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The Effects of a Temporary Migration Shock: Evidence from the Arab Spring Migration through Italy

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Abstract

This study estimates the short-term effects of migration on employment of native workers in Italy using the exogenous, unanticipated and temporary migration resulting from the Arab Spring. While migration does not have overall effects on native employment, I find significant and offsetting short-term effects across industries. In negatively affected sectors, I estimate quarterly displacement effects that range between 0.68 and 0.8 displaced natives for every immigrant hired. The positive employment effects are consistent with a rise in sectoral employment operating through increased demand from immigrants. Both positive and negative effects on employment tend to dissipate over time.

JEL Classification: F22, J61, R23, R58

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1 Introduction

The debate over the effects of migration on wages and employment of native workers is a long standing one in the labor economics literature. Several studies exploit the heterogeneous distribution of immigrants across local labor markets to derive causal estimates. Most of these studies find little or no impact of migration on wages and employment.¹ This evidence is inconsistent with the standard labor market model² and it fails to explain why migration remains at the core of the political debate in many countries. To account for the lack of effects, the literature has proposed different channels through which either native workers or firms respond to migration over time, equalizing wages and employment opportunities across local labor markets.³ These findings suggest that the short-run effects of migration on labor market outcomes may be different from the medium or long-run effects.

While the long-term effects of migration have been widely studied, to date little has been done to study how labor markets react to migration in the very short run. This study provides new estimates of the impact of migration on the employment of natives that isolate the short-term component from other confounding factors or longer-term responses. This is accomplished by using quarterly data while exploiting the unique characteristics of the migration to Italy resulting from the Arab Spring.

There are multiple reasons why migration following the Arab Spring is particularly suitable for this analysis. First, the political instability in Northern Africa was likely exogenous to the dynamics prevailing in Italian local labor markets at the time of the uprisings. Second, the Arab

¹See for example Altonji and Card (1991), Card (1990), Card (2005), Card and Lewis (2007) in the United States, Hunt (1992) in France, Pischke and Velling (1997) in Germany, Dustmann et al. (2005) in the UK and González and Ortega (2011) in Spain.

²This is true assuming that the labor demand is neither perfectly elastic nor perfectly inelastic. In a case where the labor demand is perfectly inelastic, migration has no effect on employment. On the contrary, if the labor demand is assumed to be perfectly elastic, migration has no effect on wages.

³Natives might move out of the regions more affected by migration toward those less affected, thus offsetting the differential effects of migration across regions (Borjas, 2003; Borjas, 2006; Monras, 2014). Native and immigrants might specialize in performing complementary tasks (Peri and Sparber, 2009). Firms might adjust their use of labor inputs to the local labor supply, thus reducing the effects of migration on wages and employment (Lewis, 2003; Card and Lewis, 2007; Lewis, 2011).

Spring caused a large spike in immigrants to Italy in a relatively short time period. In the first 6 months of 2011 the share of immigrants residing in Italy and originating from the Arab Spring countries of Egypt, Libya, Tunisia and Yemen increased by 23%. In the first three quarters of 2011 more than 57,000 individuals entered Italy illegally, averaging 19,000 individuals per quarter. This compares to an average of 1,300 individuals per quarter in the two years prior to the uprisings. Finally and most importantly, the Arab Spring induced a temporary migration wave. It is estimated that 95% of the legal immigrants who arrived in Italy during the uprisings left the country within one year.

The temporary, unanticipated and exogenous nature of the Arab Spring migration combined with the use of quarterly data, makes it possible to isolate the immediate effects of migration from the longer-run adjustments that it induces. Several existing studies analyze migration events that last for years or decades. In doing so they estimate the long-run effects of migration. Fewer studies focus on short-lived migration waves triggered by exogenous factors and those that do, use data at annual or lower frequency (e.g. Card, 1990; Hunt, 1992; Carrington and de Lima, 1996). While the short-lived migration events previously studied are usually associated with immigrants who take up permanent residence in the destination countries, the Arab Spring migration was temporary. Most of the immigrants in fact, left Italy within a short time period. The temporary nature of the migration wave analyzed here and my use of data at higher frequency, both result in a lower chance of capturing attenuating responses to migration.

My estimation strategy exploits the heterogeneous distribution of immigrants across Italian regions. As in many studies that use the geographical variation of migration flows, I account for endogenous settlement by using the share of immigrants from the same origin country previously living in each Italian region as an instrument for the distribution of immigrants across regions during the Arab Spring. I combine this static measure of migration intensity with the change in the flow of illegal entries into Italy over the same period to form a dynamic instrument.

Two general findings emerge from this analysis. First, while the short-run effect of migration on overall native employment is small and insignificant, I find significant and offsetting effects across industries. In particular, I find that the Arab Spring migration has a positive effect on the

employment of natives in construction and educational services and a negative effect in mining, wholesale trade, hotels and restaurants. To explain the coexistence of positive and negative employment effects, I show evidence of a shift of native workers across industries. With some assumptions, I estimate that an inflow of 1,000 new immigrants into a region caused around 50 native workers to move from either mining, wholesale trade or hotels and restaurants into construction. These findings corroborate those of other recent studies that find that workers who experience negative local shocks are more likely to move across firms and industries (Fogel and Peri, 2013; Dix-Carneiro and Kovak, 2015). I also discuss the possibility that employment in educational services and in construction increased as an effect of the contemporaneous increase in the demand of educational services and housing induced by the Arab Spring migration.⁴ The role of immigrants as consumers whose actions impact native employment better explain the positive effects of short-term migration on employment than the standard complementarity argument.⁵

Second, in the industries in which employment is affected, temporary migration has significant and sizable immediate effects that tend to dissipate as the migration wave ends. I estimate quarterly displacement effects that range in between 0.68 and 0.8 displaced natives for every immigrant that finds a job. These are up to 2.6 times as large as the annual displacement effects estimated by other studies in Europe.⁶ As immigrants flee Italy, I find that native employment gradually converges back to the pre Arab Spring level in most of the sectors. Across all sectors that migration has impacted, I estimate that around 50% of the quarterly effects disappear within 1 year. While the temporary nature of the Arab Spring makes comparisons with other studies difficult, my findings are generally in line with the literature on the dynamic adjustments of wages to migration. This literature, based on more permanent migration events, also finds effects that shrink over time (Cohen-Goldner and Paserman, 2011; Monras, 2014).

⁴The rise in demand for housing can be seen as caused either directly by immigrants seeking housing, or indirectly through state-financed housing programs for refugees.

⁵Differently from what implied by the standard complementarity argument in fact, I find no evidence of immigrants entering the sectors in which native employment goes up. I also find no positive effects of migration on the earnings of native workers.

⁶Glitz (2012) and Campos Vazquez (2008) estimate annual displacement effects of 0.3 unemployed natives for each immigrant hired.

Estimating the short-term effects of migration is relevant for multiple reasons. First, it provides a way of understanding what happens soon after immigrants enter a labor market. A finer assessment of those mechanisms may better inform the political debate on migration and help to reconcile the empirical evidence of little or no effect of migration with the predictions from the standard labor market model. Second, while the literature has extensively focused on the effects of migration in final destination regions, to date there is little evidence on the effects of migration in states that are located between origin and final destination countries (i.e. intermediary regions). The results of this study could thus be relevant to other intermediary regions.⁷ In Europe for example, the Balkan States and the Southern European countries serve as a bridge between the Middle East or Africa and Northern European countries. In Central America, Mexico is known to channel immigrants from Central and South America to the United States and Canada (Hamilton and Chinchilla, 1991; García, 2006). In the United States, border states such as Arizona or New Mexico are subject to the temporary migration of illegals from the Mexican border.⁸

The paper is organized as follows. Section 2 describes the migration through Italy resulting from the Arab Spring. Section 3 discusses the data. Section 4 introduces the empirical methodology. Section 5 and 6 present the main results and the robustness checks respectively. Lastly, Section 7 concludes.

2 The Arab Spring induced migration through Italy

The series of revolts that has become known as the Arab Spring was sparked by the first protest that occurred in Sidi Bouzid (Tunisia) on December 18, 2010. In less than one month protesters succeeded in overthrowing the existing Tunisian government. The success of this first revolt triggered a wave of violent uprisings in the neighboring countries. By August 2011,

⁷The motivation and the conclusions of my paper are aligned with the recent literature that highlight how temporary migration can have very different effects than permanent migration (Dustmann and Gorchach, 2015).

⁸Despite their status as border states, in 2013 Arizona and New Mexico together hosted fewer unauthorized Mexican immigrants (299,000 and 373,000, respectively) than Illinois (Source: MPI elaboration on ACS data) .

governments had been overthrown in four countries: Egypt, Libya, Tunisia and Yemen. The chaos that followed the ousting of Ben Ali⁹ in January 2011 led to the temporary disruption of the coastal control activities performed by the Tunisian police. The lack of controls and the political instability of the region triggered a substantial migration from the unstable countries to Italy, the nearest European country.

Figure 1 provides graphical evidence of this migration. The top panel plots legal immigrants from Egypt, Libya, Tunisia and Yemen as a percentage of the Italian population. Consistent with the timing of the revolts, in the first half of 2011 the number of immigrants from the Arab Spring countries increased by 23%.¹⁰ This is equivalent to an inflow of about 56,000 individuals, around 42,000 of whom were of working age. In the same 6 months the growth rate of the Italian population remained close to zero at about 0.005% (Source: Italian Labor Force Survey Data).

The bottom panel of Figure 1 plots illegal entries into Italy through the Central Mediterranean route as a percentage of the Italian population.¹¹ Due to the proximity of Sicily and the Italian Pelagic islands to Tunisia, the Central Mediterranean route is believed to have channeled most of the illegal immigrant flows induced by the uprisings (Fontex, 2012; Fargues and Fandrich, 2012). Consistent with the timing of the revolts, the bottom panel in Figure 1 shows a spike in illegal entries in the first 3 quarters of 2011. Such a spike amounts to a total inflow of more than 57,000 illegal immigrants, averaging more than 19,000 immigrants a quarter. In contrast, only 10,000 illegal immigrants entered Italy through the Central Mediterranean route in the 2 years prior to the Arab Spring, averaging 1,300 individuals a quarter. The sizable inflow of illegal immigrants within such a short period received extensive coverage by the Italian and the international media.¹² The event prompted a declaration of a state of emergency in

⁹The Tunisian president at the time of the revolts.

¹⁰The pattern followed by legal immigrants in 2009 seems to reflect the reduction in employment opportunities caused by the Euro crisis. This is, in fact, often mentioned as one of the reasons behind the decline in migration flows toward Europe in the second half of 2009 (see the quarterly report *FRAN 2010 Q1* from Frontex). In this study I focus on the migration flows induced by the uprisings. These are seen as plausibly exogenous to the local labor market conditions at the time of the revolts in Italy (see also Section 4.3).

