Graduate migration in Italy - Lifestyle or necessity?

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Abstract
This paper studies the locational choice of Italian mobile graduates, tackling simultaneously three aspects. First it analyses the structural drivers of migration (i.e. the key regional characteristics that attract high-skilled migrants) and the social structures that underpin it (i.e the role of migration networks). Secondly, it compares the preferences of migrants across Italy, to those who move from the least developed South to the Centre-North and those who move within the richer Centre-North. Thirdly, as graduate migration is a key mechanism to transfer knowledge from the university to the labour market, particular attention is given to migrants who are applying, in their jobs, exactly the skills gained through their degree. Results indicate that social networks are a much stronger determinant of the destination of graduates than regional characteristics, that to apply one's knowledge it is necessary to move to highly innovative areas, and that graduates from different areas have different preferences and behaviour. In particular, whilst migration is a lifestyle choice for those who move within the Centre-North, it is driven by economic necessity for those who leave the South.

***Key words*: graduate spatial mobility, migration networks, Italian regions.**
***JEL classification*: R23, J24, O3**

1. Introduction

Italy is characterised by large sub-national disparities between the less developed South (or Mezzogiorno) and the more developed Centre-North (e.g. Viesti, 2003; Barca, 2006), which are, unsurprisingly, mirrored in its complex history of internal population flows (e.g. Attanasio and Padoa Schioppa, 1991). This paper focuses on a new trend in the dynamics of internal population flows: whilst historically unskilled workers constituted the bulk of Italian migrants, leaving the South for the Centre-North, in recent years, the high skilled have become increasingly mobile, with the Mezzogiorno experiencing a proper *brain-drain* to the Centre-North (Piras, 2005, 2006). As the high skilled are a crucial input to both innovative activity and economic growth, their spatial movements can potentially affect the dynamics of local development and as such, deserve thorough investigation.

This paper focuses on a sub-sample of the highly skilled, which has recently caught large scholarly attention (i.e. Faggian and McCann, 2006; Gottlieb and Joseph, 2006; Faggian, McCann and Shepard 2006, 2007a, 2007b): young university graduates. They are especially interesting to analyse: in their transition between study and employment, graduates are a highly mobile segment of the society with the potential to transfer recent academic knowledge in the labour market.

In particular, this study explains how mobile graduates, in Italy, chose their region of destination offering important theoretical and empirical insights. At the theoretical level, the paper simultaneously explores theories of migration rooted in the economic and sociological traditions, pinning down the complementarity of the two. Specifically, it analyses the different

(macro-level) regional characteristics that attract talent and the role of (meso-level) migration networks in shaping population flows. At the empirical level, to fully understand the Italian internal *brain drain*, the study first looks at the behaviour of migrants across the whole country and, secondly, isolates the graduates moving from the South to the Centre-North and those moving within the Centre-North. This allows assessing whether those coming from different parts of the country share similar motivations. Finally, to gain insights on the process of knowledge transfer between the university and the labour market, the paper pays particular attention to those graduates who, in their jobs, apply directly the skills gained at university. These aspects are studied through conditional logit (CL) models, which are applied to the survey *Indagine sull'Inserimento Professionale dei Laureati* ISTAT (2007). The survey is run by the Italian Statistical Institute, and covers the 2001 cohort of graduates, three years after the end of their degree.

The paper is organised as follows. Section 2 reviews the different approaches to migration, which have highlighted its individual or social nature. Section 3 summarises the trends in graduate migration in Italy, contextualising the present work and defining its research objectives. Section 4 describes the methodology, covering the dataset, the econometric technique used and the specification. Section 5 reports the empirical analysis. Section 6 concludes by summarising the results and identifying some policy implications.

2. Migration: individual or social process?

Different streams of research have explored the spatial features that drive population movements. *Gravity models*, for instance, posit that population flows are determined by the size of and the distance between the areas of origin and destination: much like in Newtonian physics, movements are stronger among close areas, flow from smaller to the larger regions. Mainstream economic theory (Sjaastad, 1962), on the other hand, has highlighted that migrants move from poorer to more economically buoyant areas. This approach, although capturing a key element of the phenomenon, has been broadened to include factors that are specifically relevant to the highly skilled. Many scholars, indeed, have pointed out that highly educated individuals, including young graduates, look for quality of life and cultural amenities when choosing where to live (i.e. Cebula, 2005; Di Pietro, 2005; van Dalen and Henken, 2007) and tend to concentrate in highly innovative areas (e.g. Ritsila and Ovaskainen, 2001; Florida, 2002a, 2002b; Giannetti, 2001, 2003; Pekkala, 2003; Rutten and Gelissen, 2008; Faggian and McCann 2006, 2009). Implicit in these approaches is the assumption that migration is an individual process, whereby the choice to relocate is based on the characteristics of the areas of origin and destination. The approach posits that collective migration patterns emerge from the sum of individual decision-making processes based on utility maximisation.

Such a view has been criticised for being unrealistic and the sociology of migration has repeatedly stressed that migration is a collective phenomenon as it relies on social networks which facilitate, support and reinforce the process of relocation, reducing its intrinsic costs and risks (e.g. Portes and Back, 1985; Massey, 1990; Goss and Lindquist, 1995; Guilmoto and Sandron, 2001; Haug 2008).[1] Moreover, it has been pointed out that networks differ both in nature and in the specific function they carry out: for instance they maybe family based (Boyd, 1989), or nationality/community based (Portes *et al.*, 1999), they may facilitate

[1] The literature on migration networks has mostly focused on transnational rather than sub-national migration networks.

migration in general terms, or more formally organise employment and encourage business activity (Rindoks *et al*., 2006). As for networks of graduates, scholars have recognised that they are key in setting the future path of skilled labour circulation (Vertovec, 2002).

