



BANCA D'ITALIA  
EUROSISTEMA

# Temi di discussione

(Working papers)

Immigrant earnings in the Italian labour market

by Antonio Accetturo and Luigi Infante

December 2008

Number

695

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# IMMIGRANT EARNINGS IN THE ITALIAN LABOUR MARKET

by Antonio Accetturo\* and Luigi Infante♦

## Abstract

The aim of this paper is to assess the relationship between individual skills and labour market performance of immigrants residing in Lombardy during the period 2001-2005. We use a recent dataset collected by the NGO ISMU, which includes information on individual characteristics and the legal status of each immigrant. Our results show that returns on schooling are positive and range from 0.8 per cent to 0.9 per cent, a figure that is much lower than the one estimated for native Italians. This result is robust to a number of specifications and tests. In particular, it is not influenced by the legal status of the alien or by a possible self-selection in the labour supply. Moreover, although more talented immigrants tend to self-select in the Lombardy region compared with the other Italian regions, their return on schooling remains low compared with natives. We also show that a certain heterogeneity exists across educational levels and countries of origin: immigrants from Eastern Europe are better able to exploit their human capital, especially when they hold a university degree, while the school-wage profile of Latin Americans and Asians is basically flat. Finally, there is some evidence of a cohort effect in migration, but this tends to impact on the return on experience rather than on the return on schooling.

**JEL Classification:** J31, O15.

**Keywords:** immigration, return on schooling, return on experience.

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## 1. Introduction<sup>1</sup>

Immigration is a relatively new phenomenon in Italy. In the 1991 census, the share of legal immigrants in the Italian population was still only 0.5 per cent, whereas at the beginning of 2006 it had risen to 4.7 per cent (2.7 million individuals). The foreign population grew steadily in the 1990s and in the first half of the 2000s. The average yearly growth rate of the legal immigrant population was 17 per cent in the period 1991-2001 and 20 per cent in 2002-2005 (ISMU, 2007).<sup>2</sup> As Borjas (1994) points out, unexpected large inflows of immigrants from less developed countries usually draw the attention of scholars and policy makers to three major questions: what is the immigrant's performance in the host country? What is the impact of massive immigration on the employment opportunities of natives? What is an optimal immigration policy for the host country?

The aim of this paper is to deal with the first question.<sup>3</sup> In particular, we focus on the portability of immigrants' human capital in the host country.<sup>4</sup> we estimate their return on education by assessing the relation between immigrants' schooling levels and their performance on the labour market of Lombardy in the period 2001-2005. We pay particular attention to the legal position of immigrants, to mobility in the host country, and to differentiated returns according to country of origin.

We make use of an entirely new database collected by the non-governmental organization ISMU (Iniziativa e Studi sulla Multiethnicità – *Initiatives and Studies on*

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<sup>1</sup> We wish to thank Prof. G. Blangiardo, of ISMU, for kindly providing the dataset. We are also indebted to Paolo Pinotti for his valuable comments, the participants at the seminar held in the Bank of Italy, two anonymous referees for helping us to improve this version of the paper and Christine Stone for editorial assistance. The views expressed are the authors' own and do not necessarily reflect those of the Bank of Italy. Usual disclaimers apply. E-mail: [antonio.accetturo@bancaditalia.it](mailto:antonio.accetturo@bancaditalia.it), [luigi.infante@bancaditalia.it](mailto:luigi.infante@bancaditalia.it)

<sup>2</sup> High growth rates in the period 2002-2005 are inflated by the registration of illegal immigrants already within the Italian borders, benefiting from the 2002 amnesty (Bossi-Fini Law).

<sup>3</sup> Immigration studies in Italy are still in their infancy. Mocetti and Porello (2008) assess the impact of immigration on natives' labour market and find that massive immigration causes an outflow of less educated natives and an inflow of more skilled ones. To the best of our knowledge, the third question has never been explored for Italian immigration laws.

<sup>4</sup> Another strand of the literature on this topic relates to the wage differences between natives and foreigners (see e.g. Chiswick, 1978; Borjas, 1985). For Italy, Brandolini et al. (2005) deal with this issue using social security system data, which consider only legal workers.

*Multiethnic Society*) from surveys of immigrants from the least developed, emerging and transition countries residing in the region of Lombardy in the North-West of Italy.

Several studies in Italy have assessed the determinants of immigrants' wages. Among the few notable exceptions, Baldacci et al. (1999) use survey data of similar design to the ISMU database (Blangiardo, 1993 and 1996) but for two areas (southern Lazio and northern Campania) with radically different labour market conditions (e.g. high unemployment in the provinces of southern Lazio and relatively high crime rates in the provinces of Campania).

International experience on the topic is much richer. Using data on immigrants in Israel, Friedberg (2000) shows that a key role in explaining the wage gap between earnings of immigrants and earnings of natives is the labour market evaluation of foreigners' human capital. Friedberg illustrates that, once in the new country, immigrants tend to accept any kind of job, even ones in which they cannot fully exploit their human capital and skills. Schaafsma and Sweetman (2001) confirm this view and show that human capital transferability is easier for those who arrived in the host country in their teens, while more mature immigrants usually have a larger wage discount and a lower return on education compared with young immigrants. Evidence for a lower return on education for immigrants is also found in Sweden by le Grand and Szulkin (2002) and in Canada by Ferrer and Riddell (2008). Using information on immigrants from the former USSR still in Israel, Eckstein and Weiss (2004) also found no return for imported human capital (measured by schooling and experience), while these skills receive a larger return the longer the time spent in Israel.

