The Role of Firms in the Assimilation of Immigrants*

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Abstract

This paper studies how firms and the climbing of the firm ladder shape immigrants' labor market outcomes and convergence with natives. We do so in the context of a historical mass migration shock: the arrival of nearly one million former Soviet Union Jews to Israel during the 1990s. This setting presents unique advantages to study the role of firms and job mobility in immigrants' assimilation: the nature and numerosity of the migration wave, the granting of Israeli citizenship to immigrants on arrival, and the availability of population employer-employee data featuring precise information on immigrants' place of birth and date of arrival in Israel. Over the course of twenty-nine years since arrival, immigrants gradually entered higher-paying, larger, older, more desirable, and less segregated firms. Gaps in firms' pay premiums account for 10–27% of the immigrant-native wage gap during the first ten years since arrival. Convergence in employer characteristics is driven by immigrants' enhanced job mobility and faster climbing of the firm ladder compared to natives. The channels we uncover represent an interpretation of immigrant wage gaps as partly driven by search frictions and firm choices in imperfectly competitive labor markets, as opposed to purely explained by workers' productive abilities.

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1 Introduction

Studies of immigrants' labor market assimilation have shown that the immigrant-native wage gap shrinks as immigrants gain more experience in the host labor market (e.g., Chiswick, 1978; Borjas, 1985; Lubotsky, 2007). This paper studies how firms and immigrants' climbing of the firm ladder shape the assimilation process. We broaden the scope of assimilation outcomes, beyond wages, by additionally considering convergence with natives in a variety of employer attributes related to productivity, segregation, non-pay characteristics, and desirability measures based on revealed preferences. We are motivated by mounting evidence that *where* someone works—i.e., which firm—matters a great deal; due to firms' pay policies (Abowd et al., 1999; Card et al., 2018), but also for outcomes beyond contemporaneous wages. Such outcomes include human capital accumulation (Jarosch et al., 2021; Arellano-Bover and Saltiel, 2021), intergenerational labor market outcomes (San, 2021), unemployment duration (Cingano and Rosolia, 2012), and non-pay amenities (Sorkin, 2018).

What role could heterogeneous firms play in immigrants' assimilation? First, firms' pay policies could directly contribute to the immigrant-native wage gap, through differential sorting of immigrants across high- and low-paying firms, and through differential pay premiums within firms. This mediating channel would represent a different interpretation of wage gaps: away from traditional interpretations, purely driven by *worker* productive abilities, towards interpretations also driven by *firm* choices in imperfectly competitive labor markets. Second, assimilation in employer attributes is an unexplored dimension in the literature, yet an important one to get a fuller picture of immigrants' labor market integration. That is, beyond wages, are firms hiring immigrants different from those hiring natives, especially along attributes related to firm quality?

Firm-mediated wage assimilation and assimilation in employer attributes can only occur through firm-to-firm *mobility*. Mobility is key for young labor market entrants' wage growth (Topel and Ward, 1992), making it plausibly important too for immigrants who are entering a new labor market. However, immigrants' job mobility is commonly limited nowadays by regulations, making it difficult to study and quantify its relevance. Examples of regulatory-driven hindered mobility for immigrants include unauthorized immigrants or employer-sponsored visas that constrain job mobility.[1] The unique setting we study allows us to overcome the issue of artificially hindered immigrant mobility.

We analyze the role of firms in immigrants' assimilation in the context of a historical mass migration shock: the arrival of nearly one million Jews from the former Soviet Union (FSU) to Israel during the 1990s, following the unexpected lifting of USSR emigration restrictions. A crucial feature of this context is that FSU Jews were granted Israeli citizenship on arrival. As such, immigrants faced no differential regulatory restrictions compared to natives, including no restrictions on employer mobility. This is an uncommon institutional aspect that is beneficial for our research purposes. Differently from other studies, this

[1] E.g., H-1B in the US, 457 in Australia, Temporary Foreign Worker Program in Canada, or the 2008 Swedish migration reform. For evidence on mobility constraints see Naidu et al. (2016), Wang (2021), Hunt and Xie (2019), and Depew et al. (2017).

context allows us to study "unconstrained" assimilation, which could be informative and policy-relevant for settings where such mobility barriers do exist.

The setting presents additional key advantages apart from unconstrained assimilation. One advantage is the numerosity of the migration wave. A very large number of people migrated to Israel, during a relatively short period of time, with a clearly defined start date. This fact, coupled with rich administrative population-level data, proves useful to fit high-dimensional two-way fixed effects wage models and carry out heterogeneity analyses with precision. Another advantage is that the igniter of the migration wave—the unexpected lifting of Soviet emigration restrictions—implies that selection is less prevalent than in other contexts since the timing of migration is arguably decoupled from individuals' labor market trajectories.

We leverage the upsides offered by the historical and institutional setting using high-quality population-level records. The data consist of Israeli administrative employer-employee records featuring information on individuals' place of birth and date of arrival to Israel. We can follow immigrants from the moment they arrive in Israel up to 29 years later, enabling us to uncover assimilation patterns that may take a long time to unfold. Compared to other papers studying immigrants using administrative data, a benefit of our setting and data is that, since citizenship was granted on arrival, administrative records accurately cover immigrants from the moment they arrive in Israel. Moreover, we observe immigrants' *arrival* date independently of the date of first appearance in employment records.

We begin by laying out a framework for wages that builds on the AKM tradition (Abowd et al., 1999; Card et al., 2018) and allows for firm pay premiums that are group-specific (for native males/females and immigrant males/females). Through the lens of this framework, we define and interpret a series of assimilation statistics related to wages, firm pay premiums, job search, employment, and non-pay employer attributes. In terms of pay premiums, we detail a dynamic decomposition of the immigrant-native pay premium gap into a differential pay setting component (i.e., within firms) and a differential sorting component (i.e., between firms).

We estimate the group-specific job ladder wage model exploiting the numerosity of the immigrant groups and the long panel dimension of the data. From this estimation, we recover group-specific firm pay premiums, which we later use in a second step to estimate assimilation statistics. A wage inequality decomposition shows that firm effects explain 21–23 percent and 16–18 percent of immigrants' and natives' wage variances, respectively. Firm fixed effects are highly correlated for immigrants and natives, but the average for the former is 2–10 percent smaller than for the latter. Induced by job mobility, the correlation between immigrants' and natives' premiums grows with time since arrival in Israel. For immigrants, on arrival, the degree of assortative matching between workers and firms is very low but steadily grows and eventually catches up with the degree of assortative matching for natives.

Our assimilation results show that FSU male immigrants found jobs immediately after arriving in Israel, while females experienced a substantial employment gap compared to

natives for about five years since arrival. FSU immigrants experienced very large initial wage gaps (about 0.6–0.9 log points), followed by steep convergence, especially among males, leading to the closing of the gap only after 29 years in Israel.

Regarding immigrant-native convergence on firm pay premiums, we document an important role for differential *pay setting* effects, more so than previous work studying gender and racial gaps (Card et al., 2016; Gerard et al., 2021). Our rich dynamic analysis uncovers some nuanced results: the differential pay-setting effect (within firms) is more important during the early years in Israel compared to the later ones, while the opposite is true for the differential sorting effect (between firms). This implies that during the early years in Israel immigrants move towards firm with a lower *gap* in pay premiums, whereas in the later years they move into firms that are also high paying for natives. Overall, we document that the firm pay premium gap explains a substantial share of the overall wage gap (between 10–27 percent during the first ten years in Israel).

As opposed to wage assimilation, assimilation in employer characteristics can only be driven by job search and job mobility. We take advantage of the employer-employee panel and the good coverage of immigrants immediately after arrival to document immigrants' job search and firm ladder climbing dynamics. We find that FSU immigrants change jobs more often than comparable natives and, conditional on changing jobs, take larger steps up the job ladder of firm pay premiums. The job search gaps are more pronounced during the early years in Israel yet are persistent, especially so for males. These mobility patterns, which underlie assimilation in employer attributes, are consistent with an on-the-job search model interpretation (e.g., Postel-Vinay and Robin, 2002) in which immigrants, being newly arrived to the labor market, start out without search capital and thus move often and "far" across the ladder.

We then document assimilation in employer attributes that go beyond contemporaneous pay which could meaningfully impact workers through, e.g., skill acquisition and future compensation, non-pay amenities, or network formation. We show that, on arrival, FSU immigrants were employed at firms that were smaller, younger, segregated, and less desirable.[2] For all these margins, immigrants gradually sort over the years into employers that are more similar to those employing natives and eventually close gaps in all these employer attributes except for segregation. Moreover, we also show how FSU immigrants differentially contributed to the expansion of the high-tech sector in Israel, as well as differential sector participation gaps for various other sectors.

Lastly, we leverage the richness of our data to estimate granular assimilation patterns as a function of year-of-arrival and age-at-arrival. As such, we build on past work that emphasizes the importance of age and cohort effects when studying immigrants' assimilation (e.g., Alexander and Ward, 2018; Borjas, 1985). We find that age-at-arrival effects are meaningful for wage assimilation (e.g., those who arrive after age 30 experience greater gaps and steep convergence, while those who arrive before age 20 are very similar to natives), but not for pay premiums assimilation. On the contrary, arrival-cohort effects are pronounced for

[2]Firm desirability is measured by a poaching index (Bagger and Lentz, 2019; Dustmann et al., 2022) and by the central tendency of worker flows (Sorkin, 2018).

firm pay premium assimilation, but quite absent for wage assimilation (i.e., the main focus of prior literature).

All in all, we see our findings, grounded on the context of FSU migration to Israel, as speaking to scenarios of free immigration mobility and/or large migration waves induced by aggregate shocks. Even if contemporary regulations in most rich countries limit these scenarios, our findings are informative of policy-relevant counterfactuals, both now and in the future. Recent examples of free immigration include the German reunification and EU expansion episodes. With regards to large migration waves, the ongoing war in Ukraine has currently displaced about 19% of the Ukrainian population to other European countries (CReAM, 2022) and, in the medium term, climate change could trigger the movement of millions in large-scale migration events (Cattaneo and Peri, 2016).

Contribution to the literature. An established literature studies how immigrants fare in their destination countries and their assimilation in the labor market (e.g., Chiswick, 1978; Borjas, 1985; Lubotsky, 2007; Cohen-Goldner et al., 2012; Abramitzky et al., 2014; Dustmann and Görlach, 2015; Rho and Sanders, 2021; Albert et al., 2021; Adda et al., 2022). Most of this literature focuses on wages and occupations, with few examples considering the role of firms.[3] Two existing papers studying assimilation through an AKM framework are Damas de Matos (2017) and Dostie et al. (2021). Damas de Matos (2017) estimates immigrant-native wage catch-up in Portugal using an AKM framework. Dostie et al. (2021) quantify how much of the wage level and growth differences between Canadian natives and permanent immigrants are accounted for by firm-specific pay premiums. Unique features of our paper include a mass migration shock with a clearly defined starting date, twenty-nine years of employer-employee panel data in which date-of-arrival is observed independently of employment status, and citizenship granted to immigrants on arrival. Immigrants' numerosity and panel length allow us to study long-term assimilation patterns and fit high-dimensional wage models and heterogeneity analyses with precision. Immigrants' citizenship and recorded date of arrival imply that the administrative records' coverage of immigrants is unusually good. Moreover, we can study the role of the firm ladder free of regulation-driven mobility differences between immigrants and natives. Finally, we expand the focus of the analysis by documenting immigrant sorting and assimilation in relationship to a broad set of firm characteristics and job search behavior.

A more recent literature building on Abowd et al. (1999) (AKM) documents the contribution of firms to wage inequality, highlighting how firm-specific pay policies make similar workers earn different wages at different firms (e.g. Card et al., 2013, 2018; Goldschmidt and Schmieder, 2017; Gerard et al., 2021; Song et al., 2019). The gender and racial wage

[3] Aydemir and Skuterud (2008) and Pendakur and Woodcock (2010) document differential sorting of immigrants into employers with lower pay premiums using Canadian survey data. Carneiro et al. (2012) and Barth et al. (2012) find similar patterns in Portugal and Norway, respectively. However, all these studies (most of which lack panel data) consider firm premiums that, unlike the AKM tradition (Abowd et al., 1999; Card et al., 2018), do not account for unobserved worker characteristics. Other work emphasizes the role of search gains in the assimilation process, but relies on employer observables instead of firm-specific pay policies (Lehmer and Ludsteck, 2015).

gaps have been studied through the lens of this literature (Card et al., 2016; Sorkin, 2017; Gerard et al., 2021), finding that differential sorting into firms with different pay premiums explains substantial fractions of these gaps. Using the AKM framework, and compared to the gender and racial gaps, the *dynamics* as function of time since arrival we document are a distinguishing feature of the immigrant-native wage gap. As it turns out, the dynamic decomposition of firm pay premiums gap reveals nuanced patterns about the relative importance of differential sorting and differential pay setting.

Lastly, this paper contributes to a nascent literature studying the interplay between imperfect labor market competition and migration (Naidu et al., 2016; Dustmann et al., 2021; Amior and Manning, 2021; Amior and Stuhler, 2022). Our analysis of group-specific firm pay premiums—typically challenging to estimate precisely—provides evidence on the extent to which firms are able to wage discriminate between immigrants and natives, which is relevant for theoretical models in this literature. Understanding how much of the immigrant-native wage gap is explained by firm premiums that arise through labor market imperfections, directly speaks to the impact of imperfect competition on determining this much-studied wage gap. Lastly, building on Naidu et al. (2016), we highlight that search frictions, a key driver of imperfect competition, may differ across immigrants and natives for regulatory reasons. We argue this is a key institutional feature to keep in mind when interpreting studies of labor market assimilation while, in our context, we are able to shut off this regulatory channel and study "unconstrained" assimilation.

The rest of this paper is structured as follows. Section 2 lays out the historical context of Jewish FSU migration to Israel and related literature. Section 3 describes our data. Section 4 introduces the wage framework and the assimilation statistics that build upon it. Section 5 presents estimation results for the group-specific job ladder wage model and our estimates of the assimilation statistics. Section 6 concludes.