It is argued here, in line with Haug (2008), that the two approaches to migration, are complementary rather than alternative. Indeed, whilst the macro-view of migration can give insights on the structural features that drive population flows, the meso-view explains the actual mechanisms that sustain it. Combining the two perspectives, therefore, gives a more precise representation of the phenomenon, as such, serves as a sounder base for policy design.

3. High-skilled mobility in Italy – research questions

In the past four decades, Italy has experienced dramatic changes in the dimension and composition (though not so much in the geographical direction) of its internal population flows. Whilst in the aftermath of WWII Italy witnessed massive movements of labour from the South towards the Centre-North, such flows have been decreasing steadily since the 1970s despite the persisting economic differentials which, according to traditional theory, should have stimulated further movements (Padoa Schioppa and Attanasio, 1991). Interregional movements have started growing again only since the mid 1990s, and, albeit following largely the same direction, show two important differences: the numbers involved are much smaller and the migrants are mostly young and highly educated. In other words, the South is currently experiencing a brain drain towards the rest of the country (Piras, 2005 and 2006; D'Antonio and Scarlato, 2007; Ciriaci 2005 and 2007).[2]

Between 1980 and 2002 all Southern regions (with the exception of Abruzzo) registered a net loss of human capital, which grew even stronger since the mid 1990s when, for the first time in two decades, the total number of migrants started increasing again. To give an idea of the scale of the *brain drain*, the loss of University tertiary educated individuals in the South has gone from 4,828 in 1971 to 12,176 in 2002, with a constant increase since 1996 (Piras and Melis, 2007).[3] Focusing specifically on recent graduates, D'Antonio and Scarlato (2007) show that the percentage of those who have studied in the South and have then moved to the North has gone from 5.4% in 1992 to 18% in 2001. At the same time, the number of those from the South who have studied in the North and stayed there has also grown, from 7.0% to 11.5%. The situation is further aggravated by the fact that Southern universities do not attract students from other parts of Italy (CNVSU, 2008).

Overall, the literature on the Italian case is in line with the afore-mentioned contributions. Whilst, indubitably the interregional difference in employed opportunities have played a key role (D'Antonio and Scarlato, 2007), Di Pietro (2005) and Dalmazzo and De Blasio (2007) have found that other local characteristics, such as quality of life or other urban amenities are also important in explaining the phenomenon. Furthermore, Marinelli (2011) has confirmed

[2] It is important to notice that, this increasing internal brain-drain, is set against the background of an overall low early career and student mobility in comparison to other countries (Lindberg, 2009).

[3] Their analysis is based on the ISTAT time series on interregional migration by education level which, unfortunately, have not been updated after 2002

that Italian graduates are attracted to highly innovative regions as they seek opportunities to apply their skills.[4]

To fully understand the drivers of the Southern brain drain the paper compares the spatial preferences and the role of social networks for Italy as a whole; for graduates leaving the South towards more developed parts of the country, and for those moving within the developed Centre-North. The underlying assumption is that, in line with Biagi et al (2011), graduates following different migration routes have different drivers. Furthermore, we pay particular attention to those graduates whose jobs require exactly the skills they gained in their degree, as this gives us insights on the process of knowledge transfer between university and the labour market. Understanding this aspect is of paramount importance, as the brain drain, by depriving disadvantaged regions of a key resource for economic and innovative growth, can potentially widen sub-national disparities.

4. Methodology

4.1. Econometric techniques

This paper applies conditional logit (CL) models (McFadden, 1974), a particular case of the multinomial logit (ML). Whilst in the ML the explanatory variables refer to the decision-maker (i.e. the graduate), in the CL they are attributes of the alternatives to be chosen (i.e. of the potential regions of destination).

Mueller (1985) was among the first to apply a CL model to migration, when he examined individual destination choices among US states. However, probably because of software limitations, the CL model did not receive substantial attention among migration scholars until recently (Christiadi and Cushing, 2008). For instance Davies et al.(2001) applied it to study interstate migration in the US, whilst Faggian (2005) used it to evaluate the utility of different types of graduate mobility in the UK, and Choe and La Brent (2009) applied it to their analysis of black migration in post-apartheid in South Africa.

One of the well-known disadvantages of the CL is its reliance on the IIA assumption, which states that the odds of choosing an alternative are independent from the choice-set itself. Not only the IIA is a restrictive and, in certain circumstances, unrealistic assumption, but it is also hard to identify its violation when the number of alternatives is large. Given these problems, it would seem more appropriate to use a model, which does not rest on such restrictive assumption, such as the multinomial probit (MP). However, preferring the MP to the CL is not a straightforward choice as the former presents present empirical drawbacks, which are not fully understood (Dahlberg and Eklöf 2003; Mazzanti, 2003; Dow and Endersby, 2004; Christiadi and Crushing, 2008). In particular, as opposed to the CL, the MP has serious identification problems, which increase with the number of alternatives.[5] Furthermore, as highlighted by Train (2003) a violation of the IIA becomes a serious issue only when

[4] Interestingly, as suggested by Carillo and Marselli (2003), the Italian industrial structure has also favoured high skilled over low skilled movements. Small firms, the bulk of the production system, recruit mostly through informal channels therefore increasing the costs of job search for those living far from the firms' location. Individuals with a high level of human capital are still able to search nationally, whereas those with a low level of human capital will search only locally

[5] In the MP, as the choice-set becomes larger, a separate identification of a subset of parameters is not only possible, but also hard to detect, leading to plausible, yet arbitrary or misleading estimates and inferences (see Weeks, 1997; and Dow and Endersby, 2004).

researchers attempt to forecast the substitution patterns among the alternatives, a task not carried out in this study. When researchers are more concerned with knowing the individuals' average preferences, as is the case here, violating IIA is not a serious issue.

