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The Impact of House Prices on Internal Migration: The Case of Spain*

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Abstract

This paper studies how house prices shape internal migration across Spain's provinces and the implications for the spatial allocation of labor. Using a gravity-style framework, we estimate the causal impact of destination and origin house prices on bilateral migration flows between 2007-2023. To address the potential endogeneity of house prices, we instrument provincial house prices with a Bartik-style predictor of external inflows of foreign migrants, allowing this housing demand shock to have larger price effects in provinces with tighter land constraints. The instrumental variable (IV) estimates show that housing costs constitute a significant barrier to internal migrants—a 10 percent increase in destination house prices reduces inflows by about 4.0 percent, while a 10 percent increase in origin house prices increases outflows by about 2.8 percent. These push effects of origin house prices are larger for foreign-born and foreign-born young individuals compared to natives. Rental costs have even stronger effects than home sale prices. A simple back-of-the-envelope calculation suggests that if house prices in high-productivity provinces had not grown faster than the inflation over 2017-23, about 63,000 more working-age individuals would have migrated to these provinces, as opposed to just 1,700 (in net terms) in practice. While the direct implied GDP gain would have been small—about 0.05 percent over this period, such gains would accumulate over time if regional divergence in house prices were left unaddressed. Furthermore, this estimate does not factor in the much larger gains from attracting a large number of recent foreign immigrants—not studied here—to the most-productive regions.

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1 Introduction

Internal migration plays a central role in the efficient allocation of labor within countries. By allowing workers to move from lower-productivity and higher-unemployment regions to areas with better labor market opportunities, migration can support aggregate productivity growth, reduce structural unemployment and help local economies adjust to asymmetric shocks. In many settings, however, persistent cross-regional wage, productivity and unemployment differences suggest internal migration rates may be too low, raising concerns that a host of factors may be constraining workers' mobility. Understanding the sources of these frictions is therefore critical for assessing the effectiveness of migration as an adjustment margin and for designing policies that promote spatial efficiency.

In this regard, housing markets are a leading candidate for study, as the cost of shelter relative to income earned is a key factor in people's decisions regarding where to live. Rapid house price growth in high-productivity areas may deter potential inflows of migrants by raising the cost of relocation, while also pushing existing residents to move away. Yet, identifying the causal effect of housing costs on migration is challenging because house prices are endogenous equilibrium outcomes that respond to increased demand from migrants and local economic conditions. This paper provides causal evidence on how housing costs shape domestic migration decisions across provinces in Spain—a country with large spatial differences in productivity that has experienced sustained house price growth in recent years—by exploiting exogenous, demand-driven variation in house prices. Overall, we find that housing costs indeed play an important role in mobility choices—particularly for young and foreign-born individuals.

Specifically, this paper aims to shed light on three questions. First, we study whether high house prices dampened internal (cross-province) migration in Spain between 2007 and 2023. Second, we examine heterogeneity in the impact of house prices on mobility across demographic groups (young and foreign-born) and provinces of different characteristics (neighboring provinces or sharing the same autonomous regions), as well as the differential effect of rental costs vs house prices. Third, we conduct a simple counterfactual exercise to quantify how much recent high house price growth has dampened internal migration towards more productive provinces and, more partially, for aggregate GDP. To identify the causal effect of housing costs on migration, we develop an instrumental variable strategy that exploits exogenous, demand-driven variation in provincial house prices. Specifically, we instrument origin and destination house prices using predicted inflows in the province considered of foreign international migrants from outside Spain. These are constructed from national-level inflows interacted with past province-level settlement patterns, following a Bartik-style approach. These predicted inflows capture plausibly exogenous shifts in local housing demand that are unrelated to internal migration preferences or contemporaneous local economic conditions (Card, 2001). We further allow the price response to vary with local housing supply constraints by interacting predicted inflows with a measure of undevelopable land, reflecting the idea that a given demand shock generates a larger price increase where housing supply is more inelastic. The resulting first-stage relationships are strong, and the instruments isolate variation in housing costs that is orthogonal to internal migration decisions, enabling a clean separation of the causal pull and push effects of housing affordability on mobility. We also control for the distance between the two provinces, group specific earnings, unemployment rates, and populations, as well as time, origin-province, and destination-province fixed effects.

We find that housing costs at origin and destination provinces causally and asymmetrically affect internal migration decisions across Spanish provinces through both pull and push channels. Instrumental variable estimates show that higher housing costs at destination significantly deter internal migration inflows: for the working-age population, a 10 percent increase in destination house prices reduces inflows by about 4 percent, ceteris paribus. In contrast, higher housing costs at origin act as a push factor, with a 10 percent increase in house prices raising outward migration by around 2.8 percent. These effects are substantially larger in magnitude than the corresponding OLS estimates. This is in line with a positive effect of internal migration on house prices, which attenuates OLS estimates of the impact of housing costs on mobility. In the IV estimates, the negative pull effect from destination housing costs is particularly strong, underscoring the role of affordability constraints in limiting working-age individuals' access to high-opportunity regions. Moreover, we find that the housing price impact on internal migration, particularly for origin housing price on outward migration, is much stronger for foreign-born and young foreign-born individuals than their Spanish-born counterparts. We also estimate the impact of rental costs, instead of home sale prices, on the internal migration. Notwithstanding a weaker instrument—thus requiring caution—rental prices appear to generate substantial larger internal migration responses across nearly all groups. Destination rental prices have two to three times larger impacts on cross-province mobility than sale prices do, particularly for foreign-born migrants who are less likely to seek home ownership. Origin-province rental costs also yield stronger outward migration responses, suggesting that rental costs might be an important factor in pushing people to leave their province of origin.

We next assess the aggregate implications of these migration responses using simple counterfactual housing price paths during the recent wave of house price increases—between 2017 and 2023, the latest available year in our dataset. A simple back-of-the-envelope calculation suggests that if house prices in high-productivity provinces had risen only in line with inflation between 2017 and 2023, roughly 63,000 additional working-age individuals would have migrated to these regions—compared with just 1,700 in net terms observed in practice. The direct implied GDP gains from this additional migration would have been modest, at about 0.05 percent over the period. The estimated GDP gains, however, are likely to be a lower bound as they do not account for agglomeration effects that could endogenously improve productivity of highly-productive regions and such gains would accumulate over time if regional divergence in housing costs remains unaddressed. Moreover, this estimate also does not account for the potentially much larger benefits of attracting the recent international immigrant inflows—an issue not examined here—to the most productive regions.

Our main results are unaffected by a range of robustness checks. First, they are robust to considering two alternative housing price measures. While our baseline specification uses asking-price series, similar results are obtained when using transaction-based (final sales) prices and unit-price measures instead. Second, the baseline results are also not driven by neighboring provinces. Given potentially lower relocation costs—including stronger social and labor market linkages—between neighboring provinces, internal migration between neighboring provinces might be driving our main results. However, interaction terms with neighboring provinces dummies are estimated to be insignificant. Third, our baseline results are not driven by province pairs that are located within the same autonomous regions. Lastly, they are robust to an inclusion of province-pair fixed effects that capture the time-invariant bilateral factors that may influence migration flows beyond physical distance and control variables. These include historical migration links, cultural ties, and commuting patterns that are not captured by physical distance.

This paper makes three contributions to the literature. First, we expand the existing literature on internal migration in Spain in terms of both the temporal and analytical scope. Specifically, we examine the recent period 2007-2023 and explore heterogeneous effects across demographic groups (e.g., age and place of birth) whose decision plausibly take into account housing costs to different degrees. We also substantially improve the analytical scope by introducing an instrumental variable approach to resolve endogeneity issues. To mitigate reverse causation, we instrument provinces' house prices by Bartik-style predicted inflows of foreign international migrants from overseas. We confirm our estimated house price elasticities of internal migration are broadly in line with those in other countries. Second, the paper helps resolve puzzles identified in earlier studies, which reported counter-intuitive signs for the effect of local unemployment rates and real wages on mobility. Using group-specific earnings measures, we find the expected patterns. Third, the paper adds to the literature on the aggregate implications of housing constraints by using our reduced-form estimates to quantify, through a simple back-of-the-envelope calculation, some of the output losses associated with reduced internal migration from less-productive to more-productive provinces.

The rest of paper is organized as follows. Section 2 reviews literature. Section 3 presents descriptive analysis of house prices developments and Spanish internal migration patterns over the period of analysis. Section 4 presents the empirical strategy. Section 5 describes the data used in this study. Section 6 discusses the empirical results. Section 7 shows the simple counterfactual exercise. Section 8 discusses robustness checks, and Section 9 concludes.

2 Literature Review

This paper contributes to the literature that specifically studied the Spanish case of the impact of housing price increase on internal migration. Antolín and Bover (1997) pioneered regional migration models including wage and housing differentials for Spain using the labor force survey between 1987 and 1991. Beyond exploring individual characteristics that are associated with migration decisions, they find several puzzles. Unemployment rate differential and real wage differentials have wrong signs—with people from regions with higher real wage and lower unemployment rate tend to leave the regions. Our paper solves these puzzles, especially for real earnings calculated at group-specific level. Liu (2018) also studies internal migration in Spain using gravity-type empirical model between 1998 and 2016 and find significant roles played by housing price and labor market conditions in explaining the internal mobility, but she focuses on the internal mobility at autonomous region level while we study is conducted at a more granular provincial level. Maza (2020) using the Spanish province level analysis for 2008-2018, studies the varying roles of housing prices in affecting neighboring vs non-neighboring provincial migration patterns and between youth (16-34 years old) and adults (35-65 years old). He finds that non-significant impact of the housing price increase on the gross internal migration flows of internal migrants but finds statistically significant impact for the neighboring province pairs. For youth and adults, he doesn't find statistically significant impact of housing price on the mobility but find a stronger impact of labor market conditions (unemployment rate) for adults. Our paper complements this research by looking at more recent years (until 2023) when Spain has seen sharp housing prices increase, also differentiating not only youth and older workers but also between domestic and foreign-born individuals, and estimating the causal impact by using a novel instrument variable approach. Basco et al. (2025) examines how local house price booms (2003-2007) contributed to capital misallocation within Spanish manufacturing. They find that firms with more collateralizable real estate obtained additional bank credit and expanded investment disproportionately, especially in municipalities with tight land supply where price appreciation was strongest. These geographically amplified collateral effects increased within-industry dispersion in capital-labor ratios, and a counterfactual suggests they may explain about 40% of the TFP decline during the housing boom.

This paper also contributes to a broader literature in non-Spanish context that studies the impact of housing price increase deter internal migrations by finding that high housing costs would reduce net inflows into expensive regions. Olney and Thompson (2026), for instance, use Internal Review Service migration data for U.S. commuting zones and find that a 10 percent increase in destination housing prices reduces migration inflows by about 2.6 percent, while a 10 percent rise in origin prices raises migration outflows by 1.4 percent. Similarly, Ganong and Shoag (2017) show that in the U.S., rising house prices in high-income areas especially hurt low-skill migration and slow regional income convergence. Their model predicts housing constraints reduce total migration to productive regions and slow GDP convergence. Plantinga et al. (2013) develop a micro-founded housing cost index in the U.S. and confirm that higher housing costs significantly reduce the probability of choosing an area. In Australia, Siriban et al. (2025) estimate that a 10% rise in origin-area prices increases outward migration by around 8.1 percent, whereas a 10 percent rise at the destination reduces inflows by around 4.0 percent. While these papers use a lag of explanatory variables to address endogeneity between housing price and internal migration, we employ an instrument variable approach to estimate a causal impact of housing prices on internal migration. For China, Chai (2024) exploits housing purchase restrictions as an instrumental variable and finds that higher destination housing costs strongly deter migration, especially for disadvantaged groups. Across these settings, the qualitative result is consistent: high housing prices (relative to wages) shrink net inflows into expensive regions, reducing worker mobility. We find for Spain, based on the estimate using the instrumental variable approach, that a 10 percent increase in housing price in the destination province will dampen the immigration inflows by around 4.0 percent and a 10 percent increase in the origin province will increase the emigration inflow by around 2.8 percent, broadly similar to the estimates for other countries.

