XXXII CONFERENZA ITALIANA DI SCIENZE REGIONALI

GRADUATES ON THE MOVE: KNOWLEDGE FLOWS AND ITALIAN REGIONAL DISPARITIES. MIGRATION PATTERNS OF 2001 GRADUATES

Elisabetta MARINELLI[1]

SUMMARY

This essay is a summary of the Doctoral thesis " Graduates on the move: knowledge flows and Italian regional disparities. Migration patterns of 2001 graduates", which was submitted in partial fulfilment of the degree of Doctor of Philosophy to the London School of Economics and Political Science in September 2010.

The study draws upon a wide and interdisciplinary literature. It builds an original theoretical framework to analyse the knowledge flows generated by recent Italian graduates moving across regions. Through this framework, it carries out a comprehensive analysis of the causes and consequences of human-capital mobility, at the micro, meso and macro level. At the policy level, the study sheds light on the connection between higher education, innovation and regional development, providing a new perspective on the long-standing debate on Italian sub-national inequalities.

[1] JRC-IPTS C/ Inca Garcilaso 3, 410092, Sevilla and LSE , Houghton Street, London
Elisabetta.Marinelli@ec.europa.eu

1 Introduction

Italy is characterised by large sub-national disparities between the less developed South and the more developed Centre-North. It comes as no surprise, therefore, that it has a complex history of population flows from the South (or Mezzogiorno) to the rest of the country.

This thesis focuses on a new trend in the dynamics of internal migration. Indeed, whilst historically unskilled workers constituted the bulk of migrants, in recent years, the high skilled have become increasingly more mobile. As human capital[2] is a crucial input to both innovative activity and economic growth, this phenomenon has the potential to exacerbate the already marked Italian regional imbalances, as such, deserves thorough investigation.

This study analyses this internal brain drain, focussing on recent university graduates, whom, in transition between study and work, are especially prone to move. It draws upon a wide and interdisciplinary literature. It builds a conceptual framework through which the knowledge flows generated by skilled migration can be analysed. Through this framework, it explores in depth the links between graduate mobility and regional innovation, the relationship between mobility and job satisfaction and the social nature of migration. Methodologically, the thesis applies a wide array of econometric techniques to a survey on graduates' entry in the labour market, developed by the Italian statistical office (ISTAT). At the policy level, the analysis sheds light on the connection between higher education, innovation and regional development.

This essay gives an overview of the whole work and is organised as follows: section 2 introduces the original conceptual framework developed to analyse the causes and consequence of skilled migration in terms of knowledge flows; section 3 gives a brief socio-economic overview of Italy and its migration patterns; section 4 reports the research questions; section 5 introduces the dataset, research strategy and econometric techniques used; section 6 describes the spatial distribution of migrants and returners; section 7 summarises the results and section 8 concludes with some policy implications.

2 Migration as knowledge flows: a comprehensive conceptual framework.

The thesis builds upon a highly interdisciplinary literature (reviewed in chapter 1), and focuses on the knowledge flows generated by mobile graduates. Such knowledge flows form

[2] In this introductory paper and in the thesis we will use the terms human capital, talent, skills or high-skilled as synonyms.

the basis of a new conceptual framework devised to explore how human capital mobility and regional innovation shape each other. At the core of the thesis lies the idea that the relationship between the skills of the work force and the level of regional technological development are two sides of the same coin. Understanding how skills move and spread at the territorial level is therefore crucial to comprehend the processes of spatial knowledge creation, accumulation and distribution.

To build a comprehensive theoretical framework of migration as knowledge flows, the thesis relies on two building blocks: the literature on the geography of innovation and the literature on human capital. The former (e.g. Audretsch, 1998; Camagni, 1991; Cooke and Morgan 1998; Morgan, 1997; Storper, 1997; Rodriguez-Pose and Crescenzi, 2008) has highlighted that knowledge creation and accumulation are spatially bounded processes. The concept of Regional Innovation System (RIS) is particularly relevant to our research, as is stresses the importance of interaction and complementarity among local actors, institutions and the skills of the workforce (e.g. Doloreux and Parto, 2005; Iammarino, 2005). The literature on human capital looks at the role of education and skills at the micro and macro level. Whilst the first contributions (Schultz, 1961; Becker, 1964) highlighted that education was to be seen as an investment process, with the returns accruing in the form of higher earnings in the future, subsequent research has pointed to a more complex picture. For instance, the study of overeducation (pioneered by Thurow, 1975) has shown that the best outcome for an employee is to have a job that matches her/his education level. From our point of view, this means that transferring one's knowledge to the labour market is advantageous and that learning is a crucial element of skilled employment. This point has far reaching implications and, at the macro level, it reflected in the approach of Nelson and Phelps (1966) (further developed by Benhabib and Spiegel, 1994; and Vandenbussche et al., 2006). These authors highlight that, as jobs are heterogeneous, education is especially important for those that require continuous adaptation to change, where it is necessary to follow and understand new technological developments. It follows that the social returns of human capital will depend on the level of technological development of the country/region and, symmetrically, that different human capital structures will suit countries and regions at different stages of technological development. In other words, a highly skilled workforce in a less developed area, will generate lower returns than in a technologically advanced one.