All in all, several scholars have suggested that the results of a conditional logit can often be used as a general approximation of models that relax IIA (Train, 2003; Christiadi and Crushing, 2008) and, in light of this debate, we apply exclusively conditional logit models.[6]

4.2. Data sources

The paper uses the *Indagine sull'Inserimento Professionale dei Laureati* (ISTAT, 2007) conducted by the Italian National Statistical Institute. The survey investigates the entrance of graduates into the labour market three years after they completed their studies. In what follows, we use the 6th edition of the survey, which was carried out in 2004 and refers to 2001 graduates. The dataset contains 26,006 observations, representative of the universe of 155,664 graduates.

The *Indagine* is characterised by one-stage stratification by gender, university and degree. Each of the surveyed individuals is attributed a sampling weight which allows to build indicators representative at the level of the nation, the field of study and, most importantly, the region of study and the current region of work. As we identify migrants as those whose region of study (origin) is different than the region of employment and residence (destination)[7], this ensures a spatially unbiased analysis. Furthermore, the survey also asks respondents whether their degree was *effectively necessary* to perform their current employment. We identify those who answered affirmatively to this question, as graduates who are directly transferring their academic knowledge to the labour market. As their education *matches* the needs of their job, we will refer to this group as ***matched*** graduates. The ISTAT survey is merged with other regional-level variables, to test which regional features attract talent.

4.3. Econometric specification and strategy[8]

The econometric analysis consists of several CL models in which the probability of choosing one of the twenty Italian regions as a destination depends on a series of regional attributes, distance, and social networks (as well as regional fixed effects to control for other excluded spatial features).

[6] Nonetheless in previous versions of this paper, we have applied both MP and CL models and highlighted how the main results coincided with the two techniques, regardless of the respect of the IIA assumption.

[7] In our study migrants do not include those who leave the region of study to go back to their home region (i.e. returners), as these graduates' mobility pattern may be driven by different motives (see Marinelli, 2011). As the survey does not provide the home region of graduates previous to their university enrolment, identifying returners requires using other information from the survey. The Indagine identifies (1) whether the graduate left the home region to attend university and (2) her/his current living arrangements. With this information we classified returners as those who (a) left their home region to study, (b) are currently living in a region different than the one they studied in and (c) are currently living with their family of origin (see Marinelli, 2011 for more details).

[8] Appendix 1 contains a synopsis of all the variables.

$$P_{ij} = P(U_{ij} > U_{iv}) \quad \forall j \neq v$$

$$U = f(BASE, RIS, QLIFE, NETWORK, FE)$$

Where

- P_{ij} is the probability that graduate *i* choses *j* as a region of destination
- U is a utility function.
- BASE is a vector of variables capturing the traditional drivers of migration;
- RIS is a vector of variables capturing the regional innovation system
- QLIFE is a vector of variables capturing quality of life
- NETWORK is measures the strength of the social networks between regions of origin and destination.
- FE are regional fixed effects to control for other spatial characteristics of the regions of destination.

All the regional attributes, which are described below, are expressed in terms of destination-to-origin ratios (D-O ratios). This has two advantages: first we are able to take into account the characteristics of both the region of origin and of destination. Secondly, we are effectively standardising the different sets of variables, making it possible to compare their relative importance.

All the explanatory variables of our models are described below, the source of the indicators used is reported in parenthesis:

1. BASE variables

EMP (EUROSTAT REG_ECO)[9] is the D-O ratio of the employment rate in 2003.

POP (EUROSTAT REG_POP)[10] is the D-O ratio of the population (expressed in 1000 inhabitants) in 2003.

DIST (ACI)[11] is the distance (in 100km) between the main city of the region of origin and the main city of the region of destination. This variable captures the fact that migration is most likely across close areas.

DIST2 (ACI) is the squared distance (as defined above), which captures, as in Davies *et al.*(2001), the fact that the deterring effects of distance decline when the latter increases. In other words the marginal cost of moving a unit further is lower at greater distances.

2. RIS variables

HTKIEMP (EUROSTAT REG_ST) is the D-O ratio of the percentage of employment in high-tech sectors (knowledge intensive services and high-technology manufacturing) in 2003. [12]

[9] EUROSTAT Regional Economic Statistics

[10] EUROSTAT Regional Population Statistics.

[11] Automobil Club Italia.

[12] According to EUROSTAT knowledge intensive services include the following NACE REV 1.1 categories: 64 Post and telecommunications; 72 Computer and related activities; 73 Research and development. High technology manufacturing include the following NACE REV 1.1 categories: High-technology products; 30 Manufacture of office machinery and computers; 32 Manufacture of radio, television and communication equipment and apparatus; 33 Manufacture of medical, precision and optical instruments, watches and clocks; 35.3 Manufacture of aircraft and spacecraft.

RDGOV (EUROSTAT REG_ST) is the D-O ratio of the proportion of public R&D expenditures on regional GDP in 2003.

RDBUS (EUROSTAT REG_ST) is the D-O ratio of the proportion of business R&D expenditures on regional GDP in 2003.[13]

3. QLIFE variables

CULT (ISTAT ICCVR)[14] is the proxy for cultural amenities and captures the D-O ratio of the proportion of employment in the cultural and recreation industries[15] in 2003.

CRIME (ISTAT ICCVR) captures the proportion of micro-criminality in cities. It is the D-O ratio of the number of micro-crime per 1000 citizens in 2003.

TRANS (ISTAT ICCVR) captures the availability of public transport. It is the D-O ratio of the number of public transport lines (in cities) per 100 square km in 2003.