¹¹The Central Mediterranean route refers to irregular migration flows from northern Africa towards Italy and Malta through the Mediterranean sea (Frontex).

¹²E.g. "Italy declares state of emergency after 4,000 illegal immigrants fleeing Tunisia unrest land at its ports

February 2011. The joint effort of Tunisian, Italian and European institutions, succeeded in stopping the exceptionally high flow of illegals, which returned to pre-crisis levels by the end of 2011.

The top panel in Figure 1 highlights one other important feature of the migration resulting from the Arab Spring. Of the immigrants who arrived in Italy, only a small fraction remained in the country for a period longer than one year. In particular, 95% of the 56,000 legal immigrants who entered Italy in the first half of 2011 left the country by the end of that same year.¹³ In other words, the Arab Spring brought about a temporary rather than permanent migration to Italy. The temporary migration flow of Africans through Italy has been increasingly documented in the Italian press over the last few years.¹⁴ Once in Europe, African immigrants try to move to those countries that can offer better job opportunities (e.g. Germany and Scandinavian countries) and/or lower linguistic barriers (i.e. France).

Despite their short stay, these immigrants were active in the labor market according to data from the Italian Labor Force Survey. In the first two quarters of 2011 in fact, the number of legal immigrants from Arab Spring countries who were employed in Italy went up by 36%. There are several reasons why these temporary immigrants were active in the (formal or informal) labor market. First, the Arab Spring immigrants are likely to have made unplanned decisions to migrate. Once in Italy, they likely worked for a short time period to finance further migration. Second, immigrants with a pending or refugee status are in principle eligible to receive state-financed assistance. As the Italian and the international media have documented however¹⁵, these assistance programs could accommodate only a very limited number of people. The other immigrants were left to fend for themselves. To quote Laura Boldrini, the spokeswoman for

in four days" *The Daily Mail*, February 13, 2011. "Italy declares state of emergency over influx of 5,000 Tunisian immigrants" *The Telegraph*, February 13, 2011. "Crescono le richieste di asilo. Il 102% in piu' da Tunisia e Libia" *La Repubblica*, December 5, 2011.

¹³In the last quarter of 2011 there were around 197,000 legal immigrants from Egypt, Libya, Tunisia and Yemen in Italy, only around 3,000 more than in the last quarter of 2010 (Italian Labor Force Survey data).

¹⁴E.g. "Immigrati, boom di sbarchi ma pochi restano in Italia" *La Stampa*, June 23, 2014. "Immigrati, ne arrivano sempre meno, se ne vanno sempre di piu' e 300 mila sono senza documenti" *La Repubblica*, December 10, 2013.

¹⁵E.g. "Gli hotel della disperazione. L'emergenza infinita dei rifugiati" *La Repubblica*, January 2, 2013.

the United Nations High Commissioner for Refugees in Italy at the time of the uprisings: "If you're not lucky enough to get one of those (spots in the assistance programs), you're on your own. You have to find a way to support yourself, learn the language, get a house and a job".¹⁶

3 The Data

I collect labor market and demographic information from the restricted version of the Italian Quarterly Labor Force Survey (LFS). This survey collects data on about 70,000 households in 1,246 Italian municipalities for a total of 175,000 individuals representing 1.2% of the overall Italian population. The reference population consists of all household members residing in Italy. The survey is representative of the population at the regional level.

Consistent with the timing of the uprisings, I restrict the analysis to the years 2009-2012. The analysis is conducted at the regional level. I restrict the sample to the Italian citizens between 15 and 64 years old, who are defined as natives.¹⁷ Starting from micro level data I derive the employment rate of natives in each one of the 20 Italian regions, for each quarter and industry. I use the two-digit SIC code information contained in the LFS, to classify employed workers in 12 industries.¹⁸ Tables B.1 and B.2 in the Appendix show descriptive statistics on regional employment and earnings of natives by sector. Following the same aggregation procedure, I construct an extensive set of regional controls. Table 1 shows descriptive statistics on the complete list of controls used throughout the analysis. The LFS records both formal and informal employment relations¹⁹; however, it is impossible to distinguish between the two. In light of this limitation, we will only be able to analyze the combined effects of migration on

¹⁶Quote extracted from "In Italy, Shantytowns of Refugees Reflect Paradox on Asylum" *New York Times*, December 26 2012.

¹⁷In Section 6 I also consider a specification in which natives are defined as individuals born in Italy.

¹⁸More details on the industry classification can be found in the online Appendix A. In aggregating individual level data to the regional and sectoral level, I use the individual weights provided by ISTAT.

¹⁹The studies that compare administrative and LFS data confirm that survey data capture informal employment. In particular, Cascioli (2006) compares administrative data (*INPS*) and LFS data on employment in four Italian provinces and finds a 23% higher employment figure in the LFS than in the administrative data. A greater difference is found in segments of the labor market characterized by a greater concentration of informal jobs such as those employing workers younger than 23, or jobs in agriculture, construction, trade, hotels and restaurants.

formal and informal native employment.

Since the analysis is centered around the migration resulting from the Arab Spring, I restrict the attention to the immigrants born in Egypt, Libya, Tunisia or Yemen. In all of these countries the government was overthrown by popular rebellion resulting in considerable chaos and political instability, conditions that in turn led people to migrate. For each Italian region and quarter I derive the change in the total number of immigrants from the Arab Spring countries relative to the native population.²⁰ Migration flows from those countries, measured through LFS data, can be considered a reliable proxy of the actual flows. The correlation between (annual) administrative data and LFS data on the number of immigrants in Italian regions is around 0.95.²¹ In between the last quarter of 2010 and the first six months of 2011 (i.e. the peak of the Arab Spring), the average share of legal immigrants from these countries increased by 0.05%, or the equivalent to an inflow of around 900 individuals in the average region. Some of these immigrants actively participated in local labor markets. During this period in fact, the number of employed immigrants from the Arab Spring countries went up by 24% in the average region (Table 1).

I use ISTAT data on the number of Egyptian, Libyan, Tunisian and Yemenite citizens residing in Italy in 2003, to reconstruct the past shares of Arab Spring immigrants living in each region.²² The 2003 shares of resident immigrants vary widely across regions with some of the regions showing shares that are more than 9 times smaller than the average (Table 1). This variation is important to the estimation strategy described in Section 4. As part of the instrumental variable approach that I develop, I use Frontex data on the *number of illegal border crossing detections* through the Central Mediterranean route net of arrivals on

²⁰Unfortunately, the available information on the dates of entry of immigrants does not appear to be reliable enough to be used. According to that measure in fact, most of the immigrants arrived prior to 2011. If that were true, then the pattern we observe in the top panel of Figure 1 would have to be explained either as incorrectly recorded data on the date of entry or as the result of temporary returns by immigrants who had previously lived in Italy. Other variables in the same survey however, indicate that there was no increase in return migration in 2011.

²¹Administrative data from "Resident foreigners on January 1st - Citizenship" (ISTAT).

²²The data can be accessed through ISTAT - "Foreign resident population on the January 1st - focus on citizenship". The earliest year for which data on residents by nationality are made freely available online by ISTAT is 2003.

Malta.²³ The Central Mediterranean route refers to irregular migration flows from northern Africa toward Italy and Malta through the Mediterranean sea. Due to a mix of political and geographical reasons²⁴, this is the route that channeled most of the illegal migration associated with the uprisings.

Table 2 compares demographic and socioeconomic characteristics of natives and legal immigrants from the Arab Spring countries. For the immigrants only, I also differentiate between the pre- and the post-Arab Spring period. More than 60% of the legal immigrants in the database are males. Most of them are from Tunisia, the closest country, and Egypt, the most populated country. Even if immigrants and natives have similar educational attainments, the former are much more likely to work in agriculture, construction, hotels and restaurants. This descriptive evidence is generally consistent with the part of the literature showing that similarly educated immigrants and natives often work in very different industries (Steinhardt, 2011) or perform different tasks (Peri and Sparber, 2009). More generally, Table 2 highlights the importance of analyzing the effects of migration across different industries. Because the Arab Spring immigrants are unevenly distributed across sectors, we would expect immigration to impact some industries more than others. A comparison between the pre- and post-Arab Spring period suggests that the immigrants moved by the uprisings are more likely to be Tunisian males, and are by comparison younger and less educated than the immigrants from the Arab Spring countries who lived in Italy prior to the revolts. This is consistent with the information available from Frontex on the characteristics of the immigrants who arrived in Italy during the uprisings.²⁵

One limitation of the LFS data is that it does not measure illegal migration. To be part of the reference population for the LFS in fact, individuals must have a resident permit valid

²³Frontex is the agency that coordinates and develops the European border management. The data on illegal entries are collected by Frontex and provided by the 30 FRAN (Frontex Risk Analysis Network) border control authorities of the member states.

²⁴Among the political reasons, the temporary disruption of border patrol activities in Tunisia played a key role (see also Section 4). Geography is also important as Italy and Malta are closer to Tunisia than is any other European country (Section 2).

²⁵In particular, the quarterly reports from Frontex *FRAN Q1 2011* and *Q2 2011* document the abnormal migration of Tunisians during the uprisings. *Fran Q2 2012* describes the Tunisians arriving in Italy as "young (18-35 years) unmarried males with primary-school level of education".

for at least one year. Because of the reasons underlying the Arab Spring migration, some of the illegals likely received resident permits within 3 months of their arrival. Based on Eurostat data, around 30% of the asylum applications submitted in 2011 were accepted in first-instance decisions.²⁶ When granted, asylum allows immigrants to receive a resident permit valid for at least one year and permission to work legally in Italy. Italian laws prescribe a limit of 8 days from arrival to apply for asylum. Authorities then have 30 days to interview the applicant and to collect and receive the required documentation. The decision on an asylum application must take place within 3 working days from the interview. Immigrants on a pending or refugee status are allowed to move within the Italian territory. In the case of exceptions to this framework the procedure might be lengthened or shortened. In particular (and most relevant to our case), the illegal immigrants who are held in an Identification and Expulsion Center (CEI) are subject to a prioritized procedure that reduces the length of the entire process to 9 days.²⁷ Since most of the illegal immigrants from the Arab Spring arrived on the Italian Pelagic Islands and were then transferred to the mainland, most of them were likely held in a CEI. For immigrants held in a CEI the average length of detention was 38 days²⁸, suggesting that many of them received a decision within our reference period of 3 months. Even if some of the illegals became legal and were therefore likely captured in the LFS, the data at hand do not provide a measure of the flows of illegal immigrants who never became legal. In Section 4 I discuss how to better estimate the employment effects of migration taking this limitation into account.

²⁶The Italian authorities received 24100 asylum applications, 16960 of which were rejected. Source: Eurostat-*First instance decisions on applications by type of decision*.

²⁷If the authorities require further documentation or if there are exceptional circumstances the time limit can be extended to a maximum of 18 months. More detailed information is available from The Asylum Information Database under the section "Short overview of the asylum procedure" made available by the Italian Council for Refugees.