Finally, this paper contributes to estimating the aggregate output impact from high housing costs. Bryan and Morten (2019) use Indonesia's data and structural modeling to show that removing all internal migration barriers would raise labor productivity by about 22 percent, while merely raising mobility to U.S. levels (their high-mobility benchmark) would boost productivity by 7.1 percent. Similarly, Hsieh and Moretti (2019) use a spatial equilibrium model and data from 220 metropolitan areas and show that U.S. housing constraints effectively forced many workers to remain located in low-productivity regions. These constraints lowered aggregate US growth by 36 percent from 1964 to 2009. In our paper, we calculate the counterfactual exercise of output loss coming from the reduced internal migration flows from our reduced-form empirical estimates, which suggests a small but statistically significant impact on output loss. This large difference in the estimate of output loss arises from several factors. Hsieh and Moretti (2019) look at a long horizon (45 years) over which productivity differentials can accumulate to a much larger extent than the short time period of our analysis. Moreover, our counterfactual exercise relies on the estimates of a reduced-form empirical regression assuming labor productivity differences remain constant, while Hsieh and Moretti (2019) examine the general equilibrium effects of lifting all the house-related barriers to mobility, which entail endogenous price dynamics and adjustments in productivity.

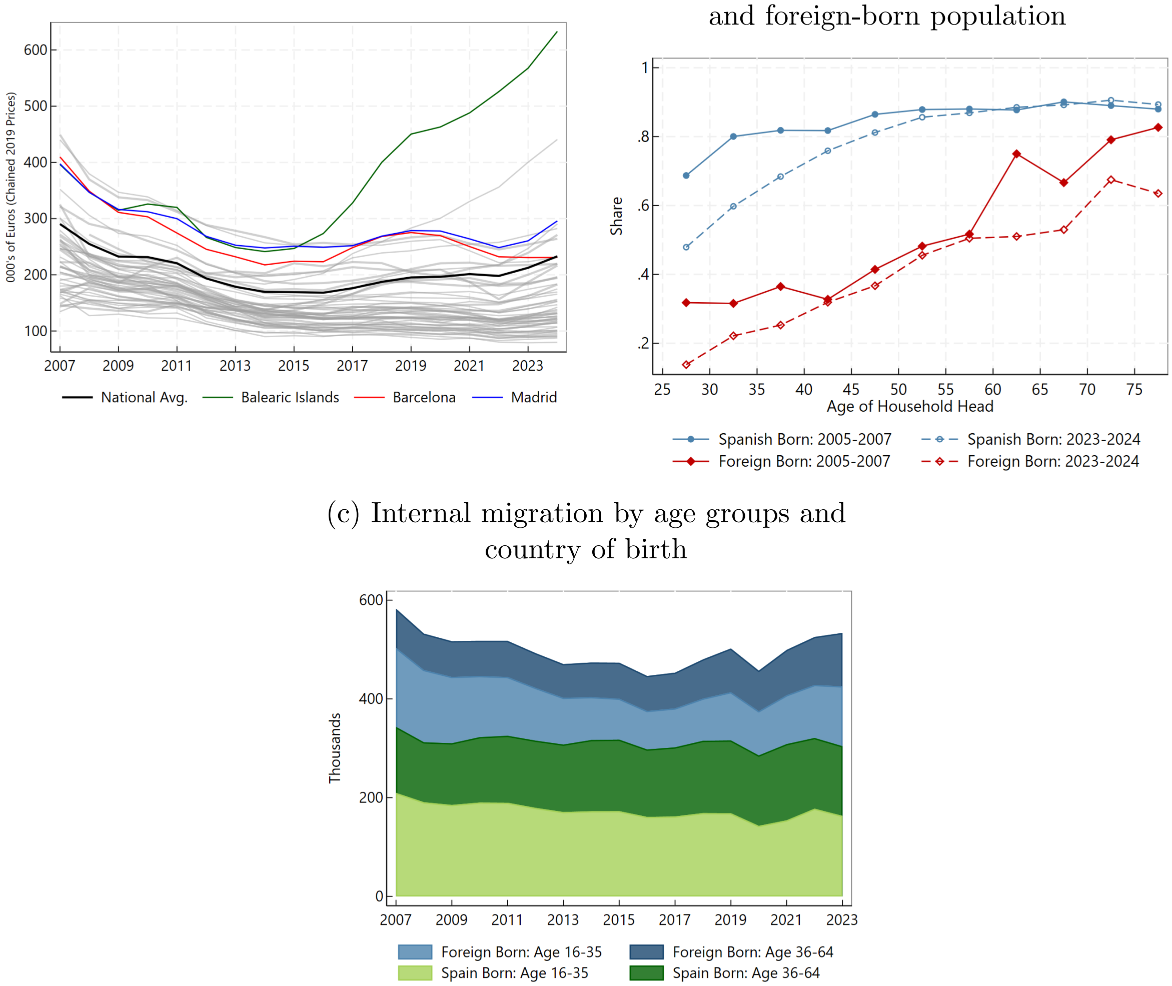
3 Background

House prices, on average, have risen rapidly in Spain since 2016 but with substantial heterogeneity across provinces. Figure 1(a) plots real province level average closing prices on the sales market from 2007 to 2023. The pace of real house price growth varies markedly, with the Balearic Islands experiencing the sharpest increases since 2016, while Madrid shows a pronounced rise in the post-pandemic period. Moreover, for numerous provinces, prices have continued to decline, never inverting the downward trend that began in 2008.

These price increases, though uneven across provinces, have sharply reduced housing affordability, especially for younger adults. Figure 1(b) illustrates homeownership rates for households headed by Spain-born and foreign-born individuals across five-year age groups in 2005–2007 and in 2023-2024.[1] First, younger cohorts consistently show lower homeownership rates than older ones, regardless of birthplace or period. In 2005–2007, for example, about 70 percent of Spain-born heads under age 30 owned their homes, compared with close to 90 percent among those aged 75 and older. The same pattern holds for the foreign-born population and for both periods. Second, the foreign-born also exhibit lower homeownership rates than their Spain-born counterparts

[1]We take the average for 2005-2007 and 2023-2024 to reduce the volatility in statistics by increasing the sample size during these years.

Figure 1: Housing Price, Home Ownership Rates and Internal Migration



(a) Housing price across provinces

(b) Home ownership rates by age: Spain-born and foreign-born population

(c) Internal migration by age groups and country of birth

Sources: Idealista, Encuesta de Condiciones de Vida, Estadísticas de Variaciones Residenciales, Estadísticas de Migraciones y Cambios de Residencia, and authors' calculations.

across all age groups and both periods. Among the youngest cohorts in 2005–2007, the foreign-born homeownership rate—around 35 percent—was roughly half that of Spain-born heads. Third, homeownership has declined for all groups between 2005–2007 and 2023-2024, with the steepest drop occurring among younger adults. For foreign-born household heads under age 30, the 2023-2024 homeownership rate fell to roughly one-third of its earlier level. Spain-born household heads in the same age group also experienced a substantial decline, with rates falling by about 20 percentage points—from around 70 percent to about 50 percent over the same period.

Importantly, the young and the foreign-born, who not only had lower homeownership rates but also experienced sharper declines, have historically exhibited higher shares of cross province internal migration, as depicted in Figure 1(c). For instance, in 2023, people aged 16-35, henceforth referred to as the "young", accounted for almost 57 percent of all cross-province residential moves in Spain despite representing only 33 percent of the working-age population. Similarly, foreign-born individuals comprised 47 percent of moves and 22 percent of the working-age population.

This descriptive evidence thus suggests that rising housing costs could have substantial implications for geographic mobility, as the demographic groups who are most sensitive to house prices also make up the bulk of the country's internal migration flows. The positive association between lower homeownership rates and higher mobility is intuitive, as owning a house, a large and immobile durable good, increases the costs of relocating and is itself a sign of weaker intentions to move to other places. On the other hand, a fall in homeownership does not necessarily imply greater mobility if reduced housing affordability restricts locational choices. In the next section, we present an econometric framework to more formally test this hypothesis and quantify the relationship.

4 Empirical Strategy

To assess the impact of housing price on inter-provincial migration, we follow the gravity-type regression approach of Liu (2018) and Maza (2020) by first running an OLS regression:

$$\begin{aligned}\log(M_{odt}+1) = {} & \alpha_1 \log(\text{Dist}_{od}) + \alpha_2 \log(\text{Pop}_{o,t-1}) + \alpha_3 \log(\text{Pop}_{d,t-1}) + \alpha_4 UR_{o,t-1} + \alpha_5 UR_{d,t-1} \\ & + \alpha_6 \log(\text{Inc}_{g,o,t-1}) + \alpha_7 \log(\text{Inc}_{g,d,t-1}) + \beta_1 \log(\text{HPrice}_{o,t-1}) + \beta_2 \log(\text{HPrice}_{d,t-1}) \\ & + \delta_o + \delta_d + \tau_t + \varepsilon_{odt}\end{aligned} \tag{1}$$

where o denotes the origin province and d the destination province; M_{odt} denotes bilateral migration from province o to d at time t (with 1 added to retain zero flows in logs); $\text{Pop}_{o,t-1}$ and $\text{Pop}_{d,t-1}$ denote populations at time $t-1$; $UR_{o,t-1}$ and $UR_{d,t-1}$ denote unemployment rates; $\text{Inc}_{g,o,t-1}$ and $\text{Inc}_{g,d,t-1}$ denote median group-specific earnings of the relevant demographic group in each specification, defined by country of birth and age as defined later; $\text{HPrice}_{o,t-1}$ and $\text{HPrice}_{d,t-1}$ denote median house prices; δ_o, δ_d, and τ_t denote origin, destination, and time fixed effects, respectively; ε_{odt} is the error term. All explanatory variables are lagged by one year. Robust standard errors are two-way clustered at the origin–destination province level.

This reduced-form specification captures some of the key drivers of people's choices to relocate across provinces: labor market opportunities (unemployment rates), earning prospects (median group-specific earnings), and the cost of shelter (median housing prices). It also contains a rich set of fixed effects. Origin (destination) province fixed effects control for province-specific characteristics that affect migration in(out)-flows while the time fixed effects control for the aggregate macroeconomic conditions that could be affecting the migrations.[2]

[2] An alternative approach is to measure housing affordability using the log house-price-to-earnings ratio rather than log house prices directly. In our specification, this transformation does not change the economic content of the regression. Since log(price/earnings) = log(price) - log(earnings), including the affordability ratio while controlling

However, the specification potentially suffers from reverse causality issues. On the demand side, migration flows increase housing demand in destination provinces, putting upward pressure on prices, and reduce demand in origin provinces. As the price of real estate reflects the discounted flow of the expected future value of housing, even lagged house prices at $t-1$ can be responsive to expected migration at time t. As a result, OLS estimates confound the causal effect of house prices on migration with reverse causality running from migration to prices. On the supply side, unobserved province-specific shocks such as changes in local amenities, infrastructure investment, or labor market prospects can simultaneously attract migrants and raise housing prices, inducing omitted-variable bias even in specifications with rich fixed effects. These concerns are particularly acute in a bilateral migration setting, where destination attractiveness is inherently difficult to fully observe and control for.

To isolate exogenous variation in house prices that is orthogonal to internal migration preferences, we therefore follow literature pioneered by Card (2001)) to instrument provincial house prices using predicted inflows of foreign migrants and their interaction with local housing supply constraints, capturing plausibly exogenous demand-driven price pressure that does not directly affect internal migration flows except through housing costs.[3]

Specifically, the first-stage regression is expressed as follows:

$$\log(\text{HPrice}_{p,t}) = \sigma + \gamma_1 BF_{p,t} + \gamma_2 BF_{p,t} \times \text{LandCons}_p + \omega_p + \tau_t + \varepsilon_{p,t} \tag{2}$$

where LandCons_p is the housing supply constraint measured as the share of undevelopable land as discussed in the data section; ω_p and τ_t are province and time fixed effects; and

$$BF_{p,t} \equiv \frac{\sum_{j \in J} \left(\frac{\text{MigStock}_{p,j,2000}}{\text{MigStock}_{\text{Spain},j,2000}} \times \text{Mig}_{\text{Spain},j,t} \right)}{\text{Pop}_{p,t-1}} \tag{3}$$

where the Bartik flow rate, $BF_{p,t}$, captures exogenous variation in housing demand arising from predicted inflows of foreign migrants into province p, constructed using national inflows (in number of people) of each nationality j in year t ($\text{Mig}_{\text{Spain},j,t}$) interacted with the province-level share of that nationality in 2000 ($\frac{\text{MigStock}_{p,j,2000}}{\text{MigStock}_{\text{Spain},j,2000}}$), a period prior to the time sample of our analysis. Summing these interactions across all nationalities yields the predicted inflow of foreign migrants

for earnings separately is algebraically equivalent to a reparameterization of the baseline model. In particular, the coefficient on log(price/earnings) is identical to the coefficient on log(price) in the baseline specification, while the new coefficient on earnings becomes the sum of the baseline earnings coefficient and the coefficient on log(price/earnings). As a result, the implied marginal effect of housing costs on migration is unchanged, and the baseline specification already captures affordability effects in a flexible way.

