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Pizza, Pasta, Paychecks: what do asylum seekers serve to Italian wages?

A provincial analysis of the effect of asylum seekers on Italian wages from 2014 to 2020.

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Abstract:
This paper analyses the effect of the inflow of asylum seekers on Italian wages in the period 2014-2020. This period saw an influx in migration into Europe and Italy was one of the countries most affected by the migration crisis due to its access to the Mediterranean sea. To understand whether policy should be geared towards accepting immigrants or denying their entrance, a study is conducted on the effect that asylum seeking immigration may have on native, low-skill, middle-skill and high-skill wages of Italian residents. This paper uses a provincial fixed effects regression and concludes that there is a positive effect on total wages and middle skill wages of Italian residents from the inflow of asylum seekers, the resulting wage elasticities of both is 0.6. The second part of the paper uses an instrumental variable approach to try to arrive at a more causal estimate and finds an economically unlikely large negative effect on low skill wages, with a wage elasticity of -8.3.

Table of Contents

I. Introduction

Italy saw a 5.7% increase in asylum seekers from 2007 to 2015. In 2016 and 2017 this number grew to 6.8% and 9% respectively (see Figure A.1). This increase was mainly driven by applicants from Pakistan, Bangladesh, Tunisia, Nigeria, Afghanistan and Egypt. The increase in asylum seekers was not followed by a similar increase in employment. Asylum seekers increased by 20,000 from 2014-2015 but total non-EU employment increased by 31,000 in Italy (European Commission, 2023). Likewise, from 2010-2014, the employment rate of non-EU residents in Italy decreased by 4.1%, whereas the inflow of asylum seekers increased by 3.63% in the same time period (European Commission, 2023). This could alter labour market outcomes for native and non-native Italian residents and have implications for wages in Italy. UNHCR Italy (2023) states that an asylum seeker is allowed to legally work 60 days after they make an asylum application by registering with the Employment Center. An asylum seeker is someone who is "not an EU citizen and cannot return to their country of origin because of fear of persecution, risk of serious harm, or is unable to receive protection from their country of origin" (UNHCR Italy, 2023, para. 1). Asylum seekers are allowed to work and stay in Italy for the entirety of the asylum procedure until they receive their asylum acceptance or rejection. If they get granted asylum, they are granted refugee status and obtain an Italian residence permit and can continue working (UNHCR Italy, 2023). According to Italian law, a commission will interview an applicant within 30 days of the application being sent, and a final decision will be taken 3 days after the interview. In practice, however, this process takes longer due to bureaucratic delays and it usually takes between 6 months to a year to get a final decision on the asylum application (Refugee.Info Italy, 2020). If an asylum application is rejected, the person can appeal the decision within 15-30 days after the decision is made. The judge's decision on the appeal process must be taken after a maximum of 4 months by law. However, in practice this can last up to 15 months. During the whole appeal process, asylum seeker applicants can still work and live in Italy (Refugee.Info Italy, 2020).

Due to Italy's access to the sea, it has become, along with Greece and Spain, the main entry point for asylum seekers into the EU. The south of Italy is branded as the port of freedom that grants immigrants the possibility to seek asylum either within Italy or in other European countries which are their final destinations (Monzini, 2007). Being able to deal with this situation requires extensive public policy but also economic policy. Political opinions are split between whether immigrants benefit or worsen the economic situation in Italy. Immigrants often get stigmatised and are blamed for "stealing jobs from hard working

Italians" (Robinson, 2019, para. 4). However, on the other side of the political spectrum lie the arguments for the economic benefits of immigration such as accepting lower-paid jobs which Italians are not willing to do. All while contributing to pensions and economic development of the economy (Robinson, 2019). In fact, there might be large unfairness for immigrants as even high skilled immigrants find it difficult to work in non-manual jobs in Italy (Fullin & Reyneri, 2011). It is economically important to test whether asylum seeking immigrants have an effect on labour market outcomes in Italy, since most natives, specifically low-skilled natives, believe that migrants lead to adverse effects on their wages (Becchetti & Acar, 2021). If they do, the effect would be important to take into consideration when enacting economic and public policy for immigration. This leads to the research question: to what extent has asylum seeking immigration had an effect on wages in Italy between 2014 and 2020?

This research paper finds that based on different econometric strategies, the effect of asylum seekers on wages in Italy has different conclusions from 2014-2020 on a provincial level. The dependent variables studied in this research paper will consist of the natural logs of median wages, low-skill wages, middle-skill wages and high skill wages. Native implies holding an Italian citizenship. High-skilled means having a tertiary education, middle-skilled means having a high school education, and low skill means having only a primary, middle school or no education. The independent variable is the inflow of asylum seekers as a percentage of the provincial population. There are 101 provinces included in this paper over a 7 year span. Firstly a fixed effects regression is used with controls to try to arrive at a causal estimate. The wage elasticities are reported as a percent change in wages as a result of a percent change in the labour force due to immigration. The fixed effects regression shows that the inflow of asylum seekers has a positive effect on total wages and middle skill wages, the resulting wage elasticities of both is around 0.6. The fixed effects regression results are likely not causal since there are many factors that could influence the results that are not included in the regression and lead to endogeneity issues. Secondly, an instrumental variable is used to try to arrive at a more causal estimate. With the instrumental variable approach there seems to be a negative effect of asylum seekers on low skilled wages, with a wage elasticity of low skilled workers around -8.3. This estimate is likely too large to be economically plausible. Furthermore, due to the large standard errors reported and the invalidity of some assumptions of the instrumental variable, the results are likely not economically significant. The robustness analyses presented later do not reinforce the fixed

effects results of the positive effect on total wages and middle skilled wages, nor do they reinforce the negative effect on low-skill workers.

There is vast theoretical and empirical research on the effects of immigration on labour market outcomes as will be discussed in Section II. The theory suggests that the effect of immigration on wages depends on whether migrants and natives are substitutes or complements and whether we are looking at a short-run or long-run scenario. If looking at the long-run scenario where migrants and natives are perfect substitutes, a migration shock causes lower equilibrium wages but no unemployment. In the short-run, there is no effect on wages since wages are sticky, but there would be an increase in unemployment. If migrants and natives are complements in production, a migration shock will raise the marginal productivity of natives and thus lead to higher wages. The main empirical papers in this field are the papers that study the immigration of Cuban immigrants to the U.S. in 1980. Card (1990) finds that there is no effect on non-Cuban low-skill wages in Miami as a result of the immigration, but by using different specifications, Borjas (2017) finds a decrease in wages of high school dropouts by 10%-30%, leading to a wage elasticity of high-school dropouts between -0.5 to -1.5. Other empirical literature focused around the European immigration crises finds negative effects on native wages from the inflow of immigrants. Tumen (2016) finds that Syrian refugees had no statistically significant effect on Turkish native wages. Angrist and Kugler (2003) also find a negative effect on natives as a result of Balkan immigration following the Yugoslavian war. However, the Italian labour market is a relatively unexplored setting considering its large importance following the 2015 migrant crisis. There are studies on the labour market effects of immigration into Italy such as Venturini & Villosio (2006); however, they are all focused on immigration before the 2015 EU migrant crisis and mostly on employment effects. Simionescu (2021) considers the 2015 refugee crisis in Italy in their data but focuses the analysis on the effect on employment. Therefore, it would be interesting to estimate the effect from this specific period of immigration in Italy on wages instead, as previous studies do.

The paper will continue with a mention of related literature in section II, the data and empirical strategy in section III, results are presented in section IV with robustness checks performed in section V. Then there will be the discussion of the results and robustness in section VI and a conclusion in section VII.

II. Related Literature

Academically, there is vast literature on the effect of immigration on labour market outcomes in other settings. There is both theoretical and empirical literature on the topic. The literature, and most specifically the empirical literature, does not come to a full consensus about the effect of immigration on labour market outcomes. Appendix Table A.3 shows a summarising table of all the empirical results that will be discussed in this section.

There are three different economics-based theoretical predictions that could be made about the effect of migrants on the labour market. The differences arise based on whether migrants and natives are perfect substitutes or complements, and whether analysing a short run or long run situation.