Our results are consistent with the international evidence. Immigrants' return on education in the Lombardy labour market is positive, but much lower than for Italian natives. This result is robust to a number of specifications. For example, it does not seem to depend on the kind of self-selection from the source country or on the selection of the local labour market where the immigrant decides to locate. Illegal immigrants are less able to exploit their skills on the labour market, their return on education is lower than that of legal aliens. Immigrants from Eastern Europe are more likely to exploit their human capital stock better, especially if they have a university degree. Finally, we find some evidence of a cohort effect in migration, showing the existence of systematic differences in earnings for different waves of immigrants.

The rest of the paper is organized as follows. The next section presents the dataset. Section 3 introduces the methodology used in our estimates. Section 4 reports the results of the baseline regression. Section 5 presents a number of robustness exercises. Section 6 concludes.

## 2. Data description

### 2.1 Survey design

Since 2001, the ISMU has conducted a yearly survey across immigrants living in Lombardy. The individuals surveyed (slightly more than 8,000 each year) are chosen according to a multi-stage design. In the first stage, the ISMU interviewers allocate the total number of questionnaires across the 11 provinces of Lombardy to obtain roughly the same sample variability within each province. In the second stage, the ISMU selects a number of representative municipalities (slightly less than 350, almost 25 per cent of all the towns in Lombardy) within each province according to the social and economic characteristics of each area. In the third stage, the ISMU selects, within each municipality, the potential interviewees using the *method of aggregation centres* (suggested by Blangiardo, 1993).

According to this technique, whenever a large proportion of immigrants is irregular, the total number of foreign individuals living in a country cannot be accurately computed. Nevertheless, every immigrant, including illegal aliens, has a social life: they go to work, spend free time in leisure facilities, attend religious centres and use healthcare services. Blangiardo's method hinges on these centres as the only means of finding the immigrants (especially illegal ones) within a country. In practice, the ISMU first chooses the aggregation centres and then, within each centre, randomly selects the immigrants to survey. For the  $i$ -th immigrant, the probability of being surveyed is equal to  $\frac{1}{\sum_{i=1}^N u_{i,j}}$ , where  $N$  is the unknown

all-in number of immigrants living in the area and  $u$  represents a binary variable equal to 1 if the  $i$ -th individual attends the  $j$ -th centre.<sup>5</sup>

Every individual attending the centre has the same probability of being sampled as the interviewer and the interviewee meet randomly. A problem of overrepresentation of individuals who attend a large number of aggregation centres may occur. In order to tackle this bias, the ISMU provides a system of sample weights, which are discussed at length in Blangiardo (1993).

## 2.2 *How many irregulars can the ISMU survey?*

In each questionnaire, the ISMU asks for the immigrant's legal status. Obviously, this information is subject to misreporting; although ISMU interviewers collaborate with the directors of aggregation centres and are usually trusted by most of the immigrants, we cannot exclude that some of the undocumented immigrants may decide not to reveal their true legal status. In order to quantify the extent of misreporting, we compare the ISMU's estimates with other data sources. The most recent alternative dataset is based on applications for regularization under the Bossi-Fini amnesty of 2002. In that year, 144,369 individuals applied in Lombardy (647,000 in the whole of Italy): this indicates that at least the 31 per cent<sup>6</sup> of the total foreign population in Lombardy was irregular in 2002. Although some misreporting does seem to occur, the ISMU's estimates for the pre-amnesty years do not appear to be far off this figure: in the 2002 wave, self-declared illegal aliens represented 27 per cent of the sample, as percentage that decreased rapidly in the following years as a result of the regularization process. Pooling all cross-sections in the period 2001-2005, self-declared irregulars average around 17 per cent.

## 2.3 *Data description*

The ISMU survey is divided into sections containing general information on the immigrant and his or her family (gender, age, country of origin, legal status, religion, civil

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<sup>5</sup> See Blangiardo (1993) for details.

<sup>6</sup> Obviously, we cannot exclude that a number of illegal aliens did not apply.

status, type of job); other sections investigate the immigrant's social life, access to public services and so on. Summary statistics of all the variables used in the regressions are displayed in Table 1. As the Table shows, immigrants in Lombardy are on average fairly young (33.9 years old) and have resided in Italy for a relatively short period (6 years). Most of the immigrants come from Africa (38 per cent) and are Muslims (42 per cent). Women represent 42 per cent of all immigrants. A fairly large share of aliens lived in another Italian region before moving to Lombardy (39 per cent), indicating that internal mobility is quite high.

### 3. Estimation issues

ISMU data are used to estimate the following basic wage equation by OLS:

$$(1) \quad \ln w_i = \alpha + \theta * S_i + \beta_1 * \exp_i + \beta_2 * \exp_i^2 + \beta_3 * oexp_i + \beta_4 * oexp_i^2 + \beta_5 * X_i + D_{origin_i} + D_{province_i} + D_{year_i} + u_i$$

where  $w_i$  is the net monthly wage,  $S_i$  is the years of schooling<sup>7</sup> of individual  $i$ ,  $\exp_i$  is the potential experience acquired in the Italian labour market,  $oexp_i$  is a measure for potential experience in the country of origin,  $X_i$  is a matrix containing a number of individual controls, while  $D_{origin_i}$ ,  $D_{province_i}$  and  $D_{year_i}$  are, respectively, dummies for the area of origin,<sup>8</sup> province in which the immigrant resides (spatial control), and year in which the individual was surveyed.<sup>9</sup>

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<sup>7</sup> As usual in this literature, we assigned zero years of schooling when the individual does not have any formal education, 8 years for a compulsory school leaving certificate, 13 years for high school and 17 for at least a university degree. Obviously, this may not reflect the actual years in education, given the wide differences between educational systems. We checked this hypothesis by estimating our equation for the educational level actually recognized by the Italian authorities (a question included in 3 surveys out of 5). Results, in this case, do not change and we preferred to use all data instead of restricting our analysis to three surveys.