With these insights in mind, it is possible to approach the study of migration from the perspective of knowledge-flows, analysing both its causes and consequences, at the micro, meso and macro level.

2.1 The causes of skilled migration: the micro, meso, and macro levels

According to traditional approaches (Hicks, 1932; Sjaastad, 1962), migration is an individual voluntary act driven by the comparison of the economic costs and gains of the present situations and those expected to arise in the future. Recent research (Quinn and Rubb, 2005) has broadened this perspective and highlighted that the desire of having a job requiring the right level of education is, in itself, also an important factor in the decision to migrate. In other words the will to apply one's knowledge is a crucial for human capital to move. At the macro level 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. Mainstream economic theory (Sjaastad, 1962), on the other hand, has highlighted that migrants move from poorer to more economically buoyant areas. These approaches have been broadened to include factors that are specifically relevant to the highly skilled. Many scholars have pointed out that highly educated individuals look for quality of life and cultural amenities when choosing where to live (i.e. Cebula, 2005; van Dalen and Henken, 2007) and, what is more, tend to concentrate in highly innovative areas (e.g. Ritsila and Ovaskainen, 2001; Florida, 2002a, 2002b; Giannetti, 2003; Faggian and McCann 2006, 2009). In other words, that the strength of the knowledge base is critical in determining the mobility choices of human capital.

The above literature implicitly assumes that migration is an individual process, whereby the choice to relocate is based on the characteristics of the areas of origin and destination. 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 (i.e. the meso-level). These facilitate, support and reinforce the process of relocation, reducing its intrinsic costs and risks (e.g. Guilmoto and Sandron, 2001; Haug 2008).[3] Moreover, it has been pointed out that networks differ both in nature and in the specific function they carry out: for instance they may facilitate migration in general terms, or more formally organise employment and encourage business activity, as is the case of many high-skilled communities (Rindoks *et al*., 2006; Vertovec, 2002). In other words, the knowledge migrants embody shape also the way social networks function and it is crucial to understand the phenomenon.

2.2 The consequences of migration: the micro and macro levels

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

As for the consequences of migration, the bulk of the literature has focused, at the micro-level, on objective labour market outcomes, finding that relocation leads to higher extrinsic and intrinsic job-related rewards (Greenwood, 1975). Subjective labour market outcomes, such as self-reported job satisfaction have, on the other hand, been mostly ignored. However, there are both theoretical and empirical reasons to look at these aspects. First, migration and job (or life) satisfaction are theoretically linked by the neoclassical assumption, which sees the former resulting from a utility maximisation process (Ziegler and Britton, 1981). Secondly, empirical work has found that both extrinsic and intrinsic job-related rewards are important determinants of job-related wellbeing (e.g. Clark and Oswald, 1994, 1996; Gruenberg, 1980; Janson and Martin, 1982). Despite these clear connections, the literature on spatial mobility and satisfaction is so far very limited and inconclusive (De Jong *et al*., 2002; Lundholm and Malmberg, 2006; Martin and Litcher, 1983). Nonetheless, we argue that focusing on job satisfaction can help assess more comprehensively the consequences of migration, especially in the case of the high skilled, where non-pecuniary factors, such as quality of life and the opportunity to learn, seem to play a prominent role.

Analysing the macro-level effects of migration, means, effectively, understanding the consequence of spatial mobility on the regions of destination and of origin. According to mainstream theory (Sjaastad, 1962), the flow of people from areas with low wage and high unemployment towards areas with high wage and low unemployment acts as a re-allocation mechanism of the factors of production and will perpetuate itself until equilibrium is reached. It follows that the ultimate consequence migration is interregional (or international) economic convergence. The theory has been criticised heavily in the past decade for not surviving empirical scrutiny (e.g. Prothero, 1987): not only the predicted convergence has not occurred, but also migratory flows have decreased despite persisting regional inequalities.[4] Several scholars have therefore tried to explain why migration can coexist with spatial differentials (i.e. Forslid, 1999; Reichlin and Rustichini 1998) From the perspective adopted in this research, it is interesting to understand whether skilled migration can actually widen disparities in the regional ability to innovate. This implies understanding firstly, whether skilled migrants can facilitate knowledge diffusion and creation and, secondly, how geography impacts on such process. There is large empirical evidence supporting the first point, from scholars following different methodologies and tackling the issue from different angles (Griliches, 1979; Hunt *et al.* 2008; Power and Lundmark 2004). As for the second point, taking geography into account, means understanding the conditions under which migrants can generate (or not) positive knowledge spillovers. In light of our review we suggest that the impact of talent mobility on innovation depends on the techno-economic

[4] Moreover the model does not explain differentials in migratory behaviour in areas with similar economic structure (Molho, 1986).

development of the area (Nelson and Phelsp, 1966). As the less innovative areas do not offer learning opportunities, they lose skills to the more innovative ones, which benefit from them as they integrate talent in their regional systems. This, in turn, encourages further migration from backward areas, generating a self-reinforcing mechanism, which can actually widen the disparities in knowledge creation capacities (Faggian and McCann, 2006 and 2009).

