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“The knowledge impact of new decentralized universities: an empirical study on Italy”

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The knowledge impact of new decentralized universities: an empirical study on Italy

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Abstract: *The geographical diffusion of universities has been recently incentivized in Europe by the growing relevance attributed to them as a driver of local development and as a source of learning for firms. However, the decision processes about the location of the new universities and the design of their study programs are not informed by any clear scientific guidelines. This paper assesses an aspect of the 'knowledge impact' of such phenomena by measuring the additional human capital produced, absorbed and coherently utilized by the local production systems in which the new universities have been created. Since universities do not track the location of their graduates in a systematic way, an original survey was conducted among all the graduates of twelve new decentralized universities in the Marche region. The analysis demonstrates that the geographical diffusion of new universities within the region produces a very small incremental contribution in terms of the overall production of graduates. We found diverging results concerning the specific cases and tested for the determinants of decentralized universities' effectiveness in terms of their contributions to the local learning processes.*

Keywords

University, Knowledge impact, local development.

Jel Classification Code

I23, R11, O30

1. Introduction

The series of reforms which involved the Italian university system in the 1990s produced a proliferation of the universities and their capillary geographical diffusion in the form of new university branches even in minor cities (Bagnasco, 2004). The number of registered university courses in Italy grew from 2444 for the academic year 1999/2000 to 9364 in 2006/2007. Simultaneously the number of cities with at least one university has increased from 62 in 1990 to 248 in 2006¹. The general background against which the institution of new universities in the

¹ The data, in this case, has been collected from www.miur.it, and from the Cnsvu's reports "La localizzazione geografica degli atenei statali e non statali in Italia dal 1980 al 2000" (2001) and "Ottavo rapporto sullo stato del sistema universitario" (2007). It is the case, here, to note that the data at the National level about the dynamic and location of new university resulted to be quite unaffordable. In fact we could experience several discrepancies between the ministerial data (Miur) and the effective situation surveyed directly in the Marche Region (the case study presented here), as well as between the 'official'(ministerial) data and other publications. However, apart from a few units of discrepancy, the main trend is clear.

territory has been commonly legitimated (in terms of policy propaganda and public opinion)², lies in the growing relevance attributed to the university as a driver of local development and as a source of learning for firms. In particular, the institution of new university branches and courses in decentralised locations is often accompanied by expectations and statements about their contributions to the hosting local economies in terms of their transition towards a “knowledge economy”. In this sense, the territorial diffusion of universities has been pictured as an important ingredient in the renovation of traditional Italian industries, and ultimately as a policy tool. However, defining the conditions which might allow mature local production systems (like the Italian ones) to effectively interact with the university system, is a more difficult task. In particular the role played by proximity in this integration process and the correspondence between the teaching programs and the local economic activities are still open issues. The distinct descriptive models and ‘labels’ which have been used to frame the research activity on successful regions such as ‘learning regions’ and ‘regional innovation systems’ (Yu and Jackson, 2011; Niosi, 2010; Fritsch, 2008) do not enable researchers to find a clear reference for those local systems in transition, which do not belong to typical ‘models’ of analysis. In the changing Italian mature industrial districts (for instance) the former and declining ‘Marshallian industrial district’ (Brusco, 1982; Belussi *et alii*, 2003) can no longer be persuasively defined as such, and the analytical categories used for describing their functioning mechanisms and organizational advantages now appear inappropriate. At the same time the literature on ‘regional innovation systems’ and on ‘hi-tech industrial clusters’ – which constructs on the same conceptual key-categories of *proximity*, and focuses on those successful cases commonly pointed out as references in modern knowledge-based economies – cannot be used either as an effective interpretative model of the current situation, or as ‘normative landmarks’. Many of the characteristics of mature industrial regions are simply too different and distant from those high-tech regions, and consequently the insights gained from the latter may not be appropriate or relevant for the former. From a long term developmental perspective the different interpretative models of local production systems still remain separated. More importantly, it seems clear that even with the advent of a ‘knowledge-based economy’ not all social resources should be diverted to ‘high-technology’ industries, since these constitute a small part of even the most advanced economies (Hirsch-Kreisten and Jacobson, 2008; Farshchi, Janne and McCann, 2009). A transitional process which implies changes based on the integration of traditional local knowledge (typically tacit and localised) and academic knowledge (codified and a-spatial), requires and is triggered by adequate human capital, capable of accompanying the local economies along such transition.

In this sense restructuring processes in mature regions are inevitably better supported by an adequate supply of highly educated human capital than by R&D cooperation and technological spillovers between local firms and universities.

The aim of this paper is to verify whether, and under which conditions, the new human capital produced locally can contribute to this process. Furthermore, the limits and obstacles at the base of the missed process of integration between Italian local systems of production and the new universities are analyzed.