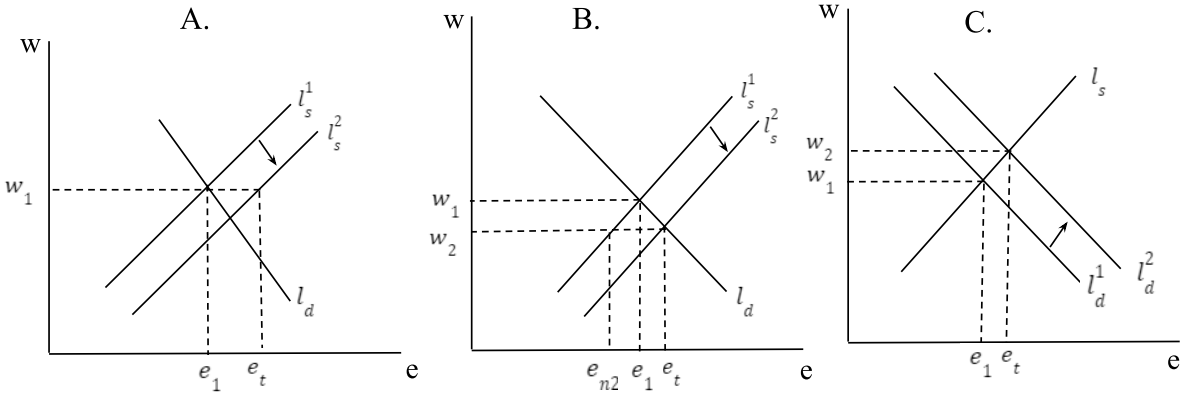

Figure 1 Theoretical Diagram of Migration on the Labour Market

Figure 1 shows these different theoretical scenarios. Panel A represents the short-run scenario where wages are sticky and natives and migrants are perfect substitutes. Since they are perfect substitutes, they compete in the same labour market. If there is a migration shock which in this case increases the labour supply, the labour supply curve would shift right from l_s^1 to l_s^2. Since wages are not flexible the wage rate will stay at w_1 but the labour supply will be larger than labour demand, hence unemployment will increase due to the disequilibrium created by the shift in labour supply. Total employment e_t increases due to the increase in the labour force and the unemployment is characterised by the gap between e_t and e_1. Panel B represents the scenario where migrants and natives are perfect substitutes in a long run scenario. If migrants and natives are perfect substitutes and wages are flexible in the long run scenario, a migration shock causes supply to shift to the right from l_s^1 to l_s^2. This leads to

lower equilibrium wages as w_1 decreases to w_2 because in the long-run, the disequilibrium from panel A will be solved by a decrease in wages. Furthermore, in this case there is no unemployment when markets clear since labour supply equals labour demand. Total employment will increase from e_1 to e_t and native employment will decrease from e_1 to e_{n2} because of the lower wage. Panel C shows the situation where migrants and natives are complements. If migrants and natives are complements in production, they do not compete on the same labour market. Immigration will make natives more productive since there is an increased supply of a complementary factor. Since the demand curve l_d^1 represents marginal productivity, a migration shock will raise the marginal productivity of natives and thus shift demand upwards to l_d^2, leading to a higher equilibrium wage (w_2).

Regarding the empirical literature, Altonji and Card (1991) measure the effects of immigration on labour market outcomes of less skilled natives. They use a first difference approach to measure the change in employment and wages for less-skilled natives between 1970 and 1980 to control for fixed effects. The instrumental variable approach uses the fraction of immigrants in 1970 to predict the change in 1980. This is because, as stated in Bartel (1989), immigrant inflows are strongly correlated to the initial fraction of immigrants in a city and not necessarily labour market outcomes. They find a negative effect on native low-skilled wages as a result of immigration into the US using first differences and instrumental variables, however, they find no or little effect on the employment of less skilled natives. As discussed in Figure 1 panel B, for wages this would coincide with a setting where natives and migrants are substitutes and in a long-run scenario.

Another empirical study by David Card (1990) finds no effect of Cuban immigrants on non-cuban low skill wage rates and employment rates in the Miami labour market. The paper analyses the increase of 125,000 Cuban immigrants to Miami as a result of the Mariel Boatlift of 1980 which increased Miami's labour force by 7%. This natural experiment compared Miami to 4 other U.S cities that did not experience an immigrant inflow and found that Miami was able to integrate the Mariel immigrants without affecting any other groups. In terms of the effect on the wage level, this is similar to the short run substitute scenario presented in panel A of Figure 1.

Following Card's (1990) paper, George Borjas (2017) published a reappraisal of the impact of the Mariel Boatlift on the Miami labour force and found a negative effect of the Cuban immigration on wages in Miami. Borjas criticises Card's conclusions by showing a

more long-run approach. Borjas states that although the labour force only grew by 7%, as a result of the Mariel Boatlift the number of high school dropouts increased by 20%. Therefore, it is necessary to look at the change in the wage of high school dropouts in Miami. Borjas (2017) uses a synthetic control approach where the control is made up of variables such as the city's rate of employment growth and the rates of employment and wage growth of the low-skill workforce. The synthetic control makes a weight of all potential placebo cities and these are all combined to create a new synthetic city. This synthetic city is then similar to the pre-immigrant inflow Miami labour market based on the controls specified previously. Using difference-in-difference and synthetic controls, Borjas concludes that during the first six years after the Mariel Boatlift, the wages of male high school dropouts in Miami fell by 10% to 30% and the wage elasticity of high-school dropouts is between -0.5 and -1.5. This conclusion follows the theoretical predictions of a long run scenario where natives and migrants are substitutes, as discussed in Figure 1 panel B. Borjas also shows that using different synthetic control specifications can lead to different conclusions, emphasising the importance of choosing a valid control.

Clemens and Hunt (2019) contribute a paper to the discrepancies between Card (1990) and Borjas (2017) and argue that the differences arise from the selection of subsamples. This is because Card (1990) looks at the effect on workers with a high school diploma or less, whereas Borjas (2017) looks at the effect on non-hispanic men with less than a high school diploma from ages 25-59. In essence, Card (1990) uses a larger subsample than Borjas (2017), leading to differing results. Clemens and Hunt further explain other discrepancies between original and reanalysis papers on different migration wave effects. They argue that some papers may also differ in conclusions due to specification choices in the instrumental variable construction and that there could be spurious correlations between the instrument and endogenous variables that bias results in favour of different conclusions. For example, in Angrist and Kugler (2003) which will be discussed in the next paragraph, there is an identification problem and statistical imprecision with their instrumental variable and so they indicate that their estimates can be interpreted as upper bounds of the true effect. Nonetheless, Clemens and Hunt (2019) claim that there is somewhat of a consensus that the impact of immigration on native born workers is small and usually only focused on low skilled workers. The criticisms and evaluations of Clemens and Hunt (2019) are useful for the evaluation of the methodology and results of this research paper since it is crucial to validate the importance of the definitions of the variables, as they can lead to different results based on different specifications.

Many previous studies use natural experiments to find the effect of refugee flows on labour market outcomes. Angrist and Kugler (2003) show the effect of immigrants fleeing from the collapse of Yugoslavia to EU countries. This paper is specifically relevant as it looks at EU countries and highlights the role of economic institutions like firing costs and wage rigidity in European markets and their ability to diminish any effect of immigration on wages. In their results, Angrist and Kugler (2003) find a negative effect on native worker wages as a result of Balkan immigration using OLS estimates and instrumental variable estimates. They find that Balkan immigration caused an increase in EU native unemployment by 0.83 percentage points. The instrumental variable used in the paper is the distance from the Yugoslav conflict. This again links to a theoretical long run situation where natives and migrants are substitutes.

Tumen (2016) studies the effect of Syrian refugees on the Turkish labour market in 2016. The setting of this paper is similar to the setting of the research conducted in my paper in terms of time frame. Using a difference-in-difference analysis, Tumen (2016) finds no statistically significant effect of the inflow of Syrian immigrants on Turkish native wages. The first difference in this paper is the pre- and post-immigration period. Tumen uses some regions in Turkey that had a high immigrant to population ratio as treatment regions and regions with virtually no immigration as control regions. Although there is no effect on wages, there is a 2.26 percentage point decrease in the likelihood of having an informal job for natives as a result of Syrian immigration. This empirical situation with no effect on wages but an increase in unemployment corresponds to Figure 1 panel A where migrants and natives are substitutes and in the short run setting.

For the analysis, the concept of wage elasticity will be important to analyse since it introduces a measure of the change in wages as a result of a change in the labour force. As was mentioned for the Borjas (2017) paper, my research will also contextualise the effect into a wage elasticity for the significant effects. The wage elasticity formula, derived from previous literature is the following:

$$Wage\ elasticity_i = \frac{\%\ change\ in\ wages_i}{\%\ increase\ in\ the\ labour\ force\ due\ to\ immigration_i} = \frac{\partial log\ w_i}{\partial (M_i/N_i)}$$

III. Empirical Strategy and Data

Italy is divided at the regional and also at the sub regional level. The regional level consists of 20 regions and the subregional level of 107 provinces. Appendix Figure A.3

shows the provinces across Italy for a better understanding of how these provinces are distributed. Data in this research paper is collected at the provincial level. My data excludes six provinces, namely, Monza e Brianza, Fermo, Barletta-Andria-Trani, Sud Sardegna, the autonomous region of Bolzano and the autonomous region of Trento. The first four provinces are not included in the data because there is no data on the inflow of asylum seekers for those provinces on any database. The latter two provinces are not included because they are autonomous provinces and therefore some legislative, administrative and financial powers differ from the rest of Italy. Additionally, there is unavailability of data on some control variables for the autonomous provinces so they are excluded from the data used for this paper. To answer the research question, the paper is split into two different methodologies. Firstly, fixed effects panel data and secondly, an instrumental variable estimation will be used to estimate the effect of the inflow of asylum seekers on wages in Italy.