4. NETWORK

NETWORK (ISTAT, 2007): Given the region of origin of a graduate, the variable provides, for each potential region of destination, the proportion of migrants coming from the same region of study of the graduate. An example will illustrate the variable better. Suppose a migrant is from region X and has to choose between region A, B, C. NETWORK would tells us that, of the total migrants from X, 20% are living in A, 20% in B, and 50% in C. The variable, in other words, measures how strong are the links between the region of origin and destination of the graduate.

The empirical analysis consists of three models including (a) the BASE variables together with the other regional attributes (RIS and QLIFE), to analyse exclusively the macro determinants of migration (b) the BASE and NETWORK variables, to capture the social nature of migration; (c) a fully specified model (BASE, RIS, QLIFE and NETWORK) to explore the synergies between the meso and macro analysis of population flow. Each model is applied in turn to the whole sample of Italian migrants, the sub-sample of migrants from the South to the Centre-North and the sub-sample of migrants moving within the Centre-North. For each of the three, we compare migrants as a whole to *matched* migrants, to gain insights on the process of spatial knowledge transfer.

Table 1 Summary of econometric analysis

Model Name	**Variables[16] included**	**Geographies of migration**	**Types of graduates**
1. REGIO	BASE + RIS + QLIFE	• Italy as a whole • South-to-CN • CN to CN	All graduates *Matched* graduates (transfer academic knowledge in their jobs)
2. NETWORKS	BASE + NETWORKS		
3. REGIO+NETWORKS	BASE + RIS+ QLIFE + NETWORKS		

[13] The RIS indicators have been selected to capture different aspects of the system: HTKIEMP gives information on key features of the local economic structure, RDGOV and RDBUS control for the role of public and private actors. Nonetheless, as it is well known from the literature (e.g. IAREG, 2008), they are not able to able to measure the level of interaction among actors and provide only a static and partial picture of the system.

[14] ISTAT Indicatori di Contesto Chiave e Variabili di Rottura

[15] The sector, as defined by ISTAT, includes the following NACE Rev.1 categories: cinema and video production and distribution, radio and TV activities, other show-business activities, press agency, libraries, archives, museums and other cultural activities, sport and other recreational activities.

[16] All models include also regional fixed effects which are reported in Appendix 2.

In what follows, models I.1 to I.3 refers to the three models for the full sample of Italian migrants. Models IM.1 to IM.3, refers to the three regressions for the sub-sample of *matched migrants.* Models S.1 to S.3 refer to the three models for Southern migrants, whilst SM.1 to SM.3 refer to those for Southern *matched* migrants. Similarly, CN.1 to CN.3 and CNM.1 to CNM.3 refer to the models for migrants within the Centre-North.

5. Econometric results

Table 2, presents the econometric results for Italian migrants. Models I.1, I.2 and I.3 focus on the whole sample, whereas IM.1, IM.2 and IM.3 cover *matched* graduates only.

Table 2 Migration behaviour of Italian graduates

	ALL MIGRANTS			MATCHED MIGRANTS		
	REGIO	NETWORK	REGIO + NETWORK	REGIO	NETWORK	REGIO + NETWORK
	I1	I2	I3	IM1	IM2	IM3
HTKIEM	1.268***		0.208	1.004***		0.206
	(9.78)		(1.29)	(3.48)		(0.66)
RDGOV	-0.00611		0.0350***	-0.00668		0.0450**
	(-0.59)		(3.06)	(-0.40)		(2.46)
RDBUS	0.0244***		0.0119	0.0158		0.00717
	(3.66)		(1.26)	(1.61)		(0.52)
CULT	0.446*		0.493*	0.634*		0.583
	(1.88)		(1.78)	(1.90)		(1.61)
TRANS	0.653***		0.145*	0.501***		0.0780
	(8.60)		(1.89)	(4.26)		(0.71)
CRIM	0.0344		-0.0314	-0.0781		-0.128
	(0.53)		(-0.39)	(-0.68)		(-0.86)
NETWORK		8.105***	8.014***		7.848***	7.992***
		(34.01)	(29.47)		(19.97)	(18.05)
EMP	5.134***	-2.428	-2.222	2.553	-4.289	-4.583
	(2.94)	(-1.43)	(-1.26)	(0.94)	(-1.58)	(-1.63)
POP	1.68E-07***	1.57e-08	1.16e-08	2.02E-07***	2.90e-08	2.73e-08
	(6.27)	(0.60)	(0.44)	(5.35)	(0.78)	(0.72)
DIST	-0.191***	0.0163	-0.00411	-0.109***	0.0585	0.0408
	(-8.65)	(0.69)	(-0.16)	(-3.02)	(1.43)	(0.94)
DIST2	0.00273*	-0.000928	0.000132	-0.000110	-0.00264	-0.00136
	(1.80)	(-0.56)	(0.08)	(-0.04)	(-0.99)	(-0.49)
N	90600	91440	90600	33660	33960	33660
Pseudo R2	0.19	0.27	0.27	0.30	0.37	0.37

* p<0.10, ** p<0.05, *** p<0.01; t scores in parentheses

In model I.1 all the BASE variables have the expected sign. Migrants, in other words, move towards large and more economically vibrant regions (POP and EMP are positive and significant). Furthermore they tend to relocate to close regions (DIST is negative and significant), however, as expected, the deterring effect of distance declines the further the graduate moves. The model also confirms that graduates prefer highly innovative regions (HTKIEMP and RDBUS are positive and significant) as well as areas that offer a good quality of life, with cultural opportunities (CULT is positive and significant) and a good transport service (TRANS is positive and significant). When we look at the social mechanisms that sustain migration, in model I.2, an interesting result emerges. Whilst NETWORK is positive and strongly significant, none of the other variables are, indicating

that social aspects are crucial in explaining migration flows. These results are confirmed in model I.3, which, as in I.2, highlights that migrants move to regions with higher quality of life (CULT and TRANS are positive and significant) and stronger innovation systems (RDGOV is positive and significant).