To sum up, the thesis combines several streams of empirical and theoretical research on migration, in a comprehensive and systematic way, highlighting that an interdisciplinary approach to the phenomenon is critical to push forward our understanding.[5]

3 Italy: a critical case study

The theoretical insights described above are applied to the case of graduate migration in Italy. As described in chapter 2 of the thesis, the country is an especially interesting case study as it is characterised by strong sub-national differences in economic and innovative performance as well as in human capital endowments (i.e. Barca, 2006; Iammarino, 2005; Di Liberto 2007), with the South lagging behind the rest of the country. As a consequence, Italy has experienced a complex history of internal migration, which has only recently involved the highly-skilled. Whilst, in the 1950s and 1960s nearly four million unskilled workers left the South to relocate in the Centre-North, this type of flow has virtually stopped since the mid 1970s (Padoa Schioppa and Attanasio, 1990). Highly educated individuals, which until then were relatively immobile, have become, since the 1980s, the most prone to migration and such trend has increased strongly the mid 1990s (e.g. Piras, 2005, 2006; Piras and Melis, 2007). This doctoral dissertation, therefore, analyses a very recent phenomenon, which poses new research and policy challenges.

The analysis is also interesting for another reason: as chapter 2 of the thesis shows, a *perverse educational/productive match* is emerging in the country. Whilst Italian (and especially Southern) employers do not demand university-trained individuals, the country is not producing graduates that are ready to participate in innovative industries (i.e. graduates in scientific and engineering disciplines). This may generate a vicious cycle in which investment in education is discouraged where it is most needed, whilst migration becomes more attractive for those (overeducated) graduates who are unable to find adequate employment opportunities. This suggests that understanding skilled mobility can shed light on how university, innovation and regional development policies need to be integrated to create a virtuous cycle of knowledge based growth.

[5] The theoretical framework is summarised in table 1 of this paper, in page 10.

4 Research objectives

The thesis analyses graduates' patterns of mobility from the region of university to the next destination. In so doing, it goes beyond the simple distinction between migrants and non-migrants and classifies graduates in three groups: *stayers*, those who remain in the region of study, *returners*, those who move back to their home region after having attended university, and *migrants*, those who leave the region of study to relocate somewhere else. As the three groups are likely to choose their region of residence for different reasons, it is interesting to verify whether they have different characteristics and whether their behaviour has different implications.

The empirical analysis, introduced in chapter 3 of the thesis, mirrors the theoretical framework described above and is organized in two parts: the first (carried out in chapters 4 and 5) covers the causes of the phenomenon at the micro, meso and macro level; the second (explored in chapters 6 and 7) analyses its consequences at the macro and micro level. Each of these chapters tackles the phenomenon from a different perspective and, in this section, we explain in detail how this is done.

As highlighted in previous pages, studying migration in terms of "knowledge flows" requires understanding if the opportunity to use one's own knowledge impacts on the decision to move and on the choice of the region of destination. This is the task undertaken in chapter 4, which proceeds in two steps: firstly, it examines whether the educational background and performance of the graduate influence the decision to migrate, return or stay. Secondly it explores whether more innovative regions, which offer more learning opportunities, attract or retain high skilled individuals, and, in particular, whether they exert the same effect on migrants, returners and stayers. By looking at the links between migration and knowledge, this analysis provides a new way to assess which skills are most needed in a regional innovation system.

Whilst chapter 4 is mostly concerned with the micro-level differences between migrants, returners and stayers, chapter 5 explores the causes of graduates' mobility at the macro and meso levels, comparing economic and sociological theories of migration. At the macro level it tests the hypothesis that quality of life and regional innovation, as well as economic performance, shape graduates' locational choices. In other words, it studies the different streams of research that explain talent mobility in terms of the spatial characteristics of the areas of origin and destination. At the meso level, it analyses the collective nature of migration, evaluating the role of social networks in shaping mobility choices.

If, as tested in chapter 4, mobile graduates are attracted to highly innovative regions where they contribute to local learning, it follows that they may be generating a cumulative process. Indeed, as talent concentrates in innovative areas, it feeds into the local knowledge creation processes, making the areas more innovative and, in turn, more attractive to human capital. Chapter 6 tests the existence of such mechanism, it investigates whether it holds for both migrants and returners and if a distinctive pattern emerges for those with a scientific and engineering background (i.e. those who have the key skills for knowledge creation). The chapter has important implications both at the theoretical and policy level. Indeed, the existence of such cumulative cycle challenges one of the main results of mainstream migration theory, namely, that by responding to market imbalances population flows lead to spatial convergence. At the policy level, this means that unless the regional system can retain talent, higher education will struggle to contribute to local development, and implies that a strategic integration between education and innovation policy is imperative if the less developed areas are to benefit from human capital.

Chapter 7 analyses the consequence of mobility on self-reported job satisfaction, bringing together two bodies of research that have rarely been combined. Indeed, as highlighted above, not much is known about how spatial mobility affects subjective wellbeing at work. Chapter 7 will compare migrants, stayers and returners across several domains of job-related wellbeing, taking into account both long-term and short-term career outcomes. Moreover, it will pay particular attention to Southern graduates: as they face harder socio-economic conditions, it is interesting to see whether relocating to the Centre-North is, other things being equal, personally rewarding.

