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The Native Mobility Response to Rising Refugees and Migrants in Turkey*

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Abstract

This paper investigates the impact of international migration on internal mobility patterns in Turkey between 2014 and 2022. Using rich bilateral migration flow data, we explore heterogeneity by migrant type and nationality. Our findings indicate that an increase in the share of foreigners in a province is associated with higher out-migration of Turkish nationals. In contrast, a greater share of refugees tends to reduce native internal migration, highlighting distinct effects based on migrant status. We also find substantial variation by migrant nationality, suggesting once more that the characteristics of migrants shape their impact on native mobility. Further, we uncover asymmetric effects: the effect of foreign presence is more pronounced in provinces with initially low levels of internal mobility. Finally, by incorporating subjective measures of satisfaction with public services, we show that both access to and satisfaction with local services significantly influence internal migration decisions.

Keywords: Gravity model; Internal migration; International migration
JEL classification: J15; F22; O15

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1 Introduction

In recent years, Turkey has attracted growing attention from European countries facing increased migration pressures. As a neighboring country of Syria, it became a primary destination for Syrians fleeing their country after the outbreak of the civil war in 2011. Following the signature of the EU-Turkey Statement & Action Plan in March 2016, Turkey strengthened its border controls and became the final destination for many Syrians. According to the United Nations High Commissioner for Refugees (UNHCR), in 2024, Turkey hosted the world's largest refugee population, with nearly 3.2 million Syrians under temporary protection and close to 222,000 refugees and asylum seekers of other nationalities. This partly explains why, over the last decade, Turkey has shifted from being primarily a source country to becoming a host country for international migrants and refugees.

A growing body of literature has examined the impact of these refugee inflows on the Turkish economy. A large part of this research has investigated the labor market effects of Syrian refugees on firm outcomes (Akgündüz *et al.*, 2018; Altındağ *et al.*, 2020) and on native employment (Del Carpio & Wagner, 2015; Ceritoglu *et al.*, 2017; Aksu *et al.*, 2022; Aracı *et al.*, 2022), with particular attention to female employment (Erten & Keskin, 2021) and intra-household inequalities (Bilge & Moriconi, 2024). Other studies have focused on political effects (Altındağ & Kaushal, 2021), crime (Akbulut-Yuksel *et al.*, 2024), or refugee integration (Demirci & Kırdar, 2023; Kırdar *et al.*, 2023). Other researchers have studied refugee mobility within Turkey, showing that refugees respond to income differentials (Beine *et al.*, 2021) and segregation levels at destination (Bertoli *et al.*, 2021). In this paper, we aim to bridge a gap between these two strands of literature by studying how inflows of immigrants and refugees, as well as their internal mobility, affect the internal mobility of Turkish nationals. Internal and international migration interact, and in particular, the internal migration of natives may be influenced by international migration[1] (Cushing & Poot, 2004).

The literature examining the wage effects of immigration has increasingly addressed the impact of international migration on internal mobility, arguing that the internal migration of natives may influence the measured effects of immigration on wages (see the debate between Card, 2001; Borjas, 2006 and Ottaviano & Peri, 2012; more recently see Dustmann *et al.*, 2016 and Piyapromdee, 2021).

Theoretically, international migration may induce internal migration for various reasons. First, foreign immigration can affect local labor markets: if migrants and natives are substitutes and

[1] According to the International Organization for Migration (IOM), international migration refers to "the movement of persons away from their place of usual residence and across an international border to a country of which they are not nationals", while internal migration refers to "the movement of people within a State involving the establishment of a new temporary or permanent residence"; See the Glossary on Migration, published by the International Organization for Migration (IOM).

compete on the job market, foreign immigration may trigger the out-migration of natives (Borjas, 2006); conversely, if they are complements, in-migration may occur. The impact of international migration on internal mobility then depends on the skill levels of both groups (Card, 2001), especially given that skilled individuals and those with prior migration experience are more likely to be mobile (Piyapromdee, 2021; Cadena & Kovak, 2016; Borjas, 2006). At the same time, if immigrants are drawn to prosperous regions, native out-migration becomes less likely since they have no incentive to leave these prosperous regions (Card, 2001). In some cases, foreign immigration may even substitute for native in-migration (Brücker *et al.*, 2011). Second, international migration may affect other markets that, in turn, impact internal migration. Foreign immigration may impact the prices of services and goods, and particularly increase housing prices (Saiz, 2007), leading to native out-migration. Third, preferences regarding the ethnic composition of neighborhoods may also explain the impact of foreign immigration on internal migration (Mayda, 2006).

Empirical studies on the link between international and internal migration mediated through the labor market have reached divergent conclusions. Most of these studies focus on the US, covering various time periods and methodologies. On the one hand, some studies[2] find that natives tend to move away from regions attracting immigrants toward regions less affected by immigration.[3] On the other hand, other studies[4] find that native responses to immigration are limited or statistically insignificant. Beyond the labor market, immigration may influence internal migration indirectly through other channels. For instance, Saiz (2007) finds that immigration significantly raises housing rents and property values in US destination cities. Rising housing costs, in turn, may discourage internal migration, particularly among low-skilled residents (Plantinga *et al.*, 2013; Ganong & Shoag, 2017). Social preferences related to neighborhood composition also contribute to internal mobility responses. Some research suggests that natives may relocate in response to increased immigrant concentrations due to preferences regarding ethnic homogeneity. For example, the phenomenon of "white flight" from large central cities to their suburbs in the US during the mid-20th century has been linked to racial and non-racial causes (Frey, 1979; Bobo & Zubrinsky, 1996; Hall & Crowder, 2014).

Empirical evidence for Europe is more limited. Edo & Özgüzel (2023), using data from 2010 to 2019, find that foreign immigration did not significantly affect native internal mobility in European countries. In the UK, however, Hatton & Tani (2005) reports that immigration displaced

[2]See Walker *et al.* (1992); Frey (1995b,a); Frey *et al.* (1996); White & Hunter (1993); White & Liang (1998); Borjas *et al.* (1997) and Borjas (2006).

[3]See also Boustan *et al.* (2010) who examine internal migration in the US during the Great Depression and show that in-migration prompted the out-migration of some residents; and Crowder *et al.* (2011) who focus on short-distance moves and find that large immigrant concentrations increase the out-mobility of natives to surrounding neighborhoods, and decrease their in-mobility from surrounding areas.

[4]See Butcher & Card (1991); Wright *et al.* (1997); White & Imai (1994); Card & DiNardo (2000); Card (2001); Kritz & Gurak (2001) and Peri & Sparber (2011)

natives across regions during the 1982–2000 period. Evidence from Italy suggests that immigration substituted for native internal migration, particularly among low-skilled natives (Brücker *et al.*, 2011; Mocetti & Porello, 2010). Similarly, Dustmann *et al.* (2017) find that the inflow of Czech cross-border commuters into Germany in the early 1990s reduced local native employment by discouraging labor market entry in affected areas. In contrast, Beerli & Peri (2015) find no evidence that cross-border commuters prompted native out-migration in Switzerland. For France, Ortega & Verdugo (2022) show that immigration between 1976 and 2007 significantly affected native mobility, especially among blue-collar workers. Likewise, Fernández Vázquez *et al.* (2011), using an input-output analysis, highlight regional heterogeneity in the internal migration response to immigration across Spain in 2005. To the best of our knowledge, no prior study has analyzed the impact of international migration on the internal migration of native residents in Turkey. While recent research has explored refugee mobility within Turkey (Beine *et al.*, 2021; Bertoli *et al.*, 2021), the question of how Turkish natives respond to immigration in terms of internal relocation remains unexplored.

We develop a theoretical framework based on a Random Utility Maximization (RUM) model to analyze the impact of international migration on internal migration. This model is particularly suitable for modeling both internal and international location choices (Bertoli & Moraga, 2017; Beine *et al.*, 2016). Then, relying on this gravity framework, we estimate the relationship between international and internal migration in Turkey between 2014 and 2022. We find that foreigners have heterogeneous effects on native mobility: while international migrants lead to net out-migration of Turkish natives, the presence of refugees is associated with reduced native outflows. We also document variation in the effects of international migrants based on their nationality. Additionally, the impact of foreigners on internal mobility is mediated by provinces' initial level of internal mobility and by subjective measures of satisfaction with public services.

This paper makes several key contributions to the literature. First, it bridges a gap between the international and internal migration literature, enhancing our understanding of how international migration affects host countries. Second, we underline that, beyond economic incentives emphasized in the literature, other factors such as the composition of immigration flows, significantly influence migration patterns. Third, to the best of our knowledge, this study is the first to examine whether native internal migration in Turkey responds to immigration, despite Turkey's recent emergence as a migration destination.