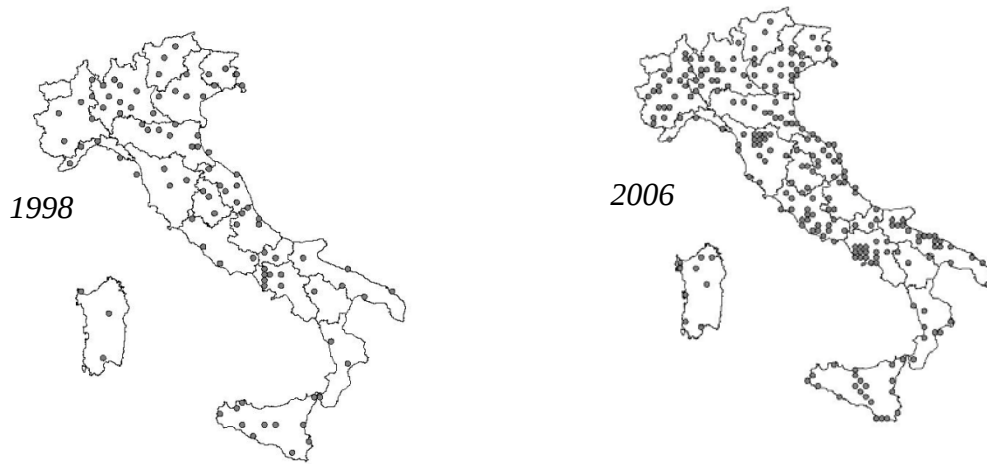
² For a reconstruction of the institutional dynamics which have led to these reforms and their micro foundations see Ballarino and Regini (2005).

The remainder of the paper is organized as follows. The next section briefly frames the institutional steps and underlying incentive mechanisms that have marked the geographical evolution of the university system in Italy after the reforms. An outline is given of how the institutional and academic setting has produced a system of incentives, whose output – i.e. the creation of the new university branches spread in the territory – does not tend to reduce the strong mismatch between competences acquired in the university and competences required by the (local) production systems. The third section provides a short survey of the economic literature on the relationship between University and local development, with a particular focus on the mostly neglected role of teaching. In the subsequent empirical section we measure the occurred integration and knowledge impact of the new university branches on the hosting local systems in the Marche, a region in the centre of Italy characterized by the diffused presence of industrial districts specialized in mature, low and medium tech manufacturing processes. We firstly describe the population involved in the survey; the methodology that has been applied and the characteristics of the students who have graduated from decentralised seats. Then the following hypotheses are verified and measured at a descriptive level: the existence of a latent reservoir of human capital activated only through proximity (i.e. through the diffusion in the territory of the new university branches); the absorption of graduates in the local production systems and the correspondence between acquired and required competences. Finally an econometric exercise is run to highlight the major descriptive results. Section 5 concludes.

2. The geographical evolution of the Italian university system

The proliferation of new university institutions in Italy manifests itself through different legal bodies and organisations, and this process is described using different terms such as delocalisation, decentralisation, creation of detached branches, university fractioning, multiplication of universities, birth of small or local universities and germination of universities. From the legal formal point of view, there are two possible interpretations. Firstly, in the satellite universities, the existing universities establish their own local branches, maintaining their the control over teaching and research activities and appointing for the management a non-university subject with more or less wide powers. Secondly, a new university subject is created, with a new legal body, and with total control also over the functions of teaching and research. This can be an entirely new body; more often, it is the result of the germination or separation of an existing university. These two options can combine with each other differently: often, the organism which has been created to manage the courses, frees itself from the original university to start a legally autonomous unit, capable of organising and handling also the teaching and research activities “on its own”. However, from the socio-economic point of view the phenomenon can be seen as unitary: a diffusion in the territory of the place where university courses are taught (see Fig. 1).

Fig. 1. Cities with at least one university (our elaboration on GIS from ministerial data)



Until the end of the 1970s the institutional rationale at the base of the geographic location of universities was the promotion of equity and efficiency. It was only in Italy during the 1980s in Italy, that universities started to be perceived (although still in a rudimentary way) as tools for the revitalisation of regional economies. For instance, in those years the University of Calabria was established as the first Italian attempt to support the development of the South through the creation of an University (Moscati, 1997). In the meantime, the interest in the university's contributory role towards economic development has been fostered by well-known examples of successful regional economies in which the university's input is easily identified, such as Silicon Valley, the Boston area, or the region around Cambridge in the UK. Firstly in the USA, relationships between industries and universities have become less sceptical, and the presence of universities is finally considered as an important potential for the regions. Therefore, the economic aspect becomes predominant among the arguments in favour of the creation of new universities and the decentralization of existing ones (Florax, 1992). Starting from the general motivations at the base of universities' decentralization presented in Florax (1992), the following table lists the motivations at the base of the Italian university decentralization process in a chronological order and the caveat which will be addressed in the rest of the paper (Tab.1).

Tab. 1.

Motivations behind university decentralization:	Caveat:
- equity (regionally balanced welfare and education)	* How far and where?
- avoiding the drain of talents from declining regions	* <i>matching</i> between local supply and demand of graduates
- increasing the total production of graduates	* effective?
- university decentralization as regional policy	* effective?

Until recently the Italian university has been characterised until recently by the persistency of an organisational model based on the centralisation of the curricula and on little functional and structural differentiation. The situation prior to the application of the law n° 537 in 1993³ was characterised by the expansion of the state expenses, by the unbalanced distribution of state resources and by a lack of state control over the costs dynamics. The increase of public expenses is also related to unsatisfactory results in terms of system productivity (Bonaccorsi, 2003).

Since the 1990s, an attempt has been made to force universities towards more cost-effective productive solutions, by means of policies which aim at increasing the number of students (in small and medium size universities) and at reducing costs, or through the exploitation of financial sources alternative to the public ones. In addition to the lack of effective access-regulation policies, we note the lack of effective policies concerning the geographical distribution of universities. As a result of the concentration of students' demand and professors' applications, some universities, faculties and courses had reached abnormal dimensions, thus generating functional difficulties in the academic community in terms of organisation, administrative management as well as in the teaching and research activities. The 1997 Financial Act laid down the possibility to arrange the gradual organic splitting of those universities where a given numeric limit was exceeded, provided that the Observatory for the Evaluation of the University System had given its approval (Capano 1998).

