

SKILLS AND WAGE DIFFERENCES BETWEEN NATIVE AND FOREIGN WORKERS IN ITALY

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Abstract. For several years, immigration has been one of the topics at the centre of the Italian media and political debate and has become a structural component of society and the economy. This paper aims to make a contribution to analysing the wage differences between Italians and foreigners in the Italian labour market in terms of the content of occupations. Several studies in the literature suggest that natives respond to immigration by specialising in occupations in which they have a comparative advantage over foreigners. Through the construction of a series of composite indicators, representing the content of occupations, the wage gap between Italian and foreign workers was analysed in order to identify the factors that most determine the observed gap. In this analysis, the Blinder-Oaxaca Decomposition was used as a statistical model and the study was conducted through statistical matching between the Labour Force Survey (research file, year 2019) of ISTAT and the Sample Survey on Occupations (year 2013) carried out jointly by ISTAT and INAPP.

1. Background and Objective

Over the last decade, the presence of foreigners in Italy has increased significantly. In fact, the number of legally resident foreigners has risen from 1.3 million in 2001 to about 5.5 million as of 1 January 2023 and their share in the total number of residents has increased from 2.3 per cent to 8.6 per cent (ISTAT, 2023). Moreover, the structure of the foreign population is particularly complex and rapidly changing, and the composition of foreigners is also very heterogeneous. Today, legally present foreign citizens are also an established reality in Italy, although to a lesser extent than in many other European countries. An important aspect for the realisation of the migration project is the wage received by foreign workers as well as their social and economic integration in the host country. The objective of this study is to identify the factors that affect workers' wages in Italy and to observe how the possession of non-Italian citizenship affects wages. Furthermore, the aim is also to identify some determinants associated with the wage differences found between

Italians and foreigners in terms of manual, communicative and quantitative content of occupations, as suggested by Peri and Sparber (2009). Specifically, *manual* content refers to those occupations in which the worker employs greater physical effort in carrying out work activities; while *communicative* content refers to that type of occupation in which the worker uses purely cognitive skills connected to the sphere of communication and, finally, *quantitative* content concerns that type of occupation in which the worker is skilled in mathematical reasoning and is familiar with numbers. Several studies in the literature have analysed the impact of immigration on native-born employees and wages. At the international level, and particularly in the US context, some authors have shown that foreign-born workers specialise in physical-manual labour-intensive occupations, while natives perform language- and communication-intensive jobs; they also show that less-educated foreign workers specialise in different productive occupations than natives, at the same level of education, due to their different skills. Thus, immigration reallocates the labour supply of natives, reducing downward wage pressure (Peri, Sparber, 2009). Among the studies in the literature analysing the dynamics in the Italian territory, an interesting contribution has been provided by Strozza, Inglese and Baldacci (1999), who analysed the determinants of immigrants' wages in some areas of Lazio and Campania, where the share of clandestine immigration is relatively high, using data from the period 1993-1994. According to the empirical results, income differences appear to be relatively high among immigrants; differences in labour market integration between genders and areas of origin also emerge. Finally, legal status plays an important role in explaining the wage gap between regular and non-regular immigrants, also due to the different structure of the labour sector in the two groups. The existence of a wide wage gap between immigrants and natives in Italy has also been highlighted by, among others, Coppola, Di Laurea and Gerosa (2013), who attempted to explain it using the characteristics observed in both populations. More recently, Pieroni, D'Agostino, and Lanari (2019) pointed out that, in Italy, language problems among foreigners reduce the employment rate by about 30 per cent, with even larger point estimates when assessing employment discrimination. The authors suggest that knowledge of the Italian language also significantly affects immigrants' wages.