The studies most closely related to ours are Beine *et al.* (2021) and Bertoli *et al.* (2021), which analyze the internal mobility of refugees and non-refugees within Turkey. Like them, we build a RUM model of internal migration and study the internal mobility of residents within Turkey.

However, our approach differs in that we measure mobility over several years (and not within a single year), and examine how internal migration flows respond to gravity variables and to the arrival and the internal mobility of foreigners.

The remainder of the paper is organized as follows: Section 2 presents the theoretical model of internal migration adapted to the Turkish case, Section 3 introduces the data and descriptive statistics, and Section 4 discusses the main findings. Finally, Section 5 concludes.

2 A RUM model for internal migration in Turkey

A substantial body of literature has examined the determinants of internal and international migration flows, mainly using RUM models (Beine *et al.*, 2016), from which a gravity model can be derived and estimated.

2.1 The standard RUM model of internal migration

We consider the internal migration decision of an individual i residing in Turkey. At time t, she chooses among D potential destinations (including her home province o). Each destination offers a distinct level of utility that depends on destination-specific and individual characteristics. We denote by $U_{iod,t}$ the utility that individual i residing in province o derives from migrating to province d at time t. Following Beine *et al.* (2016), we assume that the individual makes myopic decisions, reassessing whether and where to migrate in each time period. The individual chooses the destination d that maximizes her utility among all possible destinations.

The utility of individual i who migrates from province o to province d at time t is given by:

$$U_{iod,t} = W_{d,t} - C_{od,t} + \varepsilon_{iod,t}, \tag{1}$$

where $W_{d,t}$ is the deterministic component of utility in destination province d, $C_{od,t}$ is the deterministic cost of migrating from o to d (with $C_{oo,t} = 0$), and $\varepsilon_{iod,t}$ is an individual-specific stochastic term. As standard in the literature, we assume that $\varepsilon_{iod,t}$ is independent and identically distributed over individuals, destinations, and time, and follows a univariate Extreme Value Type-1 distribution with a unit scale parameter.

In the absence of internal mobility restrictions, the bilateral internal migration cost ($C_{od,t}$) can be approximated by the geographic distance between the origin and the destination provinces. Additionally, the contiguity between provinces should facilitate bilateral migration.

The deterministic component of utility ($W_{d,t}$) depends on economic conditions such as local labor markets (see the seminal paper by Harris & Todaro, 1970), prices, education opportunities,

the quality of life... Thus, it depends directly and indirectly from the presence of international migrants and refugees in destination d.

We define $\text{MOB}_{od,t}$ as the number of Turkish nationals moving from province o to province d at time t and $\text{IMMOB}_{o,t}$ as the number of Turkish nationals staying in province o at time t. It is equal to the ratio of the unconditional probability of migrating from o to d to the unconditional probability of staying in province o at time t. Drawing on McFadden (1974, 1984), this rate can be written as:

$$\ln\left(\frac{\text{MOB}_{od,t}}{\text{IMMOB}_{o,t}}\right) = W_{d,t} - W_{o,t} - C_{od,t}. \tag{2}$$

The bilateral mobility rate depends only on the origin and destination characteristics and bilateral migration costs. The choice structure thus satisfies the property of independence of irrelevant alternatives (IIA) (Beine *et al.*, 2016). Equation (2) implies that the logarithm of the odds of migrating to province d relative to staying in province o can be expressed as a linear function of the differential in the deterministic component of utility associated with the two provinces, net of the bilateral migration cost.

2.2 The Turkish case

A brief history of international and internal migration flows in Turkey. Between 1980 and 2020, Turkey underwent significant economic and demographic changes, including rapid urbanization, economic liberalization, and shifts in migration patterns. Its Human Development Index (HDI) rose from 0.474 in 1980 to 0.769 in 2012 and 0.855 in 2023, placing it in the "very high human development" category (UNDP, 2024). This economic development coincided with demographic changes related to both internal and international migration.

Historically, Turkey has both sent and received international migrants. The 1923 population exchange with Greece resettled 1.5 million people (Iğsız, 2018). Subsequent waves included the resettlement of Bulgarian Turks until 1984. This was the largest post-war influx from a socialist Eastern European country to a non-socialist one within such a short time frame (Vasileva, 1992).

After 1960, large-scale labor emigration to Europe began, particularly to Germany and other Western European countries (Akgunduz, 2017). Though initially framed as temporary, these movements evolved into permanent settlement due to family reunification. Consequently, these labor emigration contributed to Turkey's perception as a source country of migration.

Since 2010, following the arrival of Syrian refugees, Turkey has progressively become a major destination country, marked by an influx of migrants from various nationalities over the years. Over 3 million Syrians have fled to Turkey, making it one of the largest refugee-hosting nations.

Consequently, Turkey experienced significant changes in its demographic dynamics, reflected in a more than threefold rise in international migrants numbers over the past decade. The share of international migrants in the total population grew from 0.7% in 2014 to 2.1% in 2022 (OECD, 2023).

These changes in economic development and international migration were accompanied by shifts in terms of internal mobility. Internal migration in Turkey has been shaped by regional economic disparities. These inequalities, rooted in the Ottoman era, persist today. Research shows a dual economic structure between the more developed West and the less developed East (Aşık *et al.*, 2023; Gezici & Hewings, 2007; Luca & Rodríguez-Pose, 2015). Economic activity remains highly concentrated around Istanbul. Internal migration patterns reflect these developments. The 1950-1960 period was characterized by agriculture-oriented growth, while the 1960-1980 period was characterized by industrialization-oriented growth. This resulted in migration from rural to urban areas, especially after 1960. By 2022, according to TURKSTAT (the Turkish Statistical Institute), 67.9% of the population lived in densely urbanized areas.

The drivers of internal mobility in Turkey. The main determinants of migration flows are well known in the literature (Bank, 2018): pull and push factors include economic, demographic, geographic, and cultural factors.

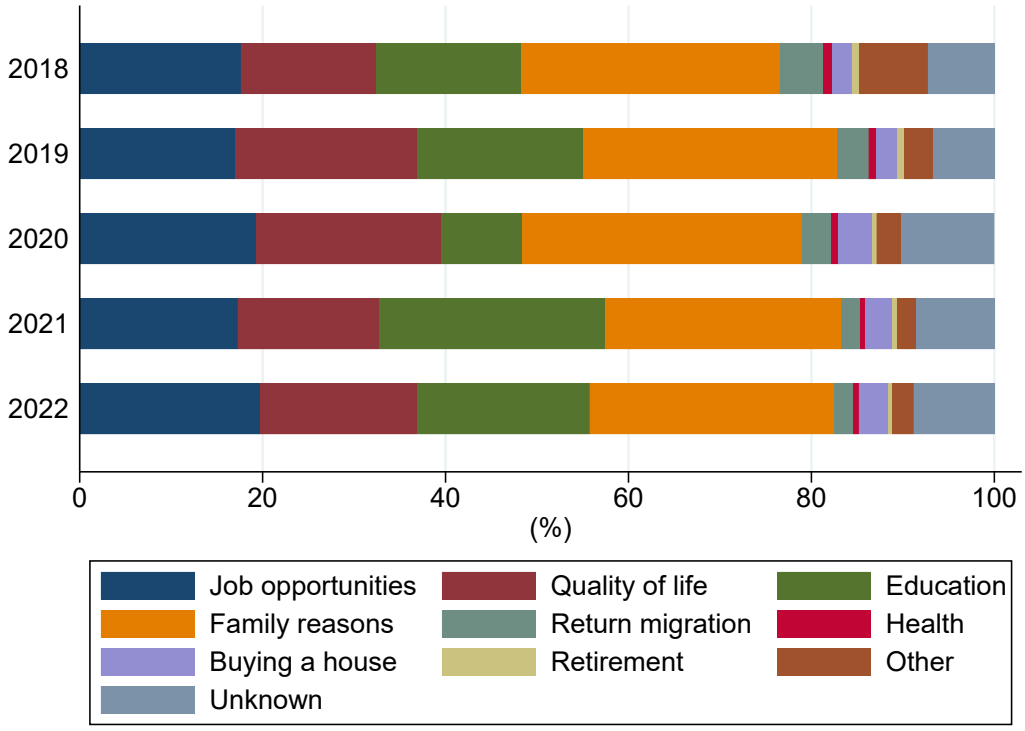
Since 2018, TURKSTAT records the stated reasons for inter-provincial migration by Turkish residents. Figure 1 summarizes the main motivations during the period 2018-2022.

