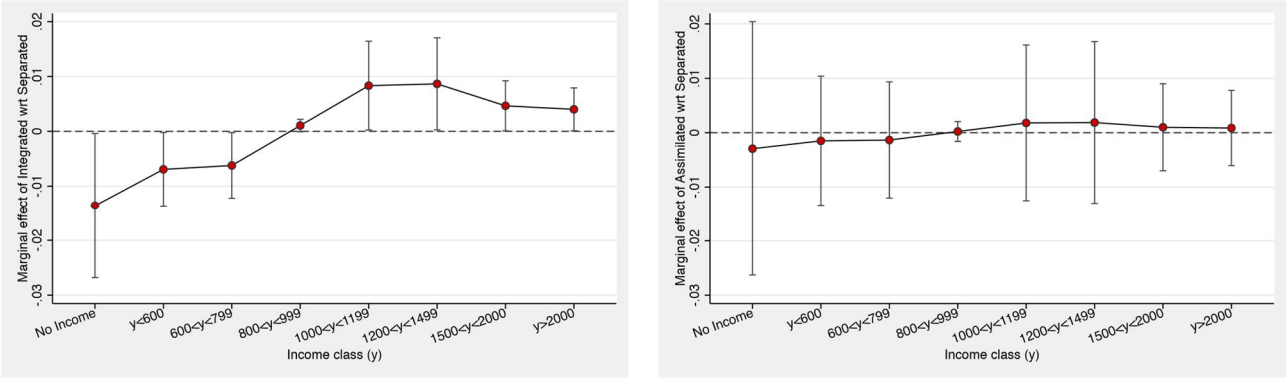
Notes. Robust standard errors in parenthesis; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. OLS estimates in columns (1)-(2) and ordered probit estimates in columns (3)-(4). R-squared are the Adjusted R-squared in columns (1)-(2) and the Pseudo R-squared in columns (3)-(4). The set of individual characteristics, includes *Years in Italy, Italian language knowledge, Male, Age, Age squared, Compulsory school, High school, BA degree +, Marital status, Children, Children in Italy and Religion dummies*. Sampling weights used.

The analysis so far carried out seems to suggest that what really matters in explaining the foreigners' working income in Italy is the contemporaneous sense of belonging to the host country society and

[4] Not showed but available on request.

to their origin ethnic group. As properly argued by the sociological literature the identity encompasses several aspects, i.e. self-esteem derived from the belonging to a group, self-confidence and psychological well-being associated to the resolution of conflicts between different identities (Nesdale and Mak, 2003; Phinney et al., 2001) and positive behaviors of peers that produce externalities such as network effects (Tajfel and Turner, 1986; Yamagishi and Kiyonari, 2000; Chen and Li, 2009). According to this, identification with both groups, as in case of integrated people, is beneficial because it affects positively the individual's self-esteem and allows to exploit two different channels to obtain in-group favoritisms, as for example receiving useful information about labour market opportunities (positive externalities due to the peer effects). For the same reasons, we do not expect differences between people who assimilate and those who separate in terms of their labour market outcomes, both implying a negative resolution of the conflicts between different identities, that leads to disclaim the participation in one of the two groups, with negative consequences on the individual's self-esteem and psychological well-being. Our results are in contrast with previous findings, since a conclusion of the leading literature in this field is that the positive foreigners' performance in labour market is mostly affected by the attachment to the host country, while the ethnic identity does not alter the result (when joined to a contemporaneous identification with the country of destination) or even worsens it (when in contrast with the individual's self-identification with the host country).

Figure 1: Marginal effects



(a) Integrated wrt Separated

(b) Assimilated wrt Separated

5 Concluding Remarks

Nowadays the issue of the immigrants' integration in Europe represents a priority in the political agenda of the European Community. Many studies recently carried out in several European countries, such as Germany and UK, seem to show that the phenomenon of integration, i.e. the self-

identification with the culture, the lifestyle and the customs of the country of destination improves the social and economic inclusion of immigrants. However, evidence about the Italian case is missing. This paper represents one of the first studies on the relationship between identity and labour market performance of the foreigners in Italy.

Using a measure of identity as described in Berry (1997) we show the access to better levels of income of integrated immigrants (i.e. those with a great sense of belonging to either the host or the home country) are higher than those of separated ones (i.e. those strongly anchored to their origin's culture but with a contemporaneously low self-identification with the country of destination). We do not find systematic evidence of a better labour market performance for assimilated people, as usually showed in previous studies. Our results differ from the existing findings related to some other European countries, as Sweden (Nekby and Rodin, 2010) and Greece (Drydakis, 2013) for example, in which it is shown that not only the status of integration but also that of assimilation matters to explain the foreigners' performance in the local labour market, so concluding that the identification with the host country represents the main driver for the foreigners' economic outcomes. Unlike these studies, our analysis seems to suggest that the full assimilation to the host country culture is not necessarily beneficial or sufficient for the foreigners' well-being. We argue that, while the condition of integrated denotes higher self-esteem and ability to acquire new knowledge, the assimilation, as the separation, may represent a "closeness" strategy. As many sociological studies highlight, there is a systematic loss of self-esteem associated to people who abandone their origin culture; it is what researchers define as "the paradox of assimilation" that justifies the lower performance realized by people who strongly assimilate to the host country culture.

Our results have an important policy implication, showing that integration policies that promote full assimilation models, i.e. policies that push for a higher identification with the destination country, without allowing for immigrants to retain their origin culture, could be ineffective or, at least, not ensure the best pay-off foreigners would be able to realize.

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Convergence of welfare provision in Europe: An assessment of the Monetary Integration effects

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Abstract

This study investigates the dynamics of European countries social spending in the period 1980-2013, in order to assess the impact of the monetary integration on the convergence of national welfare provisions. The analysis of total social expenditure and its relative main functions for 16 Western Europe countries reveals the presence of conditional convergence patterns and an increase of its speed after the monetary integration, with the sole exception of labour policy spending. This is probably due to the achievement of a coordination among European social policies favoured by an agreement on the objectives of a European Social Model.

Keywords: EU monetary integration; social protection; convergence; welfare provision indicators; panel data.

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1. Introduction

This study analyses the dynamics of European countries social spending in the period 1980-2013, to assess whether the achievement of the monetary integration drove to any convergence of national welfare provisions.

Formerly, welfare states in Europe were largely different due to countries' own political, historical and economic experience. Literature presents several examples of classification that place countries in different regimes. This is by the quantity of welfare provision, the how much dimension, and to the coverage model, the how dimension (Bonoli, 1997; Castles and Obinger, 2008; Esping-Andersen, 1990; Ferrera, 1996; Liebfried, 1992; Korpi and Palme, 2003). The latter, in particular, specifies the share of social expenditure mainly financed through contributions or taxation. Levels of protection and eligibility criteria vary throughout Europe as well as arising problems of social policy coordination and competition among European citizens.

During the last decades, the acceleration of the monetary integration process imposed deep changes in the political economy of European countries. In this new and more integrated institutional context, Governments were also expected to review their social policy actions to achieve an equal well-being condition and avoid the aspect of tightening competition among European citizens. Besides the occurrence of severe economic and demographic crises, there emerged new social risks and priorities that further fostered the reform process of the existing welfare schemes. Indeed, while the social dimension of the government policy was initially left behind, these new risks and the constraints on government balance, imposed by Maastricht Treaty in 1992 and the Growth and Stability Pact in 1997, raised serious problems of financial sustainability that required new trade-offs between different social spending items (Malinvaud, 1996). From this point of view, the convergence of national social protection systems becomes a matter of social spending convergence (Bouget, 2003) aimed to avoiding a reduction in protection levels (Cornelisse and Goudswaard, 2002).

For its part, the European Union (EU) institutions have the ambition to build a European Social Model (ESM) that aims at combining dynamism with social justice. The EU broadly define the goals and leaves member states to find the better strategy to reach them, in line with the subsidiarity principle. In particular, the major concerns of EU social policy are the fundamental rights such as education, health, mobility, social inclusion and durable pension benefits. All these goals can be achieved through an increase of labour force occupation, a higher quality of the life/work balance, the eradication of discrimination or a higher level of social protection., depending on the own socio-economic condition of each country.

The push towards the convergence of welfare provisions that is caused by a higher level of competition tends to be more pronounced within European Union where member states were committed, since the Summit of Lisbon in 2000, to design their national policies following the Open Method of Coordination (Attia and Berenger, 2007; Mosher and Trubek, 2003; Trubek and Trubek, 2005). The main aim of this policy tool was to favour an agreement on national public policies on poverty, social exclusion, pensions and health care maintaining a degree of independence among countries. However, common challenges (weak growth, aging population, unemployment) and constraints (Maastricht Treaty and Stability and Growth Pact) may have had the effect of produce more similar paths of EU member states social provision expenditures.

This new institutional context lays down a legal harmonization achieved by a ‘positive’ as well as a ‘negative’ integration (Scharpf, 1998). The first refers to the incorporation of common rules and directives on different aspects of social policy into the national legal framework (Knill and Lehmkuhl, 2002). The second refers to the removal of barriers to competition that facilitate the development of the Common Market (Leibfried and Pierson, 1995).

Finally, more similar social policies resulted in a strengthening of the globalization process that favoured governments' activity to reduce ‘unproductive’ spending. This is mainly on the welfare programs in favour of more productive expenditures with an aim to gain regarding competition (Montanari, 2001; Tanzi, 2002). This aspect of evolution drove to a social provision based on a

residual model that may lead to a downwards convergence of countries' welfare programs (Busemeyer, 2009; Garrett and Mitchell, 2001).

Given this scenario, we investigate the role played by the monetary integration in conditioning the convergence process of welfare state programs controlling for different social and economic factors. Relying on the most recent available data, covering the period 1980-2013, the analysis examines the behaviour of total social expenditure and its relative main functions (old age, survivors and incapacity-related, family, health, labour policies) for 16 Western Europe countries.

The results provide evidence of conditional convergence patterns over the whole period and reveal that the European integration strengthens the speed of convergence for all the social programs with the only exception being labour policy spending.

The study is structured as follows: section two summarizes the European legal harmonization process; section three describes the data and empirical strategy; section four presents the results and section five concludes.

2. Legal Harmonization within European countries: the social policy context

The Treaty on the Functioning of the European Union (TFEU) in 2007 declares that member states share with the Union the competence regarding the social policy of the EU (art.4. paragraph 2b). The main purpose of this is to achieve the highly competitive social market economy that should favour full employment and social progress. The EU social policy framework highlights three different concerns. From a social point of view, all countries should accept the responsibility for the social needs of their citizens and agree with the idea of a common ESM. Second, from an economic perspective, countries have to promote competition and avoid distortions due to differences in social levels caused by discrimination regarding education and labour mobility. Finally, the political concern refers to the presence of an EU active social policy as a condition sine qua non to obtain citizens' consensus on the political and economic integration.

The new context pushed to consider the specific social policy actions, which are largely a competence of the single EU member state according to the subsidiarity principle, as a very important topic of European Union Institutions 'agenda.

The pension system is a matter of common concern in EU due to the demographic crisis and the sharp decline of employment level that drove to severe sustainability problems. This issue is particularly crucial because if one of the EU countries fails to reform its pension system, there could be negative externalities spilling over the others. For this reason, the European Commission (EC, 2012) suggests different initiatives aimed at: achieving a better balance between time in work and time in retirement; ensuring the portability of pension rights when moving to another country; encouraging people to save more, through supplementary pension schemes, in order to maintain an adequate standard of living in the retirement period.

Labour market policy has been influenced by the presence of strong constraints imposed by international treaties like the European Employment Strategy (EES), started in 1997, and Lisbon Strategy 2000-2010. Their main aim was to make the EU 'the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion'[1].

Then, the EC proposed the Europe 2020 strategy to enable the Union to get out stronger by the financial and economic crisis started in 2008, which caused a significant loss in jobs and potential output.

About family policies, the Council of the EU on Employment, Social Policy, Health and Consumer Affairs expressed itself in favour of a Reconciliation of work and family life. Similarly, regarding healthcare policy, the Health 2020 framework supports action across government and society to: 'significantly improve the health and well-being of populations, reduce health inequalities, strengthen public health and ensure people-centred health systems that are universal, equitable, sustainable and of high quality' (WHO, 2012).

All these European directives are a consequence of a changed social context characterized by higher unemployment rates, demographic crisis, and increasing female labour market participation. The latter, favoured by the transition to the post-industrial era characterized by a greater specialization in the services sector (Armingeon and Bonoli, 2006), led to a different gender division of labour, with a further negative effect on the family's very stability (Iversen and Cusack, 2000; Taylor-Gooby, 2004).

3. Data and Empirical strategy

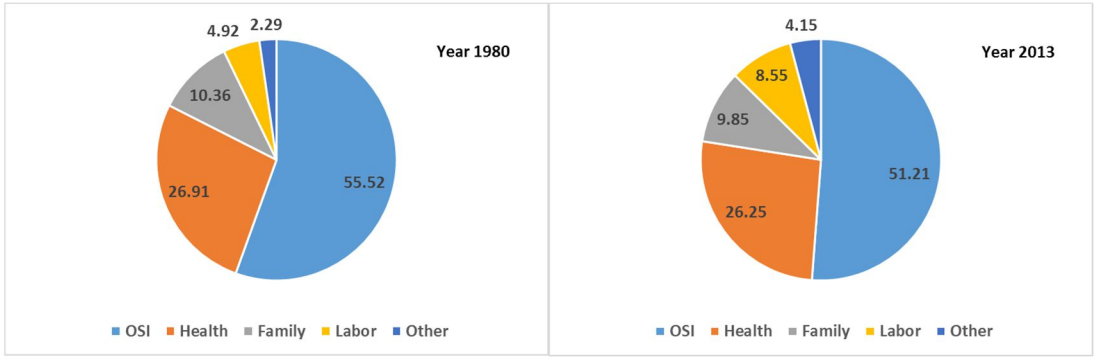
The impact of the monetary integration on the convergence of different European welfare programs is evaluated through a conditional convergence model. It is based on the hypothesis that steady-state levels of welfare provision are strongly influenced by countries' specific characteristics (Alsasua et al., 2007; Attia and Berenger, 2007; Caminada et al., 2010; Paetzold, 2013; Schmitt and Starke, 2011; Starke et al, 2008).

For our purposes, we estimate a panel data model with fixed effects, using a sample of 16 countries, namely Austria, Belgium, Denmark, Finland, France, Ireland, Italy, Germany, Greece, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom observed over the period 1980-2013. The advantage of this procedure, compared to a simple cross-section, is the possibility to account for time invariant countries heterogeneity (Evans, 1997).

The total amount of public social expenditure and its main functions are used as indicators of the countries' welfare provision. The choice of these measures is based on two objective criteria, the relative size and the responsiveness to changes in social policy. In particular, among all functions, it is worth to consider the categories attracting most of the financial resources devoted to social policy as displayed in Figure 1: old age, survivors, and incapacity-related (OSI), Family, Health, active and passive labour policies (Labour). Figure 1 shows evidence that the shares of OSI (55.52% in 1980 and 51.21% in 2013) and Health (26.91% in 1980 and 26.25% in 2013) cover more than 80% of the

total social spending. The most relevant changes over the period appear to be the reduction of OSI and the increase of Labour spending commitments.

Figure 1. Average Social Expenditure by function as a percentage of total Social Spending in 1980 and 2013.



Source: Our elaboration on OECD SOCX statistics.

Table 1 presents some stylized facts on the total social expenditure and its main functions, both expressed in percentage of GDP, describing the evolution of social programs for each country and the sample as a whole.

The total social expenditure greatly increased (average sample change 44.28%) because of the demographic crisis and the worsening of unemployment during the 1970s and early 2000s economic downturns. OSI, Health, and Family expenditures follow the same pattern (36.43%, 40.73%, and 32.94%, respectively). Of particular interest is the consistent change, far larger than the sample average, recorded above all in Mediterranean countries, that became protagonists of a remarkable catching-up process in welfare policy.