<sup>8</sup> We grouped immigrant's country of origin into four areas: Eastern Europe, Asia, Africa, Latin America.

<sup>9</sup> It is well-known in the literature that OLS estimates may be biased due to the possible correlation of the (unobserved) innate abilities with the number of years spent in education. A way to deal with this issue (see Card, 2001, for an exhaustive review) is to instrument the schooling variable. In this paper, we used classical OLS estimations for two reasons. First, we are not actually interested in disentangling the education effect from the innate abilities. The aim of this paper is to assess whether immigrants with different skills can receive different market evaluations for their abilities in the labour market in Lombardy. Second, the ISMU dataset



The variable of potential experience,  $exp_i$ , is proxied by the number of years spent in Italy so far, which seems reasonable since the unemployment level among immigrants is fairly low.

To take into account experience acquired in the country of origin, we use the variable  $oexp_i$ , built by subtracting from the immigrant's age the years spent in Italy, the years spent in education, and 6 (the first 6 years of life). Along with education, this variable captures the *portability* of immigrants' human capital into the destination country (Friedberg, 2000). A significant and positive coefficient would reveal a certain degree of compatibility between previous experience abroad and the skill requirements of the host country's labour market. Individual characteristics include gender, a dummy for married people, and the sector of occupation.

Estimating equation (1) for immigrants may lead to six additional problems:

- Self-selection from the source country;
- Self-selection in the labour market participation;
- Selection of the host region;
- Legal status of the immigrants;
- Cohort quality;
- Non-linearities across ethnic/skill groups.

The first source of bias relates to the self-selection of immigrants from the source country. Immigrants usually do not represent a random sample of the population of origin. Immigration choice<sup>10</sup> may depend on the expected relative payoffs between the immigrant's economic conditions in the source country and expectations of welfare in Italy. This idea was formalized in a theoretical model by Roy (1951) for labour market choices and applied to migration studies by Borjas (1987). According to the model, whenever relative returns on

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does not include information on parental background (or IQ tests) which is known to be a good instrument for schooling.

<sup>10</sup> Obviously, we focus on economically driven migration choices and we disregard all social or political motivations.

skills are lower in the source country, immigrants are likely to self-select from the right tail of the skill distribution (positive selection). By contrast, whenever relative payoffs are higher in the country of origin, immigrants self-select from the left tail of the skill distribution (negative selection). This may impact on our estimates of the returns on schooling. A possible way to circumvent this problem is to treat it as an omitted heterogeneity bias by inserting dummies for areas of origin of the immigrants.<sup>11</sup>

The second source of bias relates to endogenous participation in the labour market. Compared with the estimates for natives, this problem actually diminishes for the immigrant population, which usually has a lower reservation wage and tends to be more flexible about accepting any type of job.<sup>12</sup> Some differences emerge when we evaluate the impact on the employment rate by gender and ethnic group: the average employment rate for women was 61 per cent in 2005 (80 per cent for men), while the employment rate for African women was even lower (52 per cent). This implies that a number of institutional and cultural factors might influence labour market participation (especially of women), and this could, in turn, bias our estimates. We tackle this problem by treating the participation decision as endogenous and by estimating a two-stage Heckman model.

The third source of bias is connected with the choice of the region of Lombardy within the host country. Lombardy is the most economically developed region in Italy and it attracts almost one fifth of all immigrants in Italy (Lombardy's share of the population is 16 per cent). Talented immigrants might self-select and locate in more dynamic contexts within the country and within the region in order to exploit better their high (unobserved) ability. This is not an issue specifically affecting immigrants, since there exists an extensive literature on "human capital externalities" which deals with internal migrations and productivity effects of agglomeration (spatial sorting problem; for a survey, see Moretti, 2004). However, the

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<sup>11</sup> Borjas (1987) proposes the use of a measure of return to skills of the source countries, since positive (negative) self-selection is often associated with a lower (higher) return to skills in the country of origin. Unfortunately, statistics on return to skills are not particularly reliable, especially for developing countries. Borjas proposes the use of the Gini index of households' income distribution, which has been widely criticized in the literature. Hendricks (2002) argues that in most empirical papers, aiming to measure emigrant self-selection, unobserved ability plays a much smaller role than measured ability, such as human capital, and this would emerge using different approaches, such as comparing individual workers across borders or earnings of return migrants with earnings of those who never migrated.

<sup>12</sup> The employment rate for immigrants in 2005 was 73 per cent (65 per cent for natives in Lombardy).

issue is particularly important for immigrants, given their high mobility within the host country. This problem does not have a simple solution. We should observe (within the same survey) individuals in different regions and all migration patterns for all individuals to assess the existence of spatial sorting. The solution we adopt in this paper is constrained by data availability and it is based upon the immigrant's migration paths within the country. In our dataset, we are able to distinguish between those who actually chose Lombardy among all the Italian regions ("movers", those who migrated within Italy) and those (residing in Lombardy) who never migrated within the host country ("stayers"). We assume that, while "movers" are likely to choose Lombardy on the basis of a strong economic incentive (they actually self-select in a particular region), "stayers" might choose Lombardy also for non-economic motives.<sup>13</sup> In any case, the impact of this phenomenon on estimates of the return on education is ambiguous. On the one hand, movers' returns on education should be higher than those of stayers because movers are likely to self-select in the area in which their skills receive a higher return. On the other hand, immigrants' networks might help the stayer find a better job match, thus increasing her/his return on education. In both cases, internal movers might bias our estimates of the return on education and, therefore, we correct this problem by interacting all the variables with a dummy assuming the value one if the individual is a "mover".