[3] In immigration research, Card (2001) uses prior immigrant shares and national origin-specific inflows to predict local migrant supply. Analogously, one can instrument internal migration flows by "predicted foreign migration" to a province: multiply the pre-existing stock of immigrants (by origin) in each province by the aggregate inflow from each origin country. This isolates variation in local labor supply that is plausibly exogenous to domestic shocks. Several studies apply such shift-share instruments (often called "supply-push" or "network" instruments) to migration: they exploit the idea that areas historically exposed to certain origin groups will see inflows when national arrival patterns change.

into province p. To obtain the Bartik flow rate $BF_{p,t}$, the predicted inflow is normalized by the province's population, $\text{Pop}_{p,t-1}$, in the previous year.

The identifying intuition for using the Bartik-style inflow rate as an instrument is that external migration flows into a province are predicted, among other factors, by the size and composition of pre-existing stocks of foreign residents in the province. Provinces with larger historical exposure to a given nationality naturally experience stronger inflow when national migration from that nationality rises. New migrants moving to Spain are more likely to move to provinces where there already is a large community from their respective country, as they follow their network for reasons other than the cost of housing and the relative economic opportunities of each province. These "exogenous" inflows of migrants raise house prices by increasing pressure on the local housing market.

The interaction between $BF_{p,t}$ and LandCons_p allows us to capture the housing demand channel of the foreign migration inflows. It also allows the price response to vary with housing supply constraints, reflecting the idea that identical demand shocks generate larger price increases in provinces where physical or regulatory constraints limit new housing construction (Saiz, 2010). We proxy housing supply constraints by constructing a measure of undevelopable land for each province, defined as the total share of surrounding ocean, steeply sloped terrain, water bodies, and wetlands within a 50 km radius of the provincial capital.

5 Data

Annual migration flows across provinces are measured using the microdata from two datasets: the Estadística de Variaciones Residenciales (EVR) for 1998-2021 and the Estadística de Migraciones y Cambios de Residencia (EMCR) for 2022-2023. Both are compiled by Spain's Instituto Nacional de Estadísticas (INE), the Spain's national statistical office. The microdata contains all recorded residential moves of people residing in Spain in a given year, providing the origin and destination provinces as well as selected demographic information on the mover. We use the mover's country of birth to examine the subsamples of those born in Spain and the foreign-born, where the latter broadly proxy for the immigrant population, and age. Using the age variable, we first only select movers in the working-age range 16-64. Additionally, we consider the subset of young workers, defined as those below age 35. We exclude from the analysis moves to and from abroad as well as to and from the two autonomous cities of Ceuta and Melilla. We thus consider only moves across Spain's 50 provinces.

Our main data on house prices and rents is from Idealista, which is Spain's largest online platform for real estate sales and rentals. The data, covering the period 2006-2024, provides the median asking price of houses sold in each province and of rents.[4] For robustness analysis, we also consider the closing sale per square meter. Additionally, we examine alternative data sources: proprietary data from Sociedad de Tasación, available over 1994-2024, and the average price of registered housing transactions from Colegio de Registradores, available for 2007-2024.[5] Data on

[4]Data coverage for rents is incomplete prior to 2012.

[5]In the analysis below, house prices are not deflated by CPI. However, the inclusion of year fixed effects captures,

the unemployment rate by province is computed using the microdata of Encuesta de Población Activa (EPA), Spain's labor force survey, which is provided by INE. The real annual earnings by province are computed as the median/average annual income from workers' primary jobs using the microdata of the Muestra Continua de Vidas Laborales (MCVL), which is provided by the Ministry of Inclusion, Social Security, and Migration.

Population statistics by province are also provided by INE. For the econometric analysis we use provinces' total population. To construct the instrumental variable for housing demand, we use data on provinces' population by country of birth. Immigration flows into Spain by nationality are from INE's Estadística Continua de Población (ECP).

The distance in kilometers between pairs of provinces is computed as the geodesic distance between their two capitals using the Haversine formula, which calculates the shortest distance between two points on earth using their latitude and longitude. Using Google Earth Engine, we proxy housing supply constraints by constructing a measure of undevelopable land for each province, defined as the total share of surrounding ocean, steeply sloped terrain, water bodies, and wetlands within a 50 km radius of the provincial capital.

Table 1 provides summary statistics for the main variables. The OLS regressions cover 2007-2023 (since house price data start in 2006). The IV regressions cover 2009-2023 (since foreign migration inflows data, which we use to construct the instruments for sale prices, start from 2008).

Table 1: Summary statistics of regression variables, 2007–2023

	Sample Size	Mean	Std. Dev.	Min.	25th Pct.	50th Pct.	75th Pct.	Max.
Panel A: Bilateral level								
Distance (km)	41,650	532	422	43	281	431	621	2,284
M_{odt} (Working-age population)	41,642	204	570	0	24	56	151	15,849
M_{odt} (Spain-born population)	41,614	128	352	0	14	33	94	10,881
M_{odt} (Foreign-born population)	41,602	76	233	0	8	20	55	6,736
M_{odt} (Young Spain-born)	41,552	71	192	0	7	18	53	6,783
M_{odt} (Young Foreign-born)	41,486	44	136	0	5	11	31	3,157
Panel B: Province level								
$\log(HRental)$	848	6.3	0.3	5.8	6.1	6.3	6.5	7.5
$\log(HPrice)$	850	11.9	0.3	11.4	11.7	11.9	12.1	13.4
Pop (thousand)	850	931.5	1,162.6	88.4	332.9	641.5	1,047.3	6,940.5
UR	850	17.2	7.3	3.0	11.4	16.1	22.1	42.3
Inc (all)	850	14.4	0.1	14.1	14.3	14.3	14.5	14.9
Inc (Spain-born)	850	14.4	0.2	14.1	14.3	14.4	14.5	14.9
Inc (Foreign-born)	850	14.0	0.1	13.7	13.9	14.0	14.1	14.5
Inc (Young Spain-born)	850	14.2	0.2	13.9	14.1	14.2	14.3	14.7
Inc (Young Foreign-born)	850	13.9	0.2	13.2	13.8	13.9	14.0	14.5

among other factors, the effect of national-level price developments on mobility.

6 Empirical Results

Baseline OLS results

Table 2: OLS estimates of bilateral internal migration

Sample	(1) All	(2) Spanish	(3) Foreign-born	(4) Young Spanish	(5) Young Foreign-born
$\log(Dist_{o,d})$	-1.277***	-1.355***	-1.113***	-1.317***	-1.081***
	(0.0585)	(0.0660)	(0.0475)	(0.0615)	(0.0445)
$\log(Pop_{d,t-1})$	-0.435*	-0.0905	-0.849***	0.116	-0.889***
	(0.233)	(0.229)	(0.286)	(0.273)	(0.301)
$\log(Pop_{o,t-1})$	0.175	0.214	0.280	-0.125	-0.0215
	(0.221)	(0.281)	(0.295)	(0.354)	(0.333)
$\log(HPrice_{d,t-1})$	-0.112***	-0.141***	-0.113**	-0.122**	-0.0585
	(0.0308)	(0.0410)	(0.0446)	(0.0477)	(0.0468)
$\log(HPrice_{o,t-1})$	0.00246	-0.0354	0.0376	-0.0193	0.0974*
	(0.0374)	(0.0449)	(0.0491)	(0.0575)	(0.0556)
$UR_{d,t-1}$	-0.00396	-0.00493*	-0.00713	-0.00622**	-0.00820
	(0.00383)	(0.00280)	(0.00481)	(0.00289)	(0.00541)
$UR_{o,t-1}$	0.00748**	0.00847***	0.00130	0.0106***	5.44e-06
	(0.00364)	(0.00289)	(0.00391)	(0.00335)	(0.00454)
$Inc_{g,d,t-1}$	0.422	-0.00393	0.430**	0.135	0.0939
	(0.416)	(0.442)	(0.161)	(0.273)	(0.101)
$Inc_{g,o,t-1}$	-0.0154	-1.515***	0.192	-0.690***	-0.0462
	(0.410)	(0.382)	(0.145)	(0.241)	(0.0772)
Constant	7.495	33.55***	4.457	19.22***	12.53***
	(8.441)	(8.402)	(3.986)	(5.796)	(2.804)
Observations	41,642	41,614	41,602	41,552	41,486
R^2	0.883	0.858	0.861	0.847	0.842

Notes: The dependent variable, $\log(M_{odt}+1)$, is the log of bilateral migration flows from origin province o to destination province d as specified in equation (1). Variables labeled d and o refer to destination- and origin-province characteristics, respectively. All explanatory variables are lagged by one year. Group-specific earnings correspond to the median earnings of the relevant demographic group in each specification, defined by country of birth and age. Distance is measured as the logarithm of bilateral distance in kilometers. All regressions include origin province, destination province, and year fixed effects. Robust standard errors two-way clustered at the origin and destination province level are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The small difference in sample size is due to missing bilateral flows. Time coverage is from 2007 to 2023.

Table 2 reports baseline OLS estimates of bilateral internal migration flows as a function of destination and origin characteristics, estimated separately by demographic group, as specified in equation (1). The first column refers to the full sample of movers ("All" in column 1), while the following columns report results for subsamples of demographic groups by country of birth ("Spanish Born" vs "Foreign Born" in columns 2 and 3) as defined in Section 5 and age ("Young" in column 4) (and combined "Young-Foreign-born in column 5). Across all groups, distance is negatively correlated with migration flows, with similar magnitudes across groups, confirming the central role of geographic frictions. Labor market conditions also matter in expected ways: higher unemployment rates at the destination are associated with lower inflows, while higher unemployment at the origin increases outward migration, particularly for Spanish-born and young workers. Higher earnings at the destination are associated with greater inflows, whereas higher earnings at the origin are associated with lower outflows.

In terms of housing costs, higher destination house prices are consistently associated with lower migration inflows in all groups. In contrast, higher house prices at the origin are weakly associated with higher outflows. These patterns suggest that housing costs are an important factor in migration decisions and that affordability constraints can bind more tightly for younger and foreign-born populations.

However, these OLS estimates should be interpreted as descriptive correlations rather than causal effects. House prices are equilibrium outcomes that respond endogenously to migration demand and unobserved local economic conditions, which may bias the OLS coefficients. In particular, positive local demand shocks may simultaneously raise house prices and attract migrants, attenuating the negative relationship between prices and inflows. These concerns motivate the instrumental variables strategy introduced in the next section, which isolates exogenous, demand-driven variation in house prices.

Instrumental Variable Approach

A valid instrument requires both (i) relevance—the instrument is statistically significantly related to the endogenous variable—housing prices, and (ii) an exclusion restriction—the instrument influences the outcome variable only through its effect on the endogenous variable and is not correlated with the outcome's error terms. The identifying intuition for using the Bartik-style inflow rate as an instrument, as discussed in Section 4 , is that external migration flows into a province are driven by the presence of existing migrant communities from the same countries. Such variation in inflows is driven primarily by family and network connections rather than by contemporaneous local economic or housing market conditions and thus represents a plausibly exogenous demand shock. Moreover, when interacted with predetermined land supply constraints, the pressure on prices exerted by the demand shock will be heterogeneous across provinces. To show the relevance of our instrument, we next discuss the first-stage regression.

First-stage regression

Figure 2 presents the unconditional relationship between provincial house prices and the Bartik-style predicted foreign inflow rate at yearly frequency. The scatterplot shows a clear positive association, as provinces experiencing larger predicted inflow pressure tend to have higher log house prices. This raw correlation provides suggestive evidence that demand pressure from external migration is an important determinant of house prices, motivating the formal first-stage regression that conditions on province and year fixed effects.