As shown in Figure 1, family-related reasons (migration related to any member of the household, change of marital status or family-related reasons) are the most cited (26.8% on average annually). Education is also a key factor (18.5% on average, excluding 2020 because of the COVID-19 epidemic). As evidenced by many studies, migration can be seen as an investment in human capital. Educational opportunities may be proxied by the number of bachelor-level students per province. Figure 1 also shows that economic motives are central: 18.1% of internal migrants cite job change or job search as the main motive of their internal mobility. Provincial GDP per capita and population size must then be taken into account to explain internal migration in Turkey.[5] Better housing (including buying a house) and living conditions account for 19.9% of internal moves. Health access, proxied by the number of doctors per 1,000 residents, is also taken into account. Other motives include return migration, retirement, and natural disasters.

Although the presence of foreigners is not directly listed as a motive to move internally, it may be taken into consideration by movers, since it influences perceptions of economic opportunity or

[5]Unemployment rates are not available at the required disaggregation level.

Figure 1: Reasons to migrate across provinces in Turkey



Notes: Family reasons include migration related to a family member, change of marital status or other family reasons; job opportunities include migration to change, find or start a job; return migration includes going back to family or place of birth.
Source: Authors' calculations from the declarations obtained by the General Directorate of Population and Citizenship Affairs during address changes (TURKSTAT, 2018-2022).

quality of life. As underlined in the introduction, internal mobility may be a response to the effects of international migration on labor markets (Card, 2001; Borjas, 2006; Ottaviano & Peri, 2012), prices (Saiz, 2007), and ethnic compositions (Mayda, 2006).

2.3 The RUM-based gravity equation

Building on the equilibrium equation (2) and insights from the Turkish case, we estimate the following gravity equation:

$$\begin{aligned}\ln\left(\frac{\text{MOB}_{od,t}}{\text{POP}_{o,t}}\right) = \beta_0 &+ \beta_1 \, \mathbb{1}_{\Delta\text{MIGcap}_{o,t}} \cdot \ln\left|\Delta\text{MIGcap}_{o,t}\right| + \beta_2 \, \mathbb{1}_{\Delta\text{MIGcap}_{d,t}} \cdot \ln\left|\Delta\text{MIGcap}_{d,t}\right| \\ &+ \beta_3 \, \mathbb{1}_{\Delta\text{REFcap}_{o,t}} \cdot \ln\left|\Delta\text{REFcap}_{o,t}\right| + \beta_4 \, \mathbb{1}_{\Delta\text{REFcap}_{d,t}} \cdot \ln\left|\Delta\text{REFcap}_{d,t}\right| \\ &+ \beta_5 \ln\left(\text{C}_{od}\right) + B'\Gamma_{o,t} + C'\Gamma_{d,t} \\ &+ \gamma_o + \gamma_d + \gamma_t + \epsilon_{od,t}, \end{aligned} \tag{3}$$

where the dependent variable is the internal migration rate, defined as the ratio of the number of Turkish natives moving internally from origin province o to destination province d at time t, $\text{MOB}_{od,t}$, to the population in origin o ($\text{POP}_{o,t}$), which proxies the number of stayers, defined as $\text{IMMOB}_{o,t}$ previously. Our independent variables of interest are annual net per capita changes in the numbers of international migrants and refugees in origin o and destination d at time t, denoted respectively by $\Delta\text{MIGcap}_{o,t}, \Delta\text{MIGcap}_{d,t}, \Delta\text{REFcap}_{o,t}$, and $\Delta\text{REFcap}_{d,t}$[6].

These variables are decomposed into direction (via $\mathbb{1}$)[7] and magnitude (log absolute value) to capture inflows and outflows symmetrically—even when negative. Coefficients β_1 and β_3 capture the push effects of migrant or refugee changes at origin provinces, while β_2 and β_4 capture the pull effects at destination provinces.

The deterministic component of utility at origin and destination provinces at time t depend not only on local flows of foreigners and refugees, but also on other local characteristics, such as local GDP per capita or the shares of bachelor students and doctors per inhabitant, summarized in $\Gamma_{o,t}$ and $\Gamma_{d,t}$. All these variables are included as control variables in logarithmic form.

The bilateral migration cost C_{od} is considered time-invariant and approximated by geographical distance and a contiguity indicator. To capture unobserved factors related to origin and destination characteristics, as well as time-varying national trends, we include origin, destination, and time fixed effects, respectively denoted by γ_o, γ_d and γ_t. Alternative fixed-effect structures will be considered later. Finally, following the literature, we cluster standard errors by origin-destination pair to account for potential heteroskedasticity and autocorrelation. This implies that model errors across different origin-destination pairs are assumed to be uncorrelated (Cameron & Miller, 2015).

In our empirical specification, we slightly depart from the theoretical model by including origin and destination variables separately (with distinct coefficients), based on the assumption that prospective internal migrants value characteristics in origin and destination provinces asymmetrically. This may reflect easier access to information in the origin province (Beine *et al.*, 2021), or a home-bias (Schewel, 2020).

We estimate equation (3) using ordinary least squares (OLS). We suspect limited endogeneity concerns arising from reverse causality or omitted variables. Potential identification issues are further addressed in subsection 4.3.

[6] We approximate net changes using the difference in migrant and refugee stocks over one year, to estimate the effects of new arrivals or departures (flows), though this is not a perfect measure.

[7] The value is equal to 1 if the change in the number of immigrants/refugees is positive (inflow), to -1 if the change is negative (outflow), and to 0 if there is no change.

3 Data and descriptive statistics

3.1 Data

Our primary data source is the TURKSTAT Statistical Institute Portal, unless stated otherwise. We focus on the 2014-2022 period for two main reasons. First, refugee and migrant inflows to Turkey increased significantly during this period. Second, data on the distribution of Syrian refugees across provinces are only available from 2014 onward.

Internal migration flows refer to the number of Turkish nationals who changed their permanent residence from one province to another among the 81 provinces of Turkey.[8]

We compute provincial GDP per capita, and the shares of foreigners, refugees, and bachelor-level students by dividing provincial GDP and population counts of each group by the number of local inhabitants. Foreigners are defined as individuals with non-Turkish nationality. Data on the provincial distribution of Syrian refugees[9] is provided by the Ministry of Interior's Presidency of Migration Management. Data on the number of bachelor-level students is provided by the Higher Education Information Management System, developed by the Turkish Council of Higher Education. Bilateral distance between provinces is measured as the distance between their centroids.

3.2 Descriptive statistics

We obtain a sample covering the 81 Turkish provinces over the period 2014-2022. As shown in Figure 2, the ratio of inter-provincial migration (or internal migration) to Turkish population fluctuates between 2.70 percent and 3.73 percent during this period, with the lowest rate observed in 2020 during the COVID-19 pandemic. At the end of the period, in 2022, the inter-provincial migration rate stands at 3.27 percent.

Figure 3 shows the out-migration rates of Turkish provinces during the period. The provinces with the highest internal out-migration rates are Ardahan, Bayburt, and Kilis.

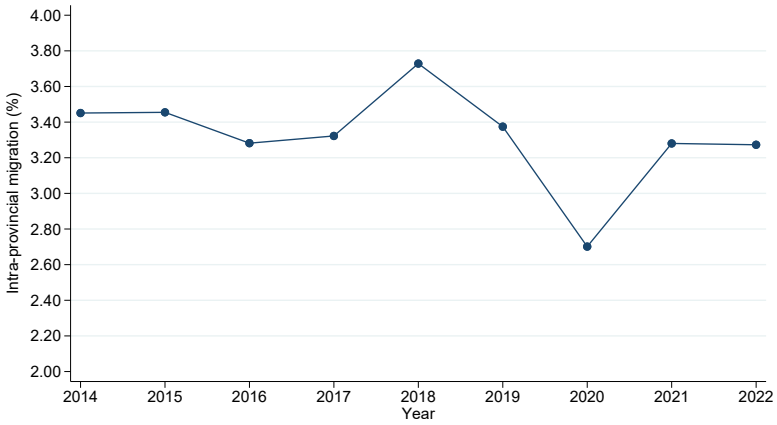
As previously mentioned, between 2014 and 2022, Turkey experienced a steady increase in international migrant inflows: while international migrants accounted for 0.37 percent of the Turkish population in 2014, their share rose to 2.14 percent by 2022. The refugee population also grew, from 2.60 percent of the population in 2014 to 4.12 percent in 2022.

Figure 4 presents the shares of international migrants by continent and main nationality in the total population in Turkey from 2012 to 2022. Most immigrants come from Asia and Europe, more specifically from Afghanistan, Iraq, Germany, Iran, and Russia. Note that a significant share of

[8] The internal migration flows of Turkish natives were obtained upon request from TURKSTAT.

[9] The Ministry does not provide information on the regional distribution of other refugees; however, Syrian refugees represent more than 93 percent of the total refugee population in Turkey.