²⁸Source: Asylum Information Database - Annual Report 2012/2013.

4 The Empirical Strategy

4.1 *The short-term effects of migration*

To estimate the short-term effects of the Arab Spring migration on changes in employment I exploit the variation of migration flows across Italian regions. The estimating equation takes the following form:

$$\frac{E_{rt+1} - E_{rt}}{pop_{rt}} = \alpha_1 + \alpha_2 \frac{(Im_{rt+1}^{AS} - Im_{rt}^{AS})}{pop_{rt}} \times 100 + \alpha_3 \Delta X_{rt+1} + \gamma_y + \gamma_t + \gamma_r + \Delta \epsilon_{rt+1} \quad (1)$$

where $\Delta Im_{rt+1}^{AS} = [(Im_{rt+1}^{AS} - Im_{rt}^{AS})/pop_{rt}] \times 100$, is the quarterly percentage change in the number of immigrants from the Arab Spring countries in region r relative to the lagged value of the working age native population in the same region (i.e. pop_{rt}). E_{rt} is the number of native workers employed in region r at time t , X_{rt} is a set of region specific controls²⁹; and γ_y , γ_t , γ_r are (respectively) year, quarter and region fixed effects. The coefficient of interest in equation (1) is α_2 . Under the assumptions discussed in Section 4.3, this captures the short-term effects of migration on the change of native employment as a fraction of the population in a region. To account for heterogeneous effects of migration across industries, I also estimate equation (1) separately for employment of natives in 12 different sectors. I do so by using the change in regional native employment relative to the population in each sector as the dependent variable in equation (1), while keeping the same set of independent variables. A separate regression is estimated for each sector.

²⁹These controls include: average age, the share men in the population, the regional population, full-time, white collar and tenured workers as a fraction of the workers employed, the share of high school and college graduates.

4.2 *The dynamic effects of temporary migration*

To analyze the dynamic evolution of the effects of the Arab Spring migration, I relate quarterly migration flows to employment changes measured at a progressively lower frequency. To account for the effects of migration flows that occurred after the end of a quarter (i.e. contemporaneous flows), I also control for the change in the number of immigrants between the end of the quarter and the end of the reference period for the employment change. The estimating equation follows:

$$\frac{E_{rt+i} - E_{rt}}{pop_{rt}} = \alpha_1^i + \alpha_2^i \frac{(Im_{rt+1}^{AS} - Im_{rt}^{AS})}{pop_{rt}} \times 100 + \alpha_3^i \frac{(Im_{rt+i}^{AS} - Im_{rt+1}^{AS})}{pop_{rt+1}} \times 100 + \alpha_4^i \Delta X_{rt+i} + \Gamma_{ytr}^i + \Delta \epsilon_{rt+i} \quad (2)$$

In estimating this model I focus on employment changes over 3, 6, 9 and 12 months so that the subscript i ranges between 1 and 4.³⁰ I control for Γ_{ytr}^i that is a vector of region, year and quarter fixed effects, while the other terms follow the same notation as in equation (1). The coefficient of interest in this model is α_2^i . When estimated over progressively greater i , this describes the evolution of the short term effects of migration over time. Equation (2) is estimated over a rolling panel in which I keep the observation window fixed (i.e. 2009-2012). I restrict the analysis of the dynamic effects to the sectors that are significantly affected on a quarterly basis by migration.

4.3 *Identification*

In this empirical model, the identification of the effects of migration on employment hinges on two conditions. First, there must be variation in migration flows across Italian regions. Second, migration flows to each region need to be uncorrelated with unobserved factors driving changes in native employment.

As regards the first condition, Figure 2 shows the distribution of legal migration flows across regions at the peak of the Arab Spring migration. The figure highlights a substantial heterogeneity, with the northern regions experiencing larger relative inflows. Presumably because of

³⁰At frequencies lower than 12 months, the instrument is weak due to the limited number of observations. This results in noisier second stage estimates which are shown in the Appendix (see Section 5).

their proximity to the countries affected by the uprisings, some regions in the south, such as Sicily and Apulia, also experienced moderately large flows. Turning to the second condition, Figure 2 suggests that it is unlikely to be satisfied in this setting. The figure shows that the Arab Spring immigrants moved to the richer regions in the north. These regions were also more likely to experience higher employment growth. This suggests that there might be a positive spurious correlation between migration flows to a given region and employment changes. This would create an upward bias in the estimated effects of migration on employment.

To deal with the endogenous settlement of immigrants across regions, I use the share of immigrants from the Arab Spring countries living in each region in 2003 as an instrument for the distribution of immigrants across regions during the Arab Spring. I combine this static measure of migration intensity with the quarterly change in illegal entries from the Central Mediterranean route to form a dynamic instrument which takes the following form:

$$\left(\frac{Im_{r2003}^{AS}}{Im_{2003}^{AS}} \right) \times \left(\frac{\Delta Illegal_{t+1} \times 100}{pop_{rt}} \right) \quad (3)$$

where $\Delta Illegal_{t+1}$ is the quarterly change in the illegal entries through the Central Mediterranean route. Im_{r2003}^{AS} is the number of immigrants from Egypt, Libya, Tunisia and Yemen (i.e. the Arab Spring countries) living in region r in 2003. Im_{2003}^{AS} is the total number of immigrants from the Arab Spring countries living in Italy in 2003.³¹ When used to predict migration flows at a frequency lower than 3 months, the instrument (3) is adjusted to match the timing of the endogenous variable. In particular, in the case of the endogenous variable $Im_{rt+i}^{AS} - Im_{rt+1}^{AS}$ in equation (2), $\Delta Illegal$ in (3) is set equal to $Illegal_{t+i}^{AS} - Illegal_{t+1}^{AS}$.

The relevance of the instrument relies on the fact that immigrants tend to move to those regions that host large communities of immigrants from the same countries of origin. This is

³¹One alternative way of instrumenting migration flows would be to use the breakdown on single nationalities. Unfortunately when migration flows to each region in each quarter are broken down by nationality, the number of observations I am left with for some regions is very small. The resulting quarter to quarter changes in migration flows are thus much more volatile and the instrument lacks the precision to perform reliable analyses. I use the same instrument for all sectors because administrative data on 2003 shares of immigrants by sector of employment are not available.

likely due to older immigrants providing new arrivals with primary help while integrating them into existing networks that offer better chances of finding a job (Munshi, 2003).³²

The validity of the instrument requires that three conditions are satisfied. First, the unobserved factors that determine the variation of native employment in each region or in a specific sector in each region, need to be uncorrelated to the determinants of settlement choices in 2003. Second, the flow of illegal entries through the Central Mediterranean route needs to be uncorrelated with the unobserved part of the variation of the native employment in each Italian region or in a given industry in each region. Third, the instrument affects the changes in employment of natives only through migration changes (i.e. the exclusion restriction).

As concerns the first condition, the main threat to its validity is the existence of unobserved factors specific to a region or a region's industry that drive employment growth and that persistently affect the settlement of immigrants over time. In order to reduce these concerns, I have region fixed effects in the baseline specification. When the model is estimated separately for each industry, these fixed effects capture constant differential in sectoral employment growth rates across regions. In Section 6 I then show that the results are robust to an exhaustive set of robustness checks that add, for instance, regional and sectoral trends to the baseline model or that use the 1995 shares in place of the ones from 2003. The fact that the baseline results are not affected in a significant way by the inclusion of these controls suggests that this issue is not likely to play a determinant role in my setting.

Turning to the second validity condition, the spike in illegal entries over the first six months of 2011 is due, to a large extent, to the disruption of the border patrol activities on the Tunisian shores. This was one of the unintended consequences of the revolts. Following the fall of Ben Ali's regime, part of the domestic security forces (e.g. police, national guards) deserted the police stations as they had become targets of violent attacks during the revolution. For weeks, the Tunisian army remained the main law enforcement body operating within the entire Tunisian territory. This resulted in loosened border patrol activities and thus in massive departures of

³²This regularity was at first noticed in Bartel (1989) and then used in many other studies to estimate the effects of migration on employment and wages (e.g. Altonji and Card, 1991; Hunt, 1992; Pischke and Velling, 1997; Cortes, 2008)

immigrants from Tunisia towards Italy (Boubakri, 2013). The flow of illegals due to this shock is likely to be uncorrelated with the unobserved part of native employment changes in local labor markets in Italy.³³

Regarding the third condition for validity, we might worry that the revolts had disruptive effects on the trade flows between Italy and the Arab Spring countries. If the regions to which immigrants move are also those that maintain closer trade relations with the Arab Spring countries, then the existence of trade effects might violate the exclusion restriction. In fact, the Arab Spring might affect native employment through trade and not only through migration. As I discuss in Section 5, most of the employment effects that I find are in sectors that produce non-tradable goods. This finding suggests that the issue of trade plays no major role in this setting.

4.4 Legal and Illegal migration

One data limitation that we face is the unavailability of measures of illegal migration at the local level (Section 3). Such a limitation comes into play in our empirical strategy because if illegal and legal flows to a region are correlated, the exclusion restriction is not satisfied. The estimated employment effects would, in fact, need to be interpreted as a combination of the effects of legal and illegal migration rather than the effects of legal migration only. To take this problem into account, I evaluate the employment effects of migration under three different specifications of equation (1). One specification combines legal and estimated illegal flows, another considers legal flows only and the third one considers a regression in reduced form. In what follows, I describe these specifications in details.

In the first specification, I consider both legal and illegal flows. Since I do not observe actual illegal flows to a region, I estimate them assuming that illegal entries, net of those who become legal, distribute across regions in the same way as legal immigrants do. In particular,

³³Migration flows from the Arab Spring could be measured using national legal flows (as in Cortes, 2008). We believe that illegal flows better capture the exogenous part migration resulting from the Arab Spring.

my measure of illegal flows to a region is:

$$\Delta Illegal_{rt+1} = \frac{Illegal_{t+1}}{pop_{rt}} \times \left(\frac{Legal_{rt+1}^{AS}}{Legal_{t+1}^{AS}} \right) \times (1 - Asylum_{t+1}) \times 100 \quad (4)$$

where $Illegal_{t+1}$ is the number of illegal entries in Italy through the Central Mediterranean route at time $t + 1$ and $Asylum_{t+1}$ is the ratio between the number of asylum applications that are accepted in first instance decision and the total number of asylum applications at time $t + 1$.³⁴ $Legal_{rt+1}^{AS}$ is the total number of legal Arab Spring immigrants in region r at time $t + 1$ while $Legal_{t+1}^{AS}$ is the total number of legal immigrants in Italy at $t + 1$. Legal migration is measured using LFS data. In estimating the employment effects, I then combine the illegal flows from (4) and the legal flows ($\Delta Legal_{rt+1}^{AS}$), to construct a measure of the total migration to a region. The estimating equation takes the following form:

$$\frac{E_{rt+1} - E_{rt}}{pop_{rt}} = \alpha_1 + \alpha_2 (\Delta Legal_{rt+1}^{AS} + \Delta Illegal_{rt+1}) + \alpha_3 \Delta X_{rt+1} + \gamma_y + \gamma_t + \gamma_r + \Delta \epsilon_{rt+1}. \quad (5)$$

where $\Delta Legal_{rt+1}^{AS} = [(Legal_{rt+1}^{AS} - Legal_{rt}^{AS})/pop_{rt}] \times 100$ is the quarterly percentage change in legal immigrants from the Arab Spring countries relative to the population.