The dependent variables will consist of the natural logs of native wages, total wages, low-skill wages, middle-skill wages, and high skill wages. Wages will be measured as the median gross hourly wage for the different nationalities and skill-levels mentioned. Native implies holding an Italian citizenship. High-skilled means having a tertiary education, middle-skilled means having a high school education, and low skill means having only a primary, middle school or no education. This heterogeneity analysis will allow to see how the inflow of asylum seekers affects the Italian job market for both specific skill levels and natives and non-natives. As a robustness analysis, instead of taking the median wages, the dependent variable will be measured as average wages in section V to see if the results are robust to a different specification. The data consists of a time span of 2014-2020 including 101 provinces in Italy.

The control variables are split into contextual, macroeconomic, and institutional controls. Firstly, the macroeconomic controls include GDP per capita per province, as was done in Latif (2015). This is controlled because an increase in GDP per capita may cause a greater affluence to the region for immigrants and might also be a factor for the increase in wages in a province. GDP per capita will be divided by 10000 to arrive at more interpretable magnitudes of the coefficients in sections IV and V. The second macroeconomic control is the nominal labour productivity per capita. This is controlled because a higher labour productivity typically leads to higher wages. Furthermore, new immigrants may decide to live in a city with a higher or lower labour productivity, depending on their willingness to work. The last macroeconomic control variable is the employment rate in the province. The employment rate is defined as per the European Commission's regulations of the ratio of

employed to the working age population. A higher employment rate might induce a higher share of new immigrants due to the labour market opportunities in that province. Additionally, the employment rate of a province could be a determinant of the wages in the province, since when employment is low, employers have more bargaining power and can depress wages.

The contextual factors consist of age, gender and the amount of workers in construction and agriculture/forestry. The share of workers in construction and agriculture/forestry will be controlled for, as was done in Ortega and Verdugo (2015). New immigrants who lack skills often enter the job market through low-education, blue collar jobs so these variables could be confounders in the relationship. The variable will be divided by the population, so as to get the provincial employment rate in construction and agriculture. The average age is controlled for since it could largely affect wages, a province with a highly retired population will have lower wages than a province with a mean working age. New immigrants could be attracted to a province with lower age as it could mean a province with labour opportunities and expansion. Furthermore, the average gender will be controlled as done in Altonji & Card (1991) as it could be correlated to wages and also the amount of new immigrants in a province.

The institutional factor controlled for will be social spending per provincial capita. Papers such as Borjas (1999) state that social spending has direct positive effects on the amount of immigrants who live in a region and that welfare spending is like a magnet that attracts immigration to a region. However, other studies such as Soroka, Banting and Johnston (2006) state that due to an increase in welfare spending on immigration, it might lead to more stringent immigration policy and hence decrease immigration. Since it is difficult to quantify the direction of the relationship, it is especially important to control for this variable as it could affect the amount of asylum seeker inflow in a province. Furthermore, from a macroeconomic standpoint, social spending can increase wages through investments in human capital, labour market improvements, and general productivity improvement that can come from for example healthcare spending. This variable will also be divided by 1000 to be able to interpret the magnitudes of the coefficients better in sections IV and V.

Data on the variables mentioned in this section will be taken from the The Italian National Institute of Statistics (ISTAT, 2022) and Eurostat (2023). On ISTAT, data is available for the “Median gross hourly wage of employee jobs in euros” per region per year for

different job sectors and the median of all job sectors for both Italian natives and foreign born residents. This variable will be taken for individuals older than 15 years old. This data can also be filtered by education level, so as to perform a heterogeneity analysis on low-skilled, middle-skilled, or high-skilled residents and see if there is a difference in the effect. The independent variable of interest is the "Annual inflows of non-EU citizens by asylum granted, asylum application and humanitarian reasons" which is also found on ISTAT and is provided per year and per region. This variable takes into account both males and females who have entered Italy and are requesting asylum or getting it granted. Section I explained the asylum requesting procedure in Italy, the asylum seekers considered in this variable are asylum seekers who have been given a permit to stay in Italy and can therefore live and work in Italy while awaiting their decision to become full residents or not being granted asylum and being sent to their country of origin. This particular variable is found on a subsection of ISTAT called Immigrants.Stat which has more detailed statistics on non-native residents. All control variables mentioned above except for nominal labour productivity and real GDP per capita can also be found on ISTAT (2022). Nominal labour productivity and GDP per capita per province was taken from EuroStat (2023).

From the descriptive statistics shown in Table 1, the summary statistics of the 707 observations do not highlight any anomalies. The standard deviations, means, minimums and maximums all seem to be in line with what might be expected of the magnitude of these variables. All percentages are reported in decimal form. The percentage of workers in construction, agriculture/forestry and the asylum seekers as % of the population have a value of zero as the minimum and it seems that these are observations without values, however, this is not the case since the minimums for these values are simply a low percentage that does not fit into the 3 decimal digit format.

Table 1 Summary Statistics

Variable	Obs	Mean	Std. dev.	Minimum	Maximum
Asylum seekers as % of province population	707	0.001	0.001	0.000	0.014
Dependent variables:					
ln(Wages)	707	2.439	0.072	2.274	2.604
ln(Wage Italians)	707	2.425	0.074	2.253	2.669
ln(Wage Low skill)	707	2.368	0.056	2.200	2.510
ln(Wage Middle Skill)	707	2.424	0.071	2.259	2.615
ln(Wage High Skill)	707	2.543	0.097	2.334	2.923
Control variables:					
GDP per capita	707	25811.760	6997.080	14419.500	55923.460
Labour productivity per capita	707	0.190	0.120	0.017	0.695
Employment rate	707	0.577	0.104	0.324	0.729
Percent Male	707	0.486	0.005	0.471	0.503
Mean Age	707	45.622	1.749	40.200	49.700
Percentage working in construction	707	0.026	0.006	0.000	0.048
Percentage working in agriculture and forestry	707	0.019	0.014	0.000	0.078
Social Spending per capita	707	146.966	88.891	5.604	466.336
Instrumental variable:					
Stock of Immigrants in previous year	707	36979.210	59460.080	1071.000	474814.000

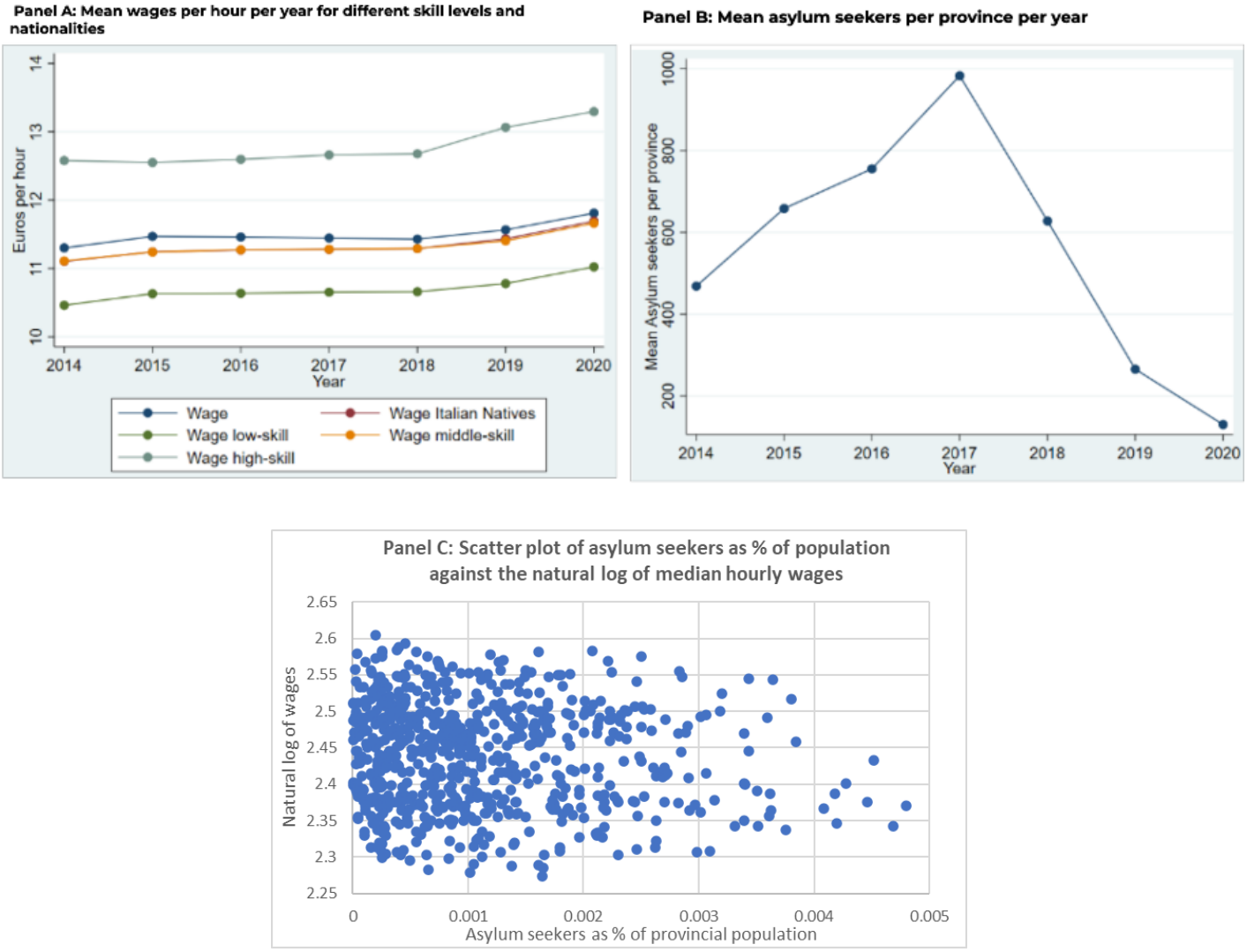

Figure 2 Graphical representation of descriptive statistics

Figure 2 shows a summary of the descriptive statistics in graphical form. Panel A shows how the mean of the median wages differ for different education levels and nationalities per year. There is a noticeable upward trend in all wages over the years, especially from 2018 onwards. As expected, high-skill wage averages are the highest, followed by middle-skill and then low-skill wages. The average median wage is higher than middle-skilled wages and the average median wage of Italian natives is very similar to the average median middle-skill wage. This graph reinforces the need to perform a heterogeneity analysis on the dependent variable of wage since there is a large difference in wages based on the composition of the nationality or skill group.