2. Data and Methods

The data used for the analysis are from the Survey on Italian Occupations (carried out jointly by ISTAT and INAPP) with reference year 2013 and from the 2019 data of the Labour Force Survey carried out by ISTAT. The database was created by integrating the data in the Labour Force Survey with those in the Survey of Italian

Occupations. It was possible to create this integrated database by means of a variable present in both databases, namely the 4-digit classification of occupations. Since there is no data source that collects both specific information on the characteristics and requirements of the worker and the occupation and information on the labour market and the socio-demographic data of the workers, the wealth of information provided by the Survey on Italian Occupations and the Continuous Labour Force Survey was exploited. In addition, composite indicators were constructed to assess the occupations in terms of attitudes, skills and activities performed. We used the methodology proposed in Peri and Sparber's work (2009), in particular we analysed three types of indicators expressing the content of dexterity, communicativeness and the quantitative aspect of the profession. These composite indicators represent a weighted average value for each profession, and they were obtained using the information contained in the Survey on Italian Occupations database. In particular, the *manual* indicator was constructed using nineteen skills that cover information on dexterity of limbs, hands and fingers, body coordination and flexibility, speed and strength. The *communicative*¹ indicator was constructed using data on four cognitive skills such as comprehension or self-expression in oral and written form. Finally, the *quantitative* indicator summarises two pieces of information concerning the ability to perform mathematical calculations or to apply the correct mathematical methods to solve a problem.

To analyse the reasons for the wage gap between Italian and foreign² workers, we applied the Blinder-Oaxaca Decomposition (Oaxaca, 1973; Blinder, 1973), both the threefold and twofold decomposition, to the data. This technique is widely used to study average differences in outcome between groups. In the literature, this methodology is often used to analyse wage gaps by sex or race.

According to the *threefold decomposition*, the difference in outcome can be obtained as the sum of the following three components:

- the "Endowment Effect" which is equal to the part of the differential that is due to group differences in predictors;
- the "Coefficient Effect" which measures the contribution of differences in coefficients (including differences in the intercept);
- the "Interaction term" which takes into account the fact that between-group differences in explanatory variables and coefficients occur simultaneously.

An alternative decomposition, called the *twofold decomposition*, which is very popular in the discrimination literature, is based on the notion that there is a vector

¹ For example, four cognitive abilities belonging to section D of the ICP questionnaire, from question number 1 to 4, were selected for the construction of the *communicative* indicator. The abilities used are as follows: Understanding communication in oral form, Understanding communication in written form, Expressing oneself in oral form, Expressing oneself in written form.

² Employed persons with foreign citizenship resident in Italy also include EU citizens.

of non-discriminatory coefficients that should be used to determine the contribution of differences in predictors. This is the vector of regression coefficients that would emerge in a world without discrimination in the labour market.

Thus, this decomposition divides the difference in mean results into two parts:

- "explained" is the component explained by the differences between the groups in the explanatory variables.

- "unexplained" is the remaining part that is not explained by differences in the explanatory variables. It is often attributed to discrimination but can also result from the influence of unobserved variables.

The unexplained part can be further broken down into two sub-parts representing discrimination in favour of the first group and against the second group, respectively.

In this study, in order to apply the Oaxaca Decomposition, we used the last average monthly salary as the dependent variable and as independent variables: the manual, communicative and quantitative content of the occupations, some socio-demographic characteristics of the workers (gender, age and educational qualification) and some occupational characteristics (fixed-term or permanent employment, full-time or part-time³, size of the company and economic sector). The categorical variables were transformed into dummy variables and a chosen category was omitted from the model for each categorical variable. The three realised composite indicators representing the manual, communicative and quantitative content of the occupations were standardised with their maximum value⁴.

3. Results

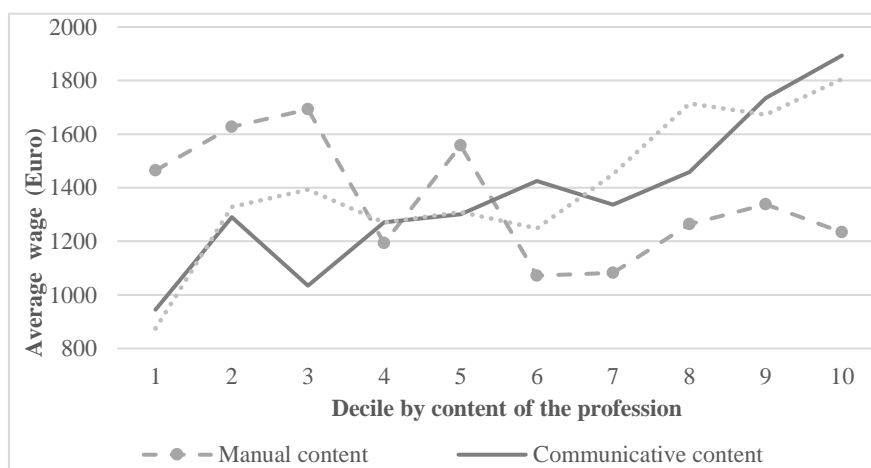
The analysis was developed from the observation of the relationship between the average wage of the employed and the content of the occupations. Figure 1 shows the curve of average wages for the total employed population as the intensity of the manual, communicative and quantitative content of the occupation changes. Wages clearly tend to decrease as the intensity of the manual content of the work performed increases and, on the contrary, to increase as the intensity of the communicative and quantitative content of the occupations increases. For example, a worker in a profession with the least communication content earns an average of 950 euros, while a worker in a profession with the most communication content earns an