In the second specification, I consider legal migration only. This is done by estimating the following model:

$$\frac{E_{rt+1} - E_{rt}}{pop_{rt}} = \alpha_1 + \alpha_2 \Delta Legal_{rt+1}^{AS} + \alpha_3 \Delta X_{rt+1} + \gamma_y + \gamma_t + \gamma_r + \Delta \epsilon_{rt+1} \quad (6)$$

On the one hand, because it is based on data available in the LFS, this specification does not require specific assumptions to estimate migration flows to a region. On the other hand however, if the correlation between legal and illegal flows is positive, α_2 from equation (6) would overestimate the effects of migration.

The third and last specification is a reduced form model in which I substitute the instrument (3) to ΔIm_{rt+1}^{AS} in estimating equation (1). This approach however, requires that the number

³⁴Source: Eurostat-*First instance decisions on applications by type of decision*.

of immigrants who entered Italy legally at the time of the uprisings was relatively small.³⁵ Otherwise, it overestimates the employment effects of migration.

In estimating both equation (5) and equation (6), I use the interaction (3) as an instrument for the quarterly migration flows to a region. Specifications analogous to equation (5) and equation (6) are used in the dynamic case (equation (2)) to estimate the evolution of the quarterly effects over time.³⁶

5 Results

Table 3 shows the results obtained from estimating the short-term employment effects of the Arab Spring migration. Column (1) in Panel A shows the first stage regression of the specification that only accounts for legal flows (i.e. equation (6)). The instrument is relevant and its predictive power is robust to the inclusion of year, region and quarter fixed effects. Based on these estimates, a rise in illegal border crossing detections equivalent to a 1% of the native population increases the number of legal immigrants from the Arab Spring countries by 0.27% in the average (in terms of 2003 shares) region.³⁷ This is generally in line with the 30% asylum acceptance rate recorded by Eurostat in 2011 in Italy (Section 3).

Column (1) in Panel B shows the second stage estimates (i.e. α_2 in equation (6)). I find no evidence of significant effects of the Arab Spring migration on overall native employment (see row labelled "All sectors"). The aggregate results, however, hide significant differences across industries. When I estimate the effects separately for each sector in fact, I find evidence of negative and significant effects on employment in mining, wholesale trade and hotels and restaurants. In these sectors, an increase of 1% in the ratio of Arab Spring immigrants over natives reduces employment by respectively 0.15%, 1.7% and 1.2%. These negative effects

³⁵Unfortunately we are not able to distinguish in the data between legal immigrants who received asylum and those who had legal status already at the time of their entry into Italy.

³⁶In this case, illegal flows in each quarter are obtained from (4) and they are summed over quarters to obtain flows at frequencies lower than 3 months.

³⁷The average 2003 share across regions is 0.1669. The figure 0.27 is obtained as the product of 0.1669 and the estimate coefficient (i.e. 1.590).

are countered by the positive effects in construction and educational services. I find that an increase in migration flows equivalent to 1% of the native population of a region increases native employment by 1.17% and 1.76% (respectively) in construction and educational services. The OLS estimates reported in column (2) are generally larger than the corresponding IV estimates. This is consistent with the descriptive evidence from Figure 2 showing that immigrants moved to faster growing regions in northern Italy.

Column (3) shows the results obtained from estimating equation (5). Unlike in column (1), in this specification I consider both legal and illegal migration flows. The evidence from this specification is very much in line with column (1). The magnitude of the second stage coefficients is slightly lower in column (3). This reflects the smaller relative effect from a larger overall flow. The difference between the coefficients in column (1) and (3), however, is rather small and statistically insignificant. Column (4) shows the results from the reduced form specification of the baseline equation (1). While the signs of the coefficients and the standard errors are in line with those of the baseline model, the magnitude of the coefficients is generally greater than in column (1). In fact, this model only exploits the variation in illegal entries through the Central Mediterranean route. It thus ignores legal flows and/or illegal flows from different sources. In doing so, it attributes relatively large effects to a small flow. In comparison with the other two specifications however, the difference is statistically small or insignificant.

Table 4 translates the relative coefficients from Table 3 into the number of native workers employed in the industries significantly impacted by migration. The Arab Spring migration led to around 900 new legal immigrants entering the average region.³⁸ Using the proxy for illegal flows from equation (4), I estimate an average total inflow of legal and illegal immigrants at around 1500 individuals. With the exception of mining, all the other sectors that were affected experienced non negligible average short-term effects on native employment from this inflow. The impact on the number of people employed was greater when both legal and illegal flows were considered, while it was smaller when only legal or only illegal flows (i.e. reduced form

³⁸Here the average region is defined as a region that experienced average migration flows during the peak of the Arab Spring migration. For more details see the footnotes for Table 4.

model) were accounted for. The difference between these models however, is statistically small.

Figure 3 and Table 5 show the evolution of the short-term effects over time in the sectors that are significantly affected on a quarterly basis. The figure plots the coefficient α_2^i from equation (2) estimated on employment changes over 3, 6, 9 and 12 months.³⁹ The figure plots both coefficients obtained from legal migration flows and those estimated from legal and illegal flows. It shows that within one year, the short-term effects converge toward zero in most of the sectors involved. At annual frequency the estimated coefficients are statistically indistinguishable from zero in mining, construction, hotels and restaurants and education services.⁴⁰ This finding suggests that in these sectors native employment shifted back to the pre- Arab Spring levels (Table 5). The effects are more persistent in wholesale trade, where they remain significant at annual frequency. The average ratio between the coefficients estimated at frequencies lower than 3 months and the quarterly coefficients, indicates that the magnitude of the short-term effect declines by around 15% within the first 6 months and by around 50% within one year.

While the main focus of this analysis is on employment, Table B.3 in the online Appendix shows the estimated effects of the Arab Spring migration on average earnings. These were obtained from the same estimation strategy discussed in Section 4, only here changes in average earnings rather than employment were used as the dependent variable in equation (6). Overall I find the effects of the Arab Spring migration on earnings to be small. In particular, I only find negative effects on average earnings in the construction sector. The evidence of little effect on earnings is consistent with the institutionalized nature of the wage-setting mechanism in Italy. Existing studies show that reduced flexibility in the labor market can amplify the negative effects of migration on employment while reducing the impact on wages (Angrist and Kugler, 2003; Glitz, 2012).⁴¹

³⁹At lower frequencies the number of observations declines and the underlying variation changes. This is reflected in weaker instruments and noisier second stage estimates. With this caveat, Figure B.2 in the Appendix shows the evolution of the effects up to 24 months later. Based on this estimate, the effects converge toward zero in all sectors after two years. Table B.4 in the Appendix shows first stage estimates at all frequencies between 3 and 24 months.

⁴⁰Educational services remains marginally significant in the specification in which I only consider legal immigrants.

⁴¹In particular, Glitz (2012) finds evidence of employment being more reactive than wages to migration in

5.1 *Discussion of the results*

The results of the previous section indicate sizeable short-term effects of migration on native employment. To better measure the relative size of the effects, I use the labor market participation of legal immigrants in the post-Arab Spring period (i.e. 2011 and 2012) and their distribution across negatively affected sectors to obtain a measure of the quarterly displacement effect of migration.⁴² I base this calculation on two sets of coefficients. The first one is from the model that only accounts for legal flows (i.e. equation (6)). The second one considers both legal and (estimated) illegal flows (i.e. equation (5)). When I consider only legal immigrants, I estimate that on a quarterly basis, in those sectors negatively affected by the Arab Spring migration, on average around 0.8 natives are displaced for each immigrant who is hired.⁴³ When I consider both legal and illegal flows, the estimated displacement effect goes down to 0.68 natives displaced for each immigrant who finds a job.⁴⁴ Among the studies that find a displacement effect of migration, Glitz (2012) estimates an annual displacement rate of about 0.3 to 1 in Germany. Using establishment-level data on German workers, Campos Vazquez (2008) finds a similar displacement of 0.3 displaced natives to 1 immigrant hired over a 1-2 year horizon. Federman et al. (2006) focusing on Californian manicurists, estimates that, depending on the model specification, 10 new Vietnamese displace 4 to 5 non-Vietnamese manicurists on

Germany, a country characterized by institutionalized labor markets.

⁴²The average employment rate of immigrants from the Arab Spring countries over the period 2011-2012 is 57.29%. The distribution of employed immigrants across the industries is reported in Table 2.

⁴³Using LFS data I obtain that 764 working-age immigrants entered the average region over the period 2010Q4-2011Q2. Using the employment rate of legal immigrants, I estimate that 438 were employed (0.5729×764). The employed immigrants are then distributed across industries following Table 2. Namely 0.13% of them are employed in mining, 2.76% in wholesale trade and 17.56% in hotels and restaurants. The resulting total inflow into those 3 sectors is thus around 90 immigrants. Based on Table 4, this inflow displaced a total of around 72 immigrants. This is the sum of the negative effects in mining (0.12), wholesale trade (41.43), hotels and restaurants (29.97). The ratio of displaced natives over hired immigrants is thus 0.8.

⁴⁴I derive the number of working age illegal immigrants multiplying illegal flows by the share of working age legal immigrants (relative to all legal immigrants) at the peak of the Arab Spring migration (i.e. 2010Q4-2011Q2). I then sum the flow of working-age legal and illegal immigrants to obtain that around 1180 working-age immigrants entered the average region over the period 2010Q4-2011Q2. Using the employment rate of legal immigrants, I estimate that 676 of these immigrants were employed in that period (i.e. 0.5729×1180). The 676 employed immigrants are then distributed across industries following Table 2. The resulting total inflow in the 3 sectors negatively affected by migration is of about 138 immigrants. Based on Table 4, this inflow displaced a total of 94 immigrants (0.15 in mining, 54.46 in wholesale trade and 39.9 in hotels and restaurants). The ratio of displaced natives over hired immigrants is thus 0.68.

a yearly basis. Consistent with my findings that capture the short-term effects of migration, the quarterly displacement rate that I obtain is significantly larger than those estimated in the literature. In particular, short-term displacements are between 2.2 and 2.6 times as large as the annual displacement estimated by Campos Vazquez (2008) and Glitz (2012) in Germany, and between 1.3 and 1.6 times larger than the displacement estimated in California by Federman et al. (2006).⁴⁵ In the specific case of the Arab Spring migration, the significant displacement effects are countered by significant positive effects on employment. Later on in this paragraph I discuss these positive effects in more details.