5 Dataset and research strategy

The study will be based on the survey *Indagine sull'Inserimento Professionale dei Laureati* (ISTAT, 2007), a survey, run by the Italian national statistical institute (ISTAT), that covers graduates' entry in the labour market. The survey focuses on graduates of the year 2001, which are interviewed in 2004. Regional data from ISTAT and EUROSTAT is also used to complement the *Indagine*.

The empirical analysis makes use of both discrete choice models (DCM) and simultaneous equation models (SEM).

Discrete Choice Models (DCM) encompass a wide array of techniques in which the dependent variable is categorical and represents the choice set (Greene, 2003). Multinomial

logit (ML) and probit (MP) are used when the choice set includes more than 2 alternatives and the choice is based on the characteristics of the decision maker. They will be applied in chapter 4, to understand what makes a graduate chose to migrate, return or stay. The conditional logit (CL), a particular case of multinomial logit, can be used when the choice set includes more than two options and the decision is taken on the basis of the characteristics of the alternatives. It will be applied (together with a multinomial probit[6]) in chapter 5, to understand how graduates choose their regions of destinations based on the local economic performance, innovation system, quality of life and presence of social networks. Finally, the family of ordered logit (OL) can be used when the alternatives in the choice set are ordinal variables, as for instance, with a Likert scale measuring the degree of satisfaction. In chapter 7 we will use a particular case of ordered logit (the generalised OL with partial proportional odds) to assess the level of job-related wellbeing of migrants, returners and stayers.

As well as DCMs, the thesis will make use of Simultaneous Equation Models (SEM), which were first developed by Haavelmo (1943). SEMs include a set of techniques that can capture social and economic phenomena, in which the dependent variables are endogenously or jointly determined. As the regional ability to innovate depends, among other things, on the inflows of human capital, and the inflows of human capital depend, among other things, on the innovative performance of a region, SEMs are an appropriate technique for the research carried out in chapter 6, where the cumulative process of graduate migration and innovation is tested.[7]

Table 1 below summarises the research strategy of the thesis, reporting the hypothesis tested, the theoretical contribution of the chapter and the methodology used.

[6] The multinomial probit model can also be used when the choice is based on the characteristics of the alternatives, though some re-organisation of the data is required. This is clarified in chapter 5.
[7] In particular we will apply Three Stage Least Squares (3SLS), first developed by by Zellner and Theil (1962).

Table 1 Summary of research strategy

Ch	Hypotheses tested	Theoretical Contribution	Methodology
The causes of graduate mobility			
4	Human capital seeks both the opportunity to learn and to apply his/her knowledge. Migrants, returners and stayers, differ in both respects.	The chapter extends the traditional economic approach to mobility to include the role of personal and spatial knowledge.	Multinomial logit and probit are used to compare migrants, returners and stayers
5	Economic performance, quality of life and regional innovation matter shape the locational preferences of graduates. Graduate mobility has a strong collective nature as it is sustained through social networks. Migrants, stayers and returners have different preferences	The chapter integrates sociological and economic perspectives on migration, giving a more realistic view of the phenomenon.	Conditional logit and multinomial probit are used to evaluate how different regional characteristics impact on the choice of a destination.
The consequences of graduate mobility			
6	Graduate mobility and regional innovation mutually reinforce each other: talent concentrates in the most innovative regions and contribute to their innovative performance, which in turn makes them more attractive. Graduates with a scientific and engineering background have a distinct effect on regional innovation. Migrants, stayers and returners have different effects on regional knowledge.	When it comes to highly skilled individuals, population flows, rather than reducing spatial inequalities increase them.	Simultaneous equation models are used to analyse the mutual relationship between graduate mobility and regional innovation.
7	Mobility impacts on job satisfaction, as the environment of the region of origin and destination influences expectations and therefore wellbeing. Migrants, stayers and returners differ in their levels of wellbeing.	Job satisfaction does not depend on the individual and job characteristics only, but also on geography.	Generalised ordered logit with partial-proportional odds are used to evaluate the level of satisfaction of graduates.

6 The spatial distribution of migrants and returners

Before presenting the results of the empirical analysis it is useful to describe the spatial distribution of the two types of *movers* analysed. In so doing, it must be remarked that identifying the two types of movers is not straightforward and the taxonomy developed tends to overestimate the number of migrants and underestimates that of returners. The interested reader is referred to section 3.4.2 of the thesis for more details.

Migrants and resturners represent respectively 18.7% and 5.3% of total graduates. Table 2 provides the proportion (of the national total) of movers between and within each macro-area.