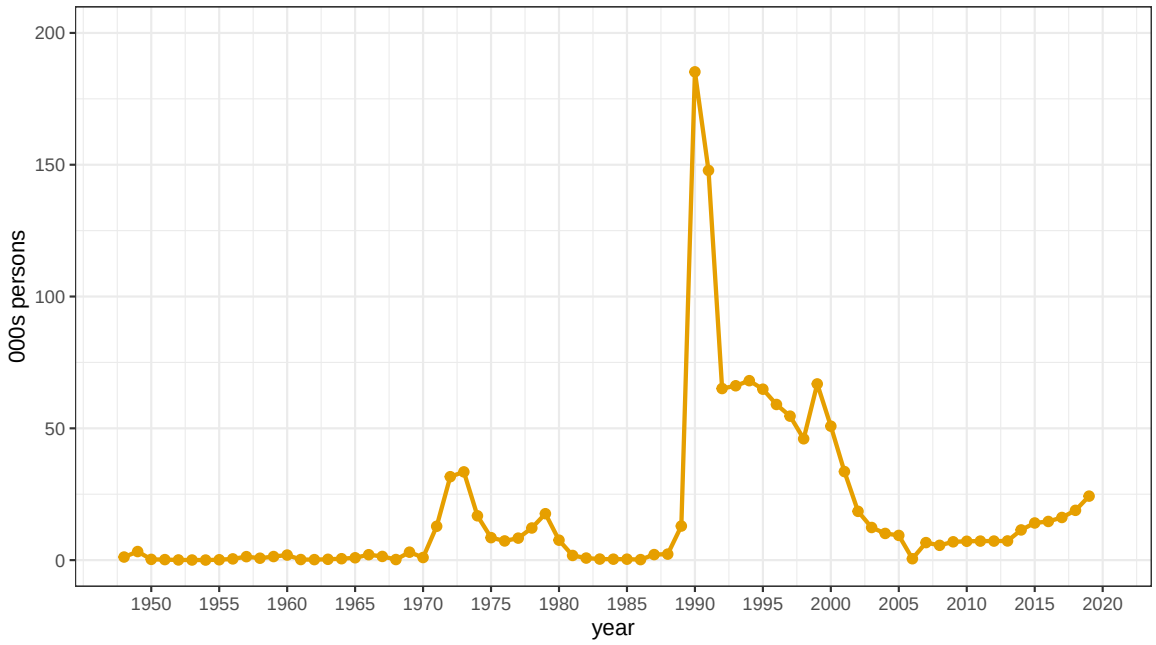
2 FSU Migration to Israel: Historical Context and Literature

In 1989 the USSR relaxed emigration restrictions and Soviet Jews, fleeing antisemitism and the collapse of the Soviet Union, started to leave the country in massive numbers. Israel accepted FSU Jews unconditionally and granted them citizenship. Between 1989–1999, around 840,000 FSU Jews migrated to Israel, which in 1989 had a population of 4.5 million.[4] Between 1989–1991 alone, 345,000 FSU immigrants arrived in Israel, 7.7% of the total 1989 Israeli population. As a comparison, around 16,000 Soviet immigrants had arrived in Israel between 1980–1988. Figure 1 plots the number of FSU yearly arrivals to Israel between 1948–2019. Peak migration in 1990–1991 was followed by sustained levels of around 60,000 annual arrivals until 1999, with a steady decline starting thereafter. During 1990–1999, between 80–90% of all immigrants arriving to Israel did so from the FSU (see Appendix Fig-

[4]Migration options outside of Israel were less accessible. The US, for instance, stopped granting refugee status to Soviet Jews in October 1989. Germany, which admitted the greatest number of FSU Jews after Israel and the US, started granting asylum visas in 1990 but didn't offer citizenship as Israel did (Remennick, 2007).

ure A1).[5]

Figure 1: Former Soviet Union (FSU) Immigration to Israel



Notes: Source is the Israel Central Bureau of Statistics. Number of immigrants arriving in Israel from the former Soviet Union, by year.

The Israeli government encouraged immigration of FSU Jews, who were granted citizenship on arrival in accordance with the Law of Return. This implied that, compared to natives, FSU immigrants did not face any additional regulatory hurdles in the labor market. Additionally, FSU immigrants received full access to social benefits and had freedom over residential and labor market choices (Buchinsky et al., 2014). The government offered assistance settling in, initially subsidizing rent and mortgages, and providing voluntary Hebrew language classes (which most immigrants did not speak). Even though assistance was comprehensive and covered many dimensions, it was modest in quantity, and immigrants had to find complementary income sources very early on after arriving in Israel (Remennick, 2007).

FSU immigrants were highly educated relative to the Israeli population. Out of those who arrived in 1990–1991, 30% of prime-age males had a college degree compared to 17% of prime-age male Israelis at the time; 70% of migrants had held middle- or high-skilled occupations in the FSU compared to 30% of Israelis (Cohen-Goldner et al., 2012). Immigrants typically found employment quickly but initial occupational downgrading with respect to previous FSU jobs was prevalent, with the job prospects of many hindered by lacking language skills or limited portability of human capital acquired in the FSU (Friedberg, 2000;

[5]Migration to Israel from FSU countries picked up starting in 2014 and dropped sharply due to the Covid pandemic in 2020–2021 (not shown in figure). In 2022, immigration to Israel from Ukraine and Russia sharply increased as a result of Russia's invasion of Ukraine: according to the Ministry of Immigration, in 2022 there were 15,037 arrivals from Ukraine and 43,584 from Russia.

Weiss et al., 2003; Remennick, 2007).[6] Over time, FSU immigrants climbed the occupational ladder and experienced rapid rates of wage growth. Using survey data, Cohen-Goldner et al. (2012) provide a detailed study of FSU immigrants' integration in the Israeli labor market. They estimate that college-educated FSU immigrants who arrived in 1990–1991 initially earned 58% of what comparable natives earned, 68% after five years, and 90% after 20 years. However, Cohen-Goldner et al. (2012) lacked employer-employee data and did not study assimilation through heterogeneous firms or the role of firm-specific pay premiums.

We complement this literature by being the first to study this remarkable historical episode using administrative matched employer-employee population data. This allows us to document new facts and provide new evidence, from an heterogeneous firms' perspective, on the evolution of FSU immigrants' labor market outcomes and assimilation.

3 Data

We use newly available matched employer-employee administrative records from Israel. These data span 1985-2019 and contain information about the entire Israeli workforce collected from tax records. The dataset includes person identifiers, firm identifiers, monthly indicators for each firm where a person worked, the yearly salary received from each employer in a year, and firms' industry.

The employment tax records are merged with the Israeli Population Registry. This dataset covers the full population of Israel and includes demographic information such as date of birth, sex, ethnic group, country of birth, and date of arrival to Israel. Starting in 2000, we observe yearly geocoded information on persons' cities and neighborhoods of residence.

Crucially, country of birth and date of arrival in Israel allow us to identify FSU migrants and the amount of time they have lived in Israel at any point in time. Arrival date records allow us to infer the actual length of time an immigrant has spent in Israel without relying on proxies used in other studies of immigrants' labor market outcomes using administrative data, such as the timing of the first appearance in employment records in Germany (Dustmann et al., 2021) or the timing of application for a Social Security Number in the US (Rho and Sanders, 2021). Typically, administrative records will miss the early years of a significant number of immigrants who are unauthorized, hold visas that do not allow them to work, and/or hold informal jobs. Since the immigrants we study were granted citizenship on arrival, this is a lesser concern in our setting. All in all, compared to existing work using administrative data, we argue that our data have unusually good coverage of immigrants' early arrival experiences.

[6] Existing studies find that any negative effects of the migration wave on natives' wages and employment were either absent or modest and short-lived (Friedberg, 2001; Cohen-Goldner and Paserman, 2011; Cohen-Goldner et al., 2012). Capital accumulation and technology responses have been put forward as explanations for the absence of large impacts on natives' wages (Gandal et al., 2004; Cohen-Goldner et al., 2012).

3.1 Sample Selection

Our sample includes (i) Israeli natives, excluding Arabs and ultra-Orthodox Jews, who were aged 25–59 between 1991–2019, and (ii) FSU immigrants who arrived in Israel between 1990–1999 and who were ages 25–59 between 1991–2019. We further exclude from our sample worker-year observations with earnings less than 25% the national average monthly wage.[7] The time span of our analysis sample is 1991–2019 (from the first year after the full start of the migration shock until the latest year available).

In most analyses, we restrict attention to observations belonging to the largest dual-connected set of firms. A connected set of firms, linked by worker movements, is required to identify models with worker and firm fixed effects. As we estimate separate models for natives and immigrants, we need a connected set in each sample. The observations belonging to the largest connected set of firms in both the natives and immigrants samples comprise our analysis sample, which we call the "dual-connected sample."

Our analysis sample is a panel dataset at the annual frequency, assigning each person-year observation to the firm where that person was employed during the month of November. We calculate the monthly wage by dividing the yearly salary in a firm by the number of months worked at that firm. If someone was employed at more than one firm during November, we follow previous literature and assign them to the firm that paid a greater monthly wage.

3.2 Summary Statistics

Tables 1 (males) and 2 (females) show sample sizes and sample means, separately for natives and immigrants, for the full sample and the dual-connected sample. The dual-connected samples for each gender—our main analysis samples—each have over 12 million worker-year observations on over 1 million workers and 68,000–78,000 firms.

Going from the full sample to the dual-connected sample, we lose 13–17% and 6% of native and immigrant worker-year observations, respectively. This is due to some firms that are not present in the dual-connected set. As expected, these dropped firms are relatively small, as evidenced by a higher average firm size in the dual-connected sample.

FSU immigrants comprise 18–19 percent of the full samples and 20–21 percent of the dual-connected samples. Immigrants are, on average, about two years older than natives. The average monthly salary for native males is around 17,000 Shekels (2019 prices), while that of FSU immigrant males is around 11,000 Shekels—a 35% raw differential when averaging over the whole sample period.

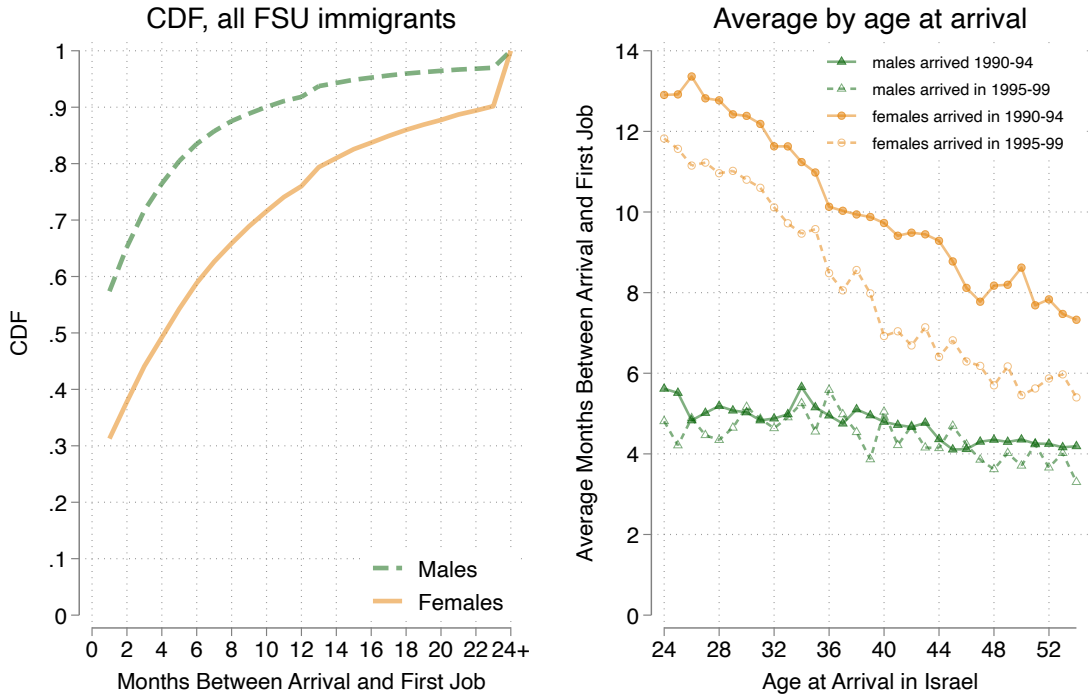
The summary statistics suggest that immigrants and natives are sorted into different types of firms. Natives are employed in significantly larger firms. In the dual-connected sample, for males, the native-worker-weighted average firm size is about 4,000 employees, whilst the immigrant-worker-weighted average firm size is about 2,200 employees. The

[7] The monthly minimum wage in 2015 was 48.8% of the average wage in that year. This ratio fluctuated between 40%–50% in 1990–2019. Therefore, we exclude workers who earn approximately 50% or less the minimum wage.

differential sorting of immigrants into firms is also reflected in firms' immigrant employee share. On average, an FSU male immigrant works in a firm where 26% of its employees are other FSU immigrants. On average, an Israeli male native works in a firm where 11% of its employees are FSU immigrants.

Arrival in Israel and time to first job. Figure 2 uses the information on date of arrival in Israel to plot, among those who arrived in working age, the distribution of months spanned since arrival to the first job (Appendix Figure A2 plots the distribution of age at arrival). The left panel shows that men found jobs quickly after arrival—80 percent of men had started their first job in Israel by the sixth month, and 90 percent by the tenth month. FSU women took longer to start their first job: 60 percent of them had started their first job by the sixth month, and 75 percent by the first year. The right panel Figure 2 shows age-at-arrival and year-of-arrival patterns in average months since arrival to first job. Across groups of men, average time to first job is quite stable, equal to between six and four months. Women instead display marked age-at-arrival patterns, with younger women taking on average as much as 13 months, and older women between six and eight.

Figure 2: Months since arrival to Israel to first job



Notes: Distribution of months passed since date of arrival in Israel to beginning of first job, among those who arrive to Israel between ages 25–58.

Table 1: Summary Statistics, Males

	Full Sample			Separate Connected Sample			Dual Connected Sample		
	All	Natives	Immigrants	All	Natives	Immigrants	All	Natives	Immigrants
Worker-years									
N	14,184,464	11,473,932	2,710,532	14,049,132	11,357,729	2,691,403	12,004,116	9,450,027	2,554,089
Salary (2019 Shekels)	15,425	16,464	11,026	15,468	16,515	11,048	15,943	17,217	11,229
Age	39.41	38.96	41.29	39.40	38.94	41.31	39.43	38.93	41.30
Years since arrival	-	-	13.77	-	-	13.76	-	-	13.72
Immigration year	-	-	1993.08	-	-	1993.08	-	-	1993.06
Birth year	1968.02	1968.60	1965.56	1968.03	1968.62	1965.54	1967.82	1968.45	1965.48
Firm: Size	3110.48	3346.94	2109.51	3140.40	3381.15	2124.44	3673.36	4061.23	2238.26
Firm: Age	13.31	13.38	13.02	13.35	13.42	13.05	14.31	14.53	13.47
Firm: Immigrant share	0.13	0.09	0.29	0.13	0.10	0.29	0.14	0.11	0.26
Workers									
N	1,248,506	1,005,521	242,985	1,225,820	987,031	238,789	1,144,119	909,032	235,087
Years observed	11.36	11.41	11.16	11.46	11.51	11.27	10.49	10.40	10.86
Immigration year	-	-	1993.27	-	-	1993.27	-	-	1993.26
Birth year	1971.13	1972.32	1966.21	1971.11	1972.31	1966.11	1970.96	1972.21	1966.12
Firms									
N	335,945	-	-	317,220	-	-	78,597	-	-
Years observed	6.40	-	-	6.43	-	-	10.95	-	-
Immigrant share	0.13	-	-	0.13	-	-	0.21	-	-
Avge. salary (2019 Shekels)	10,280	-	-	10,347	-	-	11,427	-	-
Firm size	14.33	-	-	15.01	-	-	44.89	-	-
Firm age	5.28	-	-	5.26	-	-	7.39	-	-

Notes: Number of observations and sample means for worker-years, workers, and firms. Firm characteristics are computed using workers' population data without sample restrictions. Firm age computed using the year in which it first appears in tax records, which is truncated at 1985.

Table 2: Summary Statistics, Females

	Full Sample			Separate Connected Sample			Dual Connected Sample		
	All	Natives	Immigrants	All	Natives	Immigrants	All	Natives	Immigrants
Worker-years									
N	14,126,360	11,469,601	2,656,759	14,032,200	11,399,939	2,632,261	12,493,944	9,993,273	2,500,671
Salary (2019 Shekels)	9,600	9,969	8,004	9,619	9,988	8,022	9,859	10,288	8,146
Age	39.61	39.14	41.61	39.59	39.12	41.63	39.71	39.23	41.63
Years since arrival	-	-	14.37	-	-	14.36	-	-	14.36
Immigration year	-	-	1993.07	-	-	1993.07	-	-	1993.04
Birth year	1967.96	1968.46	1965.83	1967.97	1968.47	1965.80	1967.77	1968.27	1965.77
Firm: Size	12190.00	13657.58	5854.24	12271.76	13741.01	5908.65	13781.09	15673.36	6219.13
Firm: Age	15.13	15.36	14.15	15.17	15.39	14.19	15.99	16.34	14.60
Firm: Immigrant share	0.11	0.08	0.26	0.11	0.08	0.26	0.12	0.09	0.23
Workers									
N	1,233,509	998,316	235,193	1,215,521	985,208	230,313	1,163,015	936,391	226,624
Years observed	11.45	11.49	11.30	11.54	11.57	11.43	10.74	10.67	11.03
Immigration year	-	-	1993.33	-	-	1993.32	-	-	1993.32
Birth year	1971.41	1972.44	1967.03	1971.40	1972.44	1966.93	1971.32	1972.37	1967.00
Firms									
N	278,889	-	-	263,988	-	-	68,221	-	-
Years observed	6.39	-	-	6.45	-	-	11.24	-	-
Immigrant share	0.14	-	-	0.14	-	-	0.19	-	-
Avge. salary (2019 Shekels)	6,844	-	-	6,891	-	-	7,590	-	-
Firm size	16.87	-	-	17.59	-	-	50.63	-	-
Firm age	5.83	-	-	5.83	-	-	8.18	-	-

Notes: Number of observations and sample means for worker-years, workers, and firms. Firm characteristics are computed using workers' population data without sample restrictions. Firm age is computed using the year in which it first appears in tax records, which is truncated at 1985.