Panel B instead shows how the mean number of asylum seekers per province changes per year. As expected, there is an upward trend from 2014 until 2017. After 2017 there seems

to be a downward trend as the mean number of the asylum population per province decreases in total in Italy. Panel B along with Appendix Figure A.2 show the importance of conducting this research with provincial and yearly fixed effects. For the time specific events that could be driving the results in Panel B, yearly fixed effects would help to control for any time varying and province invariant factors affecting the results.[1] Instead, Figure A.2 shows the importance of conducting the research at the smallest regional level possible. In this case, across the sub-regional level there are large differences in the means of asylum seekers across the years. A province like Milan can have an average inflow of 3,600 asylum seekers and a province like Pistoia has an average inflow of 100 asylum seekers over the 7 year period.

Panel C shows a scatter plot of the independent variable of interest on the main dependent variable. The natural log of median hourly wages for all skill levels and nationalities regressed on the asylum population as a percent of provincial population. There does not seem to be any association between wages and the asylum population as percentage of provincial population. The large amount of data points, however, show that most of the data points for the asylum population percentages are between 0.00% and 0.20%.

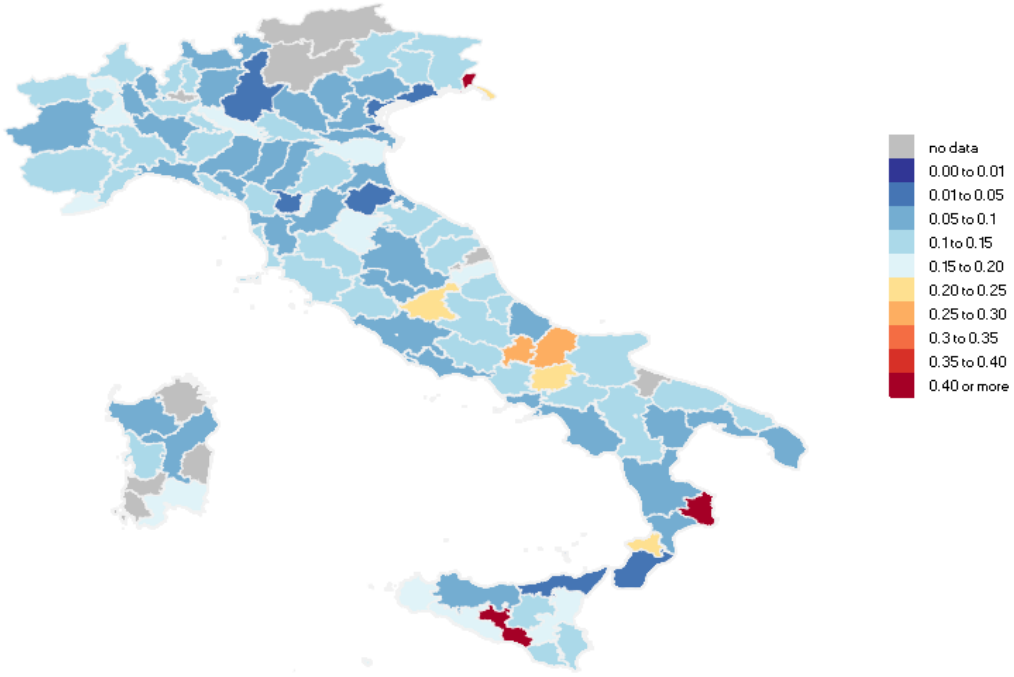

Figure 3 Heat map of the provincial variation in asylum seeking population

[1] Table A.2 presents the results of the analysis from section IV without including yearly fixed effects.

Figure 3 shows that the asylum seekers as a percentage of the population in a province vary largely across provinces and even neighbouring provinces[2]. To create the heat map, the average inflow of asylum seekers over the 2014-2020 period was taken per province. In Figure 3, the provinces with the highest average inflow across the 7 year period are Gorizia in the north-east, Crotone in the south-east and Caltanissetta in the south-west. Interestingly, the areas with the most inflow are the north-eastern most points that connect to the Balkans, which are the main entry point for asylum seekers coming from the Asian continent. Then the south of Italy also has high inflows of asylum seekers, likely due to the access to sea which allows the inflow of asylum seekers from the African continent. This also reinforces the idea that an analysis should be conducted at the smallest regional level possible due to the differences even across neighbouring provinces. The associations and the descriptive statistics show that there could be a relationship worth analysing.

$$log(w_{i,t}) = \alpha_i + \beta_1(InflowAsylumSeekers_{i,t}) + \beta_2 X_{2,i,t} + \cdots + \beta_9 X_{9,i,t} + \gamma_t + \varepsilon_{i,t} \qquad (1)$$

Equation (1) shows the regression for the fixed effects. $w_{i,t}$ will consist of native wages, total wages, low-skill wages, middle-skill wages and high skill wages. These wages will be taken as median wages. $InflowAsylumSeekers$ represents the main independent variable which is the inflow of asylum seekers as a percentage of the provincial population. The subscript i indicates the province in Italy and subscript t indicates the year. The time span is from 2014-2020 due to lack of data availability since data on wages on the specific variable of interest is only available from 2014 until 2020 on ISTAT and EuroStat.

Using panel data will allow to partially deal with omitted variable bias by including province fixed effects which will absorb time-invariant confounders, these provincial fixed effects are captured by the variable α_i. γ_t represents the year fixed effects. Yearly fixed effects are important to include in the regression for differing policy and macroeconomic situations that could directly affect the relationship being studied. Appendix Table A.2 shows the main results removing yearly fixed effects. The results in Table A.2 do not complement the conclusions from the main results, however, they are less relevant when trying to identify

[2] The region of Sardinia (island to the left of main-land Italy) is split into more provinces in Figure 3 than in Figure A.3 because the heat map software used to make the heat map still includes old Sardinian provinces which were abolished in a 2016 referendum and are now no longer considered provinces of their own, but parts of the existing provinces shown in Figure A.3. For this reason, in Figure 3 those regions do not have data.

a relationship between asylum seeker inflow and wages due to the prior reason to remove them.

$\beta_2 X_{2,i,t} + \cdots + \beta_9 X_{9,i,t}$ represents a vector of eight control variables including GDP per capita, labour productivity per capita, employment rate, gender, mean age, percent working in agriculture/forestry and construction and social spending per capita. These control variables will try to capture all other time-variant confounders. Taking the natural log of wages will allow to interpret the results as a wage elasticity, the percent change in wages as a result of an increase in inflow of 1% of the provincial population. This is relevant to analyse the effect across provinces since different provinces will have different populations and hence the effect of one more asylum seeker in a large city could be less impactful than one more asylum seeker in a small town. As shown in Figure 3 and appendix Figure A.2, there are large discrepancies between provinces in terms of the average number of asylum seekers over the years. To account for this, both the independent and dependent variables will be considered as percentages.

The estimates found from the provincial fixed effects panel data will most likely not be causal as there are other confounders that are not controlled for that could be related to the error term ($\varepsilon_{i,t}$). Panel data is beneficial for this analysis because it studies the same provinces across the years. Omitted variable bias can be dealt with partially by including province fixed effects which will absorb time-invariant confounders. However, there will be time variant omitted variables that are not accounted for in this model that might bias the estimates. For example, labour market integration policies, social attitudes towards immigrants and discrimination towards immigrants would be good controls that might otherwise bias the estimates of the effect of asylum seekers on wages. Labour market integration policies might lead to a larger effect of asylum seekers on wages if there is a policy that targets including them into the current workforce, as this could be disruptive to current workforce wages. Negative social attitudes or discrimination towards immigrants could instead lead to a smaller effect on wages if discrimination would lead to not hiring asylum seekers and no disruption in the current workforce wage level. Otherwise it could lead to a larger effect if discrimination means a lower wage for asylum seekers. Since data on these controls is not available for Italy, these variables represent the error term and then the error term might be correlated to the independent variable of interest. Furthermore, there could be reversed causality in this scenario since the wages in a province may have an effect on the amount of asylum seekers moving to the province. A higher wage in a certain province might mean a

higher attraction for asylum seekers to move to that province in order to obtain higher wages. If this is the case, then wage levels are influencing migrant inflows and the conclusions derived from the effect of asylum seekers on wages would be flawed. For this reason, this research design does not allow for causal effect estimation.

