Labor Market Assimilation of Immigrants: Theory, Evidence, and the Case of Spain

Christoph Albert*

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Abstract

This chapter reviews the literature on the labor market assimilation of immigrants and provides an empirical analysis based on recent data from Spain. Drawing on human capital theory and recent methodological advances, it examines how migrants' relative wages evolve over time and how cohort composition, self-selection, and labor market conditions shape these dynamics. Using longitudinal Spanish administrative data, the chapter documents sizable initial wage gaps for many immigrant groups, assimilation trajectories that are highly sensitive to economic cycles in Spain, and marked heterogeneity across origins. While immigrants from the EU15 quickly reach parity or even surpass natives, those from Africa, Latin America, and Asia face persistent earnings disadvantages. The findings highlight the central role of macroeconomic fluctuations and origin-dependent labor market barriers in shaping immigrant assimilation outcomes, which call for further research.

Keywords: immigrant assimilation, wage convergence, labor market integration, Spain, human capital, cohort quality, occupational barriers, reservation wages

JEL Categories: F22, J31, J61, R11.

*University of Turin and Collegio Carlo Alberto; christoph.albert@carloalberto.org

1 Introduction

Immigration has become an increasingly important phenomenon worldwide, with major implications for labor markets, social systems, and integration policies. According to the United Nations, in 2024 there were an estimated 304 million international migrants, representing about 3.7 % of the global population. This number has nearly doubled since 1990, when there were around 154 million migrants (Migration Data Portal 2025). Within Europe, recent inflows have also been substantial. In 2023, the European Union received 4.3 million immigrants from non–EU countries—of which Spain received almost 30 percent, making it by a large margin the destination with the largest inflow per capita among the group of large EU countries (Eurostat 2025). These global and European developments highlight the growing relevance of understanding how immigrants integrate into host-country societies.

A key aspect of immigrants' integration in the host country is their assimilation in the labor market, which refers to the process by which immigrants converge toward native-born workers in wages, employment, or occupational status. Understanding this process is essential for evaluating the economic contribution of immigration, designing integration policies, and assessing the long-run effects of demographic change.

Classic studies emphasize the role of human capital accumulation, showing how immigrants acquire host-country-specific skills that gradually close their wage gaps with natives (Chiswick 1978). Subsequent works highlight the importance of migrant self-selection and cohort quality (Borjas 1985, 1995), or the role of differential human capital investments, suggesting that lower initial earnings are associated with faster wage growth (Duleep and Regets 2002). More recent contributions have drawn attention to issue of selective out-migration, which can bias cross-sectional estimates upward if return migrants are negatively selected (Dustmann and Görlach 2016). A further line of work highlights how labor market competition and imperfect substitutability between natives and immigrants shape assimilation patterns, implying that assimilation trajectories depend not only on individual skill acquisition but also on current labor market conditions (Albert et al. 2025).

Spain provides a particularly instructive case for studying these dynamics. After centuries as a country of emigration, Spain became one of Europe's main immigrant destinations during

the late 1990s and 2000s. The foreign-born share of the population increased from less than 2 percent in 2000 to more than 14 percent in 2012, driven largely by inflows from Latin America, North Africa, and Eastern Europe (OECD 2024; De la Rica et al. 2014). These inflows coincided with a period of rapid economic growth, a deep crisis during 2008–2014, and a strong recovery thereafter. This unique boom–bust trajectory makes Spain an ideal laboratory for understanding how economic fluctuations shape assimilation.

We employ longitudinal administrative data to study the assimilation patterns of the various immigrant cohorts in Spain that arrived during the 1990s and the 2000. While there is a notable downward shift in the level of relative wages across cohorts over time, once we condition on experience abroad and education level, the cross-cohort heterogeneity in initial wage gaps, which lie between 20 and 30 percent, become small. However, we find high variation in the speed of assimilation over time across cohorts, shaped by the economic cycle in Spain. Episodes of strong relative wage growth during boom periods alternative with falling relative wages during crises. These patterns are consistent with recent evidence showing that immigrants' wages in Spain are significantly more sensitive to the business cycle than those of natives (Gálvez-Iniesta 2022; Escalonilla et al. 2024). In terms of assimilation in the long term, which we can thus far only assess for the arrival during the 1990s, our estimates imply that immigrants still suffer a wage gap to natives of around 10 to 15 percent after two decades.

Examining assimilation patterns separately by origin region reveals that immigrants' average wage gaps are much larger for those from Africa, Latin America, Asia and EU countries that joined in 2004 or later, while immigrants born in EU15 countries have earnings that are on a par with those of natives and unaffected by the business cycle.

This chapter concludes by discussing the role that factors not directly related to immigrants' level of human capital might play for their relative earnings. Occupational barriers, such as the non-recognition of foreign credentials, may limit access to better-paying jobs (Brücker et al. 2021; Hermansen et al. 2025). Differences in reservation wages can also matter: immigrants may be willing to accept lower pay due to weaker access to social insurance or because they derive higher real income from remittances or consumption in their origin countries (Albert 2021; Dustmann et al. 2024). However, most evidence suggests that these

mechanisms lead to an earnings disadvantage for immigrants mainly during the first few years after arrival. Thus, the nature of the observed large wage gaps to natives of immigrants from outside the EU15 in Spain, still persisting even after decades in the country, remains to be fully understood and should be the subject of further research.

In Section 2, this chapter proceeds by discussing the empirical approach to estimating immigrants' assimilation in host-country labor market based on human capital theory. In Section 3, it then presents recent advances in estimation methodologies that account for potentials distortions in estimates assimilation profiles: i) accounting for selective out-migration using longitudinal data and ii) adjusting for labor market equilibrium effects. Section 4 focuses on the recent literature on the case of Spain and provides new empirical evidence. Section 5 discusses the role of occupational barriers and reservation wages as mechanism for earnings differences between natives and immigrants. Section 6 concludes with proposing future research directions.

2 Empirical Models Based on Human Capital Theory

2.1 Investment in Host-Country-Specific Skills and Earnings Growth

Human capital theory, as formalized by Becker (1964) and Mincer (1974), posits that after leaving school, workers continue to increase their job-related knowledge and skills by investing time and resources into their human capital. This investment pays off by raising future productivity and earnings.

In his seminal study, Chiswick (1978) applies this framework in the context of immigrants in the United States. He proposes that, upon arrival, immigrants are endowed with a lower amount of host-country-specific human capital, such as language proficiency, local labor market knowledge, and recognized credentials, than the native born. By investing time and resources into acquiring host-country-specific knowledge, they assimilate in terms of productivity to natives over time. In terms of immigrants' earnings path, this implies an initial wage disadvantage that narrows during their stay in the US.

Based on this notion, Chiswick (1978) derives the following equation to estimate the

relative earnings of immigrants and how they evolve over time in the US:

$$\log w_i = \beta_0 I_i + \beta_1 x_i + \beta_2 x_i^2 + \alpha_1 y_i + \alpha_2 y_i^2 + J_i'\gamma + \epsilon_i, \tag{1}$$

where w_i is the wage of individual i, I_i is a dummy indicating foreign-born status, x_i is potential work experience measured as $age - schooling - 5$, y_i are the years since migration (equal to zero for the native born) and J_i' includes education and other socio-economic characteristics. Hence, y_i and its square capture assimilation effects: the additional wage increase over time in the US for an immigrant relative to a native. A positive estimate for α_1 and a negative one for α_2 indicate that wage assimilation slows down over time.

The equation is estimated using a single cross-section of working prime-age men from the 1970 Census and yields an estimate for β_0 of -0.16 and for α_1 of around 0.01, implying that immigrants earn 16 percent less than comparable natives at the time of arrival and that this gap narrows by one percentage point per year. The small negative estimate for α_2 suggests that this narrowing declines over time. Overall, these coefficients predict that as immigrants accumulate host-country human capital, their earnings approach and even *overtake* native earnings after about 13 years.