Table 2 Mobility matrices: percentage of migrants and returners on the Italian total

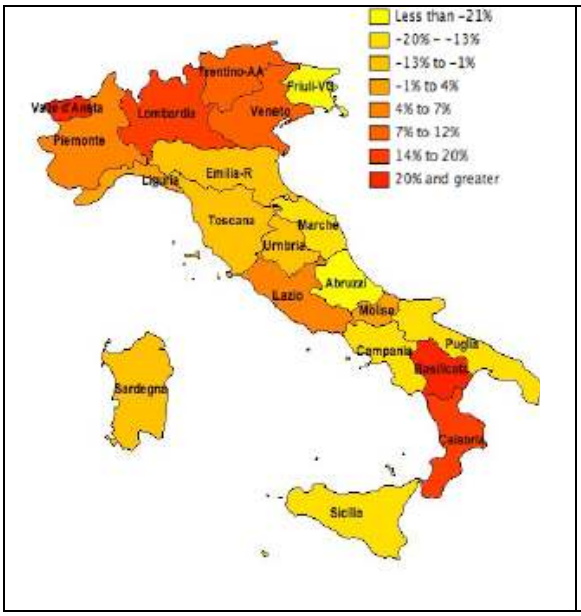
MIGRANTS						
	DESTINATION					
	North-West	North-East	Centre	South	Abroad	Total
ORIGIN						
North-West	7.7%	3.8%	2.7%	0.9%	2.4%	17.6%
North-East	8.9%	8.4%	3.0%	2.0%	1.6%	24.0%
Centre	5.6%	4.4%	6.3%	5.9%	1.7%	23.9%
South	10.9%	4.0%	10.5%	7.5%	1.6%	34.6%
Total	33.1%	20.7%	22.5%	16.4%	7.3%	100%
RETURNERS						
	DESTINATION					
	North-West	North-East	Centre	South	Abroad	Total
ORIGIN						
North-West	6.0%	2.5%	1.5%	2.6%	0.2%	12.7%
North-East	8.7%	17.8%	4.2%	6.8%	0.4%	37.8%
Centre	2.2%	1.4%	6.4%	20.9%	0.2%	31.1%
South	0.6%	0.3%	2.9%	14.5%	0.0%	18.4%
Total	17.5%	22.0%	15.0%	44.7%	0.7%	100%

Source – author's calculations from ISTAT (2007).

It shows that over a quarter of total migrants move from the South to the Centre-North: in particular 10.9% move to the North West, 4.0% to the North East and 10.5% to the Centre. Remarkably, only 0.9% and 2% move from the North West and North East to the South, whilst those moving from the Centre to the Mezzogiorno are 5.9% of the total. At the same time, those leaving the North East for the North West account for 8.9% of total migrants, whilst only 3.8% of migrants follow the opposite direction. As for returners, 17.8% of the total move within the North East, 20.9% have studied in the Centre and have gone back to the Mezzogiorno, 14.5% move within the South and only 2.6% have studied in the North West and moved back to the South.

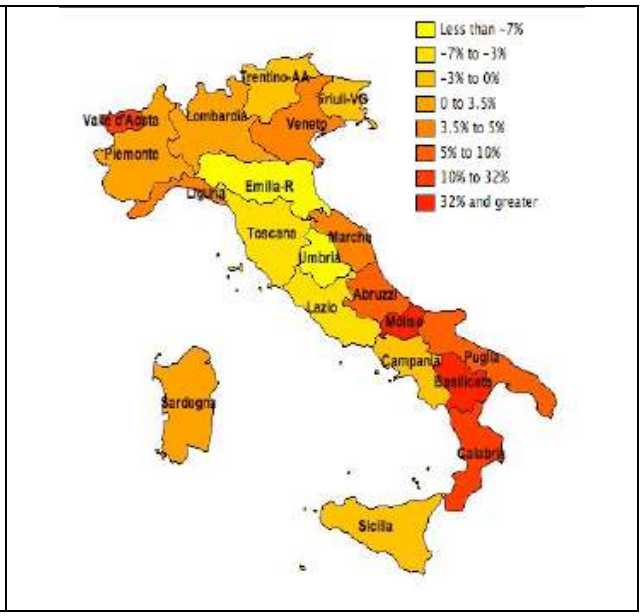
To give a full picture of graduate movements the maps below provide the net migration and net return rates. The regions are colour-coded from yellow (losing migrants/returners) to red (gaining migrants/returners).

Map 1 Net migration rates in Italian regions



Source: author's elaboration from ISTAT ((2007)

Map 2 Net return rates in Italian regions



Source – author's elaboration from ISTAT (2007).

From map 1 it clearly emerges that the largest regions in the South (Campania, Puglia and Sicilia) are those with highest net loss of migrants, whilst Lazio and the largest regions of the North (Lombardia, Piemonte and Veneto) have among the highest net intakes of migrants.[8] Emilia Romagna, Toscana and Umbria, in the Centre-North, have negative migration rates. This is because they have attractive universities, thereby produce a large number of graduates, migrants and returners. Marche, in the Centre, also loses a relatively large proportion of migrants.

An unexpected finding regards Basilicata, Molise and Calabria in the South, which have positive rates of incoming migrants. As the three regions have relatively small and new universities and traditionally *export* university students to other regions, the high immigration rates may firstly result from the aforementioned misclassification of returners as migrants [9] However, they may also reflect the fact that, as the regional higher education institutions offer

[8] Valle d'Aosta, in the North West, has the highest immigration rate because until 2001, it did not have any regional university, therefore did non generate any emigrants.