An additional source of bias relates to the immigrants' legal status in the host country. Illegal aliens usually suffer a wage discount compared with legal immigrants, which may be due either to the lower market price of their human capital (probably owing to discrimination in the labour market) or to a possible negative self-selection in the migration process. This, in turn, may affect the estimates of the return on education by reducing it for legal immigrants. The only possible way to cope with this bias is to make use of the self-reported legal status information of the ISMU survey, which, as we saw in the previous section, suffer slight misreporting. We interact all the explanatory variables with a dummy variable equal to one when the immigrant is self-declared illegal.

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<sup>13</sup> There is an extensive literature (Card and DiNardo, 2000; Saiz, 2007) showing that immigrants usually enter their host country in regions where there are strong family/ethnic connections.

Systematic differences in the labour market performance of different migration waves (i.e. cohort effect) may be another source of bias. There are a number of explanations for the existence of a cohort effect. For example, we can observe a “secular decline” in the quality of immigrants due to a change in the source countries. Alternatively, wage level differences among immigrant workers in different cohorts may basically reflect exogenous fluctuations in labour demand.<sup>14</sup> Even fluctuations in the skill composition of labour demand are likely to change the return on education of different cohorts.<sup>15</sup> In order to address this issue, we re-estimate our baseline regression by augmenting it with cohort dummies and by interacting these dummies with years of schooling (the same approach is used in Bockmann and Steiner, 2006) and with the host country potential experience variable. The cohort dummies are 5-year interval dummies covering the period 1986-2005, plus a dummy grouping all (the few) immigrants that arrived in Italy before 1986.

The last source of bias is linked to non-linearities in the return on education and experience. We adopt a spline regression approach by estimating the return on education for each education level and the return on experience for each quartile of the distribution of potential experience in Italy.<sup>16</sup> In order to detect the existence of non-linear effects across ethnic groups, we also estimate step-wise returns on education according to each sending area. In this way, we are able to assess which ethnic group and which educational group actually is able to better exploit its human capital stock.

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<sup>14</sup> International evidence on the existence of a cohort effect for immigrants is mixed. For example, a relatively strong labour demand in a certain period may be beneficial for the immigrants of that cohort, raising their wage.

<sup>15</sup> For the United States, Borjas (1985) concludes that the steeper age-earning profile of immigrants compared with the native population is due to a systematic decline in the quality of successive immigrant cohorts, rather than to an increase in the relative earnings since arrival. Differently, Friedberg (2000) concludes that immigration in Israel does not seem to be affected by a cohort quality problem.

<sup>16</sup> We split the variable of potential experience in Italy into four groups: less than 3 years, between 4 and 5 years, between 6 and 9 years, and more than 9 years.

## 4. Estimation results

### 4.1 *Baseline regression*

Table 2 shows the baseline regressions. Compared with column [1], columns [2] and [3] add, respectively, the occupational sector and the legal status of the immigrants. The return on education is found to be positive and it shows that any additional year of education increases the workers' wage by 0.7-0.8 per cent. Compared with similar studies, immigrants' return on education in Lombardy is slightly higher than abroad (see, e.g., Eckstein and Weiss, 2004, for Israel, in which it is negative, or Friedberg, 2000, in which it is nil), but definitely lower than the return on education of natives. For example, Brunello et al. (2001), de Blasio and Di Addario (2005), Ciccone et al. (2004) and Dalmazzo and de Blasio (2006) found that the return on schooling for Italians ranges from 4.7 to 6.1 per cent, depending on the specification. Moreover, Ciccone et al. (2004) found that the return on education in the North-West of the country (where Lombardy is located) is even higher (6.6 per cent). These results are not surprising. Low returns may be due to the (perceived) low quality of foreign schools, imperfect transferability of knowledge or imperfect command of the Italian language. Experience in the Italian labour market increases the immigrants' wage by 3.6-4.9 per cent per year, a bit more than the estimates for natives (2.3-3.4 per cent) in the papers cited. Again, this is not surprising. Once an immigrant succeeds in learning the local language and in understanding the crucial features of the Italian labour market, his/her marginal productivity and wage increase sharply. The return on experience in the country of origin is quite low, 0.8 per cent, signalling scarce compatibility with domestic labour market requirements.

Being female lowers monthly earnings by 26-28 per cent. Sectoral dummies do not change the parameter estimates by much and dummies on the legal status are all significant and with the expected sign. Irregular workers are paid 20 per cent less than other

immigrants<sup>17</sup> for similar individual characteristics, while a permanent visa or Italian citizenship<sup>18</sup> creates a wage premium over other immigrants.

Area-of-origin dummies (not reported) are all significant. Compared with Latin Americans, Europeans are likely to earn more (2.7 per cent), while Africans and Asians are generally paid less (-3.7 per cent and -1.8 per cent, respectively).

#### 4.2 *Differentiated effects across areas of origin*

The estimate of the return on education for immigrants may hide a great variability across areas of origin due to large differences between nations in the quality of education. To take account of this, we amend equation (1) allowing the slope related to education to vary across areas. As shown in Table 3 (col. [1]), there exists some heterogeneity across areas of origin. The return on education is higher for people from Eastern Europe (1.0 per cent), while it is 0.3 percentage points lower for Asians, Africans and Latin Americans.

In the second column of Table 3 we allow the variable for experience (both in Italy and abroad) to vary across ethnic groups. The results show that catching up through experience in Italy is greater for Asians and Africans (4.1 per cent) while it is slightly lower for Eastern Europeans and Latin Americans. Instead, portability of past experience (experience abroad) is somewhat greater for people from Eastern Europe (0.8 per cent) and Africa (0.9 per cent), but less on average for the other ethnic groups.