Figure 2: The annual share of inter-provincial migrants in Turkish total population over 2014-2022



Notes: An inter-provincial migrant is a person who changed permanent residence from one province to another within the country.
Source: Authors' calculations based on TURKSTAT data on Internal Migration Statistics.

migrants come from Germany. Given Turkey's long-standing emigration ties with Germany and the fact that multiple citizenship was not permitted in Germany until 2024, these German migrants may include Turks returning to their country of origin or children of former Turkish emigrants who were naturalized in Germany after renouncing Turkish citizenship.

Table 1: Summary statistics

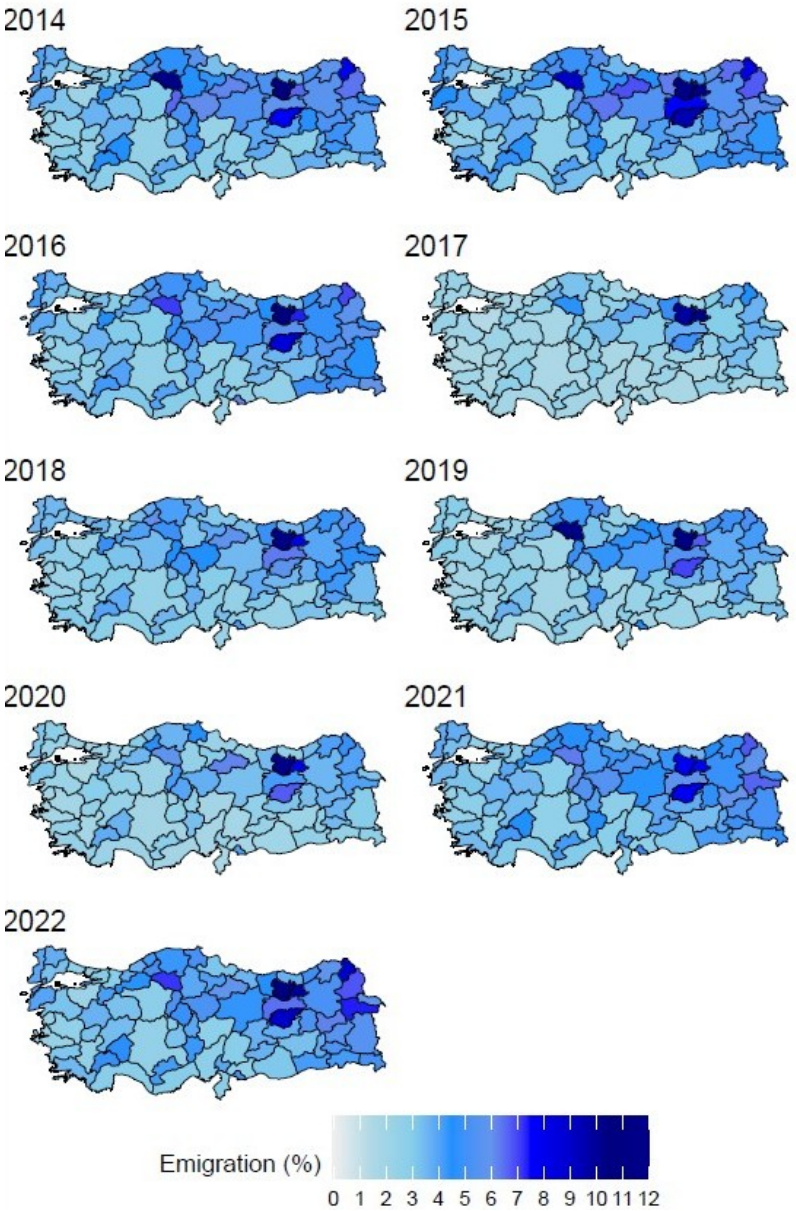
Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**	**Obs.**
Internal migration of Turkish natives					
Nbr. of internal mig.	415.567	1,225.907	0	29,990	58,315
Internal mig. share (%)	0.054	0.171	0	8.416	58,315
International migration					
Nbr. of international mig.	14,534.368	55,298.379	98	740,954	58,320
International mig. share (%)	1.122	1.188	0.029	10.687	58,320
Nbr. of refugees	38,259.627	95,376.929	0	560,881	58,320
Refugees share (%)	3.296	10.335	0	98.774	58,320
Control variables					
Population (residents)	1,009,321.564	1,824,008.189	78,550	15,907,951	58,320
Real GDP per capita (2010=100)	0.174	0.064	0.060	0.458	58,320
Nbr. of bachelor students	27,882.512	57,585.947	516	570,609	58,320
Bachelor students share (%)	3.269	2.094	0.187	13.803	58,320
Nbr. of doctors per 1000 people	1.660	0.480	0.700	4.000	58,320
Distance btw. provinces (kms)	573.927	322.295	38.037	1,558.261	58,320

Note: Summary statistics for the main variables of interest over the period 2014-2022. The share variables are created by dividing the total number of the given variable by the population in the same province and expressed in percentage.

We report summary statistics for the period 2014-2022 in Table 1.[10] Over the 2014-2022 period, for most variables, we have 58,320 observations, corresponding to 81 origin provinces and 80

[10] Table A.2 in the Appendix shows summary statistics over the restricted period 2014-2019.

Figure 3: The annual out-migration rate over 2014-2022



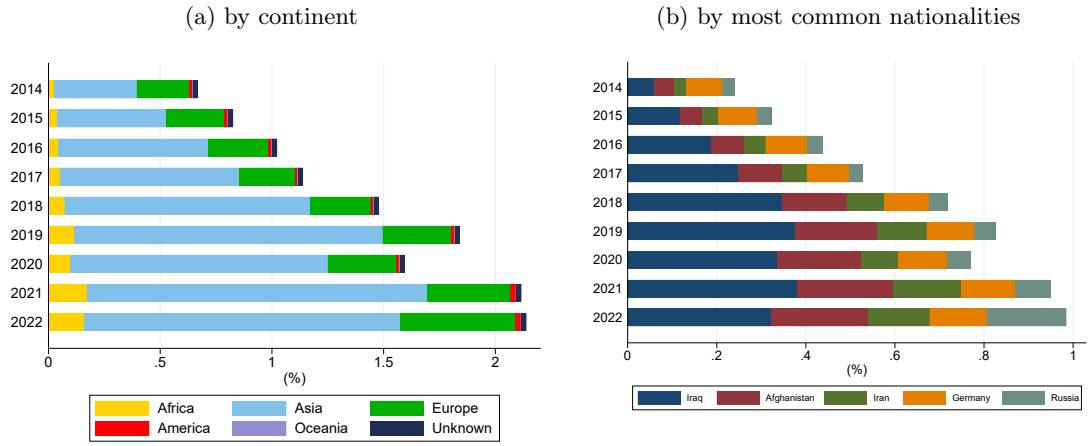
Notes: The maps show the evolution of provincial out-migration rates over the period 2014-2022. The annual out-migration rate is defined as the number of residents leaving the province over the population of that province. *Source:* Authors' calculations based on TURKSTAT data on Internal Migration Statistics.

destination provinces over nine years. For internal migration, data are missing for five provinces.[11]

On average, 415,567 Turkish citizens change their province of residence annually over the period 2014-2022. Some provinces receive no internal migrants, while others attract up to 8.4 percent of their population. The annual number of international migrants per province ranges from fewer than 100 to more than 740,000 individuals, with a mean of 14,500. International migrants represent between 0 and 10.7 percent of the local population. Provinces also vary widely in refugee population

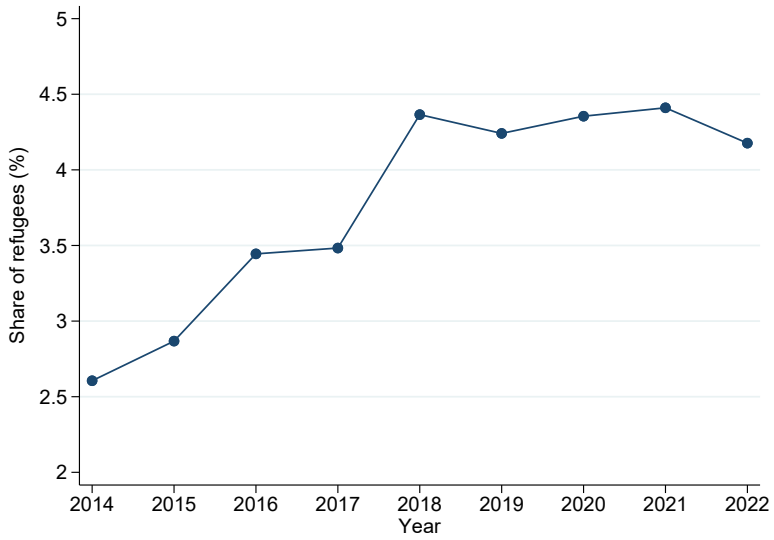
[11]Information is missing for internal migration from Kilis to Corum and Sinop in 2015, from Kilis to Usak in 2019, from Sinop to Ardahan in 2021, and from Kilis to Usak in 2021.