2.2 Selective Migration and Cohort Quality

To explain the finding that, all else equal, immigrants' earnings eventually rise above native earnings, Chiswick (1978) emphasizes the role of migrants' self-selection. On the one hand, migrants might be positively self-selected as economic theory suggests that those with higher ability or motivation will find it profitable to pay the cost of migration. On the other hand, migrants might be negatively selected if migration is induced by push-factors in the origin country, i.e natural disasters or political persecution, or more generous welfare benefits in the destination country. How fast immigrants narrow their earnings gap and whether they stay below or overtake natives in the long run serves as an indication for the direction and strength of migrants' self-selection. Thus, Chiswick (1978) interprets his empirical findings as indicative of positive self-selection of immigrants present in the US in 1970.

Building on the issue of self-selection, subsequent work by Borjas (1985, 1987) argues

that the estimation strategy based on a single cross-section applied by Chiswick (1978) may lead to misleading conclusions when the self-selection of migrants to the US *changes* over time. The implied cohort heterogeneity in initial skills or, in other words, varying "cohort quality" may be picked up by the coefficients α_1 and α_2 in (1). This is because when relying on a single cross-section of data, immigrants with different years since migration to the US will necessarily also have arrived at different points in time. Hence, if more recently arrived immigrants, i.e. those with fewer years in the US, were to be more negatively selected than earlier arrivals, the coefficient on y_i would confound assimilation with a fall in cohort quality and be biased upwards.

To solve this issue, Borjas (1985) uses an additional cross-section from the 1980 Census so that a "synthetic cohort" of immigrants, i.e., two different immigrant samples that arrived during the same period, can be observed at two different points in time. This allows the identification of within-cohort earnings growth and across-cohort heterogeneity. In particular, by using both the 1970 and 1980 censuses, it is possible to compare the earnings growth over 10 years of the cohorts who entered during 1965-70, 1960-64, 1955-59, 1950-54, and before 1950, since immigrants arriving within these intervals are identified in both censuses. The analysis suggests that previous cross-sectional studies indeed overestimated immigrants' earnings growth as many cohorts experienced only little changes or evening a fall in earnings. The finding that earlier cohorts earn more than later cohorts at each time point of their stay in the US indicates a decline in cohort quality and thus a more negative selection of immigrants over time.

LaLonde and Topel (1992) reexamine this evidence after slightly adjusting the specification and eliminating a range of sample inconsistencies present in Borjas (1985).[1] They do obtain evidence for wage assimilation within origin groups as earnings increase by around 20 percent over the first ten years. Moreover, when conditioning on experience and education, they find little difference in the estimates of within-origin wage assimilation over time between the approach based on synthetic cohorts and the approach based on a single cross-section. Thus, they conclude that there is no significant decline in cohort quality that is

[1] In particular, LaLonde and Topel (1992) extend the polynomial in experience from quadratic to quartic, and make the age selection (16-64 years old) and comparison groups (immigrants being at least 30 years in the US) consistent across the Census samples.

not fully explained by a change in the composition of observables. However, particularly the shift in the origin composition of immigrants towards origins with lower average entry wages (e.g Latin America and Asia) implies that there was an *overall* decline in cohort quality, which is obtained when pooling immigrants across origins.

By extending the sample to including also the 1990 Census, Borjas (1995) provides updated estimates of the evolution of immigrants' relative entry wages up to the cohort that entered during the 1980s. Furthermore, he introduces a regression approach to identify within-cohort earnings growth. To account for varying cohort quality, the specification augments the basic cross-sectional equation by cohort fixed effects $\theta_{c(i)}$, while time fixed effects ϕ_t control for earnings trends affecting all workers:

$$\log w_{it} = \beta_1 x_{it} + \beta_2 x_{it}^2 + \alpha_1 y_{it} + \alpha_2 y_{it}^2 + J'_{ict}\gamma + \theta_{c(i)} + \phi_t + \epsilon_{ict} \tag{2}$$

According to his estimates, the decline in immigrant earnings relative to natives continued across consecutive cohorts into the 1980s, with little compensating within-cohort earnings growth. Relative entry wages declined by 9 percentage points in the 1970s and an additional 6 points in the 1980s, while the estimated growth rate is only about 10 percentage points during the first 20 years after arrival. As this cannot compensate the low initial earnings of the post-1970 cohorts, immigrants from these cohorts do not reach parity with natives in the long run.

2.3 Human Capital Investment and Heterogenous Earnings Growth

Duleep and Regets (2002) revisit the basic cohort-fixed-effects model and argue that lower entry wages may be positively associated with subsequent wage growth when immigrants with a lower level of skills transferable to the US labor market invest more in the acquisition of US-specific skills after entry. This notion implies that the growth rate of immigrants' relative earnings are not constant but potentially vary across cohorts, with the growth rate being inversely related to the level of entry wages. The regression strategy based on (2) previously employed by Borjas (1995) could not account for such effects as the coefficients on years since migration were constrained to be the same across entry cohorts.

Theoretically, the inverse relationship between entry wages and wage growth is derived from a two-period framework of human capital investment, in which immigrants maximize their earnings according to:

$$\max_{\theta} \; w \; \tau_m \; H(1-\theta) + w \; (\tau_m H + \gamma f(H, \tau_p, \theta)), \tag{3}$$

where θ is the share of time devoted to investment in the first period, increasing human capital in the second period according to the function $\gamma f(H, \tau_p, \theta)$. The parameters τ_m and τ_p govern the fraction of human capital that is transferable to producing in the destination country labor market and to producing new human capital, respectively. The crucial restriction for yielding the postulated inverse relationship is that immigrants' human capital is always more easily transferable to acquiring new skills than to producing in the host-country labor market in period 1, that is, $\tau_m < \tau_p$. In this case, the opportunity cost of investment is lower for immigrants than for natives, Moreover, Duleep and Regets (2002) argue that the difference between τ_m and τ_p likely increases when τ_m decreases. Thus, if labor market transferability falls, the skill production transferability falls less, which in turn implies that immigrants' incentive for human capital investment grows. Hence, first-period earnings and the earnings differential to the second period are negatively related.

The reasoning behind this assumption is that immigrants' human capital may be undervalued not because of its inherent productivity, but due to employers' difficulty in evaluating foreign credentials, raising information costs and risks. Nonetheless, real abilities, especially those tied to learning capacity, tend to transfer more easily across borders. Skills related to learning—like discipline, work habits, and adaptability—facilitate the acquisition of destination-country knowledge. Even when old skills are not directly usable, their similarity to new tasks (e.g., a hand saw vs. power saw) enables more effective skill acquisition.

Using the 1980 and 1990 Census samples and a non-parametric approach involving measuring entry earnings and ten-year growth rates within origin-age-education cells, Duleep and Regets (2002) find empirical confirmation for the inverse relationship between initial earnings and earnings growth. They thus conclude that Borjas' previous studies based on regression models imposing constant earnings growth across cohorts underestimates the earn-

ings growth of *more recent* cohorts and emphasize the need for allowing for heterogeneity in both entry earnings and earnings growth in such models. Moreover, they suggest that the finding of a decline in entry wages being positively associated with higher earnings growth indicates falling skill transferability τ_m rather than falling skill levels H of more recent immigrant cohorts. As lower entry wages are therefore a flawed predictor of immigrants' long-term economic success, which is rather shaped by their rates of human capital investments, Duleep and Regets (2002) paint a more positive picture of immigrants' ability to assimilate in the host country's labor market.

In yet another study pooling additional Census years, Borjas (2015) extends the cohort-fixed-effects regression model by allowing for cohort effects not only in initial wage levels but also in wage growth by interacting years since migration with cohort indicators, hence allowing for cohort heterogeneity in the speed of assimilation. Including the US Census and ACS data up to 2010 enables him to identify 10-year growth rates by cohort up to the one that entered during the 1990s, a decade during which immigration to the US reached a new peak. Borjas (2015) finds that wage assimilation has been steadily declining across immigrant cohorts, with those arriving in the 1990s essentially experiencing no labor market assimilation during the first 10 years in the US. This is further corroborated by a similar pattern of lower improvements of English skills over time for more recent cohorts, leading to the conclusion that the absence of earnings assimilation is likely connected with a slowdown in human capital investment.

In a recent study, Albert et al. (2025) confirm these findings of a slowdown in assimilation and English language proficiency improvement but also show that, after taking into account labor market equilibrium effects and changes in immigrants' origin and education composition, more recent cohorts arrived in the US with *higher* initial human capital levels than earlier ones (more details are given in section 3.2). These patterns are consistent with the investment model implying an inverse relationship between initial earnings and subsequent growth proposed by Duleep and Regets (2002) and can therefore reconcile Borjas (2015)'s findings with the previous literature.