The last three models highlight interesting features. In IM.1 the results are in line with I.1 when it comes to quality of life and the regional knowledge base, however EMP, the D-O ration of employment rate is not significant (nor is DIST2). In other words, to those migrants transferring their specific academic knowledge to the labour market, a dynamic innovation system matters more than a vibrant economy. In model IM.2 the results are in line with I.2, whilst in IM.3, only RDGOV and NETWORK are significant and of positive sign, confirming the crucial role of networks. The pseudo R2 is high in all specifications, and highest for model IM.3.

Table 3 presents the econometric results for Southern migrants relocating to the Centre-North, the left three columns cover the whole group, whereas the right three columns focus on matched migrants.

Table 3 Migration behaviour of Southern graduates moving to the Centre-North

	SOUTHERN MIGRANTS			SOUTHERN MATCHED MIGRANTS		
	REGIO	NETWORK	REGIO + NETWORK	REGIO	NETWORK	REGIO + NETWORK
	S1	S2	S3	SM1	SM2	SM3
HTKIEM	1.737		1.130	7.626***		5.869**
	(1.48)		(0.96)	(2.75)		(2.34)
RDGOV	0.0916**		0.0248	0.00666		-0.0646
	(2.16)		(0.61)	(0.10)		(-1.01)
RDBUS	-0.00981		-0.00705	-0.0623***		-0.0479**
	(-0.83)		(-0.50)	(-2.89)		(-1.98)
CULT	-1.631***		-0.0746	-2.442***		-0.612
	(-3.02)		(-0.14)	(-2.72)		(-0.62)
TRANS	-0.178		0.0751	0.231		0.463*
	(-1.02)		(0.43)	(0.85)		(1.76)
CRIM	-0.888***		-0.449***	-1.071***		-0.665***
	(-6.04)		(-2.62)	(-4.69)		(-2.66)
NETWORK		6.730***	6.618***		6.139***	5.787***
		(7.48)	(5.98)		(5.01)	(3.34)
EMP	24.60***	-23.15***	-13.58*	30.02***	-22.46**	-3.683
	(4.18)	(-3.34)	(-1.67)	(3.04)	(-2.22)	(-0.28)
POP	1.44E-07**	2.85E-07***	2.00E-07***	5.18e-08	2.35E-07**	9.35e-08
	(1.99)	(4.33)	(2.69)	(0.47)	(2.45)	(0.84)
DIST	-0.316***	0.0626	0.0300	-0.280**	-0.0258	0.0620
	(-3.70)	(0.82)	(0.33)	(-2.17)	(-0.23)	(0.43)
DIST2	0.0201***	0.000770	0.00213	0.0176**	0.00152	-0.00137
	(4.61)	(0.23)	(0.48)	(2.52)	(0.33)	(-0.17)
N	15648	15876	15648	6912	7020	6912
Pseudo R2	0.33	0.33	0.34	0.48	0.48	0.49

* p<0.10, ** p<0.05, *** p<0.01; t scores in parentheses

South to Centre-North migrants have distinct spatial preferences, as compared to the whole Italian sample. In model S.1 we notice that all the traditional variables have the expected sign

and are significant. However, as opposed to model I.1, the presence of cultural amenities affects negatively migrants' decisions (CULT is negative and significant). The only quality of life variable that has the expected sign is CRIM, which is negative and significant, suggesting that graduates move towards areas with lower criminality. Among the RIS variables only RDGOV, capturing the D-O ratio of public RD spending, is positive and significant. In model S.2 the coefficient capturing social network is, as expected, positive and highly significant. However, surprising findings emerge for the BASE variables (with the exception of POP). Indeed, DIST and DIST2 are not significant, indicating that the support derived from the community of migrants (i.e. the network) effectively brings the *home-region closer*. At the same time, EMP (the D-O ratio of employment rate) is negative, significant and of large magnitude. This indicates that social networks are relatively more important than economic differentials in determining the destination choice (it is important to remark that the finding does not dismiss the importance of economic factors in explaining the actual decision to move). Model S.3 confirms the results of S.2. It also shows that, once networks are taken into account, RIS variables exert no influence on the destination choice and CRIM, negative and significant, is the only quality of life variable to be relevant.

Important differences emerge when we focus on Southern matched migrants, i.e. those who are transferring their specific academic knowledge through their work. In model SM.1, HTKIEM capturing the employment in high-tech sectors is positive, highly significant and has the largest magnitude of all the RIS variables. At the same time, RDGOV is not significant (as opposed to model S1) and RDBUS is negative and significant. In other words, matched Southern graduates, through not attracted by formal research are more driven to highly innovative regions than the rest of graduates. As for quality of life, the results are in line with S.1, though the coefficients have larger absolute value: matched graduates are even less attracted to regions with a strong cultural offer and even more attracted to areas with less micro-criminality. The BASE variables have all the expected sign, however POP is not significant. Interestingly, the coefficient for EMP is larger than in S.1, indicating that the economic motivation is more strongly felt by this sub-sample. Model SM.2 is fully in line with mode S.2, whilst in model SM.3 we find that all the traditional migration variables lose their significance, whilst the RIS ones are similar to SM1. As for quality of life CRIM has the expected negative sign and is significant, CULT is not significant and TRANS is now positive and significant. Again, migration networks have a strong positive effect in the choice of the region of destination. The pseudo R2s are high across models and, as above, higher for matched graduates.