Figure 4: Share of international immigrants in Turkey over the period 2014-2022



Source: Authors' calculations based on Turkish Statistical Institute data on foreign population by nationality.

Figure 5: The annual share of refugee population over the period 2014-2022



Source: Authors' calculations based on the Ministry of Interior's Presidency of Migration Management.

shares, ranging from 0 to 99 percent of the local population.[12] In 2022, the least populated province, Bayburt, had 84,241 inhabitants, while the most populous, Istanbul, has 15,907,951 residents. The average provincial population is around 1 million residents. As noted earlier, regional disparities are significant: the richest province is, on average, 7.6 times wealthier than the poorest. The average share of undergraduate students in provincial populations is 3.2 percent of the province population, ranging from 0.2 to 13.8 percent. On average, there are 1.7 doctors per 1,000 inhabitants at the provincial level, with values ranging from 0.7 to 4 per 1000 inhabitants.

[12]This extreme value corresponds to the city of Kilis (in 2016), which is a small city hosting a large refugee camp.

4 Results

4.1 Benchmark results

Table 2 presents the estimates of the baseline model. We include several fixed effects (FE) structures to assess the robustness of our specifications. In column (1), we include origin, destination, and time FE separately. In line with Ortega & Peri (2013), column (2) includes origin-time FE (as well as destination FE) to account for multilateral resistance to migration from origin provinces, i.e., origin-specific barriers to mobility. However, this specification prevents the inclusion of time-varying origin-specific variables, which are then dropped in this model. In column (3), we include origin and destination-time FE instead.

Provincial GDP per capita, geographical distance and contiguity between provinces are included as control variables. These gravity variables display the expected signs across all specifications. Internal migration flows are negatively associated with GDP per capita at origin, and (albeit insignificantly) positively associated with GDP per capita at destination. As expected, internal migration is more likely between contiguous and geographically close provinces. These findings align with prior work by Bertoli *et al.* (2021) and Beine *et al.* (2021), who report an elasticity of internal migration flows relative to distance in the range of 0 to -1.

International migrants as a push factor. We estimate the effect of newly arrived international migrants on the internal mobility of Turkish natives. Results in Table 2 indicate a positive association between the share of international migrants and internal out-migration. Specifically, a 1% increase in the number of international migrants per capita in a province is linked to a 0.3% increase in the native internal out-migration rate. This pattern suggests a crowding-out effect at the origin. Conversely, the presence of international migrants appears to deter in-migration. A 1% increase in their share is associated with a 0.8% decline in the likelihood that Turkish natives relocate to that province.

Refugees as a pull factor. In contrast to international migrants, a higher share of refugees in a province is associated with both lower native out-migration and higher native in-migration. Specifically, as shown in Table 2, a 1% increase in the refugee share corresponds to a 0.3% decline in native outflows and a 0.6% increase in inflows. These effects suggest that refugees may exert a pull effect on native mobility. While initially counterintuitive, this finding may reflect unobserved province-level attributes, which attract both refugees and natives. Furthermore, this result aligns with Bertoli *et al.* (2021), who, using granular mobile phone data, find that native Turks are more

Table 2: The impact of international migrants on natives' internal mobility

Internal migration	(1)	(2)	(3)
I*ln(MIG p.c.)(origin)	0.003***		0.003***
	(0.001)		(0.001)
I*ln(MIG p.c.)(dest.)	-0.008***	-0.008***	
	(0.001)	(0.001)	
I*ln(REF p.c.)(origin)	-0.003***		-0.003***
	(0.001)		(0.001)
I*ln(REF p.c.)(dest.)	0.006***	0.006***	
	(0.001)	(0.001)	
GDP p.c. (origin)	-0.223***		-0.223***
	(0.030)		(0.029)
GDP p.c. (dest.)	0.001	0.002	
	(0.028)	(0.028)	
Contiguity	1.188***	1.188***	1.188***
	(0.038)	(0.038)	(0.038)
Distance	-0.447***	-0.447***	-0.447***
	(0.013)	(0.013)	(0.013)
Adj-R2	0.805	0.807	0.815
N	51812	51812	51812
Fixed effects			
Origin	✓	✗	✓
Destination	✓	✓	✗
Time	✓	✗	✗
Origin-time	✗	✓	✗
Destination-time	✗	✗	✓

Notes: The sign function is indicated by "I". p.c. stands for per capita. GDP p.c. and distance are in terms of logarithms. Standard errors in parenthesis are robust to heteroskedasticity and clustered by province-pair. ***, ** and * denote significance at the 1%, 5% and 10% level respectively.

likely to migrate to regions with larger shares of refugees. As they argue, the observed effect may capture omitted variables that influence province attractiveness. We return to this point in subsection 4.3.

4.2 Heterogeneity

4.2.1 Heterogeneity by nationality of foreigners

The origins and characteristics of international migrants in Turkey are diverse, resulting in heterogeneous responses by Turkish natives depending on migrant characteristics. In our dataset, nationality is the only observable migrant characteristic. The most common countries of origin include Afghanistan, Iraq, Germany, Iran, and Russia (as shown in Figure 4).

The estimates in Table 3 show clear heterogeneity in native responses based on migrant nationality. An increase in the share of migrants from Germany and the rest of the world (RoW) is associated with a 0.2% rise in native out-migration, suggesting a push effect. These groups also

reduce the attractiveness of provinces: a 1%-increase in their presence is associated with a 0.4%-0.6% reduction in native in-migration, indicating a negative pull effect. In contrast, Iraqi migrants appear to exert a positive pull: a 1% increase in their share is associated with a 0.1% rise in native in-migration. Migrants from Afghanistan, Russia, and Iran show no statistically significant effects on native mobility, suggesting limited or neutral influence of these groups.

Finally, the earlier findings related to refugees remain robust in the heterogeneity analysis. Specifically, a 1% increase in refugee inflows is associated with a 0.4% decrease in native out-migration, and with a 0.9% increase in native in-migration.

Table 3: Heterogeneity between nationalities

Internal migration	(1)	(2)	(3)
I*ln(*Internat. Mig. p.c.*) from			
Afghanistan (origin)	0.001		0.001
	(0.001)		(0.000)
Afghanistan (dest.)	-0.000	-0.000	
	(0.001)	(0.001)	
Germany (origin)	0.002***		0.002***
	(0.001)		(0.001)
Germany (dest.)	-0.004***	-0.004***	
	(0.001)	(0.001)	
Iraq (origin)	0.000		0.000
	(0.001)		(0.000)
Iraq (dest.)	0.001**	0.001**	
	(0.001)	(0.001)	
Russia (origin)	-0.000		-0.000
	(0.000)		(0.000)
Russia (dest.)	0.000	0.000	
	(0.000)	(0.000)	
Iran (origin)	-0.000		-0.000
	(0.000)		(0.000)
Iran (dest.)	0.000	0.000	
	(0.000)	(0.000)	
RoW (origin)	0.002***		0.002***
	(0.001)		(0.001)
RoW (dest.)	-0.006***	-0.006***	
	(0.001)	(0.001)	
Refugees (origin)	-0.004***		-0.004***
	(0.001)		(0.001)
Refugees (dest.)	0.009***	0.009***	
	(0.001)	(0.001)	
GDP p.c. (origin)	-0.214***		-0.215***
	(0.030)		(0.029)
GDP p.c. (dest.)	-0.023	-0.022	
	(0.028)	(0.027)	
Contiguity	1.188***	1.188***	1.188***
	(0.038)	(0.038)	(0.038)
Distance	-0.447***	-0.447***	-0.447***
	(0.013)	(0.013)	(0.013)
Adj-R2	0.805	0.807	0.815
N	51812	51812	51812
Fixed effects			
Origin	✓	✗	✓
Destination	✓	✓	✗
Time	✓	✗	✗
Origin-time	✗	✓	✗
Destination-time	✗	✗	✓

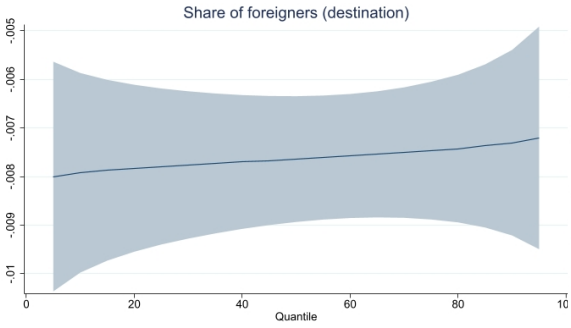
Notes: The sign function is indicated by "I". p.c. stands for per capita, RoW stands for rest of the world. All variables are in logarithm, except contiguity. Standard errors in parenthesis are robust to heteroskedasticity and clustered by province-pair. ***, ** and * denote significance at the 1%, 5% and 10% level respectively.