The results from the previous section also indicate that on average around 50% of the short-term effects dissipate within one year. This corroborates the existing evidence on the dynamic effects of migration that finds shrinking effects of permanent migration waves over time (Campos Vazquez, 2008; Cohen-Goldner and Paserman, 2011; Monras, 2014). The convergence towards zero however, is faster in the case of the Arab Spring migration.⁴⁶ This is likely due to the temporary nature of the shock. Since most of the immigrants left Italy within one year in fact, the adjustment to the pre-migration levels happened within a few quarters. While the temporary nature of the migration that I analyze makes it difficult to compare the dynamics that I obtain with those of other studies based on more permanent events, the size of the adjustments that I estimate (i.e. 50%) is generally in line with previous studies that find responses to migration to absorb between 40 and 80% of the effects (Lewis, 2003; Borjas, 2006; Peri and Sparber, 2009).⁴⁷

The comparison between quarterly effects from the Arab Spring migration and annual effects from other studies, as well as the analysis of the dynamics that followed the temporary migration, indicate that migration can lead to substantial action in local labor markets in the

⁴⁵I obtain 2.3 and 2.6 as the ratio of 0.68 and 0.8 over 0.3 (i.e. the displacement in Campos Vazquez, 2008 and Glitz, 2012). Similarly, I obtain 1.3 and 1.6 from the ratio of 0.68 and 0.8 over 0.5 (i.e. the displacement in Federman et al., 2006).

⁴⁶Campos Vazquez (2008) and Monras (2014) find the effects of migration to vanish within 2 to 5 years.

⁴⁷Borjas (2006) estimates that native migration attenuates the effect of immigration on wages in the United States by 40 to 60 percent. Peri and Sparber (2009) estimate that specialization reduced the wage loss of migration in the United States by around 80%. Lewis (2003) shows that firm adjustments can absorb as much as 80% of the labor supply change associated with migration.

short-run. The short-term effects can have both positive and negative sign and, in most sectors, they disappear within one year. The existence of sizable and short-lived effects better links the existing evidence of little long-term effects with the standard labor market model that would predict migration to impact native employment.

I find that migration has positive effects on employment in construction and negative effects in mining, wholesale trade, hotels and restaurants (Table 3). A breakdown of the effects by education and type of occupation, shows that the negative and the positive effects in these sectors are concentrated among similar workers (Table B.9 and B.8 in the Appendix).⁴⁸ In light of this finding, one possible interpretation of the results is that migration caused a shift of workers out of mining, hotels and restaurants and wholesale trade into construction. A fact consistent with this interpretation, is that in the post-Arab Spring period a greater share of immigrants from the Arab Spring countries was employed in the sectors where I find significant displacement effects, compared to the years prior to the uprisings (Table 2). In contrast, the share of immigrants employed in construction went slightly down from the pre- to the post-Arab Spring period.

To further investigate the possibility of a sectoral shift, I exploit the instrumental variable approach described in Section 4 to estimate the effect of migration on the inflow of workers in construction from mining, wholesale trade, hotels and restaurants.⁴⁹ Due to the cross-sectional nature of the LFS data, this requires assumptions about the timing of the shift from one sector to the other.⁵⁰ I find that migration causes a larger fraction of workers to switch into construction (Table 6). In particular, I estimate that the arrival of 1,000 new immigrants induced around 50 native workers to move from mining, wholesale trade, hotels and restaurants into construction

⁴⁸I classify 1 digit occupations into 4 broader categories following Cattaneo et al. (2013) (see Table B.7 in the Appendix). Recent studies find that migration is associated with natives moving to different types of occupations (Cattaneo et al., 2013; Foged and Peri, 2013). Those studies also show that the process of job upgrading for low skilled workers, happens over the medium or long-term. Consistent with this evidence, in the short-run I find that natives do not switch occupation while moving from one sector to the other.

⁴⁹In particular, I use the relative change in the regional flows of natives between the sectors negatively affected and construction as a dependent variable in equation (6). I deal with the endogenous settlement of legal immigrants using the IV approach described in Section 4.

⁵⁰In particular, I assume that the individuals who shifted to construction, did it in the same quarter of the year prior to the interview. See the online Appendix A for more details.

(Panel B). The magnitude of these effects is in line with the average effects presented in Table 4 where an inflow of around 900 immigrants is estimated to cause around 48 more workers to be hired in construction. These findings are generally consistent with recent studies based on individual longitudinal data that find that workers respond to local negative shocks by moving to less affected sectors and/or firms (see Dix-Carneiro and Kovak, 2015 and Foged and Peri, 2013). The transition of native workers to construction is also in line with the findings of negative effects on earnings in this sector (Table B.3 in the Appendix). In fact, the workers who switched to construction possibly needed some initial training to work in that sector and thus were more likely to accept lower wages in exchange for training in the short-run.⁵¹

The discussion so far suggests that fewer immigrants entered the construction industry. This might have favoured the expansion of native employment in this sector. There are multiple reasons why this scenario is plausible. First, based on the short-term nature of the migration event, immigrants were probably more interested in finding short-term jobs. This can explain why they preferred hotels and restaurants to construction as the jobs offered in the former industry are more likely to be temporary (see "Share of short-term contracts" in Table 7). Second, construction is more institutionalized than other sectors, making it more difficult for illegal workers to be hired. Third, construction work is also more dangerous than work in any other industry and as a result it is much riskier for employers to hire illegals.⁵² The smaller presentage of illegal workers in construction than in hotels and restaurants is consistent with this view (Table 7). Finally, working in construction might require more technical training and thus a good knowledge of Italian. This might favor native workers over immigrants.⁵³ A fact

⁵¹Other explanations may be consistent with negative effects that I find on earnings in construction. It might be for instance, that the increased supply of labor by immigrants lowered the bargaining power of natives and thus their wages. While the institutionalized nature of the Italian labor markets makes it difficult to believe that wages of tenured workers in construction were reduced, I can not rule out the possibility that this happened for those workers who switched to construction from other sectors. I do not find significant effects of migration on hours worked in construction (Table B.6 in the online Appendix). I thus interpret the effects on earnings as a result of changes in hourly wages.

⁵²Based the latest available data, between 1998 and 2007 on average 6,767 workers per 100,000 employees in the construction industry were involved in work-related accidents. This compares to an average of 2,334 in retail and wholesale trade and 3,283 in hotels and restaurants (Source: *INAIL - Infortuni sul lavoro (ESAW) fino al 2007 - Tav. 15*).

⁵³If we are willing to assume that jobs in the construction industry involve more interactive tasks (training in

consistent with this line of argument is that the fraction of Italian workers who participate in training activities is similar in hotels, restaurants and in construction but the corresponding fraction of foreigners is much lower in construction than in hotels and restaurants (Table 7).⁵⁴ A similar type of reasoning can be applied to the comparison between wholesale trade and construction.

The positive effect of migration on employment in construction also suggests a possible link between migration and the local housing markets. Existing studies show that migration can cause the local demand for housing to go up (Saiz, 2003; Saiz, 2007). A greater demand can result in higher rents and house prices. Higher prices might be expected to lead to a supply expansion either through the construction of new housing units or through the renovation of existing ones. If that is the case, employment in construction is expected to grow faster in regions experiencing larger migration flows. Due to the fact that most of the immigrants from the Arab Spring likely were refugees or asylum seekers who stayed in Italy for a short time period, the rise in the housing demand associated with the Arab Spring can be thought of as primarily induced by the publicly funded programs that provided housing to asylum seekers and refugees. In the years 2011 to 2013 in fact, the Italian government financed assistance programs for asylum seekers from North Africa for about 1 billion euros, on average 1,200 euros per beneficiary each month.⁵⁵ The primary aim of most of these programs was to provide new arrivals with a place to stay.

Along this lines, the available semiannual data show a positive association between migration flows, house prices and rents of inexpensive housing units in the most central zone of the regional capital cities (see Table B.10 in the Appendix).⁵⁶ In contrast, the magnitude of the association

Italian can be seen as one of those), then these findings are generally consistent with those of Peri and Sparber (2009) in the United States and D'Amuri and Peri (2011) in Europe.

⁵⁴This hold also when I group workers based on their educational attainments. However, given the descriptive nature of this analysis we can not rule out the possibility that the results are driven by differences in the composition of the Italian and foreigner population across sectors.

⁵⁵For more details see *Ordinanza del Presidente del Consiglio dei Ministri* n. 3924 February 18 2011, *Decreto-Legge*, n. 95 articolo 23 July 6 2012, "Fine emergenza Nord Africa, il 28 febbraio chiusi i centri. Il governo ha speso più di un miliardo" *Il Sole 24 Ore*, March 3, 2013.

⁵⁶Appendix A describes the housing market data in detail. The IV regressions shown in Table B.10 use the change in log prices and log rents between two consecutive semesters as the dependent variable in equation (6).

between migration flows and prices of more expensive housing units is much closer to zero as we would expect given the type of housing experiencing increased demand from the new immigrants. Turning to the housing supply, while data are only available at annual frequency, I find a positive association between the annual number of building permits issued and migration flows to a region (Table B.10). While limited by the quality and the frequency of the available data, this evidence is suggestive of a link between migration and the demand for construction labor.

I also find positive effect on employment in educational services resulting from the Arab Spring migration (Table 3). As in the case of the construction industry, a rise in the demand of educational services might be related to the wave of migration. In the first six month of 2011 in fact, 9000 legal Arab Spring immigrants younger than 15 entered the country. Many of the refugee camps that hosted the immigrants soon after their arrival, offered Italian classes. This might have increased the demand for teacher in the regions experiencing more migration.⁵⁷ The positive coefficient might also capture the growth of employment in cultural organizations. These are classified as part of the educational services industry and they were likely involved in assisting refugees and asylum seekers at the time of the uprisings.⁵⁸

So far I have presented explanations for the positive effects on employment that move away from the more canonical hypothesis of complementarity in production. There are several

I deal with the endogenous settlement of immigrants using the IV approach described in Section 4.2. Following Jud et al., 1996, I augment the set of controls ΔX_{rt} including lagged values of the regional employment rate and average income.

⁵⁷See also "Emergenza migranti: le attività di accoglienza della Croce Rossa Italiana sul territorio nazionale" (Italian Red Cross website). Comparing the inflow of immigrants with the estimated employment effects from Table 4, I obtain a 1 to 13 ratio between natives employed and immigrants arriving. The ratio is obtained by dividing average regional inflow (i.e. 887) by the estimated effects on employment (i.e. 67). These figure are shown in Table 4.

