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Immigrants' Regularization and Native Workers' Response*

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Tommaso Nannicini

Understanding Immigrants' Regularization and Native Workers' Response*

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Immigrants' Regularization and Native Workers' Response*

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Abstract

Using employer-employee Italian data over the period 1998-2018 we analyze the impact of the largest regularization of undocumented immigrant workers in Italy on wage, employment and mobility outcomes of natives. Our empirical strategy takes advantage of the 2002 Bossi-Fini law that unexpectedly regularized 634,000 undocumented non-EU immigrants, with variation across firms and provinces that was not correlated with previous economic performance. We find that the policy had a small effect on the average wage of native workers and positive effects on their employment at the local labor market level. Additionally, native co-workers in firms more affected by the policy were more likely to change employers in the post-policy period. Such higher mobility resulted in a positive assortative reallocation to firms increasing average wage and wage dispersion for natives.

Keywords: Workers, Firms, Immigrant Regularization, Local Labor Market
JEL-Classification: F16, J20, J61.

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Introduction

The labor market effects of immigrants have been widely studied in the economic literature. Classical studies have used country-level, regional or local labor market data to analyze how immigrants, by changing supply of labor of different types, affected native wages and employment (see Borjas 2003, Card 2001, Ottaviano and Peri 2012, Dustmann et al. 2013 and Edo 2019 among many others). More recently, papers have looked at firm-level, employer-employee data to analyze the consequences of immigration on additional margins of adjustment of the local economy including the firm-level productivity, the specialization effects (e.g. Mitaritonna et al. 2017, Beerli et al. 2021) and the job/occupational mobility of natives (Peri and Sparber 2009 and Foged and Peri 2016). In a previous paper, two of us (Orefice and Peri, 2024) have specifically looked at how larger presence of immigrants affected the degree of assortative matching of native workers and firms in France. Much more limited, however, is the analysis of how the regularization of existing undocumented immigrants affected native labor market outcomes.

The present paper uses Italian longitudinal employer-employee data on the universe of workers in the period 1998-2018, and the policy-induced increase in regular immigrant workers (i.e. amnesty) produced by the Bossi-Fini law of 2002, to analyze the employment and wage effects of this regularization on natives at the local level. In particular, new in this literature, as we have employer-employee matched data we analyze the dynamic response of native workers to the amnesty looking at their cross-firm mobility in the post-amnesty period, the type of match with new employers, and the implication for the wage dynamics of natives.

The Bossi-Fini Law of 2002 (d.l. 189/2002) was the largest, rarely studied, immigrant regularization in Italy.[1] The main objectives of this policy were to promote the move from the informal to the formal labor market of undocumented immigrants through the provision of work-residence permits. This feature of the Bossi-Fini law – introduced in September 2002 – allowed immigrant who had worked and lived in Italy for at least three months before the implementation of the policy, to regularize their position.[2] In the

[1]Law 189/2002 was approved in July 2002 but the regularization for private employees introduced only in September 2002 with the D.l. 195/2002. The regularization procedure resulted in around 700,000 applications – see Colombo et al. (2002), Di Porto et al. (2023) and Carrozzo (2022) for more details.

[2]To regularize informal immigrant workers, Italian employers had to pay a 700€ lump-sum tax to cover the past unpaid taxes. Irregular immigrant workers had to be hired on a minimum of one-year contract.

short-run, these features of the Bossi-Fini likely increased competition (substitutability) between immigrants and natives, making them more comparable in conditions and pay to natives.

Additionally from 2002 on, the law regulated inflows of new non-EU immigrant workers in some occupations, characterized by shortages.[3] It gave the Prime Minister authority to set the number of *non-EU workers* that could be admitted in Italy each year. They were allowed to enter the Italian labor market only if they had a valid "residence contract" (*contratto di soggiorno*), issued conditional on an employment contract signed by an employer and the immigrant worker.[4]

Specific offices were created by this law in each Italian province to manage the recruitment procedure for immigrant workers. In particular, employers were allowed to recruit directly non-EU immigrant workers from lists of immigrant workers held by Italian embassies and consulates abroad.[5] The residence permits issued for employment reasons lasted for a maximum of two years, and could be renewed if employment conditions were maintained at the end of the first period. After six years of regular residence in Italy, non-EU immigrant workers with sufficient economic requisites to support themselves and their families could apply for a permanent permit. In the long-run, this feature of the policy increased the inflows of non-EU immigrants in Italy, giving them a legal path toward employment and long-term residence.

After the reform, immigrants already living in Italy became more likely to be employed immediately, and firms (and families, in case of caregiver jobs) had easier access to hiring non-EU immigrant workers in sectors with labor shortages in the subsequent years. Both aspects of the reform increased the supply of/competition from immigrants, potentially hurting native's job and wage prospects if they were employed in similar/identical jobs as natives, with no other changes. Alternatively, if immigrants filled different jobs, complemented natives allowing firms to fill shortages (helping the productivity of firms), and if natives responded to this policy by moving to jobs where with stronger complementarities to immigrant workers, the policy could have helped employment and wage of natives. The empirical analysis of this paper will provide evidence to discriminate between these two

[3] https://www.gazzettaufficiale.it/eli/id/2002/08/26/002G0219/sg.

[4] `https://www.eurofound.europa.eu/publications/article/2002/new-legislation-regulates-immigration`. After the expiration of the contract the immigrant worker had leave the Italian territory.

[5] The Bossi-Fini law regulated also family reunification immigration to Italy and deportation requisites for irregular immigrants (who can be deported and accompanied to Italy's borders and leave Italian territory).

alternative scenarios.

The recent literature has analyzed the labor market impacts of a few regularization policies.[6] Bahar et al. (2021) studied the effects of granting the *Permiso Especial de Permanencia* (August 2018), an amnesty program allowing work-permits to undocumented Venezuelan migrants on Colombian workers. They did not find any significant effect of this amnesty on hours worked, wages, and labor force in the short to medium run (i.e. almost one year after the implementation). Elias et al. (2024), the only other recent study analyzing a significant regularization program in Europe, study the regularization of 600,000 non-EU immigrants in Spain in 2004, and show that while the policy did not affect the formal employment or wages of Spanish workers in general, it significantly decreased the informal employment of *low-skilled* Spanish natives and immigrant workers.

A different set of papers, such as Kossoudji and Cobb-Clark (2002) and Amuedo-Dorantes et al. (2007), study instead the effect of regularization (specifically the Immigration Reform and Control Act–IRCA) on the labor market outcomes of the legalized population itself. This analysis shows that legalization produced increased labor market opportunities and job mobility for men after the amnesty, and a weak positive (Kossoudji and Cobb-Clark, 2002) or not-significant (Amuedo-Dorantes et al., 2007) increase in their wages. Kaushal (2006) studies the effect of the Nicaraguan Adjustment and Central American Relief Act (NACARA) on employment and earnings of non-citizen men from Cuba, Nicaragua, Guatemala, and El Salvador, finding a not significant effect of this amnesty on employment, but a statistically significant positive effect on weekly earnings.[7] While important in evaluating the impact of regularization on wages and productivity of regularized immigrants, these papers do not provide evidence about the labor market effect of amnesty on *native* workers.

Only few studies have analyzed the consequences of the regularization program brought by the Bossi-Fini law. They mostly focused, however, on the impact on regularized workers themselves, and considered a rather limited period after the reform (only a few months

[6]Theoretical contributions as in Chassamboulli and Peri (2015) and Casarico et al. (2018) show that legalization as a policy to reduce illegal migrants has significant positive economic effects. This is even stronger in the presence of tight labor markets.

[7]Under the Nicaraguan Adjustment and Central American Relief Act, Cuba and Nicaragua nationals who have lived no more than 180 total days outside the U.S. since 12/1/95 may be eligible for permanent residence. Also, nationals from Guatemala, El Salvador and the former Soviet Bloc countries can apply for a stay of removal if they have been continuously present in the U.S. for at least seven years and applied for asylum by specific deadline dates in 1990 and 1991.

– Carrozzo 2022) or a limited area of analysis (only one city in Italy – Devillanova et al. 2018). Di Porto et al. (2023) analyze the effect of the regularization on immigrant workers themselves on firms that selected into the program. Using an identification strategy relative to a subset of audited firms they find a very small (weakly significant) wage effect, and only short-run positive employment effect for Italian firms (between 1.5 and 1.8 more workers in the four months after the policy). Carrozzo (2022) analyzes only the very short-run effects of the regularization (from one to three months after it) and finds a negative employment effect on Italian natives (i.e. lower probability of being employed in the formal sector) but positive effects on wages. Devillanova et al. (2018) limits the analysis to the city of Milan, and studies the consequences of the Bossi-Fini law on the employment probability of immigrant workers themselves. They show that the eligibility for amnesty introduced by the Bossi-Fini law had a significant positive effect on the employment probability of immigrant workers.

Our paper contributes to the previous literature on the labor market consequences of amnesties in several ways. First, we test the effect of the Bossi-Fini law on Italian natives at local, firm and individual levels – a unique feature in this literature. We are the first to analyze channels of adjustment of native workers, including firm-to-firm mobility. Second, we use a more standard identification strategy, checking for its validity and power using a well-established econometric approach. Third, we analyze the long-run effects of the amnesty (up to more than ten years after the policy) by following the path of native workers employed in firms that regularized large numbers of immigrants, and we characterize their mobility between firms and the quality of the new matches with firms.