[9] To support this point we see, in Map 2, that Calabria, Basilicata and Molise have a very high net intake of returners (19%, 34% and 31% respectively).

a limited amount of courses, certain key skills may be unavailable locally and may have to be sourced from outside the region.[10]

Map 2 shows that all the regions of the South, with the exception of Campania, are net recipient of returners. Emilia Romagna, Toscana and Umbria, have the highest negative return rate precisely because they have good universities, which attract many students that leave upon graduation. Lazio and Lombardia also have a negative return rate, though smaller in magnitude. Marche, in the Centre gains more returners than it loses, displaying a pattern more similar to the regions of the South than to those of the Centre.

This descriptive statistics show clearly that migrants and returners follow opposite geographical directions. Undoubtebly, comparing their motives and the consequences of their choices is not only interesting, but may shed important light on the evolution of subnational disparities in Italy.

7 Hypothesis testing and econometric results

In this paragraph we summarise they key results of our empirical analysis, highlighting, chapter by chapter, how our hypothesis have been validated.

Chapter 4 – Hypotheses:

- *Human capital seeks both the opportunity to learn and to apply his/her knowledge.*
- *Migrants, returners and stayers, differ in both respects.*

These two hypotheses have been tested in chapter 4, where we have compared the three mobility categories through multinomial logit and probit regressions. We have found that returners have overall a poorer academic performance, and are less attracted than migrants to regions with a strong regional innovation system. Most interesting, when focusing exclusively on employed graduates the results have pointed out that migrants, by applying their knowledge in their jobs, integrate in the innovation system more than the rest of graduates, confirming that they seek learning opportunities when deciding to move.

Chapter 5 – Hypotheses:

- *Economic performance is not the only regional feature attracting skilled individuals. Quality of life as well as regional innovation matter.*
- *Graduate mobility has a strong collective nature as it is sustained through social networks.*
- *Migrants, stayers and returners have different preferences.*

[10] To support this point, we notice that in 2001 none of the graduates from Molise had studied engineering, medicine or humanities; none of those from Basilicata had graduated in medicine, architecture, economics or law; none from Calabria had a degree in pedagogical and psychological disciplines. Furthermore, we notice that the inflows of graduates to these three regions come for the vast majority from the South.

These propositions have been explored in chapter 5, through conditional logit and multinomial probit models. We have found that whilst migrants and stayers prefer regions with higher employment, this is not the case for returners. Furthermore we have shown that although all graduates prefer highly innovative regions, this is more strongly the case for migrants who are also particularly attracted to regions that offer cultural amenities. Chapter 5 has also proven that networks are key mechanisms that sustain and direct graduates' mobility: in other words, those who move (be them returners and migrants) make a collective rather than an individual choice.

Chapter 6 – Hypotheses:

- *Graduate mobility and regional innovation mutually reinforce each other: talent concentrates in the most innovative regions and contributes to their innovative performance, which in turn makes them more attractive.*
- *Graduates with a scientific and engineering background have a distinct effect on regional innovation*
- *Migrants, stayers and returners have different effects on regional knowledge.*

These aspects were explored in chapter 6, where impact of migrants and returners has been assessed through a series of simultaneous equation models. These have taken into account, concurrently, the role of regional knowledge in attracting skills and the impact of skills on regional knowledge. The analysis has shown that two cumulative processes are generated by the two types of movers: one in which the most innovative regions attract largely migrants which contribute to local innovation and to making the area more appealing to human capital; a second one in which returners tend to move back to the less dynamic regions of the South, where they cannot participate in collective learning processes, thereby making the areas less attractive to other high-skilled individuals. Such processes are especially strong when it comes to graduates with scientific or engineering background. This chapter has, in other words, proven that when it comes to the highly skilled, population flows actually widen, rather than reduce, spatial inequalities.

Chapter 7 – Hypotheses:

- *Mobility impacts on job satisfaction, as the environment of the region of origin and destination influences expectations and therefore wellbeing.*
- *Migrants, stayers and returners differ in their levels of wellbeing.*

These hypotheses have been tested through a set of generalised ordered logit regressions with partial proportional odds. We have analysed the patters of job satisfaction both on short-term employment domains (such as job tasks and economic treatment) and long-term domains (such as career opportunities and stability and security). The models have highlighted that fulfilment depends both on the mobility category and on the area of origin and destination of the graduate, as both shape expectations and in turn satisfaction. In so doing, chapter 7 has broadened traditional approaches to the study of wellbeing. We have found that those who

moved within the Centre-North seek and find fulfilment in the tasks their jobs involve, whilst those who came from the Mezzogiorno, place more importance on economic treatment. Overall, we have shown that leaving the Mezzogiorno is a rewarding choice, in both short and long term domains of wellbeing

8 Summary and policy implications: higher education, collective learning and migration

The four empirical chapters of the thesis have demonstrated the value of looking at migration in terms of knowledge flows, and provided a thorough understanding of the drivers and consequences of the phenomenon. The key policy implications of the work revolve largely around the role of the education system and the skills it produces within the RIS.

Our results suggest that investment in tertiary education will translate into collective learning (and as a consequence economic growth) only in those regions that are able to integrate graduates in their innovation system. That is, in those regions where there is a high degree of complementarity between the labour force (of which graduates are a strategic component), the private sectors and the other institutions within the system, including universities. Such complementarity seems only partially achieved in Italy, as the difficulties that Italian graduates face in entering the labour market indicate that the skills provided by the tertiary education systems are not easily absorbed.