Whatever program has been implemented to regulate the distribution of universities, it has produced evident results only in the major seats. Mega universities have been subjected to a diet, rather than to a real fractioning process, through the deviation of certain enrolment fluxes towards newly-established universities. Other universities, on the other hand, were formed without any planning guidelines in response to the needs of local institutions and through direct negotiations with the existing university bodies.

The case of new universities which are not entirely new bodies but branches of existing ones, are the most numerous: the activities are almost exclusively focused on teaching while research remains concentrated within the head universities. In 2005, 80% of the universities had started delocalised activities, but only 7% of the delocalized activities was also dedicated to research activities⁴. The final result of all these processes does not solve the uneven distribution of university location in Italy. In order to supply a benchmark, we can compare the geographical diffusion of Italian universities with the ones in Germany and France.. On average, the ratio between the total population and the number of cities with at least one university is much higher in Germany (563.136 inhabitants per university-city in Germany vs. 225.692 in Italy), meaning that the process of geographical decentralization in Italy has gone much further than in Germany, or put in other words, the geographical concentration of universities is much higher in Germany⁵. What is even more interesting is the high variability between German

³ Classified as "Public finance corrective actions"; art. 5 is about university public expenses and, among other aspects, it establishes the "nucleo di valutazione" (evaluation board).

⁴ Data from Italian 'Comitato nazionale per la valutazione del sistema universitario'; www.cnvsu.it

⁵ In the case of France, on the contrary, this value is lower (119.152), putting Italy somehow in the middle. For these measures we considered both university and 'Fachhochschule' for Germany, and both universities and 'Grand Ecoles' for France, these being comparable to the Italian decentralized universities.

regions, which is related to the concentration of the higher educational institutions in the big cities, resulting in a much higher standard deviation of the ratios between regional population (NUTS 2) and number of cities with at least an university in the case of Germany with respect to Italy (87.266 the Italian st. dev. vs. 794.962 German st. dev.). To be noted here, and to be considered as a hint at the criteria of distribution used in Italy, is the fact that the number of universities per region, in absolute terms, is more equal in Italy than in Germany.

The brief reconstruction of the changes which have characterised the Italian university system over the last years shows how a real central program has never really existed. University branches multiplied as a function of an “exchange” between universities and local institutions: universities produce and distribute prestige, political consent and recognition and, on the other hand they attain resources in terms of students and financing.

In Italy this happened as a function of the convergence of evolutionary processes which involved both universities and local institutions. Within such processes we can mention the creation of bank trusts and the promotion of local autonomies. Furthermore, the reduction of public subsidies and the introduction of a higher degree of autonomy in the construction of university curricula increased the need to find alternative financial resources. To simplify, we could say that in a situation that lacks external assessments, the university activity taken as a whole (and not with reference to every single professor) is being evaluated in terms of quantities, and especially in terms of how many students graduate. This also leads to the use of delocalisation as a “marketing tool”. In fact, according to the interviews conducted with the university rectors⁶, the behaviour of the existing universities after the 1997 reform, was guided by the urgency to occupy all the possible ‘hunting grounds’ before the other concurring universities, i.e. to settle new branches where there could be a basin of potential new students. All this, and the decision about which faculty and programs of study should have been instituted, has been carried out by following a standardized procedure of political carve-up between the concurring universities and without further strategic guidelines linked to the specificity and needs of the local economy.

While this behaviour can be considered as physiological for an initial period immediately after the reform, today most of the newly instituted universities have not yet defined a strategic line of planning and integration with the local systems of production. It is however true that part of the responsibility of this situation can be also traced back to the lack of sound theoretical guidelines (Leoni, 2006).

3. The economic literature on the relationship between university and local development

The economic literature dealing with the relationship between universities and local economic development is still not identified by a complete research program or a fully defined theoretical framework. A preliminary distinction made is between literature which considers the ‘expenditure impacts’, i.e. every income connected to students expenditures within the local community (Wilson 1975; Bleaney *et al.* 1992), and the much more complex and wide-ranging

⁶ An extensive interview to the four universities’ rectors of the region has been conducted in order to grasp the fundamental climate and motivations on which the decentralization processes have been activated.