Figure 2: Scatterplot of Bartik Flow Rate and Log House Sale Price

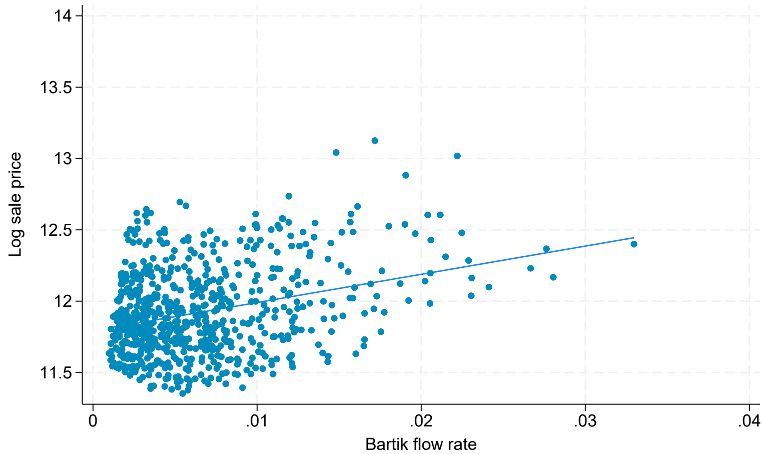


Table 3 reports the first-stage regression results relating provincial house prices to predicted foreign inflow pressure and housing supply constraints. The coefficient on the Bartik-style inflow rate is positive and statistically significant, indicating that provinces exposed to larger predicted foreign inflows experience higher house prices. The interaction between predicted inflows and land supply constraints is also positive and significant, implying that the price response to migration-driven demand shocks is amplified in provinces where housing supply is more constrained. The first-stage relationship is strong, with an F-statistic of 36.1, comfortably exceeding conventional thresholds for weak instruments (Staiger and Stock, 1997). These results confirm that the instrument generates substantial and economically meaningful variation in house prices across provinces and over time.

Overall, the strong first-stage relationships shown in Table A1, with first-stage F-statistics exceeding conventional thresholds in all specifications, support a causal interpretation of the estimated IV regression coefficients in the following sections.

Table 4 reports instrumental variables estimates of the causal effect of housing costs on bilateral migration flows across provinces. The results show that higher housing costs at the destination causally reduce internal migration. Across all groups, an increase in destination house prices leads to a statistically and economically significant decline in migration inflows, with elasticities that are substantially larger in magnitude than those obtained from OLS, a point further discussed below. For all internal migrants, a 10 percent increase in destination house prices causes a 4.03 percent decline in migration inflows (see column 1).

Table 3: First Stage Regression

Dep. Var.	log(HPrice$_{p,t}$)
$BF_{p,t}$	23.157***
	(5.936)
$BF_{p,t} \times LandCons_p$	12.661*
	(7.141)
Constant	11.830***
	(0.052)
Province FE	Yes
Year FE	Yes
Observations	728
R^2	0.647
Number of provinces	52
F-stat	36.10

Notes: The dependent variable, log(HPrice$_{p,t}$), is the log sales price in province p and year t. The Bartik flow rate, $BF_{p,t}$, captures exogenous variation in housing demand arising from predicted inflows of foreign migrants into province p as defined in equation (3). LandCons$_p$ is the housing supply constraint measured as the share of undevelopable land. Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

IV results

The causal effects of housing costs are heterogeneous across demographic groups. The negative impact of destination house prices is stronger for Spanish-born than for foreign-born migrants. This holds both for the full working-age populations and the young subsample. In fact, the estimated effect for young foreign-born migrants is about half that of the Spanish-born and less precisely estimated, a result suggestive of lower sensitivity to local housing prices for this group, possibly connected with greater flexibility in housing arrangements.

Higher house prices at the origin causally increase outward migration in most specifications, consistent with housing affordability acting as a push factor. For "all" internal migrants, a 10 percent increase in origin house prices causes a 2.81 percent increase in migration outflows (see column 1). The push effect of higher origin house prices is strongest for foreign-born and young foreign-born individuals with 6.18 and 7.89 percent increase in migration outflows in response to a 10 percent increase in origin's housing price. This result is consistent with the fact that these groups have lower home ownership rate and greater flexibility in location choice, which makes them more responsive to housing cost pressures at the origin relative to Spain-born populations.

Labor market conditions have the expected signs: higher unemployment rate at the destination is associated with less migration inflows, while higher unemployment at the origin increases outflows. Group-specific earnings at the origin are associated with reduced outflows (and the association is strongest for Spain-born population), while higher earnings at the destination are generally correlated with higher inflows, although the strength of these effects varies across groups.

Taken together, the IV results establish housing costs as a key causal barrier to internal migration and suggest that rising house prices have materially constrained the spatial reallocation of labor across Spanish provinces.

Table 4: IV estimates of bilateral internal migration

	(1) All	(2) Spanish	(3) Foreign-born	(4) Young Spanish	(5) Young Foreign-born
$\log(Dist_{o,d})$	-1.281***	-1.355***	-1.118***	-1.317***	-1.086***
	(0.0554)	(0.0618)	(0.0418)	(0.0577)	(0.0389)
$\log(Pop_{d,t-1})$	-0.0275	0.351	-0.289	0.647	-0.606
	(0.402)	(0.371)	(0.524)	(0.414)	(0.470)
$\log(Pop_{o,t-1})$	-0.0875	0.225	-0.430	-0.199	-0.932*
	(0.345)	(0.337)	(0.450)	(0.440)	(0.550)
$\log(HPrice_{d,t-1})$ (IV)	-0.403***	-0.494***	-0.475***	-0.437***	-0.211
	(0.111)	(0.130)	(0.155)	(0.156)	(0.144)
$\log(HPrice_{o,t-1})$ (IV)	0.281**	0.0329	0.618***	0.0252	0.789***
	(0.118)	(0.128)	(0.127)	(0.132)	(0.133)
$UR_{d,t-1}$	-0.0068**	-0.0057**	-0.01**	-0.005**	-0.011**
	(0.0032)	(0.0026)	(0.0046)	(0.0025)	(0.005)
$UR_{o,t-1}$	0.009***	0.0089***	0.008*	0.0092***	0.0088*
	(0.003)	(0.002)	(0.004)	(0.003)	(0.00467)
$Inc_{g,d,t-1}$	0.704	0.387	0.647***	0.332	0.130
	(0.485)	(0.501)	(0.196)	(0.277)	(0.0907)
$Inc_{g,o,t-1}$	-0.559	-1.351***	-0.0791	-0.636***	-0.113
	(0.426)	(0.376)	(0.175)	(0.221)	(0.069)
Observations	34,296	34,282	34,276	34,251	34,218
R^2	0.656	0.625	0.551	0.592	0.510
F-stats (KP rk Wald)	17.47	18.73	21.55	9.033	13.78

Notes: The dependent variable, $\log(M_{odt} + 1)$, is the log of bilateral migration flows from origin province o to destination province d. Destination house prices are instrumented using predicted foreign inflow rates and their interaction with province-level housing supply constraints. Variables labeled d and o refer to destination- and origin-province characteristics, respectively. All explanatory variables are lagged by one year. Group-specific earnings correspond to the median earnings of the relevant demographic group in each specification, defined by nationality and age. All regressions include origin province, destination province, and year fixed effects. Two-way robust standard errors clustered at the origin and destination province level are reported in parentheses. The reported F-statistics correspond to the first-stage excluded instruments. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Year coverage is from 2009–2023.

The sample of the IV regression is smaller than the OLS regression because data for foreign migration is only available since 2008. The OLS regressions cover 2007-2023 while the IV regressions cover 2009-2023. To be able to compare the coefficients with OLS results, we rerun the OLS on the same sample of the IV regression (full results are shown in Appendix Table A1). Table 5 compares the magnitudes of the IV and OLS coefficients on destination and origin house prices across demographic groups. For destination provinces, the OLS estimates reflect two opposing forces. On the one hand, higher migration inflows raise housing demand and therefore increase house prices. This is the reverse causation we aim to address. On the other hand, higher house prices at destination discourage migration by raising the cost of relocation. Because these two effects operate in opposite directions, the OLS coefficient conflates the causal deterrent effect of housing costs with endogenous demand responses, causing attenuation toward zero.

Table 5: Comparison of magnitude between IV and OLS coefficients

	All	Spanish	Foreign-born	Young Spanish	Young Foreign-born
Panel A: Destination sale price: $\log(HPrice_{d,t-1})$					
IV	-0.403***	-0.494***	-0.475***	-0.437***	-0.211
	(0.111)	(0.130)	(0.155)	(0.156)	(0.144)
R^2	0.656	0.625	0.551	0.592	0.510
OLS	-0.231***	-0.273***	-0.237***	-0.236***	-0.0749
	(0.0651)	(0.0772)	(0.0851)	(0.0832)	(0.0794)
R^2	0.884	0.860	0.862	0.849	0.841
N	34,296	34,282	34,276	34,251	34,218
Panel B: Origin sale price: $\log(HPrice_{o,t-1})$					
IV	0.281**	0.0329	0.618***	0.0252	0.789***
	(0.118)	(0.128)	(0.127)	(0.132)	(0.133)
R^2	0.656	0.625	0.551	0.592	0.510
OLS	0.0116	-0.138*	0.247***	-0.152*	0.350***
	(0.0690)	(0.0689)	(0.0759)	(0.0843)	(0.0862)
R^2	0.884	0.860	0.862	0.849	0.841
N	34,296	34,282	34,276	34,251	34,218

Consistent with this interpretation, the IV estimates for destination house prices are substantially larger in magnitude than the corresponding OLS estimates across all groups (Table 5). For example, for the full working age population of internal migrants, the IV coefficient is -0.40 whereas the OLS coefficient is -0.23. By instrumenting destination house prices with exogenous, migration-driven demand shocks, the IV specification isolates the causal effect of housing costs on migration decisions, net of reverse causality. The larger absolute IV coefficients therefore indicate that OLS understates the true extent to which high housing costs causally reduce migration into destination provinces.

A similar but inverted logic applies to origin provinces. In the OLS specification, origin house prices are influenced both by migration outflows, which reduces housing demand and puts downward pressure on prices. At the same time, origin house prices act as a push factor that encourages migration out of the province. These two effects again operate in opposite directions, biasing the OLS coefficients toward zero. In contrast, the IV estimates isolate the causal push effect of higher housing costs at the origin on emigration, yielding larger and more precisely estimated coefficients.

The comparison between OLS and IV estimates highlights the importance of addressing endogeneity in housing markets. By separating housing cost effects from migration-driven price responses, the IV approach delivers more precise and economically meaningful estimates of the causal impact of housing costs on internal migration decisions at both destination and origin provinces.

Rental prices

Introducing rental prices also yields a clear response of migration to local housing costs. Because a significant share of internal migrants might be renters at arrival, rental prices provide another useful direct measure of the initial housing costs faced when choosing destinations. Moreover, as discussed in Section 3, young and foreign-born individuals, who make up the majority of internal migration, also have lower rates of homeownership.

Appendix Table A2 presents the results of the IV regression where monthly rental prices are used instead of house sales prices.[6] The estimated coefficients for rental prices are shown in Table 6 in comparison with those for sale prices from Table 4. Panel A shows that higher destination rental prices significantly reduce inflows across all groups, with the largest elasticities for foreign-born migrants. The estimated effect for foreign-born migrants (-1.21) is roughly 50 percent larger than for Spanish natives (-0.90), indicating a higher sensitivity of foreign-born internal migration to rental market conditions at destination.

Interestingly, the impact of destination rental prices on young foreign-born migrants is smaller and less statistically significant. Panel B shows that higher origin rental prices increase outward migration, driven primarily by foreign-born and young foreign-born individuals, consistent with rental costs acting as a push factor that disproportionately affects more mobile and liquidity-constrained groups. Origin provinces' rental prices do not significantly affect migration for Spanish natives, consistent with them being less mobile and having higher home ownership.

Relative to sale prices, rental prices generate substantially larger migration responses across nearly all groups. At destination, the rental-price elasticity is roughly two to three times larger than the corresponding sale-price elasticity, particularly for foreign-born migrants (-1.21 vs. -0.48). A similar pattern holds for origin prices, where increases in rental prices induce stronger outward migration responses than increases in sale prices. This contrast suggests that migration decisions respond more strongly to contemporaneous housing costs faced by renters than to asset prices, consistent with the idea that internal migrants are more likely to start their new lives in their destination province as renters initially. Unfortunately, the first stage F-statistics for the IV regression using rental prices are generally below 10 (see Appendix Table A2), indicating a weaker instrument, and suggesting that the estimates should be interpreted with greater caution compared to the baseline results.