4 Framework: Wage Model and Assimilation Statistics

4.1 Group-Specific Job Ladder Wage Model

Building on the AKM tradition (Abowd et al., 1999; Card et al., 2018) and its more flexible refinements (Card et al., 2016; Gerard et al., 2021), we interpret our assimilation analyses through the lens of the following model of wages:

$$\ln w_{it} = \theta^{g(i)}_{A_{it}} + \alpha_i + \psi^{g(i)}_{J(i,t)} + X'_{it}\beta_{g(i)} + \varepsilon_{it}, \tag{1}$$

where $\ln w_{it}$ is the log monthly wage of worker i in year t, $g(i)$ indexes the group g person i belongs to, $\theta^g_{A_{it}}$ is a function of years since arrival in Israel (only applicable to immigrants), α_i is a person fixed effect capturing portable earning capacity, $J(i,t)$ indexes the firm J person i is employed at during year t, ψ^g_J is the pay premium firm J pays to workers in group g, X_{it} are time-varying controls (age and time effects), and ε_{it} is an error term.

The groups g we consider are native males, native females, FSU immigrant males, and FSU immigrant females. The wage equation (1) can be micro-founded through a rent-sharing wage setting model (Card et al., 2016) or a monopsonistic wage setting model (Gerard et al., 2021). According to these models, immigrants and natives could face different pay premiums if they have differential bargaining power, outside options, or lower firm-specific labor supply elasticities. These and related mechanisms are also emphasized in recent work on imperfect labor market competition and migration (Dustmann et al., 2021; Adda et al., 2022).

Identification Assumptions Consistent estimation of the parameters in equation (1) using OLS requires an exogenous mobility assumption to hold (see Card et al., 2016, for a detailed discussion). This assumption amounts to ε_{it} to be conditionally independent of employer transitions. Card et al. (2013), Card et al. (2016), Macis and Schivardi (2016), Gerard et al. (2021), and Song et al. (2019) carry out a variety of tests indicating that, reassuringly, administrative data from Germany, Portugal, Italy, Brazil, and US are consistent with the exogenous mobility assumption. Moreover, Bonhomme et al. (2019) show that, in the context of a more flexible model, modeling firm and worker heterogeneity in a log-additive way is a good approximation.

The gradual sorting of migrants into higher-paying firms as their time in Israel increases does not necessarily pose a threat to identification since we explicitly condition on time since arrival to Israel. Similarly, sorting based on time-invariant worker characteristics (e.g., higher-ability workers matching with high-paying firms) does not pose a threat thanks to the inclusion of worker and firm fixed effects.

Normalization of firm effects. The firm fixed effects for natives and immigrants in equation (1) are not comparable to each other without normalization. We follow the literature that estimates group-specific pay premiums and assume that the average pay premium in the

restaurant industry is equal to zero for both immigrants and natives in each sex (Card et al., 2016; Gerard et al., 2021). Appendix Figure A3 shows the distribution of industry-level averages of our estimated firm pay premiums for natives.

4.2 Assimilation Statistics

4.2.1 Overall wage gap

The first assimilation statistic compares immigrants' earnings to those of natives as a function of immigrants' time spent in Israel, simply adjusting for age and time effects. This assimilation statistic, capturing the overall wage gap, is defined as:

$$G_A^w \equiv \mathbb{E}\left(\ln w_{it}|M, A_{it}, X_{it}\right) - \mathbb{E}\left(\ln w_{it}|N, X_{it}\right) \tag{2}$$

Based on equation (1) and omitting X_{it} for notational simplicity, G_A^w amounts to:[8]

$$G_A^w = \underbrace{\theta_{A_{it}}}_{\text{non-firm assimilation}} + \underbrace{\mathbb{E}\left(\alpha_i|M\right) - \mathbb{E}\left(\alpha_i|N\right)}_{\text{baseline differences}} + \underbrace{\mathbb{E}\left(\psi_{J(it)}^M|M, A_{it}\right) - \mathbb{E}\left(\psi_{J(it)}^N|N\right)}_{\text{firm assimilation: pay setting and sorting}} \tag{3}$$

We quantify the overall immigrant-native gap by estimating the following regression:

$$\ln w_{it} = M_i \cdot \left[\sum_{a=1}^{29} \beta_a \mathbf{1}\{A_{it} = a\}\right] + X_{it}'\gamma + \varepsilon_{it}, \tag{4}$$

where M_i is a dummy equal to one for FSU immigrants, $\mathbf{1}\{A_{it} = a\}$ are time-since-arrival fixed effects, X_{it}' includes time and age effects,[9] and the set of parameters β_a represent our estimate of G_A^w.

4.2.2 Within-firm wage gap

The next statistic compares immigrants' earnings to those of natives as a function of time spent in Israel, additionally controlling for employers' identity. This assimilation statistic, capturing the within-firm wage gap, is defined as:

$$G_{A|J}^w \equiv \mathbb{E}\left(\ln w_{it}|M, A_{it}, X_{it}, J(i,t)\right) - \mathbb{E}\left(\ln w_{it}|N, X_{it}, J(it)\right) \tag{5}$$

Based on equation (1) and abstracting from X_{it}, $G_{A|J}^w$ amounts to:

[8] Under no selective sample attrition, we have that $\mathbb{E}\left(\alpha_i|M.A_{it}\right) = \mathbb{E}\left(\alpha_i|M\right)$.

[9] Throughout the paper time effects are calendar year fixed effects, while age effects are age fixed effects in specifications without worker fixed effects, and quartic polynomials of age restricted to be flat at age 40 in specifications with worker fixed effects (Card et al., 2018).

$$G^w_{A|J} = \underbrace{\theta_{A_{it}}}_{\text{non-firm assimilation}} + \underbrace{\mathbb{E}\left(\alpha_i|M, A_{it}, J(i,t)\right) - \mathbb{E}\left(\alpha_i|N, J(i,t)\right)}_{\text{within-firm baseline differences}} + \underbrace{\mathbb{E}\left(\psi^M_{J(i,t)}|M, A_{it}, J(i,t)\right) - \mathbb{E}\left(\psi^N_{J(i,t)}|N, J(i,t)\right)}_{\text{firm assimilation: pay setting only}} \tag{6}$$

We estimate $G^w_{A|J}$ with the following regression:

$$\ln w_{it} = M_i \cdot \left[\sum_{a=1}^{29} \beta_a \mathbf{1}\{A_{it} = a\}\right] + X'_{it}\gamma + \phi_{J(i,t)} + \varepsilon_{it}, \tag{7}$$

where $\phi_{J(i,t)}$ are firm fixed effects (common for immigrants and natives), and the set of parameters β_a represent our estimate of $G^w_{A|J}$. Equation (7) corresponds to the type of wage gaps documented by previous work not accounting for person effects nor group-specific firm effects (Aydemir and Skuterud, 2008; Pendakur and Woodcock, 2010; Carneiro et al., 2012; Barth et al., 2012).

4.2.3 Firm pay premium gap

The following statistic explicitly focuses on the time-varying difference between firm pay premiums received by natives and those received by immigrants, that is, the firm assimilation component in G^w_A:

$$G^\psi_A = \mathbb{E}\left(\psi^M_{J(it)}|M, A_{it}, X_{it}\right) - \mathbb{E}\left(\psi^N_{J(it)}|N, X_{i,t}\right). \tag{8}$$

We will be able to estimate G^ψ_A in two steps. In a first step, we will estimate immigrant- and native-specific firm fixed effects in equation (1). In a second step, we use the estimated firm effects as an outcome variable in the following regression:

$$\widehat{\psi}^{g(i)}_{J(i,t)} = M_i \cdot \left[\sum_{a=1}^{29} \beta_a \mathbf{1}\{A_{it} = a\}\right] + X'_{it}\gamma + \varepsilon_{it}, \tag{9}$$

where the set of parameters β_a represent our estimate of G^ψ_A.

Decomposition: differential pay setting and differential sorting. We gain a better understanding of the immigrant-native firm pay premium gap by decomposing it into two components: differential pay setting (within firm) and differential sorting (between firm). Abstracting from X_{it}:

$$\underbrace{G^\psi_A}_{\text{firm pay premium gap}} = \underbrace{\mathbb{E}(\psi^M_{J(i,t)} - \psi^N_{J(i,t)}|M, A_{it})}_{\text{differential pay setting } \textit{(within)}} + \underbrace{\mathbb{E}(\psi^N_{J(i,t)}|M, A_{it}) - \mathbb{E}(\psi^N_{J(i,t)}|N)}_{\text{differential sorting } \textit{(between)}}. \tag{10}$$

The differential pay setting term captures the average within-firm difference in immigrant-

vs. native-specific pay premiums, weighted by time-since-arrival-specific immigrant employment. It reflects how different are firm premiums paid to immigrants compared to natives and how immigrants, over time, move across firms with varying gaps.

The differential sorting term captures the time-varying average generosity, as measured by native firm premiums, of firms employing immigrants compared to firms employing natives. It reflects immigrants' climbing the (native) job ladder as they spend more time in Israel.

4.2.4 Assimilation in non-pay employer characteristics.

In addition to firm pay policies, we study how employers of immigrants differ from employers of natives, as a function of time since arrival, for various non-pay attributes such as productivity, size, age, revealed-preference desirability, segregation, and sectoral composition. Analogous to G_A^{ψ}, we consider assimilation statistics G_A^{π} referring to firm attribute π_J, and estimate such statistics with regressions similar to (9):

$$\pi_{J(i,t)} = M_i \cdot \left[\sum_{a=1}^{29} \beta_a \mathbf{1}\{A_{it} = a\} \right] + X'_{it}\gamma + \varepsilon_{it}, \tag{11}$$

where $\pi_{J(i,t)}$ is one of the characteristics of interest of firm J.

4.2.5 Assimilation in employment dynamics

We further consider assimilation statistics relative to employment and job search behavior. We estimate these assimilation patterns estimating regression models such as (11) where the outcome variable is either an employment dummy variable, a dummy variable for changing employers in a given time period, or the size of a firm ladder "jump" (i.e., the period-to-period growth in the employer pay premium).

5 Results

5.1 Group-Specific AKM Estimation Results

Wage inequality decomposition. Table 3 presents a decomposition of the variance of log wages into components attributable to person effects, firm effects, covariates, and their covariances. Firm effects explain a larger share of the variance for FSU immigrants (21–23 percent) relative to natives (16–18 percent). The flipside is that person effects explain a greater share of wage inequality among natives (57–61 percent) than among FSU immigrants (38–49 percent), which could be due to the barriers to skill portability highly educated FSU immigrants faced. The correlation between person and firm effects is equal to 0.17–0.19 for FSU immigrants and equal to 0.09 for natives. These figures lie between the values of 0.03–0.25 reported by Card et al. (2013) for West Germany between 1985–2009.

Table 3: Summary of Estimated Group-Specific AKM Models

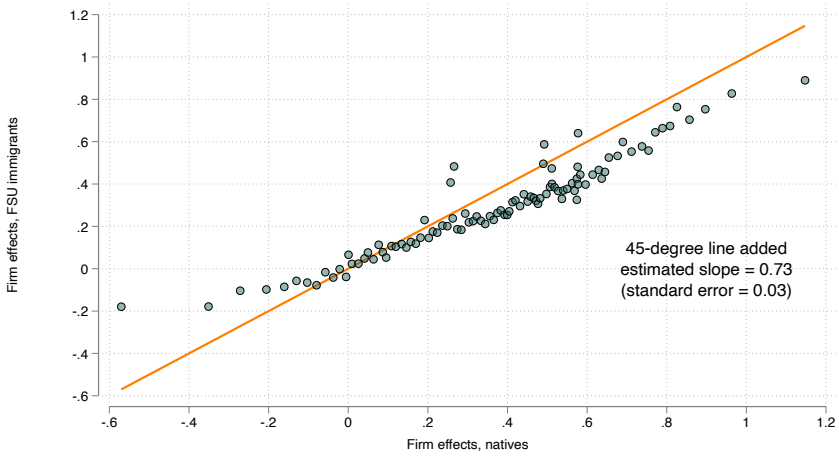
	FSU Males	FSU Females	Native Males	Native Females
	(1)	(2)	(3)	(4)
SD of log wages	0.586	0.567	0.707	0.608
SD of person effects	0.360	0.396	0.533	0.474
SD of firm effects	0.283	0.262	0.302	0.243
SD of covariates	0.249	0.355	0.269	0.281
Correlation of person/firm effects	0.190	0.169	0.091	0.089
Percentage of log wages variance due to:				
Person effect	37.8	48.9	57.0	60.9
Firm effect	23.3	21.4	18.3	16.0
Covariance person/firm effect	11.3	10.9	5.9	5.6
Firm effect + cov. person/firm	34.6	32.3	24.1	21.6
N person-year observations	2,554,089	2,500,671	9,450,027	9,993,273

Notes: Log wage variance decomposition of estimated group-specific two-way fixed effects outlined in equation (1).

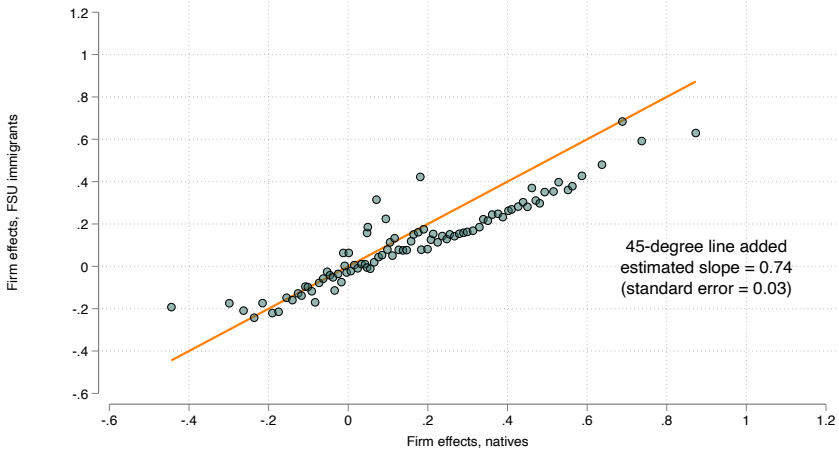
Immigrant-specific and native-specific firm pay premiums. We first present results on the relationship between immigrant- and native-specific pay premiums estimated in equation (1). Figure 3 plots the relationship between $\hat{\psi}_J^M$ and $\hat{\psi}_J^N$. On the horizontal axis, it groups firms into 100 equally sized bins, according to the value of $\hat{\psi}_J^N$. For each bin, on the vertical axis, the figure plots the average value of $\hat{\psi}_J^M$. Pay premiums for immigrants are typically lower than those for natives, as evidenced by most points being below the 45-degree line. In any case, the correlation between the two sets of fixed effects is high, with an estimated OLS slope of around 0.7 for both males and females.