To try to reach a causal estimate of the effect of immigration on wages in Italy I will use an instrumental variable. The instrumental variable (IV) that will be used is the stock of immigrants from non-EU countries in the previous year. This instrumental variable is following the ideas of Altonji & Card (1991) and Bartel (1989). The IV estimate of the effect on wages will be calculated by taking a two stage least squares regression by dividing the coefficient τ from equation (3) by the coefficient ɣ from equation (2).

$$log(w_{i,t}) = \theta + \tau(Stock\ of\ Immigrants\ in\ previous\ year_{i,t}) + \beta_2 X_{2,i,t} + \cdots + \beta_9 X_{9,i,t} + n_i \quad (3)$$

$$Inflow\ of\ asylum\ seekers_{i,t} = \boldsymbol{\delta} + \beta_2 X_{2,i,t} + \cdots + \beta_9 X_{9,i,t} + \gamma(Stock\ of\ Immigrants\ in\ previous\ year_{i,t}) + u_i \quad (2)$$

$w_{i,t}$ in equation (3) represents all heterogeneity analyses of wages mentioned in equation (1). $\beta_2 X_{2,i,t} + \cdots + \beta_9 X_{9,i,t}$ in equation (2) and (3) represent the same vector of control variables as for equation (1). Data on the stock of immigrants from non-EU countries in the previous year is found on ISTAT (2022). The variable will be taken from 2013-2019 since the inflow of asylum seekers is measured from 2014-2020.

For the instrumental variable to be valid, it must satisfy the conditional independence, exclusion and monotonicity assumptions. The conditional independence assumption states that the IV must be uncorrelated to the error term or any other determinant of the outcome. It is not possible to verify this assumption since the error is unobserved, however, it can be informally checked by checking the correlation between the IV and observed characteristics. Appendix Table A.1 column 1 shows that when regressing the IV on the control variables, there are some significant effects. Most notably, labour productivity, number of construction and agriculture workers have significant effects on the IV. Furthermore, from an economic perspective, the stock of immigrants will likely be correlated to other omitted variables that are not included in the regression, for example, the stock of immigrants can be correlated to labour market integration policies or discrimination towards migrants which is part of the error term. This might weaken the strength of this IV variable for a causal interpretation as this assumption does not fully hold.

The second assumption is that the instrument has a clear and strong causal effect on the variable of interest. As a rule of thumb, the effect of the IV on the variable of interest

should have an F-statistic larger than 10. As shown in Appendix Table A.1 column 2, the F-statistic is larger than 10, and there is a highly significant positive effect of previous immigrants on the asylum seeker population. It is also likely that the amount of immigrants flowing into a country depends on the previous number of immigrants. Migrants will likely follow their families or where their compatriots are settled in already since it represents familiarity and an easier process to embed themselves into their new country. The third assumption for a valid IV is the exclusion restriction which states that the instrument has no direct effect on the outcome. Although previous literature Bartel (1989) and Altonji and Card (1991) deduce that there is likely no strong effect of the IV on wages, the exclusion restriction likely does not hold. If there is an effect from the inflow of immigrants on wages, as stated in section II from previous literature, then likely the stock of immigrants will also be related to wages since the stock or inflow contain the same sample of people and their effects on the labour market will be similar. Since the conditional independence assumption and the exclusion restriction likely do not hold, to try to reach a causal conclusion, control variables will also be added to the IV regression.

IV. Results

IV. A Fixed effects

Table 2 shows the results for the provincial fixed effects regression of the inflow of asylum seekers on different types of wages in Italy. Column 1 has the natural log of median wages as the dependent variable. This dependent variable is useful to see if the inflow of asylum seekers is impactful on total wages in Italy. The coefficient of interest is positive and significant at the 90% confidence level. This indicates that an increase of 1% of the provincial population of asylum seekers leads to a roughly 0.6% increase in median wages. This result indicates that there is a positive effect of asylum seekers on median wages. A similar conclusion can be drawn from column 4 which shows that there is a significant positive effect from an inflow of asylum seekers on wages of middle skilled workers at the 10% level. An increase of 1% of the provincial population of asylum seekers leads to again a roughly 0.6% increase in middle skill wages on average. The other columns (2, 3, 5) of the fixed effects regressions do not provide significant results but column 2 shows an insignificant positive effect on Italian wages. Whereas column 3 and 5 show an insignificant negative effect on low-skill and high-skill wages.

Table 2 Fixed effects main results

	Wages all Residents (1)	Wages Italian Citizens (2)	Wages Low Skill (3)	Wages Middle Skill (4)	Wages High Skill (5)
Asylum Seekers as % of population	0.597* (0.344)	0.228 (0.342)	-0.150 (0.293)	0.553* (0.299)	-0.115 (0.833)
Mean Age	0.015*** (0.004)	0.009** (0.004)	0.008* (0.004)	0.008** (0.004)	-0.017*** (0.006)
Male %	0.088 (0.805)	-0.341 (0.779)	0.060 (0.816)	-0.576 (0.734)	-1.516 (1.733)
GDP per capita (in tens of thousands €)	-0.014* (0.00)	-0.021*** (0.000)	-0.011 (0.000)	-0.018* (0.000)	-0.030** (0.000)
Nominal Labour Productivity per capita	0.118 (0.090)	0.181** (0.077)	-0.006 (0.074)	0.187** (0.084)	0.812*** (0.197)
Employed in Construction	0.536** (0.262)	0.595** (0.280)	0.753** (0.342)	0.346* (0.208)	-0.571 (0.453)
Employed in Agriculture/Forestry	0.114 (0.148)	-0.046 (0.026)	-0.103 (0.172)	0.201 (0.143)	0.042 (0.228)
Employment Rate	0.025 (0.026)	0.046* (0.026)	0.055** (0.024)	0.045 (0.028)	0.004 (0.041)
Social Spending per capita (in thousands €)	0.018*** (0.000)	0.021*** (0.000)	0.015** (0.000)	0.019*** (0.000)	0.015 (0.000)
Constant	1.672*** (0.529)	2.116*** (0.490)	1.950*** (0.525)	2.260*** (0.450)	3.656*** (0.935)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	707	707	707	707	707

Notes: Table 2 represents the panel data regression results regressing inflow of asylum seekers as % of the provincial population, on the wages through 101 provinces in Italy from 2014-2020. The control variables are the provincial mean age, provincial male %, GDP per capita per province, provincial nominal labour productivity per capita, the number of workers employed in construction and agriculture/forestry as % of provincial population, the employment rate, and social spending per capita. Standard errors are in parentheses. *p-value <0.1, **p-value<0.05, ***p-value<0.01

Since there is a positive effect on total wages (column 1) as a result of immigration, this fits the theoretical scenario that natives and migrants are complements in the labour market. Therefore, an increase in migrants will lead to an enhanced marginal productivity of natives which will increase labour demand, since the demand curve represents marginal productivity. This will in turn increase wages to a new equilibrium as shown in Figure 1 panel C. Furthermore, there is a positive effect of asylum seekers on middle-skill wages. Meaning that according to theory, middle-skilled natives and asylum seekers are complements in production. Hence, an increase in migration will increase wages of middle-skilled workers.

This is plausible economically since migrants could be complementary to a specific native skill-level. Commonly, most asylum seekers have lower skills and human capital than natives (Andersson & Eriksson & Scocco, 2019). Low-skill workers usually perform manual and low-knowledge tasks which complement more knowledge demanding middle-skill tasks. Asylum seekers will likely not have a large effect on high-skill labour since low-skill workers are further in capabilities from high-skilled workers. If asylum seekers are mostly low-skilled, often low-skilled and middle-skilled work is jointly needed to successfully produce a good. Perhaps for this reason, the positive effect is found specifically on middle-skill workers.

Some control variables in the fixed effects regression have significant results. Firstly, age seems to have a positive relationship to all dependent variables except for high skill wages. The mean age is significant in every column at varying levels and sometimes at the 1% level. This means that for all types of wages except for high-skill wages, an increase in mean age results in higher wages, which is as expected from the previous literature and general economic tendencies. Employment in construction has a positive and mostly significant effect on wages at the 95% confidence level. The macroeconomic controls nominal labour productivity, employment rate and GDP per capita have some significant effects on the dependent variables. The employment rate has positive significant effects on native Italian and low-skill wages. Nominal labour productivity per population has significant positive effects on Italian native, middle-skill and high-skill wages. Lastly, GDP per capita has a significant negative effect on middle-skill and high-skill wages.