At the local labor market level we find that areas with larger regularization under the Bossi-Fini law did not experience significant average wage differences up to ten years after the policy. Those labor markets experienced instead statistically significant increase in employment. Additionally, more productive firms grew in areas where the immigrant supply increased due to the amnesty while less productive firms exited the market revealing a strengthening of competition effect. Third, native workers in firms experiencing larger availability of non-EU immigrant workers because of the regularization were more likely to change employers and move across firms in the following years. Interestingly, these moves strengthened the degree of positive assortative matching between firms and native workers: high-productivity native workers tended to move towards more productive firms

when responding to the increase in immigrants supply. The increase in mobility, and the assortative matching re-allocation of workers in response to the amnesty-induced increase in immigrant workers, left average wages unchanged but increased the wage premium for high- relative to low-productivity workers.

The rest of the paper is organized as follows. Section 1 discusses the institutional context and the evolution of the Italian migration policy over time. Section 2 sketches the conceptual framework to interpret our results. Section 3 presents the data sources and some stylized facts about immigration in Italy. Section 4 outlines the empirical strategy, and section 5 discusses the results. The final section concludes.

1 The Bossi-Fini law and the Italian Immigration Policy

International migration became significant in Italy starting only in the late 1980's.[8] The Foschi Law approved in 1986 introduced for the first time rules for employers hiring non-EU workers (Zincone and Caponio, 2006; Ambrosetti and Paparusso, 2018). According to the law, employers had to prove the absence of native or EU workers willing to fill the specific job in order to employ non-EU immigrant workers.

Italian borders were quite permeable in those years and immigrants were able to enter illegally and join the informal Italian labor market. This produced backlash and social tensions between immigrant workers illegally entered and native workers.[9] After few years, in February 1990, a new immigration act was approved, the Martelli-law. This was the first comprehensive Immigration Act in Italy that : (i) introduced the asylum right in Italy (Art. 1), (ii) regulated the entry of non-EU citizens in the Italian territory *via* a compulsory entry visa requirement and more effective controls at the borders to detect and expel illegal immigrants, (iii) regularized the immigrants already present in the Italian territory (namely, all non-EC immigrants present in Italy before 31 December 1989 could apply for regularization regardless of their employment position). The amnesty implied

[8]Other EU countries experienced important immigration episodes after the Second World War (Germany, Netherlands and Belgium) as well as during the 1960's (France, Switzerland). Italy was historically an origin country of immigrant workers emigrated towards North and South America, Australia and Western Europe (Germany, Belgium, Netherlands, France and UK).

[9]In this context the immigrant worker Jerry Essan Masslo was murdered by a group of right-wing extremists in Villa Literno in the south of Italy.

the regularization of 218,000 non-EU workers (Ambrosetti and Paparusso, 2018). With the fall of the Soviet block, the Italian borders experienced an unprecedented pressures from ex-Communists countries (mainly from Albania and the ex-Yugoslavian countries) and a new amnesty policy was approved by Prime Minister Dini in 1995 to regularize these new immigrant workers. The Dini law was mainly an amnesty, but introduced for the first time in Italy some basic health care rights to immigrant workers (in case of serious illness and accidents) and gave the right to children of illegal immigrants to attend public schools in Italy.

The Dini law anticipated by few years the second comprehensive Italian Immigration Act ratified in 1998 and known as the Turco-Napolitano act. The Turco Napolitano Act: (i) established the creation of temporary accommodation centres (*centri di prima accoglienza*) to host undocumented immigrants while waiting for entry approval or expulsion, (ii) promoted the integration of legal immigrants who resided in Italy for at least five years by giving the opportunity to apply for permanent residence card, (iii) extended some health care rights to illegal immigrants, and (iv) introduced a further amnesty the regularized about 220,000 illegal stayers (Zincone and Caponio, 2006). Importantly, the Turco-Napolitano Act regulated the entry of non-EU immigrant workers *via* the introduction of "sponsorship" to facilitate the entry of workers within annual quotas. Temporary permits were granted to non-EU immigrant workers looking for jobs in Italy if sponsored by an Italian citizen. The Turco-Napolitano Act was finally amended in 2002 by the Bossi-Fini law. A chronology of the evolution of the Italian migration policy is reported in Table 1.

To signal the discontinuity with previous Immigration Acts, the Bossi-Fini law abolished the "sponsorship" system for new entry, increased at six years the minimum amount of residence period to apply for permanent residence card and tightened the penalties (up to imprisonment) for illegal immigrants who did not comply with an order of expulsion. Also, under the Bossi-Fini law, non-EU immigrant workers could access the Italian labor market only if in possession of a valid job contract of at least one year (in line with previous legislation in force, employers still had to prove the absence of native workers willing to fill the specific job – Colombo et al. 2002). Such restrictive features of the Bossi-Fini law came, however, with an important regularization of illegal non-EU immigrant workers already present in the Italian labor market: 634,000 non-EU immigrant workers (mainly

Table 1: Migration Policy in Italy: a chronology

Law ID	Named	Date	Main objectives
D.l. 943-1986	Foschi law	Dec 30, 1986	Hiring non-EU workers.
D.l. 39-1990	Martelli law	Feb 28, 1990	Border regulation; Visa requirement.
D.l. 489-1995	Dini law	Nov 18 1995	Amnesty.
D.l. 40-1998	Turco Napolitano Act	Mar 6 1998	Prevent illegal entry; Regulate new flows; Integration legal immigrants; Treatment of illegal stayers.
D.l. 189-2002	Bossi Fini law	July 2 2002	Prevent illegal entry; regulate new entry.

coming for Eastern European Countries and Asia – see Zincone and Caponio 2006) were regularized.

This was the biggest amnesty ever given in Europe (Paparusso et al., 2017), with an interesting peculiarity: the regularization was delegated to employers. Namely, to apply for the regularization, employers had to declare and prove (informal) employment status of concerned immigrant workers in Italy for at least three months before the entry in force of the law, pay a lump-sum tax of about 700€, and hire the immigrant worker for at least one year.[10] Applications could be submitted from September 10^{th} (the day after the approval of the law) to November 13^{th} 2002. After this period, the Italian police authorities checked the validity of regularization forms and finally granted residence permit to legalized workers. Such a screening process took about two years to be completed and approximately the 95% of applicants were legalized (Devillanova et al., 2018).

Importantly for our identification strategy, the Parliamentary process that led to the final approval of the Bossi-Fini law suggests the absence of any anticipation effect during the entire process, and up to the approval of the d.l. 189/2002 in July 2002, the amnesty was supposed to apply only to family caregivers workers. The extension of the amnesty to *all* immigrant workers in the private sector was introduced (unexpectedly) only in a supplement of the law in September 2002. It is therefore unlikely that firms hired undoc-

[10]While the exact duration of the employment status was hardly measurable (making *de facto* such requirement not enforceable), the duration of stay in Italy (implicit condition to be employed informally) was verifiable. The amnesty application form asked to prove the date of entry in Italy by uploading a copy of the visa stamp (the great majority of irregular immigrants in Italy were visa over stayers).

umented workers right before 2002 since the extension of the amnesty to all immigrant workers was not even discussed during the Parliament debate up to the second half of year 2002. We can therefore rule out any pre-amnesty effect (i.e. labor demand/supply shifts). The absence of any anticipatory effects is also showed in Di Porto et al. (2023).[11]

2 Conceptual Framework

The Bossi-Fini law had two main objectives. First, it allowed the regularization of employment for a group of existing immigrants, who were already working at the time of the amnesty, as irregular. Second, it made it easier for some employers to hire non-EU immigrants in the following years in some occupations, by regulating the number of legal entries. The regularization of immigrant workers implied that they gained options to be employed in formal jobs, usually better paid and more protected. This typical role of amnesties has usually an unambiguous positive effect on wages and returns to skills for newly legalized workers as shown in several papers (Kossoudji and Cobb-Clark, 2002; Amuedo-Dorantes et al., 2007; Kaushal, 2006). By getting legal status, the newly regularized immigrants can change employers more easily, achieving better returns to skills, and they may increase their bargaining power. These changes are expected to increase the wages of regularized workers relative to undocumented immigrants (i.e. those who did not meet the amnesty's requirement) and native workers (whose labor supply remains unchanged in the short-run).

Our analysis, however, focuses on the effect of the regularization on *natives* in the formal sector. Following the framework illustrated in Elias et al. (2024) we can think that more regularized immigrants decreased the bargaining power of employers (increasing immigrant workers' outside option), potentially helping all workers, including natives, to bargain for a larger share of surplus and hence higher wages. However, the amnesty also increased the supply of regular workers and increased the substitutability between immigrants and natives likely generating downward pressure on wages of native workers. Depending on the elasticity of supply these effects may also be reflected on native employment. Hence the wage and employment effect of amnesties on native workers are theoretically ambiguous and the empirical analysis may shed light on them.

[11] See Figures 1 and 2 in Di Porto et al. (2023).

Additionally, we focus on another dynamic effect of regularization. As newly legalized immigrants move to better jobs and potentially better matches with employers, native workers may suffer tougher competition and may also try to escape such competition by moving out of firms and/or occupations that hire a large number of amnestied immigrants. The "upskilling" of natives, who may access alternative occupations, is likely encouraged by the regularization. They realize better wage opportunities in jobs with less competition with immigrants. This mobility response, however, may be very different depending on the characteristics of less-educated natives (those who suffer competition from regularized immigrants). Some may be able to move to jobs that compensate for their less substitutable skills, other less so. Hence we test the effect of the Bossi-Fini law on the wages, employment and job mobility of native workers within five years from the implementation of the policy, which is long enough for these effects to have taken place.

As this amnesty required immigrants to be employed at the time of application, the anticipation of the law may have caused an increase in the labor supply of (or demand for) undocumented workers in the months immediately before the policy. This would bias the pre- *vs* post-amnesty comparison in the econometric analysis of its effects. However, the pre-policy effect is unlikely to be relevant in our case as the Bossi-Fini law extension to workers in the private sector was unexpected and only announced at the time of the passing of the reform– see Section 1. The event-study analysis in Di Porto et al. (2023) confirms the absence of any pre-policy effect in the seven months preceding the policy.