[6] One might alternatively consider including both rental prices and sale prices simultaneously in the migration regressions. We do not pursue this specification for two reasons. First, both rental and sale prices are instrumented using the same set of Bartik-style predicted foreign inflows and their interaction with local housing supply constraints. Including both endogenous price measures jointly would therefore rely on the same excluded instruments to identify two highly correlated regressors, substantially weakening first-stage relevance and complicating interpretation. Second, rental and sale prices are themselves strongly correlated across provinces and over time, reflecting common underlying housing demand and supply conditions. Joint inclusion would thus introduce severe multicollinearity, inflating standard errors without providing additional identifying variation. For these reasons, we analyze rental and sale prices in separate specifications and interpret the rental-price results as a complementary perspective on housing affordability faced by migrants at arrival.

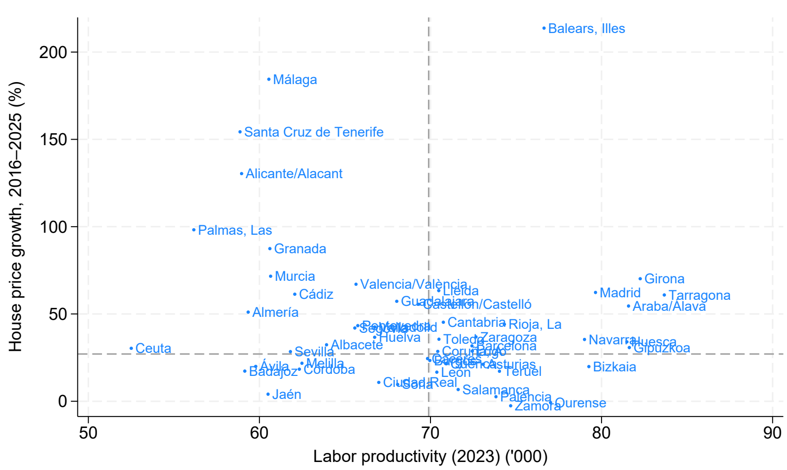
Table 6: Comparison of magnitude between IV coefficients for sale price and rental price

	All	Spanish	Foreign-born	Young Spanish	Young Foreign-born
			Panel A: Destination price		
$\log(HPrice_{d,t-1})$	-0.403***	-0.494***	-0.475***	-0.437***	-0.211
	(0.111)	(0.130)	(0.155)	(0.156)	(0.144)
R^2	0.656	0.625	0.551	0.592	0.510
$\log(HRental_{d,t-1})$	-0.808***	-0.898***	-1.205**	-0.728*	-0.687
	(0.310)	(0.339)	(0.537)	(0.378)	(0.459)
R^2	0.650	0.620	0.524	0.589	0.480
N	34,296	34,282	34,276	34,251	34,218
			Panel B: Origin price		
$\log(HPrice_{o,t-1})$	0.281**	0.0329	0.618***	0.0252	0.789***
	(0.118)	(0.128)	(0.127)	(0.132)	(0.133)
R^2	0.656	0.625	0.551	0.592	0.510
$\log(HRental_{o,t-1})$	0.435**	0.00854	1.165***	0.0215	1.573***
	(0.218)	(0.230)	(0.376)	(0.223)	(0.453)
R^2	0.650	0.620	0.524	0.589	0.480
N	34,296	34,282	34,276	34,251	34,218

7 Counterfactual

To assess the economic significance of rising housing costs in high-demand provinces, we use the estimated elasticities to construct counterfactual migration flows under alternative house price paths. In particular, we ask how internal migration patterns, and the associated reallocation of labor and output, would have been if house prices in high-productivity provinces had grown more slowly. This counterfactual exercise allows us to translate the estimated migration responses into implied effects on regional employment and aggregate GDP.

Figure 3: Productivity vs. House Price Growth across Spanish Provinces



We start by identifying high-productivity and high-house-price-growth provinces. Figure 3 plots Spanish provinces by labor productivity in 2023 (x-axis) and cumulative real house price growth between 2016 and 2025 (y-axis). The vertical dashed line indicates the national labor productivity median in 2023 (the latest year with province-level data). The horizontal dashed line indicates the cumulative CPI inflation between 2016-2025. The chart reveals substantial heterogeneity along both dimensions. Several provinces cluster in the top-right quadrant, combining high productivity with rapid house price growth.[7] The bottom-left quadrant consists of provinces with both below-median productivity and below-inflation house price growth, reflecting relatively weak economic performance and limited housing demand pressure. The top-left quadrant includes provinces with strong house price growth but below-median productivity, capturing locations, often coastal or amenity-rich, where housing demand has risen despite weaker underlying productivity. The bottom-right quadrant comprises high-productivity provinces with comparatively modest house price growth, indicating productive areas where housing affordability pressures have been more muted. Overall, the figure highlights a substantial cluster of provinces where high price growth and productivity growth coincide, motivating the focus on high-productivity, high-price-growth provinces in the counterfactual analysis.

To discipline the counterfactual exercise, we focus on the subset of provinces that combine both high productivity and rapid house price growth, which we refer to as the top-right quadrant. These provinces are simultaneously among the most productive provinces in Spain and those experiencing the strongest housing affordability pressures during the recent housing boom. The counterfactual analysis applies the baseline instrumental-variable estimates of housing price elasticities uniformly across all province pairs. The counterfactual therefore asks how migration flows and aggregate output would have evolved between 2018 and 2025 if house price growth in these top-right-quadrant provinces every year had moderated to the annual country-level inflation between 2017 and 2024 (i.e. zero real growth in house prices). Because migration decisions respond to lagged house price levels, implementing this counterfactual only requires house price data through 2024. Migration microdata are not yet available for 2024 and 2025; accordingly, bilateral migration flows in those years are assumed to equal their 2023 levels.

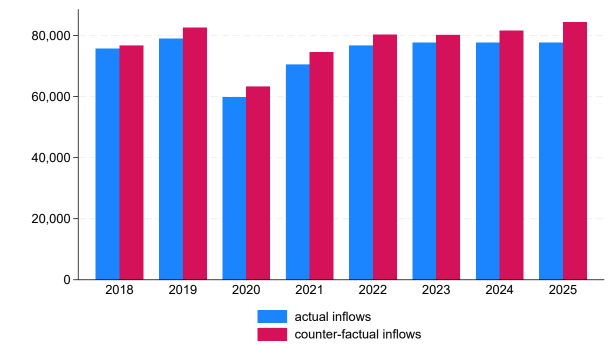
We focus the counterfactual exercises on this period because this interval coincides with a pronounced acceleration in housing price growth across Spanish provinces, particularly in high-productivity destinations. Concentrating on this period allows the counterfactual scenarios to target the years in which housing affordability pressures intensified most sharply and are therefore most likely to have constrained internal migration. As a result, the counterfactuals capture the quantitative importance of housing market dynamics precisely when housing costs became a salient barrier to labor reallocation.

Figure 4 compares actual and counterfactual migration flows involving top-right-quadrant provinces (high productivity and high house-price growth). The left column reports inflows into top-right

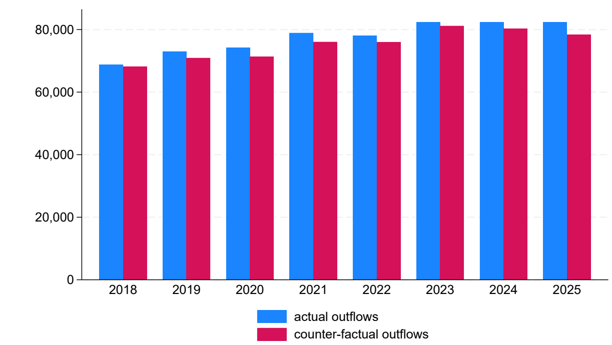
[7] These provinces in the top-right quadrant are Álava, Balearic Islands (Illes Balears), Barcelona, A Coruña, Girona, Gipuzkoa, Huesca, Lleida, La Rioja, Lugo, Madrid, Navarre (Navarra), Cantabria, Tarragona, Toledo, and Zaragoza.

provinces from other quadrants, while the right column reports outflows from top-right provinces to other quadrants. In each panel, blue bars show observed flows and red bars show counterfactual flows under moderated house price growth.

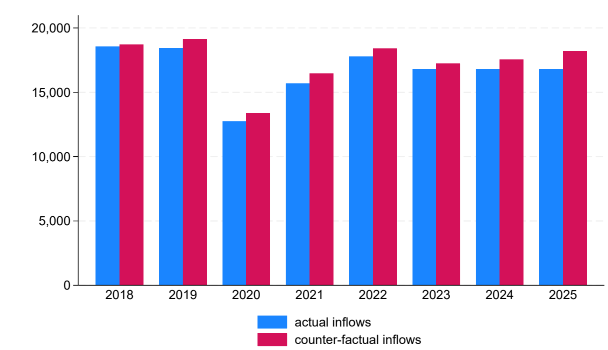
Figure 4: Cross-province actual flows and counter-factual flows



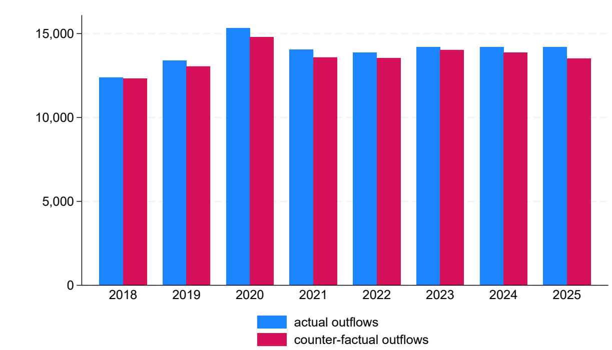
(a) Top-Left to Top-Right



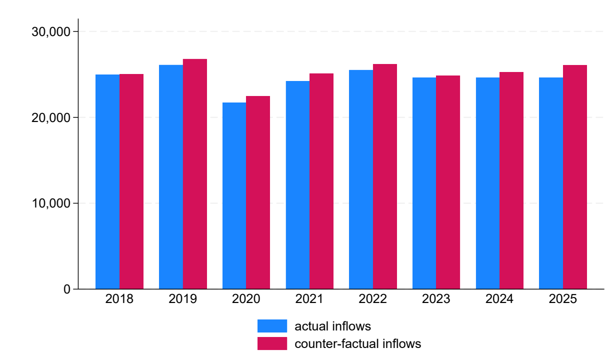
(b) Top-Right to Top-Left



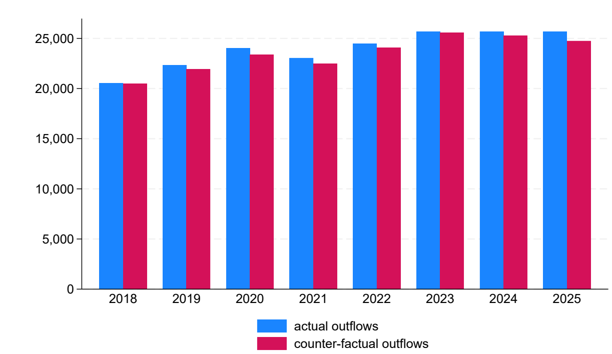
(c) Bottom-Left to Top-Right



(d) Top-Right to Bottom-Left



(e) Bottom-Right to Top-Right



(f) Top-Right to Bottom-Right

Starting with inflows (left column), the largest migration volumes originate from the top-left quadrant, provinces with relatively high productivity but lower house-price growth. These inflows amount to roughly 80–95 thousand movers per year and increase noticeably under the counterfactual, with annual inflows higher by several thousand workers, corresponding to increases on the order of 5–10 percent. House prices in top-right provinces in the counterfactual scenario would now be cheaper, attracting more migration. Inflows from the bottom-left quadrant are smaller in absolute terms, typically around 12–20 thousand movers per year but also rise under the counterfactual. Inflows from the bottom-right quadrant are intermediate in size, around 20–30 thousand movers annually and similarly exhibit modest but systematic increases when housing affordability constraints in top-right provinces are relaxed.