literature considering the ‘knowledge impact’ of a University on a region. Within these last approaches, innovation economics is the branch which has widely recognised that the knowledge exploited by companies to generate innovations, i.e. the “sources of learning”, does not lie exclusively inside the company itself. A deep effort along this line of research has been made by the literature on ‘learning regions’ and on ‘regional systems of innovations’ (Yu and Jackson, 2011; Niosi, 2010; Varga, 2009; Fabrizio, 2009; Lundvall, 2006; Edquist, 1997). This literature emphasizes the importance of the region as a *locus* of institutional co-integration between production modes, organisations, technologies and competences and measures final performances in terms of local patenting, licensing, spinoff and R&D cooperations between the university and local firms. However, only a minor part of the contribution that even big universities can supply as source of learning, to local firms can be traced back to these mechanisms (Lester, 2005). This is even more true for the new decentralized university branches in Italy which in the majority of the cases do not provide a strong focus on research activity. Sotarauta *et alii* (2003) and Srinivas *et alii* (2008) find that the university role in local innovation processes depends on what kind of industrial transformation is occurring in the local economy. New industry formation, industry transplantation, industry diversification, and industry upgrading are each associated with a different pattern of technology take-up and with a different set of university contributions. If at present the major focus is on technology transfer through R&D cooperation and many universities are seeking to exploit their laboratory discoveries by patenting and licensing intellectual property to local firms, often this is not the most important contribution. In addition to their own discoveries, universities can help to attract new human knowledge and financial resources from elsewhere. In addition, they can serve as a public space for ongoing local discussion about the future direction of technologies and markets. Very often, however, the university’s most important contribution is education. The contribution that the education can make to economic growth has been formalized by endogenous growth theories (Lucas, 1988), from which any neoclassical analysis on this issue begins (Bils and Klenow, 2000). Analytically the diffusion of university courses in the territory increases the growth rate of the human capital through the overall increase of the time dedicated to studying and of its productivity⁷. This is mainly due to two effects: i) the increase in the number of students, which is composed of those students who would not have enrolled unless the university course was close to their residence, plus those who have been captivated by the specificity of the new subjects⁸; and ii) the increase in the productivity of the time dedicated to obtaining a degree thanks to the reduction of commuting time and to a supposedly higher connection with the territory vocation⁹. Leaving this latter effect to one side, we delineate the hypothesis that the institution of a new university within a local productive system generates a positive growth in the stock of human capital compared to the situation before such opening. The intuitive hypothesis is that, generally speaking, there is a reserve of individuals who decide to go to university only if the course is held close to their

⁷ This is given by the factor $\varphi(1-u)$ in the relationship introduced by Lucas to explain the accumulation of the human capital: $h_t = H_t \varphi(1-u_t)$ where u_t is the portion of time dedicated to working, $1-u_t$ the time spent studying, h represents the growth rate, H is the human capital already accumulated (or the average knowledge stock owned by workers), and φ is the learning ability, which is supposed to be positive and linear with respect to the acquired knowledge level.

⁸ Which, in the formula exposed in note 7 corresponds to an increase of $1-u$

⁹ Which, in the formula exposed in note 7 corresponds to an increase of φ

home. As soon as a part of this student reserve reaches graduation, that part represents the differential of human capital which becomes available only when a course is instituted in the local system. This first hypothesis will be tested and quantified in the next section.

However, the actual integration of new graduates in the socio-economic structure, and their contribution to the learning ability of the local firms has still to be verified. In other words, the connections – provided there are any – between the geography of university and the geography of innovative companies (D'Este and Iammarino, 2010) are not considered in neoclassical growth theories¹⁰. As a consequence, the measurement of the creation of human capital needs to be integrated within an analysis of the mechanisms which allow its co-evolution with the organisations and the technologies of the local production systems. The following analysis will skip the (co)evolutionary processes considered by the 'regional economic system' literature and focus on some ex post evidence. In particular, it will measure ex post the output of these processes by measuring the production, absorption, and coherent local utilization of human capital. Although these measure can only be a partial indicators of the total and complex impact that a university can have on the dynamic capability of the hosting local production system, they are also the necessary starting point from which developing further considerations on the creation of evolutionary complementarities between university teaching activity and local productive systems may be developed.

4. The Empirical Analysis

The following dataset is based on an original survey submitted to all graduates in the new decentralized branches of the Marche region in the years 2000 - 2004¹¹. The region, located in the centre of Italy, is characterised by the diffusion of many industrial districts which, in some cases, have been the location of the new university branches. Unlike typical surveys on graduate students which consider graduates at one point in time and analyze how and when they have entered the labour market, here we examined the total number of graduates in new decentralized university branches (DUB) during their first five years of activity. This allows us to evaluate – when opportune – the cumulative impact of this phenomena starting from its origins.

In the Marche region, four universities were located in four different cities before the reforms of the '90s. At the end of 2004, twelve cities had at least one university, eight of which hosted new DUBs. Questionnaires were sent to all students who have graduated from DUBs. The 988 graduates in the examined years and grouped according to the different macro disciplines are illustrated in Table 4.

¹⁰ The empirical analyses which go under the name of *β -conditioned* estimation methods have tried to overcome such a-spatiality by identifying the socio-economic and institutional variables which can explain the differentials of growth rates between more and less advanced regions. However, although such methods introduce in the models the idea of growth as a result of localised characteristics, they tell us very little about the micro-economic dynamics which are at the basis of the evolution of such characteristics.

¹¹ We consider only graduates in the new 3 (+2) year course in the decentralized universities. Some of the oldest graduates are individuals who converted from the already existing three year "Diploma Universitario". In the main cases the content of the "Diploma universitario" remained the same once converted into the "Laurea degree".