4.2.2 Asymmetric effects

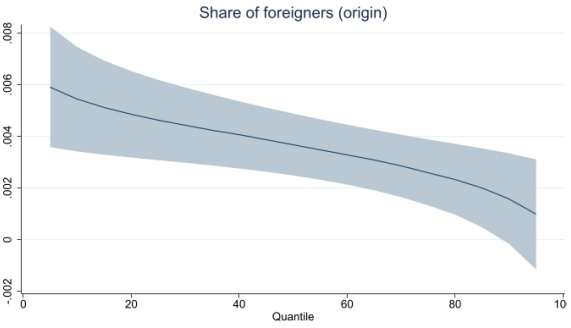
To further explore heterogeneity in internal migration responses, we estimate a non-linear model using the conditional location-scale framework developed by Machado & Silva (2019), and using *Quantile regressions via Method of Moments* (MM-QR). The effects are identified by estimating a location effect (mean) and a scale effect (deviation from the mean). Therefore, the quantile effect is the sum of the location effect and the product of the scale effect and the quantile. An extension of this method also allows for estimation of conditional quantiles with multiple fixed effects, which overcomes the limitations of the earlier quantile regression framework by Koenker (2005).[13]

Figure 6: The effects of the share of international migrants on the internal mobility of residents by quantile

(a) Share of international migrants in destination



(b) Share of international migrants in origin



Notes: The figure shows the estimated effects of the share of international migrants on internal migration across percentiles, following the estimation results in Table A.5. All estimations include origin, destination, and time fixed effects. Standard errors in parenthesis are robust to heteroskedasticity and clustered by province-pair. The grey shaded area represents the 95% confidence interval. *Source:* Authors' calculations using TurkStat data.

Table A.4 presents estimates of the location and scale components from the MM-QR method. The location parameter indicates that an increase in the share of international migrants is associated with increased average native out-migration and lover in-migration, suggesting a push effect. The scale parameter for out-migration is statistically significant, indicating heteroskedastic variation in native out-migration responses with respect to international migrant shares. This heteroskedasticity justifies the use of quantile regression to identify variation along the internal migration distribution.

Figure 6 presents the estimated coefficients from quantile regressions, showing how the share of international migrants affects the conditional distribution of internal migration rates. The push effect of international migrants in origin provinces is more pronounced in provinces with lower levels of internal mobility, suggesting that international migrants act as stronger push factors in provinces with traditionally lower levels of internal mobility. In contrast, the discouraging effect on in-migration appears relatively uniform across quantiles.

[13] Besides the absence of estimation with fixed effects, quantiles are defined based on a heteroskedastic model.

Concerning refugees, Table A.5 shows a similar pattern: refugee inflows are a stronger push factor in provinces with initially low levels of internal mobility. The coefficients in origin at the 5^{th} and 10^{th} percentiles are equal to -0.005, decreasing in magnitude to -0.002 at the 90^{th} percentile. In contrast, the positive pull effect of refugees on in-migration remains relatively stable across the distribution. In contrast, the positive pull effect of refugees on in-migration remains relatively stable across the distribution.

4.2.3 Heterogeneity by life satisfaction in origin

The effect of foreigners on native mobility may be mediated by individuals' satisfaction with public services in their province of residence. Using TURKSTAT's 2013 life satisfaction survey, we classify provinces based on whether their average satisfaction levels with public services fall above or below the national average. The survey assessed residents' satisfaction levels in 2013 with various public services. Randomly selected citizens were asked to rate their satisfaction using the following categories: satisfied, neither satisfied nor dissatisfied, and dissatisfied (some categories also included "no idea"). The responses were then used to calculate the provincial satisfaction rates for public services. The survey covered a range of public services, including social insurance, healthcare, education, judicial services, public security, and transportation.

Table 4 reports results for the two subsamples of provinces, the satisfied and the unsatisfied, using models that include destination and time fixed effects. Since the characteristics of public services is a time-invariant attribute of the origin, origin fixed effects are excluded. Consistent with benchmark estimates (Table 2), we find that in both subsamples, higher shares of international migrants significantly increase native out-migration and reduce native in-migration, suggesting a crowding-out or push effect of international immigrants and a negative pull effect. Natives may feel under pressure or in competition with immigrants to access public services, regardless of satisfaction levels.

Again, the impact of refugees on internal migration differs from that of international migrants. In line with Table 2, refugees make destination provinces more attractive, regardless of the local satisfaction level with public services. Similarly, higher refugee shares are associated with lower native out-migration, especially in provinces with low satisfaction. This may reflect constrained mobility.

In this specification, GDP per capita in origin and destination provinces are excluded from the set of control variables due to multicollinearity concerns,[14] as they correlate with satisfaction levels.

[14]Mean VIF is equal to 7.46 and 6.46, respectively for satisfied and unsatisfied provinces estimations. These specifications do not suffer from multicollinearity concerns.

Instead, we include proxies for education (share of bachelor students) and healthcare (doctors per 1,000 inhabitants), as these are key factors influencing migration decisions (see Figure 1).[15]

Higher shares of students increase native out-migration, especially in unsatisfied areas where rising student populations may strain already limited infrastructure. Student-rich destinations are attractive, particularly for unsatisfied provinces. These findings may reflect the fact that educated individuals are more mobile, and educational opportunities are a pull factor.

Improved healthcare provision discourages out-migration, especially in unsatisfied provinces. However, healthcare provision is a pull factor only for inhabitants unsatisfied with public services: an increase in doctor density can be perceived as a better access to healthcare.

Table 4: Heterogeneity across satisfaction levels with public services

Internal migration	Provinces satisfied with public facilities	Provinces unsatisfied with public facilities
	(1)	(2)
I*ln(MIG p.c.)(origin)	0.011***	0.012***
	(0.002)	(0.001)
I*ln(MIG p.c.)(dest.)	-0.007***	-0.008***
	(0.001)	(0.001)
I*ln(REF p.c.)(origin)	-0.008***	-0.016***
	(0.002)	(0.001)
I*ln(REF p.c.)(dest.)	0.006***	0.007***
	(0.001)	(0.001)
Sh. Bachelor students (origin)	4.259***	10.389***
	(0.396)	(0.571)
Sh. Bachelor students (dest.)	3.837***	4.324***
	(0.815)	(0.830)
Doctors per 1000 people (origin)	-0.235***	-0.369***
	(0.037)	(0.034)
Doctors per 1000 people (dest.)	0.036	0.168***
	(0.044)	(0.046)
Contiguity	1.245***	1.172***
	(0.052)	(0.053)
Distance	-0.478***	-0.327***
	(0.021)	(0.017)
Adj-R2	0.772	0.758
N	27502	24310

Notes: The sign function is indicated by "I". p.c. stands for per capita. All variables are in logarithms, except contiguity. The satisfaction levels over social insurance, health, education, judicial, public security and transport services are averaged and compared to the national average. If the provincial satisfaction rate is below the national average, the province is defined as unsatisfied with public goods, otherwise it is defined as satisfied. All estimations include destination and time fixed effects. Standard errors in parenthesis are robust to heteroskedasticity and clustered by province-pair. ***, ** and * denote significance at the 1%, 5% and 10% level respectively.

The life satisfaction survey was conducted in 2013 only. Public services stem from long-term

[15]The effects of international migrant and refugee flows on natives' mobility are similar when these additional variables are not included, as shown in Table A.7 in Appendix.

public investments that exhibit long-lasting consequences on the quality of these services (Scandizzo *et al.*, 2020). Nonetheless, to account for possible changes in infrastructure and satisfaction over time, we re-estimate the models using data from the 3-year period following the survey (2014–2016). In Table A.6, the sign of the coefficients are aligned with previous results, even though some of the coefficients lose their significance.[16]

Disaggregating public services by category in Table 5 reveals that the impact of international migrants is consistent across service type, but its intensity varies. In provinces with perceived high-quality judicial, healthcare and public security services, natives are less likely to out-migrate in response to migrant inflows, suggesting that the quality of these services reduce perceived pressure from immigrants. In contrast, for other services, higher migrant shares are associated with greater native out-migration from satisfied provinces, possibly due to concerns over service congestion.

Similarly, migrant inflows generally deter native in-migration, with slightly stronger effects in unsatisfied provinces. This may suggest greater sensitivity to migrant competition in areas with weaker service provision.

Refugee inflows reduce native out-migration, particularly in provinces with better public service provision, except in the category of judicial services. This may be because better services cushion the social impact of new refugees. At the same time, higher refugee shares are associated with higher in-migration, particularly from unsatisfied regions. This suggests that individuals may tolerate potential crowding in destinations when fleeing poorly served provinces.