Finally, in the long run, the amnesty might have produced a "magnet" role for future immigrants to Italy, encouraging potential migrants by giving them legal access to Italian labor markets in some occupations. So, in the years following the law, native workers may have faced larger supply of new immigrants and hence stronger competition in the labor market. To capture these consequences we look at the impact of the Bossi-Fini Law up to 10 years after its implementation (*long-run* effect of the Bossi-Fini Law).

3 Data and descriptive evidence

3.1 Data sources

To test the short- and long-run effect of the Bossi-Fini Law on native workers, we use matched employer-employee Italian data from the National Social Security Institute

(INPS) in the period 1998-2018. This dataset provides worker-level information for all workers and their employer in the Italian private sector. Specifically, we have information on the employment status, wage, employing firm, sector, region, gender and age for the universe of workers (natives and immigrants) in Italy in the period 1998-2018. Importantly, the INPS dataset allows to track workers over time, and hence measure their history and cross-firm mobility. These data represents a unique opportunity to test the consequences on native workers of an immigrants regularization, by following the career of each specific worker during the post-treatment period. Two features of INPS data make this source well-suited for our estimations. First, they include both the nationality of workers and the (broad) occupation; this is crucial to properly identify the policy-induced effects of the amnesty on native workers separating less skilled from more skilled ones (blue-, white-collar and managers). Second, by spanning twenty years, 16 of which after the policy enactment, the data allow us to analyze the long-run effect of the Bossi-Fini law adopted in September 2002.

Finally, we match INPS employer-employee data with Cerved balance sheet data containing information on sales, revenues, costs and other variables relative to Italian firms in the private sector during the same time period as the INPS data. We use these to calculate the value added per worker of Italian firms, which is used here as a proxy for the firm productivity (type).

3.2 Descriptive evidence

Before moving to the econometric approach and test the labor market consequences (i.e. wage and firm-to-firm switches) of native workers facing the migration shocks occurred during the post-2002 Bossi-Fini law, we provide some stylized facts on the Italian immigration during the last three decades.

The share of immigrant workers in Italy grew constantly in the period 1998-2018 (Figure 1), from about 3% in 1998 to almost 9% in 2018, fueled mostly by blue-collar immigrant workers. The same figure also shows a trend break in the share of immigrants between 2002 and 2003. This sudden increase in the share of immigrants likely reflects the legalization of undocumented foreign workers granted by the Bossi-Fini law in September 2002. Table 2 shows the change in the composition of immigrant workers in Italy by macro-occupation. During the period considered, the share of immigrants in blue collar

jobs grew from 70.8% to 83%, while the share in white-collar jobs declined correspondingly from 27% to 16%. In line with the larger availability of immigrant workers, there has been a marked increase in the share of Italian firms employing immigrant workers over the period: from 24.6% in 1998 to 45.4% in 2018.

Table 2: Immigrant workers in Italy in the period 1998-2018.

	1998	2008	2018	98-18 Δ p.p.
Share of immigrants (%)	2.8	7.7	9.6	6.8
Sh. blue-collar immigrants (%)	70.8	84.0	82.9	12.1
Sh. white-collar immigrants (%)	27.6	15.0	16.1	-11.5
Sh. manager immigrants (%)	1.5	0.9	0.09	-1.4
Sh. of firms employing immigrants (%)	24.6	41.9	45.4	20.8

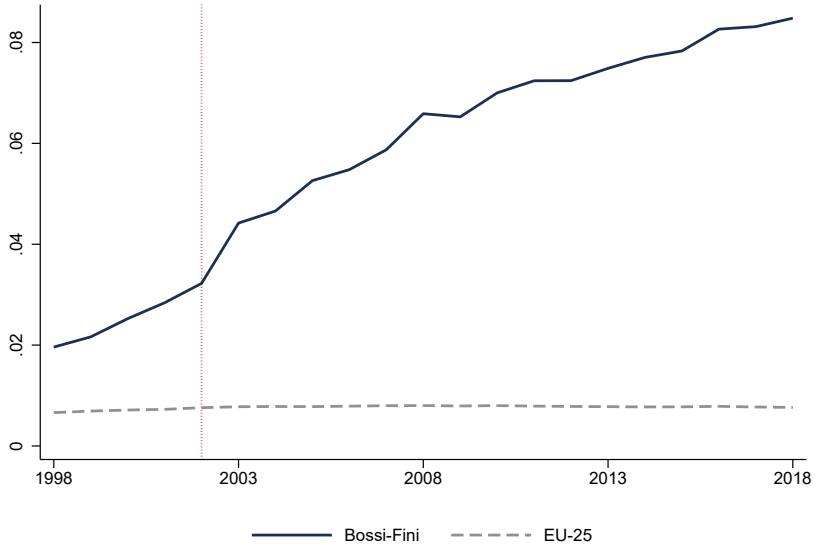
Notes: Authors' calculation in INPS employer-employee longitudinal data in the period 1998-2018.

An additional important fact documented in Figure 1 is the constant employment share of immigrants not affected by the Bossi-Fini law (i.e., immigrants from EU-15 origins), and the increasing trend in the share of immigrants from non-EU origins – see respectively dashed and solid line in Figure 1. This comparison implies that we need to allow for a non-EU specific trend of immigration, but also the absence of a jump/break in the share of immigrants from not affected origins in 2002-03. Once we account for the pre-trend, the upward shift/trend break in the employment share of immigrants from non-EU origins after 2002 is clear, while no corresponding change occurs for EU immigrants. Looking at the data, in line with its role in regularizing and bringing into the labor market a large number of undocumented immigrants, Bossi-Fini law appears to be a one-time permanent shift in the population of immigrants in the labor force. No permanent trend shift is visible, confirming the result in Elias et al. (2024) that the amnesty did not generate a subsequent immigration magnet at the aggregate level.

Additionally, and crucially for our empirical analysis, the change in the labor supply from immigrant workers, after the regularization granted by the law, was different across Italian provinces. Figure 2 shows large increases in the regions of Tuscany, parts of Lombardy, parts of Calabria and much lower growth in the rest of the South, Sicily and Sardinia. The *change* in the supply of immigrant workers from non-EU origins in the post-policy period across provinces is strongly correlated with the *pre-policy* share of

immigrants from non-EU origins – see Figure A2. Provinces with larger share of non-EU immigrants in 2002 experienced larger legalization, and likely larger inflows in the year after the policy as the network of migrants increased the attractiveness of such local labor markets among the potential destinations. Accordingly, after ten years from the Bossi-Fini law, the share of firms employing non-EU immigrant workers grew by 9 percentage points: from 31% of Italian firms employing at least one non-EU immigrant in 2001 to 40% in 2011.

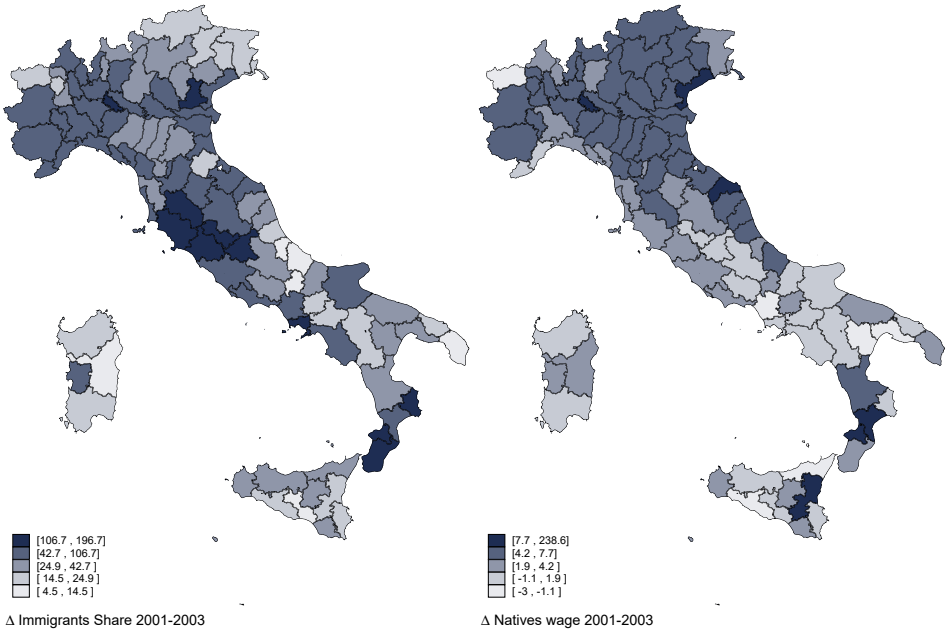
Figure 1: Share of immigrant workers from origins impacted and not-impacted by the Bossi-Fini law.



Note: the figure plots the share of immigrants from impacted (continuous line) and not-impacted origins (i.e. EU-25 member countries, dash line) in the period 1998-2018.

Finally, to correlate the firm-to-firm mobility of natives with the increase in the supply of non-EU workers, we show that in provinces with larger increases in non-EU workers, natives were more likely to change employer during the post-policy period. In Table 3 we show the probability of a native worker to change employer and move to a firm of any type (columns 1 and 2) and to a firm with *higher* (column 3) or *lower* value added (column 4) per worker, relative to the pre-2002 firm. The explanatory variable is the share of non-EU immigrant workers in firm f in the pre-policy period. Native workers in firms relatively more impacted by the Bossi-Fini law were more likely to change employer in the post-treatment period – see columns (1)-(2) of Table 3. Interestingly,

Figure 2: Change in immigrant share and average wage across Italian districts around the 2002 Bossi-Fini law.