⁵⁸I do not exclude the possibility that other factors played a role in determining the positive effects on employment in educational services. In fact, I find the employment effect to be driven by female workers (Appendix Table B.11). Based on this, one concurrent explanation might be that migration had positive effects on the labor supply of female workers, as Cortes and Tessada (2011) argue in the case of the United States. One other possibility is that female workers were induced to enter the educational services sector to compensate for the loss of income at the household level deriving from the displacement of male workers in the other industries (Mincer, 1960; Mincer, 1962). In fact, I find that most of the displacement effects are concentrated in the male native population (Appendix Table B.11). While those channels can explain an increase in the supply of labor by female workers, they can-not explain why there was an excess demand for labor in the educational services sector at the time of the uprisings.

reasons for this. First, I do not find evidence of the Arab Spring immigrants entering those sectors in which I estimate positive employment effects.⁵⁹ Second, I do not find significant effects of migration on earnings in educational services while I find significant and negative effects on earnings in construction. These results are difficult to reconcile with the standard complementarity arguments.⁶⁰

Most of the sectors that I find to be affected by the Arab Spring migration produce nontraded goods or services. This suggests that the IV approach that I use does not capture the effects of the uprisings on trade flows between Italy and the Arab Spring countries. Mining can be seen as an exception to this. The uprisings in Libya did, in fact, significantly impact the supply of oil and, probably, the employment of Italians in mining. However, these effects appear to be very small and play only a minor role in my findings (Table 4). Finally, I do not find significant effects on employment in finance, insurance, real estate or manufacturing. Since these industries were heavily hit by the European debt crisis, I also exclude the possibility that the instrument captures the effects of the financial crisis on employment.

6 Robustness checks

In this section I present the results of a set of robustness checks performed on equation (6). The same robustness analysis was performed on equation (5) and on the reduced form model. The results obtained from these other specifications are similar to those presented here, but they are available upon request. To control for region-specific effects that change over-time, I add to the empirical model year times region fixed effects and regional trends.⁶¹ When equation (6) is estimated separately for each industry, the year-region fixed effects and the regional

⁵⁹On average, I observe around 21,900 immigrants employed in construction in the pre-Arab Spring period and 21,700 in the post-Arab Spring period. Similarly in educational services, there were around 1,600 immigrants employed prior to the uprisings and 900 after.

⁶⁰In the standard labor market model, if natives and immigrants are complements in production wages and employment of native workers are positively linked to the supply of labor from immigrants. The existing literature on Italy finds no evidence of negative effects and some evidence of positive effects on employment (Venturini and Villosio, 2006; Giuntella, 2012) and wages (Gavosto et al., 1999; Staffolani and Valentini, 2010). Those are generally interpreted as evidence of complementary in production.

⁶¹I obtain similar estimates using non linear trends.

trends capture time varying factors specific to a given industry in each region. Controlling for these factors is particularly important in my setting, where the instrument is available only at the regional level rather than at the sector-region level. This creates concerns about the existence of persistent industry-specific factors that might have influenced the past settlement of immigrants. Table 8 shows that the baseline results are robust to these controls. This suggests that the instrument isolates the effects of migration from other region or sector specific confounding factors.

I then proceed to include quarter times year fixed effects to control for unobserved factors specific to a given quarter-year. I also control for the stock of immigrants in the previous period and I instrument for it using 2003 shares of immigrants from the Arab Spring countries. This is done to control for lagged effects of migration that might change the interpretation of the coefficients estimated in the baseline model. Finally, I control for the change in migration flows from countries not involved in the Arab Spring. The existence of contemporaneous migration flows to Italian regions, in fact, might bias the estimated effects of the Arab Spring migration.⁶² The baseline findings are robust to these checks (Table 8).

Table 9 shows the results of a falsification test in which I restrict the sample used for the analysis to the pre Arab spring period (2009Q1-2010Q3). If the instrument only captures the flows of immigrants from the Arab Spring, I do not expect to find significant effects in the pre-Arab Spring period. The instrument remains relevant despite the lower number of observations (Panel A). Turning to the second stage regressions, I find no evidence of significant effects on total or industry specific employment (Panel B).

In the baseline specifications the standard errors are clustered at the regional level to account for serial correlation. The limited number of regions, however, can cause the estimated standard errors to be biased toward zero (Bertrand et al., 2004).⁶³ To check that the significance of the estimated effects does not entirely depend on a limited number of clusters, I use the wild

⁶²I use the interaction between 2003 shares of immigrants from other origin countries and the national change in legal immigrants from other origin countries as an instrument for the change in immigrants from other origin countries.

⁶³In Italy there are 20 regions.

bootstrap procedure to derive new p-values on the estimated coefficients (Cameron et al., 2008; Davidson and MacKinnon, 2010). The results are reported in Table 10. As expected, the p-values obtained from the wild bootstrap are greater than those from the baseline specification. With the exception of the effects on employment in mining however, the coefficients that are significant in the baseline specification remain significant in the wild bootstrap.

Other studies in the literature use 1995 shares of resident permits as an instrument for the endogenous settlement of immigrants across regions (e.g. Barone and Mocetti, 2011; Giuntella, 2012; Bratti and Conti, 2014). Table B.13 in the Appendix reports the results obtained using those earlier shares. Panel A shows that the instrument obtained from the 1995 shares is weak. The estimated coefficients of the second stage regression are however, very similar to those estimated in the baseline model. Overall, I take this as evidence of the results being robust to the use of the 1995 shares in place of the 2003 shares. I thus prefer to use the 2003 shares in the baseline model because they have greater predictive power.

In deriving the baseline estimates, I do not distinguish between working age and nonworking-age immigrants. Old or very young immigrants, however, are arguably less likely to participate in the labor market. Table B.14 in the Appendix shows the results obtained when using the flow of working-age immigrants as a dependent variable in the first stage regressions. As expected, the greater magnitude of the effects on employment reflects the larger effects associated with smaller flows. The overall results however, are very similar to those obtained from the baseline model.

The existing literature provides evidence of negative effects of migration on labor market outcomes of older immigrants (e.g. Cortes, 2008). To investigate whether the effects are driven by older immigrants, I redefine native workers as Italian born. The results obtained while using this alternative definition are reported in Table B.15 in the Appendix. The effects are very similar to those of the baseline model. I thus infer that most of the effects that I find are on Italian-born workers.

Mobility can equalize labor market outcomes across regions (Borjas, 2006). In Table B.16 and B.17 in the Appendix, I use the instrumental variable approach described in Section 4

to estimate the effects of the Arab Spring migration on the regional outflow and inflow of natives and of other immigrant groups.⁶⁴ I also estimate the effect of migration on inflow rates in those industries in which I find significant employment effects.⁶⁵ I fail to find significant effects of the Arab Spring migration on inflows or outflows of natives or different immigrant groups. Migrating from one region to the other might involve sunk costs, it is thus less likely to happen within a quarter. The absence of particular migration flows argues in favor of the effects discussed in Section 5 as capturing the more direct effects of migration. The derivation of quarterly outflow/inflow rates from LFS data however, requires assumptions on the timing of the migration from one region to the other (Appendix A).

Finally, Table B.18 in Appendix shows the results obtained while using the average population and the population in the first quarter of 2009 as the denominator in equation (6). The baseline results are robust to these changes.

7 Conclusions

The temporary, unanticipated and exogenous migration caused by the Arab Spring provides an ideal setting in which to estimate the short-term effects of migration. In the short-term, migration is found to have considerable and offsetting effects on employment of native workers across sectors. I estimate a quarterly displacement that is 2.2 to 2.6 times larger than the annual displacement estimated by other studies in the European literature. I also show that the employment effects disappear within one year in most of the sectors that were affected on a quarterly basis. This evidence in favor of substantial and short-lived effects suggests that a significant share of the effects of migration is concentrated in the very short run.

Focusing on the very short run allows us to uncover labor market mechanisms that would otherwise be neglected. I find, in fact, that migration has both positive and negative effects on

⁶⁴The results are obtained using changes in inflows/outflows as dependent variables in (6). Other immigrants include all immigrants with the exception of those born in the Arab Spring countries or in any other African country.

⁶⁵Due to a change of the industry classification used in the LFS across time, I can not derive regional outflow rates at the industry level that are consistent over time. For more details see Appendix A.

employment of native workers. In particular, I find evidence of displacement effects in mining, hotels, restaurants and wholesale trade but positive effects on employment in construction and educational services. I present evidence that suggests that migration led to a short-term shift of displaced workers to construction.

Finally, I discuss the possibility that the positive employment effects in construction and educational services were driven by the increased demand for goods and services from this sectors from immigrants, rather than by complementarity between immigrants and native workers in production. The effects that immigrants as consumers exert on the demand for labor have so far received little attention in the literature and therefore warrant more rigorous analysis in the future.

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8 Figures and Tables

Figure 1: The Arab Spring Migration

Source: Top panel - Italian Labor Force Survey (ISTAT),
Bottom panel - Frontex and Frontex Malta

Figure 2: Average change in immigrants from the Arab Spring countries (% native working age population) - 2011Q1-2011Q2

Source: Italian Labor Force Survey - ISTAT

Figure 3: The dynamic effects of the of the Arab Spring migration

Notes: Figure based on coefficients from Table 5

Table 1: Descriptive Statistics - Explanatory Variables

	Obs.	Mean	Std. Dev.	Min	Max
Change immig. from Arab Spring countries (% native pop.)	300	0.006	0.185	-0.761	0.722
Change immig. from Arab Spring countries Q410-Q211 (% native pop.)	60	0.050	0.187	-0.402	0.534
Change Arab Spring immigrants employed Q410-Q211 (%)	53	24.55051	83.15233	-100	400.296
2003 share of AS imm. (fraction of national AS imm.)	20	0.167	0.129	0.018	0.383
Illegal border crossing dectections (number of people)	16	4783	7635	87	24193
Illegal border crossing dectections (number of people) Q110-Q311	3	19029	7129.936	10894	24193
Males (% working age pop.)	320	45.694	1.768	42.934	49.842
Average Age	320	41.012	1.098	38.758	42.994
Elementary school or less (% working age pop.)	320	47.467	6.237	33.935	60.924
High school diploma (% working age pop.)	320	32.422	2.839	24.781	39.793
College degree or more (% working age pop.)	320	11.415	1.706	7.128	15.725
Tenured workers (% native workers)	320	64.900	3.733	53.883	71.762
Full-Time workers (% native workers)	320	85.599	1.870	78.631	91.426
White collars (% native workers)	320	43.063	4.534	30.897	53.412
Working age population	320	1977665	1603703	82801.4	6512507
Native working age population	320	1807053	1444980	75273	5775852
Total Population	320	3008085	2424482	125980.6	9967758

Sources: Italian Labor Force Survey Data - Istat, I.Stat - Istat, Frontex and FrontexWatch Malta
Regional observations are weighted by the corresponding population shares. AS stands for Arab Spring.
Elementary school is defined as primary (grade 1 to 5) and middle school (grade 6 to 8).
High school follows middle school. It can consist of 3 or 5 years of schooling depending on the field of study.
College or more is defined as any type of degree issued by a university, independently of its length.