Table 4. Graduate students in DUB in the period 2000-2004, grouped by learning branches

<i>Group</i>	<i>No. of graduate</i>	<i>Received responses</i>
<i>Law</i>	<i>139</i>	<i>41</i>
<i>Engineering</i>	<i>228</i>	<i>43</i>
<i>Economy</i>	<i>3</i>	<i>0</i>
<i>Social Studies</i>	<i>179</i>	<i>34</i>
<i>Art and History</i>	<i>107</i>	<i>29</i>
<i>Architecture</i>	<i>122</i>	<i>20</i>
<i>Science</i>	<i>89</i>	<i>25</i>
<i>Medical Studies</i>	<i>121</i>	<i>15</i>

The obtained response rate of 21% is lower than what one could have expected considering other studies with similar targets. A similar survey reached a 43% response on the total number of graduates in the Marches universities (Staffolani and Sterlacchini, 2001). The high number of missing answers has imposed a weight strategy of the individuals who have answered, in order to obtain statistics which are valid for all the graduates. Assuming that the decision to answer does not depend on the individuals' characteristics, we could say that the respondents are a simple casual sample, and this would ensure the equivalence of the distributional characteristics of such a sample to those of the entire group. However, this hypothesis cannot be introduced, because of the strong differences in the response rates between the various disciplines. As a consequence, we have decided to assign to each respondent a weighting factor which assimilates the respondents' characteristics to those of all the graduates¹². The ideal weighting strategy, in theory, should assign to every individual a weight which is proportional to the inverse of the probability that the individual has to answer the questionnaire. This value, which is unknown, can be approximated using the information available for all the graduates. The adopted strategy is to assess such a probability by means of a Probit model, using the variables available for all the graduates and then using the opposite of such assessment as a weight to ponder the answers received¹³.

The empirical analysis provides some initial descriptive statistics in order to find out the specificities of the students firstly which choose to enter the new DUB. In particular, the motivations behind their selection and the wideness of the DUB's catchment areas are analysed. Subsequently, the differential growth of human capital produced in the Marche Region through the geographical diffusion of the DUB is measured, quantifying the relevance of proximity in this sense. The absorption of the new human capital and the effective transfer of capabilities from the universities to the local production systems are also quantified. Finally an econometric exercise is run to test the major descriptive results.

4.1. Motivations behind the selection of decentralised courses and catchment areas

An initial and rather interesting profile among the examined cases relates to the importance of the university course being more or less close to the student's home. In the "Almalaurea" 2004 survey,

¹² This is the most common strategy, although it is not the only possible one (see Staffolani and Sterlacchini, 2001).

¹³ The results of the Probit analysis and the comparison between the data obtained from the universe and those obtained from our sample with the pondered cases can be supplied if requested. Differences are very seldom higher than 8%.

which examined Italian graduates' profiles in 2003, 13% of the students declared that they had selected a certain course because of its closeness to their homes. In our survey, 16.6% of graduate students, on a scale from 1 to 5, states as "mandatory" the possibility of remaining close to their home, and the percentage rises to a 45,7% if we sum the answers that have defined this aspect as "important" (see Table 5).

Table 5: the relevance of proximity between home and university

	<i>Percent</i>	<i>Cumulative Percent</i>
<i>Mandatory</i>	1.,6	1.,6
<i>Important</i>	29.1	45.7
<i>Medium</i>	22.9	68.6
<i>Marginal</i>	14.3	8.,9
<i>Irrelevant</i>	17.1	100.0

Comparing our data with the 2000 survey carried out by Staffolani and Sterlacchini (2001) on the students who graduated in the Marche in 1992, we find a value which is more aligned with our results.

The strong relevance given to the university location seems to be typical of students from the Marche when compared with the national results. This is probably due to the fact that in a region which can be considered peripheral where there are several university centres with respect to the residents' population, the distinction between "prestige universities", typically located in large cities, and "close university" is more strongly felt.

This information should be put in relation with the data on graduate students who were already working during their studies. The data we assessed, based on the sample answers, shows a 68,4% value of working students, 20% of whom are employed in continual activities, while 16% of the students have a job which is related to what they are studying. According to the ISTAT survey (2004) on job opportunities for students who graduated in 2001, on a national basis, a 15,5% of the students were working continually during their studies. The survey on DUB graduate students in the Marche region shows that their dominant approach to studying is one where they most frequently aim at the re-qualification of their professional experiences – which had started before their graduation – rather than at their official entrance into the labour market. This tendency, if matched with the above-mentioned importance given to the university proximity, seems to confirm a specific trait of local universities: they are addressed to or attract those individuals who are characterised by the objective of *improving* their professional position.

This is relevant as far as individual aspirations are concerned, but it is also meaningful for the local institutions since it actually outlines, as a matter of fact, a situation where users assign a *mission* to DUB which is different from the one assigned to traditional university. This is only partially reflected in the logics behind the establishment of DUB, since both local bodies and academic actors seem to address preferably to an audience of full-time students. Universities, in particular, tend to design courses which are a copy of the courses being held in central seats, at least with regards to the organisation of lessons and exams.

By examining the provenance of graduate students, we can assess the capacity to attract students from areas further afield or from areas already served by local universities. In fact, both the quality and the quantity of the human capital which will be produced depend on the dimension of the

catchment area. Such dimension also influences a series of accessory effects, such as those defined as *expenditure impacts*, which have not been considered in this work.

The DUB catchment areas are rather limited. In 13 seats out of the 22 examined, more than 75% of the graduate students were living not farther than 60 km from the university at the moment of matriculating, while for 5 courses the figure was as high as 100%.

The most attractive courses propose subjects that are less present in the region, such as veterinary studies, where 86% of the graduate students live farther than 30 km from the courses' seat.