³ The data on the type of part-time or full-time work were already available in the Labour Force Survey dataset, the name of the variable taken into consideration is "PIEPAR", it is a variable reconstructed by Istat. Therefore, wages were not converted into full-time equivalents, but this PIEPAR variable was used in the model, which distinguishes full-time from part-time work.

⁴ The maximum value of the manual indicator is 64, the maximum value of the communicative indicator is 89 and the maximum value of the quantitative indicator is 85.

average of 1,900 euros. The trend of the three curves is not so linear but reflects in general terms what has just been stated.

Figure 1 - Average wage of workers by manual, communicative and quantitative content decile in the occupation. Year 2019 (RCFL) and 2013 (ICP).



Source: Own elaboration on ISTAT-INAPP data.

From this consideration, we wanted to investigate the topic further by applying the Blinder-Oaxaca decomposition in order to understand, above all, how much of the wage gap between Italian and foreign workers in Italy in 2019 can be attributed to working in a profession with a higher manual, communicative or quantitative content. All analyses were only conducted on employed persons due to data availability. As shown in Table 1, the sample consists of 152,115 employed persons (n), of whom 134,306 are natives (n_A) and 17,809 are foreigners (n_B).

Table 1 - Size of groups.

Employed Italian Citizenship (n_A)	Employed Foreign Citizenship (n_B)	Employed Pooled Regression (n)
134,306	17,809	152,115

Source: Own elaboration on ISTAT-INAPP data.

The first results (Table 2) show that the average monthly wage⁵ is 1,386.27 euros for Italians (group A) while that of foreign workers (group B) is 1,076.65 euros. So,

⁵ No hourly wage data are available to apply this type of analysis. Monthly wage values were estimated by extracting a sample of employed persons with a pooled regression.

the wage difference is about 309.63 euros and it is this gap that we tried to explain with the Blinder-Oaxaca Decomposition.

Table 2 – *The average wage values by groups.*

Average Wage of Italians (Y_A)	Average Wage of Foreigners (Y_B)	Wage Difference ($Y_A - Y_B$)
1,386.27 euro	1,076.65 euro	309.63 euro

Source: Own elaboration on ISTAT-INAPP data.

First, we examined the results of the threefold Blinder-Oaxaca decomposition, which suggest that the 309.63 euros wage difference can be explained by three different effects (Table 3). The endowment effect represents that part of the differential due to the average differences in the composition of the two groups observed in the predictors (age, gender, education, economic sector of employment) and is about 234.55 euros. The coefficients effect is that part of the differential due to the differences between the two groups in the coefficients, generally attributed to the discrimination present in the labour market or to potential effects in unobserved variables; this effect represents 49.83 euros and finally the interaction effect is that term which takes into account the differences in the two groups in both endowments and coefficients simultaneously.