Table 4, presents the econometric results for migrants within the Centre-North of the country.

Table 4 Migration behaviour of graduates moving within the Centre-North

	CENTRE-NORTH MIGRANTS			CENTRE-NORTH MATCHED MIGRANTS		
	REGIO	NETWORK	REGIO + NETWORK	REGIO	NETWORK	REGIO + NETWORK
	CN1	CN2	CN3	CNM1	CNM2	CNM3
HTKIEM	0.520***		-0.280	0.396*		-0.203
	(4.04)		(-1.50)	(1.91)		(-0.68)
RDGOV	-0.0380**		-0.0382*	-0.0175		-0.0260
	(-2.23)		(-1.96)	(-0.67)		(-0.94)
RDBUS	-0.409***		0.208	-0.838***		-0.00725
	(-3.79)		(1.33)	(-3.40)		(-0.03)
CULT	3.285***		3.692***	2.291*		4.720***
	(4.58)		(4.39)	(1.92)		(4.00)
TRANS	0.463**		-0.0821	-0.0407		-0.694*
	(2.25)		(-0.35)	(-0.13)		(-1.89)
CRIM	0.000705		0.209	0.0722		0.954**
	(0.01)		(1.54)	(0.33)		(2.55)
NETWORK		8.288***	8.591***		8.519***	9.945***
		(24.62)	(23.45)		(14.76)	(12.15)
EMP	-48.74***	-2.959	-1.320	-67.16***	11.03	32.86
	(-4.99)	(-0.29)	(-0.11)	(-3.84)	(0.62)	(1.26)
POP	4.42E-07***	9.49e-09	2.56e-08	5.66E-07***	-5.33e-08	-0.00000021
	(5.72)	(0.12)	(0.27)	(4.26)	(-0.41)	(-1.10)
DIST	0.515***	0.309***	0.229***	0.745***	0.199	-0.120
	(7.93)	(4.39)	(2.71)	(5.85)	(1.51)	(-0.64)
DIST2	-0.104***	-0.0414***	-0.0364***	-0.108***	-0.0168	0.0319
	0.520***		-0.280	0.396*		-0.203
N	29436	29436	29436	9672	9672	9672
Pseudo R2	0.17	0.27	0.27	0.35	0.44	0.45

p<0.10, ** p<0.05, *** p<0.01; t scores in parentheses

Model CN.1 indicates that migration within the Centre-North is not driven by employment differentials, indeed the coefficient for EMP is negative and significant. Furthermore, in strong contrasts with the models for Southern graduates, relocation choices seem to be driven by the knowledge base and quality of life of the regions of destination. The main feature of attraction is the presence of cultural amenities: CULT is positive and highly significant and has the largest coefficient among the regional variables. A good transport network is also important in shaping graduates' flows within the Centre-North. As in previous models, migrants are attracted to regions with a high level of employment in knowledge intensive sectors (HTKIEM), rather than areas with strong basic research (RDGOV and RDBUS are both negative and significant). Model CN.2 confirms the crucial role of social networks: NETWORK is positive and highly significant, the D-O ratios of employment rate (EMP) and population size (POP) are not significant, whilst DIST and DIST2 have the expected sign. Model CN.3 confirms the findings of CN.2 and highlights again that cultural amenities are the main feature in determining graduates' destination (indeed, CULT is the only positive and significant coefficient among the regional variables). Results for model CNM.1 are similar to CN.1, though RDGOV and TRANS are not significant in this case. In CNM.2, NETWORK is the only significant variable, suggesting that social support is even more important for matched graduates. This finding is confirmed in CNM.3, where we also find that none of the BASE or RIS variables are significant, and where CULT, among the quality of life coefficients, has the largest magnitude and is the only one to have the expected sign. The pseudo R2s are again high in all models, and especially in the last three.

To sum up, the three sets of models strongly indicate that the role of social network is critical to understand migration and push for a better theoretical integration of economic and sociological approaches to the phenomenon. Secondly, they point out that, whilst all graduates tend to concentrate in highly innovative regions, this is especially the case for those who are directly transferring their university knowledge in the labour market.[17] This suggests that highly innovative regions, which are located in the Centre-North of the country, are those most able to exploit graduates knowledge. As a consequence, the Italian internal brain drain can actually widen sub-nationally disparities in innovative activity (a hypothesis confirmed in Marinelli, 2011). Thirdly, the analysis has highlighted that graduate migration in Italy, follows two distinct patterns: whilst it is a lifestyle choice for those who move within the most developed regions, it is largely an economic necessity for those leaving the Mezzogiorno.

6. Conclusions

This paper has analysed the locational choice of Italian graduates providing both theoretical and empirical insights. As for the former the determinants of the region of destination have been analysed both from a macro and a meso level perspective, a task rarely undertaken in economic-geography studies of migration. As for the latter, we have compared the preferences and behaviour of migrants from different geographies, paying particular attention to those effectively transferring their academic knowledge in the labour market.

[17] With the methodology adopted, it not possible to establish whether a graduate is able to transfer her/his knowledge because he/she has moved to an innovative area, or whether those who aim at applying their skills prefer regions with a strong knowledge base. However it is not the aim of the paper to address the causality of this link.