3 Recent Methodological Advances

Accurately measuring labor market assimilation of synthetic cohorts using repeated cross-sections remains challenging even when using empirical models that flexibly allow for cohort effects in earnings levels and growth. This section discusses two main issues for the estimation of earnings profiles and recent advances on how to deal with them: selective out-migration and time-varying labor market equilibrium effects.

3.1 Selective Out-Migration

Empirical evidence suggests that migrants often only remain temporarily in the host country as out-migration rates within the first five years are close to or exceed 50 percent in many OECD countries (Dustmann and Görlach 2016). This phenomenon of temporary migration is problematic for the identification of earnings profiles if out-migration is non-random, which results in an endogenous selection of the immigrants that remain in the long term. In particular, the decision whether to stay or not might be related to success in the host-country labor market. Therefore, as time advances, those with lower earnings, e.g. due to lower skill transferability, are more likely to have left the country and, as a consequence, the average earnings of those cohort members that are still observed at later stages of their stay would rise even in the absence of assimilation. Without accounting for this selection effect, the estimated earnings assimilation of individuals in the original arrival cohort will be biased upward.

Dustmann and Görlach (2015) give an overview over the strategies to cope with selective out-migration. Unless out-migration is exogenous, relying on repeated cross-sectional data does not allow to identify the hypothetical earnings profiles of the immigrants who arrived in a particular year in the absence of subsequent out-migration.

Stock sampled data

One alternative strategy is to use "stock sampled data", for example constructed from administrative datasets, in which individuals observed at a certain point in time can be linked to their past employment and earnings trajectory. Such data therefore contain only the

population of immigrants that has remained in the host country from the year of arrival until the survey year. This restriction to a single sample of the earnings history of immigrants known to stay until a certain year is the key advantage over repeated cross-sections, where each sample consists of a different composition of stayers and future out-migrants. Examples of recent studies relying on stock sampled data are Hu (2000), Lubotsky (2007) and Abramitzky et al. (2014), who all find flatter profiler with such data compared to relying on repeated cross-sections, consistent with the hypothesis of a negative selection of out-migrants. Lubotsky (2007) for example finds that within the initial 20 years in the US, immigrants close the earnings gap by 10 to 15 percent, while this rate is around twice as large according to synthetic-cohort estimates.

One remaining important disadvantage of the approach with stock sampled data is that it yields the estimated earnings profiles of stayers only and not necessarily the hypothetical profiles of the full original arrival cohort. As shown by Dustmann and Görlach (2015), these hypothetical profiles along with the direction of the selection of out-migrants are only identified in the special case of the selection mechanism being based on time-invariant unobservables only. When selection is based on time-varying unobservables, complete longitudinal data including the information on those immigrants who later out-migrate at each point in time is necessary for identifying the direction of selection. Unbiased earnings profiles are then obtained by including a Heckman-type selection correction term in the estimation equation.

Complete Longitudinal Data

The earliest studies leveraging complete longitudinal data including future out-migrants focus on two European countries with large immigrant populations: Edin et al. (2000) use income registers from Sweden and Constant and Massey (2003) use the German Socioeconomic Panel. Both these studies quantify the bias due to selective out-migration that arises with employing a pure cross-sectional approach.

Edin et al. (2000) have a representative sample of the population in Sweden observed between 1970 and 1997. They document that immigrants' earnings gap increased from 12 percent in the early 1970s to 46 percent in the 1990s, mostly driven by a shift in the composition of migrants from Nordic and OECD to non-OECD countries. Their findings

reveal that over a quarter of migrants leave within the first five years, that emigrants are more likely from Nordic and OECD countries and, conditional on source region, that they tend to have lower earnings and labor force participation rates. Not accounting for selective out-migration leads to overestimating earnings assimilation by about 90 to 100 percent for migrants from within the OECD. Similar to the patterns in the US, the authors also find that the rate of assimilation is inversely related to initial earnings, as those from non-OECD countries start with a greater earnings gap but converge more rapidly to natives than other immigrants, although their convergence comes to a halt after about five years in Sweden, at which point their earnings still remain 40 percent below those of natives.

Constant and Massey (2003) use a sample spanning from 1984 to 1997 and find immigrants' emigration rate from Germany to be 18 percent. This rate is higher during the first five years after arrival and around retirement. In terms of selection, they obtain no significant relationship between emigration and human capital measures like education or fluency in German, although they do find that emigration is negatively related with being employed and indicators of attachment to Germany, such as having citizenship or being married. In contrast to Edin et al. (2000), they conclude that there is no bias due to selective out-migration as the earnings profile estimated on the full cross-section only marginally differs from that estimated on the sample of stayers only. Moreover, while in the Swedish case earnings assimilation happened mainly during the first few years after arrival, the earnings profiles estimated by Constant and Massey (2003) only increase after around twenty years of residence in Germany.

In more recent work, Akee and Jones (2019) use a complete longitudinal dataset from the US Internal Revenue Service to examine the earnings trajectory of the full immigrant cohort that arrived during the mid-2000s. They find that after ten years, almost 40 percent of immigrants in the sample have left the country. During the two to three years prior to leaving, these returnees experienced a decline in earnings relative to other migrants, providing direct evidence for the negative selection of return migrants. Moreover, the fact that future returnees are not statistically different at the time of arrival suggests that time-variant unobserved characteristics influence both earnings and the out-migration decision. In line with this notion, comparing the estimates of immigrants' relative earnings growth

when correcting for selection to the estimates resulting from the method based on stock sampled data, they find that the latter approach may underestimate the true rate of earnings assimilation.

Using panel data from US administrative records, Rho and Sanders (2021) emphasize that both selective out-migration and nonrandom entry into employment can bias estimates from cross-sectional data. They focus on immigrants entering the US during the second half of the 1990s—precisely the cohort for which Borjas (2015) fails to find any wage assimilation over 10 years—and show that wage assimilation profiles are downward sloping only for those with at most a Bachelor degree, whereas the earnings of immigrants with lower education levels converge toward those of natives. Notably, in contrast to Lubotsky (2007), their comparison between cross-sectional estimates and estimates based on stock sampled data reveals that there is a *positive* selection of those that have left the US by 2010 as immigrants' relative earnings growth is *lower* according to the cross-sectional estimates. As a partial explanation for the contradicting results, they propose a larger share of high-earning immigrant managers, often only temporarily staying under L-1A visas, present in their sample.

Furthermore, Rho and Sanders (2021) document that the delayed labor market entry of Bachelor graduates with lower earnings implies an additional downward bias in the estimated earnings growth of immigrants with Bachelor degree, as the more productive worker of this group enter employment immediately upon arrival (many of who are likely H-1B visa holders), while those that are less productive search for work after arrival. By including individual fixed effects, Rho and Sanders (2021) correct for this bias and obtain a positive assimilation rate also for college-educated immigrants, thus overturning Borjas (2015)'s finding based on synthetic cohorts and further emphasizing the need for longitudinal data to correct for biases present in estimates based on repeated cross-sections.

3.2 Labor Market Competition and Assimilation

The above described literature has implicitly assumed that once any potential sample selection problems are identified and properly accounted for, differences across arrival cohorts in earnings reflect differences in human capital (or in its degree of transferability to the host country), i.e., cohort quality.

Albert et al. (2025) argue that cohort quality is only part of the picture when it comes to interpreting cross-cohort variation in relative earnings. Previous work has neglected the fact that two cohorts arriving in different periods, even when identical in terms of their human capital, will have different earnings assimilation profiles if they face different conditions in terms of labor market competition upon arrival. The intuition behind this idea is that when immigrants and natives are imperfect substitutes in the labor market, for example because of a comparative advantage in different occupations, their relative wages are partly determined by the aggregate supply of foreign workers in the economy.[2] This is because an increase in the share of immigrant workers makes the types of skills they supply more abundant and thus pushes down the price of these skills, which in turn reduces immigrants' relative wages.