Table 1. Descriptive analysis of social indicators 1980-2013

	SE			OSI			Health			Family			Labour*		
	1980	2013	**Δ1980-2013**	1980	2013	**Δ 1980-2013**	1980	2013	**Δ 1980-2013**	1980	2013	**Δ 1980-2013**	1985	2013	**Δ 1985-2013**
Austria	22.00	27.60	**25.45**	13.35	16.28	**21.90**	4.73	6.49	**37.07**	3.17	2.57	**-18.83**	1.19	1.74	**46.26**
Belgium	23.10	29.30	**26.84**	12.39	13.42	**8.34**	5.13	8.02	**56.43**	2.94	2.86	**-2.69**	4.36	3.96	**-9.20**
Denmark[a]	20.30	29.00	**42.86**	12.12	14.85	**22.59**	5.10	6.68	**30.93**	2.75	3.66	**33.09**	0.79	1.81	**129.90**
Finland	17.70	29.50	**66.67**	9.35	16.13	**72.54**	4.61	5.79	**25.74**	2.04	3.21	**57.49**	1.98	2.95	**48.44**
France	20.20	31.50	**55.94**	12.08	15.98	**32.32**	5.36	8.61	**60.57**	2.39	2.91	**22.18**	2.85	2.49	**-12.79**
Germany	21.80	24.80	**13.76**	12.59	12.19	**-3.19**	6.30	7.94	**26.00**	2.01	2.17	**7.90**	1.44	1.69	**17.90**
Greece[b]	9.90	26.00	**162.63**	6.14	18.45	**200.72**	3.15	6.07	**92.76**	0.30	1.28	**329.43**	0.45	1.31	**193.95**
Ireland	15.70	20.20	**28.66**	7.79	7.45	**-4.37**	6.06	5.47	**-9.79**	1.05	3.29	**213.23**	4.27	3.41	**-20.22**
Italy[c]	17.40	28.60	**64.37**	10.44	18.08	**73.15**	5.33	6.81	**27.73**	1.04	1.42	**36.31**	0.80	2.11	**164.25**
Netherlands	23.30	22.90	**-1.72**	12.61	9.50	**-24.64**	4.83	7.86	**62.66**	2.35	1.35	**-42.66**	4.34	2.45	**-43.45**
Norway	16.10	21.80	**35.40**	8.95	11.55	**29.05**	4.28	5.55	**29.49**	1.78	3.02	**69.58**	1.05	0.85	**-19.52**
Portugal[d]	9.50	25.50	**168.42**	5.57	15.94	**186.00**	2.99	6.05	**102.58**	0.64	1.20	**88.09**	0.47	2.11	**348.09**
Spain	15.00	26.30	**75.33**	8.43	14.51	**72.17**	3.97	6.37	**60.45**	0.46	1.33	**189.57**	2.98	3.73	**25.34**
Sweden	24.80	27.40	**10.48**	12.36	14.21	**15.01**	7.21	6.55	**-9.14**	3.51	3.64	**3.53**	2.77	1.82	**-34.46**
Switzerland	12.80	19.20	**50.00**	7.60	8.90	**17.17**	3.29	6.63	**101.28**	0.94	1.56	**65.39**	0.40	1.34	**233.33**
United Kingdom	15.60	21.90	**40.38**	6.59	8.58	**30.11**	4.41	7.15	**61.94**	2.18	3.80	**74.56**	2.58	0.53	**-79.50**
Mean	17.83	25.72	**44.28**	9.90	13.50	**36.43**	4.80	6.75	**40.73**	1.85	2.45	**32.94**	2.04	2.14	**4.80**
CV	0.26	0.14	**-46.25**	0.27	0.26	**-4.54**	0.24	0.14	**-42.31**	0.54	0.39	**-27.58**	0.70	0.46	**-34.65**

* Because of unavailability, data on labor policies start from 1985.

a. For Denmark data on Labor in 1980 is not available and is substituted by that of 1986. Unemployment insurance is organized on a voluntary basis and one can become member of a UI-insurance fund when he is between 18 and 65 of age and has residence in the country. Hence, Labour data include only active policies information (Westergaard-Nielsen, 2002).

b. For Greece data on OSI, Family and Labor are available till 2012.

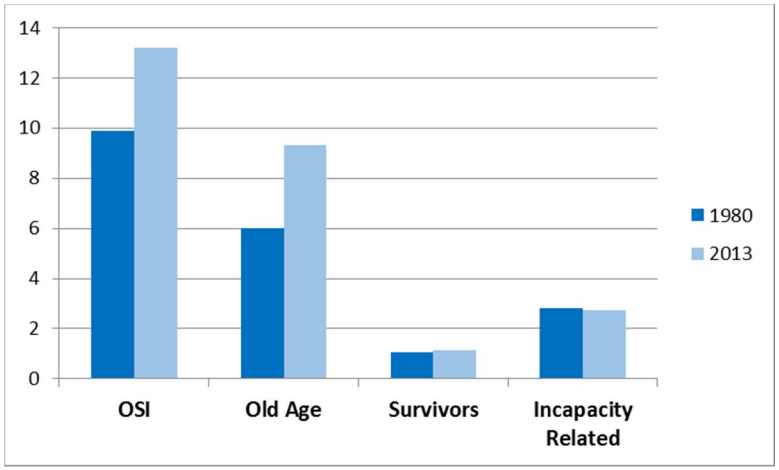
c. For Italy data on Active Labor Policy are available from 1990, therefore the 1980 value is substituted by that of 1990.

d. For Portugal data on Labor in 1980 is not available and is substituted by that of 1986.

Moreover, total social spending and OSI and Health functions have a relatively low coefficient of variation, implying higher similarity, while Family and Labour show greater differences among countries. The general increase of similarity suggests the presence of an absolute convergence process. The trend over time of the social indicators evidences a convergence process beginning in the middle of the 1990s when European countries were invited to join the cohesion policy in the light of a monetary integration. As regards OSI policies, Greece, Ireland, Italy, the Netherlands, Switzerland, and UK diverge from the common path the plots are not presented but are available upon request.

It should be noted that the principal determinant of OSI is the expenditure for old age pension, as evidenced in Figure 2.

Figure 2. OSI and its components in 1980 and 2013 (average values, % GDP).



Source: Our elaboration on OECD SOCX statistics.

While survivors and incapacity related pension spending remain stable, the retirement spending registers over the period a large increase from 6.0 to 9.3(% of GDP).

By means of a panel data structure, the impact of the European monetary integration on countries' social provision is tested using the following conditional convergence model:

$$\Delta Y_{i,t} = \alpha_i + \beta Y_{i,t-1} + \gamma DEurope_{i,t} + \delta_k \boldsymbol{\pi}_{i,t} + \varepsilon_{i,t} \qquad with\ k=1, \ldots 7 \qquad (1)$$

where $\Delta Y_{i,t}$ represents the annual growth of the social indicator of country $_i$ (with i=1,…,16), at time t (with t=1, …,33) and $Y_{i,t-1}$ is the lagged value of the social indicator so that the coefficient β, depending on its sign, reveals the presence of convergence (if negative) or divergence (if positive) among countries. *DEurope* is our variable of interest, equal to 1 from 1992 onwards and zeroes otherwise, enabling us to account for the impact of the European monetary integration process. Specific time invariant characteristics and structural differences are captured by country fixed effects α_i. The vector $\boldsymbol{\pi_{i,t}}$ includes a set of variables controlling for demographic, economic and institutional factors. The first are accounted by the old dependency ratio, i.e. the ratio of the population older than 64 to the working-age population (those ages 15-64), and the birth rate. These factors may drive changes in social expenditure for pension, health and education services for children and young people. The economic determinants included in the model are the following: the GDP growth rate, that improving social well-being favours a reduction in resources devoted to social functions; the unemployment rate which causes an increase in most of the social spending functions; the trade openness, i.e. the sum of imports and exports in terms of GDP, which may reduce social spending in favour of more productive uses to gain competitiveness. Institutional factors are accounted by the government debt as a percentage of GDP, as the implementation of austerity measures, laid down by the EU, causes an obvious rationing of all public expenses. Finally, we control also for the female labour force participation rate which changes may imply a different reorganization of family needs and labour market policy.

To capture the impact of European Monetary integration process on the welfare programs convergence, we first estimate a baseline model and then add our variable of interest *DEurope*. All data are taken from OECD statistics.

The variables are considered in level or at differences according to the results of different unit root tests, namely Levin et al. (2002), Im et al. (2003), ADF Fisher $\chi 2$ and Fisher-PP tests defined by Maddala and Wu (1999), where the null hypotheses are 'non-stationary'[2].

4. Results

Empirical results reveal the presence of conditional convergence for all the social provision categories as shown by the negative and highly statistically significant coefficients of their lagged levels in Table 2. The size of β is particularly high for labour policy (-7.9) and family (-7.08), denoting a stronger convergence process for social expenditure devoted to these functions. The inclusion of *DEurope* demonstrates that European integration gives more strength to this convergence process in most of the social programs. This rise in the speed of convergence is probably due to an increase in the number of policy areas under the responsibility of EU Institutions. Since the implementation of Maastricht treaty (1992), European Central Bank and European Commission have the task to control the compliance of deficit criteria with an indirect impact on member states fiscal policies. Therefore, national social policies, being a component of the public budget, are induced to follow similar patterns.

The control variables, when statistically significant, have the expected signs. However, some unexpected outcomes need clarification. First, the old dependency ratio does not have any statistically significant impact on OSI, even though it is mainly driven by pension benefits. In a legal harmonization context, this can be understood as the consequence of the EC encouragement (EC, 2012) to maintain an adequate standard of living through private supplementary pension schemes. Second, the positive and significant government debt coefficient for all social indicators implies that these programs are largely financed using government bonds. Finally, particularly interesting is also the negative impact of female participation in the labour market and Health policies. These may be due to the resulting greater household income availability that reduces the requests regarding these typologies of social services.

Table 2. Conditional β-convergence results

VARIABLES	SE	SE DEurope	IVS	IVS_ DEurope	LABOR	LABOR DEurope	HEALTH	HEALTH DEurope	FAMILY	FAMILY DEurope
L.Soc_exp	-0.637***	-0.659***	-0.886***	-0.893***	-7.913***	-7.372***	-1.726***	-2.366***	-7.084***	-7.746***
	(0.0724)	(0.0744)	(0.118)	(0.119)	(1.247)	(1.243)	(0.593)	(0.598)	(2.010)	(2.127)
Old dependency	0.153**	0.121	0.0685	0.0445	-0.792**	-0.139	0.0850	-0.227	0.117	-0.0416
	(0.0760)	(0.0804)	(0.0629)	(0.0694)	(0.374)	(0.419)	(0.193)	(0.201)	(0.327)	(0.367)
Δbirth_rate	1.369***	1.365***	0.948**	0.955**	0.0963	-1.770	1.139	1.440	6.962***	7.034***
	(0.474)	(0.474)	(0.411)	(0.411)	(2.630)	(2.659)	(1.232)	(1.209)	(2.384)	(2.385)
GDP growth	-0.870***	-0.866***	-0.913***	-0.911***	-1.472**	-1.552***	-0.894***	-0.902***	-0.876*	-0.873*
	(0.100)	(0.100)	(0.0875)	(0.0875)	(0.590)	(0.584)	(0.264)	(0.259)	(0.511)	(0.511)
Δtrade_openess	-0.123***	-0.125***	-0.0637**	-0.0661**	-0.302	-0.233	-0.0784	-0.103	-0.257	-0.266
	(0.0337)	(0.0337)	(0.0290)	(0.0291)	(0.191)	(0.190)	(0.0885)	(0.0869)	(0.170)	(0.171)
Δdebt/GDP	0.676***	0.683***	0.0583**	0.0588**	0.0729	0.0504	-0.112	-0.0954	0.508***	0.517***
	(0.177)	(0.177)	(0.0255)	(0.0255)	(0.168)	(0.166)	(0.0765)	(0.0750)	(0.149)	(0.149)
Δunemployment rate	0.0473	0.0496*	0.359**	0.361**	3.695***	3.734***	-0.168	-0.0927	-2.157**	-2.127**
	(0.0295)	(0.0295)	(0.154)	(0.155)	(1.036)	(1.024)	(0.465)	(0.456)	(0.902)	(0.903)
Δwlfp	0.0996	0.112	0.0183	0.0274	-1.933*	-2.218**	-0.825*	-0.650	-0.685	-0.626
	(0.176)	(0.176)	(0.153)	(0.154)	(1.030)	(1.021)	(0.454)	(0.447)	(0.894)	(0.897)
DEurope		0.495		0.284		-7.932***		4.567***		2.023
		(0.407)		(0.345)		(2.383)		(1.010)		(2.130)
Constant	13.19***	14.10***	11.24***	11.73***	44.80***	32.59***	10.95**	19.24***	16.52*	20.50**
	(1.758)	(1.912)	(1.576)	(1.684)	(9.974)	(10.52)	(4.520)	(4.793)	(8.977)	(9.909)
Observations	476	476	475	475	451	451	488	488	475	475
R-squared	0.512	0.513	0.523	0.524	0.269	0.288	0.068	0.108	0.095	0.097
Number of countries	16	16	16	16	16	16	16	16	16	16

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

5. Conclusions

This study explores the impact of the achievement of the monetary integration on the convergence of welfare provision among European countries, controlling for the specific contribution of economic and demographic factors. To this end, we analyse the dynamics of total social spending and its main functions, as indicators of welfare provision, over the period 1980-2013 for a sample of 16 Western European countries.

The stylized facts on the social indicators highlight an increase in social expenditure, total and by functions, over the sample period. The most substantial changes are recorded in Mediterranean countries which became protagonists of a catching-up process in welfare programs.

To highlight the impact of the European monetary integration, since the Maastricht Treaty of 1992, the study tests the presence of a conditional convergence process using panel data estimation approach. The results give evidence of conditional convergence patterns and reveal that the European integration strengthens the speed of convergence for all the social programs, with the only exception of labour policy spending. This is probably due to the achievement of the coordination among European social policies, as stated by the ESM that allowed overcoming the large differences in welfare regimes to which countries belong. This outcome is robust to controls for the demographic crisis, the changes in economic and institutional conditions and the gender composition of labour force generating new social risks and needs.

To evaluate whether this process also has an impact on the competition among European citizens, one should evaluate the effectiveness of each system and compare the respective degree of risk and needs coverage. In fact, the main aim of ESM is ‘to bind Europe together’ ensuring that citizens of each member state feel equally protected, regardless their residence-country. Further analyses could be performed to verify whether the convergence regarding financial efforts goes together with a convergence of the beneficiary's well-being.

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Heterogeneous entrepreneurs, government quality, and optimal industrial policy

Michele Di Maio, Giorgio Fabbri and Vincenzo Lombardo

Abstract

This paper presents a theoretical model exploring the effects of industrial policy (IP) when entrepreneurs are characterized by different ability levels and sectors are heterogeneous as for their profitability and social externalities generated. The optimal structure of IP in terms of monetary transfers is shown to crucially depend on the distribution of entrepreneurs abilities. In an extension of the model, we consider the case in which the Government can use also the provision of business training to entrepreneurs as an additional instrument of IP. Based on these results, policy implication for industrial policy in developing countries are discussed.

Keywords: Industrial policy; entrepreneurs; heterogeneous abilities; training.

JEL classification: O25, O15, O14.

1 Introduction

The recent waves of economic crises have made evident the high vulnerability to external shocks of developed and developing countries. Diversification of production and export has been advocated as a possible strategy to build resilience to shocks. Yet, most of developing countries are highly depended on agriculture and raw material sectors and are experiencing a deindustrialization process (UNCTAD and UNIDO, 2011). As a reaction to this state of affair, there has been an increasing commitment of Governments to support industrialization as part of a broader agenda to diversify the economy through industrial policy (Chang et al., 2013).[1]

Interestingly, this policy change has been accompanied by an increasing agreement among scholars on the fact that - beside the creation of a competitive market environment - Governments of developing countries should also play a proactive role in facilitating structural transformation and industrial upgrading (Yu and Lin, 2015). Economic development requires structural change from low to high productivity activities and the manufacturing sector is a key engine of growth in the development process (Rodrik, 2014). As Ocampo and Ros (2011) point out, once the process of economic growth is seen as a process of structural change, industrial policy becomes a central element of national development strategies.

While industrial policy (IP) is now back in both the political and the economic discourse, this does not imply that it is all clear how to design an effective IP. In fact, there are several factors that may make the effects of IP worse than the problems it aims to solve. In this paper, we emphasize that one of the most relevant obstacle to make IP successful is the mismatch between IP and the quality of the private sector and of the government. In particular, we show how the characteristics of the private sector have important - and not always obvious - implications for the efficacy of IP. The same IP can have even opposite impact depending on the characteristics of the population of entrepreneurs. Learning about the characteristics of the private sector is thus of utmost importance to make IP effective.

To explore these issues, we develop a model whose assumptions have two characteristics: 1) are able to capture those peculiar features of developing economies that are likely to be relevant in determining the impact of IP in those countries and 2) provide a simple setting to study this complex phenomenon. We consider a two-sectors economy populated by agents heterogeneous in terms of entrepreneurial

[1] This phenomenon has been particularity relevant in African countries. The New Partnership for Africa's Development (NEPAD) adopted by African leaders in 2001 identifies economic transformation through industrialization as a critical vehicle for growth and poverty reduction in the region. In 2008, African heads of state signed the Plan of Action for the Accelerated Industrial Development of Africa (AIDA). In 2010, the Economic Community of West African States (ECOWAS) adopted the West African Common Industrial Policy. Industrialization is a component also of recent national development programmes for a number of countries including Brazil, Egypt, Ethiopia, Kenya, Namibia, Myanmar, Oman, Papua New Guinea, Tunisia, Uganda, and Vietnam (Altenburg and Lutkenhorst, 2015).

abilities. The two sectors differ for the amount of knowledge diffused among the entrepreneurs' population about their specific production process. The already active or *known sector* (e.g. agriculture, tourism etc.) is characterized by a high degree of diffusion among entrepreneurs of the knowledge needed to operate its production process. On the contrary, for the non-active or *unknown sector* (e.g. manufacturing) the knowledge about the production tasks is not yet standardized and/or diffused in the population. This cross-sectoral heterogeneity is reinforced in terms of sector profitability and externality: while the already active or *known sector* provides a higher return for private entrepreneurs than the other, the Government objective is to support the *unknown sector* because it is assumed to produce a higher positive externality.