Note: the figure plots the change in the share of immigrants and average wage during the 2001-2003 period spanning before and after the Bossi-Fini law.

native workers in firms experiencing higher growth of non-EU immigrants show a specific re-allocation pattern: blue-collar native workers were more likely to move to firms with a lower productivity, white-collar native workers to one with higher productivity. This is a first suggestive evidence of a re-allocation process induced by immigration shock, that potentially sorted natives across firms, and changed the quality of (native) workers-firms match. Econometric based evidence of the assortative matching re-allocation process is provided in the next sections.

Table 3: The career path of native workers impacted by the Bossi-Fini law.

	Post-policy change in employer towards firm of :			
	any type		*higher* productivity	*lower* productivity
	(1)	(2)	(3)	(4)
Sh. non-EU immigrant: Total	0.140***			
	(0.032)			
Sh. non-EU immigrant: Blue-collar		0.061	-0.179***	0.178***
		(0.042)	(0.028)	(0.028)
Sh. non-EU immigrant: White-collar		0.249***	-0.121	0.121
		(0.061)	(0.071)	(0.071)
Sh. non-EU immigrant: Manager		0.584***	0.124**	-0.123**
		(0.089)	(0.053)	(0.053)
Estimator	OLS	OLS	OLS	OLS

Notes: Firm productivity in columns (3)-(4) is approximated by value added per worker (Cerved data). Cluster standard error at region and sector level. *** $p < 0,01$; ** $p < 0,05$; * $p < 0,1$.

4 Identification strategy

We analyze empirically the labor market effects of the Bossi-Fini regularization of undocumented immigrant workers in the short- and long-run using three different levels of aggregation. We start by testing the consequences induced by the Bossi-Fini law at the local labor market level p (i.e. Italian province) and at the firm f level (section 4.1) looking at employment, wages, and job mobility of native workers. Then, leveraging the longitudinal nature of our data, we analyze the response of individual workers i in response to the firm-specific intensity of the 2002 Bossi-Fini policy (section 4.2). Addressing endogeneity and omitted variable bias are critical issues and we will discuss and address them in section 4.3.

4.1 Local labor market and firm-level estimations

We use equations (1) and (2) below to test the effect of the Bossi-Fini law on respectively Italian local labor markets and firms:

$$\Delta y_{p,\bar{t}+l} = \text{Mig sh}_{p,t<\bar{t}} + \theta_{rs} + \varepsilon_{p,t} \tag{1}$$

$$\Delta y_{f,\bar{t}+l} = \text{Mig sh}_{f,t<\bar{t}} + \theta_{rs} + \varepsilon_{f,t} \tag{2}$$

In equation (1) the treatment variable $\text{Mig sh}_{p,t<\bar{t}}$ is the share of immigrant workers from the origin countries included in the Bossi-Fini regularization (i.e. non-EU immigrant workers) in the province p during the pre-policy period $t < \bar{t}$. $\bar{t}$ is the year of the implementation of the policy. The Bossi-Fini law was enacted on July 30^{th} 2002 (beginning the amnesty in September 2002), so we use pre-2002 as pre-treatment and the year 2002 as treatment year $\bar{t}$. The outcome variable $\Delta y_{p,\bar{t}+l}$ is the *change* in province-level outcomes, namely the average wage and total employment of native workers, in the province p, l years after year $\bar{t}$. We also test the firm-creation effect of immigrants by using the change in the number of firms in the local labor market p in the post-treatment period.

In equation (2) we consider instead firms f as units of analysis and consider the post-policy *change* in firm level outcomes $\Delta y_{f,\bar{t}+l}$ for firms differently exposed to the treatment $\text{Mig sh.}_{f,t<\bar{t}}$, because of their pre-2002 differences in the share of non-EU immigrants in

their employment. Firm level outcomes are *changes* in the average wage of natives in the firm, and changes in the total employment of natives in the firm. We also consider the survival probability of the firm as outcome.

As the outcomes are in changes, the sector-by-region fixed effects θ_{rs} included in both equation (1) and (2) capture any specific trend affecting areas and sectors differentially in Italy.[12] Hence, we identify the labor market effect of the Bossi-Fini law (at both province and firm level) by comparing, within a given region-sector, the short- and long-run *changes* in labor market outcomes of provinces/firms with different initial exposure to immigrants regularized by the Bossi-Fini law. In the short-run, our identification strategy is likely to capture mainly the labor market effects for natives from the newly regularized immigrant workers (a pure amnesty effect). In the longer run, as the share of non-EU immigrant workers in the province (and firm) in 2002 predicts the growth in the share of non-EU immigrant workers – see Figure A2 – the effects may also capture the labor market effect of a *larger* availability of immigrant workers from treated origins during the post-policy period.[13]

4.2 Worker-level estimations

In the second part of the analysis we test the individual-level consequences of the Bossi-Fini law, and study the post-policy career path of native workers i employed in firms with different exposure to the policy in 2002, i.e. firms having different levels of Mig sh.$_{f,t<\bar{t}}$, hence capturing the larger or smaller exposure to an increase in non-EU regular workers:

$$\Delta y_{i,\bar{t}+l} = \text{Mig sh.}_{f,t<\bar{t}} + \theta_{rs} + \varepsilon_{i,t} \tag{3}$$

The outcome variable $\Delta y_{i,\bar{t}+l}$ is: (i) the change in native worker's i wage in the post-policy period, (ii) the probability of being employed l years after the policy, (iii) the probability of having changed employer, and (iv) the probability of switching toward more (or less) productive firms in the post-policy period. The explanatory variable is the share of firm's policy-concerned (i.e. non-EU) co-workers in the pre-policy period. Sector-by-region fixed effects θ_{rs} capture trends affecting the career-path of workers driven by regional and

[12] Italian regions are larger administrative areas than provinces. There are 20 regions in Italy, each of them grouping on average 5.5 provinces.

[13] Since the wages of individuals are serially correlated within region and sector, standard errors are clustered at region and sector level

sector-specific factors.

4.3 Validity Test

The Bossi-Fini law was enacted by a conservative government, as a way to regularize immigrants and set quotas and procedures for the future. The law was announced by the second Berlusconi government (Colombo et al., 2002) as a way to bring to the surface and regulate illegal immigration considered as an issue by the right wing coalition (Casa delle Libertà). As discussed in Section 1, the extension of the amnesty to *all* workers in the private sector, rather than only to caretakers of the elderly, was introduced unexpectedly at the very end of the Parliament debate with an executive measure in September 2002 (the main law was approved in July 2002). So, firms were unlikely to expect it, and to rush to hire non-EU immigrants, making (Mig $\text{sh}_{p,t<\bar{t}}$) and (Mig $\text{sh}_{f,t<\bar{t}}$) plausibly exogenous. The absence of any anticipatory effects is nicely shown in Di Porto et al. (2023).

Unobserved factors that correlate with the *pre*-policy share of non-EU immigrant workers in local labor markets/firms and their *post*-policy labor market dynamics is however a potential threat. To reduce concerns of correlation with local pre-existing trends we adopt a 2SLS approach, and use a simple shift-share IV to instrument the share of immigrants in each province and firm in the pre-policy period. First, we calculate the *imputed* number of immigrants in province p and firm f coming from policy concerned origins $\bar{o} \in O$ in the pre-policy period $t < \bar{t}$ as follows:

$$\widehat{Mig}_{p,\bar{o},t<\bar{t}} = \sum_{\bar{o}\in O} \left[\frac{Mig_{p,\bar{o},1998}}{\sum_p Mig_{p,\bar{o},1998}} \times Mig_{\bar{o},t<\bar{t}} \right] \tag{4}$$

$$\widehat{Mig}_{f,\bar{o},t<\bar{t}} = \sum_{\bar{o}\in O} \left[\frac{Mig_{f,\bar{o},1998}}{\sum_{f\in p} Mig_{f,\bar{o},1998}} \times Mig_{p,\bar{o},t<\bar{t}} \right] \tag{5}$$

where $Mig_{p,\bar{o},1998}$ and $Mig_{f,\bar{o},1998}$ are the number of immigrants from treated origins in respectively province p and firm f in year 1998 (the first available year in INPS data). The ratio in squared brackets represents the share of immigrants from origin $\bar{o}$ employed respectively in province p and firm f in 1998. This ratio is then augmented by the number of immigrants respectively in Italy (eq. 4) and province (eq. 5) from a given origin $\bar{o}$ in the years before the policy $t < \bar{t}$. Finally, our instrumental variables at respectively province

and firm level are as follows:

$$\text{Mig sh}^{IV}_{p,\bar{o},t<\bar{t}} = \frac{\widehat{Mig}_{p,\bar{o},t<\bar{t}}}{\widehat{Mig}_{p,t<\bar{t}} + Nat_{p,t<\bar{t}}} \tag{6}$$

$$\text{Mig sh}^{IV}_{f,\bar{o},t<\bar{t}} = \frac{\widehat{Mig}_{f,\bar{o},t<\bar{t}}}{\widehat{Mig}_{f,t<\bar{t}} + Nat_{f,t<\bar{t}}} \tag{7}$$

where $Nat_{p,t<\bar{t}}$ and $Nat_{f,t<\bar{t}}$ are the observed number of native workers respectively in the province p and firm f in the pre-policy year; and $\widehat{Mig}_{p,t<\bar{t}}$ and $\widehat{Mig}_{f,t<\bar{t}}$ the *imputed* number of immigrants workers in p and f from non-EU origins as from eq. (4) and (5). The exclusion restriction holds if: (i) the geographic distribution of origin-specific immigrants workers across Italian provinces and firms in 1998 was uncorrelated with post-2002 labor market dynamics, and (ii) the aggregate inflows of immigrants in Italy in the period $t < \bar{t}$ are also uncorrelated to firm-specific dynamics. The second assumption is satisfied if each firm (or province) is too small to determine the overall number of non-EU immigrants in Italy. The orthogonality of the 1998 geographic distribution of immigrants with subsequent trends can be tested.