Figure 3: Correlation between immigrant-specific and native-specific firm fixed effects: Equally sized bins

(a) Males.



(b) Females.

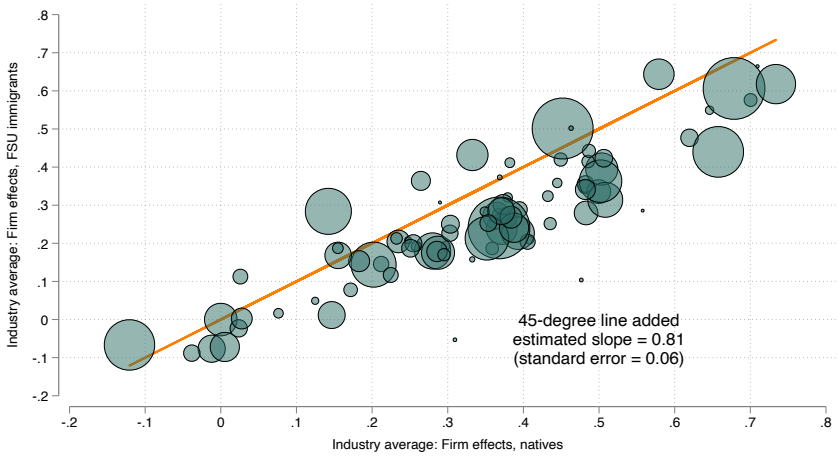


Notes: Correlation between immigrant-specific and native-specific firm fixed effects. 100 bins (with an equal number of native person-years) of firm pay premiums based on native firm effects.

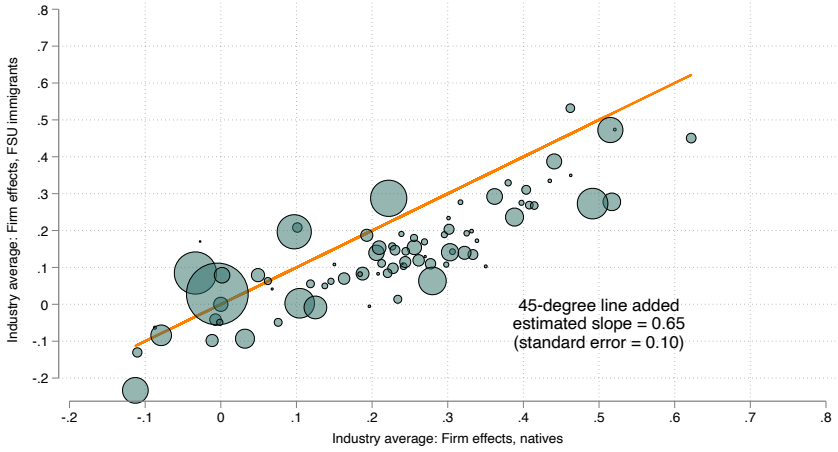
Figure 4 plots the correlation between the two sets of fixed effects grouping firms according to their industry, and weighting industry bins proportional to the number of worker-year observations. The main takeaways are the same as before, although the industry-based correlation is slightly lower for females compared to males.

Figure 4: Correlation between immigrant-specific and native-specific firm fixed effects: Industry averages

(a) Males.



(b) Females.



Notes: Correlation between immigrant-specific and native-specific firm fixed effects. Industry averages (weighted by person-year observations of natives).

Group-specific pay premiums and time since arrival. We now explore how the correlation between immigrant- and native-specific firm effects documented above varies as a function of immigrants' years since arrival in Israel.[10] We do so estimating the following equation using data on FSU immigrants:

$$\hat{\psi}^{M}_{j(i,t)} = \lambda + \pi \cdot \hat{\psi}^{N}_{j(i,t)} + X'_{it}\beta + \nu_{it}, \tag{12}$$

where $\hat{\psi}^{M}_{j(i,t)}$ and $\hat{\psi}^{N}_{j(i,t)}$ are recovered from estimating equation (1) and π captures the strength of the within-firm similarity of pay premiums. We estimate equation (5) for the pooled sample of FSU immigrants and separately by years since arrival. We account for measurement error by using a split-sample IV approach.[11] Figure 5 shows that the pooled IV estimate of π

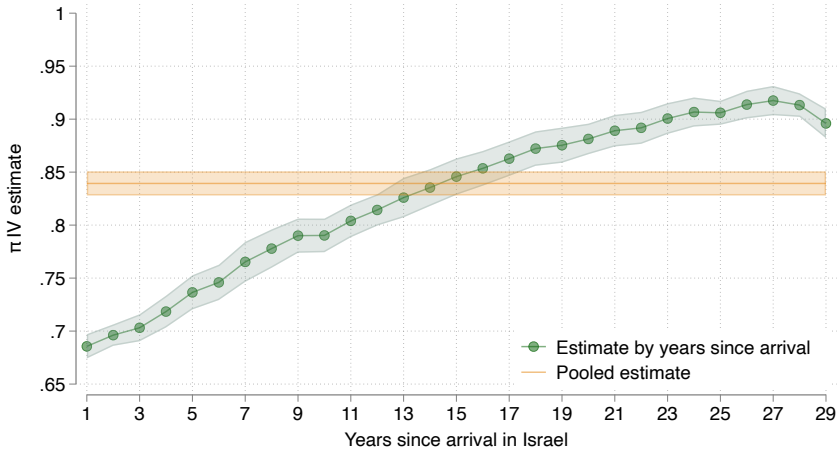
[10]Note that while the firm-level correlation is fixed over time, the person-year weighted correlation can evolve as a function of years since arrival as immigrants switch employers.

[11]Specifically, we randomly split the sample of natives into two groups, estimate an AKM model for each

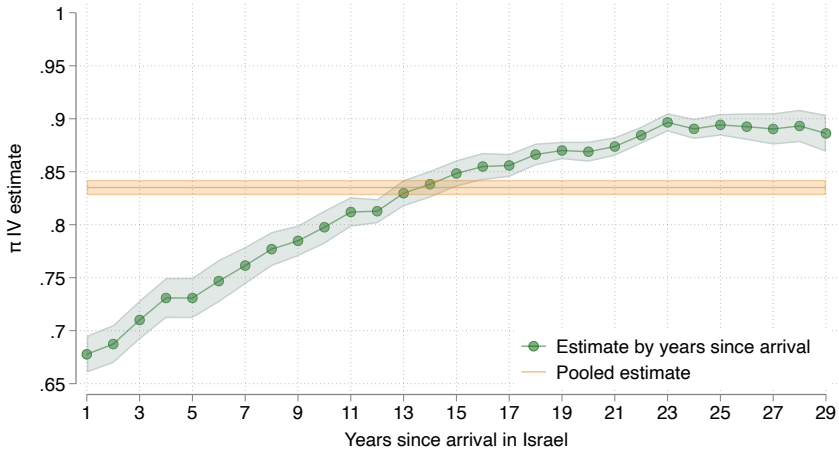
is close to 0.85 for both men and women (the OLS estimates instead are equal to 0.64–0.67). When π is allowed to vary as a function of years since arrival, we see an increasing gradient, both for men and women. Estimates of π one year after arrival are close to 0.7, and they stabilize at around 0.9 for both men and women around 20 years after arrival. This implies that, over time, immigrants move towards firms with pay premiums that are more similar for immigrants and natives. That is, there is evidence of dynamic sorting of immigrants towards firms with lower *gaps* in pay premiums. We present additional evidence on this finding in Section 5.4 below.

Figure 5: Correlation between group-specific premiums and time since arrival

(a) Males.



(b) Females.



Notes: Point estimates and 95% confidence intervals of parameter π in equation (5). The equation is estimated for FSU immigrants, for the pooled sample and separately by year since arrival. IV estimates which instrument each group's firm pay premium with that corresponding to the other group. Standard errors clustered at the person level.

Assortative matching and time since arrival. Two-way fixed effects wage models such as (1) imply that assortative matching—the observed covariance between person effects and firm effects—is a key statistic to consider when aiming to understand wage inequality (Card

group separately, and then use the estimated firm pay premium of one group of natives as an instrument for the firm pay premium of the second group.

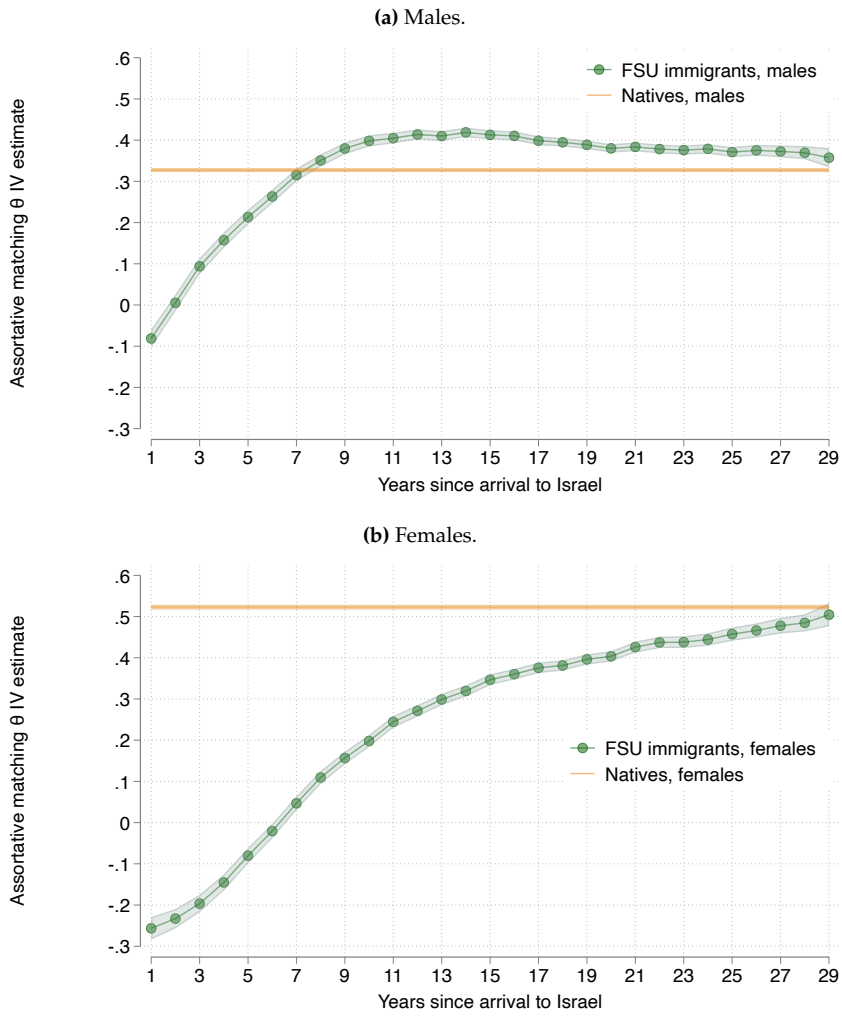
et al., 2013). We compute how assortative matching evolves for immigrants as they spend more time in Israel and how it compares to natives' by estimating the following equation:

$$\hat{\alpha}_i = \delta + \theta \cdot \hat{\psi}^{g(i)}_{j(i,t)} + X'_{it}\gamma + \eta_{it}, \tag{13}$$

where $\hat{\alpha}_i$ and $\hat{\psi}^{g(i)}_{j(i,t)}$ are recovered from estimating equation (1) and θ captures the degree of assortative matching. We estimate equation (13) separately for natives vs. immigrants, further separately for immigrants by time since arrival. We follow Gerard et al. (2021) and account for measurement error by instrumenting $\hat{\psi}^{M}_{j(i,t)}$ with $\hat{\psi}^{N}_{j(i,t)}$ and vice-versa. Figure 6 shows estimates of θ for natives and for immigrants as a function of time since arrival. For immigrant men, there is little assortative matching on arrival, even slightly negative, but it sharply grows surpassing the level of natives after eight years in Israel and stabilizing at around 0.4 after ten years in Israel. On arrival, female immigrants display negative assortative matching,[12] which becomes positive after seven years and steadily grows until it catches up with natives' level only after 29 years.

[12] As we show below, there is selection into employment for female immigrants during the early years since arrival. This could result into negative assortative matching if, shortly after arrival, high-α_i women accept any available job while low-α_i women only do so if an opportunity at a good firm arises.

Figure 6: Worker-Firm Assortative Matching: Natives and Immigrants

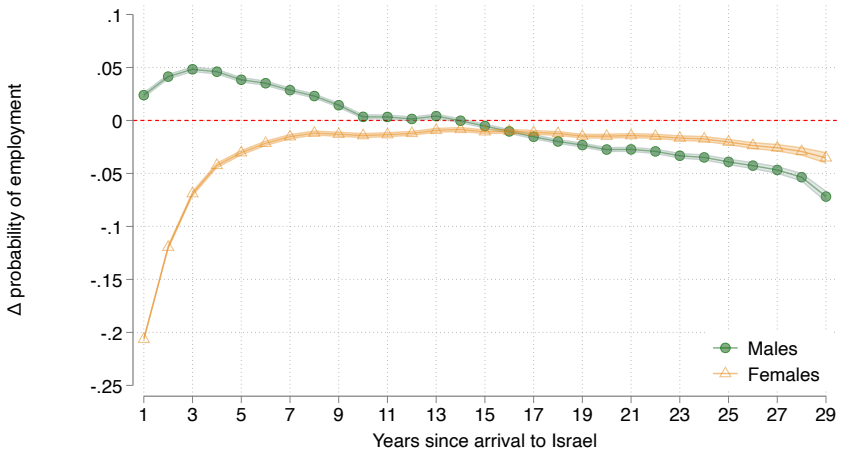


Notes: Point estimates and 95% confidence intervals of parameter θ in equation (13). The equation is estimated separately for natives and for immigrants for each year since arrival. IV estimates which instrument each group's firm pay premium with that corresponding to the other group. Standard errors clustered at the person level.

5.2 Employment Assimilation

Figure 7 shows estimates, separately for males and females, of β_a in equation (11) when the outcome variable is a dummy equal to one if a person i is employed in year t. Note that we are able to estimate employment assimilation thanks to the unusual fact that our administrative data record immigrants' date of arrival in Israel independently from employment status.

Figure 7: Employment Assimilation



Notes: Point estimates and 95% confidence intervals of parameters β_a, $a \in \{1, \ldots, 29\}$ in regression equation (11) when the outcome variable is a dummy equal to one if a person i is employed in year t. Standard errors clustered at the person level.

These results align with the months-to-first-job distribution documented in Figure 2 and further confirm, for males, the historical narrative on FSU immigrants' being compelled to find jobs in Israel immediately after arrival (Remennick, 2007). Figure 7 shows that during their first nine years in Israel, FSU males were slightly more likely than native males to be employed. Over time the differential decreases and turns slightly negative between years 16–29, possibly due to out-migration.

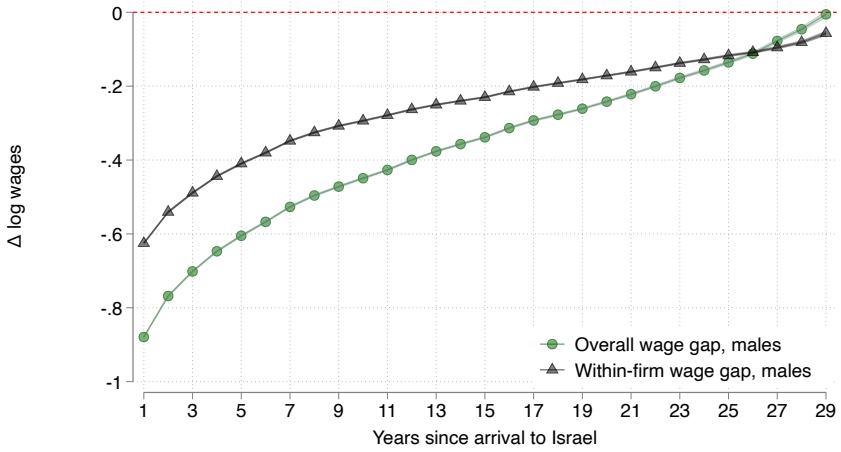
For women, instead, Figure 7 shows that the first four years since arrival featured strong selection into employment. Compared to native females, FSU females' probability of employment was around 0.2 lower one year after arrival. These selection patterns in the earlier years should be kept in mind when interpreting the following results.