Table 2: Immigrants versus Natives - Descriptive Statistics

	Immigrants from Arab Spirng Countries		Natives
	Pre-Arab Spring	Post-Arab Spring	
Demographics			
Males (%total)	61.52	62.66	48.59
Mean Age	45	44	43
Number of individuals (thousand)	192.86	215.50	60215.19
Observations (unweighted)	3416	3786	2424758
Educational attainments (%total)			
Elementary school or less	52.29	56.84	54.99
High School	33.67	33.00	33.95
College or more	14.04	10.16	11.06
Observations (unweighted)	3209	3563	2113357
Country of Origin (% total)			
Egypt	40.37	38.80	
Tunisia	40.76	44.07	
Lybia	18.38	16.92	
Yemen	0.48	0.21	
Observations (unweighted)	3416	3786	
Distribution of workers across sectors (% total)			
Agriculture, Forestry and Fishing	6.51	6.85	3.66
Mining	0.05	0.13	0.16
Construction	25.59	22.03	7.43
Manufacturing	17.36	15.67	18.75
Transportation, Communications, Electric, Gas and Sanitary Services	7.47	5.43	8.86
Wholesale Trade	2.38	2.77	4.29
Retail Trade	5.43	7.43	8.88
Finance, Insurance and Real Estate	2.20	1.19	3.75
Hotels and Restaurants	12.72	17.57	4.93
Public Administration	2.06	1.98	6.76
Educational Services	1.88	0.92	7.29
Other Services	16.34	18.03	25.25
Observations (unweighted)	1386	1548	822282

Source: Italian Labor Force Survey-Istat. Each observation is weighted by its relative population weight.

"Number of individuals" refers to the average number per quarter. Elementary school is defined as primary (grade 1 to 5) and middle school (grade 6 to 8). High school follows middle school. It can consist of 3 or 5 years of schooling depending on the field of study. College or more is defined as any type of degree issued by a university, independently of its length. Natives are defined as Italian citizens. The pre-Arab Spring period consists of the years 2009 and 2010. The years 2011 and 2012 belong to the post-Arab Spring period.

Table 3: The effects of the Arab Spring migration on employment

Panel A: First stage regressions					
	Legal Migration change (%) (1)	Legal and Illegal Migration change (%) (3)			Obs.
$\left(\frac{Im_{2003}^{AS}}{Im_{2003}}\right) \times \left(\frac{\Delta Illegal_{t+1} \times 100}{pop_{rt}}\right)$	1.590*** (0.202)	1.926*** (0.235)			300
F-stat excl. instr.	62.00	67.08			
R-squared	0.136	0.165			
Panel B: Second stage regressions					
Dep. Variable: Native employment change (fraction of native working age pop.)					
	IV Legal Migr. (1)	OLS Legal Migr. (2)	IV Legal and Illegal Migr. (3)	Reduced Form (4)	Obs.
All sectors	-0.0034 (0.0202)	0.0031 (0.0030)	-0.0027 (0.0172)	-0.0534* (0.0262)	300
Agriculture, Forestry and Fishing	0.0074 (0.0066)	0.0016 (0.0013)	0.0061 (0.0056)	0.0118 (0.0105)	300
Mining	-0.0015* (0.0007)	-0.0002 (0.0004)	-0.0012* (0.0006)	-0.0023* (0.0013)	300
Construction	0.0117** (0.0041)	0.0009 (0.0025)	0.0097** (0.0037)	0.0187** (0.0065)	300
Manufacturing	-0.0003 (0.0113)	-0.0041 (0.0054)	-0.0003 (0.0098)	-0.0006 (0.0189)	300
Transportation, Communications, Electric, Gas and Sanitary Services	-0.0004 (0.0099)	0.0011 (0.0020)	-0.0003 (0.0085)	-0.0007 (0.0164)	300
Wholesale Trade	-0.0174*** (0.0043)	0.0020* (0.0010)	-0.0144*** (0.0038)	-0.0278*** (0.0051)	300
Retail Trade	-0.0008 (0.0090)	-0.0023 (0.0023)	-0.0004 (0.0076)	-0.0008 (0.0146)	300
Finance, Insurance and Real Estate	-0.0067 (0.0055)	-0.0021** (0.0009)	-0.0055 (0.0047)	-0.0106 (0.0084)	300
Hotels and Restaurants	-0.0121*** (0.0034)	0.0023 (0.0022)	-0.0099*** (0.0029)	-0.0190*** (0.0051)	300
Public Administration	-0.0048 (0.0043)	0.0026 (0.0017)	-0.0039 (0.0036)	-0.0076 (0.0068)	300
Educational Services	0.0176*** (0.0059)	0.0004 (0.0010)	0.0146** (0.0052)	0.0280*** (0.0085)	300
Other Services	0.0039 (0.0138)	0.0008 (0.0034)	0.0030 (0.0117)	0.0058 (0.0221)	300
Quarter and year fixed effects	YES	YES	YES	YES	
Region fixed effects	YES	YES	YES	YES	

The dependent variable in Panel A column (1) is $\Delta Legal_{rt+1}^{AS}$ from eq. (6)

The dependent variable in Panel A column (3) is $\Delta Legal_{rt+1}^{AS} + \Delta Illegal_{rt+1}$ from eq. (5).

Each entry in Panel B column (1) and (2) is the coefficient on the variable "legal migration flows" ($\Delta Legal_{rt+1}^{AS}$) in equation (6).

Each entry in Panel B column (3) is the coefficient on the variable "legal and illegal migration flows" ($\Delta Legal_{rt+1}^{AS} + \Delta Illegal_{rt+1}$) in equation (5).

Each entry in Panel B column (4) is the coefficient on the (instrumental) variable $\left(\frac{Im_{2003}^{AS}}{Im_{2003}}\right) \times \left(\frac{\Delta Illegal_{t+1} \times 100}{pop_{rt}}\right)$ from the reduced form regression.

Each regression contains the following controls (relative to the native population): average age, the fraction of males, the regional population, the fraction of full-time workers, white collar and tenured workers, the fraction of high school and college graduates.

Standard errors in parentheses. Observations are weighted by quarter specific population shares.

Standard errors are clustered at the regional level. *, ** and *** are 10, 5 and 1 percent significance levels.

Table 4: The employment effects of the Arab Spring migration: number of workers

Average inflow of legal immigrants Q42010-Q22011 (number of individuals)	887				
Average inflow of legal and illegal immigrants Q42010-Q22011 (number of individuals)	1413				
Average regional working age population Q42010-Q22011 (number of individuals)	1806878				
	Mining	Construction	Wholesale Trade	Hotels and Restaurants	Educational Services
	(1)	(2)	(3)	(4)	(5)
Estimated change in native employment due to legal migration (number of workers)	-0.12* (0.056)	47.53** (17.96)	-41.43*** (10.84)	-29.97**** (8.887)	67.62*** (23.39)
Estimated change in native employment due to legal and illegal migr. (number of workers)	-0.15* (0.076)	62.46** (23.58)	-54.46*** (14.35)	-39.39*** (11.73)	88.87** (31.52)
Estimated change in native employment from the reduced form model (number of workers)	-0.08* (0.042)	32.44** (11.38)	-28.28*** (5.155)	-20.46*** (5.513)	46.15*** (14.04)
Average native employment 2009-Q32010 (number of individuals)	1548	80335	46969	49620	76044
Quarter, year and region fixed effects	YES	YES	YES	YES	YES

Standard errors in parentheses. The period Q42010-Q22011 is here considered as the peak of the Arab Spring.

The effects of legal migration are based on the coefficients from Table 3 Panel B column (1).

The effects of legal and illegal migration are based on the coefficients from Table 3 Panel B column (3).

The effects from the reduced form model are based on the coefficients from Table 3 Panel B column (4).

The estimated change in native employment is derived in two steps. First, by multiplying the coefficients from Table 3 column (1), (3) and (4) by, respectively, the average $\Delta Legal_{rt+1}^{AS}$, the average $\Delta Legal_{rt+1}^{AS} + \Delta Illegal_{rt+1}$ and the average $\left(\frac{Im_{2003}^{AS}}{Im_{2003}^{AS}}\right) \times \left(\frac{\Delta Illegal_{t+1} \times 100}{pop_{rt}}\right)$ at the peak of the Arab Spring (Q42011-Q22011).

The resulting number is then multiplied by the average number of workers employed in each industry prior to the uprisings (this reported in the Table). At the peak of the Arab Spring $\Delta Legal_{rt+1}^{AS}$ was on average around 0.05%,

$\Delta Legal_{rt+1}^{AS} + \Delta Illegal_{rt+1}$ was about 0.08% and $\left(\frac{Im_{2003}^{AS}}{Im_{2003}^{AS}}\right) \times \left(\frac{\Delta Illegal_{t+1} \times 100}{pop_{rt}}\right)$ was about 0.02%.

Table 5: The dynamic effects of temporary migration

Dep Var: Native Employment change over 3,6,9 and 12 months (fraction of native work. age pop.)				
	3 months	6 months	9 months	12 months
Mining				
Quarterly change legal immigr. (%)	-0.0015*	0.0003	0.0015	-0.0007
	(0.0007)	(0.0021)	(0.0021)	(0.0014)
Quarterly change legal and illegal immigr. (%)	-0.0012*	0.0007	0.0015	-0.0004
	(0.0006)	(0.0018)	(0.0015)	(0.0011)
Construction				
Quarterly change legal immigr. (%)	0.0117**	0.0086	-0.0025	-0.0064
	(0.0044)	(0.0061)	(0.0058)	(0.0076)
Quarterly change legal and illegal immigr. (%)	0.0097**	0.0052	-0.0053	-0.0020
	(0.0037)	(0.0062)	(0.0050)	(0.0071)
Wholesale trade				
Quarterly change legal immigr. (%)	-0.0175***	-0.0170***	-0.0147***	-0.0269***
	(0.0046)	(0.0051)	(0.0045)	(0.0092)
Quarterly change legal and illegal immigr. (%)	-0.0144***	-0.0141***	-0.0109**	-0.0196*
	(0.0038)	(0.0042)	(0.0042)	(0.0103)
Hotels and Restaurants				
Quarterly change legal immigr. (%)	-0.0120***	-0.0214**	-0.0134**	-0.0045
	(0.0036)	(0.0078)	(0.0053)	(0.0055)
Quarterly change legal and illegal immigr. (%)	-0.0099***	-0.0221***	-0.0106	0.0009
	(0.0029)	(0.0045)	(0.0063)	(0.0056)
Educational Services				
Quarterly change legal immigr. (%)	0.0176***	0.0178***	0.0114**	0.0116*
	(0.0061)	(0.0052)	(0.0047)	(0.0066)
Quarterly change legal and illegal immigr. (%)	0.0146**	0.0153***	0.0080	0.0077
	(0.0052)	(0.0043)	(0.0063)	(0.0069)
Legal migration effect as a share of the quarterly effect (mean across sectors)	1.000	0.860	0.278	0.498
Legal and illegal migration effect as a share of the quarterly effect (mean across sectors)	1.000	0.842	0.116	0.498
F stat. excluded instrument legal immigr.	62	59.69	12.41	9.93
F stat. excluded instrument legal and illegal immigr.	67.08	74.52	17.88	14.18
Obs.	300	280	260	240

Each entry corresponding to the variable "Quarterly change legal immigr." is the coefficients on the variable $(\Delta Legal_{it+1}^{AS})$ in equation (6).