Omitted variable bias exists if unobserved province (or firm) specific variables affected the distribution of non-EU immigrant workers across local labor markets in 1998 as well as the wage/employment outcomes of provinces/firms in the pre-policy period, with persistence in the post-period. In Table A1 we perform a validity test. In the table we show the correlation between the share of immigrants from non-EU origins as of 1998 (explanatory variable) and the pre-2002 change in the average wage at respectively local labor market (column 1) and firm (column 2) level. The estimated coefficient shows no significant correlation, with a point estimate very close to zero. This indicates the absence of pre-policy differential trends between firms and provinces that experienced different exposure to the immigrants' regularization. The results of this check are consistent with the validity of our Instrumental Variables.

5 Results

In this section we first show the short- and long-run labor market effect of the Bossi-Fini law on the average province-level (section 5.1) and firm-level (section 5.2) outcomes.

Then, in section 5.3 we analyze how the career paths of native individual workers are affected by the amnesty. We focus on the 2SLS results in sections 5.1 - 5.3 and only report OLS results in the appendix section.

5.1 Province level results

Table 4 shows the estimated coefficients from a specification as in eq. (1) where the outcomes are changes in log wages in Panel (a) and changes in log employment in Panel (b). In the first column we show the effects over five years (i.e. $\bar{t}+5$) capturing the short-run effect of the amnesty. In column (2) and (3) we show the effects over ten years ($\bar{t}+10$) or more (i.e. $> \bar{t}+10$). Appendix Table A2 shows the corresponding OLS estimates. In each panel the outcome for native workers is separated into "unskilled" (i.e. blue-collar workers) and "high skilled" (i.e., white-collar workers).

Two results emerge from the regression coefficients. First the average wages of native workers were not affected by the regularization. Provinces with large increase in legal immigrant employment after the amnesty were not associated to changes in average native wages. The positive labor supply effect and the increased bargaining power of workers (i.e., decreased firms' labor market power), may have offset each other and explain the null wage effect shown in Panel (a) of Table 4. This result is in line with the theoretical framework proposed by Elias et al. (2024). Second, provinces that were relatively more affected by the Bossi-Fini law experienced *null* employment change in the short-run (in line with results in Elias et al. 2024), and a *positive* employment change in the long-run (i.e. $\bar{t}+10$ or more) equal to 2-3 percentage point increase per one percentage point growth of immigrants.[14] The positive effect on employment in the long-run is not driven by a *net* firm-creation. Panel (c) in Table 4 shows no significant net increase in number of firms in response to the regularization. Such a null effect on the *total* number of firms may hide an interesting selection effect. The firm-level results discussed in the next section will clarify the firm entry/exit dynamics and show an interesting firm selection effect induced by the Bossi-Fini law.

The point estimates on wage and employment, suggest an expansionary effect of the amnesty on the local labor market opportunities of native workers in the long-run, compatible with complementarities in production between immigrant and native workers, and

[14]Similar effect is found in the OLS estimations in Appendix Table A2

Table 4: Labor market effect at province level. 2SLS estimations.

	Panel (a) : Wage regressions		
	$\Delta_{\bar{t},\bar{t}+5}$	$\Delta_{\bar{t},\bar{t}+10}$	$\Delta_{\bar{t},\bar{t}>\bar{t}+10}$
Δ Wage (natives)	-0.026	0.119	0.116
	(0.186)	(0.324)	(0.319)
... Unskilled	0.035	-0.101	-0.138
	(0.183)	(0.282)	(0.302)
... Skilled	-0.165	0.268	0.205
	(0.198)	(0.276)	(0.328)
	Panel (b) : Employment regressions		
	$\Delta_{\bar{t},\bar{t}+5}$	$\Delta_{\bar{t},\bar{t}+10}$	$\Delta_{\bar{t},\bar{t}>\bar{t}+10}$
Δ Employment (natives)	0.679	2.963***	2.960***
	(0.851)	(0.739)	(0.869)
... Unskilled	1.095	2.337**	2.429**
	(0.909)	(0.841)	(0.975)
... Skilled	-0.017	2.323**	2.528***
	(0.391)	(0.889)	(0.821)
	Panel (c) : Active firms		
	$\Delta_{\bar{t},\bar{t}+5}$	$\Delta_{\bar{t},\bar{t}+10}$	$\Delta_{\bar{t},\bar{t}>\bar{t}+10}$
Δ Active firms	-0.382	-0.194	-0.196
	(0.346)	(0.284)	(0.477)
Estimator	2SLS	2SLS	2SLS
Coeff. IV all natives	0.614***	0.614***	0.614***
F-stat all natives	152.5	152.5	152.5
Region-Sector FE	Yes	Yes	Yes

Notes: Cluster standard error at province level. *** $p < 0,01$; ** $p < 0,05$; * $p < 0,1$..

with investment (firm expansion) following the amnesty – see next section. These results are consistent with Elias et al. (2024) who also find a not negative effect on wages of formal Spanish high- and low-skilled workers after the amnesty.[15] As our data only cover the formal sector in Italy we are unable to analyze what happens to informal workers as done in Elias et al. (2024).

5.2 Firm level results

Table 5 follows the same structure as Table 4 and reports the firm-level effect of the Bossi-Fini law. 2SLS results (our baseline) show mostly not significant average wage effect for native workers in firms relatively more exposed to regularized immigrants by the Bossi-Fini law. Unskilled (blue-collar) native workers seemed to experience a marginally significant wage reduction only in the long run (i.e. $> \bar{t} + 10$), potentially revealing a selective change in unskilled workers in those firms (workforce composition). In fact, while we didn't observe any negative wage effect at the province level, a positive employment effect, especially for native unskilled is also present at the firm-level in the long-run ($\bar{t}+10$ and $> \bar{t} + 10$). This is consistent with the idea that firms more affected by the amnesty experienced growth of employment but possibly also an inflow of less paid workers and/or downward wage competition. As these firms are likely specialized on the type of tasks and jobs previously performed by undocumented workers, they may have hired low-wage and low skilled natives in the post-policy period. Taken together results in Panel (a) and (b) of Table 5 suggest that firms intensively affected by the Bossi-Fini law paid slightly lower wage for blue-collar workers in the long run and grew in terms of employment by selecting less skilled natives. A small negative wage effect of the Bossi-Fini law at firm level is also shown in Di Porto et al. (2023).

The expansion of some firms may have occurred at the expense of others (competition effect). Accordingly, the Panel (c) of Table 5 shows negative and significant effect of the amnesty on the survival probability of specific firms that hired a large share of undocumented. Combined with province level results (i.e. null effect on the number of firms in the province), the results in Panel (c) of Table 5 suggest that while some firms that had

[15]Elias et al. (2024) actually find a small positive wage effect in the short-run – see Table 5 in Elias et al. (2024). This is likely due to the reduced firms' labor market power induced by the policy in Spain. Given the high unemployment rates in Italy, the reduction in firms' labor market power induced by the amnesty was not sufficient to drive wages up.

large share of regularized immigrants, in a province, were more likely to exit the market, other firms were created to keep unchanged the number of firms (and employment) in the local labor market, as shown in Table 4.

Taken together, results on local labor market (Table 4) and firm level (Table 5) suggest that firms hit by the Bossi-Fini law were more likely to exit the market (Panel c of Table 5), but surviving firms in provinces with large regularization of immigrants expanded (Panel b of Tables 5), generating a positive overall and firm-level employment effect of the regularization shock (Panel b of Table 4).

Table 5: Labor market effect at firm level. 2SLS estimations.

	Panel (a) : Wage regressions		
	$\Delta_{\bar{t},\bar{t}+5}$	$\Delta_{\bar{t},\bar{t}+10}$	$\Delta_{\bar{t},\bar{t}>\bar{t}+10}$
Δ Wage (natives)	-0.004	0.016	0.017
	(0.015)	(0.015)	(0.020)
... Unskilled	-0.019	-0.004	-0.030*
	(0.017)	(0.011)	(0.016)
... Skilled	0.000	0.026	0.041
	(0.017)	(0.032)	(0.034)
	Panel (b) : Employment regressions		
	$\Delta_{\bar{t},\bar{t}+5}$	$\Delta_{\bar{t},\bar{t}+10}$	$\Delta_{\bar{t},\bar{t}>\bar{t}+10}$
Δ Employment (natives)	0.182***	0.117**	0.036
	(0.056)	(0.046)	(0.038)
... Unskilled	-0.050	0.074*	0.129*
	(0.045)	(0.036)	(0.069)
... Skilled	-0.012	0.008	0.015
	(0.049)	(0.061)	(0.059)
	Panel (c) : Firms survival		
	$\Delta_{\bar{t},\bar{t}+5}$	$\Delta_{\bar{t},\bar{t}+10}$	$\Delta_{\bar{t},\bar{t}>\bar{t}+10}$
$\mathbb{P}$ firm survival	-0.070**	-0.100**	-0.114**
	(0.028)	(0.035)	(0.042)
Estimator	2SLS	2SLS	2SLS
Coeff. IV all natives	0.629***	0.629***	0.629***
F-stat all natives	2352	2352	2352
Region-Sector FE	Yes	Yes	Yes

Notes: Cluster standard error at region and sector level. *** $p < 0,01$; ** $p < 0,05$; * $p < 0,1$..

5.3 Worker level results

Results on individual native worker's outcomes are reported in Table 6. Three interesting results emerge. First, native workers that remain employed in treated firms (*stayers*) do not face significant changes in their wage – see first two rows in Panel (a). This is consistent with the fact that the small negative wage effect obtained at the level of the firm in Table 5 derives from the hiring of new workers, likely with lower skills. Second, native workers who changed employer in the post-policy period (*switchers*) experienced a significant wage loss if their initial firms was subject to a larger regularization shock. Third, native workers in firms with larger exposure to the amnesty did not experience significantly lower probability of remaining employed in the long run – see the first row of Panel (b).