5.3 Wage Assimilation

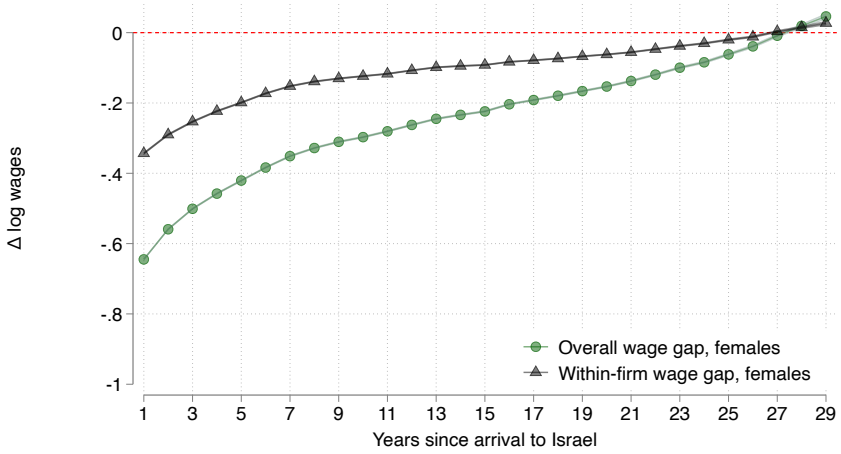
The main immigrant-native wage gap convergence estimates are shown in Figure 8. The overall wage gap is captured by the estimates of β_a in equation (4), while the within-firm wage gap is captured by the estimates from equation (7). The overall gap among males shows that, on arrival, FSU immigrants earned .85 log points less than comparative natives. This sizable gap steadily shrinks over time, reaching .57 log points after five years and .21 after twenty years. It is only after 29 years since arrival that we see the gap disappear. For females, the initial gap is smaller but the convergence rate is lower, meaning that the gap is closed roughly around the same time as males'.

Figure 8: Wage Assimilation

(a) Males.



(b) Females.



Notes: Point estimates and 95% confidence intervals of parameters β_a, $a \in \{1, \ldots, 29\}$ in regression equations (4) and (7). Standard errors clustered at the person level.

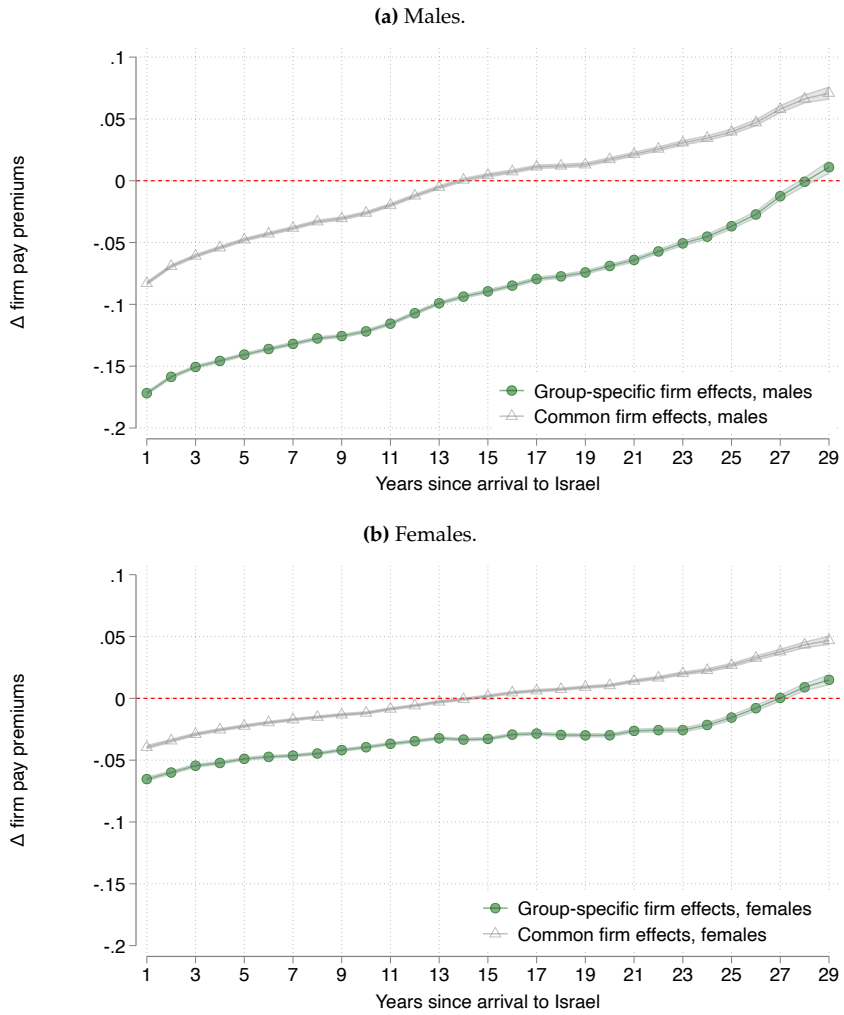
The within-firm gap profile reports our estimates of the statistic $G^w_{A|J}$. Once we condition on employers' identity, the wage gap between immigrants and natives is significantly reduced—by as much as 26–30% for males and 41–53% for females during the first ten years. Our analysis in Section 4.2 interprets this reduction as the combination of two forces. First, immigrant-native differences in person effects are likely larger unconditionally than within firm. Second, the overall gap in firm pay premiums is likely wider than the within-firm pay setting component (something we confirm in turn).

5.4 Firm Pay Premiums: Assimilation and Gap Decomposition

The circles profile in Figure 9 shows the firm pay premium assimilation results arising from estimating equation (9) following the two-step procedure outlined above. One year after arrival and relative to comparable natives, FSU immigrants are employed in firms with pay premiums that are smaller by .17 log points (20 percent of the overall immigrant-

native earnings gap) for males and by 0.07 log points (10 percent of the overall immigrant-native earnings gap) for females. Convergence rates are greater for males, resulting in both differentials being closed around the same time, 28 years after arrival in Israel.

Figure 9: Firm Pay Premiums Assimilation



Notes: Point estimates and 95% confidence intervals of parameters β_a, $a \in \{1, \ldots, 29\}$ in regression equation (9). Circles are estimates when firm premiums are allowed to be group-specific. Triangles are estimates when firm premiums are constrained to be common across groups. Standard errors clustered at the person level.

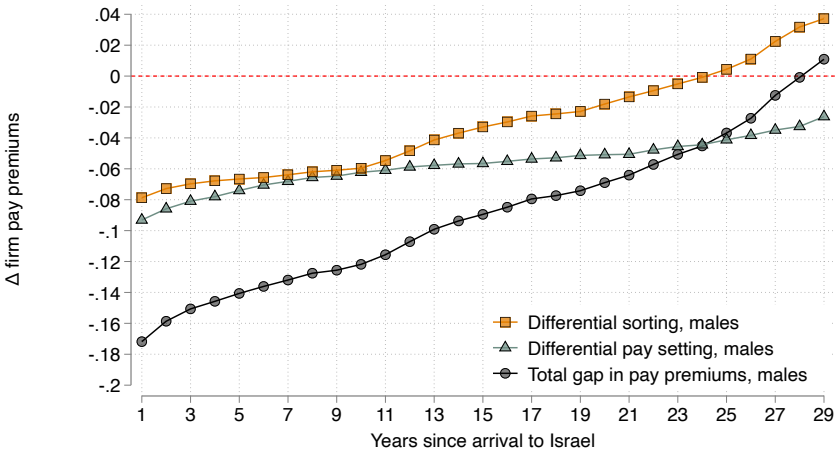
The triangles profile in Figure 9 shows the resulting assimilation pattern if one were to assume *common* firm effects for immigrants and natives. Compared to the unrestricted assimilation profile, the initial gap is substantially smaller, and the ensuing dynamics result in a positive gap for natives after 15 years in Israel. The differences in these two assimilation profiles are preliminary evidence of the importance of allowing for group-specific firm pay premiums and the relevance of a pay-setting channel in addition to sorting.

Decomposition: differential wage setting and differential sorting. Figure 10 displays the results from decomposing the firm pay premium gap into a differential pay setting component and a differential sorting component, following equation (10). On arrival, for

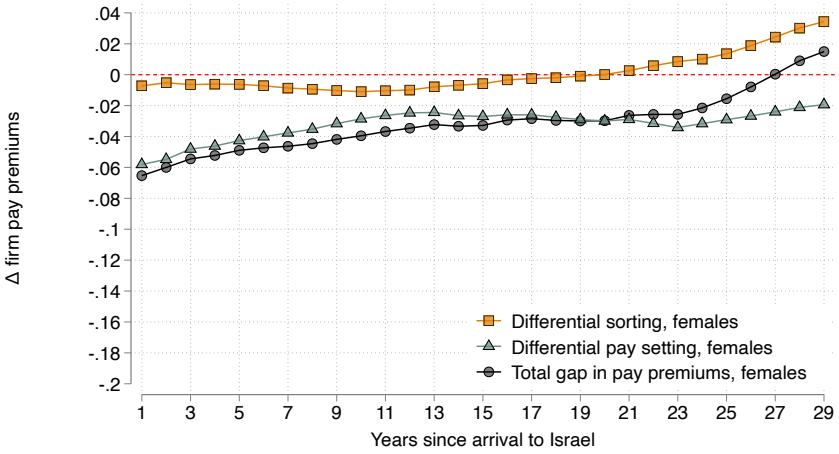
males, differential pay setting accounts for 54 percent of the firm pay premium gap and differential sorting for the remaining 45 percent. For females, on arrival, differential pay setting accounts for 89 percent of the firm pay premium gap and differential sorting for the remaining 11 percent

Figure 10: Firm Pay Gap Decomposition: Differential Wage Setting vs. Differential Sorting

(a) Males.



(b) Females.



Notes: Decomposition of the overall immigrant-native gap in firm pay premiums into a differential pay setting (within) and differential sorting (between) components, as detailed in equation (10).

Interestingly, the steady immigrant-native convergence in firm pay premiums is driven by different components at different points in time. During the first 15 years in Israel, differential pay setting gradually shrinks while differential sorting shrinks too for males but stays rather constant for females. From years since arrival 15–29, there is a sharp convergence in the sorting channel (even changing sign during the last few years) which drives the bulk of the overall gap. In other words, during the initial years, immigrants are mostly able to move into firms that pay immigrants *more similarly* to natives but do not climb much the firm ranking as defined by natives' pay premiums. Instead, 15–29 years after arrival, immigrants become more and more likely to access firms that not only pay more to immi-

grants, but also to natives. Overall, and contrary to prior work studying other wage gaps (Card et al., 2016; Gerard et al., 2021), we find an important role for the pay setting channel and document a novel dynamic sorting pattern by which immigrants gradually move into firms where the differential pay setting channel is less severe.

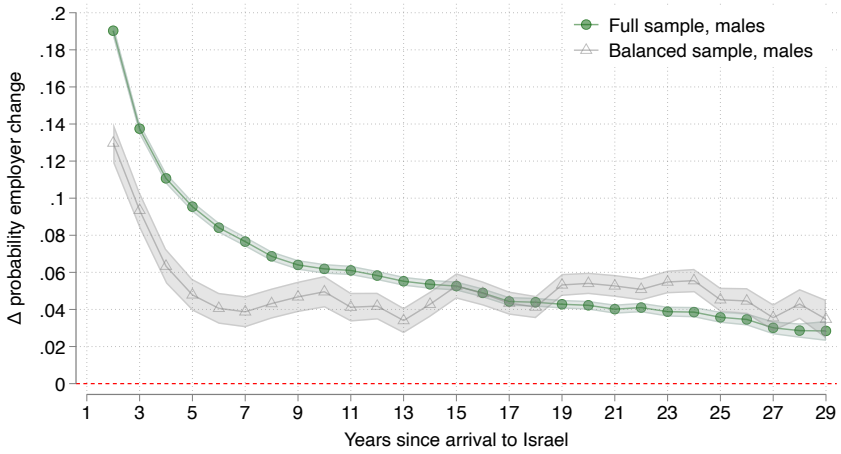
5.5 Job Search and Firm Ladder Climbing Assimilation

As opposed to wage assimilation, assimilation in firms' pay premiums can only arise through job search and job mobility. The convergence patterns documented in Figures 9 and 10 must be a combination of immigrants changing jobs more frequently than natives and/or taking larger steps up on the job ladder conditional on moving. Figure 11 and 12 show how both these margins play a role.

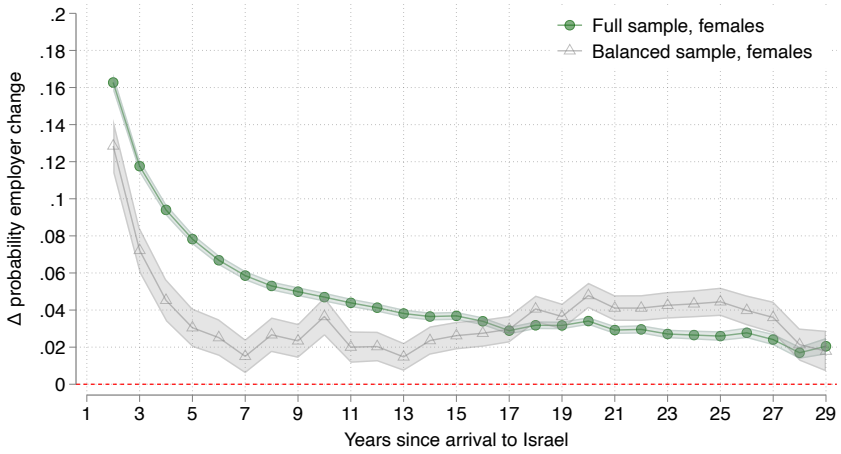
Figure 11 shows estimates of job search assimilation, plotting $\hat{\beta}_a$ from equation (11) when the outcome variable is a dummy equal to one if a worker switches employers between two periods. The key takeaway is that FSU immigrants are much more mobile than comparable natives and persistently so. In their second year in Israel, the probability that an immigrant has changed employers is 0.16–0.19 higher than that of a comparable native. This differential drops quickly during the first years but it remains positive throughout and equals 0.02–0.03 even 29 years after arrival. The triangles profile shows the main takeaway is true even among the balanced sample of workers (who are continuously employed between ages 25–59).

Figure 11: Job Search Assimilation

(a) Males.



(b) Females.