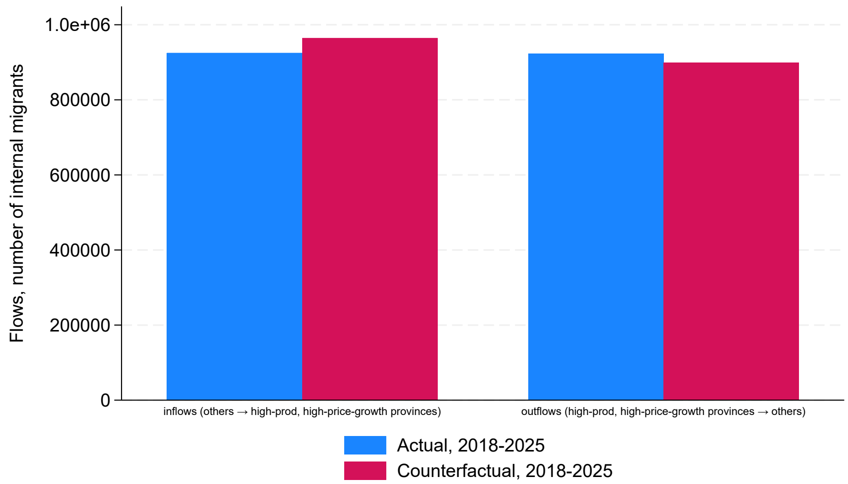
Turning to outflows (right column), migration from top-right provinces is dominated by flows toward the top-left quadrant, with annual volumes in the order of 70–85 thousand movers. Under the counterfactual, these outflows decline relative to observed levels, as house prices in top-right provinces in the counterfactual scenario would be now cheaper, retaining more labor. Outflows from top-right to bottom-left provinces are substantially smaller, typically around 12–15 thousand per year and fall modestly under the counterfactual. Finally, outflows from top-right to bottom-right provinces are sizeable, around 20–25 thousand movers annually.

Overall, the figure shows that moderating house price growth in top-right-quadrant provinces primarily operates by increasing inflows into these provinces and reducing outward migration from them. Although the annual differences are modest relative to total migration volumes, they are large compared with observed net inflows into top-right provinces over this period and form the basis for the aggregate GDP gains reported in the counterfactual analysis.

Figure 5 summarizes cumulative actual and counterfactual internal migration flows involving top-right-quadrant provinces (high productivity and high house-price growth) over the 2018–2025 period. The left bar pair reports total inflows into top-right provinces from all other provinces, while the right bar pair reports total outflows from top-right provinces to the rest of the country. Blue bars show observed flows, and red bars show counterfactual flows under the scenario in which house price growth in top-right provinces is moderated to match country-level CPI growth. Under observed housing prices, cumulative inflows into top-right provinces amount to 925,163 migrants, while cumulative outflows total 923,429 migrants, implying a modest net inflow of only 1,734 workers over the period. Under the counterfactual housing price path, inflows rise substantially to 964,844 migrants, while outflows decline to 899,153 migrants. As a result, net migration into top-right provinces increases sharply to 65,691 workers, which is about 0.3% of Spain's total employment

Comparing the two scenarios, moderating house price growth in high-productivity, high-price-growth provinces generate an increase in net inflows of more than 63,000 workers relative to the observed outcome. Although these gross flows are large in absolute terms, the key implication of the figure is the stark contrast between the near-zero net inflow observed and the economically meaningful net reallocation of labor toward high-productivity provinces implied by the counterfactual.

Figure 5: Summation of cross-province actual flows and counter-factual flows, 2018–2025



We translate the counterfactual migration flows into GDP gains by assigning productivity differences to each bilateral migration pair and aggregating across all pairs. For inflows into top-right provinces, the GDP gain for each origin–destination pair is computed as the increase in counterfactual inflows relative to observed inflows, multiplied by the difference in output per worker between the destination province and the origin province.

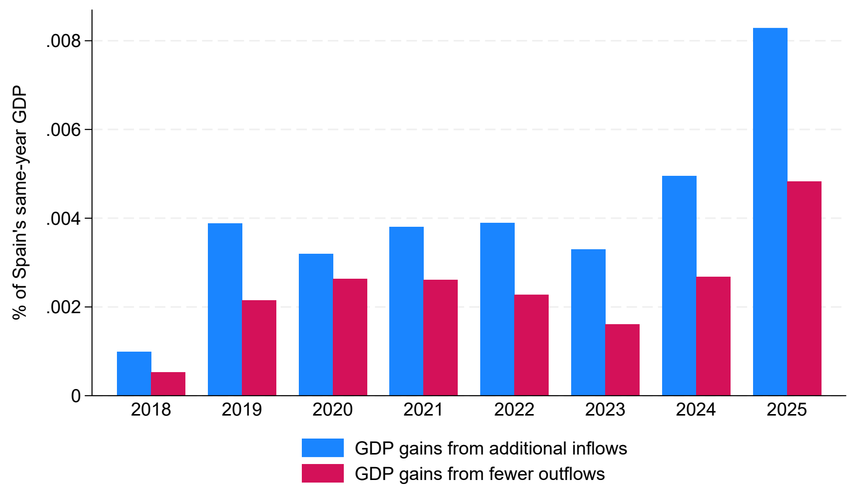
$$GDP_{gains} = \sum_{\substack{(o,d) \\ o\text{ord}\in\text{top=right quadrant}}} \left(\widehat{Inflows}_{o\to d} - Inflows_{o\to d}\right)\left(GDP_{perworker,d} - GDP_{perworker,o}\right) \tag{4}$$

where $\widehat{Inflows}_{o\to d}$ denotes the counterfactual inflows from origin to destination provinces and $Inflows_{o\to d}$ denotes the observed inflows. For outflows, the GDP gain is computed as the reduction in counterfactual outflows relative to observed outflows, multiplied by the difference in output per worker between the origin (top-right) province and the destination province. Aggregating these pair-level gains across all province pairs yields the total GDP gains for each year.

Figure 6 presents the implied GDP gains from the counterfactual house price path, expressed as a share of Spain's contemporaneous GDP and decomposed into gains arising from additional inflows into high-productivity provinces and gains from reduced outflows from those provinces. Both margins contribute positively to aggregate output in every year, with gains from additional inflows generally larger than those from fewer outflows, reflecting the dominant role of migration from lower-productivity regions into top-right-quadrant provinces.

The magnitude of the gains varies over time and closely tracks the intensity of housing affordability pressures. GDP gains are modest in the early years of the sample but rise steadily as house price growth in top-right provinces accelerates. The effects peak in 2025, when total gains exceed 0.01 percent of GDP, driven primarily by strong additional inflows and reinforced by a simultaneous reduction in outward migration. This pattern reflects the fact that migration decisions respond to lagged house price levels: exceptionally strong house price growth in 2024 translates into larger migration responses, and hence larger output gains, in 2025 under the counterfactual. Overall, the figure illustrates how sustained housing cost pressures in productive provinces can generate economically meaningful, though quantitatively modest, aggregate output losses over time by impeding labor reallocation.

Figure 6: Counterfactual GDP Gains by year, 2018–2025



Summing the annual GDP gains across the 2018–2025 period, the cumulative GDP gain implied by the counterfactual amounts to 0.05 percent of Spain's GDP. A simple back-of-the-envelope calculation suggests that if house prices in high-productivity provinces had not grown faster than the inflation over 2017-23, about 63,000 more working-age individuals would have migrated to these provinces, as opposed to just 1,700 (in net terms) in practice. While the direct implied GDP gain would have been small—about 0.05 percent over this period, such gains would accumulate over time if regional divergence in house prices were left unaddressed.

The implied GDP gains from the counterfactual are quantitatively modest and are likely to be a lower bound for several reasons. First, internal migration flows constitute only a limited share of the overall labor force. Even under alternative housing price paths, the number of additional workers relocating to high-productivity provinces, and the actual net inflows to these provinces, remain small relative to total employment in those provinces. Second, the counterfactual focuses on a relatively short window of unusually rapid house price growth, suggesting that persistent affordability pressures could generate larger cumulative losses over time.[8] Third, the implied GDP gains may be also understated because our reduced-form counterfactual exercises hold inter-provincial productivity differentials fixed at their observed levels and therefore omit additional productivity improvements that could arise from agglomeration effects driven by increased net internal migra-

[8]For example, Hsieh and Moretti (2019) study the adverse effect of labor misallocation from housing constraints in the US over a 45-year period.

tion toward more productive provinces. Lastly, our counterfactual exercise focuses on the impact of housing prices on internal cross-provincial migration and ignores the possible housing price impact on international migration, which could generate an even larger GDP impact from housing price changes given its size (around 2 percent of total Spanish employment). Moreover, international migration adds new labor to the Spanish economy, while internal migration is net-zero by construction, which means that our estimated GDP losses arise solely from the reallocation of a fixed stock of workers. At the same time, the results are economically meaningful. Even small percentage effects on aggregate GDP can correspond to sizable absolute output losses in large economies (at around 800 million euros in 2025), underscoring that housing market frictions in productive regions can meaningfully impede efficient spatial allocation of labor.

8 Robustness checks

This section shows that our baseline results are robust to (i) alternative house price measures, (ii) neighboring provinces, (iii) sharing the same autonomous regions, (iv) an inclusion of province-pair fixed effects, and (v) excluding zero bilateral flows.

Robustness check 1: Alternative house price data

Appendix Table A3 assesses the robustness of the baseline results to alternative measures of provincial house prices. Instead of relying solely on the Idealista asking-price series used in the baseline specification, we re-estimate the IV regressions using transaction-based prices from the Colegio de Registradores, appraisal-based prices from Sociedad de Tasación, and alternative unit-price measures from Idealista. Each of these series provides an alternative viewpoint on housing market development. Our baseline series of choice is the average price demanded by sellers, which is likely a fast-moving signal of the cost of housing in a given location from the viewpoint of someone who is planning to move provinces. However, this measure may not reflect the actual price at which transactions are concluded, as it is more of a starting point for negotiations between buyers and sellers. Especially in markets experiencing large swings, the two can deviate substantially. The data from Colegio de Registradores addresses this issue by reporting data on effective transactions. Meanwhile, the professional valuations captured by the Sociedad de Tasación series tend to give greater emphasis to long-term fundamentals and structural characteristics relative to short term fluctuations in the market, which would enter into the transaction data. Finally, using the price per squared meter by Idealista, rather than the average house price, partly controls for changes in the average of the housing stock for sale.[9] These series provide a stringent test of whether the estimated migration responses are sensitive to how housing costs are measured.

Across all alternative price measures, the qualitative results remain unchanged. The results in Appendix Table A3 demonstrate that the estimated causal impact of housing costs on internal migration is robust to alternative house price measures drawn from distinct institutional sources.

[9] Nevertheless, this approach has limitations to the extent that the relationship between price and size is not linear. For instance, larger properties may sell at a premium. It also does not control for other compositional changes in the quality of housing and other factors influencing the price, such as location.

Higher house prices at the destination province causally reduce migration inflows, while higher house prices at the origin increase outward migration. These pull and push effects are consistently stronger for foreign-born and young foreign-born individuals, mirroring the baseline heterogeneity patterns. The signs and relative ranking of coefficients across demographic groups are remarkably stable across data sources, reinforcing the interpretation that housing affordability operates as a broad and systematic constraint on internal mobility rather than an artifact of a particular house price series.

In terms of magnitude, the estimated elasticities are broadly comparable to the baseline Idealista results, though with some variation across sources. Destination-price elasticities generally range between -0.4 and -0.8 for the full working-age sample, compared with -0.4 in the baseline specification. Origin-price elasticities lie between 0.3 and 0.6 for most series, again close to the baseline estimate of 0.28. Appraisal-based prices from Sociedad de Tasación tend to produce somewhat larger coefficients, while transaction-based prices yield estimates closer to the baseline. Overall, the similarity in magnitudes across datasets suggests that the baseline results are not driven by choices of house price measures.

Robustness check 2: The main results are not driven by neighboring provinces

A potential concern is that migration responses to housing costs may vary systematically with geographic proximity. Moving to a neighboring province typically involves lower relocation costs, stronger social and labor market linkages, and smaller disruptions to housing tenure and family networks. As a result, migrants may be more responsive to housing price differentials when destination provinces are geographically close. To examine this channel, we re-estimate the IV specification allowing the effect of house prices to differ between neighboring and non-neighboring province pairs by interacting destination and origin house prices with an indicator for neighboring provinces. This specification tests whether housing affordability constraints operate more strongly along short-distance migration margins, where migration decisions are more elastic.

Appendix Table A4 reports IV estimates allowing the effect of housing costs to differ between neighboring and non-neighboring province pairs. In this specification, the coefficient on destination house prices captures the effect for non-neighboring provinces. This coefficient remains large, negative, and statistically significant across all demographic groups, indicating that higher housing costs at the destination causally reduce migration even for longer-distance moves. The persistence of this effect alleviates concerns that the baseline results are driven primarily by short-distance or local migration responses.