Control variables behave as expected. Higher healthcare provision reduces native out-migration, especially in unsatisfied provinces (except for judicial services). Educational infrastructure shows asymmetric effects, with student shares driving out-migration as well as in-migration, especially from unsatisfied provinces. Finally, gravity variables yield expected results: neighboring provinces are preferred destinations, and internal migration decreases with distance.

[16] This may be because of reduced sample size and lack of variations in the number of international migrants and refugees during this period.

Table 5: Heterogeneity across satisfaction levels with different types of public services

Internal migration	Social security Institution	Health Services	Educational Services	Judicial Services	Public security Services	Transportation Services
Provinces satisfied with public facilities						
I*ln(MIG p.c.)(origin)	0.015***	0.009***	0.016***	0.003*	0.009***	0.013***
	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
I*ln(MIG p.c.)(dest.)	-0.006***	-0.007***	-0.007***	-0.008***	-0.007***	-0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
I*ln(REF p.c.)(origin)	-0.017***	-0.010***	-0.013***	-0.001	-0.007***	-0.013***
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)
I*ln(REF p.c.)(dest.)	0.005***	0.005***	0.005***	0.006***	0.006***	0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Bachelor student (origin)	5.065***	6.075***	4.299***	5.780***	4.853***	4.920***
	(0.586)	(0.520)	(0.402)	(0.628)	(0.390)	(0.382)
Bachelor student (dest.)	4.143***	4.352***	3.897***	2.799***	4.039***	4.298***
	(0.830)	(0.742)	(0.846)	(0.904)	(0.764)	(0.776)
Doctors per 1000 people (origin)	-0.213***	-0.159***	-0.190***	-0.511***	-0.178***	-0.107***
	(0.041)	(0.036)	(0.038)	(0.047)	(0.035)	(0.036)
Doctors per 1000 people (dest.)	0.027	0.092**	0.048	0.040	0.080**	0.053
	(0.044)	(0.042)	(0.045)	(0.048)	(0.041)	(0.042)
Contiguity	1.215***	1.194***	1.270***	1.256***	1.240***	1.161***
	(0.051)	(0.047)	(0.051)	(0.060)	(0.047)	(0.049)
Distance	-0.507***	-0.527***	-0.491***	-0.396***	-0.477***	-0.540***
	(0.021)	(0.019)	(0.021)	(0.020)	(0.018)	(0.020)
Adj-R2	0.785	0.788	0.776	0.756	0.778	0.784
N	25593	30060	26222	22394	30060	28782
Provinces unsatisfied with public facilities						
I*ln(MIG p.c.)(origin)	0.005***	0.008***	0.007***	0.012***	0.011***	0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
I*ln(MIG p.c.)(dest.)	-0.009***	-0.009***	-0.008***	-0.007***	-0.008***	-0.009***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
I*ln(REF p.c.)(origin)	-0.005***	-0.008***	-0.011***	-0.014***	-0.014***	-0.009***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
I*ln(REF p.c.)(dest.)	0.008***	0.008***	0.007***	0.006***	0.007***	0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Bachelor student (origin)	6.357***	7.319***	10.787***	5.641***	11.440***	11.892***
	(0.424)	(0.507)	(0.610)	(0.399)	(0.653)	(0.600)
Bachelor student (dest.)	3.930***	3.668***	4.262***	4.974***	4.122***	3.805***
	(0.811)	(0.921)	(0.798)	(0.755)	(0.888)	(0.881)
Doctors per 1000 people (origin)	-0.225***	-0.337***	-0.432***	-0.132***	-0.476***	-0.424***
	(0.031)	(0.035)	(0.034)	(0.029)	(0.036)	(0.033)
Doctors per 1000 people (dest.)	0.169***	0.107**	0.149***	0.143***	0.122**	0.154***
	(0.045)	(0.047)	(0.044)	(0.042)	(0.049)	(0.049)
Contiguity	1.187***	1.178***	1.165***	1.226***	1.200***	1.213***
	(0.054)	(0.060)	(0.053)	(0.048)	(0.059)	(0.057)
Distance	-0.354***	-0.295***	-0.316***	-0.388***	-0.302***	-0.293***
	(0.017)	(0.018)	(0.017)	(0.017)	(0.019)	(0.018)
Adj-R2	0.742	0.736	0.751	0.762	0.740	0.749
N	26219	21752	25590	29418	21752	23030

Notes: The sign function is indicated by "I". p.c. stands for per capita. All variables are in logarithms, except contiguity. If the provincial satisfaction rate is below the national average, the province is defined as unsatisfied with public goods, otherwise it is defined as satisfied. All estimations include destination and time fixed effects. Standard errors in parenthesis are robust to heteroskedasticity and clustered by province-pair. ***, ** and * denote significance at the 1%, 5% and 10% level respectively.

4.3 Robustness

4.3.1 Restricted period

To assess the robustness of the baseline results, we re-estimate the main specification by excluding the years 2020-2022, which correspond to the COVID-19 period, potentially marked by atypical mobility patterns and policy disruptions. Estimates excluding this period are reported in Table 6. The results remain broadly consistent with those reported in Table 2, both in terms of magnitude and statistical significance. This suggests that the baseline results are not driven by the exceptional circumstances of the pandemic. Notably, GDP per capita in destination provinces becomes statistically significant in the restricted sample, with a larger effect size. This may indicate that economic conditions more clearly affect internal migration during non-crisis periods.

Table 6: Results for period 2014-2019

Internal migration	(1)	(2)	(3)
I*ln(MIG p.c.)(origin)	0.006***		0.006***
	(0.001)		(0.001)
I*ln(MIG p.c.)(dest.)	-0.006***	-0.006***	
	(0.001)	(0.001)	
I*ln(REF p.c.)(origin)	-0.006***		-0.006***
	(0.001)		(0.001)
I*ln(REF p.c.)(dest.)	0.004***	0.004***	
	(0.001)	(0.001)	
GDP p.c. (origin)	-0.456***		-0.456***
	(0.046)		(0.045)
GDP p.c. (dest.)	0.244***	0.245***	
	(0.040)	(0.039)	
Contiguity	1.218***	1.218***	1.218***
	(0.038)	(0.039)	(0.039)
Distance	-0.438***	-0.438***	-0.438***
	(0.013)	(0.013)	(0.013)
Adj. R^2	0.804	0.806	0.811
N	38857	38857	38857
Fixed effects			
Origin	✓	✗	✓
Destination	✓	✓	✗
Time	✓	✗	✗
Origin-time	✗	✓	✗
Destination-time	✗	✗	✓

Notes: The sign function is indicated by "I". p.c. stands for per capita. All variables are in logarithms, except contiguity. Standard errors in parenthesis are robust to heteroskedasticity and clustered by province-pair. ***, ** and * denote significance at the 1%, 5% and 10% level respectively.

4.3.2 Excluding the largest cities

Large cities are key migration destinations due to their strong pull factors. These urban centers typically offer broader economic opportunities, such as diverse employment prospects and higher

wages. Additionally, they often provide better access to essential public services, including education, healthcare, and transportation infrastructure, which may be less developed in rural areas. The combination of these advantages makes large cities particularly attractive to both domestic and international migrants seeking improved living conditions. As shown in Table 7, the results remain robust even after excluding the three largest provinces in Turkey, namely Istanbul, Ankara and Izmir. The magnitude and statistical significance of the coefficients are consistent with the baseline results, indicating that the observed effects are not driven by these metropolitan provinces.

Table 7: Gravity model excluding big cities: Istanbul, Ankara and Izmir

Internal migration	(1)	(2)	(3)
I*ln(MIG p.c.)(origin)	0.003***		0.003***
	(0.001)		(0.001)
I*ln(MIG p.c.)(dest.)	-0.007***	-0.007***	
	(0.001)	(0.001)	
I*ln(REF p.c.)(origin)	-0.003***		-0.003***
	(0.001)		(0.001)
I*ln(REF p.c.)(dest.)	0.006***	0.006***	
	(0.001)	(0.001)	
GDP p.c. (origin)	-0.234***		-0.235***
	(0.031)		(0.030)
GDP p.c. (dest.)	0.017	0.018	
	(0.029)	(0.028)	
Contiguity	1.187***	1.187***	1.187***
	(0.038)	(0.038)	(0.038)
Distance	-0.460***	-0.460***	-0.460***
	(0.013)	(0.013)	(0.013)
Adj. R^2	0.761	0.764	0.773
N	49892	49892	49892
Fixed effects			
Origin	✓	✗	✓
Destination	✓	✓	✗
Time	✓	✗	✗
Origin-time	✗	✓	✗
Destination-time	✗	✗	✓

Notes: The sign function is indicated by "I". p.c. stands for per capita. All variables are in logarithms, except contiguity. Istanbul, Ankara and Izmir are excluded as destinations. Standard errors in parenthesis are robust to heteroskedasticity and clustered by province-pair. ***, ** and * denote significance at the 1%, 5% and 10% level respectively.