Through this mechanism, increasing inflows of immigrants, as observed in the United States particularly since the 1970s, result in a decline in the relative earnings of cohorts entering later in time, and therefore affect earnings profiles in addition to any potential shifts in cohort-specific skill endowments. If at the same time technological change increases the demand for skills that are relatively more supplied by natives, which the authors find to be the case, this decline is further amplified.

To quantify the role of increasing competition and technological change in shaping assimilation profiles of immigrants in the US, Albert et al. (2025) set up and estimate a production framework in which output is produced with two types of imperfectly substitutable skills: "general" skills that are portable across countries, and "specific" skills that are particular to the host country. At arrival, immigrants have the same amount of general skills as natives but only a fraction of specific skills, which can be accumulated over time in the host country in order to catch up with (or eventually overtake) natives' skills. Thus, imperfect substitutability between immigrants and natives arises as a consequence of their different skill sets, and the process of assimilation gradually increases substitutability and thereby reduces the earnings gap. The model also implies that an increase in the share of immigrants, which increases the relative price of the now scarcer specific skills, pushes down more the earnings of recently arrived immigrants, who still have fewer specific skills. This makes the

[2]For evidence regarding imperfect substitutability between immigrants and natives, see for example Peri and Sparber (2009), Ottaviano and Peri (2012), Manacorda et al. (2012), or Caiumi and Peri (2024).

competition effect intrinsically dynamic in nature.

Counterfactual simulations based on the estimated model suggest that the increase in competition in the US induced by steeply rising immigrant inflows since the 1970s can explain about one fifth of the decline in immigrants' average earnings relative to natives between the 1960s and 1990s. Including the impact of a secular shift in the relative demand for specific skills, this magnitude increases to one third. Apart from competition and demand changes, also the important shifts in terms of the origin composition of newly arriving immigrants that happened since the 1970s, with Latin America and Asia becoming much more important sending regions, have led to a significant decline in relative earnings. However, the authors find that the residual unobserved cohort quality, that is, the cohort heterogeneity not explained by variation in observable characteristics but instead captured by the estimated cohort fixed effects, has actually *increased* over time: the gap to natives in specific skill is 53 percent for those entering during the 1960s but only 17 percent for those entering during the 1990s (conditional on origin, education and experience at entry).

Thus, the findings of this study emphasize the importance of taking into account labor market conditions faced by each cohort in addition to changes in observed characteristics when comparing and interpreting the earnings assimilation experience of different arrival cohorts, in particular when entry periods are far apart in time.

Note that the final estimating equation derived from the model in Albert et al. (2025) can be seen as a generalization of the standard wage assimilation model used in the previous literature. Under perfect substitutability between skill types and without changes in skill demands due to technological change, the equation collapses to the standard assimilation model in the spirit of Borjas (2015), in which relative earnings only depend on individual characteristics but not on aggregate skills supplies in the labor market.

One caveat is that the empirical analysis relies on repeated cross-sections from the US Census and ACS, since longitudinal data for the long time period considered are unavailable. Hence, this precludes accounting for selective out-migration using any of the above described approaches, for example through stock sampling.[3]

[3]To address the issue of selective out-migration, Albert et al. (2025) provide several robustness checks in which the weights used in the estimation are adjusted such that the population aggregates resemble stock-sampled longitudinal data.

4 Labor Market Assimilation of Immigrants in Spain

In this section, we put the focus on Spain as a destination, starting with a short summary of the country's immigration experience during the last few decades. We then review the previous findings on the labor market assimilation of immigrants in Spain and present new empirical evidence based on recent longitudinal social security data.

4.1 Overview of Immigration into Spain

Since the end of the 1990s, Spain, a country that used to have a very low percentage of foreign-born residents, has received enormous immigration waves, leading to an increase in the foreign population share from 2 percent in 2000 to over 14 percent in 2012. According to the latest numbers of the National Institute of Statistics (INE), the share stood at around 8 percent in 2024. The sudden surge in immigration was fueled by Spain's strong economic growth that started in the late 1990s and lasted until the Great Recession.

The most important origin region of immigrants in Spain is South and Central America, with Colombia being the most important sending country from this area. The share of Colombians among the foreign-born population has also increased the most in 2022, reaching 9 percent by the end of the year (OECD 2024). Cultural similarities, such as a common language, as well as a program for visa-free entry from former colonies are the main factors driving migration from Latin America to Spain (De la Rica et al. 2014). Outside Latin America, the most common origins are Morocco and Romania, representing 13 and 7 percent of the immigrant population in 2023, respectively (OECD 2024).

The large majority of immigrants in Spain actively participate in the labor market. In 2023, the labor force participation rate of immigrants was 78 percent, higher than that of natives (74 percent) and slightly above the OECD average. However, immigrants also had a higher unemployment rate than natives (16.5 versus 11 percent).

4.2 Previous Empirical Evidence

Employment, Occupations and Job Quality

Early work on immigrants' labor market performance in Spain focused on employment rates as long time series on wages including the period of surging immigration since the late 1990s were not available yet.

Using the 2001 Census, Amuedo-Dorantes and De La Rica (2007) find that immigrant men have a 15 percentage points lower employment probability, whereas this gap is only 4 percent for women. Over time, the gap closes for both genders, with the rate being particularly fast for men from Latin America and women from the EU15. Amuedo-Dorantes and De La Rica (2007) also investigate immigrant assimilation in terms of occupational attainment, which is based on ranking occupation categories in terms of their average hourly wages paid. They uncover a gap in occupational attainment for non-EU15, Latino and African immigrants and find evidence for occupational assimilation over time for the two former groups but not for immigrants from Africa.

Fernández and Ortega (2008) use four key metrics to assess immigrants' integration in the Spanish labor market: labor force participation, unemployment, overeducation, and contract type (temporary vs permanent). They confirm the finding of both higher participation and unemployment rates, which over time converge to the rates of natives. Additionally, they show that immigrants are more frequently overeducated and in temporary contracts and that these differences to natives do *not* fade away over time in Spain. This suggests that while immigrants gain access to jobs, these positions are often mismatched and of lower quality.

Sanromá et al. (2015) show that the phenomenon of overeducation is mainly prevalent among immigrants from sending countries that are less developed than Spain and have a distinct culture and language, in particular Eastern Europe and the Maghreb. Overeducation vanishes after seven to nine years in Spain through occupational upgrading.

Earnings Assimilation

Simón et al. (2008) examine immigrant-native wage gaps using cross-sectional matched employer–employee data, with a particular focus on occupational and workplace segrega-

tion. They show that immigrants from developing countries suffer larger wage gaps and display a more compressed wage structure, while immigrants from developed countries earn more with a wider dispersion. The main takeaway is that much of the observed wage gap stems from differences in observed characteristics, especially the segregation of immigrants into distinct occupations and workplaces. They emphasize that this segregation could be the result of productivity differences due to imperfect transferability of immigrants' human capital but also be caused by employer-side discrimination.

Izquierdo et al. (2009) are the first to use Spanish administrative longitudinal data with full earnings information from the "Muestra Continua de Vidas Laboras" (MCVL). These data include the complete formal-labor-market histories of a 4 percent sample of individuals affiliated with the social security starting in 2004. Wage and other employment information, such as contract type, sector or hours worked, is available retrospectively since a worker's first entry in the social security records. As the MCVL data is designed to be representative of the working population in the formal labor market in the year of sampling, it loses representativeness when looking at past histories, as these are only available for those staying in the labor market until the sampling year. While this design implies worse representativeness when going further back in time, it avoids the potential bias due to selective out-migration by only considering workers that remained in the labor market up to the sample data. However, as noted in Section 3.1, these data thus only allow the identification of the assimilation profiles of stayers. The estimates for these stayers indicate an initial earnings gap of about 35 percent for those that arrived in Spain between 1996 and 2000. Their results also suggest that there has been an upgrading in the initial skills over time as earlier cohorts suffered larger wage gaps at arrival, with the difference being up to 18 percent points for the 1983-1985 cohort. Similarly across all arrival cohorts, these initial gaps diminish by 20 percentage points during the first 10 years and subsequently remain constant.