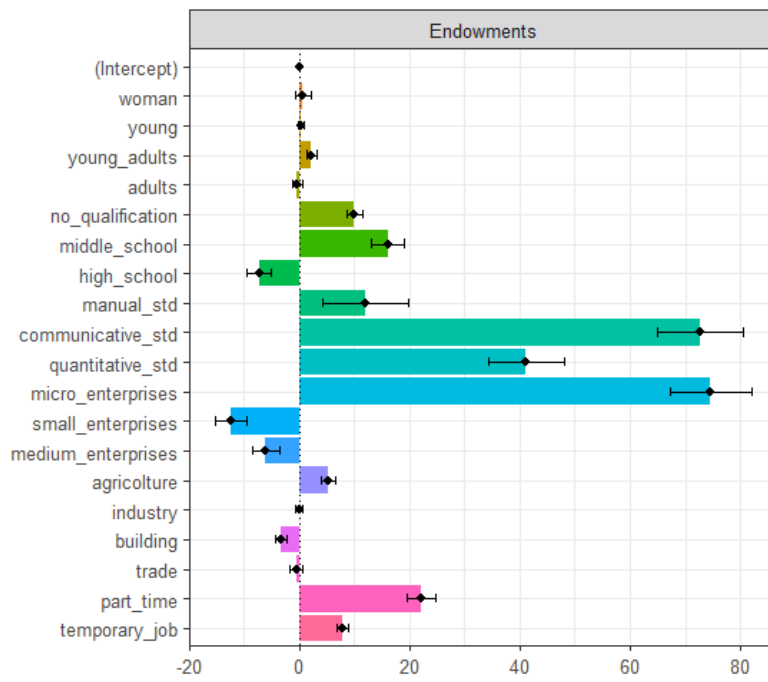
Table 3 – *Threefold Decomposition results.*

coef(endowments)	coef(coefficients)	coef(interaction)
234.55 euro	25.24 euro	49.83 euro

Source: Own elaboration on ISTAT-INAPP data.

Next, we examined the components of the endowments and coefficients of the triple decomposition, variable by variable. Figure 2 shows the estimation results for each variable of the threefold decomposition, together with the error bars indicating the 95% confidence intervals. In the endowment's component, the most statistically significant variables are: the communicative and quantitative content of occupations and working in micro enterprises. It thus appears that a significant part of the wage gap between natives and foreigners is determined by group differences in performing a more communicative and quantitative occupation and in the proportion of individuals working in micro-enterprises.

Figure 2 - Endowment components of a threefold Blinder-Oaxaca decomposition to explain the wage gap between natives and immigrants.



Source: Own elaboration on ISTAT-INAPP data.

Table 4 – The estimates of the terms constituting the endowments effect for the three most significant variables.

	β_B	$E(X_A) - E(X_B)$	Endowment effect: $\beta_B \{E(X_A) - E(X_B)\}'$
communicative_std	502.547	0.145	72.869
micro_enterprises	-281.239	-0.265	74.528
quantitative_std	320.721	0.128	41.052

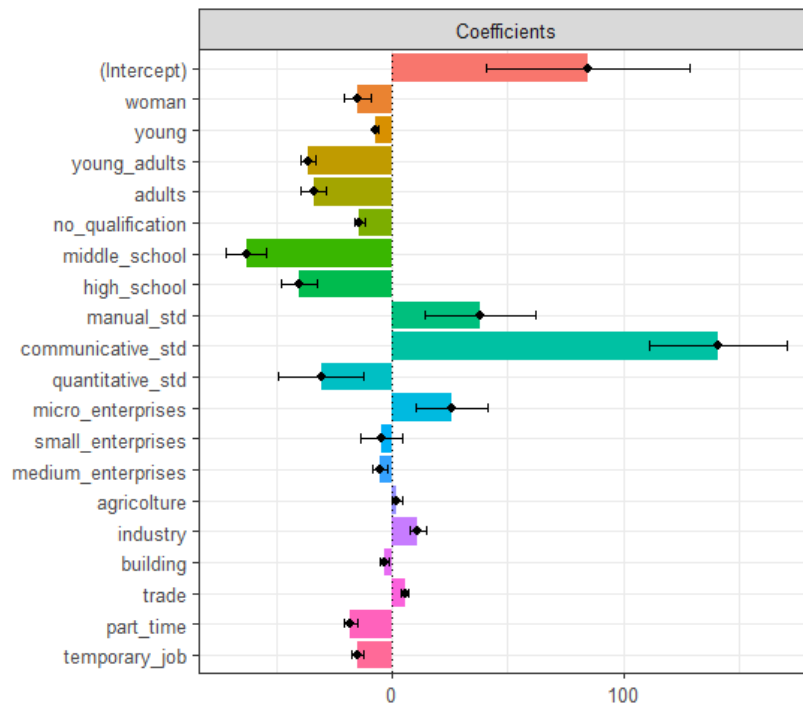
Source: Own elaboration on ISTAT-INAPP data.