The results presented above show that there seems to be a significant (at the 90% confidence level) effect of asylum seeker inflow on median wages and particularly middle-skill median wages on average in the sample collected in this research paper. The reason for the significant effect on middle-skill wages could be, as stated before, that asylum seekers may have skills that complement the existing labour force. This would cause an increase in productivity and lead to higher wages. However, immigration can also have a positive spillover effect on the economy which will lead to an increased overall economic situation through investment and growth in job opportunities which drive up wages.

IV.B Instrumental variable

The effect considered in section IV.A can not be considered causal as there may be time-varying omitted variables which are correlated to the error term and hence bias the results as mentioned in section III. To reach an estimate that is closer to being causal, an

instrumental variable approach is used. The instrumental variable that will be used for this is the stock of non-EU immigrants in the year before.

Table 3 Instrumental variable main results

	Instrumental variable: Stock of non-EU immigrants in the previous year				
Variables	Wages (1)	Wages Italians (2)	Wages low-skill (3)	Wages mid-skill (4)	Wages high-skill (5)
Asylum Seekers as % of population	-0.372 (3.673)	-5.299 (4.167)	-8.319* (4.920)	-0.605 (3.545)	2.613 (7.005)
Controls	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	707	707	707	707	707

Notes: Table 3 represents the instrumental variable regression results regressing inflow of asylum seekers as % of the provincial population on the wages through 101 provinces in Italy from 2014-2020. The control variables are provincial mean age, provincial male %, GDP per capita per province, provincial nominal labour productivity, the number of workers employed in construction and agriculture/forestry, the employment rate, and social spending per capita. Standard errors are in parentheses. *p-value <0.1, **p-value<0.05, ***p-value<0.01

Table 3 shows the results of including the instrumental variable of the stock of previous immigrants in the provinces to the regression of the effect of asylum seeker inflow on wages. As mentioned before, the assumptions for an instrumental variable are not fully satisfied, therefore, adding controls will try to capture the confounders in the relationship. The control variables[3] are the same controls as in Table 2. Columns 1, 2, 3 and 4 have a negative sign, however, column 5 has a positive sign. Column 3 shows that there is a significant negative effect of asylum seekers on the median wages of low-skilled workers. The significance is at the 10% significance level and it indicates that an increase in the inflow of asylum seekers of 1% of the provincial population will lead to an 8.3% decrease in the wages of low-skill workers. As mentioned in Section II, it is useful to interpret the results as wage elasticities. The IV estimates from Table 3 indicate that the wage elasticity of low-skill wages with respect to the inflow of asylum seekers is equal to -8.3. The large magnitude of these estimates provide an indication that these estimates are too large to be a true effect. The economic significance of these results is therefore low. This is also reinforced by the large

[3] Control variable coefficients are not included for simplicity. Appendix Table A.4 shows the same table as Table 3 but including the coefficients for all control variables.

standard errors present in Table 3 which decrease the confidence of making any conclusions based on these estimates.

Although this does not seem economically plausible, it could be an indication of the possible sign of the effect. Since there is a negative effect of migrants on wages, this could be linked to the long run scenario where natives and migrants are substitutes mentioned in section II. It is plausible that migrants and natives are substitutes in low-skill levels of production if most asylum seekers are low-skilled. A low-skill manual labourer is easily replaced with a different low-skill worker. Therefore, the sign of the effect of asylum seekers on low-skill wages found in Table 3 may suit the economic explanation that low-skill migrant workers are substitutes for low-skill native workers in a long-run scenario.

V. Robustness Checks

To test the validity of the results presented in section IV, robustness checks will be conducted. Firstly, a robustness check will be performed by omitting the values from the year 2020. Then a robustness check will be conducted to analyse whether there is a different effect when changing the specification of wages to average wages instead of median wages.

The year 2020 was an unordinary year characterised by the coronavirus pandemic. Due to the pandemic, there was a large decrease in global movements and immigration numbers and also the pandemic led to disproportionate consequences between immigrants and non-immigrants (OECD, 2022). The anomaly in global movement and the harsher consequences of the pandemic on immigrants could therefore be a potential issue that is driving or altering the results. To check that the anomaly of 2020 is not biassing the results, a separate regression is conducted for the years 2014 to 2019, where 2020 is omitted.

Table 4 panel A and B show that there is no large difference in the magnitudes between adding or removing the year 2020. Panel A shows the fixed effects regression and Panel B the instrumental variable regression. Clearly, there is a reduction in observations, and the previously significant at 10% level effects of asylum seekers on mid-skill wages and total wages of the fixed effects regression is no longer significant. Additionally, the previously significant effect on low-skill wages from the IV regression is not significant anymore. Nonetheless, all the signs and magnitudes of the coefficients in panel A and B remain similar to Table 2 and Table 3. The loss in significance could be because the number of observations reduces by 101 observations. The estimates in section IV and their magnitudes, therefore, do not seem to be driven by the anomaly of the year 2020 but the loss in significance decreases

the reliability of the results in section IV. Additionally, the magnitudes and the standard errors of the instrumental variable estimates are still large and likely not economically plausible.

As mentioned in the data and methodology section, the main results of this paper are based on median wages, as this is the most representative way of displaying wages. However, a robustness check on the same data but with a different specification of wages would provide an indication to the validity of the results. Therefore, instead of median wages, the same regressions will be performed but on the average wages of individuals. Table 4 panel C and D show the effect of the inflow of asylum seekers on average wages of native Italian, low-skill, middle-skill and high-skill workers. Panel C replicates Table 2 but with average wages instead of median wages. The controls included in panel C and panel D are the same as the ones in Table 2 only that they are not reported for simplicity. Panel C column 1 indicates a negative, significant at the 10% level, effect of the inflow of asylum seekers on wages of all residents. This is different to the significant, positive effect found in Table 2. Furthermore, the remaining effects of interest in columns 2-5 are all negative but insignificant. This differs from Table 2 which had a positive effect for both column 2 and 4, and a significant coefficient for column 4. Table 4 panel D replicates the results from Table 3 with average wages instead of median wages. The results from columns 1-4 have negative effects as in Table 3 but with larger magnitudes. Low-skill wages which were significantly negative in Table 3 are no longer significant at the 10% significance level. Contrary to Table 3, there is a large negative but insignificant effect on high-skill wages in Table 4 panel D.

The results are generally not robust to different specifications. The magnitudes of the results are somewhat robust to removing the year 2020, since the estimates are similar and do not change considerably. However, there is a loss in significance for the results. The different specification of average wages shows that there are some differences in signs and in the magnitudes of the effects. They do not reinforce the fixed effects results found in section IV.A of the effect on total wages and middle skilled wages, nor do they reinforce the effect on low-skill workers found in section IV.B. However, since the previous literature in section II conducts the analysis on median wages and not average wages, the results found in section IV are more comparable to previous papers than the conclusions from the robustness results.

Table 4 Robustness analyses

	Wages all Residents (1)	Wages Italian Citizens (2)	Wages Low Skill (4)	Wages Middle Skill (5)	Wages High Skill (6)
		A. Fixed Effects Results 2014-2019			
Asylum Seekers as % of population	0.539 (0.333)	0.190 (0.314)	-0.097 (0.320)	0.428 (0.276)	-0.289 (0.713)
Controls	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	606	606	606	606	606
		B. Instrumental variable Results 2014-2019			
Asylum Seekers as % of population	-0.414 (4.489)	-4.818 (4.994)	-9.319 (6.607)	-0.461 (4.333)	0.197 (8.973)
Controls	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	606	606	606	606	606
		C. Fixed Effects Results with average wage as dependent variable			
Asylum Seekers as % of population	-0.979* (0.558)	-0.691 (0.552)	-0.872 (0.681)	-0.416 (0.558)	-1.581 (1.424)
Controls	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	707	707	707	707	707
		D. Instrumental Variable with average wage as dependent variable			
Asylum Seekers as % of population	-10.724 (7.637)	-9.677 (7.592)	-14.417 (8.995)	-6.344 (6.815)	-15.809 (13.523)
Controls	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	707	707	707	707	707

Notes: Table 4 shows the robustness analyses. Panel A shows regression results regressing inflow of asylum seekers on the wages through 101 provinces in Italy from 2014-2019. Panel B shows the instrumental variable regression from 2014-2019. Panel C and D show results with average wages as the dependent variable for 2014-2020. Panel C shows the fixed effects results and Panel D the IV results with average

wages instead of median wages. The control variables are the provincial mean age, provincial male %, GDP per capita per province, provincial nominal labour productivity, the number of workers employed in construction and agriculture/forestry, the employment rate, and social spending per immigrant. Standard errors are in parentheses. *p-value <0.1, **p-value<0.05, ***p-value<0.01

VI. Discussion

The analysis above results in varying conclusions and implications for policy advice. When looking at the fixed effects regression, it seems that there is a positive effect of the inflow of asylum seekers on median wages of all residents and median wages of middle-skill workers in particular. For policy, this indicates that an open policy towards including asylum seekers in the labour market would have positive implications for wages overall and specifically for middle skill workers. When considering the instrumental variable results, different policy implications are drawn because there seems to be a negative effect from the inflow of asylum seekers on low-skill wages. This would imply that policy should either limit the inflow of asylum seekers into the job market to preserve low-skill wages, or there should be policy to prevent a negative effect on low-skill wages from the inflow of asylum seekers.