However, workers become more likely to leave the firm (Panel c). In particular, for those who do not leave (Panel b, second row) the probability of losing the job increases somewhat. Competition from new inflows of immigrants in the long run seems to take the form of pushing some natives to leave the firm (i.e., initial employer) and to decrease employment probability of those who do not. Overall the increased regularization seems to have increased the churning of natives in the firm. The increased mobility selects workers who will stay employed out of the firm, while firms with large share of immigrants receiving the amnesty are more likely to have lower wages and lose some incumbents for less skilled new natives.[16]

The firm-to-firm re-allocation of native workers across firms happened with an interesting occupational heterogeneity – see second and third row in Panel (c). Unskilled workers appear to respond more than skilled workers to the amnesty – larger point estimates of their response – both in the short and in the long run. Table A5 in the Appendix shows that, when hit by the shock, in firms with larger share of undocumented non-EU immigrants, native workers tend to be more likely to change sector but not local labor market.[17] Native workers in firms more intensely affected by the Bossi-Fini law were more likely to re-allocate across firms and sectors in the post-policy period.

[16]OLS estimations in Table A4 point to qualitatively the same results but with lower standard errors.
[17]Results are robust to OLS estimations in Appendix Table A6.

Table 6: Labor market effect at individual worker level. 2SLS estimations.

	Panel (a) : Wage regressions		
	$\Delta_{\bar{t},\bar{t}+5}$	$\Delta_{\bar{t},\bar{t}+10}$	$\Delta_{\bar{t},\bar{t}>\bar{t}+10}$
Δ Wage (natives)	-0.022	-0.025	-0.060
	(0.013)	(0.028)	(0.041)
... Stayers	-0.020	-0.012	-0.036
	(0.016)	(0.022)	(0.032)
... Switchers	-0.031*	-0.057	-0.106*
	(0.018)	(0.043)	(0.055)
	Panel (b) : $\mathbb{P}$ of being employed		
	$\Delta_{\bar{t},\bar{t}+5}$	$\Delta_{\bar{t},\bar{t}+10}$	$\Delta_{\bar{t},\bar{t}>\bar{t}+10}$
$\mathbb{P}$ to be employed (natives)	-0.014	-0.035	-0.065
	(0.027)	(0.044)	(0.044)
... Stayers	-0.047	-0.082*	-0.112**
	(0.033)	(0.047)	(0.043)
... Switchers	0.007	0.002	-0.026
	(0.012)	(0.036)	(0.038)
	Panel (c) : $\mathbb{P}$ of changing firm		
	$\Delta_{\bar{t},\bar{t}+5}$	$\Delta_{\bar{t},\bar{t}+10}$	$\Delta_{\bar{t},\bar{t}>\bar{t}+10}$
$\mathbb{P}$ firm-to-firm switch (natives)	0.022*	0.040*	0.058**
	(0.012)	(0.022)	(0.027)
... Unskilled	0.027	0.045	0.068**
	(0.018)	(0.029)	(0.032)
... Skilled	0.011*	0.026	0.042
	(0.006)	(0.023)	(0.027)
Estimator	2SLS	2SLS	2SLS
Coeff. IV all natives	0.631***	0.631***	0.631***
F-stat all natives	1326	1326	1326
Region-Sector FE	Yes	Yes	Yes

Notes: Cluster standard error at region and sector level. *** $p < 0,01$; ** $p < 0,05$; * $p < 0,1$..

5.4 Worker-firm sorting and wage inequality in the long run

A key feature of the INPS longitudinal employer-employee data is the information on the type of the firm a worker is matched with (in terms of its productivity). So, we can test whether the higher probability of firm-to-firm moves induced by the amnesty, as shown in Table 6, affects also the type of worker-firm match. If the re-allocation of native workers in the post-policy period happens in a *positive assortative* way, we expect higher average wage and higher wage inequality in labor markets as a consequence (Orefice and Peri, 2024). In this section, we test the nature of worker-firm sorting in response to the Bossi-Fini law, to connect employer change to changes in average wages and wage dispersion after the shock.

In particular, we test whether workers of different types, approximated by quintiles in residual wage at initial year (2002),[18] sort into new firms of *higher* or *lower* productivity (here approximated by value added per worker) than their initial employer. For each type of worker k we estimate the effect of the treatment Mig sh.$_{f,t<\bar{t}}$ on the worker's probability to transition towards a more productive firm ($f_{i(k),\bar{t}} \geq f_{i(k),\bar{t}+10}$) in the post-policy period:

$$\mathbb{P}\left[f_{i(k'),\bar{t}} \geq f_{i(k),\bar{t}+10}\right] = \text{Mig sh.}_{f,t<\bar{t}} + \theta_{rs} + \varepsilon_{i,t} \qquad \forall \quad k \tag{8}$$

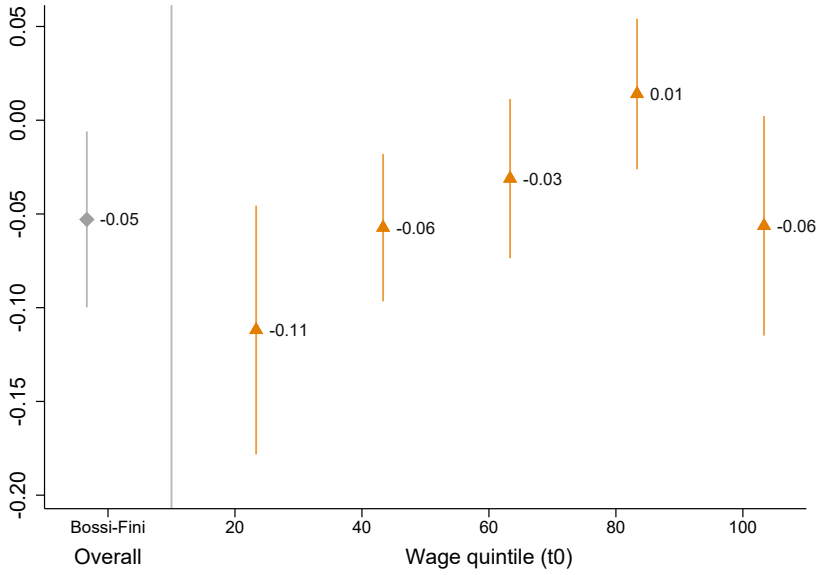
with $f_{i(k),\bar{t}}$ and $f_{i(k'),\bar{t}+10}$ indicating respectively the productivity of the employer at $\bar{t}$ (i.e., 2002) and 10 years after the policy, $\bar{t}+10$. In Figure 3, we show the 2SLS point estimates of native worker's probability to match with a firm with *higher* value added (i.e. probability to switch to a better employer). OLS based results reported in Appendix Figure A3. Low-productivity workers (i.e. those having a residual wage below the median) are less likely to transition toward higher productivity firms after the shock from firms with high share of regularized immigrants; while high-productivity native workers (i.e. those having a residual wage at around the 80^{th} percentile of the distribution) have higher probability of transitioning toward better firms from firms with larger share of regularization of undocumented immigrants. Notice, however, that workers from the highest quality did not improve the quality of their matched firm.

This suggests a sorting of displaced workers consistent with positive assortative worker-

[18]Before splitting workers in quantile based on their initial wage, we net-out any sector, gender, age and province effect from workers' wage. The residual wage is therefore a more compelling measure of worker's productivity.

firm matching in the post-treatment period. Firms with higher share of regularized immigrants generated a type of native mobility that pushed the high productivity among them in better firms, while the low productivity stayed or ended up in lower productivity firms. Clear evidence of the positive assortative re-allocation of workers is shown in Figure A4 for blue-collar workers. Evidence for white collar and managers is of the same type but estimated with lower precision (i.e. larger standard errors) – see Figures A5 and A6.

Figure 3: Probability of switching to a better firm. 2SLS estimations. Policy: Bossi-Fini law



Note: the figure plots the point estimates of 2SLS estimations on the effect of policy-concerned migration share on the native worker's firm switching probability in the post-treatment period (by type of transition).

The positive assortative matching re-allocation of native workers from high regularized firms in the post-policy period likely pushed upward the wage of high quality native workers and down the wage of low quality ones. This, in the presence of complementarity of firm-worker wage components is consistent with increased average wage and higher wage inequality within each local labor market. This is consistent with small positive average wage effect of the Bossi-Fini law highlighted in Panel a of Table 4. The increased wage inequality effect is shown in Table 7. In the long run, provinces relatively more affected by the amnesty experienced a widening of the wage gap between skilled and unskilled native workers.[19]

[19]Results are robust to OLS estimations in Appendix Table A7.

Table 7: Re-allocation of workers and wage inequality across local labor markets. 2SLS estimations.

Dep var:	Change in wage gap (skilled-unskilled)		
	$\Delta_{\hat{t},\hat{t}+5}$	$\Delta_{\hat{t},\hat{t}+10}$	$\Delta_{\hat{t},\hat{t}>\hat{t}+10}$
Sh. non-EU immigrants	0.044	0.529**	0.503**
	(0.214)	(0.203)	(0.210)
Estimator	2SLS	2SLS	2SLS
Coeff. IV all natives	0.652***	0.653***	0.650***
F-stat all natives	275	291	270
Region-Sector FE	Yes	Yes	Yes

Notes: Cluster standard error at region and sector level *** $p < 0,01$; ** $p < 0,05$; * $p < 0,1$..