The results have shown that regional innovation and quality of life are key structural drivers of migration. However, social networks, as mechanisms supporting the process, cannot be ignored. The choice of region of destination, indeed, is largely dependent on the existence of communities of peers that help the migrant through a *beaten path*, facilitating the process of relocation. Skilled migration, in other words, has emerged as a collective, rather than an individual phenomenon. At the empirical level, the analysis has confirmed that graduates who apply their academic background concentrate in innovative regions. This is an unsurprising yet crucial result. It indicates, as confirmed in Marinelli (2011), that a cycle of human capital accumulation and knowledge creation may be generated in the most dynamics part of the country, widening the marked sub-national disparities. Most importantly, as with Biagi et al. (2011)[18], we find that graduate migration in Italy effectively consists of two parallel phenomena: graduates who move within the more developed Centre-North have different preferences and behaviour than those who leave the less developed Mezzogiorno. For the former quality of life, and in particular the presence of cultural amenities seems to play a major role. The latter, on the other hand, cannot afford such luxury, mobility is largely an economic choice.

To conclude, the results are rich in policy implications. First of all, they indicate that policies aimed at attracting talent, rather than focussing on regional characteristics, should aim at understanding and accessing migration networks. Incidentally, universities could play an important role as they could access networks by actively engaging with their alumni. More generally, and more importantly, the results show how investment in higher education in the Mezzogiorno is not sufficient to generate the desired local development. The South is not able to retain its graduates, who chose to give up on a better quality of life in search of opportunities elsewhere in the country. It is of paramount importance, therefore, that education, industrial and innovation policies be better integrated to enable Southern graduates to develop their career and transfer their knowledge in the local labour market.

[18] Biagi et al (2011) focus on Italian migration as a whole, rather than on young graduates.

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Appendix 1 – Synopsis of the variables

1. BASE Variables

EMP – D-O ratio of the employment rate in 2003.

POP – D-O ratio of the population (expressed in 1000 inhabitants) in 2003.

DIST – distance (in 100km) between the main city of the region of origin and the main city of the region of destination.

DIST2 (ACI) – squared distance (as defined above).

2. RIS Variables

HTKIEMP – D-O ratio of the percentage of employment in high-tech sectors in 2003.

RDGOV – D-O ratio of the proportion of public R&D expenditures on regional GDP in 2003.

RDBUS – D-O ratio of the proportion of business R&D expenditures on regional GDP in 2003

3. QLife Variables

CULT – D-O ratio of the proportion of employment in the cultural and recreation industries in 2003.

CRIME captures the proportion of micro-criminality in cities. It – D-O ratio of the number of micro-crime per 1000 citizens in 2003.

TRANS captures the availability of public transport. It – D-O ratio of the number of public transport lines (in cities) per 100 square km in 2003.

4. Network

NETWORK (ISTAT, 2007) – captures the networks of migrants between two regions.

Appendix 2 regional fixed effects

Table A. 1 Regional Fixed Effects for models M1 to MM3

	ALL MIGRANTS			MATCHED MIGRANTS		
	REGIO	NETWORK	REGIO + NETWORK	REGIO	NETWORK	REGIO + NETWORK
	M1	M2	M3	MM1	MM2	MM3
Valle d'Aosta	-2.364***	-1.362***	-2.030***	-2.094**	-1.020**	-1.655
	(-3.64)	(-3.95)	(-3.03)	(-2.05)	(-2.16)	(-1.58)
Trentino	-0.866***	-0.381	-0.481*	-20.18***	-21.86***	-21.01***
	(-3.17)	(-1.58)	(-1.85)	(-56.67)	(-69.32)	(-58.75)
Veneto	1.797***	0.145	0.496**	-19.57***	-20.25***	-21.52***
	(9.50)	(1.15)	(2.30)	(-61.38)	(-99.32)	(-57.31)
Friuli VG	-0.434*	-0.434**	-0.472**	-20.06***	-22.43***	-21.28***
	(-1.87)	(-2.32)	(-2.08)	(-69.26)	(-117.82)	(-68.79)
Liguria	-0.334	-0.427**	-0.600***	-0.964***	-1.049***	-1.267***
	(-1.41)	(-2.33)	(-2.60)	(-2.62)	(-3.83)	(-3.51)
Emilia R	0.304	0.531**	0.600**	0.222	0.574	0.612
	(1.14)	(2.38)	(2.44)	(0.54)	(1.63)	(1.59)
Toscana	0.163	0.0754	0.0879	-20.35***	-20.78***	-21.26***
	(0.87)	(0.54)	(0.48)	(-80.91)	(-138.66)	(-88.16)
Umbria	-0.144	-0.769***	-0.708***	-0.504	-0.976***	-1.014**
	(-0.58)	(-3.74)	(-2.94)	(-1.22)	(-2.99)	(-2.51)
Marche	0.180	-0.0782	0.0620	-0.0361	-0.195	-0.151
	(0.73)	(-0.40)	(0.27)	(-0.09)	(-0.60)	(-0.37)
Lazio	0.290	-0.190	-0.976***	-0.178	-0.495*	-1.549***
	(1.12)	(-0.97)	(-3.09)	(-0.48)	(-1.66)	(-3.42)
Abruzzo	0.682**	-0.677***	-0.600**	-0.176	-1.245***	-1.338***
	(2.41)	(-3.02)	(-2.13)	(-0.48)	(-4.26)	(-3.59)
Molise	0.923**	-1.898***	-1.529***	0.0586	-2.406***	-2.178***
	(2.19)	(-5.37)	(-3.32)	(0.08)	(-4.33)	(-2.81)
Campania	0.644	-1.259**	-1.122*	-0.713	-2.297***	-2.306**
	(1.08)	(-2.25)	(-1.88)	(-0.77)	(-2.61)	(-2.47)
Puglia	2.432***	-1.008*	-0.554	0.842	-2.079**	-1.868*
	(3.99)	(-1.82)	(-0.90)	(0.91)	(-2.40)	(-1.95)
Basilicata	2.609***	-0.964**	-0.463	1.264*	-1.822***	-1.583**
	(5.85)	(-2.45)	(-0.98)	(1.87)	(-2.95)	(-2.17)
Calabria	2.192***	-1.070*	-0.852	0.721	-2.350***	-2.260**
	(3.67)	(-1.94)	(-1.38)	(0.77)	(-2.65)	(-2.30)
Sicilia	2.672***	-1.302*	-0.986	1.088	-2.142*	-2.176*
	(3.69)	(-1.92)	(-1.34)	(0.94)	(-1.95)	(-1.84)
Sardegna	1.179**	-2.196***	-1.804***	0.0378	-2.787***	-2.646***
	(2.48)	(-4.97)	(-3.64)	(0.05)	(-4.07)	(-3.40)
N	90600	91440	90600	33660	33960	33660