These differing policy implications come from two different sets of results based on different econometric specifications. This reinforces Clemens and Hunt's (2019) argument mentioned in section II that differences in conclusions arise from differences in specifications. Nonetheless, the conclusions have some weaknesses. The advantages of the fixed effects model used are that it can control for time-invariant unobserved differences, meaning one does not have to control for time-invariant omitted variables. Furthermore, it is important to use the same provinces since a within-province analysis provides a better estimate of the true effect of asylum seekers on wages. However, one of the main limitations is that these results are not causal because there can be factors that influence the results and lead to issues with endogeneity. The drawbacks of fixed effects regressions as a causal estimation strategy are amplified if the underlying assumptions do not hold. An assumption is that one needs to control for all time varying omitted variables because the error term should have a conditional mean of zero. Even though there are multiple control variables in the regressions, other omitted variables like labour market integration policies, social attitudes, and discrimination towards immigrants are not included in the model. Therefore, the conditional independence assumption will likely not hold. For example, high discrimination towards migrants can decrease the inclusion of asylum seekers in the labour market and this could have a differing effect per province on wages and the number of asylum seekers that settle in that province. Further, if there are more favourable labour market integration

policies, there could be less of an effect on wages in general due to a better organised system which accounts for the increase in job opportunities for the asylum seekers.

Another point of discussion regarding the validity of the results considers the issue of reverse causality. This paper assumes that the effect present is from asylum seekers influencing wages; however, the effect could be reversed. Perhaps it is not asylum seekers that influence wages but wages that influence asylum seekers. An asylum seeker's motives to enter a new country usually stem from the search for a better life (Borjas, 1999). This might mean that asylum seekers will try to move to a province with the highest standard of living and the best economic situation, most likely a location with the highest or most advantageous wages. This would mean that wages are in fact a determinant of migration patterns. Although an instrumental variable approach can be useful to solve endogeneity and reverse causality issues, it was shown above that the instrumental variable used in this paper does not adhere to the IV assumptions. Nonetheless, the empirical literature such as ones mentioned in section II point towards a unidirectional effect of migration on wages and not the reverse. This can not be proved but it is economically likely that this is the case especially within a country.

In the second part of the paper, an instrumental variable is used with an aim to arrive at a causal estimate. Instrumental variables are useful to arrive at conclusions because they do not require data on omitted variables to have casual estimates. Therefore, the omitted variables could be observed, unobserved, time variant, or invariant and the IV would still arrive at causal estimates if the assumptions hold. As mentioned in section III, the conditional independence assumption does not fully hold for the IV, the clear and strong causal effect assumption does hold but the exclusion assumption is difficult to test, and the restriction's validity is unlikely. This shows that the effect found can not be interpreted as a causal effect. One of the limitations of the instrumental variable approach is that the effect measured applies only to those who changed the treatment due to the instrument, therefore only applying to asylum seekers who entered Italy as a result of an existing immigrant population. This means that it is a local average treatment effect (LATE) instead of an average treatment effect on the treated.

The most significant limitation is the large standard errors found in Table 3 for the instrumental variable estimates. These standard errors do not give me confidence to derive true conclusions for policy advice since the estimates are likely not accurate. The estimates of the effects are also too large in magnitude which further leads to considering the results as not accurate. The wage elasticity of low skill wages of -8.3 would indicate that a 1% increase in provincial population of asylum seekers has an almost 10% decrease in wages which is a

large effect that is likely not visible in real life as wages are not that susceptible to migration based on the previous literature mentioned in section II. As was done by Angrist and Kugler (2003), the effect found in my paper with the instrumental variable could be considered an upper bound of the true effect. Most likely, the effect is still large for an upper bound and it should be interpreted with caution. The conclusions that can be derived from these estimates is an indication of what the effect could be, especially by looking at the sign of the effect.

My research's conclusions have similarities to the previous studies mentioned in section II. The instrumental variable results seem to follow the theory from the theoretical long-run setting where natives and migrants are substitutes. The sign of the IV result found in this research matches the results found in Borjas (2017). The positive effect of immigration on wages found from the fixed effects model was not mentioned in the empirical studies in section II but it matches the theoretical situation where natives and migrants are complements in production. Borjas (2017) finds a wage elasticity of high-school dropouts between -0.5 to -1.5. The magnitude of the elasticity in Borjas (2017) is similar to the elasticity found in my fixed effects regression of 0.6, indicating a moderate effect. The wage elasticity found in my instrumental variable results is unrealistically larger in magnitude.

In terms of limitations to the data, there is a difference between asylum seekers and refugees since asylum seekers become refugees once their asylum seeking status is granted. It would have been more useful to look at the effect that refugees have on the labour market, since refugees are guaranteed to then be able to stay in the country and have longer-run effects. Further, since asylum seekers represent a smaller portion of the population than total refugees, asylum seekers likely have smaller effects than refugees on labour market outcomes. However, there is no data available on refugees specifically at the provincial level. Furthermore, as mentioned in section I, asylum seekers are allowed to work 60 days after requesting asylum. It is not guaranteed that all the asylum seekers did work, nor that they found legal work, nor that they didn't do other types of work before the 60 days. Moreover, it would have been more effective to analyse quarterly data instead of yearly data, since many asylum seekers may have already been declined asylum and made to return to their country throughout the year. However, due to data unavailability the best way to measure the effect of asylum seekers was at a yearly level. Furthermore, the same analysis could be done for different age groups since there could be differing effects based on the age category. A general analysis, as performed in this paper, does not allow for the fact that different age groups naturally have differing effects on the labour market.

VII. Conclusion

Based on different empirical strategies, the effect of asylum seekers on wages in Italy between 2014 and 2020 has different conclusions. Firstly, with a fixed effects regression there is a positive effect on median wages and middle skilled median wages, the resulting wage elasticities of both is around 0.6. Secondly, with an instrumental variable approach, there seems to be a negative effect on low skilled median wages, with an economically unlikely large wage elasticity of -8.3. This has varying policy implications and shows the difficulty of designing economic policy based on empirical research. The provincial fixed effects design would imply an economic policy open to and incentivising asylum seekers, due to their positive effect on some specifications of wages. The instrumental variable would instead imply an economic policy to either limit or aid the potentially affected low-skilled workers from the negative effects that were found in the results. However, conclusions on the instrumental variable results should cautiously be made due to the large magnitude and standard errors in the estimates.

Based on previous literature, there was no full consensus on the effect of immigrants in general, and asylum seekers more specifically, on wages in the host country. This research paper further creates doubt on which effect is larger. In terms of magnitude, the instrumental variable negative effect is larger than the fixed effects positive effect. However, further research has to be conducted on this topic to arrive at more stable conclusions. A consensus would be difficult since every migrant crisis is different. However, the Italian- and EU-migrant crises require more attention to allow for more comprehensive immigrant integration policies. The first point of further research could involve analysing a heterogeneity in age and gender. Whether there is a difference between male and female immigrants, or if their effect is different on male or female residents of the host country. Furthermore, as mentioned in section VI asylum seekers are not directly refugees and thus, to arrive at conclusions that are more useful for economic policy, it would be best to conduct research on the effect that refugees have had on wages instead. Lastly, the effect studied in this paper was a heterogeneity on Italian, low-skill, middle-skill, and high-skill wages separately. However, the effects that immigration might have on wages of low-skill natives or middle-skill natives would be more in line with previous studies.

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IX. Appendix

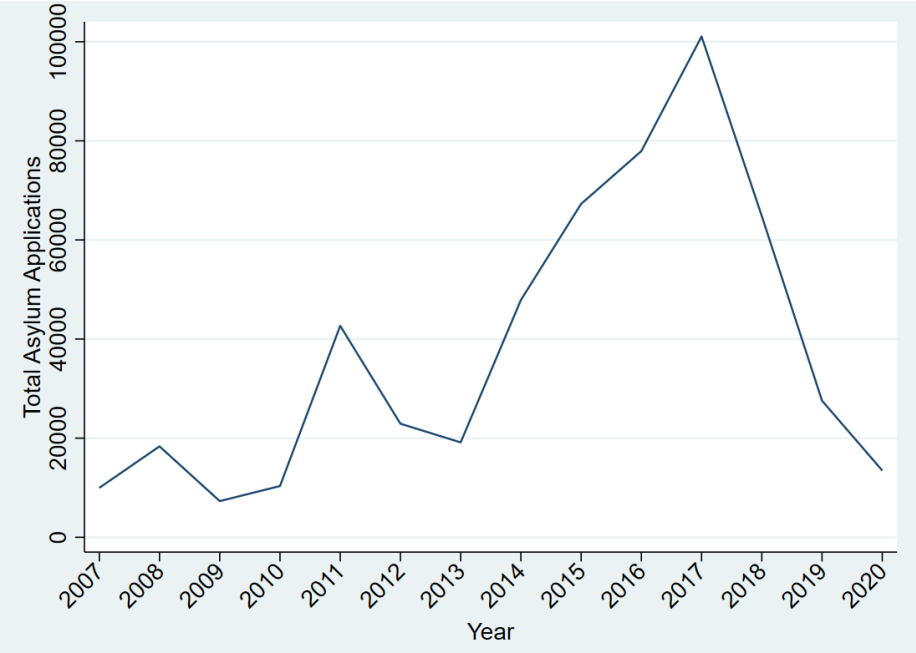

Figure A.1 Asylum applications total number across time period 2007-2020

Data Derived from ISTAT (2022)