Rodríguez-Planas (2012) use cross-sectional data from the Spanish Labor Force Survey from 2000 to 2008, thus relying on synthetic cohorts but with the advantage of also including undocumented immigrants, to analyze both occupational and earnings assimilation by education level. They find that, at arrival, immigrants of all education levels are more likely to work in jobs classified as "non-qualified", and that having a high school degree does

not lead to a higher chance of occupational upgrading over time compared to being a high-school dropout. Moreover, medium- and high-skilled immigrants have a substantially larger wage gaps to their native counterparts than low-skilled ones. As a possible explanations, Rodríguez-Planas (2012) propose that the high demand for workers in the low-skill service sector (construction, tourism, personal services) might have led to over-qualified immigrants being employed in these sectors, with little opportunity for the accumulation of relevant human capital in such low-skill jobs.

4.3 An Update on Earnings Assimilation

Our analysis of the earnings assimilation of recent immigrant cohorts in Spain relies on the MCVL, the same data source as in Izquierdo et al. (2009), but pooling the yearly worker samples up until 2019, the last year before the start of the COVID-19 pandemic. In the following we provide some descriptive statistics of the various immigrant arrival cohorts since the 1990s and then estimate their wage assimilation profiles.

Data Preparation and Descriptives

We first aggregate the monthly series to the yearly level by taking the sum of monthly wages for each worker.[4] We then combine the yearly samples from 2005 to 2019, which are each representative of the population affiliated with the social security in the respective year. We restrict our final sample to consist of workers above the age of 24 who have their first record after 1981.[5]

We follow the standard approach in the literature and define immigrants as those with a foreign birth place. This differs from the approach of Izquierdo et al. (2009), who opt for using nationality due to 36 percent of the foreign-born sample having missing birth place information in their 2005 sample. In our extended sample, birth place information is available for around 80 percent of those not reporting Spain as their birth place.

[4]We take the value of the first month in the year as the yearly observation in case of variables that potentially vary within-year, such as type of employment contract.

[5]Note we can observe workers' labor market outcomes before 2005 but the sample loses representativeness going further back in time as only the histories of workers still affiliated with the social security in 2005 are observed.

One evident downside of using the MCVL records is that immigrants' year of entry into Spain is not observed. Instead, we use the first year in which an immigrant's labor market history is recorded for the full calendar year. Computing time in the host country based on labor market entry is an approach also used by Rho and Sanders (2021), who take the year of application for a social security number instead of self-reported year of arrival, despite the latter also being available in their data. Therefore, like in their study, we can interpret relative wage growth starting at the first year of being in formal employment as a measure of assimilation into the formal Spanish labor market.[6]

To account for selective out-migration, we only keep immigrants that fulfill any of the following three conditions: remain in the data for at least 25 years, remain until reaching the age of 65, or remain until our sample ends in 2019. Thus, while each estimated cohort-specific profile should not be affected by any bias due to selective out-migration, more recent cohorts differ to earlier ones in the sense that they might also include migrants who will leave Spain during the years beyond the end of our sample i.e. after 10-15 years in case of the 2005-2009 cohort, after 15-20 years in case of the 2000-2004 cohort and so on. However, as the findings in Edin et al. (2000) and Constant and Massey (2003) suggest that the majority of those who leave do so during the first five years, we believe the number of potential future out-migrants beyond 10 years to be small and not significantly drive cross-cohort heterogeneity.

In Table 1, we present the origin composition of immigrant arrival cohorts grouped into five-year intervals starting in 1990.[7] During the 1990s, arriving immigrants predominantly came from Morocco, Latin America (within which more than half from Argentina and Peru), France and other EU countries. While inflows from Morocco and Latin America remained high during the 2000s, the composition of immigrants shifted from France and other EU15 countries towards the non-EU15, in particular Romania. Moreover, immigration from Colombia and especially Ecuador dramatically increased and made up more than half

[6]Note that many immigrants entering during the early years of the boom before 2005 arrived without work permits. A large-scale amnesty program implemented in February 2005 granted permits to the majority of them (Elias et al. 2025). Hence, some of the immigrants appearing in the MCVL records during the months following this date are likely to have arrived in Spain earlier and gathered experience in the informal Spanish labor market. To account for this, we drop immigrants entering in 2005 who were born in countries outside the EU or Asia, do not have the Spanish nationality, and younger than 40 at entry.

[7]Note that for the descriptives in Table 1 and Figure 1, we do not yet condition on staying in the sample for at least 25 years as described above.

Table 1: Origin composition by immigrant entry cohort (%)

	1990–94	1995–99	2000–04	2005–09	2010-14	2015-19
Morocco	24.0	20.0	19.6	17.3	12.5	9.2
Other Africa	4.9	6.8	5.4	6.1	9.5	7.4
Colombia	1.3	1.5	7.9	6.5	5.3	5.9
Ecuador	0.1	1.4	14.3	9.8	4.6	3.7
Other Latin America	21.0	23.6	20.5	21.5	25.9	35.4
France	14.2	10.0	1.9	0.8	1.1	1.9
Italy	2.1	3.4	1.3	1.3	2.7	5.3
Other EU15	13.9	12.7	3.9	2.9	3.9	5.2
Romania	0.3	1.3	7.2	16.3	12.1	8.3
Non-EU15	8.6	8.0	8.9	8.6	6.9	7.8
Asia	7.0	8.2	7.2	7.7	14.1	8.6
Rest of the world	2.6	3.1	2.0	1.2	1.5	1.4

of all immigrants from Latin America during the first 10 years of this millennium.

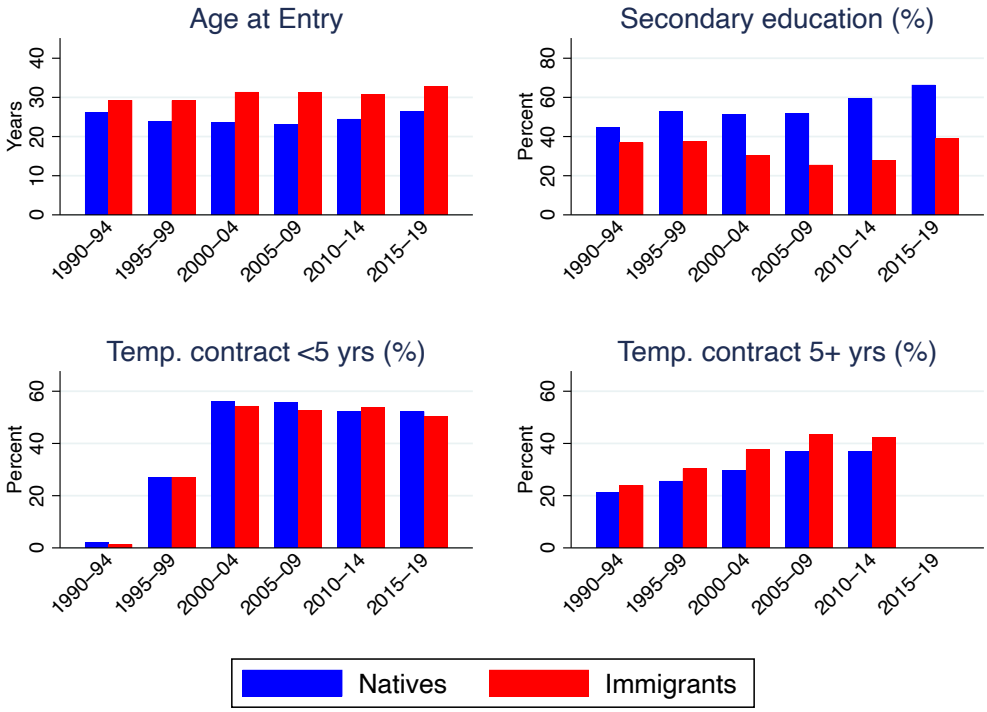
After this first immigration boom period, the share of Moroccans fell by around half in favor of other African countries. Moreover, the composition of Latin American immigrants became more dispersed with falling importance of Colombians and Ecuadorians.[8] Another notable figure is the spike in the share of entering immigrants from Asia during 2010 to 2014.

In Figure 1 we compare a range of key characteristics between immigrant and native workers belonging to each entry cohort. As many immigrants arrive in Spain at a later stage of their adulthood, immigrants are on average older than natives at the time of entering the Spanish labor market. In terms of educational attainment, we find a large native-immigrant gap in the percent of workers having secondary education, which increases from below 10 percent to over 20 percent between the 1990s and the 2010s.