Each entry corresponding to the variable "Quarterly change legal and legal immigr." is the coefficients on the variable $(\Delta Legal_{it+1}^{AS} + \Delta Illegal_{it+1}^{AS})$ from equation (5). The first stage regressions are in Table B.4 and B.5 in the Appendix.

Each cell is a different regression. Each regression contains the following controls: average age, the fraction of males, the regional population, the fraction of full-time workers, the fraction of white collar and tenured workers, the fraction of high school and college graduates, region, year and quarter fixed effects. Observations are weighted by quarter specific population shares.

Standard errors in parentheses. Standard errors are clustered at the regional level. *, ** and *** are 10, 5 and 1 percent significance levels.

Table 6: Sectoral shift of employment

Panel A: First stage regression				
Change in Arab Spring immigrants (%native working age pop.)				
	(1)	Obs.	(2)	Obs.
$\left(\frac{Im_{r2003}^{AS}}{Im_{2003}^{AS}}\right) \times \left(\frac{\Delta Illegal_{t+1} \times 100}{pop_{rt}}\right)$	1.8533*** (0.3866)	220	1.8690*** (0.4177)	220
F-stat excl. instr.	22.98		20.02	
R-squared	0.178		0.178	
Panel B: Second stage regression				
Inflow into construction from Mining, Wholesale trade and Hotels and Restaurants (fract. native working age pop.)				
	(1)	Obs.	(2)	Obs.
$\Delta Legal_{rt+1}^{AS}$	0.0487* (0.0254)	220	0.0491* (0.0273)	220
Quarter and year fixed effects	YES		YES	
Region fixed effects	NO		YES	

Panel A and B: Each cell is a different regression. Each regression contains the following controls (native pop.): average age, the fraction of males, the regional population, the fraction of full-time workers, the fraction of white collar and tenured workers, the fraction of high school and college graduates. Observations are weighted by quarter specific population shares. Standard errors in parentheses.

The variable "Instrument" in Panel A indicates the product term described in expression (3).

Standard errors are clustered at the regional level. *, ** and *** are 10, 5 and 1 percent significance levels.

Table 7: Descriptive Statistics on Sectors

	Average earning pre-Arab Spring period Elementary School at most	Illegal workers (% total) Av. 2005-2009	Italians (% total Italians)	Training Foreigners (% total foreigners)	Share of short term contracts (less than 6 months) (% total emp.)
Agriculture, Forestry and Fishing	992.04	23.55	1.54	0.79	11.68
Mining	1304.13	4.87	3.98	0.35	2.66
Construction	1181.15	10.63	2.21	0.97	2.24
Manufacturing	1162.57	3.94	3.10	1.15	2.21
Transportation, Communications, Electric, Gas and Sanitary Services	1303.04	28.26	4.85	2.18	2.34
Wholesale Trade	1140.03	7.25	3.79	2.60	1.56
Retail Trade	984.48	7.25	2.44	0.76	2.48
Finance, Insurance and Real Estate	1326.57	9.04	9.87	7.10	0.90
Hotels and Restaurants	886.90	31.26	2.17	1.86	6.85
Public Administration	1346.72		5.37	0.66	1.14
Educational Services	972.88	6.74	8.61	5.55	2.24
Other Services	938.37	12.59	7.25	2.09	2.29

Source: Data on illegal workers from *La misura dell'occupazione non regolare nelle stime di contabilità nazionale* - Istat.

All the remaining statistics are from the Italian Labor Force survey data - Istat.

The training variable is constructed looking at the number of workers who have attended at least one job training activity in the 4 weeks prior to the interview.

Elementary school is defined as primary (grade 1 to 5) and middle school (grade 6 to 8).

Table 8: Employment effects - Robustness checks

Second stage regression					
Employment change (fraction of native working age pop.)					
	(1)	(2)	(3)	(4)	(5)
All sectors	-0.0042 (0.0222)	-0.0049 (0.0230)	-0.0114 (0.0243)	-0.0039 (0.0186)	-0.0087 (0.0212)
Agriculture, Forestry and Fishing	0.0073 (0.0074)	0.0070 (0.0076)	0.0164 (0.0099)	0.0073 (0.0063)	0.0049 (0.0067)
Mining	-0.0015* (0.0008)	-0.0015 (0.0009)	-0.0024* (0.0013)	-0.0015** (0.0007)	-0.0015** (0.0007)
Construction	0.0118** (0.0046)	0.0120** (0.0050)	0.0143* (0.0079)	0.0118*** (0.0039)	0.0090* (0.0054)
Manufacturing	-0.0007 (0.0128)	-0.0008 (0.0135)	-0.0096 (0.0146)	-0.0006 (0.0104)	0.0011 (0.0079)
Transportation, Communications, Electric, Gas and Sanitary Services	-0.0004 (0.0113)	-0.0006 (0.0117)	-0.0079 (0.0132)	-0.0004 (0.0094)	-0.0012 (0.0099)
Wholesale Trade	-0.0176*** (0.0050)	-0.0177*** (0.0053)	-0.0141** (0.0065)	-0.0172*** (0.0040)	-0.0173*** (0.0054)
Retail Trade	-0.0008 (0.0100)	-0.0010 (0.0104)	-0.0009 (0.0110)	-0.0009 (0.0086)	-0.0021 (0.0071)
Finance, Insurance and Real Estate	-0.0063 (0.0062)	-0.0065 (0.0065)	-0.0028 (0.0059)	-0.0066 (0.0052)	-0.0074 (0.0048)
Hotels and Restaurants	-0.0116*** (0.0039)	-0.0115** (0.0043)	-0.0235** (0.0090)	-0.0118*** (0.0031)	-0.0122*** (0.0038)
Public Administration	-0.0052 (0.0051)	-0.0053 (0.0052)	0.0039 (0.0075)	-0.0047 (0.0040)	-0.0030 (0.0047)
Educational Services	0.0173** (0.0064)	0.0174** (0.0067)	0.0223** (0.0102)	0.0173*** (0.0054)	0.0160** (0.0076)
Other Services	0.0034 (0.0154)	0.0036 (0.0162)	-0.0071 (0.0204)	0.0036 (0.0130)	0.0050 (0.0119)
Observations	300	300	300	300	300
Year f.e.	YES	YES	YES	YES	YES
Quarter f.e.	YES	YES	NO	YES	YES
Region times year f.e.	YES	YES	YES	NO	NO
Regional time trends	NO	YES	YES	NO	NO
Quarter times year f.e.	NO	NO	YES	NO	NO
Region f.e.	NO	NO	NO	NO	NO
Stock of AS immigrants at t-1	NO	NO	NO	YES	NO
Change Immig. from other countries	NO	NO	NO	NO	YES

Each entry in the table is the coefficients on the explanatory variable of interest (migration flows) in equation (6).

Change Immig. from other countries is instrumented using the interaction between 2003 regional shares and the national quarterly change in non-As immigrants.

Stock of AS immigrants at t-1 is instrumented using the 2003 regional shares of immigrants from the AS countries relative to the native population. Table B.12 in the online Appendix shows the first stage regressions. Each cell is a different regression. Each regression contains the following controls: average age, the fraction of males, the regional population, the fraction of full-time workers, white collar and tenured workers, the fraction of high school and college graduates. Observations are weighted by quarter specific population shares.

Standard errors in parentheses. Standard errors are clustered at the regional level.

*, ** and *** are 10, 5 and 1 percent significance levels.

Table 9: Placebo Test - Pre-Arab Spring period only (09Q1-10Q3)

Panel A: First stage regressions		
Change in Arab Spring immigrants (% native working age pop.)		
		Observations
$\left(\frac{Im_{t,2003}^{AS}}{Im_{2003}^{AS}}\right) \times \left(\frac{\Delta Illegal_{t+1} \times 100}{pop_{rt}}\right)$	-19.279*** (3.459)	120
F-stat excl. instr.	31.07	
R-squared	0.285	
Panel B: Second stage regressions		
Native employment change (fract. native working age pop.)		
		Observations
All sectors	-0.0103 (0.019)	120
Agriculture, Forestry and Fishing	0.0020 (0.005)	120
Mining	-0.0004 (0.001)	120
Construction	0.0104 (0.007)	120
Manufacturing	-0.0045 (0.010)	120
Transportation, Communications, Electric, Gas and Sanitary Services	-0.0022 (0.005)	120
Wholesale Trade	0.0069 (0.009)	120
Retail Trade	-0.0092 (0.008)	120
Finance, Insurance and Real Estate	-0.0028 (0.003)	120
Hotels and Restaurants	0.0024 (0.004)	120
Public Administration	0.0073 (0.005)	120
Educational Services	-0.0089 (0.007)	120
Other Services	-0.0112 (0.013)	120
Quarter and year fixed effects	YES	

Each cell is a different regression. Each regression contains the following controls: average age, the fraction of males, the regional population, the fraction of full-time workers, white collar and tenured workers, the fraction of high school and college graduates. Observations are weighted by quarter specific population shares.

The variable "Instrument" in Panel A indicates the product term described in expression (3).

Each entry in Panel B is the coefficient on the explanatory variable of interest (migration flows) in equation (6).

Standard errors in parentheses.

Standard errors are clustered at the regional level. *, ** and *** are 10, 5 and 1 percent significance levels.

Table 10: Wild bootstrap versus clustered standard errors

Second stage regressions			
Native employment change (share of native working age pop.)			
	(1) Clustered s.e.	(2) Wild bootstrap	Observations
Mining (p-value)	-0.0015* (0.0546)	-0.0015 (0.3442)	300
Construction (p-value)	0.0117** (0.0107)	0.0117** (0.0374)	300
Wholesale Trade (p-value)	-0.0174*** (0.0007)	-0.0174** (0.0226)	300
Hotels and Restaurants (p-value)	-0.0121*** (0.0019)	-0.0121*** (0.0026)	300
Educational Services (p-value)	0.0176*** (0.0076)	0.0176* (0.063)	300
Quarter, year f.e.	YES	YES	

Each cell is a different regression. Each regression contains the following controls:

average age, the fraction of males, the regional population, the fraction of full-time workers, the fraction of white collar and tenured workers, the fraction of high school and college graduates.

Observations are weighted by quarter specific population shares.

Each entry in Panel B is the coefficients on the explanatory variable of interest (migration flows) in equation (6).

Wild bootstrap performed as in Davidson and MacKinnon (2010). Results obtained from 999 repetitions.

Standard errors in parentheses. *, ** and *** are 10, 5 and 1 percent significance levels.