As can be seen in Table 4, work with high communication content contributes strongly to the wage difference between the two groups. In fact, natives work in occupations with a higher communication content (0.145) than foreigners and at the same time the coefficient associated with communication occupations is strongly positive (502.547), indicating that among foreigners, those in occupations with a higher communication content tend to earn more. Thus, the product between the two explains the strong contribution of this variable in explaining the wage differences

resulting from the different composition between the groups. The variable associated with workers in micro-enterprises explains another large part of the wage differences between natives and foreigners. In fact, the coefficient of the regression indicates that foreign workers employed in micro enterprises earn less than foreign workers employed in large enterprises (-281.239). A reading of the differences in the endowment shows that foreigners work more in micro-enterprises (26.5%) than Italians. Therefore, the product between the two factors explains a substantial part of the wage differences. Work with a high quantitative content also helps to explain part of the wage difference between the two groups. Italians work in occupations with a higher quantitative content (0.128) than foreigners and at the same time the coefficient associated with quantitative occupations is positive (320.721). This indicates that foreigners employed in a purely quantitative activity receive a higher salary. Thus, the product between the two explains the strong contribution of this variable in explaining the wage differences resulting from the different composition between the groups.

Similarly, some variables are significant in the coefficient component (Figure 3).

Figure 3 - Components of the coefficients of a threefold Blinder-Oaxaca decomposition to explain the wage gap between natives and immigrants.



Source: Own elaboration on ISTAT-INAPP data

Table 5 - Estimates of the terms constituting the coefficient effect for the three most significant variables.

	$E(X_B)$	$\beta_A - \beta_B$	Coefficient effect: $E(X_B) (\beta_A - \beta_B)$
communicative_std	0.496	284.274	150.000
middle_school	0.430	-146.449	-62.973
young_adults	0.208	-173.518	-36.092

Source: Own elaboration on ISTAT-INAPP data.

The most significant variables are, for example, the communicative content of professions, possession of a secondary school leaving certificate or being aged between 25 and 34.

As can be seen in Table 5 (*the coefficient effect*), the differences in the regression coefficients on the communicative aspect of occupations account for the decisive part of the wage gap, where the wage gain in performing a more communicative occupation is 284 euros higher for Italian workers than for foreigners. The average communicative content of the occupations performed by the group of foreigners is very low at 0.49.

Possession of a secondary school leaving certificate and being aged 25-34 also seem to influence wage differences. In particular, wage differences seem to be attenuated in favour of foreigners considering occupations with these characteristics, i.e. with low educational qualifications compared to higher qualifications and considering younger ages compared to older ages. This effect is essentially due to the " $\beta_A - \beta_B$ " component, which returns strongly negative values. In the group of foreigners about 43% have a secondary school leaving certificate and 21% are young adults.

The Twofold Decomposition was then applied, which decomposes the difference in average results into two parts: the part explained by the differences between the groups in the explanatory variables and the unexplained part which is often attributed to labour market discrimination or the effect of unobserved variables.

We examined the results with group weights of "-1", which indicates that the reference coefficients come from pooled regressions in which the group indicator variable relating to citizenship (with value "1" for foreign citizenship and "0" for Italian citizenship) is omitted as a covariate.

Table 6 - Twofold Decomposition Results.

Group Weight	coef(explained)	coef(unexplained)	coef(unexplained A)	coef(unexplained B)
-1	284.99 euros	24.64 euros	2.89 euros	21.75 euros

Source: Own elaboration on ISTAT-INAPP data.

The results of the aggregate decomposition (Table 6) indicate that the wage gap of about 310 euros between Italian and foreign workers can be decomposed into 285 euros, which can be explained by group differences in the explanatory variables, and about 25 euros, which is the unexplained part.

We assume that the unexplained component of the wage gap is due to labour market discrimination and that the aggregate regression coefficients are non-discriminatory. The Blinder-Oaxaca decomposition would indicate that about 2.89 euros of the unexplained part comes from discrimination in favour of Italian workers ("unexplained A" component), while about 21.75 euros comes from discrimination against employed persons with foreign citizenship ("unexplained B" component).