Table 6: Dimension of the catchment areas grouped by learning branches

<i>Learning branch</i>	<i>Percent of graduates living at more than:</i>		
	30 Km	60 Km	100 Km
Veterinary Studies	86.0	62.0	33.1
Architecture	64.8	46.7	32.0
Art and History	57.9	33.6	12.1
Social Studies	55.8	42.9	38.1
Engineering	52.6	28.5	14.0
Law	36.7	20.1	12.9
Science	20.5	9.1	8.0
Economy	0.0	0.0	0.0

One can distinguish three different groups: the first one composed of veterinary studies and architecture, which are characterised by wide catchment areas; the second one, composed of the programs in art and history, social studies and engineering which are in the middle, and the law courses, which together with the scientific ones, are characterised by a smaller catchment area. The bigger the catchment area, the more attractive the new course. This dimension is related to both the demographic factors and to the diffusion of similar courses in the territory, but also to the specialisation of the production system, to the demand for competence by the local economic actors and to more or less explicit local development projects. Excluding the last group, in which smaller catchment areas depend mainly on the abundance of supply in the region, the intermediate group is that which seems to be better suited to the integration with the local dimension, as will be confirmed by the analysis of the absorption of graduates within the local production systems. As far as this introductory analysis is concerned¹⁴, the data on the wideness of the catchment areas, is considered here to be related to the data on the capacity of absorption of the local system. Although the analysis of the catchment areas of university seats is mandatory for any central attempt of planning which aims to have an equal and more functional distribution of high educational supply in the territory, we currently have no knowledge, at the moment, of any study concerning such data.

¹⁴ The analysis of the catchment areas of University seats is necessary for any central attempt of pianification which aims to have an equal and more functional territorial distribution of high educational supply. However we have no knowledge, at the moment, of any study on such data.

4.2. The growth of human capital produced in the Marche Region through the institution of the new seats

In the last few years, the number of graduate students in the Marche Region rose from 4044 graduates in 2000 to 7420 in 2004, with an increase higher than 83%¹⁵. This trend can be connected to a variety of factors, related to both social and economic dynamics and to the effects of the university reform. The aggregated data do not allow, however, for an isolation of the effects on the production of human capital induced by the opening of new decentralised courses in the territory. Neither do they allow for the isolation of its absolute (positive or negative) effect, nor its quantitative aspects. The decentralisation of a new university seat within a region can easily subtract students from the central seats. As a result the total number of registered students could remain unchanged. To identify the differential of human capital which emerges due to the establishment of new DUB's in the Marche region, we have considered those graduates who have stated that at the moment of choosing a course, they have only taken into consideration the local courses. Therefore, for those students, the decision to enrol was based only on the fact that that specific DUB was available in their home town.

The results show that there is a reserve of individuals – an estimated 27% of all the graduates (Table 3) – who declare that they have enrolled in a certain course simply because it was close to their residence. This reserve of individuals represents the additional human capital made available through the opening of courses diffused in the territory. In our survey, this corresponds to an absolute value of 260 individuals.

Table 7: Percent of graduates who consider the university location a crucial criterion in the selection of a course.

	<i>Percent value</i>	<i>Cumulative p. v.</i>
Selection among local options	27.1	27.1
Selection among regional options	33.1	60.2
Selection among national options	38.4	98.6
Selection among international options	1.4	100.0

If we consider the total number of graduates in the Marche region over the five years examined (which totals 27.000 including those of the old universities seats), the differential of the human capital produced by the process of diffusion of the new university seat in that region corresponds to the 1% of the human capital produced over the same period within the Region. This is quite a modest result in quantitative terms, and even more so if evaluated in a perspective of costs-benefits analysis.

The empirical results confirm that the spatial diffusion of university courses positively affects the total number of enrolled students. This is mainly due to the effect of proximity. Such a result was not to be taken for granted, since the delocalisation of a course might have subtracted students from the central seats, leaving the total number of students unchanged. The empirical analysis has then confirmed the assumed existence of a reserve of individuals who decides to enrol in a certain course only because of its proximity to home. The graduates who belong to this reserve group provide the 'delta' of the human capital which becomes available only through the opening of a

¹⁵ Data from the Italian Ministry of University and Research (www.miur.it) on graduate students grouped according to the location of the attended courses.

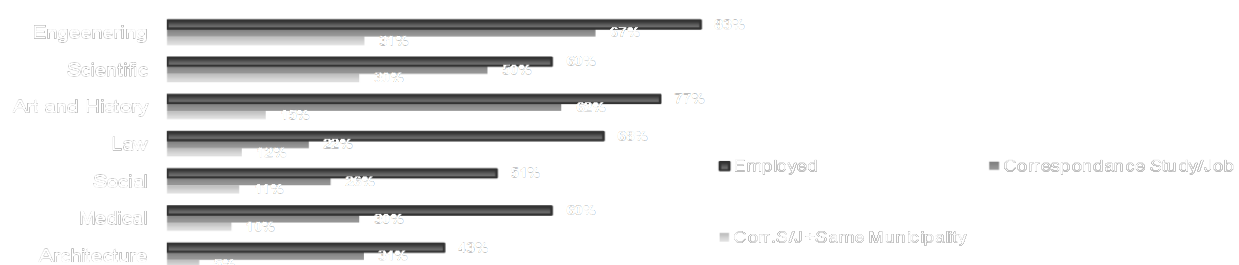
course within the local system. We found that this ‘delta’ corresponds to about 1% of the total human capital produced over the considered five years period within the Marche Region, i.e. 260 individuals over 27000. In our sample, this value is 27% of the total number of graduates in the decentralised seats.