Conclusion

In this paper we study the short- and long-run effect of the regularization of undocumented immigrant workers on the labor market outcomes of Italian provinces, firms and workers. We use the most important amnesty implemented in Italy in the recent past: the Bossi-Fini law (d.l. 189/2002). Three main results emerge from our estimations. First, average wages at local labor market level (i.e. *province*) were not affected by the amnesty, and a positive employment effect at both province and firm level is found. Second, the Bossi-Fini law induced a significant increase in mobility across firms and sectors of native workers. Such re-allocation of native workers pushed most high quality workers towards higher quality firms increasing the wage inequality in the local labor markets.

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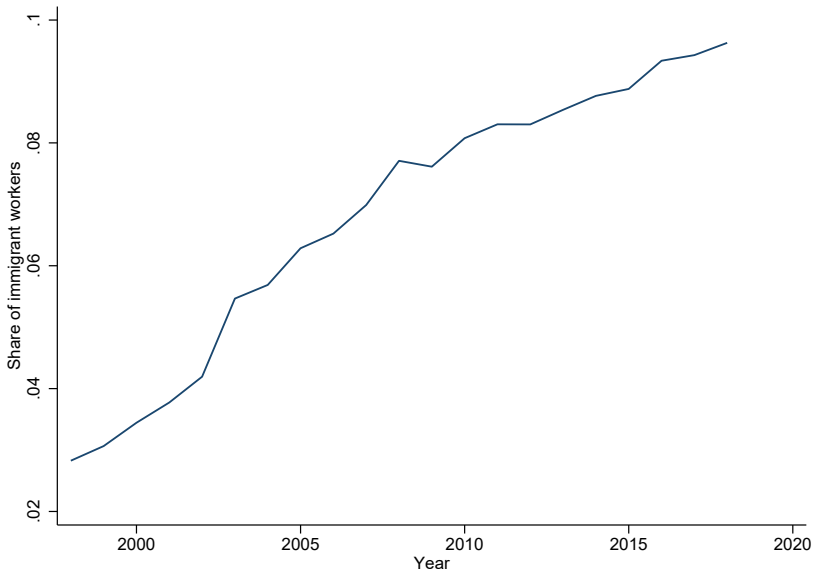
Appendix A. Additional Tables and Figures

Figure A1: Share of immigrant workers in Italy in the period 1998-2018.



Note: The figure plots the share of immigrants in Italy in the period 1998-2018.

Table A1: Correlation between the share of non-EU immigrants in 1998 and the pre-2002 wage growth.

	Wage growth pre-2002	
	Province	*Firm*
	(1)	(2)
Sh. non-EU immigrants in 1998	0.000	-0.000
	(0.000)	(0.000)
Estimator	OLS	OLS
Observations	3,102	31,150

Notes: Cluster standard error at region and sector level. *** $p < 0,01$; ** $p < 0,05$; * $p < 0,1$..

Figure A2: Initial endowment and change in the share of immigrants from treated origins

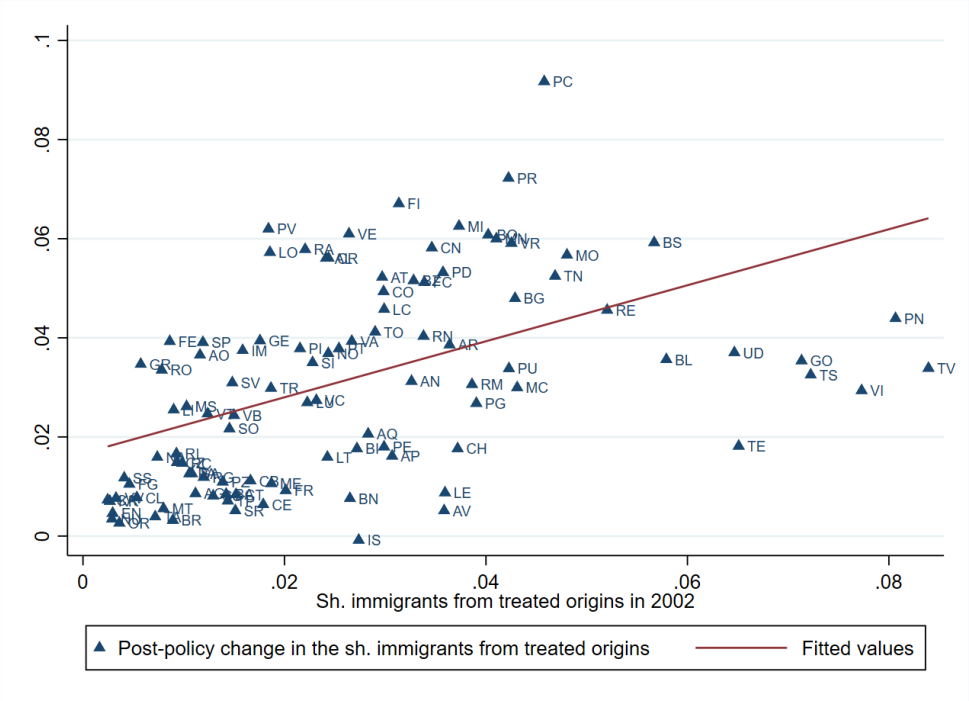
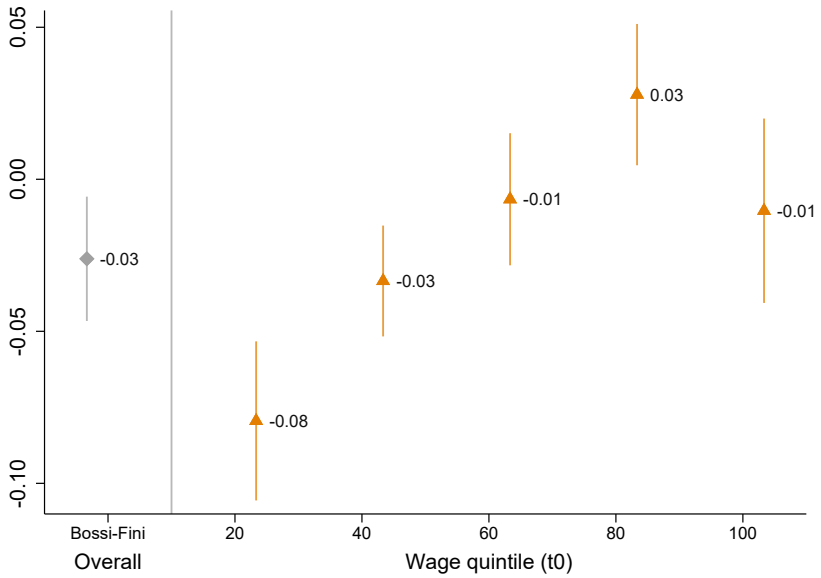


Figure A3: Probability of switching to a better firm. OLS estimations.



Note: The figure plots the point estimates of OLS estimations on the effect of policy-concerned migration share on the native worker's firm switching probability in the post-treatment period (by type of transition).

Table A2: Labor market effect at province level. OLS estimations

	Panel (a) : Wage regressions		
	$\Delta_{\bar{t},\bar{t}+5}$	$\Delta_{\bar{t},\bar{t}+10}$	$\Delta_{\bar{t},\bar{t}>\bar{t}+10}$
Δ Wage (natives)	0.019	0.048	0.019
	(0.118)	(0.159)	(0.171)
... Unskilled	-0.070	-0.132	-0.103
	(0.193)	(0.188)	(0.169)
... Skilled	-0.029	0.214	-0.026
	(0.152)	(0.184)	(0.282)
	Panel (b) : Employment regressions		
	$\Delta_{\bar{t},\bar{t}+5}$	$\Delta_{\bar{t},\bar{t}+10}$	$\Delta_{\bar{t},\bar{t}>\bar{t}+10}$
Δ Employment (natives)	0.748*	1.861***	2.253***
	(0.367)	(0.523)	(0.570)
... Unskilled	0.565	1.660***	2.200***
	(0.509)	(0.534)	(0.611)
... Skilled	0.528**	1.474**	1.679**
	(0.213)	(0.556)	(0.759)
	Panel (c) : Active firms		
	$\Delta_{\bar{t},\bar{t}+5}$	$\Delta_{\bar{t},\bar{t}+10}$	$\Delta_{\bar{t},\bar{t}>\bar{t}+10}$
Δ Active firms	-0.299	-0.037	0.036
	(0.247)	(0.205)	(0.300)
Estimator	OLS	OLS	OLS
Region-Sector FE	Yes	Yes	Yes

Notes: Cluster standard error at province level. *** $p < 0,01$; ** $p < 0,05$; * $p < 0,1$..

Table A3: Labor market effect at firm level. OLS estimations.

	Panel (a) : Wage regressions		
	$\Delta_{\bar{t},\bar{t}+5}$	$\Delta_{\bar{t},\bar{t}+10}$	$\Delta_{\bar{t},\bar{t}>\bar{t}+10}$
Δ Wage (natives)	0.011	0.030***	0.027**
	(0.013)	(0.007)	(0.013)
... Unskilled	-0.003	0.005	-0.007
	(0.015)	(0.005)	(0.014)
... Skilled	0.044**	0.079***	0.089***
	(0.016)	(0.018)	(0.026)
	Panel (b) : Employment regressions		
	$\Delta_{\bar{t},\bar{t}+5}$	$\Delta_{\bar{t},\bar{t}+10}$	$\Delta_{\bar{t},\bar{t}>\bar{t}+10}$
Δ Employment (natives)	0.408***	0.312***	0.134***
	(0.064)	(0.038)	(0.021)
... Unskilled	0.063*	0.248***	0.340***
	(0.031)	(0.038)	(0.066)
... Skilled	0.121***	0.225***	0.266***
	(0.026)	(0.041)	(0.042)
	Panel (c) : Firms survival		
	$\Delta_{\bar{t},\bar{t}+5}$	$\Delta_{\bar{t},\bar{t}+10}$	$\Delta_{\bar{t},\bar{t}>\bar{t}+10}$
$\mathbb{P}$ firm survival	-0.057**	-0.074**	-0.086**
	(0.023)	(0.030)	(0.034)
Estimator	OLS	OLS	OLS
Region-Sector FE	Yes	Yes	Yes

Notes: Cluster standard error at region and sector level. *** $p < 0,01$; ** $p < 0,05$; * $p < 0,1$..