### 5. **Robustness**

So far we have obtained quite a clear result: immigrants' returns on education are positive, but lower than those of natives. Although this result has some variability across sending areas, none of the ethnic groups seems to receive a return on education comparable to that of Italians. In this section, we assess the robustness of this result by taking into

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<sup>17</sup> The benchmark group is represented by immigrants awarded a temporary visa, which is a document valid for a specific period of time (according to the type of employment, i.e. seasonal or permanent); it can be renewed before the expiry date.

<sup>18</sup> The information on citizenship is available only in a limited number of surveys (namely those for 2003, 2004 and 2005).

account five potential sources of bias: (i) selection of the host region within Italy (spatial sorting), (ii) self-selection in labour market participation, (iii) legal status of the immigrants, (iv) cohort quality effect and (v) non-linear effects across ethnic/skill groups.

### 5.1 *Spatial sorting*

The question whether talented individuals tend to concentrate in the most dynamic economic context is frequently examined in regional studies. This issue, is of particular interest for immigrants, given their high mobility within the host country (39 per cent of the immigrants in our sample lived in another region before arriving in Lombardy). As we have seen in Section 3, this may bias our estimates of the return on education, although the sign cannot be predicted in advance.

By interacting all explanatory variables with the dummy “mover” (Table 4), we find that spatial sorting takes place across immigrants: the return on education for “movers” reaches 1.0 per cent, while for “stayers” it averages around (0.6 per cent). A possible explanation is that “movers” migrate within the host country in order to find a place where they receive a higher return on their private human capital. It should be noted, anyway, that the return for movers is still considerably lower than the estimates for natives. Moreover, internal migration comes to a cost, since “movers” lose in terms of the return on experience in the Italian labour market, probably due to the lack of familiarity with the new local labour market.

### 5.2 *Labour market participation*

We further test the hypothesis of a possible endogeneity bias in labour market participation by using a two-stage Heckman model. The dependent variable for the first-stage probit is a dummy indicating one if the immigrant is working at the survey time; right-hand-side variables include a mix of personal and ethnic characteristics. As Table 5 shows, schooling and potential experience have a positive impact on the probability of being employed; being female or Muslim have, instead, a negative influence. By including the

inverse mills ratio<sup>19</sup> (Table 6) in the baseline regression we find that, although a process of self-selection is at work in labour market participation (the inverse mills ratio is significant), our variables of interest do not seem to be much affected: the return on schooling still ranges between 0.8 and 0.9 per cent and the return on potential experience in Italy varies between 3.8 and 5.5 per cent. The wage loss for women, instead, widens (around 28-34 per cent), showing that cultural characteristics tend to have a large impact, especially on female labour supply and wages.

### 5.3 *Legal status*

So far, we have treated regulars and irregulars as an homogeneous group, thus assuming that the labour market evaluation of individual skills is the same for both groups. This may lead to an attenuation bias of the return on education of the regulars, whenever illegal aliens do not succeed in obtaining a higher market price for their human capital due to discrimination or segregation.

In order to assess these hypotheses, in Table 7, we interact each regressor in the basic specification with a dummy variable for the irregulars. Results do not reject the hypothesis of a lower return on schooling for irregulars (although at 10 per cent significance) but it does not succeed in significantly raising the return for regulars: while legal aliens earn 0.8 per cent more for each year spent in education, illegal aliens earn only 0.4 per cent.<sup>20</sup>

Quite interestingly, the male-female wage gap mostly counterbalances in the irregular group. The experience gain is faster for irregulars, probably due to the fact that they start with an extremely low entry wage. Additional econometric results<sup>21</sup> (not reported) indicate that the experience gain is faster for the first three years in Italy, while irregulars' return does not significantly differ from that of regulars in the subsequent period.

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<sup>19</sup> The inverse mills ratio is calculated by the ratio between the standard normal density and the cumulative standard normal distribution, both calculated at the fitted values of the first-stage regression.

<sup>20</sup> Obviously, this result may suffer from an attenuation bias due to misreporting by illegal aliens (see Section 2).

<sup>21</sup> We split the variable of potential experience in Italy into four groups: less than 3 years, between 4 and 5 years, between 6 and 9 years, and more than 9 years.



#### 5.4 *Cohort effect*

As explained in Section 3, differences in quality in the cohorts of immigrants may bias both the rate of assimilation (return on years since migration) and the return on human capital.

To address this issue we re-estimate our equation augmenting it with cohort dummies (the omitted cohort is the most recent) and interacting these dummies with years of schooling and with the variable “years in Italy”.

Our results do not reject the hypothesis of the existence of a cohort effect for immigrants in Italy. This effect impacts on the immigrants’ experience in the Italian labour market, but we found no evidence of a differentiated return on schooling for different cohorts. In the first column of Table 8 we report the results of the basic equation in which the coefficient of education is allowed to vary across cohorts (the regression also contains the arrival-cohort dummies). An F-test of joint significance of the coefficient does not reject the null hypothesis of equality among the school-cohorts coefficients, thus implying that the return on schooling does not change for different migration waves. In the second column, the estimates contain the interaction between the variable “experience in the Italian labour market” with the cohort dummies; in this case the F-test rejects the null hypothesis of equality, revealing that a cohort-quality issue is at work. In particular, catching up through experience seems to be stronger for more recent cohorts (6.3 per cent for those between 2001 and 2005; 3.1 per cent for the 1996-2000 cohort), while it is basically flat for those who arrived in Italy before 1995. This phenomenon may be explained by the fact that wages for earlier cohorts are higher (fixed effects for earlier cohorts are positive and significant compared with our reference group) and therefore they display a relatively smaller dynamic compared with the more recent arrivals. Specification [3], in which schooling and experience are allowed to vary across cohorts, confirm previous estimates.