In this setting, IP is conceived as the set of selective government measures to influence the structure of the economy in order to increase the share of the high social return unknown sector (manufacturing) to maximize the aggregate welfare of the population. We assume that IP is under the responsibility of the Industrial Policy Agency (IPA), the country-specific governmental body which is in charge of the design, implementation and monitoring of the national and subnational industrial policy. We model IP in two ways. The first one is a monetary transfer to entrepreneurs. This is sector specific and independent from the individual productivity of the entrepreneur. The second is instead the IPA increasing the economy-wide knowledge level about the production in the unknown sector. This is achieved by providing local entrepreneurs entering the unknown sector with training, market information, and logistic support to begin the activity and reduce the costs associated with production and exporting in that sector.

This simple model structure allows us to derive a number of results. First, we show that - as long as in the economy there is a positive level of knowledge concerning the production technique of each sector, IP always increases welfare with respect to a neutral policy, i.e. the one that provides the same incentives to both sectors. Second, our results show that the structure of the sector incentives of the optimal IP largely depends on the distribution of entrepreneurs abilities. In particular, the welfare gain effect of IP is larger in economies where the level of knowledge about the production process in the unknown sector is low (relatively to the average ability of the population) and the inequality in the abilities' distribution is high or, on the contrary, where the level of knowledge about the unknown sector is high and inequality is low. Third, when we allow for Government failures, we find that, while the larger the bias of the IPA the lower the welfare gain of the IP with respect to the neutral policy, there always exists a non-empty set of values for the bias for which IP remains beneficial. It follows that there are configurations of parameters for which IP increases welfare even in the presence of a corrupt and non-benevolent Government. Fourth, when we expand the model to allow for IPA to use two instruments, namely the monetary transfer and the support to entrepreneurs entering the unknown sector, we find that the latter and the quality of entrepreneurs are in fact substitutes: the

higher is the ability of the private sector, the less needed are investments to improve the capabilities of the IPA in coordinating or guiding the economic activity. At the same time, the higher the inequality in the abilities the more important is the role of the IPA.

Taken together these results support the view that the effectiveness of IP not only depends on the characteristics of the specific IP measures adopted but also on the quality of the entrepreneurs and on the capabilities of the government. It is thus essential to learn about and take into proper account the heterogeneity in the entrepreneurs abilities to identify the IP that would work better in each context.

Three main assumptions simplify our analysis. First, we abstract from the possibility of international trade. It is well known that in the context of an open economy the arguments in favour of IP are weaker. We will show that even in the more favorable closed-economy case the conditions for the optimality of IP may be very stringent. Second, we assume that the Government is benevolent and there is no corruption. Under these assumptions, we are able to show that even excluding any political economy consideration IP optimality is a nonobvious outcome that indeed greatly depends on the fit between IP and the characteristics of the entrepreneurs. Finally, we abstract from local taxation issues since we assume that IP is financed by an external donor. While this is indeed a not too heroic assumption given that most of developing countries heavily rely on donors to finance government programs to support domestic firms (also because of the well-know difficulties to collect taxes), it also allows us to focus only on which is the optimal structure of IP.

Our paper is related to different strands in the literature. The first is the large and heterogeneous literature that argues that manufacturing and structural change matter for economic growth and that sectors are different in terms of productivity and externalities they generate (Rodrik, 2014; Lin, 2013; Szirmai, 2012). This heterogeneous body of research is relevant for our analysis to the extent to which the unknown sector can be considered to be the manufacturing sector. We argue that this is very likely in the context of developing countries where usually the largest share of economic activity takes place in agricultural, service or natural resource sectors.

Our paper is also related to the literature on the role of government intervention and in particular on the effects of industrial policy in developing countries. The empirical literature on the effect of industrial policy has mostly focused on the analysis of the Asian Tigers and the Latin American experiences (see Amsden, 1998; Chang, 1994; Lall, 1996; Noland and Pack, 2002; Di Maio, 2009) while the number of studies on the Sub-Saharan countries experiences with IP are much smaller (for a review see UNECA, 2011). Theoretical research has analysed the effect of IP on growth using a large variety of different models and reaching almost any possible conclusion (Hausmann and Rodrik, 2003; Hodler, 2009; Hoff, 1994; Harrison and Rodrigues-Clare, 2010). In the literature, IP has been modeled in different ways: targeted subsidies; monetary transfers to cover the fixed costs of production; a regulatory policy forcing firms to remain in one specific sector; a subsidy provided only

to innovative firms (Bjorvatn and Coniglio, 2006; 2012; Aghion et al., 2015; Hausman and Rodrik, 2003). With respect to this literature, our model consider two types of IP (monetary transfer and improvement in IPA quality) and it is the first one to explore the role of entrepreneur's heterogeneous abilities in determining the optimal IP.[2]

Finally, our paper is close to the set of contributions looking at which policies would favour most entrepreneurship and economic activity. In general, all policies directed to influence entrepreneurs' decisions can be considered as part of IP. There are few empirical papers looking at the micro-economic effects of those policies in developing countries. While economic theory has long focused on mechanisms via which expanded access to capital enables individuals to alter their occupational choices and improve their economic conditions (Banerjee and Newman, 1993), there is an increasing attention to the need to complement this with skill and information provision. Bandiera et al. (2017) emphasize the importance of the process of occupational change and of programs which enable poor people to upgrade occupations, rather than just make them more productive in a given occupation. Lin (2012) argues that governments need to play a proactive role to facilitate structural transformation and industrial upgrading by providing information to entrepreneurs in the private sector on the the most dynamic industries. While there is an increasing evidence on the disappointing performance of short-term training for existing micro-entrepreneurs (McKenzie and Woodruff, 2014), recent evaluations of business training programs provide evidence of the existence of a complementarity between the provision of capital and training (de Mel et al. 2012). Given the importance of both these aspects, our IP actually uses both these instruments: it provides economic incentives in the form of an individual cash transfer and provides support services for entrepreneurs investing in a new sector.

The paper proceeds as follows. In section 2 we present the basics of the model. In section 3 we discuss the optimal IP when the government can use only one measures (individual cash transfer). In Section 4, we extend the basic model allowing for possible Government failures as well as considering the case in which the government can use an additional measure (business training) as part of IP. Section 5 concludes.

[2] Acs and Naude (2013) note that one of the reasons for IP failure is the "inappropriate emphasis on stimulating economic activities and growth in a manner that was not optimal for entrepreneurship given these countries' levels of development". In fact, there is considerable evidence that in countries where IP has been more successful such as the NIEs and China - IP was designed taking into proper account the characteristics of the country's entrepreneurs and their relation to the State. For instance, where the entrepreneurial base was small and weak (Singapore and Korea), IP was at first aimed to complement and strengthen the domestic entrepreneurial base, through allowing in much more foreign entrepreneurship and by providing financial support to allow entrepreneurs to take on more risk in imitation and foreign technology adoption. On the contrary, where the entrepreneurial base was fairly strong to begin with (e.g. Taiwan and Japan), more limitations were placed on foreign entrepreneurs (Nelson and Pack, 1999).

2 The model

2.1 Basic structure

Consider a two-sectors economy populated by a continuum of individuals of mass M with different innate abilities $a_i \in [0,1]$. Individuals (henceforth, the entrepreneurs) are risk-neutral and self-employed in their small or medium size enterprises (SME's). The two sectors differ as for the amount of knowledge diffused among the population about the sector-specific production processes. The already active or known sector (denoted by "k") is characterized by a high degree of diffusion among the population of entrepreneurs of the knowledge needed to operate its production process. On the contrary, in the case of the non-active or unknown sector (denoted by "u") production knowledge is not yet diffused and/or production tasks are not yet standardized.[3]

Return y_{ij} for project i in sector j is determined by sector-specific productivity π_j and by entrepreneurial skills e_{ij} of individual i operating in sector $j = k,u$, namely: $y_{ij} = \pi_j e_{ij}$. The level of entrepreneurial skills e_{ij} is a weighed average of the ability of the entrepreneur, a_i, and of the level of basic knowledge available in the economy concerning the sector production process, $b_j > 0$. The level of basic knowledge b_j may be determined by several factors, including government intervention, historical episodes, geographical conditions or even chance. Both the ability of the entrepreneur and of the level of basic knowledge concerning the sector production technology positively contribute to the project return. However, their weight differ in each sector. While in the known sector, project return hinges relatively more on the entrepreneur's individual ability (since the level of knowledge about the sector is already high and diffused), in the unknown sector the project return depend more on the entrepreneur having the basic knowledge about the production process (since entrepreneur's ability is not very useful if the basics are not known). Formally, $y_{ij} = \pi_j e_{ij}$, where $e_{ij} = \theta_j a_i + (1 - \theta_j) b_j$ with $j = u,k$ and $\theta_k > \theta_u$. To simplify the exposition, we assume $\theta_k = 1$ and $\theta_u = 0$, i.e. that in the known sector return only depends on the entrepreneurs' ability, a_i, while in the unknown what matters is only the amount of basic knowledge available, b, in the economy which the entrepreneur can access fully and at no cost.[4]

[3] This formalization is meant to capture the situation - common to several developing countries - in which entrepreneurs have often deep knowledge about the traditional sector (agriculture or often also in the tourism and natural resources sectors) while there is a significant lack of expertise in the non-traditional sectors (in most of the cases manufacturing).

[4] In fact, the only necessary condition for all our results to hold true is that the basic knowledge component is relatively more important in the unknown sector rather than in the known one.

2.2 Industrial Policy

As we discussed in the Introduction, Industrial policy (IP) can be defined as the set of selective government measures to modify the structure of the economy by increasing the share of the manufacturing sector. IP can take different forms including subsidies, tax concessions, soft loans, preferential procurement policies, import restrictions or export promotion measures. We assume that IP is under the responsibility of the Industrial Policy Agency (IPA), the country-specific governmental body in charge of the design, implementation and monitoring of the national and sub-national industrial policy (Hodler, 2011).[5]

In our model, IP takes two forms. The first one is a monetary transfer to entrepreneurs.

This is sector specific and independent on the individual productivity of the entrepreneur. The second is the IPA increasing the economy-wide knowledge level about the production in the unknown sector. This is achieved by providing local entrepreneurs entering the unknown sector with training, market information, and logistic support to begin the activity and reduce the costs associated with production and exporting in that sector.[6] In this case, the level of basic knowledge concerning the production process in the unknown sector, i.e. b, is a choice variables of the IPA maximization problem. To simplify the exposition of the model, we begin by assuming that b is exogenously given. In Section 4.2, we consider the case in which IPA uses both instruments and thus we endogenize b in the budget constraint.

We assume that IPA has an exogenously given amount G of resources (e.g. provided by an international donor development project) to be used to conduct IP (Hodler, 2011). The total amount of resources G is fully utilized, so there is no saving by the IPA. The individual transfer received by each entrepreneur in the known sector is τ_k and the total amount at the sector level is:

$$T_k := M\eta\tau_k$$

where η is the share of entrepreneurs investing in the known sector. The amount of resources received by each entrepreneur in the unknown sector is τ_u and the total amount is:

$$T_u := M(1-\eta)\tau_u$$

[5] For a historical overview and empirical assessment of IPA activities and strategies in different countries see for instance Amsden, 2001; Cimoli et al. 2009; Naude et al. 2015.

[6] For instance, these are the activities usually performed by export promotion agencies in several developing countries (Belloc and Di Maio, 2012).

where $(1-\eta)$ is the share of entrepreneurs investing in the unknown sector.

When b is exogenous, IP is characterized by the couple $(\tau_k;\tau_u)$. Hence the budget constraint of the IPA is simply given by:

$$G = M(\eta\tau_k + (1-\eta)\tau_u) \tag{1}$$

that rewritten in per-capita terms is:

$$g = \eta\tau_k + (1-\eta)\tau_u \tag{2}$$

with $g := G/M$ defined as the per-capita resources available for IP.

2.3 Entrepreneur sectoral allocation choice

As it follows from our assumptions (see Section 2.1), the entrepreneurial skill is $e_{ij} = a_i$ if $j = k$, and $e_{ij} = b$ if $j = u$. Hence, the profit associated with a project in the known sector for entrepreneur i is:

$$\pi_k a_i + \tau_k$$

while the profit associated with a project in an unknown sector is:

$$\pi_u b + \tau_u$$

The entrepreneur chooses to invest in the known sector if and only if

$$a_i \geq \bar{a} := \frac{\pi_u b + \Delta\tau}{\pi_k} \tag{3}$$

with $\Delta\tau \equiv \tau_u - \tau_k$. This condition gives the threshold ability level $\bar{a}$ that identifies entrepreneurs investing in the known sector: all those with an individual ability higher than $\bar{a}$ will have a higher (after the transfer) profit if they invest in the known sector. The reverse holds for low ability individuals.

For any a_i, we denote $F(a_i)$ as the share of entrepreneurs that have individual ability smaller or equal than a_i. Formally, if f denotes the density of the share of the entrepreneurs ability distribution, for any entrepreneurial skill $\tilde{a}$, we have:

$$F(\tilde{a}) = \int_0^{\tilde{a}} f(a_i)\,\mathrm{d}a_i \tag{4}$$

Using this notation, the share of entrepreneurs in the known and unknown sectors can be, respectively, written as $\eta = \int_{\bar{a}}^{1} f(a_i)da_i$ and $(1-\eta) = \int_0^{\bar{a}} f(a_i)da_i$. It follows that the sector-level knowledge

structure (in particular the level of knowledge in the unknown sector *b*) plays a central role in determining the economy patter of specialization.

2.4 Aggregate welfare

Aggregate welfare is given by the sum of total sectoral returns, i.e. the social return of each investment plus the transfer. We assume that investment in any of the two sectors generates both a private return and a positive externality. Thus, the social return of each investment Π_j, with $j = k,u$, is given by

$$\Pi_u = \pi_u + U > \pi_u \qquad \text{and} \qquad \Pi_k = \pi_k + K > \pi_k \tag{5}$$

where $U,K > 0$ are the sector-specific externalities of the unknown and known sector, respectively.[7] Each investment in the known sector generates a total sectoral return equal to

$$\Pi_k a_i + \tau_k$$

i.e. the sum of the ability-weighted social return of the investment (individual return plus the externality) and of the individual transfer received by the entrepreneur. It follows that the total welfare generated by projects in the known sector is given by

$$M\left(\Pi_k \int_{\bar{a}}^{1} a_i f(a_i)\,\mathrm{d}a_i + \int_{\bar{a}}^{1} \tau_k f(a_i)\,\mathrm{d}a_i\right)$$

The total return for each unknown project is, instead, given by

$$\Pi_u b + \tau_u$$

so that the total welfare generated by projects in the unknown sector is

$$M(\Pi_u b + \tau_u) \int_0^{\bar{a}} f(a_i) da_i.$$

Finally, the net per capita aggregate welfare, defined as the average of all individual returns and transfers, is

[7] Note that this simple formalization allows for the consideration of several different cases, including that in which a sector with low individual productivity π_j can generate high individual total returns because of its high positive externality.

$$\frac{W}{M} \equiv \omega = \Pi_k \int_{\bar{a}}^{1} a_i f(a_i)\,\mathrm{d}a_i + \int_{\bar{a}}^{1} \tau_k f(a_i)\,\mathrm{d}a_i + (\Pi_u b + \tau_u) \int_{0}^{\bar{a}} f(a_i) da_i$$

$$= \Pi_k \left(\int_{\bar{a}}^{1} a_i f(a_i)\,\mathrm{d}a_i \right) + b\Pi_u \int_{0}^{\bar{a}} f(a_i) da_i + g \quad (6)$$

Equation (6) makes clear that, in our model, IP influences aggregate welfare in two ways.
First, IP directly increases welfare because each individual receives a transfer *g* at no cost. Second, IP indirectly affects welfare by modifying the allocation of entrepreneurs among the two sectors. Note that, differently from other models, in our case IP does not affect welfare by modifying sector productivities. This choice allows us to explore in detail the role of IP as an instrument for creating the conditions for structural change through the reallocation of individuals across different economic activities.

3 Results

We begin our analysis by deriving the optimal IP when the IPA is benevolent and has perfect information, i.e. there are no government failures. This implies that IPA knows the *true* values of the sector-specific externalities.[8] The analysis of the effect of government failures on the characteristics of the optimal IP is presented in Section 4.1.