p<0.10, ** p<0.05, *** p<0.01; t scores in parentheses

Table A. 2 Regional Fixed Effects for models S1 to SM3

	SOUTHERN MIGRANTS			SOUTHERN MATCHED MIGRANTS		
	REGIO	NETWORK	REGIO + NETWORK	REGIO	NETWORK	REGIO + NETWORK
	S1	S2	S3	SM1	SM2	SM3
Valle d'Aosta	-0.299	0.206	0.399	9.119*	0.299	6.729
	(-0.10)	(0.18)	(0.14)	(1.71)	(0.19)	(1.40)
Trentino	-4.407***	1.268	-0.195	-22.76***	-16.40***	-18.23***
	(-5.63)	(1.48)	(-0.19)	(-20.01)	(-14.11)	(-12.10)
Veneto	0.196	0.664*	1.610	-12.28***	-18.68***	-11.58***
	(0.12)	(1.84)	(0.97)	(-3.40)	(-40.01)	(-3.51)
Friuli VG	-1.408	-0.300	-0.692	-18.30***	-18.59***	-17.52***
	(-1.59)	(-0.71)	(-0.75)	(-11.41)	(-41.95)	(-11.48)
Liguria	1.143	-1.662***	-1.081	0.820	-5.673***	-2.021
	(1.05)	(-3.27)	(-0.98)	(0.36)	(-5.08)	(-0.90)
Emilia R	-2.550***	3.626***	2.651**	-0.335	3.142**	3.559*
	(-2.70)	(3.65)	(2.06)	(-0.21)	(2.17)	(1.84)
Toscana	-0.00579	0.499	0.617	-16.52***	-18.72***	-15.93***
	(-0.01)	(1.27)	(0.62)	(-8.47)	(-37.89)	(-8.60)
Umbria	-0.313	-1.515***	-1.133	3.096	-2.360***	1.597
	(-0.28)	(-3.08)	(-0.96)	(1.43)	(-3.17)	(0.72)
Marche	-1.832**	0.926	0.210	-0.652	-0.134	0.626
	(-2.19)	(1.62)	(0.22)	(-0.41)	(-0.16)	(0.39)
Lazio	4.745***	-2.572***	-1.893	4.173***	-3.009**	-1.513
	(6.89)	(-2.63)	(-1.55)	(4.14)	(-2.10)	(-0.79)
N	15648	15876	15648	6912	7020	6912

p<0.10, ** p<0.05, *** p<0.01; t scores in parentheses

Table A. 3 Regional Fixed Effects for models S1 to SM3

	CENTRE-NORTH MIGRANTS			CENTRE-NORTH MATCHED MIGRANTS		
	REGIO	NETWORK	REGIO + NETWORK	REGIO	NETWORK	REGIO + NETWORK
	CN1	CN2	CN3	CNM1	CNM2	CNM3
Valle d'Aosta	-1.776	-0.912	-4.901***	1.507	-1.960	-7.236**
	(-1.25)	(-0.87)	(-2.87)	(0.64)	(-1.07)	(-2.31)
Trentino	2.167**	-0.0757	0.329	-16.48***	-21.12***	-21.80***
	(2.49)	(-0.08)	(0.29)	(-10.80)	(-13.71)	(-9.99)
Veneto	1.859***	0.257	0.835*	-20.02***	-21.26***	-20.44***
	(5.05)	(0.86)	(1.78)	(-27.37)	(-38.11)	(-22.10)
Friuli VG	-0.401	-0.189	0.440	-20.02***	-20.39***	-18.94***
	(-1.08)	(-0.63)	(1.01)	(-32.27)	(-46.18)	(-26.73)
Liguria	-3.112***	-0.230	-0.477	-3.795***	-0.0387	0.779
	(-6.88)	(-0.71)	(-0.99)	(-4.70)	(-0.07)	(0.88)
Emilia R	4.562***	0.628	0.0927	5.894***	-0.939	-3.763
	(4.59)	(0.58)	(0.07)	(3.29)	(-0.50)	(-1.41)
Toscana	-0.991***	0.207	-0.157	-21.42***	-19.81***	-20.32***
	(-3.28)	(0.91)	(-0.45)	(-44.33)	(-60.02)	(-34.44)
Umbria	-2.540***	-0.487**	-0.114	-3.455***	-0.189	0.793
	(-6.78)	(-2.00)	(-0.27)	(-4.59)	(-0.49)	(0.95)
Marche	0.923*	0.0681	1.061**	0.671	-0.263	0.604
	(1.95)	(0.17)	(1.97)	(0.75)	(-0.38)	(0.64)
Lazio	-8.029***	-0.0188	-2.529*	-10.18***	1.206	-1.079
	(-6.57)	(-0.02)	(-1.75)	(-5.00)	(0.68)	(-0.44)
N	29436	29436	29436	9672	9672	9672

p<0.10, ** p<0.05, *** p<0.01; t scores in parentheses