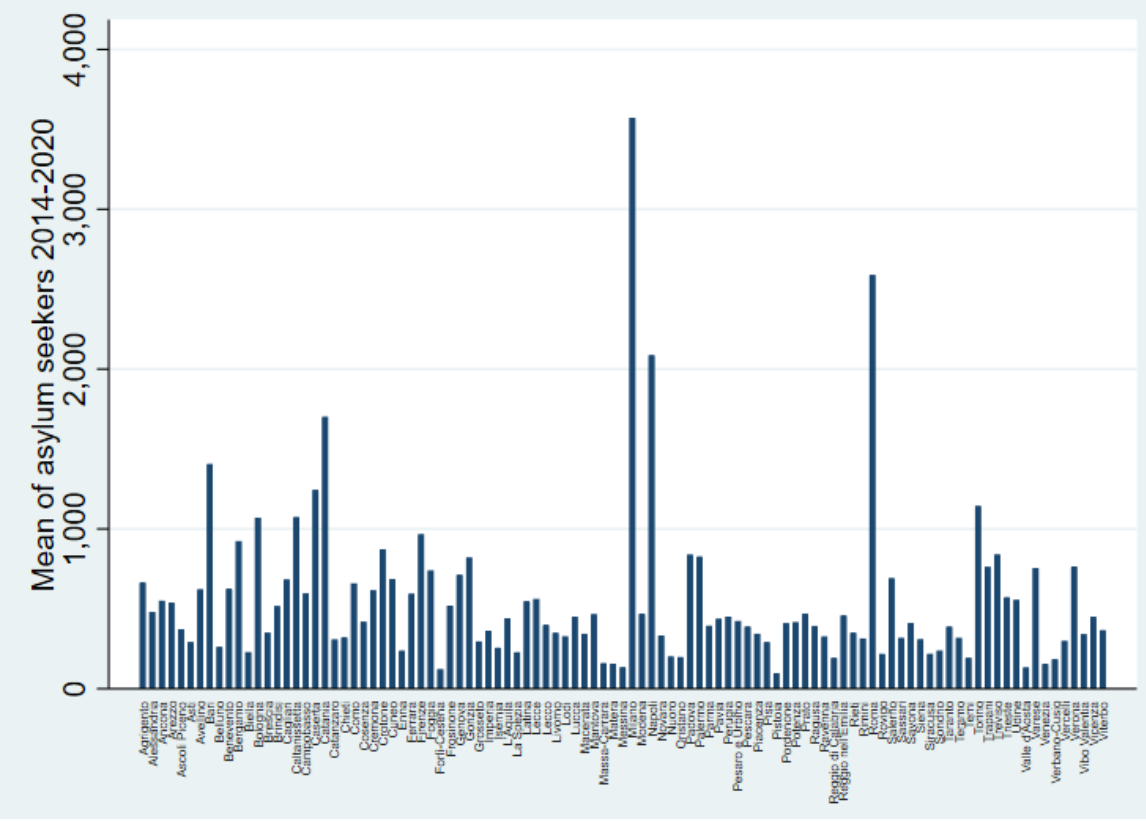

Figure A.2 Distribution of mean asylum seekers per province

Data Derived from ISTAT (2022)

Figure A.3 Provinces of Italy

Source: Unione Province d'Italia (2019)

Notes: White boxes indicate provinces that are also metropolitan cities. The different colours represent different regions, there are 20 regions in Italy and 107 provinces.

Table A.1 Instrumental variable assumption check

	Stock of immigrants in previous year (1)	Asylum seekers as % of population (2)
Stock of immigrants in previous year		0.000*** (0.000)
Mean Age	-433.13 (447.704)	
Male %	-128300.300 (180966.700)	
GDP per capita	0.209 (0.175)	
Nominal Labour Productivity per capita	-49684.350** (21040.260)	
Employed in Construction	257517.100** (99807.9)	
Employed in Agriculture/Forestry	-250279.800*** (62308.900)	
Employment Rate	6958.815 (10902.730)	
Social Spending per capita	2.059 (2.964)	
Constant	117123.2 (74821.63)	0.0013*** (0.000)
F-Statistic		18.150
Observations	707	707

Notes: Standard errors are in parentheses. *p-value <0.1, **p-value<0.05, ***p-value<0.01

Table A.2 Results without year fixed effects

	Wages all Residents (1)	Wages Italian Citizens (2)	Wages Low Skill (3)	Wages Middle Skill (4)	Wages High Skill (5)
			A. Fixed Effects		
Asylum Seekers as % of population	0.087 (0.026)	-0.215 (0.323)	-0.116 (0.311)	0.221 (0.298)	-2.799*** (0.939)
Controls	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	No	No	No	No	No
Observations	707	707	707	707	707
			B. Instrumental variable: Non-EU immigrants in year before		
Asylum Seekers as % of population	-10.825 (7.952)	-13.588 (9.061)	-10.176 (8.355)	-16.601* (9.897)	-43.701** (21.454)
Controls	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	No	No	No	No	No
Observations	707	707	707	707	707

Notes: Table A.2 Panel A represents the panel data regression results and Panel B the instrumental variable results from regressing inflow of asylum seekers on the wages through 101 provinces in Italy from 2014-2020. These results do not include yearly fixed effects. The control variables are provincial mean age, provincial male %, GDP per capita per province, provincial nominal labour productivity, the number of workers employed in construction and agriculture/forestry, the employment rate, and social spending per provincial capita. Standard errors are in parentheses. *p-value <0.1, **p-value<0.05, ***p-value<0.01

Table A.3 Summarising Table of Literature

Paper	Group of Interest	Variable of interest	Size of the effect
Altonji and Card (1991)	Less skilled natives	Wages and employment	Negative effect on native low skilled wages, no effect on employment
Card (1990)	Non-cuban low skill	Wages and employment rate	No effect on either
Borjas (2017)	Male high school dropouts	Wages and employment rate	Wage elasticity between -0.5 and -1.5. No effect on employment
Angrist and Kugler (2003)	Native workers	Employment rate and wages	Immigration raised native unemployment by 0.83 percentage points
Tumen (2016)	Native workers	Wages and employment rates	No effect on wages, negative effect on Turkish native employment

Table A.4 Control variable coefficients for Instrumental Variable regression

	Instrumental variable: Stock of non-EU immigrants in the previous year				
Variables	Wages (1)	Wages Italians (2)	Wages low-skill (3)	Wages mid-skill (4)	Wages high-skill (5)
Asylum Seekers as % of population	-0.372 (3.673)	-5.299 (4.167)	-8.319* (4.920)	-0.605 (3.545)	2.613 (7.005)
Mean Age	0.143*** (0.005)	0.003 (0.006)	-0.001 (0.007)	0.007 (0.005)	-0.014 (0.009)
Male %	-0.176 (1.146)	-1.847 (1.300)	-2.166 (1.535)	-0.892 (1.106)	-0.773 (2.186)
GDP per capita (in tens of thousands €)	-0.014** (0.006)	-0.020*** (0.006)	-0.010 (0.007)	-0.017*** (0.005)	-0.030*** (0.011)
Nominal Labour Productivity per capita	0.113* (0.064)	0.151** (0.072)	-0.051 (0.085)	0.180*** (0.061)	0.827*** (0.121)
Employed in Construction	0.551** (0.063)	0.684*** (0.253)	0.885*** (0.299)	0.365* (0.215)	-0.615 (0.426)
Employed in Agriculture/Forestry	0.104 (0.147)	-0.080 (0.166)	-0.195 (0.196)	0.188 (0.142)	0.072 (0.280)
Employment Rate	0.029 (0.029)	0.071** (0.032)	0.092** (0.038)	0.051* (0.028)	-0.008 (0.055)
Social Spending per capita (in thousands €)	0.016* (0.009)	0.012 (0.010)	0.002 (0.012)	0.017** (0.008)	0.019 (0.017)
Constant	1.848** (0.749)	3.120*** (0.850)	3.432*** (1.004)	2.470*** (0.723)	3.460** (1.430)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	707	707	707	707	707

Notes: Table A.4 represents the instrumental variable regression results regressing inflow of asylum seekers on the wages through 101 provinces in Italy from 2014-2020. The control variables are provincial mean age, provincial male %, GDP per capita per province, provincial nominal labour productivity , the number of workers employed in construction and agriculture/forestry, the employment rate, and social spending per capita. Standard errors are in parentheses. *p-value <0.1, **p-value<0.05, ***p-value<0.01