3.1 Optimal Industrial Policy

The objective of IPA is to select the sectoral allocation of total resources *G* that maximizes aggregate welfare. Thus, the IPA chooses τ_k and τ_u that maximize (6), by inducing the optimal sectoral allocation of entrepreneurs which satisfies (3). Since the choice of τ_k and τ_u impacts the welfare only through the value of $\bar{a}$, i.e. the threshold ability level that determines the sector allocation of entrepreneurs, we first find the optimal level of $\bar{a}$ by maximizing eq. (6). This is given by

$$\bar{a}^* = \frac{\Pi_u b}{\Pi_k} \quad (7)$$

This is the ability value for which the return of the marginal entrepreneurs in the know and unknown sector is equalized while individuals with ability greater (resp. smaller) than $\bar{a}^*$ invest in the known (resp. unknown) sector.

[8] The values of *U* and *K* employed by IPA in choosing IP can be the result of different processes, ranging from being the outcome of a correct economic analysis, of a politically motivated decision (the values are determined by the objective function of the Government) or of the activity of lobby groups on the Government. In fact, as with any other form of government intervention, the effectiveness of IP can be seriously impaired by the presence of different sources of government failure.

Using (3) and (5), the optimal allocation condition (7) can be rewritten as:

$$b\left(\frac{U\pi_k - K\pi_u}{\pi_k + K}\right) = \tau_u - \tau_k \tag{8}$$

The optimal IP is characterized by non-negative individual transfers τ_u and τ_k that satisfy the budget constraint in eq. (1). There are three possible cases: 1) corner solution with $\tau_u = 0$; 2) corner solution with $\tau_k = 0$; 3) internal solutions with both transfers positive. The first two cases correspond to situations where the condition (8) cannot be satisfied because - for given parameters - g is not large enough and, hence, the optimal allocation of entrepreneurs described in (7) is not feasible.[9]
Focusing on the internal solution case, we derive the following proposition:[10]

Proposition 3.1. *The optimal τ_k and τ_u are the solutions of*

$$\begin{cases} b\left(\frac{U\pi_k - K\pi_u}{\pi_k + K}\right) = \tau_u - \tau_k \\ g = \eta\tau_k + (1-\eta)\tau_u = \left[1 - F\left(\frac{\Pi_u b}{\Pi_k}\right)\right]\tau_k + F\left(\frac{\Pi_u b}{\Pi_k}\right)\tau_u \end{cases} \tag{9}$$

and (7) is satisfied so that

$$\tau_u = g + [1 - F(\bar{a}^*)]\, b\left(\frac{U\pi_k - K\pi_u}{\pi_k + K}\right) \tag{10}$$

$$\tau_k = g - F(\bar{a}^*)\, b\left(\frac{U\pi_k - K\pi_u}{\pi_k + K}\right) \tag{11}$$

Proposition 3.1 shows that the optimal IP crucially depends on the value of the sector externality as assumed by the Government. To focus on the most interesting case, we assume that the positive externality generated by an investment in the unknown sector is larger than that in the known sector, i.e. $U > K$.[11]To make the analysis clearer, we assume $U > 0$ and $K = 0$. Under these assumptions, the optimal IP is characterized by the individual transfers

[9] It is possible to show that the IP induces the optimal allocation of entrepreneurs only under the condition that a minimum level of transfers is available. Note that the larger is the value of g, the larger is the possibility for the IPA to induce a reallocation of entrepreneurs. Yet, for g larger than a certain critical value $\bar{g}$, entrepreneurs' choices are unaffected, so that the marginal entrepreneur has ability equal to $\bar{a}^*$ in eq. (7). It follows that the value of $\bar{g}$ divides the corner solutions cases and the internal solutions ones.
[10] The full characterization of the optimal IP for the different cases is derived in Appendix A, see in particular Proposition A.1.
[11] Note that this is the configuration for which a-priori IP may appear less controversial. By showing that also in this case optimal IP largely depends on the distribution of entrepreneurs abilities strengthen our argument.

$$\tau_u = \quad g + [1 - F(\bar{a}^*)]bU, \tag{12}$$

$$\tau_k = \qquad g - F(\bar{a}^*)bU, \tag{13}$$

while the optimal amounts of resources transferred to each sector are

$$T_u = M(1-\eta)\tau_u = MF(\bar{a}^*)(g + (1 - F(\bar{a}^*))bU) \tag{14}$$

$$T_k = M\eta\tau_k = M(1 - F(\bar{a}^*)(g - F(\bar{a}^*)bU) \tag{15}$$

It can be easily verified that, for $K = 0$, the minimum level of per-capita resources $\bar{g}$, which guarantees that the optimal allocation of entrepreneurs $\bar{a}^*$ is feasible, is given by:

$$\bar{g} := F\left(\frac{\Pi_u b}{\Pi_k}\right) bU. \tag{16}$$

Aggregate Welfare The IP affects aggregate welfare through two channels. On one side, IP increases aggregate welfare by providing monetary transfers to all entrepreneurs. On the other side, IP impacts on aggregate welfare by providing (asymmetric) incentives at the sector level to influence the size and the ability composition of the group of entrepreneurs operating in the two sectors.
To disentangle the two phenomena, we define as benchmark the aggregate welfare when the IPA chooses the neutral policy $\tau_u = \tau_k = g$.[12] It is easy to show that:

Proposition 3.2. *For any $b > 0$, the aggregate welfare under optimal IP is always strictly larger than under the neutral policy.*

As long as the level of basic knowledge in the unknown sector is not zero, the neutral policy (same transfer to both sector) does never satisfies the optimality conditions (12) and (13), and hence it is always suboptimal. This result implies that the optimal IP does not necessarily need to target only sectors characterized by dynamic comparative advantage *á la* Redding (1999). In our setting, indeed,

[12] Observe that such a policy is admissible (the contribution to each entrepreneur is g and the total cost of the intervention is $G = Mg$) and non-distortionary (entrepreneur i chooses to invest in a project in the known sector if and only if $a_i \geq (\pi_u b + \Delta\tau)/\pi_k$ where $\Delta\tau \equiv \tau_u - \tau_k = 0$, which is equivalent to $a_i\pi_k \geq \pi_u b$, i.e. the condition to invest in a project in the known sector in absence of IPA intervention).

the welfare increasing effect of IP follows specifically from the fact that IP induces low-ability entrepreneurs to invest in the unknown sector.[13]

3.2 Optimal IP and distribution of entrepreneurs' abilities

In order to characterize in detail the link between the optimal IP and the characteristics of the economy, in the following we explore how the former changes with the distribution of entrepreneurs' abilities. More precisely in this section, we analyze how optimal IP changes with differences in the: 1) average population ability and; 2) inequality in the ability distribution (for given average ability level of the population of entrepreneurs).

Comparing populations of entrepreneurs with different average ability levels We consider a family of cumulative distributions of entrepreneurs' abilities F_γ indexed by a real parameter γ. We assume that the distributions are "ordered" in the sense that $F_\gamma(\bar{a}^*)$ is decreasing in γ. This is the case, for instance, if F_γ are ordered in the sense of stochastic dominance. We denote with η_γ the share of entrepreneurs investing in the known sector when the distribution of ability is induced by F_γ. We have the following results:

Lemma 3.3. *Under the optimal IP, η_γ is increasing in γ.*

Proof. See Appendix A. □

Proposition 3.4. *The optimal individual and sectoral transfers are characterised as follows:*

(i) If $g \geq F_\gamma\left(\frac{\Pi_u b}{\Pi_k}\right) bU$ *, individual transfers τ_k and τ_u are increasing in γ; also, T_k (T_u) is increasing (decreasing) in γ.*

(ii) If $g \leq F_\gamma\left(\frac{\Pi_u b}{\Pi_k}\right) bU$, $\tau_u = \frac{g}{F\left(\frac{\Pi_u b}{\Pi_k}\right)}$ *and $T_u = g$, while $\tau_k = T_k = 0$.*

Proof. See Appendix A. □

Proposition 3.4 illustrates how - when IPA has enough resources (case *i*) - the optimal IP changes with the average level of ability in the entrepreneurs' population. If the ability level of the population is low, it is optimal for the IPA to support relatively more the entrepreneurs in the unknown sector (the lower γ the higher T_u). On the contrary, for high levels of average ability, the optimal IP is

[13] Those are all individuals with entrepreneurial ability smaller than the level of the basic knowledge in the unknown sector ($a_i < b$), implying that for them it always holds $y_u > y_i$.

characterized by more resources transferred to the known sector. It follows that - *ceteris paribus* - the optimal structure of the IP incentives depends on the average ability level of the entrepreneurs' population.

While IP is always welfare improving as long as $b > 0$ (see Proposition 3.2), it is important to evaluate how this effect changes with the ability level in the population. To analyze how the welfare gain of the optimal IP varies with respect to the benchmark case (i.e. neutral policy) as a function of γ, we define the gain in the aggregate per-capita welfare generated by the optimal IP, as following:

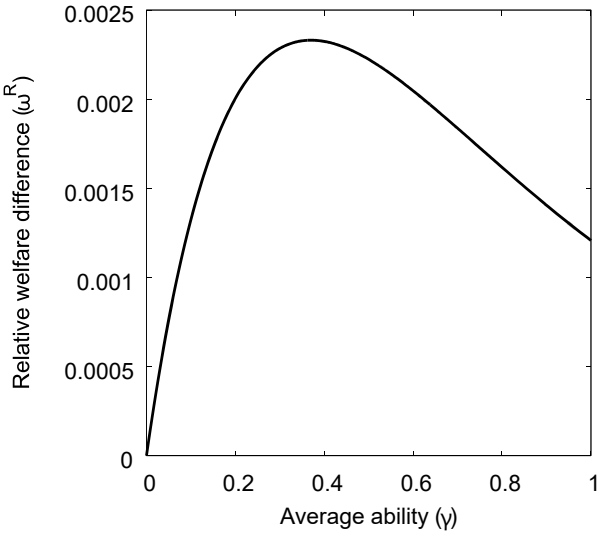
$$\omega^R = \frac{\omega^*}{\omega^n} - 1 \tag{17}$$

where, using eq. (6), $\omega^* = \omega(\bar{a}^*)$ is the welfare under the optimal IP (i.e., evaluated at $\bar{a}^*$), while $\omega^n = \omega(\bar{a}^n)$ is the welfare under the neutral policy, (i.e., evaluated at $\bar{a}^n = \pi_u b/\pi_k$).

To numerically solve the model, we consider a family of cumulative abilities $F_\gamma(a) = a^\gamma$ for $\gamma \in [0,1]$, with larger γs associated with higher abilities (in the sense of first order dominance).[14]Figure 1 shows the relation between ω^R and γ for different distributions of abilities. For small γ's, the welfare effect of the optimal IP is always increasing in the population abilities. To understand why, we first note from eq. (6) that the IP has two opposite effects on welfare. On a side, the higher the number of entrepreneurs in the unknown sector (i.e., the lower is γ), the larger the positive welfare effect of supporting them (*size effect*). On the other side, the optimal IP - providing a higher transfer to entrepreneurs in the unknown sector - has a negative effect on welfare since it induces some high ability individuals to divert their investment from the known (high productivity) sector to the unknown (low productivity) one (*productivity effect*). Starting from small γ, the size effect is greater than the productivity one. As γ increases, there exists a threshold ability level beyond which the productivity and the number of entrepreneurs in the known sector become large enough that supporting relatively more the entrepreneurs in the unknown sector does not relatively increase welfare: after this point, the welfare gain of IP is smaller the larger the γ.

[14] This functional form generates in a simple way a positive correlation between average ability of the population and individual returns (see Section 2.1).

Figure 1: Relative welfare difference (ω^R): optimal IP vs benchmark



Parameters: $\pi_k = \Pi_k = 1.5$, $\pi_u = 1$, $U = 1$, $b = 0.1$, $g = 2$.

Summarizing, the welfare gain effect of IP is larger for economies with entrepreneurs with intermediate level abilities: the allocation induced by the optimal IP and the benchmark one are the most different. On the contrary, for very small or large values of γ, the optimal and benchmark allocation are more similar and the welfare gain of IP is small.

Comparing population of entrepreneurs characterized by different inequality levels in the ability distribution We now compare the optimal IP for populations of entrepreneurs characterized by different inequality levels in the abilities' distribution, while holding constant the average ability. Due to the analytical complexity of this comparison, we consider the following specific family of cumulative distribution function:

$$F_\alpha(a) = a + \alpha\varphi(a) \tag{18}$$

where $\varphi(a)$ is the function

$$\varphi(a) = a(a - 1/2)(a - 1). \tag{19}$$

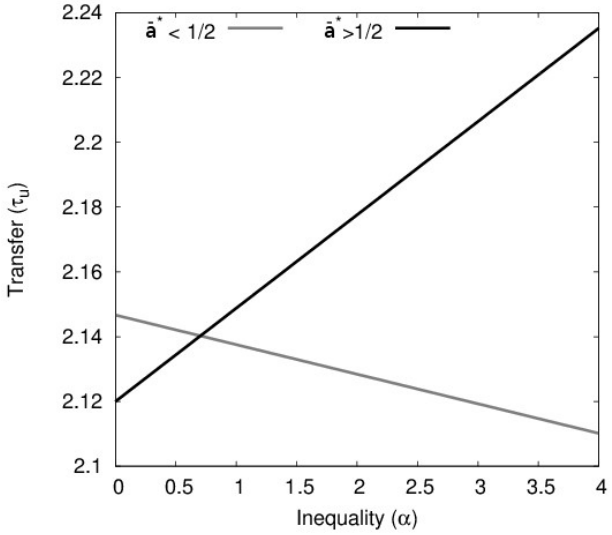
While for any value of α the average value of the ability in the population is always 1/2, the larger is α the higher is the inequality in the abilities' distribution.[15] Using eqs. (18) and (19), we start noticing that:

[15] This functional form of the cumulative distribution function (18) connects, in a simple way, the mean preserving spread of the distribution to one parameter only (i.e., α). The distribution is ordered in the sense of second order

$$\frac{\partial F_{\alpha}(\bar{a}^*)}{\partial \alpha} \; if \; and \; only \; if \; \bar{a}^* \gtreqless \frac{1}{2} \qquad (20)$$

Condition (20) indicates that for an economy in which the ability of the marginal entrepreneur ($\bar{a}^*$, see eq. 7) is lower (resp., higher) than the average ability level of population, a higher inequality is associated with a larger (resp., smaller) number of entrepreneurs investing in the unknown sector.[16] The implications of this mechanism for the structure of optimal IP for different levels of inequality in the distribution of entrepreneurs' abilities are illustrated in Figure 2. Numerical results show that the relation between the optimal individual transfer and the distribution of entrepreneurial ability depends on the knowledge structure of the economy. In economies where the level of basic knowledge b is low enough such that the ability of the marginal entrepreneur is lower than the average ability in the population (i.e. $\bar{a}^* < 1/2$), the higher is the inequality the smaller is the optimal individual transfer to entrepreneurs in the unknown sector (τ_u). On the contrary, if the economy has a level of b high enough such that $\bar{a}^* > 1/2$, the higher the inequality the higher the optimal transfer τ_u.

Figure 2: Optimal individual transfer to the unknown sector (τ_u) and inequality (α): low and high ability of the marginal entrepreneur ($\bar{a}^*$)



Parameters: $\pi_k = \Pi_k = 1.5$, $\pi_u = 1$, $U = 1$, $g = 2$; $\bar{a}^* < 1/2$ ($b = 0.2$), $\bar{a}^* > 1/2$ ($b = 0.6$).

As it directly follows from eqs. (12)-(13) and (20), if $\bar{a}^* < 1/2$, a higher inequality implies a higher share of entrepreneurs working in the unknown sector, and thus a lower amount of resources that can

stochastic dominance (e.g., Lorenz dominance). The choice of the mean at 1/2 is a simplifying assumption which does not qualitatively affect the results.

[16] This directly follows from the fact that an increase in the spread makes the tails of abilities distribution fatter.

be transferred to each of them.[17] At the same time, a higher inequality corresponds to a higher minimal level of resources necessary to induce the optimal allocation of entrepreneurs (see 16). The vice-versa holds for $\bar{a}^* > 1/2$. Hence, depending on the level of basic knowledge in the unknown sector (which is a crucial determinant of $\bar{a}^*$), inequality in the abilities' distribution may generate either an additional cost or a bonus for the optimal IP, with higher inequality resulting more costly for economies with low levels of basic knowledge.

This mechanism becomes even clearer if we analyze in another way the role of inequality by comparing two economies with same abilities' distributions but different levels of basic knowledge in the unknown sector. As it follows from eqs. (12)-(13), a higher level of b has two opposite effects. On the one hand, through its effect on the ability of marginal entrepreneur ($\bar{a}^*$), a higher b is indirectly associated with a higher number of entrepreneurs working in the unknown sector and thus with a lower per-capita transfer τ_u (the same *size effect* described above). On the other hand, a higher b also increases the productivity of each entrepreneur in the unknown sector (*productivity effect*), pushing the differential $\tau_u - \tau_k$ (eq. 9), by directly increasing (resp., reducing) the level of τ_u (resp., τ_k). Greater inequality tends to amplify the size effect, and then the cost associated with a larger number of entrepreneurs in the unknown sector. For sufficiently low levels of inequality the size effect is lower than the productivity one, so that economies with low levels of basic knowledge in the unknown sector can support higher optimal individual transfers than economies with high levels of basic knowledge can do. On the contrary, for sufficiently high levels of inequality, the relation is reversed: economies with low levels of basic knowledge in the unknown sector show smaller individual transfers than economies with high levels of basic knowledge.