#### 5.5 *Non-linear effects*

Finally, we test whether returns on education and on experience vary in a non-linear way by estimating a spline regression. Following Friedberg (2000), we divide the years of education into three classes: compulsory school (8 years), secondary school (13 years),

university (17 years). We also divide the potential experience according to the distribution of the quartile of years in Italy. The returns on education and experience are then estimated as a piece-wise linear function. The estimates are reported in Table 9, column [1]. We find evidence of non-linear effects in the return on education and experience. The return on education for a graduate is almost double that of people completing secondary school. The return on experience is particularly large for recent immigrants (11.2 per cent for those who have lived in Italy for less than 3 years), while it tends to converge on lower values for those who have lived in Italy for a longer period (more than 9 years, 4.5 per cent). Column [2] reports the estimates of the return on education across different ethnic groups for each educational level. Once again, Eastern Europeans receive a higher return on education, while Latin Americans receive no return. Returns are particularly high for graduates from Eastern Europe (1.0 per cent), Asians and Africans receive similar returns across educational levels, while only Latin Americans with a university degree seem to receive a statistically significant positive return (although lower than the one estimated for other sending areas).

## **6. Conclusions**

The aim of this paper is to assess the relation between individual skills and labour market performance using a recent dataset collected by the ISMU, which includes information on individual characteristics and the legal status of each immigrant over the period 2001-2005.

Our results show that the return on schooling is positive and it ranges between 0.8 per cent and 0.9 per cent, a figure that is much lower than the one estimated for Italian natives. This result is robust to a number of specifications and tests. In particular, it is not influenced by the legal status of the alien or by a possible self-selection in the labour supply. Moreover, although Lombardy seems to attract more talented immigrants within Italy, their return on schooling remains low compared with natives. We also show the existence of a certain heterogeneity across educational levels and countries of origin. In particular, immigrants from Eastern Europe are better able to exploit their human capital stock, especially when they hold a university degree. Conversely, the school-wage profile of Latin Americans and Asians is basically flat. Finally, there is some evidence of a cohort effect in migration, but this tends to impact on the return on experience rather than on the return on schooling.

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Table 1

**SUMMARY STATISTICS OF THE MAIN VARIABLES**

	No. obs.	Sample mean	Std. Dev.
Log(wage)	26,266	6.89	0.47
School	36,771	10.46	4.53
Years in Italy	37,163	6.03	4.74
Female	37,286	0.42	0.49
Age	37,089	33.89	8.37
Irregular	37,286	0.17	0.37
Permanent visa	37,286	0.12	0.32
Italian citizenship	22,315	0.03	0.18
Europeans	37,286	0.24	0.43
Africans	37,286	0.38	0.49
Latinos	37,286	0.16	0.36
Asians	37,286	0.21	0.41
Muslims	37,286	0.42	0.49
Catholics	37,286	0.30	0.46
Other Christians	37,286	0.15	0.35
Buddhists	37,286	0.03	0.18
Hindu	37,286	0.02	0.12
Other religions	37,286	0.02	0.15
Not religious	37,286	0.07	0.25
Manufacturing blue collars	26,266	0.09	0.28
Construction blue collars	26,266	0.08	0.27
Agriculture blue collars	26,266	0.07	0.26
Specialized blue collars	26,266	0.04	0.19
Clerks	26,266	0.04	0.19
Artisans	26,266	0.08	0.28
Professionals	26,266	0.03	0.18
Tertiary and other sectors	26,266	0.37	0.48
Movers	37,286	0.39	0.49

Table 2

## BASIC REGRESSION

	[1]	[2]	[3]
School	0.008*** (0.001)	0.008*** (0.001)	0.007*** (0.001)
Years in Italy	0.049*** (0.003)	0.049*** (0.003)	0.036*** (0.003)
(Years in Italy) <sup>2</sup> (x100)	-0.131*** (0.014)	-0.131*** (0.014)	-0.085*** (0.018)
Experience abroad	0.008*** (0.001)	0.008*** (0.001)	0.008*** (0.001)
(Experience abroad) <sup>2</sup> (x100)	-0.020*** (0.004)	-0.020*** (0.004)	-0.020*** (0.004)
Female	-0.283*** (0.007)	-0.261*** (0.007)	-0.269*** (0.010)
Married	0.018*** (0.006)	0.016** (0.006)	0.007 (0.008)
Manufacturing blue collars		0.016* (0.009)	0.012 (0.010)
Construction blue collars		0.112*** (0.010)	0.123*** (0.011)
Agriculture blue collars		-0.017* (0.009)	-0.007 (0.016)
Specialized blue collars		0.125*** (0.010)	0.115*** (0.011)
Clerks		0.086*** (0.014)	0.053** (0.024)
Artisans		0.031*** (0.010)	0.077*** (0.016)
Professionals		0.073*** (0.022)	0.140*** (0.027)
Irregular			-0.205*** (0.016)
Italian citizenship			0.081*** (0.022)
Permanent visa			0.061*** (0.012)
Intercept	7.084*** (0.021)	7.066*** (0.021)	6.549*** (0.026)
R <sup>2</sup> adj.	0.38	0.39	0.27
No. Obs.	25,849	25,849	16,025 <sup>1</sup>

The left-hand side variable is the log of net monthly wages. White-robust standard errors are in brackets. Stars show significance levels, \*\*\* up to 1 per cent, \*\* between 1 per cent and 5 per cent, \* between 5 per cent and 10 per cent. Every regression is weighted according to the sample design. (1) This regression is run over the period 2003-2005, for which we are able to distinguish regular immigrants awarded citizenship, permanent visa, and temporary visa.