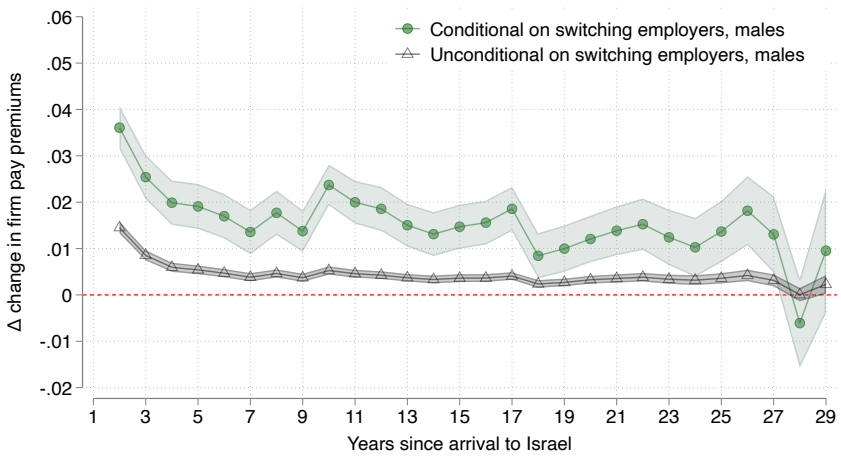


Notes: Point estimates and 95% confidence intervals of parameters β_a, $a \in \{1, \ldots, 29\}$ in regression equation (11) when the outcome variable is a dummy equal to one if a worker switches employers between periods. Standard errors clustered at the person level. The unconditional mean for natives is equal to 0.13 for males and 0.10 for females (full sample).

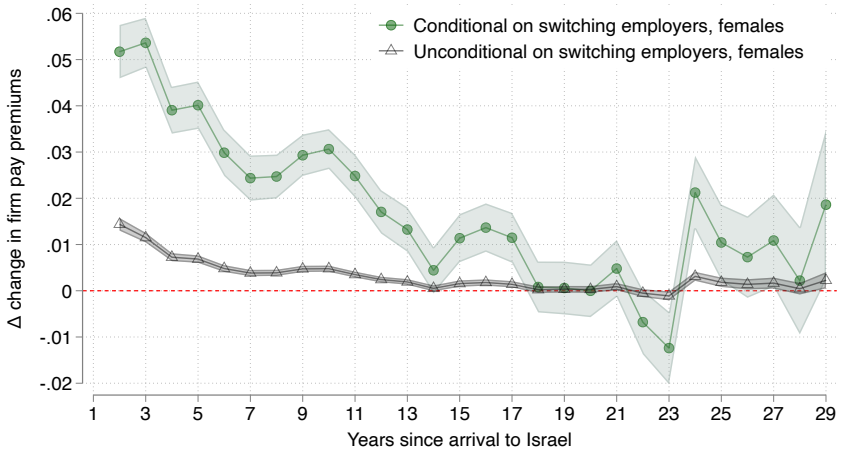
Figure 12 shows assimilation estimates when the outcome variable is period-to-period jumps in the job ladder. That is, the outcome of interest is equal to $\psi^{g(i)}_{J(i,t)} - \psi^{g(i)}_{J(i,t-1)}$. The circles profile shows that, conditional on switching employers from $t-1$ to t, immigrants take greater steps up the job ladder than comparable natives (especially females), and this differential is persistent (especially males). The triangles profile shows equivalent results in the full sample, that is, without conditioning on switching employers. The gap dynamics are similar but the level is more muted due to stayers.

Figure 12: Firm Ladder Climbing Assimilation

(a) Males.



(b) Females.



Notes: Point estimates and 95% confidence intervals of parameters β_a, $a \in \{1, \ldots, 29\}$ in regression equation (11) when the outcome variable is equal to $\psi^{g(i)}_{J(i,t)} - \psi^{g(i)}_{J(i,t-1)}$. Standard errors clustered at the person level. Unconditional mean for natives is equal to 0.04 for males and 0.02 for females (full sample).

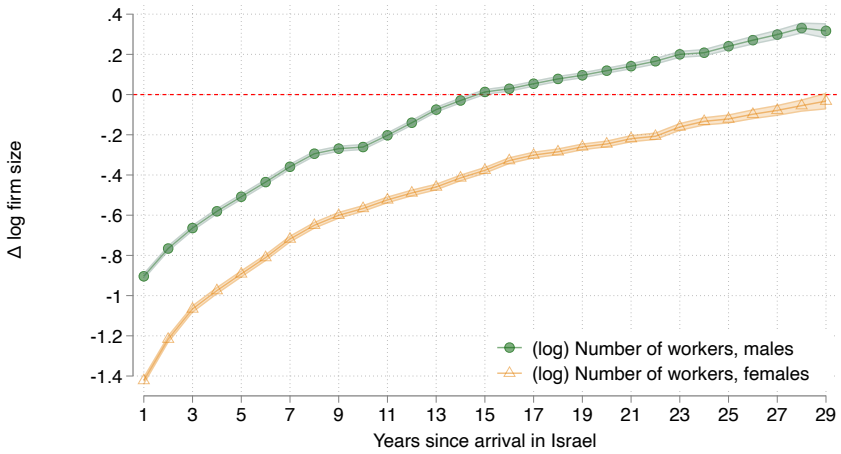
5.6 Assimilation in Non-Pay Employer Characteristics

We now consider assimilation in employer attributes that go beyond contemporaneous pay. These attributes are firm size, firm age, revealed-preference desirability, segregation, and sectoral composition. These employer dimensions could impact workers through skill acquisition and future compensation, non-pay amenities, or network formation. As a result, this analysis provides a richer picture of labor market assimilation than the one arising from focusing on compensation only.

Firm size. Figure 13 shows estimates of assimilation in terms of firm size (number of employees). On arrival to Israel and relative to comparable natives, FSU immigrants were employed in substantially smaller firms, with a firm size differential of .90 log points for males and 1.4 log points for females. Convergence in firm size takes a long time for females, only

occurring after 29 years, while the gap closes after 15 years for males and it steadily continues to grow after having changed its sign. After 29 years in Israel, FSU males are employed in firms that are on average .30 log points larger than those employing comparable natives.

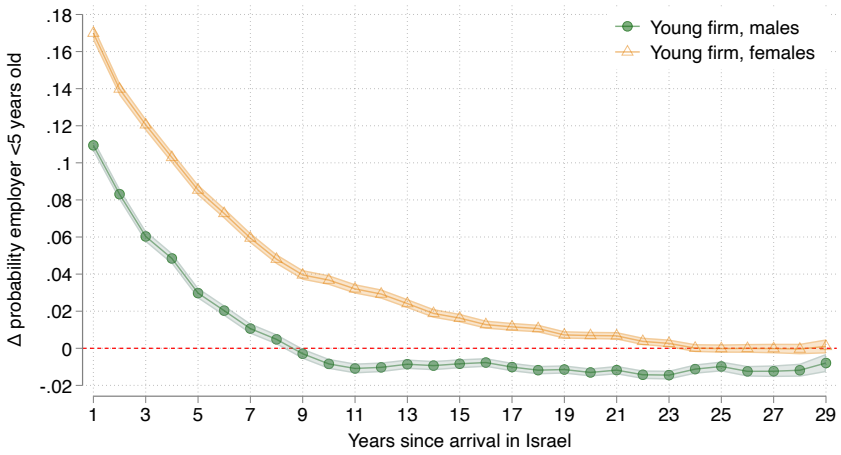
Figure 13: Assimilation in Employer Size



Notes: Point estimates and 95% confidence intervals of parameters β_a, $a \in \{1, \ldots, 29\}$ in regression equation (11) when the outcome variables are equal to log number of employees. Standard errors clustered at the person level.

Firm age. Figure 14 displays the assimilation pattern in term's of employer age, where the outcome variable is a dummy equal to one if a worker's employer was born less than five years ago. On arrival, FSU immigrants were disproportionately found in young firms, with a probability of employment at a young firm greater than that of comparable natives by 0.11–0.17. Male immigrants experience relatively quick convergence along this margin, closing the gap after nine years in Israel. For females, the gap is closed only after 23 years. After closing, gaps stabilize at values that imply immigrants are slightly less likely to work in young firms.

Figure 14: Assimilation in Employer Age



Notes: Point estimates and 95% confidence intervals of parameters β_a, $a \in \{1, \ldots, 29\}$ in regression equation (11) when the outcome variable is a dummy equal to one if a worker's employer is less than five years old. Standard errors clustered at the person level. Unconditional mean for natives is equal to 0.22 (males) and 0.16 (females).

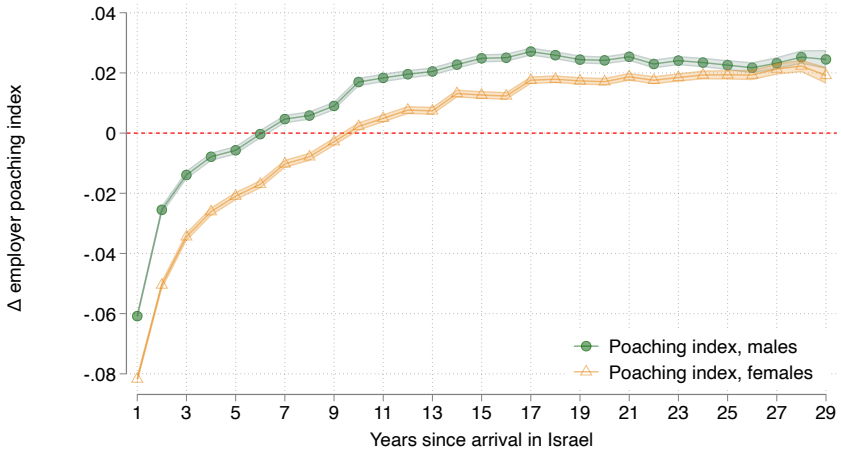
Employer desirability. We now consider two measures of employer desirability based on revealed preferences. First, a poaching index which measures the share of workers a firm poaches from other employers (Bagger and Lentz, 2019; Dustmann et al., 2022). This index is meant to capture a revealed-preference desirability measure, since firms that are most preferred by workers will have greater shares of poached employees. Second, a revealed preference index following Sorkin (2018).[13]

Panel (a) in Figure 15 shows that FSU immigrants were initially employed in less desirable firms compared to natives (by about 12–17 percent of the natives' mean), and gradually climb into more desirable employers, converging with natives after six to ten years in Israel. After that, FSU immigrants were consistently employed through the years ahead in slightly more desirable firms compared to natives.

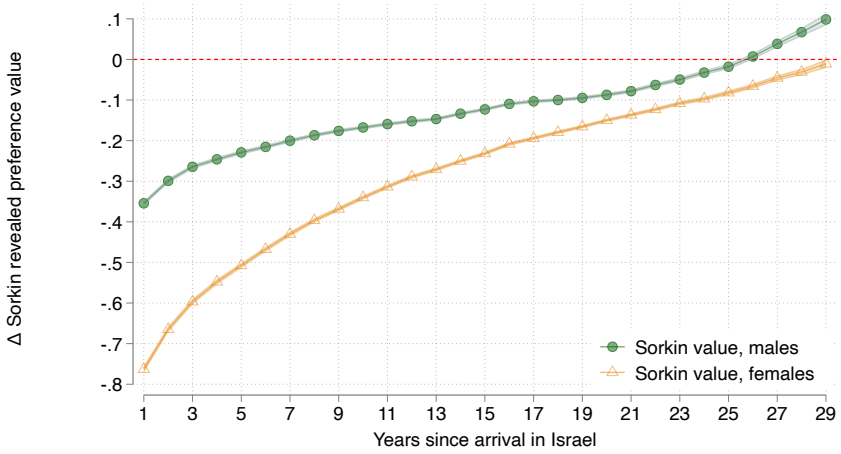
[13]The Sorkin (2018) index rests on a similar logic to the poaching index but further accounts for the fact that if new hires originate from a desirable firm, the destination firm is itself more desirable than if the new hires originate from a less desirable firm instead.

Figure 15: Employer Desirability

(a) Poaching index.



(b) Sorkin (2018) Revealed Preference Index.



Notes: Point estimates and 95% confidence intervals of parameters β_a, $a \in \{1, \ldots, 29\}$ in regression equation (11) for two different outcome variables. Panel (a): the outcome variable is equal to a firm's poaching index, defined as the share of workers who are poached from other employers; unconditional mean for natives is equal to 0.497 (males) and 0.452 (females). Panel (b): the outcome variable is equal to a firm's Sorkin (2018) index; unconditional mean for natives is equal to -0.05 (males) and 0.13 (females). Standard errors clustered at the person level.

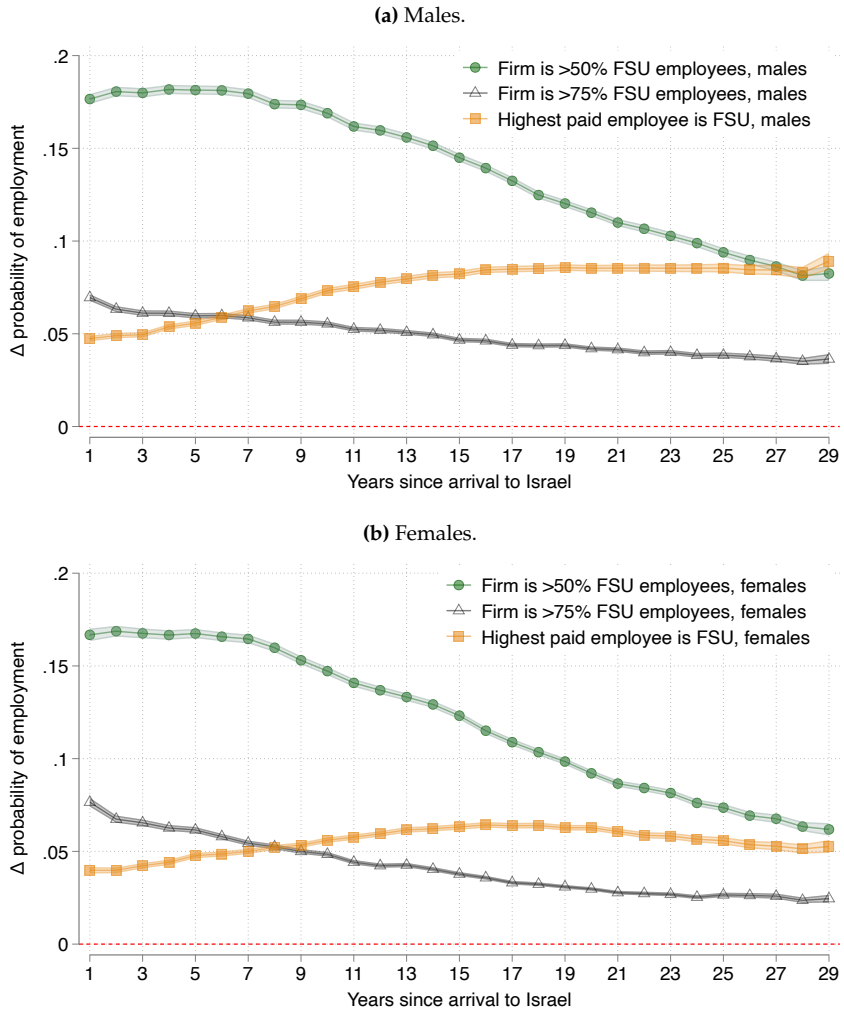
Panel (b) in Figure 15 shows instead that convergence in employer desirability as measured by the Sorkin (2018) index is slower than that measured by the poaching index above. It takes FSU immigrants more than 25 years to catch up to natives (26 years for males, 29 for females).

Segregation. Whether immigrants are mostly employed with other similar immigrants or, instead, mostly natives can have implications for cultural assimilation, language learning, or network formation (Eliason et al., 2019; San, 2021). We consider three measures of employment segregation: whether a firm is composed of 50% or more of FSU employees, the same index for a 75% threshold instead of 50%, and a dummy equal to one if a firm's highest-paid worker is an FSU immigrant (as a proxy for the firm being owned or operated by an FSU person). Figure 16 shows assimilation patterns for these three measures.

On arriving in Israel, FSU immigrants' employment was highly segregated. Relative to comparable natives, the probability of being employed in a majority or over-75% FSU firm was 0.16–0.18 and 0.07–0.08 higher, respectively (relative to very low baseline probabilities for natives). This segregation takes time to unfold. For example, the share of those employed in majority-FSU firms starts to slowly decline only after seven years in Israel.