Table A4: Labor market effect at worker level. OLS estimations.

	Panel (a) : Wage regressions		
	$\Delta_{\bar{t},\bar{t}+5}$	$\Delta_{\bar{t},\bar{t}+10}$	$\Delta_{\bar{t},\bar{t}>\bar{t}+10}$
Δ Wage (natives)	-0.046**	-0.044**	-0.089***
	(0.017)	(0.020)	(0.030)
... Stayers	0.001	0.008	-0.006
	(0.017)	(0.021)	(0.028)
... Switcher	-0.115***	-0.115***	-0.174***
	(0.035)	(0.028)	(0.040)
	Panel (b) : $\mathbb{P}$ of being employed		
	$\Delta_{\bar{t},\bar{t}+5}$	$\Delta_{\bar{t},\bar{t}+10}$	$\Delta_{\bar{t},\bar{t}>\bar{t}+10}$
$\mathbb{P}$ to be employed (natives)	-0.078***	-0.104***	-0.093**
	(0.026)	(0.035)	(0.037)
... Stayers	-0.149***	-0.150***	-0.117***
	(0.031)	(0.038)	(0.035)
... Switchers	-0.037*	-0.110*	-0.119**
	(0.018)	(0.062)	(0.055)
	Panel (c) : $\mathbb{P}$ of changing firm		
	$\Delta_{\bar{t},\bar{t}+5}$	$\Delta_{\bar{t},\bar{t}+10}$	$\Delta_{\bar{t},\bar{t}>\bar{t}+10}$
$\mathbb{P}$ firm-to-firm switch (natives)	0.034*	0.008	0.034
	(0.017)	(0.024)	(0.031)
... Unskilled	0.012	0.023	0.041
	(0.018)	(0.025)	(0.038)
... Skilled	0.061	-0.018	0.020
	(0.035)	(0.023)	(0.027)
Estimator	OLS	OLS	OLS
Region-Sector FE	Yes	Yes	Yes

Notes: Cluster standard error at region and sector level. *** $p < 0,01$; ** $p < 0,05$; * $p < 0,1$.

Table A5: Post-amnesty re-allocation of native workers. 2SLS estimations.

	$\mathbb{P}$ change firm	$\mathbb{P}$ change province	$\mathbb{P}$ change sector
Sh. non-EU immigrants	0.097***	-0.077**	0.085***
	(0.025)	(0.035)	(0.021)
Estimator	2SLS	2SLS	2SLS
Coeff. IV all natives	0.633***	0.633***	0.633***
F-stat all natives	1326	1326	1326
Region-Sector FE	Yes	Yes	Yes

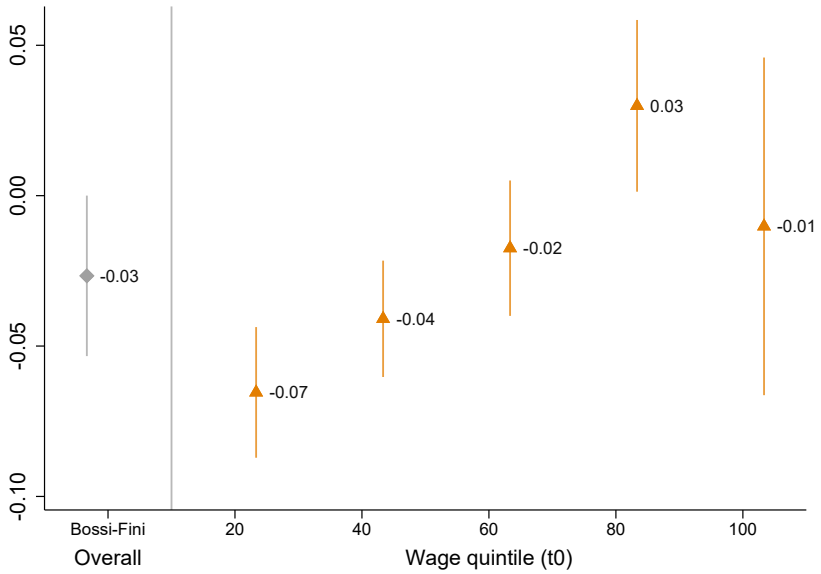
Notes: Cluster standard error at region and sector level *** $p < 0,01$; ** $p < 0,05$; * $p < 0,1$..

Table A6: Post-amnesty re-allocation of native workers. OLS estimations.

	ℙ change firm	ℙ change province	ℙ change sector
Sh. non-EU immigrants	0.140***	-0.021	0.121***
	(0.032)	(0.016)	(0.021)
Estimator	OLS	OLS	OLS
Region-Sector FE	Yes	Yes	Yes

Notes: Cluster standard error at region and sector level *** $p < 0,01$; ** $p < 0,05$; * $p < 0,1$..

Figure A4: Probability of switching to a better firm. 2SLS estimations. Blue collar workers.



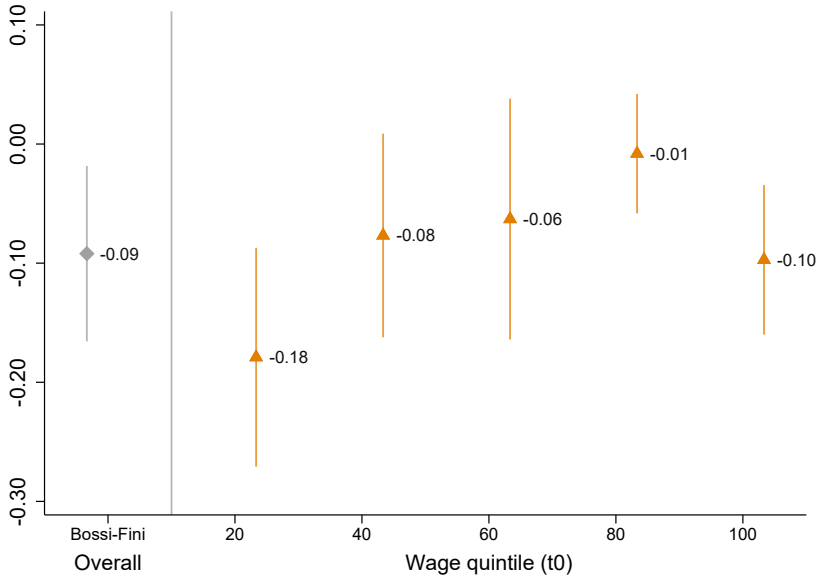
Note: the figure plots the point estimates of 2SLS estimations on the effect of policy-concerned migration share on the native worker's firm switching probability in the post-treatment period (by type of transition).

Table A7: Re-allocation of workers and wage inequality across local labor markets. OLS estimations.

Dep var:	Change in wage gap (skilled-unskilled)		
	$\Delta_{\hat{t},\hat{t}+5}$	$\Delta_{\hat{t},\hat{t}+10}$	$\Delta_{\hat{t},\hat{t}>\hat{t}+10}$
Sh. non-EU immigrants	-0.097	0.410**	0.021
	(0.343)	(0.189)	(0.365)
Estimator	OLS	OLS	OLS
Region-Sector FE	Yes	Yes	Yes

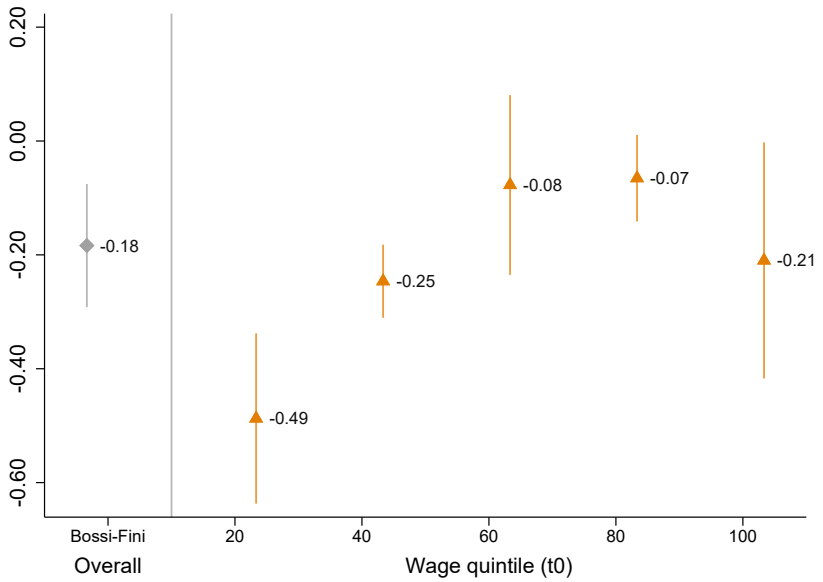
Notes: Cluster standard error at region and sector level *** $p < 0,01$; ** $p < 0,05$; * $p < 0,1$..

Figure A5: Probability of switching to a better firm. 2SLS estimations. White collar workers.



Note: the figure plots the point estimates of 2SLS estimations on the effect of policy-concerned migration share on the native worker's firm switching probability in the post-treatment period (by type of transition).

Figure A6: Probability of switching to a better firm. 2SLS estimations. Managers.



Note: the figure plots the point estimates of 2SLS estimations on the effect of policy-concerned migration share on the native worker's firm switching probability in the post-treatment period (by type of transition).