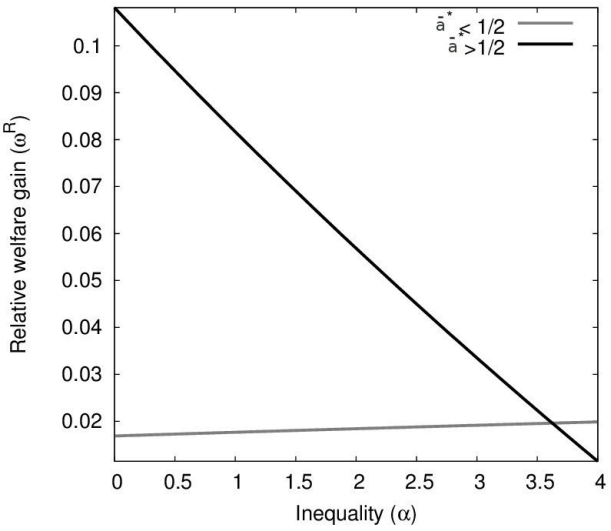
Together, these opposite results demonstrate once again how sensitive the optimal IP is to the actual distribution of abilities in the population of entrepreneurs and, as a consequence, how diverse can be the impact of a given IP on aggregate welfare depending on the inequality in the ability levels and on the knowledge structure of the economy. Specifically, Figure 3 illustrates that the welfare gain (ω^R) induced by the optimal IP (relatively to the neutral policy) is either larger or smaller in the level of inequality α depending on whether $\bar{a}^* < 1/2$ or $\bar{a}^* > 1/2$.

When the level of basic knowledge is high, the ability of the marginal entrepreneur is higher than the average ability of the population ($\bar{a}^* > 1/2$). In this case, a large share of entrepreneurs are active in the unknown sector, while only the highest ability individuals invest in the known sector. In this environment, the IP, which is characterized by an asymmetric treatment of entrepreneurs ($\tau_u > \tau_k$), has a larger effects on aggregate welfare than the neutral policy ($\tau_u = \tau_k$). However, the higher the

[17] Recall that the unknown sector is always more costly for IPA than the known sector and that the difference $\tau_u - \tau_k$ does not depend on α (see eq. 9).

inequality, the smaller the number of entrepreneurs in the unknown sector (eq. 20), and then the smaller the effect of IP on aggregate welfare. In this case, the welfare gain of the optimal IP decreases with inequality. When the level of basic knowledge is low (i.e., $\bar{a}^* < 1/2$), the effects are reversed.

Figure 3: Relative welfare difference and inequality: low and high ability of the marginal entrepreneur



Parameters: $\pi_k = \Pi_k = 1.5$, $\pi_u = 1$, $U = 1$, $g = 2$; $\bar{a}^* < 1/2$ ($b = 0.2$), $\bar{a}^* > 1/2$ ($b = 0.6$).

A large part of the entrepreneurs invest in the known sector, while only few choose the unknown one: this implies that the IP generates only small gains on aggregate welfare with respect to a neutral policy. Yet, the higher the inequality, the higher the fraction of entrepreneurs in the unknown sector (eq. 20), and then the larger becomes the role of the optimal IP in sustaining aggregate welfare. Hence, in this case, the welfare gains of the optimal IP increases with inequality.

This mechanism suggests that IP plays a more important role in countries where either the level of basic knowledge concerning the unknown sector is high and inequality in the entrepreneur's ability distribution is low, or, on the contrary, where the level of basic knowledge in low and inequality is high. To understand why, note that IP impacts aggregate welfare only through its effect on the marginal entrepreneurs:[18] IP increases aggregate welfare by inducing them to change sector of activity. The other entrepreneurs instead never change the sector they invest into.[19] Since the higher welfare gain is generated by the reallocation of entrepreneurs with lower abilities among those in the

[18] These are the entrepreneurs with ability a_i in the interval $(\bar{a}^n, \bar{a}^*)$.

[19] These are the entrepreneurs with with $a_i < \bar{a}^n$ or $a_i > \bar{a}^*$. Despite IPA intervention, entrepreneurs with $a_i < \bar{a}^n$ remain in the unknown sector, while those with $a_i > \bar{a}^*$ always stay in the known one.

interval $[b(\pi_u/\pi_k), b(\Pi_u/\Pi_k)]$[20], the effectiveness of the IP on aggregate welfare depends on the population size in that interval. The findings in Figure 3 can then be rationalized noticing that a higher level of b enlarges this interval via the *productivity effect*. At the same time, when $\bar{a}^* > 1/2$ (resp., $\bar{a}^* < 1/2$) a higher inequality tends to reduce (resp., increase) the mass of entrepreneurs in the interval through the *size effect*.

Overall, these results reinforce our previous conclusions: the impact of IP on the economy crucially depends on the distribution of entrepreneurs abilities. This means that the characteristics of the optimal IP vary with the *current* economic conditions. Hence, in order to correctly predict its effects and to minimize unintended negative consequences, a proper understanding of the characteristics of the economic environment - and in particular of the private sector - is a necessary condition for the design of any IP.

4 Robustness and extensions

Until now, we have assumed that the Government is benevolent, it has perfect information, and it has no control over the amount of knowledge concerning the production process in the unknown sector - we have assumed that b is exogenously given. In the followings, we relax these assumptions, showing: 1) the robustness of the basic setup to possible IPA's errors in evaluating the *true* externality of the economic sectors; 2) that, when the Government can influence the level of basic knowledge in the unknown sector, further insights emerge on the effect of IP for the aggregate welfare.

4.1 Optimal IP and Government bias

We first introduce the possibility that a bias affects the Government choice of the optimal IP. This bias can be interpreted - among other possibilities - as a measure of the level of corruption or of imperfect information on the Government side. In particular, we study the effect of a bias in the IPA evaluation of the magnitude of the externality generated in the unknown sector. We assume that while the true value of the unknown sector externality is $\widehat{U}$, the IPA chooses the IP under the expectation that the externality is $U = \widehat{U}(1 - z)$, with $z \in [-1,1]$; hence, the lower (resp., higher) the value of z with respect to 0, the more IPA overestimates (resp., underestimates) the true value of the externality. Since the externality produced by the unknown sector can now be smaller than that generated by the known one, we need to abandon the simplifying assumptions we have employed so far, $U > K = 0$

[20] Remember that $\bar{a}^n = b(\pi_u/\pi_k)$ is the ability of the marginal entrepreneur under the neutral policy $\tau_u = \tau_k$, while $\bar{a}^* = b(\Pi_u/\Pi_k)$ is the threshold ability of the marginal entrepreneur under the optimal IP (eq. 7).

(see Section 3.1). This implies that the relationship between the optimal τ_u and τ_k depends on both sector externalities and individual productivities (see eq. 8). In particular τ_u R τ_k, as long as:[21]

$$U \gtreqless \frac{\pi_u}{\pi_k} K \tag{21}$$

In the presence of Government bias, condition (21) becomes:

$$U = \widehat{U}\,(1-z) \gtreqless \frac{\pi_u}{\pi_k} K \tag{22}$$

To analyze the effects of the IPA bias on aggregate welfare, we compare the aggregate welfare under the optimal IP for different levels of z, and the aggregate welfare in the benchmark case (neutral policy). We define this relative difference as:

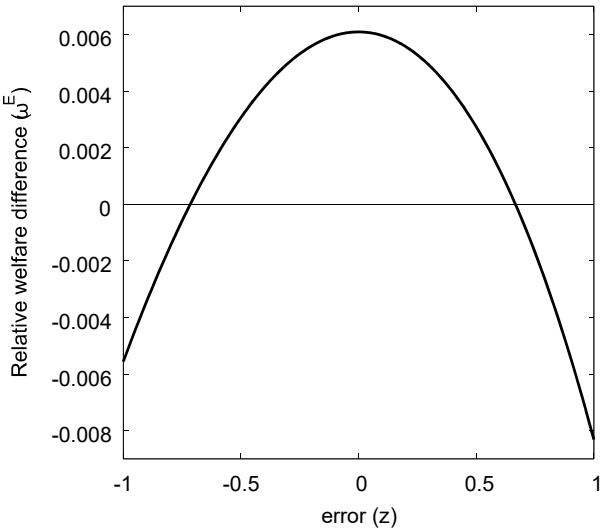
$$\omega^E = \frac{\omega^B}{\omega^n} - 1 \tag{23}$$

with $\omega^B = \omega(\bar{a}^B)$, where $\bar{a}^B$ is the socially optimal allocation of entrepreneurs as defined in eq. (7) under the bias z.

Figure 4 plots ω^E as function of the bias z. Not surprisingly, the larger the bias (either positive or negative) of the IPA the lower the welfare gain of the optimal IP with respect to the neutral policy. More interestingly, the numerical results indicate that there is a non-empty set of values of the bias for which IP is still optimal: there exist configurations of parameters for which IP is optimal even in the presence of a corrupt and non-benevolent Government. Finally, note that the effect of the bias is not symmetric. In particular, underestimating the true value of the externality reduces the welfare gain of IP less than overestimating it. This suggests a conservative approach in estimating the magnitude of the positive externalities generated by investments in the unknown sector as to minimize the possible negative welfare effects of IP in the presence of Government bias.

[21] Condition (21) indicates that it is optimal for the IPA to support relatively more the entrepreneurs in the unknown sector under the condition that U is greater than the weighed K, where the weight is given by the sector specific relative productivities π_u/π_k. Note that the condition is also satisfied when $U < K$ if π_k is sufficiently higher than π_u, $\pi_k >> \pi_u$. This implies that the condition $U > K$ is not necessary to have the Government optimally providing support to the unknown sector.

Figure 4: Relative welfare difference under optimal IP and neutral policy (ω^E) for different level of government bias (z)



Parameters: $\pi_k = 1.5$, $\pi_u = 1$, $U = 1$, $K = 0.5$, $b = 0.2$, $\gamma = 0.7$, $g = 2$.

4.2 Endogenous sector knowledge level, IPA quality and the effectiveness of Industrial Policy

Until now, we have assumed that the return for investment projects in the unknown sector y_u is equal for all entrepreneurs, positive and *exogenously* given since it only depends on the sector-level productivity π_u and on the current level of knowledge concerning the production techniques in the unknown sector available in the economy b. However, the level of b - rather than being exogenous - may more realistically depend on a series of industrial policy measures implemented by the IPA. For instance, it may be determined by the quantity of training provided by the IPA to local entrepreneurs planning to invest in the unknown sector; by the quality of the information on markets opportunities provided by the Government to entrepreneurs, etc. It follows that the costs of these activities have to be more realistically included in the IPA budget constraint together with the monetary transfers. Thus, differently from the exogenous case, b is now a choice variable in the Government optimization problem: this implies that the return for the projects in the unknown sector depends on the Government investments to improve the IPA quality. In this sense, b can be interpreted as a proxy for the quality and the capability level of the IPA itself: the higher the ability of the IPA, the higher b, and thus the higher the return from investing in the unknown sector.

In the following, we assume that the cost of achieving a targeted level of b is represented by a specific functional form given by:[22]

[22] In the main text, we highlight only the main features of the modeling strategy. All the mathematical details are included in the Appendix B.

$$c(b) = \frac{1}{2}\Lambda b^2 \tag{24}$$

for some positive constant Λ, representing a technological shift that governs the relevance of the cost function. The IPA budget constraint becomes

$$g = c(b) + \eta\tau_k + (1-\eta)\tau_u, \tag{25}$$

and the IP becomes defined by the triple (τ_k, τ_u, b), among those satisfying the budget constraint. Given $c(b)$, the sectoral allocation of the entrepreneurs follows the same structure described in Section 2.3: entrepreneurs choose to invest in the unknown sector if and only if the profit is higher than the profit of investing in the known sector (see eq. (3)).[23] Finally, the per-capita welfare function can be rewritten as:

$$\begin{aligned}\omega &= \Pi_k \int_{\bar{a}}^{1} a_i f(a_i)\,\mathrm{d}a_i + \int_{\bar{a}}^{1} \tau_k f(a_i)\,\mathrm{d}a_i + (\Pi_u b + \tau_u)\int_0^{\bar{a}} f(a_i)da_i - c(b) \\ &= \Pi_k \left(\int_{\bar{a}}^{1} a_i f(a_i)\,\mathrm{d}a_i\right) + b\Pi_u \int_0^{\bar{a}} f(a_i)da_i + g - c(b) \end{aligned} \tag{26}$$

As in the case of exogenous b, in the following we compare the social optimal allocation chosen by the IPA with a benchmark. In this context, to be consistent with our previous analysis, we consider as a benchmark a situation where the level of b is exogenously fixed and $\tau_u = \tau_k = \frac{G-c(b)}{M}$. It is immediate to show that Proposition 3.2 holds also in this new setting (see Proposition B.1).

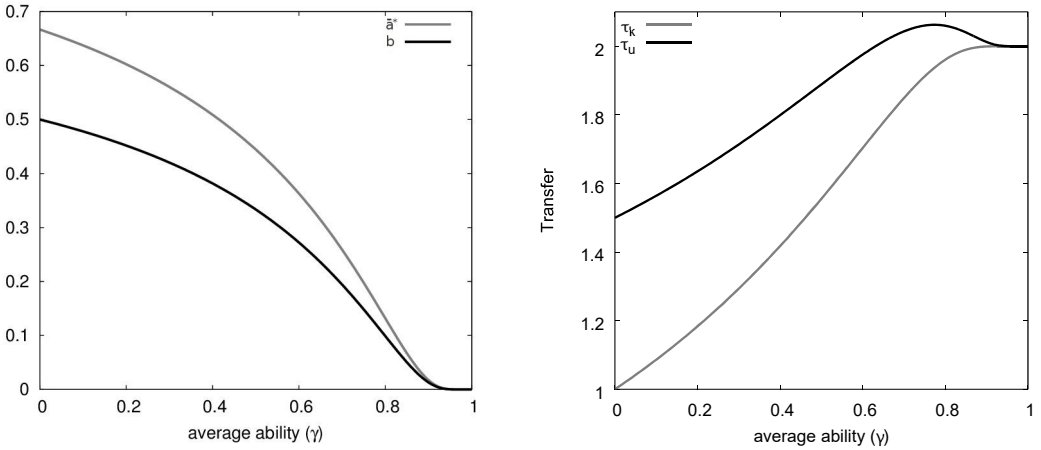
4.2.1 IP and entrepreneurs' quality

IP, welfare and average ability As in the exogenous case, the characteristics of the optimal IP depend on the average entrepreneurs' abilities (Figure 5). The numerical results in Panel 5a shows that, if we choose the same cumulative distributions F_γ as in Section 3.2, b (the optimal level of IPA quality chosen by the Government) and $\bar{a}^*$ (the ability of the marginal entrepreneur under the optimal IP) are both decreasing functions of γ (the average level of abilities in the entrepreneurs population). These results complement those derived in Section 3.2: a higher average ability in the population is optimally associated with larger transfers to support projects in the known sector (Panel 5b) and with smaller investment to support IPA activities. This can be interpreted as suggesting that the ability level of entrepreneurs and that of the IPA are in fact substitutes: the higher is the ability of the private sector, the less useful are investments to improve the capabilities of the IPA in coordinating or guiding the economic activity. Moreover, Panel 5b shows that, differently from the exogenous case, now the

[23] The only difference is that now b in equation (3) is a choice variable for the Government.

difference between τ_k and τ_u is not longer constant across entrepreneur's average ability levels,[24] and the value of τ_u is not necessarily monotonic.[25]

Figure 5: Optimal IPA quality (b), share of entrepreneurs in the unknown sector ($\bar{a}^*$) and individual sector-specific transfers as function of the entrepreneurs' average ability (γ)



(a) b and $\bar{a}^*$ (b) Individual transfers

Parameters: $\pi_k = \Pi_k = 1.5$, $\pi_u = 1$, $U = 1$, $g = 2$, $\Lambda = 4$

Finally, similarly to the exogenous case, the effect of the optimal IP is always welfare increasing and its effectiveness depends on γ. The mechanics is the same as for Figure 1: the effect of IP is small for very low and very high levels of average ability because in these cases the entrepreneur's individual choice in the benchmark is similar to that under the optimal IP. In the case of endogenous IPA quality, this effect is even stronger because for higher levels of γ the optimal level of b is lower.

[24] In the exogenous setting (eq. 9), the difference in the individual transfers for the entrepreneurs in the two sectors $\tau_u - \tau_k$ is constant and determined only by exogenously fixed parameters (i.e., b,U,K,π_k,π_u). It follows that, whatever the ability level, also the difference between the optimal individual incentives is fixed.