This suggests that the university sectors needs to be more closely aligned with the broader development agenda, easing the integration of graduates in the labour market by coordinating education, industrial and innovation policies. In particular it seems that more attention should be paid to understanding the key skills required in different areas, and perhaps (though more research is needed) the current education system should provide a more diversified type of training, rebalancing the mix between vocational and academic studies.

Addressing these issues is especially important for the Mezzogiorno, which, through its intense brain drain, proves unable to benefit from its investment in higher education: in the terminology of Nelson and Phelps (1965), the local level of techno-economic development is not high enough as to benefit from the highly skilled. Although difficult, the South must tackle these issues urgently, for at least two reasons. First, skilled migration is cumulative in its nature: the more graduates leave, the more they will keep leaving, as they feed into social networks, which support and perpetuate their movements. Secondly, and most relevantly, the brain drain is cumulative in its effects as it

contributes to a virtuous cycle of skilled concentration and knowledge creation in the most developed parts of the country, and of skilled depletion and lack of innovation in the least developed ones.

Finally far-sighted policy measures must be accompanied by further investigation. This should monitor the trends we identified in this thesis, by conducting similar analysis on future editions of the *Indagine*. Furthermore, it should tackle in more depth the role, scope and geography of social networks. Finally, graduate migration should also be explored through case studies at the regional and at the university levels. Such comprehensive action is imperative to enhance knowledge-based growth and avoid worsening the already marked Italian sub-national disparities.

Acknowledgements and awards

I am honoured to present this essay in acceptance of the doctoral prize "Giorgio Leonardi". Many people, in a variety of ways, helped me develop the ideas contained in my thesis and I am grateful to all of them. Today, I would like to expresses my special thanks to my PhD advisor Dr Iammarino, for her guidance and support throughout the doctoral process and to Prof Philip McCann and Prof Rodriguez-Pose, my doctoral examiners, whose feedback and advice will help shape these ideas further.

Bibliografia

Audretsch, D. B. (1998) Agglomeration and the Location of Innovative Activity. *Oxford Review of Economic Policy,* 14, 2, 18-29.

Barca, F. (2006) *Italia Frenata, Paradossi e Lezioni della Politica per lo Sviluppo*. Rome, Donzelli.

Becker, S. (1964) *Human Capital*. Chicago and London, The University of Chicago Press.

Benhabib J.M. & Spiegel, J.M. (1994) The Role of Human Capital in Economic Development: Evidence from Aggregate Cross-Country Data. *Journal of Monetary Economics*, 34, 2, 143-173.

Camagni, R. (Ed.) (1991) *Innovation Networks: Spatial Perspectives*. London, Belhaven.

Cebula, R. J. (2005) Internal Migration Determinants: Recent Evidence. *International Advances in Economic Research,* 11, 2, 267–274.

Clark, A.E. & Oswald, A.J. (1994) Unhappiness and Unemployment. *Economic Journal*, 104, 424, 648-59.

Clark, A.E. & Oswald, A.J. (1996) Satisfaction and Comparison Income. *Journal of Public*

Economics, 61, 3, 359-81.
Cooke, P. N. & Morgan, K. (1998) *The Associational Economy: Firms, Regions, and Innovation*. Oxford, Oxford University Press.
De Jong, G., Chamratrithirong, A. & Tran, Q.G (2002), For Better, For Worse: Life Satisfaction Consequences of Migration. *International Migration Review*, 36, 3, 838-863.
Doloreux, D. & Paarto, S. (2005) Regional Innovation Systems: Current Discourse and Unresolved Issues. *Technology in Society,* 27, 2, 133-153.
Faggian, A. & Mccann, P. (2009) Human Capital, Graduate Migration and Innovation in British Regions. *Cambridge Journal of Economics,* 33, 2, 317-333.
Faggian, A. & Mccann, P. (2006) Human Capital Flows and Regional Knowledge Assets: A Simultaneous Equation Approach *Oxford Economic Papers,* 58, 3, 475-500.
Florida, R. (2002a) *The Rise of the Creative Class.* New York, Basic Books.
Florida, R. (2002b) The Economic Geography of Talent. *Annals of the Association of Regional Geographers,* 92, 4, 743-755.
Forslid, R. (1999) *Agglomeration with Human and Physical Capital: an Analytically Solvable Case*. Working Paper, CEPR and University of Lund.
Giannetti, M. (2003) On the Mechanics of Migration Decisions: Skill Complementarities and Endogenous Price Differentials. *Journal of Development Economics*, 71, 2, 329-349.
Greene W. (2003) *Econometric Analysis, 5th Edition*. Upper Saddle River, NJ, Prentice Hall.
Greenwood, M. J. (1975) Research on Internal Migration in the United States: A survey. *Journal of Economic Literature*, 13, 2, 397-433.
Greenwood, M. J. (1975) Research on Internal Migration in the United States: A survey. *Journal of Economic Literature*, 13, 2, 397-433.
Griliches, Z. (1979) Issues in Assessing the Contribution of Research and Development to Productivity Growth. *Bell Journal of Economics,* 10, 1, 92-116.
Gruenberg, B. (1980) The Happy Worker: an Analysis of Educational and Occupational Differences in Determinants of Job Satisfaction. *American Journal of Sociology*, 86, 2, 247–271.
Guilmoto, C. Z. & Sandron, F. (2001) The Internal Dynamics of Migration Networks in Developing Countries. *Population: An English Selection*, 13, 2, 135-164.
Haavelmo, T. (1943) The Statistical Implications of a System of Simultaneous Equations. *Econometrica*, 11, 1, 1-12.
Haug, S. (2008) Migration Networks and Migration Decision-Making, *Journal of Ethnic and Migration Studies*, 34, 4, 585-605.
Hicks, J. R. (1932) *The Theory of Wages.* London, McMillan.
Hunt, J., Gauthier-Loiselle, M. & Room, L.B (2008*) How Much Does Immigration Boost Innovation?* NBER Working Paper 14312, National Bureau of Economic Research, Boston.
Iammarino, S. (2005) An Evolutionary Integrated View of Regional Systems of Innovation: Concepts, Measures and Historical Perspectives. *European Planning Studies,* 13, 4, 497-519.
ISTAT (2007) *Indagine Campionaria sull'Inserimento Professionale dei Laureati.* ISTAT, Rome.
Janson, P. & Martin, J.K. (1982) Job Satisfaction and Age: a Test of Two Views. *Social Forces*, 60, 4, 1088-1102.
Lundholm, E. & Malmberg, G. (2006) Gains and Losses, Outcomes of Interregional Migration in the Five Nordic Countries. *Geografiska Annaler, Series B*: *Human Geography*, 88, 1, 35-47.
Martin, J. K. & D. T. Lichter (1983) Geographic Mobility and Satisfaction with Life and