As is well-known, temporary work contracts, especially at the beginning of workers' careers, have become an increasingly important phenomenon in Spain since the late 1990s. The bottom-left plot shows the percent of workers with temporary contracts who entered

[8]The country-of-birth records in the MCVL aggregate immigrants from Latin American countries other than Argentina, Colombia, Cuba, the Dominican Republic, Ecuador, Peru, Bolivia and Brazil, into one residual category, which is why the exact nature of the drastic increase in the "Other Latin America" category in the 2010s cannot be fully determined.

Figure 1: Native and immigrant characteristics by entry cohort



the formal Spanish labor market less than five years ago. For most entry cohorts, the share of temporary contracts is somewhat lower among immigrants, which could be explained by immigrants on average being older and thus starting their careers in Spain in more senior roles, for which temporary contracts are less common. However, when conditioning on being in the formal Spanish labor market for five years or more, the share of immigrants under temporary contracts becomes significantly higher than that of natives. This finding in line with Fernández and Ortega (2008) suggests that immigrants remain stuck in such contracts over a longer horizon during their labor market trajectory in Spain.

Estimation of Earnings Assimilation

We now turn to providing updated estimates of immigrants' earnings assimilation profiles. Following Izquierdo et al. (2009), we compute the hourly wage as yearly earnings divided by

days worked in a year. We then run the following regression:

$$\log w_{it} = \sum_{l=1}^{3} \beta_{1,l,t} x_{it}^{l} + \beta_{2,y(it),c(i)} \mathbb{1}_{immigrant} + J'_{it}\gamma + \phi_t + \epsilon_{it}, \tag{4}$$

where x_{it} denotes the potential work experience of individual i at time t and J'_{it} is a vector of potentially time-varying worker or job characteristics.[9] The assimilation process is estimated non-parametrically by including a dummy for each combination of cohort and years since entering the records, with the coefficients given by $\beta_{2,y(it),c(i)}$. Each of these dummies captures the wage difference to natives of immigrant i in cohort $c(i)$ after y years in the formal Spanish labor market, conditional on experience, characteristics J'_{it} and year effects ϕ_t.[10] We group cohorts by five-year entry intervals between 1990s and 2009 as shown in Table 1.[11] We estimate the assimilation profiles of these cohorts for four different sets of controls included in J'_{it}, shown in the four subplots in Figure 2.

In the first specification underlying plot A of Figure 2, we do not include any additional controls (beside experience and year fixed effects) in the regression. The profiles suggest that there has been a steady decline in immigrants' relative entry wages over time. Those who arrived in the early 1990s initially earned around 22 log points less and this initial wage gap increased to just over 40 log points for those who arrived in the late 2000s. During the first five years, the wage assimilation rate was similar for the 1990-94 and 2000-04 cohorts, while the 1995-99 cohort assimilated faster and the 2005-09 cohort more slowly. While assimilation for this most recent cohort picked up after around six years, we observe negative assimilation, that is, a widening of the wage gap after five years for the 2000-04 cohort and after ten years for the 1995-99 cohort.

Given that Spain's recent immigration experience is strongly connected to its economic boom and bust period between the late 1990s and the mid-2010s, with a recovery during 2015-

[9] Experience is computed as age minus 16 for those without tertiary education and age minus 22 for those with tertiary education.

[10] We opt for a non-parametric specification as our long time series, large sample size and yearly observation frequency allows us to identify smooth assimilation profiles without using a polynomial specification, as for example in Albert et al. (2025), who only have data at a decadal frequency with immigrants' time of arrival partly given by intervals.

[11] While included in the estimation, we do not show assimilation profiles for the two cohorts that entered during the 1980s. The reason is that for these individuals are a particularly selected subgroup that is already for a long time in the Spanish labor market given that the first MCVL sample we use is from 2005.

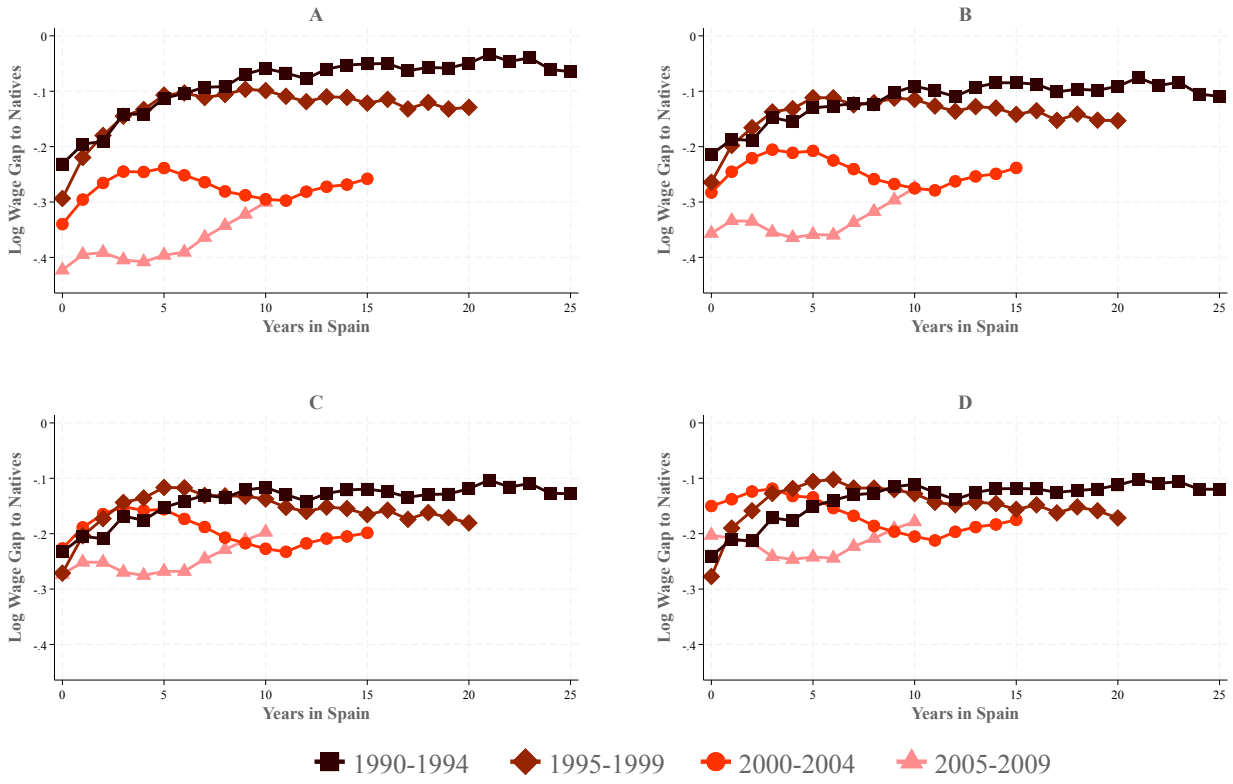
2019, it is worthwhile to gauge whether these patterns are connected to Spain's economic growth cycles. Looking at the timing of episodes of fast and slow assimilation across cohorts, one notices the striking regularity that the episodes of fast assimilation that all cohorts experience at some point tightly coincide with the two periods of high GDP growth in Spain. For the two cohorts entering in the 1990s, assimilation was fastest around the boom at the turn of the millennium (around years 3-10 for the 1990-94 and years 1-5 for the 1995-99 cohort) when the GDP growth rate was close to or even above 5 percent for several years. Moreover, also the 2000-04 cohort assimilated particularly fast during the first 4 years when the Spanish economy boomed just before it got hit by the financial crisis. The same holds for both cohorts of the 2000s during Spain's 2015-2019 period of economic recovery. In a similar fashion, the profiles also suggest a coincidence between negative wage assimilation and the 2008-2014 economic bust period, particularly notable for the 2000-2004 entry cohort, which suffered a 6 log points decline in relative wages during years 5 to 11 in Spain.