Lastly, the squares profile in Figure 16 shows that the relative probability of working at a firm where the highest-paid worker is an FSU immigrant *increases* as a function of time since arrival. This differential probability is equal to about 0.05 on arrival for both males and females, it climbs up to 0.09 for males after 29 years, while it stays relatively constant for females.

Figure 16: Segregation: FSU immigrants employment composition



Notes: Point estimates and 95% confidence intervals of parameters β_a, $a \in \{1, \ldots, 29\}$ in regression equation (11) when the outcome variable is equal to a dummy equal to one if a worker's employer is composed of 50% or more FSU employees, the same metric for a 75% threshold, and a dummy equal to one if a worker's employer's highest-paid worker is an FSU immigrant. Standard errors clustered at the person level. Unconditional mean for natives is equal to 0.011 (males) and 0.006 (females) for the 50% threshold, to 0.002 (males) and 0.001 (females) for the 75% threshold, and equal to 0.013 (males) and 0.009 (females) for the highest paid employee is FSU dummy.

Sectoral composition. Lastly, we consider differential sectoral employment composition be-

tween FSU immigrants and natives. Figure 17 shows assimilation results when the outcome variables are dummies for being employed in different sectors.

FSU immigrants were disproportionately employed in manufacturing, and persistently so throughout the study period. On arrival, the differential probability of manufacturing employment is 0.14 for males and 0.19 for females, relative to baselines of 0.17 and 0.07, respectively, among natives. Twenty-nine years after arrival, the differential is still equal to 0.09 for men, and 0.05 for women. The prevalence of engineering skills among FSU immigrants and the Hebrew language barrier makes manufacturing a natural sector for over-representation.

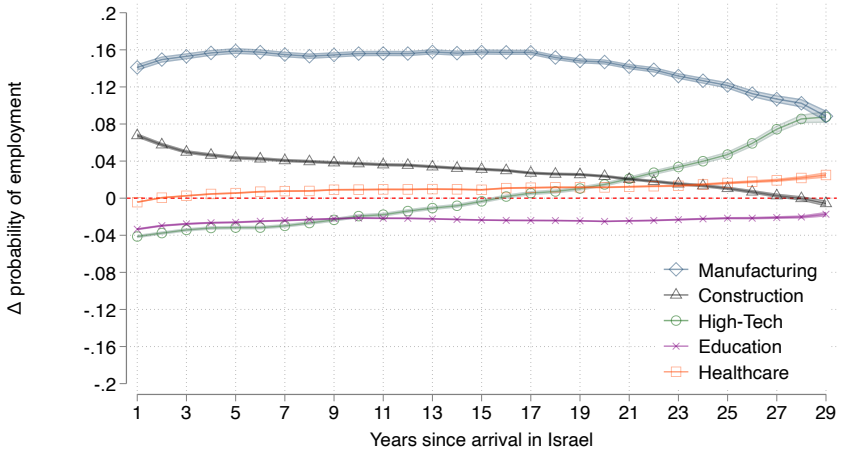
For FSU men, construction was another sector initially attracting plenty of employment, in both absolute and relative terms. The differential probability with respect to natives on arrival is equal to 0.07, more than doubling the baseline for native males, equal to 0.06. As time passes, however, FSU males gradually shift away from the construction sector and the gap is closed twenty-eight years after arrival.

The high-tech sector—whose growth in Israel is popularly credited to the arrival of highly educated FSU immigrants—presents a striking pattern.[14] Indeed, we can see that, on arrival, FSU immigrants' relative probability of employment in high-tech was equal to -0.04 for males and 0.02 for females. For males, it steadily increases at a high rate, becomes positive after 17 years and, far from stabilizing, continues to grow up to about 0.09. For females, it grows at a lower rate yet doubles after 29 years.

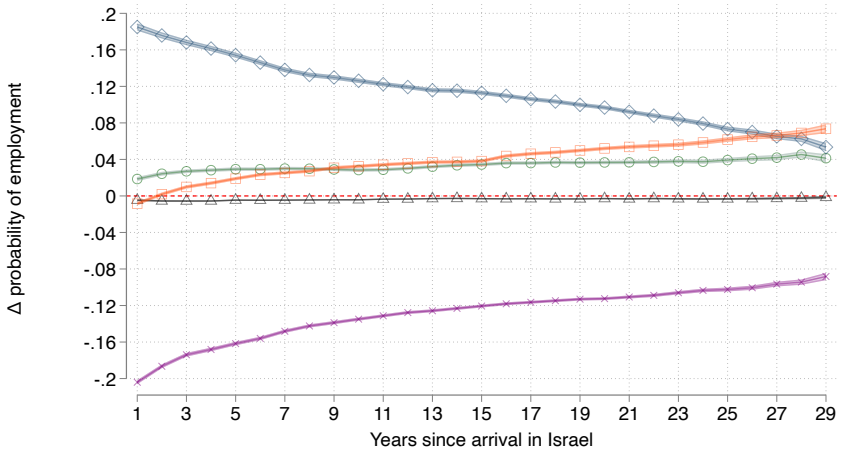
[14]The high-tech definition we use encompasses i) manufacture of computer, electronic and optical products, ii) telecommunications, iii) computer programming, consultancy and related activities, iv) information service activities, and v) scientific research and development.

Figure 17: Sectoral employment: Manufacturing, construction, high-tech, education, and healthcare

(a) Males.



(b) Females.



Notes: Point estimates and 95% confidence intervals of parameters β_a, $a \in \{1, \ldots, 29\}$ in regression equation (11) when the outcome variables are dummies for being employed in various sectors—manufacturing, construction, high-tech, education, and healthcare. Standard errors clustered at the person level. Unconditional means for natives are equal to 0.165 (males) and 0.071 (females) for manufacturing, 0.055 (males) and 0.017 (females) for construction, 0.155 (males) and 0.075 (females) for high-tech, 0.044 (males) and 0.182 (females) for education, and 0.017 (males) and 0.057 (females) for healthcare.

On the other hand, FSU immigrants were persistently underrepresented in the education sector, overwhelmingly so for women. This is consistent with historical accounts detailing how the skills of FSU teachers were difficult to transfer to Israel due to the Hebrew language barrier, the differences in teaching curriculum in most subjects other than hard sciences, and the very different classroom cultures in the FSU compared to Israel.

Healthcare is an example of a skilled sector where, instead, language and cultural barriers are arguably lower. We see in Figure 17 that male and female immigrants steadily become more and more likely to be employed in the healthcare sector. On arrival, the differential probability is close to zero whereas, 29 years after arrival, FSU immigrants' probability of employment in the healthcare industry is 0.025 (males) and 0.07 (females) greater than natives' (a differential of more than 100 percent of the natives' baseline probabilities of 0.017 and 0.057).

5.7 Arrival Cohort and Age at Arrival Effects

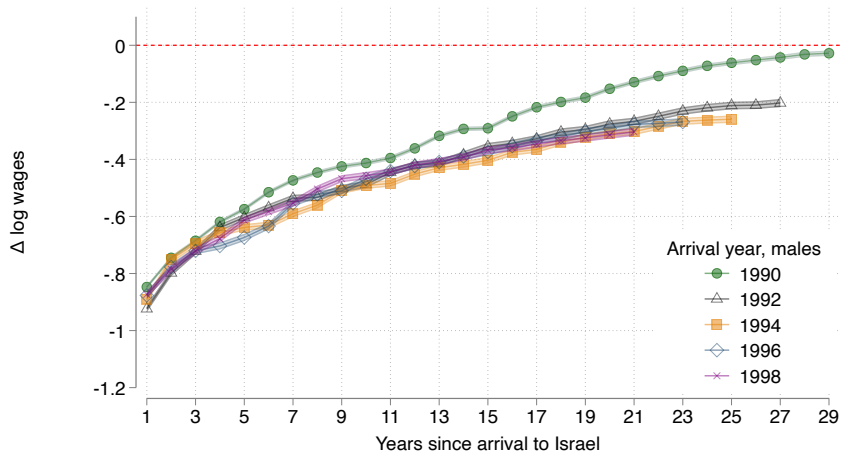
This paper studies FSU immigrants who arrived in Israel over the course of ten years and at all types of ages. Building on the literature that highlights the importance of immigrants' age-at-arrival effects (Friedberg, 1992; Alexander and Ward, 2018) and arrival cohort effects (Borjas, 1985; Abramitzky et al., 2014), we document heterogeneous assimilation patterns along these margins for wages and firm pay premiums. The numerosity of the migration wave together with our population-level data allow us to estimate these granular assimilation trends with precision.[15]

Arrival cohort effects. Figure 18 shows wage assimilation patterns, separately for various arrival cohorts. There is some evidence of slightly lower gaps and faster convergence for the first arrival cohort relative to the rest, but overall, wage assimilation profiles are quite similar across cohorts.

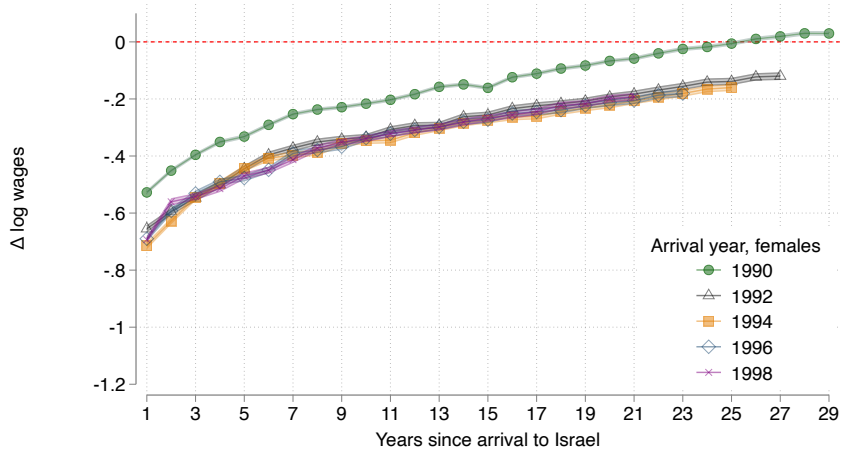
[15] Appendix Figure A2 shows the number of FSU immigrants in our sample by age at arrival to Israel.

Figure 18: Arrival Cohort Effects: Wage Assimilation.

(a) Males.



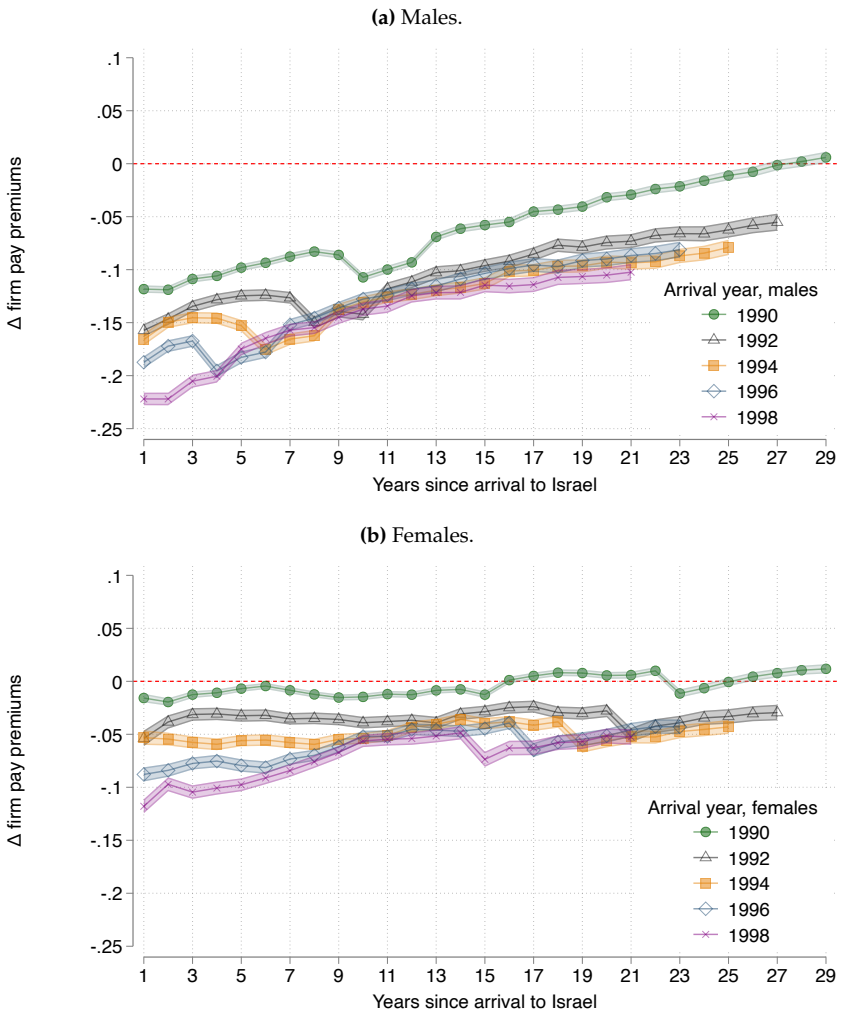
(b) Females.



Notes: Point estimates and 95% confidence intervals of parameters β_a, $a \in \{1, \ldots, 29\}$ in regression equation (4) estimated separately for different year-of-arrival groups.

Figure 19 shows assimilation patterns in firm pay premiums for different year-of-arrival groups. Earlier cohorts had smaller initial gaps in pay premiums, compared to later ones. This is consistent with the notion that earlier year of arrival was negatively correlated with the probability of holding a higher education degree or originating from a large FSU city (Remennick, 2007). In any case, convergence rates across groups are quite similar as reflected by the comparable profiles' slopes. Such slopes are quite different however between males and females, with the former experiencing steeper convergence than the latter.

Figure 19: Arrival Cohort Effects: Firm Pay Premiums Assimilation.

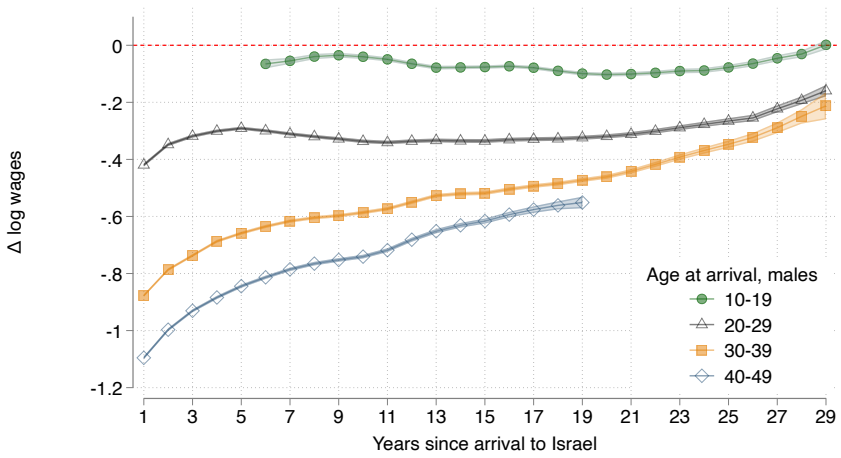


Notes: Point estimates and 95% confidence intervals of parameters β_a, $a \in \{1, \ldots, 29\}$ in regression equation (9) estimated separately for different year-of-arrival groups.