Table 3

**EDUCATION AND EXPERIENCE BY COUNTRY OF ORIGIN**

	[1]	[2]
School * Eastern Europe	0.010*** (0.002)	0.009*** (0.002)
School * Asia	0.007*** (0.002)	0.005*** (0.002)
School * Africa	0.007*** (0.001)	0.008*** (0.001)
School * Latin America	0.007*** (0.003)	0.006*** (0.002)
Years in Italy * Eastern Europe		0.035*** (0.003)
Years in Italy * Asia		0.041*** (0.003)
Years in Italy * Africa		0.041*** (0.003)
Years in Italy * Latin America		0.032*** (0.003)
Exper. abroad * Eastern Europe		0.008*** (0.001)
Exper. abroad * Asia		0.007*** (0.001)
Exper. abroad * Africa		0.009*** (0.002)
Exper. abroad * Latin America		0.008*** (0.001)
Sector dummies	Yes	Yes
R <sup>2</sup> adj.	0.39	0.40
No. Obs.	25,849	25,849

The left-hand side variable is the log of net monthly wages. White-robust standard errors are in brackets. Stars show significance levels, \*\*\* up to 1 per cent, \*\* between 1 per cent and 5 per cent, \* between 5 per cent and 10 per cent. The regressions also include the variables (Years in Italy)<sup>2</sup>, (Experience abroad)<sup>2</sup>, Female, Married, Irregular. Every regression is weighted according to the sample design.

Table 4

## SPATIAL SORTING

	Stayers	Movers
	[1]	[2]
School	0.006*** (0.001)	0.004*** (0.002)
Years in Italy	0.046*** (0.003)	-0.022*** (0.005)
(Years in Italy) <sup>2</sup> (x100)	-0.123*** (0.016)	0.091*** (0.025)
Experience abroad	0.009*** (0.002)	0.000 (0.002)
(Experience abroad) <sup>2</sup> (x100)	-0.022*** (0.005)	0.001 (0.007)
Female	-0.259*** (0.010)	-0.006 (0.015)
Married	-0.021** (0.010)	0.058*** (0.013)
Irregular	-0.156*** (0.014)	0.012 (0.025)
Mover	0.038 (0.038)	
Intercept		7.127*** (0.029)
Origin country*Mover		Yes
Sector dummies		Yes
R <sup>2</sup> adj.		0.40
No. Obs.		25,849

The left-hand side variable is the log of net monthly wages. White-robust standard errors are in brackets. Stars show significance levels, \*\*\* up to 1 per cent, \*\* between 1 per cent and 5 per cent, \* between 5 per cent and 10 per cent. Every regression is weighted according to the sample design.



Table 5

**ROBUSTNESS CHECK: FIRST STAGE**

	First-stage probit
Age	-0.004*** (0.001)
School	0.011*** (0.002)
Years in Italy	0.038*** (0.002)
Female	-0.667*** (0.016)
Europe	0.186*** (0.025)
America	0.185*** (0.029)
Africa	-0.004 (0.022)
Muslims	-0.140*** (0.028)
Catholics	0.032 (0.029)
Other Christians	0.101*** (0.033)
Buddhists	-0.096 (0.049)
Hindu	-0.135*** (0.059)
Intercept	0.751*** (0.051)
Time dummies	Yes
Spatial controls	Provinces
Pseudo R <sup>2</sup>	0.10
No. Obs.	36,516

The left-hand side variable is the worker status. Standard errors are in brackets. Stars show significance levels, \*\*\* up to 1 per cent, \*\* between 1 per cent and 5 per cent, \* between 5 and 10 per cent. Every regression is weighted according to the sample design.

Table 6

**ROBUSTNESS CHECK: SECOND STAGE**

	[1]	[2]	[3]
School	0.009*** (0.001)	0.008*** (0.001)	0.008*** (0.001)
Years in Italy	0.055*** (0.002)	0.053*** (0.002)	0.038*** (0.002)
(Years in Italy) <sup>2</sup> (x100)	-0.146*** (0.008)	-0.144*** (0.007)	-0.092*** (0.010)
Experience abroad	0.007*** (0.001)	0.007*** (0.001)	0.008*** (0.001)
(Experience abroad) <sup>2</sup> (x100)	-0.018*** (0.003)	-0.019*** (0.003)	-0.018*** (0.003)
Female	-0.341*** (0.016)	-0.298*** (0.016)	-0.285*** (0.021)
Married	0.028*** (0.005)	0.027*** (0.005)	0.018 (0.007)
Manufacturing blue collars		0.022*** (0.008)	0.019** (0.009)
Construction blue collars		0.122*** (0.009)	0.137*** (0.010)
Agriculture blue collars		-0.012 (0.009)	0.001 (0.016)
Specialized blue collars		0.124*** (0.012)	0.116*** (0.013)
Clerks		0.093*** (0.013)	0.062*** (0.023)
Artisans		0.031** (0.009)	0.089*** (0.014)
Professionals		0.056*** (0.013)	0.102*** (0.017)
Irregular			-0.219*** (0.011)
Italian citizenship			0.051*** (0.017)
Permanent visa			0.059*** (0.009)
Inverse Mills ratio	0.211*** (0.052)	0.151*** (0.051)	0.100 (0.065)
Intercept	6.957*** (0.029)	6.971*** (0.029)	6.601*** (0.031)
Time dummies	Yes	Yes	Yes
Spatial controls	Provinces	Provinces	Provinces
Origin country	Yes	Yes	Yes
Rho	0.539	0.401	0.271
No. Obs.	25,849	25,849	16,025 <sup>1</sup>

The left-hand side variable is the log of net monthly wages. White-robust standard errors are in brackets. Stars show significance levels, \*\*\* up to 1 per cent, \*\* between 1 and 5 per cent, \* between 5 and 10 per cent. Every regression is weighted according to the sample design. Rho is the correlation between first and second stage residuals.