The interaction between destination house prices and the neighboring-province indicator is small in magnitude and generally not statistically significant. This indicates that geographic proximity does not materially attenuate the negative effect of destination housing costs on migration flows. Similarly, the interaction between origin house prices and the neighboring-province indicator is positive but small in magnitude and only marginally statistically significant. The modest size of the interaction suggests that the primary effect of origin and destination house prices operates through overall migration rather than through a strong reorientation toward neighboring destinations.

Robustness check 3: The main results are not driven by provinces in the same autonomous region

Appendix Table A5 reports a robustness check in which the baseline IV specification is augmented by interacting house prices with an indicator for province pairs that belong to the same autonomous community. Although the analysis remains at the province level, this interaction allows migration responses to housing costs to differ for within–autonomous-region moves, which may involve lower administrative, institutional, or cultural barriers than moves across autonomous communities. The coefficient on destination house prices, which captures migration responses across provinces in different autonomous regions, remains negative and statistically significant across all demographic groups, indicating that higher housing costs deter migration even when moves cross broader administrative boundaries. The interaction terms with same autonomous region status are small in magnitude and statistically insignificant, suggesting that shared regional institutions do not materially attenuate the effect of housing costs on migration. Overall, these results reinforce the conclusion that housing affordability constraints operate broadly across space and are not confined to within-region or short-distance relocation. This robustness strengthens the conclusion that rising housing costs are a key factor constraining labor mobility across Spanish provinces.

Robustness check 4: Including province-pair fixed effects

As a further robustness check, we include province-pair fixed effects to control for time-invariant bilateral factors that may jointly influence migration flows and housing markets. These fixed effects absorb persistent pair-specific characteristics such as historical migration links, cultural or linguistic ties, commuting patterns, and geographic frictions that are not fully captured by distance alone. By exploiting only within–province-pair variation over time, this specification ensures that the estimated effect of housing costs is not driven by unobserved, static differences between province pairs and strengthens the causal interpretation of the results.

Appendix Table A6 presents IV estimates that include province-pair fixed effects, which absorb all time-invariant bilateral factors such as persistent migration links, cultural proximity, commuting patterns, and unobserved geographic frictions. Even under this demanding specification, the estimated effect of destination house prices remains negative, statistically significant, and economically meaningful across all demographic groups. The magnitude of the coefficients is comparable to the baseline IV results, indicating that the core findings are not driven by unobserved, static differences between province pairs. Origin house prices continue to exert a positive push effect on outward migration, consistent with housing affordability pressures encouraging relocation. Overall, this robustness check reinforces the causal interpretation that housing costs materially constrain internal migration in Spain.

Robustness check 5: Using log(flows) as the dependent variable

Lastly, as final robustness check, we also re-estimate the baseline IV specification using log(migration) as the dependent variable, instead of log(migration + 1), thereby excluding zero bilateral flows and eliminating any sensitivity to the treatment of small migration pairs. The sample shrinks somewhat because all zero migration pairs are dropped out. The results, reported in Appendix Table A7, closely mirror the baseline findings in both sign and magnitude. For the full working-age population, a 10 percent increase in destination house prices reduces migration inflows by about 4.15 percent, compared with 4.03 percent in the baseline specification, while a 10 percent increase in origin house prices raises outward migration by roughly 2.9 percent, essentially identical to the baseline estimate of 2.8 percent. The magnitude of the effects is similarly stable across demographic groups. Overall, the near-identical magnitudes across the two transformations confirm that the baseline results are not driven by zero flows and that the estimated housing price elasticities reflect genuine behavioral responses rather than functional-form artifacts.

9 Conclusion

This paper provides evidence that housing affordability is a causal barrier to internal labor mobility in Spain. Using an instrumental variable strategy that isolates exogenous variation in housing costs, we show that higher house prices in destination provinces materially reduce migration inflows, while higher house prices at the origin increase outward migration. These effects are heterogeneous across demographic groups, with foreign-born and young individuals exhibiting greater sensitivity to house prices in their moving decisions. The analysis is also robust to alternative specifications, including models that account for persistent bilateral migration ties and regional proximity. Together, the results indicate that housing markets actively shape migration decisions and can limit the extent to which labor reallocates toward more productive regions.

The findings highlight an important interaction between housing markets, mobility, and place-based policies. When housing supply constraints in high-productivity regions raise living costs, migration's role in narrowing spatial productivity gaps weakens. This underlines the importance of easing housing supply constraints not only in general, but also in high-productivity regions, in particular. One option to mitigate the resulting increase in regional disparities is to strengthen place-based interventions that improve economic opportunities in lagging regions. More broadly, addressing housing affordability by boosting supply in high-demand regions and improving local conditions in lower-productivity ones should be viewed as complementary tools for promoting efficient spatial allocation of labor and reducing persistent regional disparities.

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Appendix

Table A1: OLS regressions on the same sample of the IV regressions

	(1) All	(2) Spanish	(3) Foreign-born	(4) Young Spanish	(5) Young Foreign-born
$\log(Dist_{o,d})$	-1.281***	-1.355***	-1.118***	-1.317***	-1.086***
	(0.0586)	(0.0654)	(0.0473)	(0.0608)	(0.0440)
$\log(Pop_{d,t-1})$	-0.318	-0.0106	-0.672*	0.302	-0.823**
	(0.308)	(0.274)	(0.388)	(0.328)	(0.376)
$\log(Pop_{o,t-1})$	0.368	0.506*	0.170	0.105	-0.231
	(0.260)	(0.274)	(0.320)	(0.359)	(0.383)
$\log(HPrice_{d,t-1})$	-0.231***	-0.273***	-0.237***	-0.236***	-0.0749
	(0.0651)	(0.0772)	(0.0851)	(0.0832)	(0.0794)
$\log(HPrice_{o,t-1})$	0.0116	-0.138*	0.247***	-0.152*	0.350***
	(0.0690)	(0.0689)	(0.0759)	(0.0843)	(0.0862)
$UR_{d,t-1}$	-0.00715*	-0.00597**	-0.0106**	-0.00553*	-0.0108*
	(0.00405)	(0.00289)	(0.00508)	(0.00300)	(0.00576)
$UR_{o,t-1}$	0.00958**	0.00903***	0.00824**	0.0092***	0.00871*
	(0.00358)	(0.00294)	(0.00394)	(0.00343)	(0.00466)
$Inc_{g,d,t-1}$	0.461	0.0961	0.530***	0.152	0.117
	(0.477)	(0.524)	(0.164)	(0.271)	(0.0885)
$Inc_{g,o,t-1}$	-0.179	-1.125***	0.104	-0.478**	-0.0698
	(0.373)	(0.352)	(0.159)	(0.211)	(0.0697)
Constant	8.715	27.41***	2.635	16.56***	10.39***
	(8.919)	(8.832)	(4.555)	(5.546)	(3.392)
Observations	34,296	34,282	34,276	34,251	34,218
R^2	0.884	0.860	0.862	0.849	0.841

Notes: The OLS regressions use the same sample as the IV regressions. The dependent variable is the log of bilateral migration flows from origin province o to destination province d. Variables labeled d and o refer to destination- and origin-province characteristics, respectively. All explanatory variables are lagged by one year. Group-specific earnings correspond to the median earnings of the relevant demographic group in each specification, defined by nationality and age. Distance is measured as the logarithm of bilateral distance in kilometers. All regressions include origin province, destination province, and year fixed effects. Two-way robust standard errors clustered at the origin and destination province level are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A2: IV regression on Rental Prices (Full regression result)

	(1) All	(2) Spanish	(3) Foreign-born	(4) Young Spanish	(5) Young Foreign-born
$\log(Dist_{o,d})$	-1.281***	-1.355***	-1.118***	-1.317***	-1.086***
	(0.0554)	(0.0618)	(0.0418)	(0.0577)	(0.0389)
$\log(Pop_{d,t-1})$	0.889	1.336*	1.368	1.357*	0.440
	(0.840)	(0.767)	(1.359)	(0.789)	(1.150)
$\log(Pop_{o,t-1})$	-0.473	0.263	-1.773*	-0.197	-2.844**
	(0.477)	(0.489)	(0.957)	(0.576)	(1.206)
$\log(HRental_{d,t-1})$ (IV)	-0.808***	-0.898***	-1.205**	-0.728*	-0.687
	(0.310)	(0.339)	(0.537)	(0.378)	(0.459)
$\log(HRental_{o,t-1})$ (IV)	0.435**	0.00854	1.165***	0.0215	1.573***
	(0.218)	(0.230)	(0.376)	(0.223)	(0.453)
$UR_{d,t-1}$	-0.013***	-0.012***	-0.016***	-0.0096**	-0.014**
	(0.0048)	(0.0044)	(0.0059)	(0.0043)	(0.0056)
$UR_{o,t-1}$	0.013***	0.0089***	0.0137**	0.0093***	0.0168**
	(0.0042)	(0.0032)	(0.006)	(0.0033)	(0.0074)
$Inc_{g,d,t-1}$	-0.463	-1.091*	0.651**	-0.118	0.117
	(0.519)	(0.639)	(0.279)	(0.304)	(0.106)
$Inc_{g,o,t-1}$	0.160	-1.301***	-0.00392	-0.614***	-0.0498
	(0.472)	(0.396)	(0.206)	(0.197)	(0.101)
Observations	34,296	34,282	34,276	34,251	34,218
R^2	0.650	0.620	0.524	0.589	0.480
F-stats (KP rk Wald)	4.899	3.510	3.151	6.677	4.495

Notes: The dependent variable is the log of bilateral migration flows from origin province o to destination province d. Destination rental prices are instrumented using predicted foreign inflow rates and their interaction with province-level housing supply constraints. Variables labeled d and o refer to destination- and origin-province characteristics, respectively. All explanatory variables are lagged by one year. Group-specific earnings correspond to the median earnings of the relevant demographic group in each specification, defined by nationality and age. All regressions include origin province, destination province, and year fixed effects. Two-way robust standard errors clustered at the origin and destination province level are reported in parentheses. The reported F-statistics correspond to the first-stage excluded instruments. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A3: Robustness 1: IV regressions – Alternative house prices

	(1) All	(2) Spanish	(3) Foreign-born	(4) Young Spanish	(5) Young Foreign-born
Colegio de Registradores					
$\log(HPrice_{d,t-1})$ (IV)	-0.599***	-0.759***	-0.671***	-0.684**	-0.294
	(0.202)	(0.267)	(0.209)	(0.305)	(0.201)
$\log(HPrice_{o,t-1})$ (IV)	0.437**	0.0573	0.918***	0.0422	1.200***
	(0.191)	(0.201)	(0.172)	(0.210)	(0.186)
Observations	34,296	34,282	34,276	34,251	34,218
R^2	0.655	0.623	0.550	0.590	0.509
F-stats (KP rk Wald)	23.85	26.56	26.72	21.31	14.66
Colegio de Registradores (unit price)					
$\log(HPrice_{d,t-1})$ (IV)	-0.540***	-0.672***	-0.620***	-0.588**	-0.279
	(0.176)	(0.233)	(0.188)	(0.265)	(0.183)
$\log(HPrice_{o,t-1})$ (IV)	0.379**	0.0451	0.817***	0.0342	1.062***
	(0.169)	(0.177)	(0.145)	(0.179)	(0.158)
Observations	34,296	34,282	34,276	34,251	34,218
R^2	0.656	0.623	0.551	0.590	0.510
F-stats (KP rk Wald)	13.98	25.45	15.46	24.90	26.85
Sociedad de Tasación (unit price)					
$\log(HPrice_{d,t-1})$ (IV)	-0.769***	-0.991***	-0.810***	-0.902***	-0.306
	(0.194)	(0.243)	(0.271)	(0.301)	(0.241)
$\log(HPrice_{o,t-1})$ (IV)	0.611***	0.0944	1.203***	0.0630	1.516***
	(0.218)	(0.257)	(0.245)	(0.277)	(0.264)
Observations	34,296	34,282	34,276	34,251	34,218
R^2	0.656	0.624	0.550	0.591	0.509
F-stats (KP rk Wald)	7.395	7.450	9.482	7.589	5.694
Idealista (unit price)					
$\log(HPrice_{d,t-1})$ (IV)	-0.421***	-0.518***	-0.512***	-0.453***	-0.219
	(0.114)	(0.141)	(0.154)	(0.168)	(0.146)
$\log(HPrice_{o,t-1})$ (IV)	0.297**	0.0356	0.666***	0.0264	0.831***
	(0.119)	(0.134)	(0.126)	(0.136)	(0.126)
Observations	34,296	34,282	34,276	34,251	34,218
R^2	0.657	0.625	0.552	0.592	0.511
F-stats (KP rk Wald)	22.59	22.26	25.41	17.37	17.95