[25] We have that

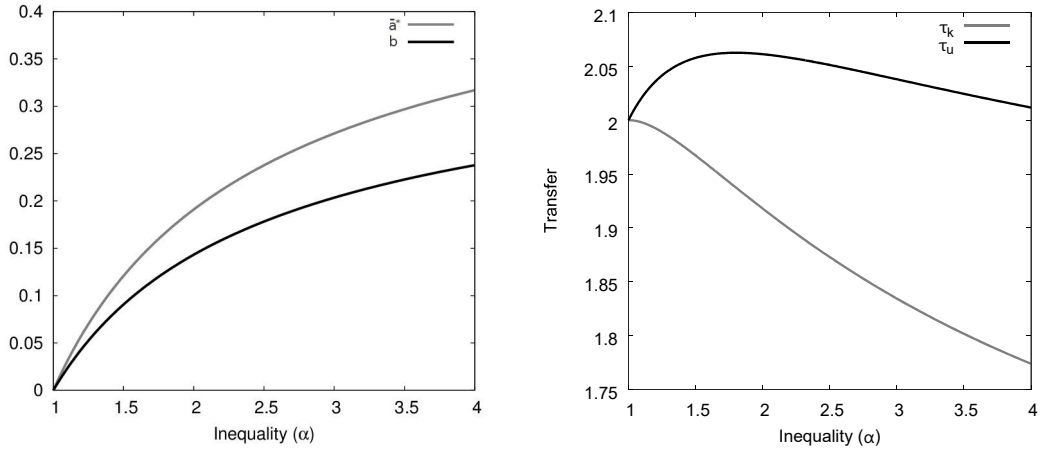
$$\tau_u = \Omega - \frac{1}{2}\Lambda b^2 + \left(1 - F\left(\frac{\Pi_u b}{\Pi_k}\right)\right) bU.$$

with b being the optimal level of IPA quality, as represented in Figure 5a. The term $\frac{1}{2}\Lambda b^2$ is the cost of maintaining the IPA structure: the higher the cost to maintain the IPA the less the resources available to be transferred to entrepreneurs investing in the projects in unknown sector (and in the known sector as well, since the same term appears also in the expression of τ_k). The term $\left(1 - F\left(\frac{\Pi_u b}{\Pi_k}\right)\right) bU$ instead represents the value of the "missed externalities". It is given by the product between $\left(1 - F\left(\frac{\Pi_u b}{\Pi_k}\right)\right)$ (which is the number of projects activated in the known sector, i.e. the sector without positive externality), U (which is the intensity of the externality) and b. In other words, this is the value the projects activated in the known sector would have had if they had been activated in a unknown sector. While the behavior of the cost $\frac{1}{2}\Lambda b^2$ is monotonic in γ (we have already observed that b always decreases when γ increases), the behavior of the missed externalities is not monotonic. Indeed the optimal number of projects in the known sector $\left(1 - F\left(\frac{\Pi_u b}{\Pi_k}\right)\right)$ increases with the ability level of the population while the optimal quality b of the IPA structure decreases. Panel 5b shows that the first effect is stronger for small values of γ while the second is stronger for γ large enough. This non-monotonic behavior of the missed externalities causes the non-monotonic behavior of τ_u.

IP, welfare and inequality levels in the ability distribution To analyze how abilities' distributions characterized by different inequality levels affect the optimal level of IPA quality, the optimal share of entrepreneurs in the unknown sector, and aggregate welfare, we consider the same family of cumulative distribution described in section 3.2 (eqs. 18-19).

Numerical solutions of the model are illustrated in Figures 6 and 7.[26] Panel 6a indicates that the higher is the inequality in the abilities' distribution (higher α), the higher are both the optimal level of IPA quality (b) and the ability of the marginal entrepreneur ($\bar{a}^*$). Indeed, the higher the inequality, the larger the share of the population with very low ability, and thus the higher the potential gain that can be achieved by training and employing them in the unknown sector. Again, this suggests that the IPA intervention is particularly important in economies characterized by higher abilities' inequality: even if costly, the activity of the IPA is optimal because it allows the identification and support of projects in the unknown sector in a situation in which the entrepreneurs' abilities are particularity weak.

Figure 6: Optimal IPA quality (b), productivity of the marginal entrepreneur ($\bar{a}^*$) and optimal transfers as function of of the distribution of entrepreneurs' ability (α)



(a) b and $\bar{a}^*$ (b) Individual transfers

Parameters: $\pi_k = \Pi_k = 1.5$, $\pi_u = 1$, $U = 1$, $g = 2$, $\Lambda = 4$

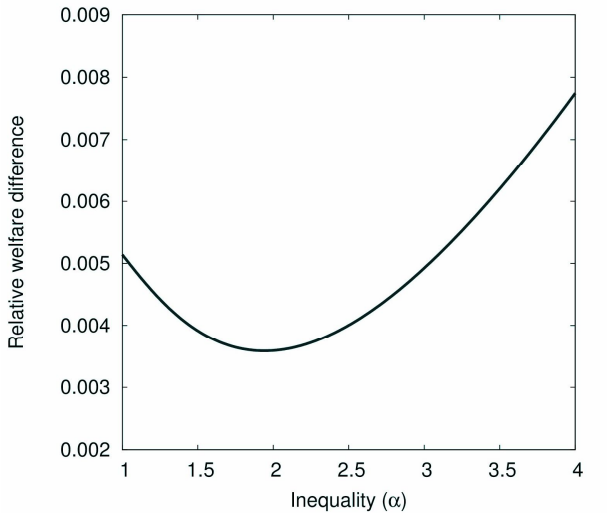
As shown in Panel 6b, this mechanism affects also the individual monetary resources that the IPA can optimally transfer to the entrepreneurs. Increases in the spread of the abilities' distribution induces the IPA to invest more to improve the quality of services provided (as measured by b), which, as a consequence, partially crowds out the individual transfers. Hence, *both* the individual transfers tends to decrease when the level of the inequality increases, indicating that the higher the inequality, the stronger the incentives of the IPA to substitute improvements in quality of services for higher

[26] Mathematical details are sketched in the Appendix B.

individual transfers. However one can observe that, consistently with the described behavior of b, the net incentive $\tau_u - \tau_k$ to switch to the unknown sector increases when α increases and that the individual transfers to entrepreneurs in the unknown sector are not necessarily monotonic, increasing for very low levels of inequality and decreasing only for high levels of inequality. This latter effect depends on the quality of the support that the IPA can offer to entrepreneurs investing in the unknown sector. When the inequality in the ability of the entrepreneurs is very low, it is optimal for the IPA to invest less in the quality of services provided (i.e. choosing a low b). As a consequences, for low levels of inequality, the IPA substitutes monetary transfers for the provision of services to sustain the activity of the unknown sector entrepreneurs: this implies that individual transfers to entrepreneurs in the unknown sector are larger. On the contrary, when the quality of the IPA (b) is large enough, the resource constraint makes it optimal for IPA to reduce the individual transfer to entrepreneurs in the unknown sector.

Finally, results reported in Figure 7 show that the welfare gain associated with the optimal IP is non-monotonic in the levels of inequality in the ability distribution. This is due to two different effects of the IP. On one hand, there is the same mechanism described in Figure 1: the higher the polarization the more similar the individual and the optimal social choice. This implies that the effectiveness of the IP is smaller for higher values of inequality. On the other hand, the higher the inequality the higher the optimal level of training and services provided by IPA (as measured by b) and then the larger the benefit of re-allocating workers. Hence, IP turns to be most effective when inequality is either very small or very high.

Figure 7: Welfare gain under the optimal IP for different levels of inequality in the ability distribution (α).



Parameters: $\pi_k = \Pi_k = 1.5$, $\pi_u = 1$, $U = 1$, $g = 2$, $\Lambda = 4$.

5 Conclusions

In this paper we have provided a simple model to analyse the effects of IP on aggregate welfare. The setting of the model is able to capture some of the peculiar features of most developing economies and allows us to derive a number of results. In particular, we have shown how the optimal IP changes with the ability distribution of the entrepreneurs' population and the Government bias.

Our results support the view that that there is not a one-for-all optimal IP but rather there is an IP that is more likely to be most effective given a certain distribution of abilities among entrepreneurs in any specific historical moment. In fact, our results show that the same intervention (a simple cash transfer) may have very different (even opposite) effects depending on the distribution of entrepreneurs capabilities.

These results also shed some lights on the reasons for the very different effects that the various development strategies implemented in the last four decades (i.e. inward-industrialization strategy, structural adjustment programs, etc.) had in different countries. While we do not discuss why these waves of development strategies are adopted in developing countries (on this see Hodler, 2011), we argue that these strategies cannot be said to be wrong or correct in abstract since the effects of Government intervention (or lack thereof) ultimately depends on the distribution of entrepreneurs abilities and Government quality. Our results thus suggest that there is no much sense in trying to identify the best development strategy and make developing countries to adopt that, as it is still too much common in development advocacy. In fact, Government interventions that have been historically effective (for instance in the form of Industrial Policy) had a strong country-specific component and had been shaped according to the characteristics of the entrepreneurial class and government capabilities and on how they historically evolved creating the current economy context. We leave the exploration of these propositions for further research.

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Appendices

A Proofs and technicalities for Section 3

The following more general version of Proposition 3.1, that also takes into account the corner solutions case, can be obtained using a standard maximization procedure.

Proposition A.1. *The optimal IP is characterized by non-negative individual transfers* τ_u *and* τ_k *that satisfy the budget constraint in eq.* (1)*. The optimal individual transfers can be characterized as*

(i) If $\left(\frac{U\pi_k - K\pi_u}{\pi_k + K}\right) \in \left(-\frac{g}{\left(1-F\left(\frac{\Pi_u b}{\Pi_k}\right)\right)b}, \frac{g}{F\left(\frac{\Pi_u b}{\Pi_k}\right)b}\right)$ *then the optimal* τ_k *and* τ_u *are*

$$\tau_u = g + (1 - F(\bar{a}^*))\, b \left(\frac{U\pi_k - K\pi_u}{\pi_k + K}\right) \tag{A.1}$$

$$\tau_k = g - F(\bar{a}^*)\, b \left(\frac{U\pi_k - K\pi_u}{\pi_k + K}\right) \tag{A.2}$$

(ii) If $\left(\frac{U\pi_k - K\pi_u}{\pi_k + K}\right) \leq -\frac{g}{\left(1-F\left(\frac{\Pi_u b}{\Pi_k}\right)\right)b}$*, then the optimal* τ_k *and* τ_u *are*

$$\tau_u = 0 \tag{A.3}$$

$$\tau_k = g + F\left(\frac{\Pi_u b}{\Pi_k}\right) \frac{g}{\left(1 - F\left(\frac{\Pi_u b}{\Pi_k}\right)\right)} = \frac{g}{\left(1 - F\left(\frac{\Pi_u b}{\Pi_k}\right)\right)} \tag{A.4}$$

(iii) If $\left(\frac{U\pi_k - K\pi_u}{\pi_k + K}\right) \geq \frac{g}{F\left(\frac{\Pi_u b}{\Pi_k}\right)b}$*, then the optimal* τ_k *and* τ_u *are*

$$\tau_u = g + \left(1 - F\left(\frac{\Pi_u b}{\Pi_k}\right)\right) \frac{g}{F\left(\frac{\Pi_u b}{\Pi_k}\right)} = \frac{g}{F\left(\frac{\Pi_u b}{\Pi_k}\right)} \tag{A.5}$$

$$\tau_k = 0. \tag{A.6}$$

Proof of Lemma 3.3. We have that $F_1(\bar{a}^*) = F_1\left(\frac{\Pi_u b}{\Pi_k}\right) \geq F_2\left(\frac{\Pi_u b}{\Pi_k}\right) = F_2(\bar{a}^*)$ so $\eta_1 = 1 - F_1(\bar{a}^*) \leq 1 - F_2(\bar{a}^*) = \eta_2$. □

Proof of Proposition 3.4. From equations (12), (13) and (15) it derives that a decrease in the proportion of entrepreneurs in the unknown sector $F(\bar{a}^*)$, induced by an increase in the average ability γ, implies an increase of τ_u, τ_k and T_k. Hence, from the budget constraint (1), T_u decreases correspondingly. Part (ii) describes just the corner solution case. □

B Proofs and details for Section 4.2

The objective of this section is to formally characterize the optimal IP when the IPA may use - in addition to individual transfer - also an additional set of costly non-monetary instruments, represented by the level of b.

Define $c(b)$ the function (increasing in b and with $c(0) = 0$) that describes the per-capita cost for the IPA to generate a level of basic knowledge in the unknown sector b for the projects in the unknown sector. Later $c(b)$ will be specified as in Section 4.2. As already observed in Section 4.2, in this case the (per-capita) IP budget constraint becomes:

$$g = c(b) + \eta\tau_k + (1-\eta)\tau_u. \tag{B.1}$$

and the per-capita welfare function is:

$$\begin{aligned}\omega = \Pi_k \int_{\bar{a}}^{1} a_i f(a_i)\,\mathrm{d}a_i + \int_{\bar{a}}^{1} \tau_k f(a_i)\,\mathrm{d}a_i + (\Pi_u b + \tau_u)\int_0^{\bar{a}} f(a_i)da_i - c(b) \\ = \Pi_k \left(\int_{\bar{a}}^{1} a_i f(a_i)\,\mathrm{d}a_i\right) + b\Pi_u \int_0^{\bar{a}} f(a_i)da_i + g - c(b). \quad \text{(B.2)}\end{aligned}$$

The IPA choose (τ_k,τ_u,b) to maximise eq. (B.2)[27]. For any possible choice of b, the maximization problem in the variables τ_k and τ_u is the same of Section 3 so the optimal individual transfers are given by:

$$\tau_u = g - c(b) + \left(1 - F\left(\tfrac{\Pi_u b}{\Pi_k}\right)\right) bU \tag{B.3}$$

$$\tau_k = g - c(b) - F\left(\tfrac{\Pi_u b}{\Pi_k}\right) bU \tag{B.4}$$

and then, again as in Section 3, the level of ability that discriminates between entrepreneurs investing in the known or in the unknown sector is:

$$\bar{a}^* = \frac{\Pi_u b}{\Pi_k} \tag{B.5}$$

It follows that welfare maximization becomes a one-dimensional problem. Hence, using (B.5), (B.2) it can be rewritten as:

$$\Pi_k \int_{\frac{\Pi_u}{\Pi_k}b}^{1} a f(a)\,\mathrm{d}a + \Pi_u \int_0^{\frac{\Pi_u}{\Pi_k}b} b f(a)\,\mathrm{d}a + g - c(b) \tag{B.6}$$

By maximizing (B.6), we find that $b \in (0,1)$ is a critical point if and only if

[27] In the following, we assume that G is large enough to allow for interior maxima of τ_k and τ_u (both strictly positive).

$$\Pi_u F\left(\frac{\Pi_u}{\Pi_k} b\right) = c'(b) \tag{B.7}$$

Observe that since $c^{'}(0) > 0$ (i.e. the cost of improving IPA quality is increasing in the quality), the optimal IP always requires $b > 0$.[28]

As in the case of exogenous *b*, our next step is to compare the social optimal allocation chosen by the IPA with a "neutral" benchmark. In this context, to be consistent with our previous analysis, we consider as a benchmark the neutral policy case, i.e. a situation where the level of *b* is exogenously fixed and $\tau_u = \tau_k = \frac{G - c(b)}{M}$. From equation B.7, it immediately follows that:

Proposition B.1. *Aggregate welfare under optimal IP is always larger than under the neutral policy.*

B.1 IP and entrepreneurs' quality (Section 4.2.1)

Comparing populations of entrepreneurs with different average ability levels In this paragraph we show how to derive the results of the paragraph *IP, welfare and average ability* in Section 4.2.1. As in that section we assume that the cost function for the IPA is quadratic of the form:

$$c(b) = \frac{1}{2}\Lambda b^2 \tag{B.8}$$

We consider the same family of cumulative distributions we used in the Section 3.2:

$$F_\gamma(a) = a^\gamma$$

for $\gamma \in (0,1)$. Finally, we make a technical assumption to ensure an internal maximum, namely:

$$\Lambda > \frac{\Pi_u^2}{\Pi_{k.}} \tag{B.9}$$

Under these assumptions, the model can be analytically solved. The results are illustrated in the following proposition. They are used in the numerical study of Section 4.2.