(1) This regression is run over the period 2003-2005, for which we are able to distinguish regular immigrants awarded citizenship, permanent visa, and temporary visa.

Table 7

**LEGAL STATUS**

	Legal	Irregular
	[1]	[2]
School	0.008*** (0.001)	-0.004* (0.003)
Years in Italy	0.034*** (0.003)	0.042*** (0.009)
(Years in Italy) <sup>2</sup> (x100)	-0.076*** (0.014)	-0.176*** (0.056)
Experience abroad	0.008*** (0.001)	-0.002 (0.004)
(Experience abroad) <sup>2</sup> (x100)	-0.022*** (0.004)	0.002 (0.010)
Female	-0.297*** (0.008)	0.255*** (0.023)
Married	0.019*** (0.006)	-0.153*** (0.047)
Irregular	-0.211*** (0.060)	
Mover		
Intercept	7.158*** (0.022)	
Origin country*Irregular		Yes
Sector dummies		Yes
R <sup>2</sup> adj.	0.40	
No. Obs.	25,849	

The left-hand side variable is the log of net monthly wages. White-robust standard errors are in brackets. Stars show significance levels, \*\*\* up to 1 per cent, \*\* between 1 per cent and 5 per cent, \* between 5 per cent and 10 per cent. Every regression is weighted according to the sample design.

Table 8

## COHORT QUALITY

	[1]	[2]	[3]
School*Cohort6485	0.007 (0.005)		0.007 (0.005)
School*Cohort8690	0.009*** (0.002)		0.009*** (0.002)
School*Cohort9195	0.008*** (0.001)		0.008*** (0.001)
School*Cohort9600	0.008*** (0.001)		0.008*** (0.001)
School*Cohort0105	0.007*** (0.002)		0.007*** (0.002)
Years in Italy	0.034*** (0.004)		
School		0.008*** (0.001)	
Years in Italy *Cohort6485		0.031 (0.036)	0.031 (0.036)
Years in Italy *Cohort8690		0.025 (0.022)	0.025 (0.022)
Years in Italy *Cohort9195		0.018 (0.015)	0.018 (0.015)
Years in Italy *Cohort9600		0.031*** (0.09)	0.031*** (0.09)
Years in Italy *Cohort0105		0.063*** (0.007)	0.063*** (0.007)
Arrival-cohort dummies	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes
Spatial controls	Provinces	Provinces	Provinces
Origin country	Yes	Yes	Yes
Sector dummies	Yes	Yes	Yes
R <sup>2</sup> adj.	0.40	0.40	0.40
No. Obs.	25,849	25,849	25,849

The left-hand side variable is the worker status. Standard errors are in brackets. Stars show significance levels, \*\*\* up to 1 per cent, \*\* between 1 and 5 per cent, \* between 5 and 10 per cent. The regression also includes the variables (Years in Italy)<sup>2</sup>, (Experience abroad)<sup>2</sup>, Female, Married, Irregular. Every regression is weighted according to the sample design. The omitted cohort dummy is the most recent one.

Table 9

**NON-LINEAR EFFECTS:  
RETURN ON SCHOOLING AND ON EXPERIENCE BY LEVEL**

	[1]		[2]
Compulsory school	0.005*** (0.001)	Compulsory school * East. Europe	0.009** (0.03)
Undergraduate school	0.005*** (0.001)	Undergraduate school * East. Europe	0.008*** (0.002)
Graduate school	0.009*** (0.001)	Graduate school * East. Europe	0.010*** (0.002)
Years in Italy1	0.112*** (0.028)	Compulsory school * Asia	0.005* (0.003)
Years in Italy1^2	-0.012 (0.007)	Undergraduate school * Asia	0.004** (0.002)
Years in Italy2	0.090*** (0.016)	Graduate school * Asia	0.009*** (0.002)
Years in Italy2^2	-0.007** (0.003)	Compulsory school * Africa	0.004*** (0.002)
Years in Italy3	0.074*** (0.008)	Undergraduate school * Africa	0.005*** (0.001)
Years in Italy3^2	-0.004*** (0.001)	Graduate school * Africa	0.009*** (0.001)
Years in Italy4	0.045*** (0.004)	Compulsory school * Latin America	-0.003 (0.005)
Years in Italy4^2	-0.001*** (0.000)	Undergraduate school * Latin America	0.001 (0.003)
		Graduate school * Latin America	0.005* (0.003)
Sector dummies	Yes	Sector dummies	Yes
Pseudo R <sup>2</sup>	0.39	Pseudo R <sup>2</sup>	0.40
No. Obs.	25,849	No. Obs.	25,849

The left-hand side variable is the worker status. Standard errors are in brackets. Stars show significance levels, \*\*\* up to 1 per cent, \*\* between 1 per cent and 5 per cent, \* between 5 per cent and 10 per cent. Regressions include the variables (Experience abroad), (Experience abroad)<sup>2</sup>, Female, Married, Irregular. We split the variable potential experience in Italy into four groups: less than 3 years (Years in Italy1), between 4 and 5 years (Years in Italy2), between 6 and 9 years (Years in Italy3), more than 9 years (Years in Italy4). Every regression is weighted according to the sample design.

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