Work. *Social Science Quarterly*, 64, 3, 524-535.
Molho, I. (1986) Theories of Migration: a Review. *Scottish Journal of Political Economy*, 33, 4, 396-419.
Morgan, K. (1997) The Learning Region: Institutions, Innovation and Regional Renewal. *Regional Studies*, 31, 5, 491-503.
Nelson, R. R. & Phelps, E. S. (1965) Investments in Humans, Technology Diffusion and Economic Growth. *The American Economic Review*, 56, 2, 69-75.
Padoa Schioppa, F. & Attanasio, O. (1990) Regional Inequalities, Migration and Mismatch in Italy 1960-1986. IN PADOA SCHIOPPA, F. (Ed.) *Mismatch and Labour Mobility.* Cambridge, Cambridge University Press.
Piras, R. & Melis, S. (2007) Evoluzione e Tendenze delle Migrazioni Interne. *Economia Italiana*, 2, 437-461.
Piras, R. (2005) Il Contenuto di Capitale Umano dei Flussi Migratori Interregionali: 1980-2002. *Politica Economica*, 21, 461-491.
Piras, R. (2006) I Movimenti Migratori Interregional per Titolo di Studio: una Stima dei Tassi Migratori ed un'Analisi dei Flussi. *Studi di Emigrazione*, 43, 153-170.
Power, D. & Lundmark, M. (2004) Working through Knowledge Pools: Labour Market Dynamics, the Transference of Knowledge and Ideas, and Industrial Clusters. *Urban Studies*, 41, 5/6, 1025-1044.
Quinn, M. A. & Rubb, S. (2005) The Importance of Education-Occupation Matching in Migration Decisions. *Demography*, 42, 1, 153-167.
Rindoks, A., Penninx, R. & Rath, J. (2006) *Gaining from Migration: What Works in Networks? Examining Economically Related Benefits Accrued from Greater Economic Linkages, Migration Processes, and Diasporas*. IMISCOE Working Paper, 13, Institute for Migration and Ethnic Studies, Amsterdam.
Ritsila, J. & Ovaskainen, M. (2001) Migration and Regional Centralization of Human Capital. *Applied Economics*, 33, 3, 317-325.
Rodriguez-Pose, A. & Crescenzi, R.(2008) Research and Development, Spillovers, Innovation Systems, and the Genesis of Regional Growth in Europe. *Regional Studies*, 42, 1, 51-67.
Schultz, T. W. (1961) Investment in Human Capital. *The American Economic Review*, 51, 1, 1-17.
Sjaastad, L. A. (1962) The Costs and Returns of Human Migration. *Journal of Political Economy*, 70, 5, 80-93.
Storper, M. (1997) *The Regional World: Territorial Development in a Global Economy.* New York, Guildford.
Thurow, L. C. (1975) *Generating Inequality.* New York, Basic Books.
Van Dalen, H. P. & Henkens, K. (2007) Longing for the Good Life: Understanding Emigration from a High-Income Country. *Population and Development Review*, 33, 1, 37-65.
Vandenbussche, J., Aghion, P. & Meghir, C. (2006) Growth, Distance to Frontier and Composition of Human Capital. *Journal of Economic Growth*, 11, 2, 97-127.
Vertovec, S. (2002) *Transnational Networks and Skilled Labour Migration*. Paper presented at the conference "Migration", Ladenburg, 14-15 February.
Ziegler, J. A. & Britton, C. R. (1981) A Comparative Analysis of Socioeconomic Variations in Measuring the Quality of Life. *Social Science Quarterly*, 62, 2, 303-312.