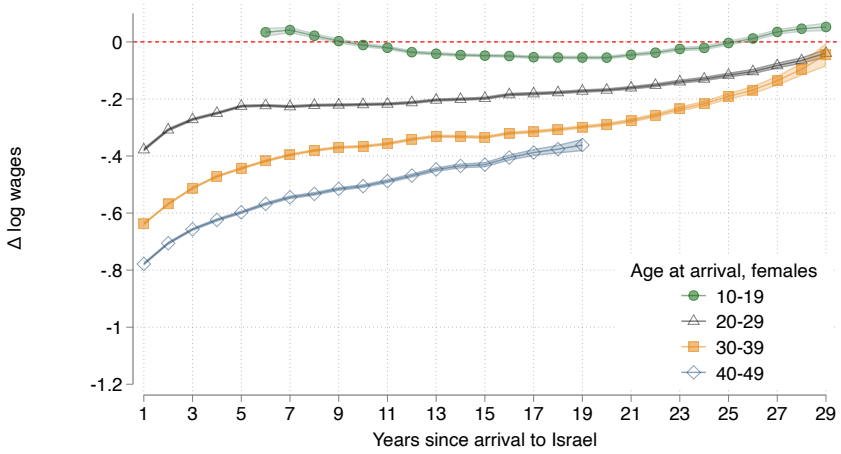
Age at arrival effects. Figure 20 shows heterogeneous wage assimilation profiles separately for different groups based on age at arrival in Israel. There are substantial differences in wage assimilation between these groups. Those who arrived between ages 30–39 and 40–49 have experience wage gaps on arrival accompanied by steep convergence with natives. Those who arrive in their 20s do not experience much convergence compared to young natives (especially males), although there are substantial level gaps during most years. Finally, those who arrive between ages 10–19 are hardly distinguishable from natives.

Figure 20: Arrival Age Effects: Wage Assimilation.

(a) Males.



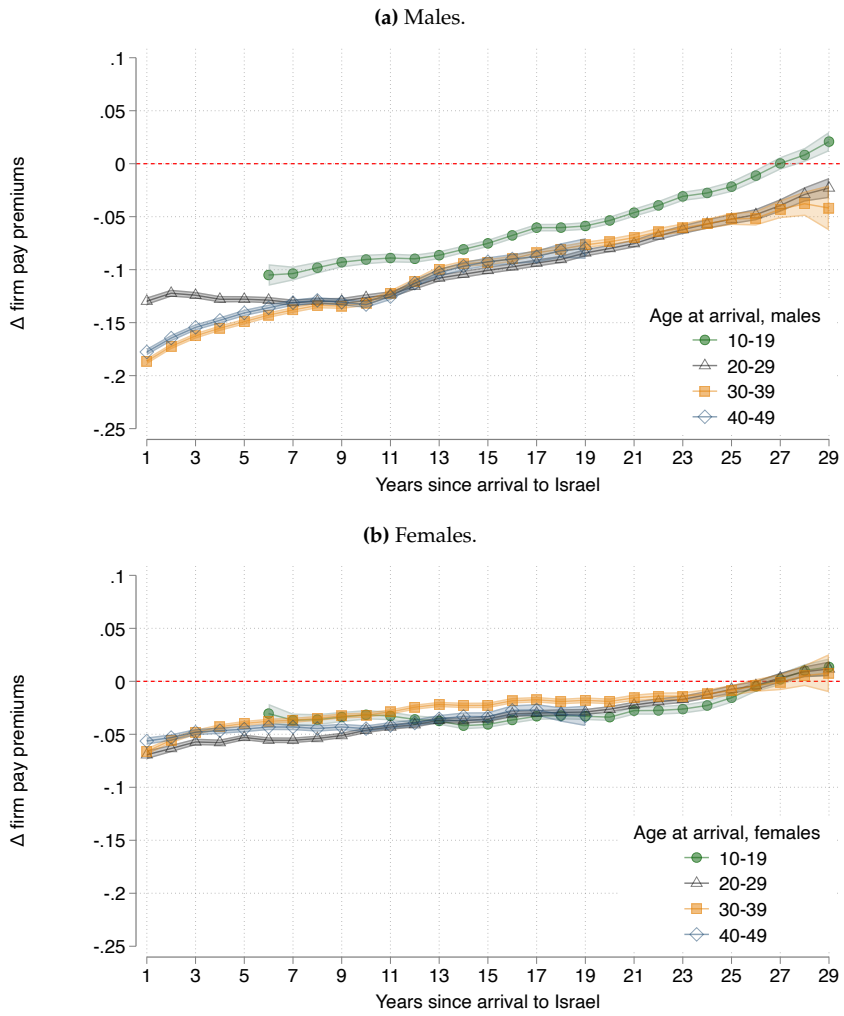
(b) Females.



Notes: Point estimates and 95% confidence intervals of parameters β_a, $a \in \{1, \ldots, 29\}$ in regression equation (4) estimated separately for different age-at-arrival groups.

Figure 21 shows no evidence of large age-at-arrival effects for firm pay premiums assimilation. Males who arrived in Israel between ages 10–19 display a level effect in that the gap with comparable natives is slightly smaller throughout. However, convergence rates are similar for all age-at-arrival groups (10–19, 20–29, 30–39, and 40–49) and genders. The temporary lack of convergence for males who arrived in their 20s during their first 5–6 years in Israel is noteworthy. This is potentially due to the fact that comparable natives for this group are also labor market entrants experiencing substantial job mobility during those years (Topel and Ward, 1992).

Figure 21: Arrival Age Effects: Firm Pay Premiums Assimilation.



Notes: Point estimates and 95% confidence intervals of parameters β_a, $a \in \{1, \ldots, 29\}$ in regression equation (9) estimated separately for different age-at-arrival groups.

6 Conclusion

We provide a systematic analysis of how do heterogeneous firms and firm-specific pay policies contribute to the process of immigrants' labor market assimilation. We are able to do so with a novel combination: the study of a mass migration episode of historical importance using high-quality administrative data featuring a long panel of 29 years. Moreover, the institutional context is propitious as we benefit from the numerosity of the migration wave and "unconstrained assimilation" due to the granting of citizenship to immigrants on arrival.

Our analysis of firm pay premiums assimilation sheds new light on heterogeneous firms' pay policies as an important mediator of wage assimilation. This has implications for our understanding of what are the ultimate drivers of immigrant-native wage gaps. Our findings also emphasize the importance of firm-to-firm mobility as an enabler of immi-

grants' labor market success in their new host country. This fact is policy relevant for many contemporaneous contexts in which immigrants' employer mobility is limited by different regulations. However, while mobility is important to close the differential sorting gap, our findings also highlight the importance of a differential pay setting channel, that is, the fact that even within firm, pay policies can be different for natives compared to immigrants. Understanding the sources and evolution of these within-firm gaps is a relevant question for future research.

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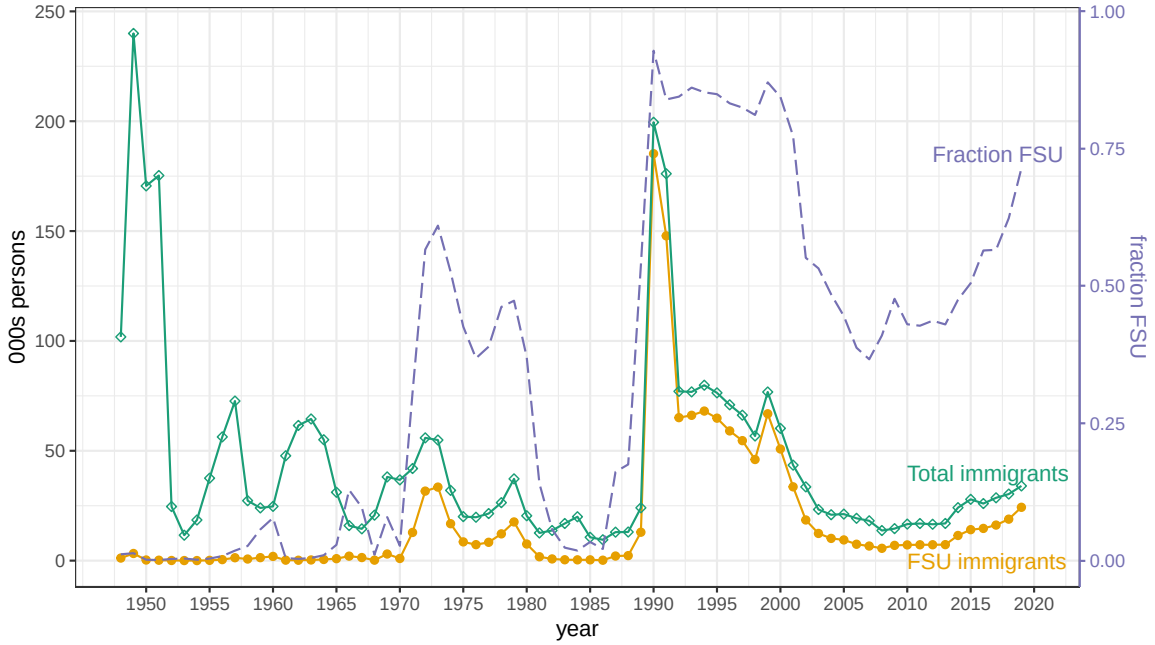
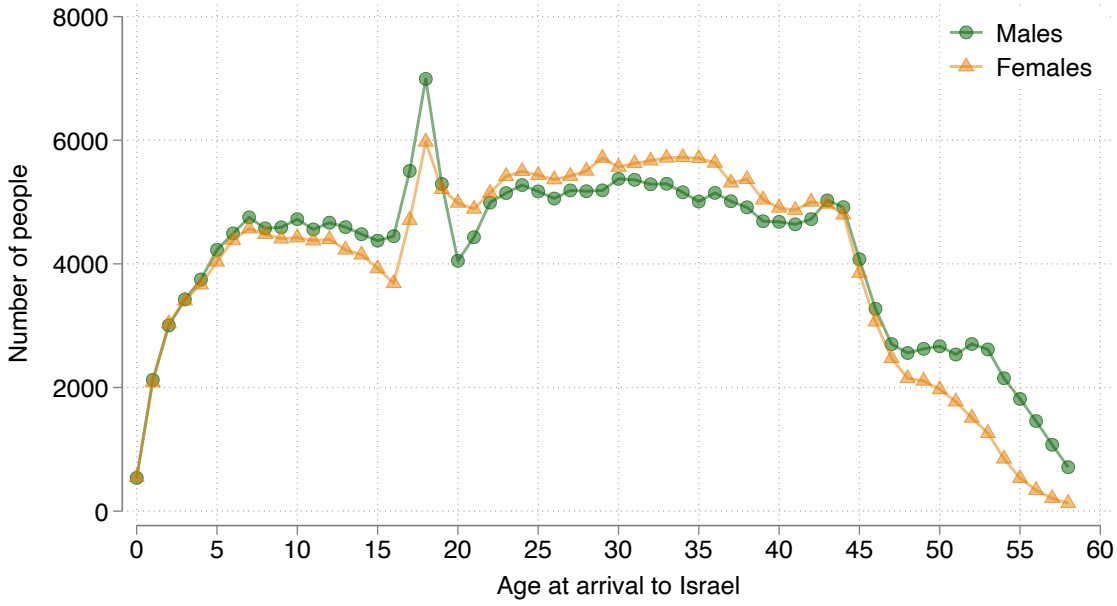
A Appendix Figures

Figure A1: Immigration to Israel: 1948–2017



Notes: Source is the Israel Central Bureau of Statistics. Total number of immigrants arriving to Israel, and those arriving from the former Soviet Union, by year. Dashed line is the fraction of total immigrants who are FSU immigrants.

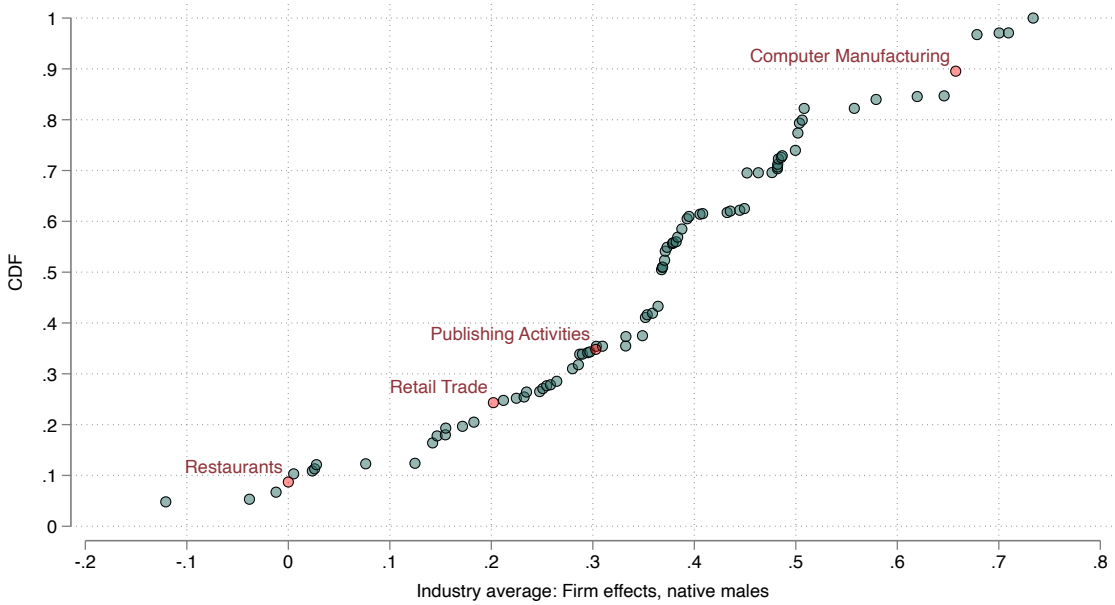
Figure A2: FSU Immigrants' Age at Arrival to Israel



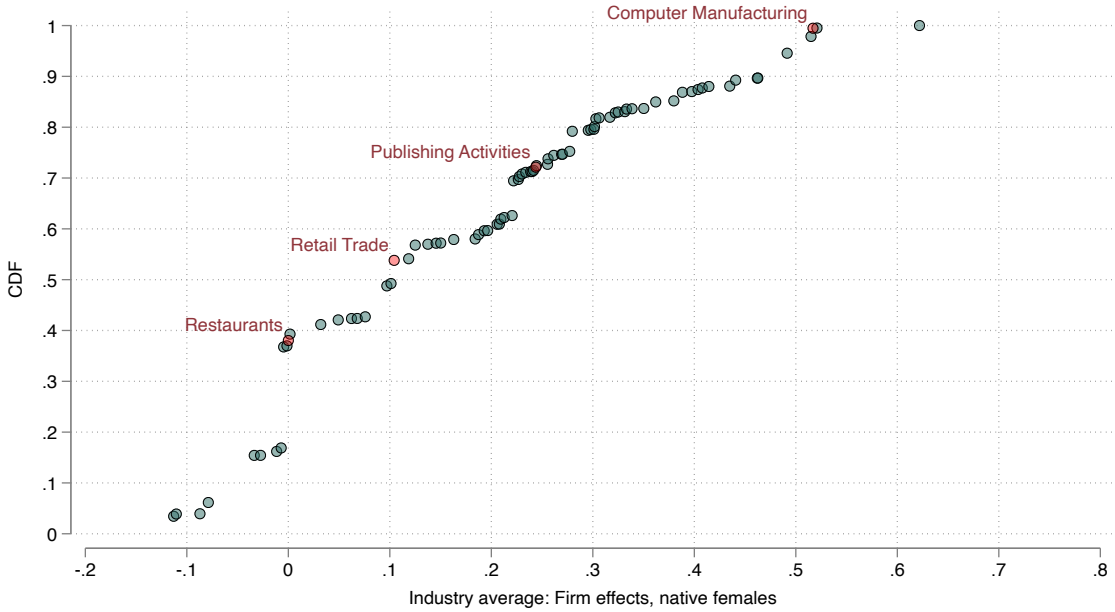
Notes: Number of persons in our sample by age at arrival to Israel.

Figure A3: CDF of industry-level average firm pay premiums

(a) Males.



(b) Females.



Notes: CDF of industry-level averages of firm fixed effects for natives. Pay premiums are normalized such that the average for the restaurant industry is equal to zero.