Overall, this varying speed of wage assimilation depending on the business cycle in Spain suggests that immigrants' wages are much more cyclical than those of natives. This finding is consistent with previous work that examined the differential effects of economic slumps on natives and immigrants. Bratsberg et al. (2006) document a higher sensitivity of immigrants' wages to unemployment rates in the US. For Spain, Gálvez-Iniesta (2022) finds that the reaction of wages to the unemployment rate in Spain is 40 percent stronger for immigrants than for natives. Using recent data from the MCVL as well, Escalonilla et al. (2024) reach a similar conclusion, finding that immigrants' earnings fall more due to an increases in unemployment immediately but that the effect vanishes more quickly over time compared to natives.

In plot B of Figure 2, we show estimates after including a cubic term in immigrants' experience abroad as a control.[12] The profiles in plot B depict the case of experience abroad being evaluated at its mean across all immigrants sampled, which is around 14 years. Controlling for experience abroad leads to the profiles lying closer to each other as the profiles of the later cohorts are now shifted upwards. This is consistent with the fact that immigrants'

[12]This is calculated as general experience x_{it} but using immigrants' age at entry into the Spanish labor market instead of actual age.

Figure 2: Immigrant assimilation profiles in Spain by entry cohort



Notes: This figure shows the coefficients $\hat{\beta}_{2,y(it),c(i)}$ obtained from estimating (4) for different sets of controls included in J'_{it}. In plot **A** no additional controls are included. In plot **B**, we include a cubic term in immigrants' years of experience abroad computed as age at arrival minus 16 (22) for those without (with) tertiary education. In plot **C**, we additionally include dummies for below primary, primary, secondary and tertiary education. In plot **D**, we additionally include a dummy indicating having a temporary contract, which includes those with contract codes ("clave") 401 to 557.

age at entry has increased over time as seen Figure 1, which implies that later cohorts, in particular those coming during the 2000s, have a smaller share of work experience that is gained in Spain, negatively impacting their wages. Although this compositional change can account for the downward trend in assimilation profiles across entry cohorts seen in plot A to some extent, a large part of the heterogeneity still remains.

In plot C we additionally account for changes in the educational composition of immigrants over time by adding dummies for having below-primary, primary, secondary and tertiary education. As one would anticipate given the sharply rising gap in the attainment of secondary education between natives and immigrants seen in Figure 1, including this control further decreases cohort heterogeneity, to the extent that the initial wage gaps now barely

vary across cohorts. Yet, profiles still diverge over time in the labor market due to above described cyclical patterns of immigrants' relative wages.

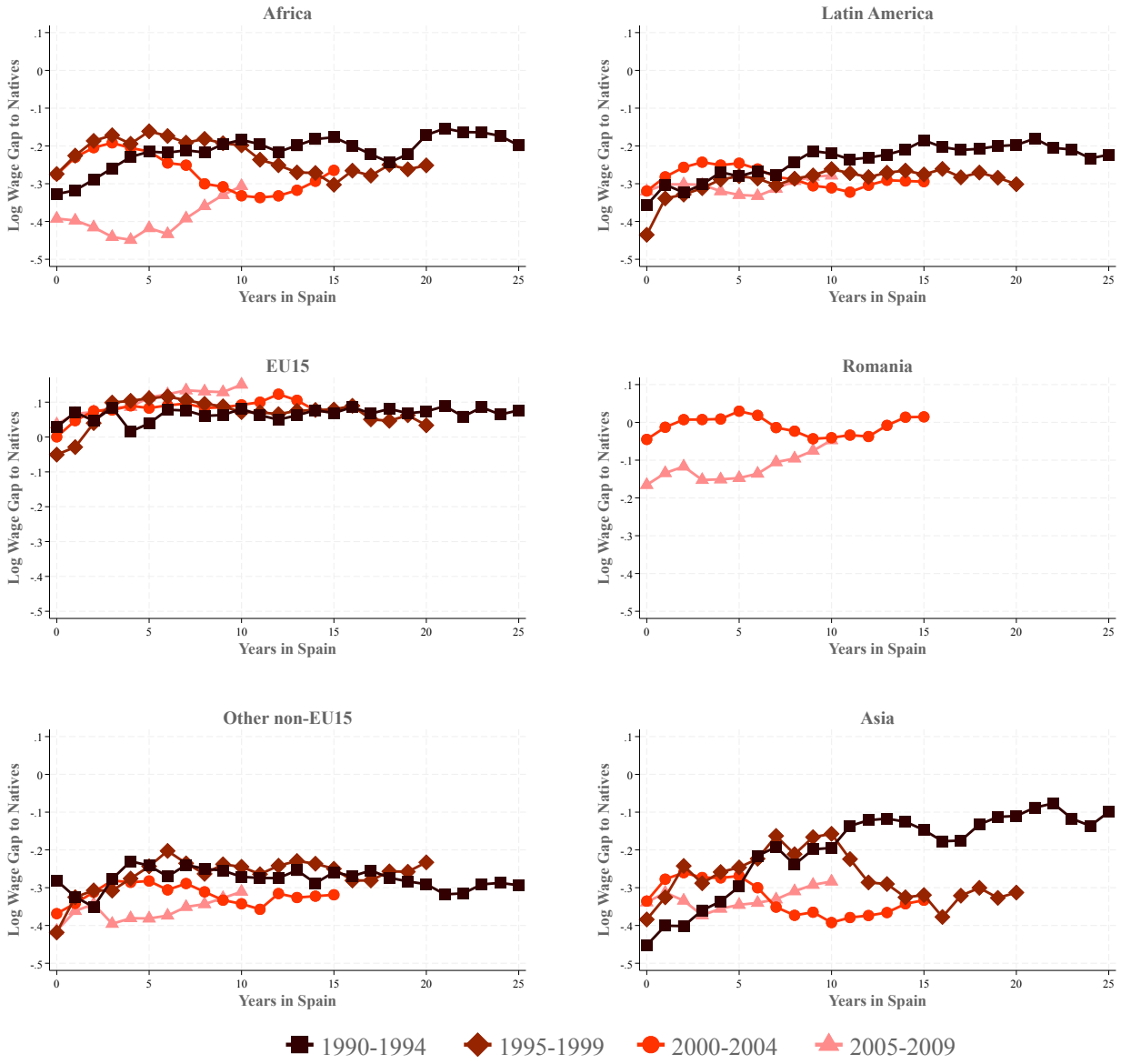
Finally, in plot D we also add a dummy indicating being employed under a temporary contract. Although contract type is time-varying and rather an *outcome* of immigrants' labor market assimilation process, including this control and examining how the estimated assimilation profiles change could still shed some light on a potential mechanism behind the uncovered patterns. Since we have found that immigrants on average spend a longer time of their career having a temporary contract than natives, ex-ante we would expect the inclusion of this control to potentially affect the shape of the assimilation profiles in the long run, especially given that the coefficient estimate implies that having a temporal contract is associated with having a 24 log points lower wage than an otherwise comparable worker. Despite this fact, we obtain very little change in the profiles in the long run. Only the relative wages during the first few years become again more heterogenous across cohorts, although in a different direction compared to plots A and B: conditional on contract type, immigrants that arrived during the 2000s now have somewhat smaller initial wage gaps to natives than earlier cohorts.

An important take-away from this figure is that even in the long run, immigrants in Spain do not seem to fully assimilate to natives in the labor market. Conditional on having the sample-average experience abroad, immigrants that arrived during the 1990s have 10 to almost 20 log points lower wages than natives with the same education, even after more than 20 years in Spain. Of course, the long-run assessment for those who entered during the 2000s is still pending. Once further data becomes are available, it will be interesting to investigate the patterns during the Covid-19 recession and the following steep recovery that Spain experienced.

Next, we estimate the assimilation profiles separately by origin group. For this, we only keep natives and immigrants from the respective origin in the sample and use the specification including experience abroad and education, thus corresponding to plot C of Figure 2.[13] The results for six groups of origins (Africa, Latin America, EU15, Romania, other non-EU15, Asia) are shown in Figure 3.

[13]Conclusions are similar when additionally controlling for temporary contracts.

Figure 3: Immigrant assimilation profiles by entry cohort and country of birth



Notes: This figure shows the coefficients $\hat{\beta}_{2,y(it),c(i)}$ obtained from estimating (4) including a cubic term in immigrants' years of experience abroad and dummies for below-primary, primary, secondary and tertiary education. For each plot, only immigrants from the origin indicated in the plot title are kept in the sample.