Notes: This table reports instrumental-variables estimates of the effect of housing costs on bilateral internal migration flows using alternative measures of provincial house prices. Columns correspond to different demographic groups defined by age and country of birth. In each panel, destination and origin house prices are instrumented using predicted foreign inflow rates constructed in a Bartik fashion and their interaction with province-level housing supply constraints. Alternative house price series are drawn from Colegio de Registradores (average transaction prices per square meter), Sociedad de Tasación (appraisal-based prices), and Idealista (asking prices per square meter). All regressions include origin-province, destination-province, and year fixed effects, as well as the full set of control variables used in the baseline specification. All explanatory variables are lagged by one year. Standard errors are two-way clustered at the origin and destination province level and reported in parentheses. The reported F-statistics correspond to the Kleibergen–Paap rk Wald statistic for the excluded instruments. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A4: Robustness 2: Interacting with neighboring provinces

	(1) All	(2) Spanish	(3) Foreign-born	(4) Young Spanish	(5) Young Foreign-born
$\log(HPrice_{d,t-1})$ (IV)	-0.406***	-0.497***	-0.477***	-0.441***	-0.213
	(0.111)	(0.130)	(0.154)	(0.155)	(0.143)
$\log(HPrice_{o,t-1})$ (IV)	0.279**	0.0299	0.617***	0.0218	0.787***
	(0.118)	(0.128)	(0.127)	(0.132)	(0.133)
$\log(HPrice_{d,t-1}) \times Neighbor$ (IV)	0.0409	0.0449	0.0361	0.0423	0.0372
	(0.0394)	(0.0373)	(0.0418)	(0.0348)	(0.0381)
$\log(HPrice_{o,t-1}) \times Neighbor$ (IV)	0.0329	0.0427	0.0224	0.0396	0.0200
	(0.0397)	(0.0376)	(0.0418)	(0.0355)	(0.0382)
$\log(Dist_{o,d})$	-1.010***	-1.033***	-0.903***	-1.015***	-0.875***
	(0.0614)	(0.0692)	(0.0439)	(0.0673)	(0.0418)
$\log(Pop_{d,t-1})$	-0.0315	0.347	-0.291	0.651	-0.602
	(0.403)	(0.371)	(0.524)	(0.413)	(0.470)
$\log(Pop_{o,t-1})$	-0.0928	0.219	-0.434	-0.199	-0.931*
	(0.346)	(0.339)	(0.450)	(0.441)	(0.551)
$UR_{d,t-1}$	-0.00677**	-0.00572**	-0.0104**	-0.00542**	-0.0108**
	(0.00323)	(0.00258)	(0.00457)	(0.00253)	(0.00512)
$UR_{o,t-1}$	0.00899***	0.00884***	0.00781*	0.00916***	0.00881*
	(0.00313)	(0.00245)	(0.00403)	(0.00281)	(0.00468)
$Inc_{g,d,t-1}$	0.700	0.383	0.646***	0.335	0.130
	(0.485)	(0.500)	(0.196)	(0.276)	(0.0906)
$Inc_{g,o,t-1}$	-0.563	-1.358***	-0.0800	-0.636***	-0.112
	(0.426)	(0.377)	(0.175)	(0.222)	(0.0688)
Observations	34,296	34,282	34,276	34,251	34,218
R^2	0.712	0.683	0.594	0.645	0.549
F-stats (KP rk Wald)	1.866	1.878	1.851	1.890	1.928

Notes: The dependent variable is the log of bilateral migration flows from origin province o to destination province d. Variables labeled d and o refer to destination- and origin-province characteristics, respectively. Neighbor is an indicator equal to one if provinces o and d share a common border. All explanatory variables are lagged by one year. Group-specific earnings correspond to the median earnings of the relevant demographic group in each specification, defined by nationality and age. All regressions include origin province, destination province, and year fixed effects. Two-way robust standard errors clustered at the origin and destination province level are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A5: Robustness 3: Interacting with the same autonomous region

	(1) All	(2) Spanish	(3) Foreign-born	(4) Young Spanish	(5) Young Foreign-born
$\log(HPrice_{d,t-1})$ (IV)	-0.408***	-0.502***	-0.471***	-0.447***	-0.206
	(0.112)	(0.131)	(0.157)	(0.155)	(0.144)
$\log(HPrice_{o,t-1})$ (IV)	0.283**	0.0379	0.614***	0.0306	0.783***
	(0.115)	(0.126)	(0.124)	(0.131)	(0.129)
$\log(HPrice_{d,t-1}) \times AutoRegion$ (IV)	-0.0564	-0.172	0.193	-0.194	0.225
	(0.717)	(0.639)	(0.855)	(0.601)	(0.854)
$\log(HPrice_{o,t-1}) \times AutoRegion$ (IV)	0.106	0.227	-0.148	0.248	-0.180
	(0.717)	(0.638)	(0.855)	(0.600)	(0.854)
$\log(Dist_{o,d})$	-1.103***	-1.157***	-0.960***	-1.124***	-0.925***
	(0.0513)	(0.0611)	(0.0399)	(0.0578)	(0.0397)
$\log(Pop_{d,t-1})$	-0.0301	0.351	-0.293	0.654	-0.605
	(0.404)	(0.370)	(0.528)	(0.414)	(0.474)
$\log(Pop_{o,t-1})$	-0.0923	0.219	-0.438	-0.201	-0.939*
	(0.345)	(0.335)	(0.454)	(0.438)	(0.555)
$UR_{d,t-1}$	-0.0068**	-0.00568**	-0.0103**	-0.00539**	-0.0108**
	(0.00321)	(0.00253)	(0.00458)	(0.00248)	(0.00513)
$UR_{o,t-1}$	0.009***	0.00887***	0.00782*	0.00920***	0.00880*
	(0.00315)	(0.00246)	(0.00407)	(0.00282)	(0.00473)
$Inc_{g,d,t-1}$	0.704	0.396	0.647***	0.338	0.129
	(0.483)	(0.502)	(0.197)	(0.276)	(0.0903)
$Inc_{g,o,t-1}$	-0.568	-1.369***	-0.0796	-0.641***	-0.113
	(0.427)	(0.378)	(0.175)	(0.221)	(0.0706)
Observations	34,296	34,282	34,276	34,251	34,218
R^2	0.687	0.653	0.578	0.619	0.536
F-stats (KP rk Wald)	1.442	1.474	1.297	1.428	1.456

Notes: The dependent variable is the log of bilateral migration flows from origin province o to destination province d. Variables labeled d and o refer to destination- and origin-province characteristics, respectively. AutoRegion is an indicator equal to one if provinces o and d share a common autonomous region. All explanatory variables are lagged by one year. Group-specific earnings correspond to the median earnings of the relevant demographic group in each specification, defined by nationality and age. All regressions include origin province, destination province, and year fixed effects. Two-way robust standard errors clustered at the origin and destination province level are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A6: Robustness 4: Adding province-pair fixed effects

	(1) All	(2) Spanish	(3) Foreign-born	(4) Young Spanish	(5) Young Foreign-born
$\log(HPrice_{d,t-1})$ (IV)	-0.403***	-0.495***	-0.475***	-0.439***	-0.213***
	(0.0431)	(0.0481)	(0.0646)	(0.0598)	(0.0663)
$\log(HPrice_{o,t-1})$ (IV)	0.280***	0.0319	0.618***	0.0237	0.788***
	(0.0400)	(0.0440)	(0.0570)	(0.0560)	(0.0590)
$\log(Pop_{d,t-1})$	-0.0219	0.372***	-0.282	0.678***	-0.584***
	(0.127)	(0.137)	(0.178)	(0.167)	(0.192)
$\log(Pop_{o,t-1})$	-0.0755	0.238*	-0.423**	-0.178	-0.927***
	(0.121)	(0.136)	(0.167)	(0.166)	(0.185)
$UR_{d,t-1}$	-0.0067***	-0.0056***	-0.0103***	-0.0053***	-0.011***
	(0.0011)	(0.0011)	(0.0015)	(0.0013)	(0.0017)
$UR_{o,t-1}$	0.009***	0.0089***	0.0078***	0.0092***	0.0087***
	(0.0011)	(0.0011)	(0.0016)	(0.0013)	(0.0017)
$Inc_{g,d,t-1}$	0.704***	0.399**	0.650***	0.347***	0.132***
	(0.160)	(0.188)	(0.0771)	(0.113)	(0.043)
$Inc_{g,o,t-1}$	-0.553***	-1.353***	-0.0776	-0.635***	-0.116***
	(0.154)	(0.177)	(0.076)	(0.107)	(0.042)
Constant	2.185	17.23***	-3.800**	7.140***	2.980**
	(3.223)	(3.725)	(1.873)	(2.477)	(1.519)
Observations	34,296	34,282	34,276	34,251	34,218
R^2	0.970	0.963	0.933	0.947	0.914
F-stats	516.2	520	547.3	411.8	527.9

Notes: The dependent variable is the log of bilateral migration flows from origin province o to destination province d. Variables labeled d and o refer to destination- and origin-province characteristics, respectively. Destination and origin house prices are instrumented using predicted foreign inflow rates and their interaction with province-level housing supply constraints. All explanatory variables are lagged by one year. Group-specific earnings correspond to the median earnings of the relevant demographic group in each specification, defined by nationality and age. All regressions include province-pair fixed effects and year fixed effects, thereby absorbing time-invariant bilateral characteristics between each origin–destination pair. Robust standard errors clustered at the province-pair level are reported in parentheses. The reported F-statistics correspond to the first-stage excluded instruments. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A7: Robustness 5: Excluding zero bilateral flows

	(1) All	(2) Spanish	(3) Foreign-born	(4) Young Spanish	(5) Young Foreign-born
$\log(HPrice_{d,t-1})$ (IV)	-0.415***	-0.507***	-0.480***	-0.481***	-0.276*
	(0.114)	(0.142)	(0.163)	(0.167)	(0.158)
$\log(HPrice_{o,t-1})$ (IV)	0.290**	0.0295	0.651***	0.0454	0.872***
	(0.122)	(0.132)	(0.131)	(0.138)	(0.143)
$\log(Dist_{o,d})$	-1.304***	-1.392***	-1.165***	-1.371***	-1.146***
	(0.059)	(0.066)	(0.046)	(0.063)	(0.043)
$\log(Pop_{d,t-1})$	-0.0459	0.250	-0.374	0.689	-0.562
	(0.418)	(0.399)	(0.558)	(0.472)	(0.546)
$\log(Pop_{o,t-1})$	-0.0944	0.177	-0.500	-0.158	-1.082*
	(0.355)	(0.337)	(0.486)	(0.454)	(0.599)
$UR_{d,t-1}$	-0.0073**	-0.0057**	-0.011**	-0.006**	-0.0111*
	(0.0030)	(0.0028)	(0.0050)	(0.0029)	(0.0059)
$UR_{o,t-1}$	0.0089***	0.0089***	0.0085**	0.0094***	0.0098*
	(0.0030)	(0.0026)	(0.0041)	(0.0030)	(0.0050)
$Inc_{g,d,t-1}$	0.746	0.274	0.697***	0.326	0.142
	(0.513)	(0.532)	(0.208)	(0.288)	(0.108)
$Inc_{g,o,t-1}$	-0.581	-1.386***	-0.0645	-0.695***	-0.112
	(0.447)	(0.401)	(0.187)	(0.231)	(0.0724)
Observations	34,269	34,126	33,833	33,661	32,939
R^2	0.646	0.611	0.534	0.577	0.501
F-stats (KP rk Wald)	20.99	18.47	11.63	17.69	16.48

Notes: The dependent variable is the log of bilateral migration flows from origin province o to destination province d. Destination house prices are instrumented using predicted foreign inflow rates and their interaction with province-level housing supply constraints. Variables labeled d and o refer to destination- and origin-province characteristics, respectively. All explanatory variables are lagged by one year. Group-specific earnings correspond to the median earnings of the relevant demographic group in each specification, defined by nationality and age. All regressions include origin province, destination province, and year fixed effects. Two-way robust standard errors clustered at the origin and destination province level are reported in parentheses. The reported F-statistics correspond to the first-stage excluded instruments. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Year coverage is from 2009–2023.

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