Proposition B.2. *The optimal IP is characterized by the following triple:*

[28] If $b = 0$ was optimal, it would satisfy (B.7) and on the left side of the equation we would have $\Pi_u F(0) = 0$.

$$\begin{cases} b_\gamma = \left(\frac{\Pi_u^{\gamma+1}}{\Pi_k^\gamma \Lambda}\right)^{\frac{1}{1-\gamma}} \\ \tau_{u,\gamma} = g - \frac{1}{2}\Lambda \left(\frac{\Pi_u^{\gamma+1}}{\Pi_k^\gamma \Lambda}\right)^{\frac{2}{1-\gamma}} + \left(1 - F\left(\frac{\Pi_u \left(\frac{\Pi_u^{\gamma+1}}{\Pi_k^\gamma \Lambda}\right)^{\frac{1}{1-\gamma}}}{\Pi_k}\right)\right) \left(\frac{\Pi_u^{\gamma+1}}{\Pi_k^\gamma \Lambda}\right)^{\frac{1}{1-\gamma}} U \\ \tau_{k,\gamma} = g - \frac{1}{2}\Lambda \left(\frac{\Pi_u^{\gamma+1}}{\Pi_k^\gamma \Lambda}\right)^{\frac{2}{1-\gamma}} - F\left(\frac{\Pi_u \left(\frac{\Pi_u^{\gamma+1}}{\Pi_k^\gamma \Lambda}\right)^{\frac{1}{1-\gamma}}}{\Pi_k}\right) \left(\frac{\Pi_u^{\gamma+1}}{\Pi_k^\gamma \Lambda}\right)^{\frac{1}{1-\gamma}} U. \end{cases}$$

The corresponding per-capita welfare level is given by:

$$\omega = \Pi_k \frac{\gamma}{\gamma+1}\left(1 - \left(\frac{\Pi_u^2}{\Pi_k \Lambda}\right)^{\frac{\gamma+1}{1-\gamma}}\right) + \Pi_u \left(\frac{\Pi_u^{\gamma+1}}{\Pi_k^\gamma \Lambda}\right)^{\frac{1}{1-\gamma}} \left(\frac{\Pi_u^2}{\Pi_k \Lambda}\right)^{\frac{\gamma}{1-\gamma}} + g.$$

Proof. For the specific case considered here, (B.7) becomes

$$\Pi_u \left(\frac{\Pi_u}{\Pi_k} b\right)^\gamma = \Lambda b.$$

There exists a unique strictly positive solution b_γ of such an expression and, thanks to (B.9), it belongs to $(0,1)$. It is given by

$$b_\gamma = \left(\frac{\Pi_u^{\gamma+1}}{\Pi_k^\gamma \Lambda}\right)^{\frac{1}{1-\gamma}}$$

Using standard arguments, it can be easily verified that such a critical point, whenever interior (as in the simulation we present), is in fact a maximum. The corresponding value of $\bar{a}^*$, found using (B.5), denoted with $\bar{a}_\gamma$, is given by

$$\bar{a}_\gamma = \left(\frac{\Pi_u^2}{\Pi_k \Lambda}\right)^{\frac{1}{1-\gamma}}$$

To find the corresponding values of τ_k and τ_u one has only to use (B.3). The explicit expression of the net welfare is obtained using the previous values in the expression of the welfare:

$$\begin{aligned} \omega = \Pi_k \int_{a \geq \bar{a}^*} a f(a)\,\mathrm{d}a + \Pi_u \int_{a<\bar{a}^*} b f(a)\,\mathrm{d}a + g - \frac{1}{2}\Lambda b^2 \\ = \Pi_k \int_{\left(\frac{\Pi_u^2}{\Pi_k \Lambda}\right)^{\frac{1}{1-\gamma}}}^1 a\gamma a^{\gamma-1}\,\mathrm{d}a \\ + \Pi_u \int_0^{\left(\frac{\Pi_u^2}{\Pi_k \Lambda}\right)^{\frac{1}{1-\gamma}}} \left(\frac{\Pi_u^{\gamma+1}}{\Pi_k^\gamma \Lambda}\right)^{\frac{1}{1-\gamma}} \gamma a^{\gamma-1}\,\mathrm{d}a + g - \frac{1}{2}\Lambda \left(\frac{\Pi_u^{\gamma+1}}{\Pi_k^\gamma \Lambda}\right)^{\frac{2}{1-\gamma}} \\ = \Pi_k \frac{\gamma}{\gamma+1}\left(1 - \left(\frac{\Pi_u^2}{\Pi_k \Lambda}\right)^{\frac{\gamma+1}{1-\gamma}}\right) + \Pi_u \left(\frac{\Pi_u^{\gamma+1}}{\Pi_k^\gamma \Lambda}\right)^{\frac{1}{1-\gamma}} \left(\frac{\Pi_u^2}{\Pi_k \Lambda}\right)^{\frac{\gamma}{1-\gamma}} + g. \quad \text{(B.10)} \end{aligned}$$

This concludes the proof. □

IP, welfare and inequality In this paragraph we show how to derive the results of the paragraph *IP, welfare and inequality levels in the ability distribution* in Section 4.2.1. As mentioned in Section 4.2.1 we use in this case the same cumulative distribution function introduced in (18) and we specify the cost function $c(b)$ as in (B.8). The optimum triple $(b_\alpha,\tau_{k,\alpha},\tau_{u,\alpha})$ can be then explicitly characterized as shown in the following proposition. This result is used in the numerical study of Section 4.2.

Proposition B.3. *The optimal IP is characterised by the following triples* $(b_\alpha,\tau_{k,\alpha},\tau_{u,\alpha})$*:*

$$\begin{cases} b_\alpha = \frac{\Pi_k}{\Pi_u}\bar{a}_\alpha \\ \tau_{u,\alpha} = g - \frac{1}{2}\Lambda\left(\frac{\Pi_k}{\Pi_u}\bar{a}_\alpha\right)^2 + (1 - F(\bar{a}_\alpha))\frac{\Pi_k}{\Pi_u}\bar{a}_\alpha U \\ \tau_{k,\alpha} = g - \frac{1}{2}\Lambda\left(\frac{\Pi_k}{\Pi_u}\bar{a}_\alpha\right)^2 - F(\bar{a}_\alpha)\frac{\Pi_k}{\Pi_u}\bar{a}_\alpha U. \end{cases}$$

where

$$\bar{a}_\alpha = \frac{\frac{3}{2}\alpha - \sqrt{\frac{9}{4}\alpha^2 - 4\alpha\left(\frac{\alpha}{2} + 1 - \Lambda\frac{\Pi_k}{\Pi_u^2}\right)}}{2\alpha}.$$

Proof. In this case, (B.7) specifies as

$$\Pi_u F\left(\frac{\Pi_u}{\Pi_k}b\right) = \frac{\Pi_u^2}{\Pi_k}b\left(\alpha\left(\frac{\Pi_u}{\Pi_k}b - 1/2\right)\left(\frac{\Pi_u}{\Pi_k}b - 1\right) + 1\right) = \Lambda b$$

that can be solved for $\bar{a}^* = \frac{\Pi_u}{\Pi_k}b$ obtaining

$$\bar{a}^* = \frac{\frac{3}{2}\alpha \pm \sqrt{\frac{9}{4}\alpha^2 - 4\alpha\left(\frac{\alpha}{2} + 1 - \Lambda\frac{\Pi_k}{\Pi_u^2}\right)}}{2\alpha}$$

By standard arguments one can easily see that the solution

$$\bar{a}^* = \frac{\frac{3}{2}\alpha - \sqrt{\frac{9}{4}\alpha^2 - 4\alpha\left(\frac{\alpha}{2} + 1 - \Lambda\frac{\Pi_k}{\Pi_u^2}\right)}}{2\alpha}$$

if interior, is a maximum point of the welfare. Give such a $\bar{a}^*$ we can find the explicit formulas for τ_u and τ_k using (B.3) and (B.4). □

The influence of parliamentary gender composition on Aid-Corruption linkages: Evidences from African countries

Maria Rosaria Carillo, Valentina Chiariello and Rita De Siano

Abstract

This study investigates whether the share of women in parliaments of recipient countries may influence the impact of aid on corruption in recipient countries. In order to account for nonlinear effects of variables determining corruption, we follow a quantile regression approach for panel data. By observing a sample of African countries, our results reveal that, bringing their social preferences into the political process, women may raise the effectiveness of foreign aid by reducing cases of corruption because of closer correspondence between their social preferences and the aims of aid. This is particularly true in less developed countries, where aid mainly concern social objectives such as health, education, gender gap, childcare, and water sanitation. Moreover, the positive effect of women' involvement is greater where the pre-existing level of corruption is higher.

Keywords: Corruption, Aid, Gender, Quantile regression.

JEL Classification: C21, D73, F35, J16.

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1. Introduction

In recent decades, the effectiveness of aid has been strongly questioned not only because of its doubtful efficacy in boosting the economic development of recipient countries, but also its perverse effects on corruption (Knack, 2001; Tavares, 2003; Moyo, 2009). The main motivation is that, similarly to the case of "natural resources course", the huge amount of resources available through foreign aid raises the incentives for politicians and bureaucrats to engage in corrupting activities (Djankov et al., 2008). Although this argument is well founded both theoretically and empirically, it needs to be further explored since, as several authors have highlighted, the perverse effects of foreign aid on the level of corruption could be either mitigated or amplified depending on the pre-existing quality of the socio-political institutions and level of corruption of recipient countries. Our paper develops this line of research by testing, in the case of sub-Saharan African countries, whether the presence of women in the policy-making process may reduce the perverse effects of aid on corruption and whether this effect is modified by the pre-existing level of corruption. To this extent, we use the quantile regression estimator for panel data (QRPD) developed by Powell (2016) in a framework of instrumental variables, which helps to solve endogeneity problems, with time-additive fixed effects and country non-additive fixed effects.

Several authors have advanced the hypothesis that the identity of policy makers matters, especially gender identity, considered an important dimension to explain the aims and the effectiveness of policy interventions (Chattopadhyay, Duflo, 2004; Brollo, Troiano, 2016). In this line, we advance the hypothesis that a higher presence of women in Parliaments renders more effective the use of aid resources, by reducing corruption and avoiding their distraction from the social purposes for which they have been collected. The idea that women are more trustworthy and socially oriented than men is also supported by considerable empirical literature mainly focused on less developed countries[1]. Nevertheless, the effect of women's political participation does not appear to be always conclusive. This may be due to the interaction between the corruption level and the effectiveness of whatever factor is able to reduce corruption itself. The hypothesis of nonlinearity in the effects of factors affecting corruption has been tested by several authors. Billger and Goel (2009) and Okada and Samreth (2012), for example, find that factors that reduce corruption, such as economic freedom and democracy, have greater effects in countries with low levels of corruption. The non-linearity in the effects of the corruption's determinants, makes very difficult designing good policies aimed at sustaining less developed countries trough foreign aid, which cannot be completely

[1]Croson and Gneezy (2009) contain a comprehensive review of this literature.

avoided given the high frequency of humanitarian crises, caused by wars, natural disasters and climate change.

Against this background, we argue that women, bringing their social preferences into the political process, may raise the effectiveness of foreign aid by reducing cases of corruption because of closer correspondence between their social preferences and the aims of aid which, particularly in African countries, mainly concern social objectives and social infrastructures such as health, education, the gender gap, childcare, and water sanitation. Our results confirm that greater involvement of women in aid governance makes the use of resources more effective by reducing the probability of misappropriation. This effect is greater where the pre-existing level of corruption is higher.

In what follows, Section 2 describes the methodology and data, Section 3 presents the results, and Section 4 concludes.

2. Methodology and data

Our empirical analysis aims to detect the impact of foreign aid on corruption and whether women's political empowerment has a role in reducing a possible perverse effect of aid on corruption. Data on recipient countries' levels of corruption are obtained by rescaling the Worldwide Governance Indicator "Control of Corruption"[2]. Our variables of interest are: foreign aid (*Aid*) expressed as the share of the country's GDP (OECD Creditor reporting system); the share of seats held by women in national parliament (Inter Parliament Union); the interaction term *Aid*Women*. The latter allows the direct effect of women in parliament on corruption to be disentangled from the indirect effect due to "good management" of foreign aid, favored by greater involvement of women in political decisions. Following the existing literature, we include a parsimonious vector of control variables to account for institutional, economic and social factors influencing the country's corruption level (Tavares, 2003). In particular, for the quality of institutions we include: an index of the degree of democracy (*Polity* from the Polity IV project), capturing significant national political changes; an index of perceptions of political stability (from WGI), which accounts for risks of riots and terrorist incidents; the former colonizer's influence, given by a binary dummy variable that we set equal to one if the former colonizer is also the major donor[3] and zero otherwise. Finally, we include an index of fractionalization[4], to capture the effect of a high heterogeneity of population, and per capita GDP[5] to account for the influence of economic development on both corruption and female political

[2] A larger value indicates a higher level of corruption (values from -2.5 to 2.5)
[3] Following some authors we hypothesize that former colonial links are a determinant in giving aid (Rajan, Subramanian, 2008), and relationships between donor and recipient may favor corruption (Moyo, 2009).
[4] See Alesina et al. (2003).
[5] We take the GDP of 2010 from the World Bank.

empowerment. All variables refer to 35 sub-Saharan African countries and, in order to encompass short-term business cycle noises and correlation effects, they are taken as three-year timespans from 1998 to 2015 and lagged of one period in order to control for simultaneity problems.

To tackle the omitted variables problem, we include time and country fixed effects in the baseline OLS model to account for sources of variability not adequately controlled by other covariates. Nevertheless, due to reverse causality between aid and corruption (Alesina, Dollar 2000), we run an IV regression to eliminate all other sources of endogeneity. We use as an instrument the infant mortality rate (Mishra, Newhouse, 2009) as a proxy of health conditions that may cause larger inflows of foreign aid, devolved to ensure satisfaction of the population's basic needs, which are not correlated with the level of corruption. In addition, we build a new instrument correlated with donors' internal conditions, to account for social and political pressures behind decisions to send aid[6]. In particular, for each recipient, we select the five major donors, for which we calculate a ratio between the inflow of asylum seekers and domestic population. The average of these ratios is our instrument. The idea is that higher inflows of refugees increase the host population's awareness of the economic problems and humanitarian crises plaguing less developed countries and hence raise its willingness to send aid.

To account for the nonlinear effects of variables determining corruption, we use the QRPD estimator with non-additive country fixed effects and instrumental variables. We opt for non-additive fixed effects since additive ones could change the distribution of corruption at country level, by not providing any information about the effects of the factors determining corruption on the outcome distribution.

3. Results

In the estimation results (Table 1) the baseline OLS and IV regressions show that aid raises levels of corruption. The coefficient of the interaction term between women in parliament and aid is negative, as expected, and statistically significant, while the coefficient of the term that captures the direct effect of women in parliament not linked to a "virtuous use" of foreign aid, contrary to what might be expected, is positive. This may be due to the nonlinearity of the effects of determinants of corruption. Indeed, QRPD results confirm that the effects of corruption determinants differ throughout the conditional distribution of corruption across countries. Aid has no perverse effect on corruption in countries with low levels of corruption, but shows a positive and increasing coefficient in countries with medium and high levels of corruption. The direct effect of *women* on corruption is strongly nonlinear, showing a negative coefficient for countries with low

and medium levels of corruption, but positive, albeit not significant, for higher levels of corruption. This maybe explained with gender differences in risk aversion: women are less likely to engage in corruption where it is stigmatized, but equally likely to do where it is not (Esarey, Schwindt-Bayer, 2017). The most interesting finding is the indirect positive effect of women in parliament on corruption through aid. This positive impact is consistent throughout the distribution as it increases with the level of corruption. This evidence confirms that the effect of women in parliament through aid captures an independent and different channel through which women affect corruption and is consistent with the hypothesis of women's political preferences coinciding with aid goals. In order to verify this hypothesis, we tested the same model using aid for specific social goals, namely social infrastructures, water sanitation and health.

Table 1 – OLS, IV and QRPD estimation results

VARIABLES	OLS	IV	QR_10	QR_25	QR_50	QR_75	QR_90
Aid	1.757***	5.701***	-2.243***	-0.810***	1.394***	1.860***	1.871***
	(0.481)	(1.967)	(0.486)	(0.200)	(0.359)	(0.554)	(0.125)
Aid*W	-0.196***	-0.471***	0.122***	0.0313	-0.115***	-0.194***	-0.180***
	(0.0352)	(0.156)	(0.0180)	(0.0256)	(0.0279)	(0.0505)	(0.00760)
Women	0.0207***	0.0464***	-0.0221***	-0.0136***	0.00202	0.0137***	0.00919***
	(0.00466)	(0.0152)	(0.00294)	(0.00259)	(0.00464)	(0.00489)	(0.00103)
lnGDP	-0.321***	-0.380***	-0.113***	-0.0843***	-0.103***	-0.154***	-0.0752***
	(0.104)	(0.124)	(0.0182)	(0.0132)	(0.0162)	(0.0136)	(0.0116)
Polity	0.00448	-0.00799	-0.0213***	-0.0247***	-0.0380***	-0.0195***	-0.0446***
	(0.00753)	(0.0106)	(0.00787)	(0.00450)	(0.00286)	(0.00394)	(0.00229)
Influence	-0.0583	-0.0493	-0.0290	-0.0493	-0.0147	0.0147	-0.0220
	(0.0375)	(0.0438)	(0.0198)	(0.0445)	(0.0103)	(0.0409)	(0.0162)
Fractionalization			2.299***	2.448***	1.313***	1.244***	1.340***
			(0.0769)	(0.0409)	(0.104)	(0.0847)	(0.0497)
Political_stability	-0.0396	-0.00255	-0.0249	-0.106***	-0.167***	-0.140***	-0.147***
	(0.0396)	(0.0548)	(0.0258)	(0.0271)	(0.0239)	(0.0234)	(0.0127)
Observations	210	210	210	210	210	210	210
Number of countries	35	35	35	35	35	35	35

Note: Dependent variable: *Corruption*. Instruments in IV: Infant mortality, asylum seekers. Standard errors in parentheses. Significance levels ***, ** and * are at 1%, 5% and 10%, respectively. OLS and IV include country and time fixed effects. QR includes non-additive fixed effects.