Compared to the full-sample results, immigrants from Africa across all cohorts have a roughly 10 log points larger wage gap to natives. Their wages also seem more cyclical relative to the average immigrant as up and down swings in the speed of assimilation are more pronounced than in Figure 2. Moreover, there is a notable decline in initial wages for the 2005-09 cohort.

Turning to Latin American immigrants, we obtain a similar shift downwards in their relative wages relative to the full sample. However, they are less cyclical and the level differences across cohorts are smaller.

Immigrants from EU15 countries essentially earn the same wages as comparable natives at arrival and even surpass them after the first few years, a pattern that is similar across all cohorts. Interestingly, those that came during the late 2000s, right before the economic bust, started with wages slightly above those of comparable natives and experienced a steady increase, reaching 15 log points higher wages after 10 years.

Due to their enormous inflows during the 2000s, we also show a separate plot for immigrants from Romania. Since barely any Romanians entered during the 1990s, the assimilation profiles of these cohorts would be based on a handful of observations leading to high imprecision. Therefore, we only plot the profiles of the two large cohorts of the 2000s. Romanians' assimilation profiles have a similar cyclicality as in the full sample but the level of the gap to natives is reduced by around 10-15 log points, implying that those arriving in the early 2000s, like those from the EU15, have essentially no wage gap to natives, while those arriving during subsequent five years almost fully catch up after 10 years.

Finally, both those from other non-EU15 countries and those from Asia have initial wage gaps of 30 to 40 log points with almost no assimilation over time in case. A notable convergence to natives in the long term can only be observed for 1990-94 arrivals from Asia.

Overall, similar to what has been found by various studies for the US, immigrants from highly developed origin countries are fully assimilated in the labor market in terms of wages upon entry, while immigrants from less developed regions, except Romanians, suffer initial wage gaps between 30 and 40 log points and experience high cyclicality in their relative wages with very little assimilation in the mid to long run.

In the next section, we discuss potential reasons apart from skill differences brought forward by the literature, which could potentially explain the failure of immigrants to assimilate in Spain's labor market.

5 Explanations for Wage gaps beyond Skill Differences

5.1 Occupational Barriers

A major obstacle in the process of immigrants' integration into the host country labor market are barriers that impede their access to certain occupations or jobs. Such barriers could be occupational licensing, unrecognized foreign qualifications, language requirements or racial discrimination.

In a recent study based on matched employer-employee data from nine developed countries, Hermansen et al. (2025) examine to what extent the earnings gaps between natives and immigrants are driven by sorting into different jobs (defined as firm-occupation combinations) as opposed to earning differently *within* jobs. They find that three quarters of the gap is driven by different sorting across jobs. Interestingly, the study also reveals that Spain is the country with the largest earnings gap between natives and immigrants among all examined countries and the one with the largest difference (almost 30 percentage points) between the within-job and raw wage gap. Despite their exact source remaining unclear, this suggests that occupational barriers might play an important role in explaining the persistent earnings differences between natives and immigrants in Spain.

More direct evidence for the wage effect of a particular type of occupational barrier is provided by Brücker et al. (2021). They show that the formal recognition of foreign qualifications in Germany leads to around 20 percent higher wages after three years and full convergence to natives.

It should be noted that since getting access to certain jobs might also be the outcome of accumulating human capital in the host country, the sorting of immigrants into lower-paying jobs is unlikely to be *entirely* driven by occupational barriers. Moreover, one would expect immigrants to overcome barriers like licensing or the recognition of foreign qualifications over time, at least in the very long run. In line with this notion, Lessem and Sanders (2020) use a labor market search model to estimate the wage benefit for immigrants in a counterfactual where they start in their model-predicted long-run job at arrival. They find that this increases wages by 25 percent at entry but only by 2.8 percent after 10 years. This is because even in the baseline scenario where some immigrants start their career in a low-paying occupation,

the majority would eventually catch up through occupational mobility.

5.2 Reservation wages

Another mechanism driving a wedge between the earnings of observationally similar immigrants and natives might be that the former have lower reservation wages and are thus willing to accept to work for wage rates that natives would reject. Albert (2021) compares wage gaps between low-skilled natives, legal and likely undocumented immigrants in the US and finds that the latter earn by far less than both natives and legal immigrants, even within the same occupation. This result is rationalized by a labor market search model in which undocumented workers have the lowest reservation wages due to the fact that they do not qualify for social benefits and thus underbid the lowest wage offer a legal worker would accept when competing with them for the same job.

Since the Spanish data we used in our analysis above only includes legal workers in formal jobs, this mechanism does not apply in our analysis to the extent it does in the US, where the main labor market data also include those that work informally. Nevertheless, there are at least two reasons why reservation wages might still play a role in the case of the formal Spanish labor market.

First, many immigrants from regions outside the EU arrived in Spain illegally or under tourist visas and were subsequently granted legal status through amnesties (Rodríguez-Planas 2012). Hence, many of these immigrants may have worked in the informal labor market at low wage rates before becoming legal and, possibly due to firms having high bargaining power over them or general wage rigidities, their earnings might have continued to be suppressed even in the formal labor market. Nevertheless, a persistence of this effect over a longer time horizon than a few years does not seem plausible.

Second, Dustmann et al. (2024) provide evidence for a different mechanism affecting reservation wages, which might also apply to immigrants in Spain. They argue that when immigrants come from origins with lower price levels and spend a part of their earnings there, for example through remittances or consumption upon return, their effective real wage derived from the same nominal pay is higher relative to natives that only consume in the host country. In accordance with this idea, they show that the wages of recently arrived

Eastern European immigrants in Germany are lower when the real exchange rate between host and origin country is higher. However, they also find that this effect already dissipates two years after arrival.

In sum, while both occupational barriers and differences in reservation wages might play a role for the low relative earnings of some immigrant groups in Spain during the first few years after arrival, these mechanisms seem unlikely to be the main drivers behind the still large wage gaps one or two decades after arrival for most immigrants outside the EU15.

6 Conclusion and Further Research Directions

The evidence reviewed in this chapter shows that labor market assimilation is shaped by a combination of human capital accumulation, cohort composition, and broader economic conditions. In Spain, many immigrant groups face substantial initial wage disadvantages, while others—most notably those from the EU15—start at parity with natives and even move ahead. Wage trajectories are strongly cyclical: periods of rapid assimilation coincide with economic booms, while downturns are associated with widening gaps.

Three lessons emerge. First, labor market assimilation is highly heterogeneous across origin groups, with immigrants from more developed countries achieving long-run parity and most of those born in other regions experiencing persistent disadvantages. Second, business cycle conditions in Spain play a central role, with a fast catch-up to natives during expansions but a further fall behind during recessions. Third, longitudinal administrative data such as the MCVL are essential for tracing these dynamics with precision over long horizons.

Overall, Spain's experience highlights both the potential for rapid economic integration in favorable conditions and the vulnerability—particularly of those coming from less developed origins—to lasting disadvantages when exposed to downturns. Further work is needed to clarify whether this results from immigrants' industry concentration, differences in contract types, or the faster deterioration of host-country-specific human capital during recessions. Understanding these mechanisms is crucial for assessing the long-run consequences of economic crises for immigrant integration.

At the same time, important mechanisms not directly related to immigrants' level of hu-

man capital—such as occupational barriers and differences in reservation wages, potentially interacting with firm-level career dynamics—may contribute to the large wage gaps that persist even after decades. To better understand the role of these or other potential forces, more work is needed on firm-level dynamics, including promotion, training, and internal mobility, to understand how immigrants' career trajectories differ from those of natives. Moreover, research on the second generation is still scarce, leaving open the question of whether children of immigrants overcome the disadvantages faced by their parents or inherit them.

Finally, regional variation within Spain deserves closer attention, since immigrant opportunities are likely shaped by local factors such as labor market competition, which in turn depends on the intensity of local immigration, or other local factors like political institutions.

Especially in the current environment with immigration becoming an increasingly contentious political issue and ever louder calls for restrictions, more research that sheds light on the mechanisms driving the short- and long-run labor market assimilation of immigrants is necessary. Its findings will help guide policies aimed at improving immigrants' labor market outcomes and reducing persistent inequalities, thereby enhancing both their economic and broader social integration in the host-country community to the benefit of all.

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