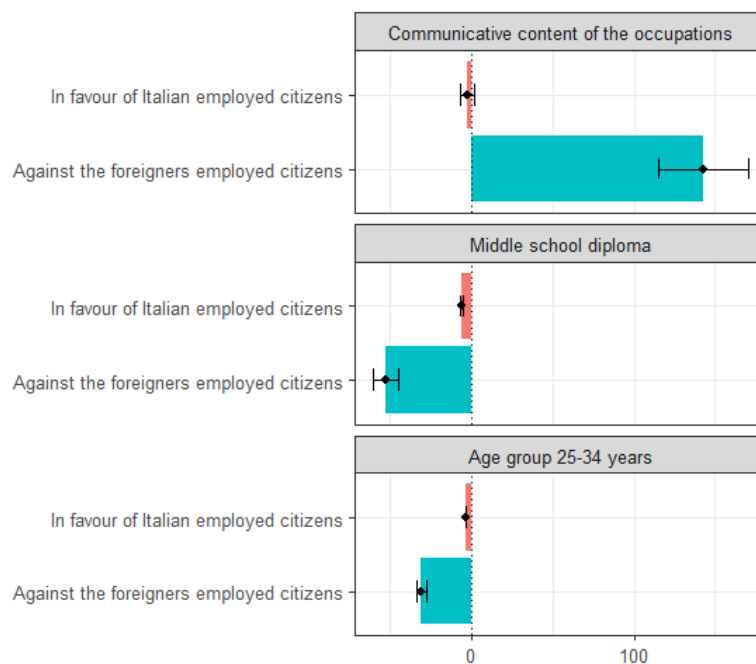
The contribution of each variable in the explained and unexplained part of the two-way decomposition was analysed. It turns out that the wage gap is largely determined by the fact that Italian workers are employed in more communicative and quantitative occupations and by a higher proportion of foreign workers working in small businesses. Furthermore, when analysing the unexplained part, it emerges that the wage differences between Italians and foreigners clearly benefit the natives when considering employment with a communicative content. It can be observed that the wage differences seem to be attenuated in favour of foreigners when considering those employed with a middle school degree as opposed to university degrees or an age between 25-34 rather than older ages.

We further explored the unexplained component. In Figure 5, we have examined the three variables that make a greater contribution to the breakdown: communicative content of occupations, average school-leaving certificate, age group 25-34. We therefore want to visualise how much of the unexplained wage gap can be attributed to discrimination in favour of natives and how much is due to discrimination against foreigners.

It seems that only the three components of discrimination against foreigners are significant. In fact, the unexplained part of the wage gap can be attributed to discrimination against foreigners in the exercise of a profession with a communicative content, whereas discrimination against foreigners seems to be attenuated for those with low educational qualifications (middle school certificate) compared to those with higher educational qualifications (university degrees) and for young adults, those between the ages of 25 and 34 compared to older ages.

Table 7 shows the specific numerical values of the point estimates of the unexplained discrimination components.

Figure 5 - The sub-components of discrimination of the unexplained part in a Twofold decomposition of the wage gap between natives and immigrants.



Source: Own elaboration on ISTAT-INAPP data.

Table 7 - Estimates of the two components of unexplained discrimination.

	Group	Weight	coef(unexplained A)	coef(unexplained B)
communicative_std		-1	4.079	102.8048
middle_school		-1	-4.329	-41.587
young_adults		-1	-3.432	-32.1952

Source: Own elaboration on ISTAT-INAPP data.

4. Conclusions and Future Developments

We used the Blinder-Oaxaca Decomposition to examine the wage gap between Italian and foreign workers in Italy in 2019. The results of the analysis suggest that the wage gap can be explained by several factors. Mainly by the fact that Italians on average hold professions with a higher communication content than foreigners. Workers in non-communicative professions generally tend to receive lower wages in the Italian labour market. Consequently, the group of foreign workers in uncommunicative professions compared to Italians will, on average, earn lower

wages than their native counterparts. But also, that Italian employees work in professions with a higher quantitative content than foreigners, as well as a higher proportion of foreign employees working in small enterprises than natives. Moreover, the wage difference between natives and foreigners is reduced by considering low compared to high educational qualifications or youthful compared to older ages. Indeed, it would seem that foreigners compared to Italians have an advantage in terms of wages when considering low educational qualifications or younger ages compared to their native counterparts.

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