4.3. The absorption of the new graduates within the local production systems

In order to control for the assumption by which the territorial diffusion of university courses is generally justified (also on a political level) by the alleged need to favour a better matching between the local production systems and the knowledge created by universities, we finally estimate how many graduates from the new DUB’s are actually absorbed by the local production systems. One year after graduating, 65% of the graduates have obtained either a permanent or temporary job. (This data is aligned with the Almalaurea analysis on graduates in Northern Italy¹⁶. More than half of the employed individuals (60% of employed subjects and 39.4% of graduates) found a job within the province where the course was held, while 44% of the employed subjects – which corresponds to 29% of graduate students – found employment within the same municipality.

By analysing the employed subjects and grouping them according to the courses attended, we can observe that the best absolute performance is given by the engineering group. Degrees in this field also show a higher connection between the degree obtained and the actual job. At the opposite end we find degrees in law, with a lower correspondence between the studied subjects and the professional position (Fig. 2)

Fig. 2: Absorption of Human Capital per Disciplines



The subset of the employed subjects who have a job related to their studies within the same municipality where they graduated, i.e. the subset resulting from the application of the three conditions together and corresponding to the lighter bars in the figures 1 and 2, shows to what extent the knowledge produced by the DUB in terms of human capital is actually exploited by

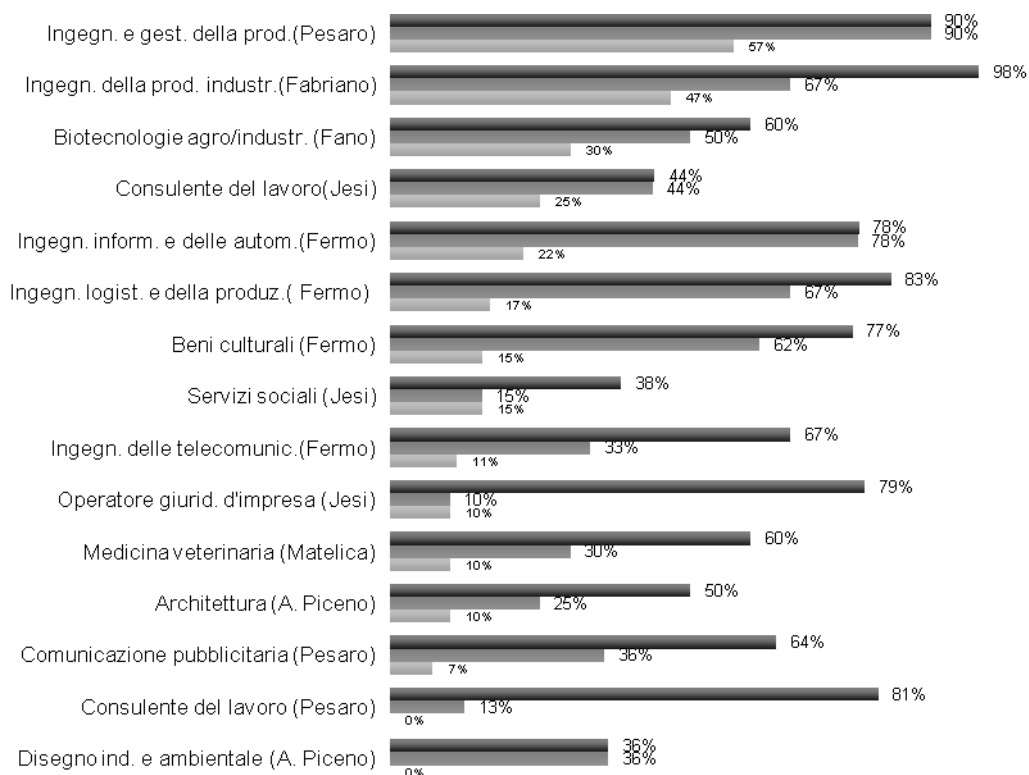
¹⁶ <http://www.almalaurea.it/universita/occupazione/occupazione04/>

the local economic system. Only in some engineering courses this value is as high as 50% (31% in average); in the other cases it is quite low, at around 10%.

Examining the grouping of the different learning branches, on the one hand we find ‘technical’ degrees, and especially those in the engineering group, which ensure higher employment opportunities and a higher correspondence between the acquired competences and the professional position. These degrees have an effect on the local production system which becomes visible in terms of absorption of the human capital. Together with the university programs in art and history (considering both the extension of the catchment area and the rate of local absorption of the graduates) these are the new high educational programs which seem to be better suited for the integration with the local dimension of traditional Marches’ economies. On the other hand, we find courses which, while having a relatively higher employment rate, also imply a lower correspondence between the studied subjects and the professional position. Interviews to social actors, administrators and DUB’s directors (Animali and Seri, 2009), have shown that there is an awareness that these courses are undoubtedly more attractive than others. From this point of view, the other courses represent a “second best” choice because they are much less attractive.

Finally, by considering the single courses, we give an explanation for the different performances occurring between the same disciplinary groups. The following figure (Fig. 3) shows the same information as the Fig. 3 but breaks up the disciplinary groups according to each of the university courses instituted in the various cities (cities within brackets).