The results in Table 2 confirm that the coincidence of interests between female political preferences and aid goals, rather than their honesty, is the channel through which women in parliaments strengthen their influence in increasing aid effectiveness. This is an important result given that much aid is devolved to health and social aims. As regards the other covariates, the sign of coefficients is consistent with the previous studies.

Table 2 – OLS, IV and QRPD estimation results by different aid sector

VARIABLES	OLS	IV	QR_10	QR_25	QR_50	QR_75	QR_90
Aid (Social_Infrastructures) *w	-0.340***	-0.958***	0.217***	-0.0691	-0.202***	-0.145***	-0.314***
	(0.0599)	(0.333)	(0.0168)	(0.0769)	(0.0317)	(0.0209)	(0.0220)
Aid (Health&Pop)*w	-0.624***	-1.710***	0.141***	-0.397*	-0.529***	-0.394***	-0.825***
	(0.106)	(0.575)	(0.00457)	(0.207)	(0.125)	(0.0469)	(0.0582)
Aid(Water&Sanitation) *w	-1.323**	-9.130**	0.273	-0.680	-1.834***	-0.172	-2.276***
	(0.598)	(4.065)	(0.318)	(0.819)	(0.269)	(0.530)	(0.235)
Observations	210	210	210	210	210	210	210
Number of countries	35	35	35	35	35	35	35

Note: Dependent variable: *Corruption*. Aid refers to specific sectors and is multiplied by 1000000; other explanatory variables are the same as in table 1. Complete results are available upon request. Standard errors are in parentheses*** p<0.01, ** p<0.05, * p<0.1. OLS and IV include country and time fixed effects. QR includes non-additive fixed effects.

4. Conclusion

This paper shows that, in a context of less developed countries like that of sub-Saharan Africa, greater involvement of women in the political decision process may have a positive impact on the quality of the political process itself as they manage to reduce the level of corruption above all through a better use of foreign aid. In fact, while the direct effect of women is nonlinear throughout the distribution of corruption, a strong linearity is found for the indirect effect. Our results demonstrate that, more than their honesty, is the correspondence between women social preferences in the political agenda and aid goals that lead them to put a greater effort in promoting interventions to improve social well-being. In particular, this positive influence appears to be stronger in more corrupt institutional contexts.

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Explaining voting behaviour in the 2016 Italian constitutional referendum*

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Abstract

At the end of 2016, a crucial constitutional reform was rejected by referendum in Italy. The vote, coming after the UK's European membership referendum and the US presidential election, may have significant implications for both Italy and the European Union. The object of this paper is to investigate whether and to what extent socio-economic, demographic and political factors influenced voting behaviour. Our analysis shows that political and socio-economic variables were the main drivers of the referendum result. Demographic variables had a weaker effect. These findings suggest that the merit of the constitutional reform proposal had little relevance in explaining voting behaviour. The political reasons were common to the whole country. Other determinants of the referendum outcome varied in different geographical areas. In particular, demographic variables were more important in Northern and Central Italy. Socio-economic aspects were less relevant, although statistically significant, in the South.

Keywords: Constitutional reform, referendum, political parties
JEL Classification: D72; H10; P16

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I. Introduction

This paper aims to identify the reasons for the success of the 'no' vote in the Italian constitutional reform referendum held on 4 December 2016. The reform proposed to change the composition, power and size of the Italian Parliament, and the allocation of powers between central government and local administrative authorities. It was viewed as an important opportunity for the country to implement the structural reforms required after years of slow economic growth. Italy is a weak point for the European Union (EU) with large amounts of public debt and high levels of bad debts in the banking sector. Rejection of the referendum question could therefore affect the economy and political stability of the entire EU. The most obvious beneficiary of a government defeat was considered to be Movimento 5 Stelle. Its economic views were unclear, and it had already announced plans to hold a referendum on Italy leaving the Euro.

Some post-referendum surveys suggested that voting behaviour was defined along demographic lines. Older and retired citizens were generally in favour of reform and younger, unemployed, self-employed and blue-collar citizens against it (Osservatorio Demos, 2016). Most commentators, however, agreed that citizens had not voted on the merit of the reform proposals. Instead, they had mainly followed the political party for which they normally voted, or expressed a protest vote against the 'elite'. Centre-left parties generally supported the referendum, while the right-wing, leftist, and populist groups opposed it. Around 37% of voters supported political parties in favour of the reform in the 2013 general election. Questions asked in constitutional referenda are often difficult for many citizens to understand, so voting behaviour is more likely to reflect broad political views.

Some post-referendum analyses proposed reasons for the outcome of the referendum. David (2016) suggested that the higher percentage of 'no' votes in Southern Italy may be because of the employment, income and quality of life gap between north and south. Istituto Cattaneo (2016) and Del Monte (2017) suggested that the outcome was linked to voters' adherence to particular parties. Regalia and Troncone (2017) stressed the territorial differences in voting behaviour: in Northern Italy, adherence to a party was more important, but unemployment was crucial in the South. A Demos survey (2016) suggested that the vote was driven mostly by political affiliation: in a hypothetical repeat referendum, 84% of Partito Democratico voters, the main government party, would vote 'yes', while 83% of Movimento 5 Stelle voters, 73% of Lega Nord voters, and 68% of Forza Italia voters would vote 'no'. The parties supporting reform would get 34.7% of total votes and against 65.30%.

This article contributes to this debate and to the literature on national referenda (see, for example, Ahlfeldt et al., 2017; Streicher et al., 2016; Matti and Zhou, 2016) through an econometric analysis

assessing the impact of socio-economic, political and demographic factors on the referendum outcome.

II. Data

The econometric analysis was at provincial level (NUTS-3 level), the second-level administrative division in Italy. It drew on data from the historical archive of elections (Italian Ministry of Internal Affairs), the Italian National Institute of Statistics (Istat) and the Institutional Quality Index database developed by Nifo and Vecchione (2014). The final sample included 106 observations.

The model's dependent variable was the share of 'no' votes (*Vote for no*). The explanatory variables were based on previous studies. The model included the proportion of the adult population with a bachelor's degree or higher (*Higher education*), and the rate of unemployment at two points in time: in 2015, to reflect the current labour market situation (*Short-term unemployment*), and as an average over the period 2004–2008, to measure long-term unemployment before the economic crisis (*Long-term unemployment*). As a proxy for socio-economic conditions, we also included the Institutional Quality Index, a composite indicator that measures the quality of Italian institutions and assumes higher values for better institutions. The explanatory variables for political factors were '*No' parties* and *Regional council*. '*No' parties* was the proportion of votes for parties opposing the current government in the 2013 general election (all parties except Partito Democratico, Scelta Civica con Monti, Centro Democratico, Futuro e Libertà and Unione di Centro). *Regional council* was a dummy indicating the regions governed by parties not forming the majority government or whose leader supported the 'no' vote. The demographic variables included percentage of voters aged 18–45 years (*Young*) or female (*Female*), and the change in the foreign-born population between 2013 and 2016 (*Foreign change*). The empirical model was estimated using ordinary least squares regression. Table 1 shows the descriptive statistics for the variables used in the analysis.[2]

Table 1. Descriptive statistics

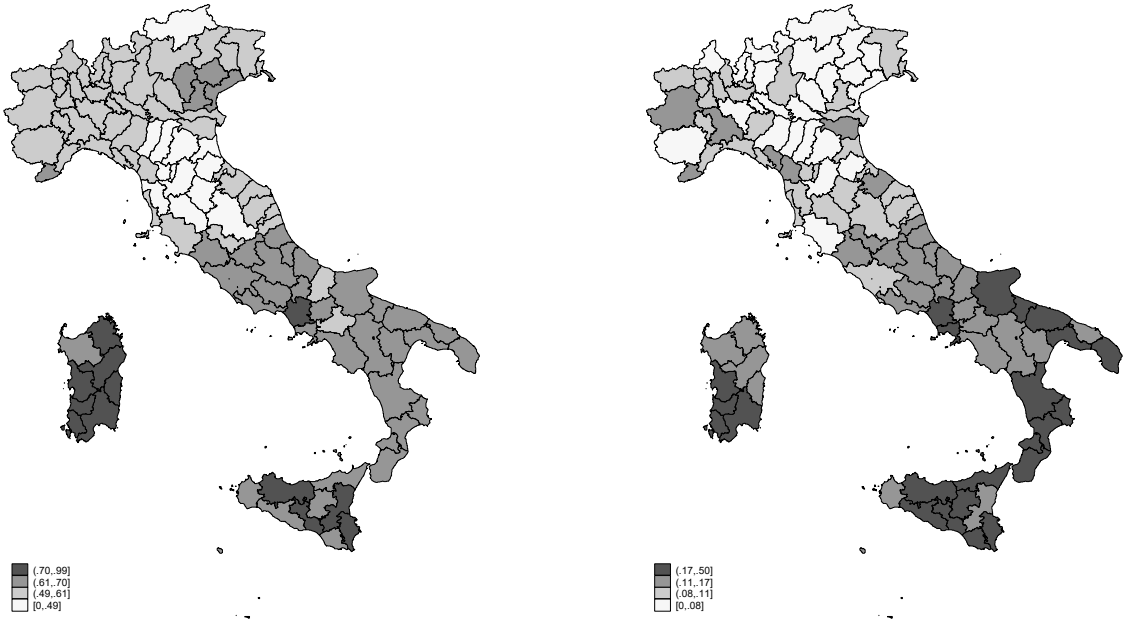
	Mean	Std. dev.	Minimum	Maximum
Y (*Vote for no*)	0.59	0.07	0.35	0.73
Short-term unemployment	0.12	0.05	0.03	0.31
Long-term unemployment (*n = 103*)	0.07	0.04	0.02	0.17
Higher education	0.07	0.01	0.05	0.13
'No' parties	0.63	0.07	0.46	0.98
Regional council	0.27	0.44	0	1
Young	0.32	0.01	0.28	0.37
Female	0.51	0.00	0.50	0.52
Foreign change	0.15	0.13	−0.07	0.56
Institutional quality index (*n = 103*)	0.60	0.21	0.14	0.90

Note: Number of observations: 106

[2] The choice of the reference year for the explanatory variables was limited by data availability at local level. *Institutional quality index* was from 2004, *Female* and *Age* from 2016, and *Higher education* from 2011.

The proposal was rejected by 59.11% of voters. The 'no' vote was particularly high in some southern regions, such as Sardinia (72.2%) and Sicily (71.6%). The only regions with a majority of 'yes' votes were Tuscany (52.5%), Emilia Romagna (50.4%), and Trentino (53.9%), all of which traditionally elect left-wing parties. Such territorial heterogeneity is depicted in Figure 1a, which show the distribution of the 'no' vote across Italian provinces. Figure 1 shows the spatial distribution of 'No vote' and rate of unemployment, indicating a high correlation between the two variables (0.75).

Figure 1. 'No' vote and rate of unemployment at provincial level (NUTS-3 level)



Source: our elaboration

III. Results

The estimates of the model specifications are shown in Table 2. Model 1 includes only socio-economic factors as explanatory variables, Model 2 adds political factors, Model 3 demographic variables and Model 4 *Institutional quality index*. Each model was estimated with both short- (columns labelled a) and long-term unemployment (columns labelled b).

The most important factors affecting voting outcome were short- and long-term unemployment, which were statistically significant in all models. The coefficients were slightly higher for long-term unemployment and suggested that if the rate of unemployment increased by 1%, the 'no' vote would increase by 0.63–1.37%. In Model 4, the coefficients were lower, especially for *Short-term unemployment*. This is because of the high negative correlation (about −0.85) between the unemployment variables and *Institutional quality index*. The adjusted R^2 of Model 1 was relatively

high (0.52–0.55), suggesting that unemployment itself explained more than 50% of the 'no' vote. Education was not a significant factor in any model.

Political factors were statistically significant in Models 2–4. Both variables had a positive coefficient, meaning that the proportion of opposition party supporters influenced the outcome. This suggests that the effect of party affiliation was quite strong, and that voting behaviour may not have been directly linked to the referendum question.

Both *Young* and *Female* were significant: younger citizens were more likely to oppose reform, and women to support it.[3] *Foreign change* only had a very weak effect, and was statistically significant in just one model (Column 3a). This suggests that anti-immigration sentiment had only a marginal role in the result. The increase in the adjusted R^2 of Model 3 was very low, suggesting that demographic variables had a weaker effect than socio-economic or political ones.

The index of institutional quality negatively affected voting: provinces with better institutions were more supportive of the constitutional reform. This variable was statistically significant at the 1% level and the adjusted R^2 of Model 4 increased above 0.7.

Table 2. Determinants of the share of 'no' votes in the 2016 Italian constitutional referendum

Y = Vote for no	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4c)
Short-term unemployment	0.963*** (0.102)		0.895*** (0.161)		0.705*** (0.223)		0.491** (0.251)	
Long-term unemployment		1.377*** (0.118)		1.284*** (0.199)		1.232*** (0.278)		0.630** (0.273)
Higher education	−0.507 (0.400)	−0.365 (0.383)	0.057 (0.332)	0.157 (0.318)	−0.002 (0.336)	0.341 (0.339)	−0.102 (0.307)	0.087 (0.310)
'No' parties			0.330** (0.161)	0.321** (0.161)	0.319** (0.156)	0.301** (0.139)	0.258* (0.154)	0.256* (0.153)
Regional council			0.027** (0.012)	0.027** (0.012)	0.027** (0.012)	0.029** (0.012)	0.033*** (0.012)	0.032*** (0.011)
Female					−0.760 (1.027)	−1.871*** (0.910)	−1.804** (0.962)	−1.600** (0.840)
Foreign change					0.098* (0.057)	0.019 (0.050)	0.049 (0.053)	0.012 (0.049)
Institutional quality index							−0.169*** (0.039)	−0.146*** (0.038)
Observations	106	103	106	103	106	103	103	103
Adjusted R^2	0.520	0.556	0.621	0.653	0.630	0.659	0.695	0.703

Notes: Robust standard errors in parentheses. Constant term included but not shown. ***, **, * indicate statistical significance at the 1%, 5% and 10% levels.

We also investigated whether the determinants of the 'no' vote were the same in different geographic areas. We split the sample into two groups, for Southern Italy and the rest of the country (Northern and Central Italy), along the socio-economic divide between the two.

[3] The variable *Young* is not included in Tables 2 and 3 because of the high correlation with unemployment variables. However, bivariate regressions indicated that younger citizens mostly voted 'no', and that this was statistically significant only in Northern and Central Italy.

The estimates for the two groups are shown in Table 3. This model used only the most relevant independent variables from the previous analysis. The model fit was higher for the rest of Italy (adjusted $R^2 = 0.46$) than for Southern Italy (adjusted $R^2 = 0.25$). *Female* was only significant in Northern and Central Italy. Unemployment and political reasons remained important determinants of the referendum outcome in both areas, although the coefficient of *Long-term unemployment* was lower in the south. The quality of the institutions affected voting behaviour only in Northern and Central Italy. This could be because of the strong correlation between unemployment and the quality of institutions, which was more obvious in the Southern sub-sample (0.6 vs. 0.2).

Table 3. Determinants of the share of 'no' votes in Southern vs Northern and Central Italy

Y = Vote for no	Southern	Northern and Central Italy
Long-term unemployment	0.577***	1.305***
	(0.244)	(0.446)
'No' parties	0.317***	0.272*
	(0.115)	(0.161)
Female	−1.712	−1.681*
	(1.436)	(0.905)
Institutional quality index	0.010	−0.316***
	(0.040)	(0.058)
Observations	36	67
Adjusted R^2	0.254	0.461

Notes: Robust standard errors in parentheses. Constant term included but not shown. ***, **, * indicate statistical significance at the 1%, 5% and 10% levels.

IV. Conclusion

Our analysis showed that socio-economic and political factors significantly affected the results of the 2016 Italian constitutional referendum. Other variables, such as gender and age, also affected the result but to a lesser extent. Anti-immigration sentiment had a marginal role, perhaps because people did not see a link between the referendum question and the migration problem. Our analysis also showed that political and socio-economic variables were important in explaining the referendum vote across the whole country, but demographic variables were only important in Northern and Central Italy.

These findings suggest that the merit of the constitutional reform played a minor role in the result. One important implication of this study is that the 2016 Italian referendum probably did not reflect citizens' views on constitutional reform, an issue affecting the quality of institutions and economic development of the country. It is therefore important to establish legal and procedural conditions to ensure that voting behaviour better reflects views on referenda questions.

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