Fig. 3: Absorption of human capital per single study program



This figure reveals the basic hypothesis of this paper: looking at the five engineering courses instituted in the cities of Pesaro, Fabriano and Fermo, we notice that there is a 40 percent point difference in performances between the better performing one (“Industrial Engineering and Production Management” - Pesaro) and the latter (Engineering and Production Logistics-Fermo). Both courses are very similar in carrying out their teaching activities in the areas of management and industrial engineering, whereas the economic bases of the local systems in which they are inserted are very different. The same applies for the two almost identical courses of “Employment Advisor” in Jesi and in Pesaro, with a 25 point difference in performance (always bearing in mind the knowledge impact on the local system as defined above, i.e. the tree conditions together).

The case of Pesaro refers to a typology of transitions in which an existing local production system is declining, but some of its core competencies are redeployed and the university provides the support for the emergence of a new related industry. The development of machinery for woodworking within the furniture industrial districts of Pesaro once acquired from (or outsourced to) German firms was also possible thanks to the right decision of the university management to define a study program which in the next few years would have produced the right graduates and skills to facilitate this transformation. This explains the good performance of the courses on engineering and management of Pesaro (“Industrial Engineering and Production Management in Pesaro.. Although a transition towards the new local specialization had already started, such a decision was not to be taken for granted. In fact at the time of the creation of the new DUB the local demand expressed by the entrepreneur was entirely concentrated in the old production models.

Here the studies on *skill-relatedness* (Nefke and Henning, 2009; Maliranta and Nikulainen, 2008; Ingram, and Neumann, 2006) provides a tool to introduce *evolutionary complementarities* between the skills supplied by the local university and those that will be needed by the evolution of the industry. These kinds of evolutionary complementarities (as opposed to the usually considered static matchings between the local demand and supply of graduates) should be the criteria on which local universities should pay attention to when designing their teaching programs.

A similar evaluation process was carried out for the creation of the comparable courses in Fermo. However, the shoe-making industrial district there was not evolving through a diversification process into skill-related productions. In that case a transition towards the production of machineries was not possible (Seri, 2004), and this explains the relatively low performance of the new local university which was designed in the perspective of a local diversification of the typology analyzed here. In fact that was more the case of an upgrading process of one of the larger Italian shoe industrial districts. Important roles may also exist for specialization other than science and engineering disciplines. In our analysis the study program on cultural heritage (“Beni culturali”) in Fermo shows a local knowledge impact in terms of locally coherently absorbed graduates, almost in line with the engineering and science courses. Moreover the overall employability of the graduates in this course is quite high and in line with the engineering and scientific courses.

Generally speaking, today, more than ever, products determine their own market presence through the meanings that they assume and the symbolic value that they exude (Dellera, 2010). For this reason, an increasing number of companies are relying on creatives, artists and experts in humanities in order to enrich brands and products with new cultural values and messages. The cultural aspects of products and brands are so relevant that lately several companies and organizations have aimed at linking art and business in an attempt to improve both society and corporate performance (Holt, 2004; Gilmore and Pine, 2007).

The example of the even higher local marketability of the course in Employment Advisor course in Jesi should be compared to the low general employability of graduates in this course. In this case the local university was too focused on the local needs. However for law faculties in general it is an even more difficult challenge to balance the need to meet regional requirements with the need to encourage the national and global mobility and competitiveness of staff and students and to position the institution in the global market.

This evidence confirms the hypothesis that the management of the university branches' diffusion in the territory cannot follow a standardized procedure (one fits all), but should be replaced by a stronger awareness of the pathways of the local industries in which universities are inserted. Only through this awareness can new universities fulfill the need and help to overcome the obstacles that are associated with those pathways. In this sense, the differences in performance between identical courses outlined above, depend on the different effort that each management has made to align the local university's contributions with what is actually happening in the local economy¹⁷.

5. Conclusion

This work analyzed the knowledge impact of the geographical diffusion of the new university which occurred in Italy after the reform of the '90s. Given that many of the new universities focus their activity only on teaching, both the theoretical and empirical analyses were devoted to assessing the mainly neglected role of high education for local development.

After a brief theoretical survey, the empirical analyses show that beyond a certain level, stretching the diffusion of universities in the territory does not proportionally raise the production of graduates. As far as concern the 'local knowledge impact' (as defined above) of the different faculties is concerned, we find diverging results. The predominance of engineering courses in this sense is clear, and the simultaneous existence of complementary characteristics are confirmed as significant predictors of a coherent and local utilization of human capital. However, we notice how the creation of almost identical university courses in different local systems produced very different results in terms of the 'local knowledge impact' (as defined above). This suggests that the design, implementation and management of the new university courses should be based on a stronger awareness and consideration of the evolutionary path of the local systems in which they are inserted. Universities need a stronger awareness of the pathways along which local industries are developing and the innovation processes that are

¹⁷ The coincidence of the better performances with a major analytic and strategic involvement of the local universities' managerial level is confirmed in the interviews made during the research project and summed up in Animalì and Seri (2009)

associated with those pathways. They should seek to align their own contributions with what is actually happening in the local economy, thus pursuing a strategic approach to local economic development.

Taken together, the cases strongly suggest that the skills, resources and institutional capabilities associated with each type of local development are different, and that each transition is associated with a distinct pattern of organizational or technology take-up and application. The roles of local universities also appeared to vary considerably depending on which kind of transition was occurring. An initial distinction of some typologies of local industrial transformation in act according with the role and modalities of local graduates' utilization has been drawn. Further studies are needed in order to validate and better specify the role of local graduates in different local restructuring processes.

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