4.3.3 Identification strategy

To address potential endogeneity concerns in estimating the effects of foreigners on the internal mobility of Turkish natives, we construct a shift-share instrument for the share of foreigners.[17] This

[17] In this setting, foreigners are defined as the sum of refugees and international migrants.

language-based instrument relies on historical settlement patterns of foreigners across provinces for the "share" component, interacted with national-level inflows in the "shift" component, for the period 2016-2022.[18] The instrument is strongly correlated with the current migrant share in origin provinces while being exogenous to unobserved factors that may affect natives internal mobility.

Following Altındağ *et al.* (2020); Altındağ & Kaushal (2021), the instrument is constructed as:

$$IV_{o,t} = ArabSpeak_{o,1965} \times Inflow_t$$

where $ArabSpeak_{o,1965}$ represents the share of Arabic-speaking population in 1965 in origin o, and $Inflow_t$ denotes the overall inflow of foreigners to Turkey at time t. In our estimation, we focus on push factors by including only variables related to origin provinces while controlling for destination and time fixed effects. Standard errors are clustered at the bilateral province level.

The estimates in Table 8 reveal a negative and statistically significant effect of the share of foreigners on the out-migration of Turkish natives, once endogeneity is addressed using this instrumental variable approach. This finding suggests that natives are less likely to leave provinces that host larger shares of foreigners. Note that the first-stage F-statistic exceeds the conventional threshold of 10, supporting the strength of the instrument.

Table 8: Comparing OLS and IV results for total share of immigrants

	OLS	IV
Internal migration	(1)	(2)
I*ln(TOT-MIGR p.c.)(origin)	-0.001	-0.100***
	(0.001)	(0.013)
GDP p.c. (origin)	0.075***	0.079***
	(0.019)	(0.020)
Contiguity	1.218***	1.251***
	(0.039)	(0.042)
Distance	-0.410***	-0.390***
	(0.013)	(0.015)
Adj. R^2	0.746	0.528
N	45334	45334
F-stat		285.79

Notes: TOT-MIGR denotes the total share of foreigners, consisting of international migrants and refugees. The sign function is indicated by "I". p.c. stands for per capita. All variables are in logarithms, except contiguity. Destination and time fixed effects are included. Standard errors in parenthesis are robust to heteroskedasticity and clustered by province-pair. ***, ** and * denote significance at the 1%, 5% and 10% level respectively.

We further estimate the separate effects of international migrants and refugees. To this end, we construct a second shift-share instrument following the same logic. This time, rather than relying

[18] The sample is restricted to 2016-2022 due to data limitations on national inflows.

on the historical distribution of Arabic-speaking Turkish residents, we use data from the 1965 Population Census on residents who spoke other foreign languages, namely Greek, Albanian, Pomak, and Bosnian. These language groups reflect historical settlement patterns of various migrant communities.

In column (1) of Table 9, we estimate the effect of two potentially endogenous regressors, the share of international migrants and the share of refugees in the origin province, on native internal mobility. To account for endogeneity, we employ two shift-share instruments, one for each regressor. This approach yields a just-identified model. In column (2), we include only the refugee inflow in the origin province as an endogenous regressor. Since, given their nationalities, refugees are more likely to settle in provinces with a high share of Arabic-speaking Turkish citizens, the former language-based instrument effectively predicts their spatial distribution. Consistent with the results in Table 2, native out-migration increases with a higher share of international migrants (column 1) and decreases with a higher share of refugees (columns 1 and 2).

Table 9: 2SLS results

Internal migration	(1)	(2)
I*ln(MIG p.c.)(origin)	0.084*	
	(0.045)	
I*ln(REF p.c.)(origin)	-0.134***	-0.079***
	(0.036)	(0.010)
GDP p.c. (origin)	-0.036	0.031
	(0.045)	(0.020)
Contiguity	1.244***	1.251***
	(0.040)	(0.041)
Distance	-0.392***	-0.388***
	(0.014)	(0.014)
Adj. R^2	0.639	0.574
N	45334	45334
KP (F-stat)	90.695	418.649

Notes: MIGR and REF denote the share of international migrants and refugees, respectively. The sign function is indicated by "I". p.c. stands for per capita. All variables are in logarithms, except contiguity. Destination and time fixed effects are included. Standard errors in parenthesis are robust to heteroskedasticity and clustered by province-pair. ***, ** and * denote significance at the 1%, 5% and 10% level respectively.

Additionally, to address concerns regarding reverse causality, we re-estimate the model including the first and second lags of GDP per capita. As shown in Table A.3 in the Appendix, the results for our main variables of interest remain closely aligned with those reported in Table 2, further confirming the robustness of our estimates.

5 Conclusion

Migration remains a salient issue in both academic and policy discussions. This study examines the distinct roles of refugees and international migrants in Turkey, a country that has transitioned from a source of emigration to a major destination, in shaping internal mobility patterns.

Based on a random utility maximization (RUM) model of internal migration, our empirical analysis identifies key determinants of internal migration in Turkey and documents significant heterogeneity in the effects of foreigners, depending on the migrant characteristics, specifically international migrants versus refugees. We show that an increase in the share of international migrants has a significant positive effect on native out-migration, and discourages native in-migration, suggesting a crowding-out effect. By contrast, an increase in the share of refugees seems to attract natives and to decrease out-migration. In line with Bertoli *et al.* (2021), Turkish natives are more likely to emigrate to provinces where refugee populations have grown. This may reflect omitted variables that jointly influence the attractiveness of provinces for both refugees and Turkish nationals.

These divergent effects underscore that foreigner characteristics influence internal mobility decisions. Disaggregating by migrant nationalities, we confirm that migrants' characteristics play a key role in shaping the impact of foreigners on native internal mobility patterns. For example, an increase in the share of German migrants is associated with greater native out-migration, suggesting a push effect. In contrast, the presence of Iraqi migrants appears to attract natives, indicating a pull effect.

To account for potential heterogeneity in migration responses, we employ quantile regression analysis. We find that the push effect of international migrants is particularly pronounced in areas with lower levels of internal mobility, indicating asymmetric responses across provinces. In contrast, the pull effect of international migrants seems to be similar across quartiles.

The decision to migrate may also be influenced by satisfaction with public services in the origin province. We incorporate subjective measures of satisfaction with public goods into the analysis and find that the push and pull effects of foreigners seem stronger in provinces dissatisfied with public services. This may be because the perception of foreigners as contributors or consumers of local resources may be reinforced for natives in underserved provinces.

The interplay between international and internal migration remains a critical area for further research. With access to more disaggregated and detailed data, future studies could provide deeper insights into how native and foreign-born populations interact in shaping migration dynamics. Such evidence is essential for designing effective integration and regional development policies, taking

into account both pull and push factors across provinces, and the heterogeneity of migrants.

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A Appendix

A.1 Additional summary statistics

Table A.1: Shares of International Migrants by Nationality and Year

Nationality	2014	2015	2016	2017	2018	2019	2020	2021	2022
Afghanistan	0.040	0.048	0.073	0.093	0.139	0.180	0.188	0.213	0.204
Germany	0.080	0.084	0.080	0.092	0.094	0.105	0.106	0.119	0.125
Iraq	0.060	0.115	0.184	0.248	0.345	0.373	0.328	0.372	0.321
Russia	0.027	0.032	0.034	0.029	0.041	0.048	0.052	0.079	0.176
Iran	0.026	0.035	0.046	0.052	0.084	0.111	0.081	0.151	0.135
The rest	0.426	0.502	0.584	0.609	0.759	1.015	0.825	1.167	1.154

Notes: The table shows the evolution of the share of international migrants by nationality in Turkey over the period 2014-2022.

Table A.2: Summary statistics for the restricted period 2014-2019

Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**	**Obs.**
Internal migration					
Nbr. of internal mig.	424.479	1,269.942	0	29,990	38,877
Internal mig. share (%)	0.057	0.189	0	8.416	38,877
International migration					
Nbr. of international mig.	11,617.844	41,650.373	98	597,440	38,880
International mig. share (%)	0.945	0.952	0.029	8.824	38,880
Nbr. of refugees	34,883.006	89,496.136	0	560,881	38,880
Refugees share (%)	3.122	10.520	0	98.774	38,880
Control variables					
Population (residents)	992,224.757	1,788,593.234	78,550	15,519,267	38,880
Real GDP per capita (2010=100)	0.165	0.058	0.060	0.391	38,880
Nbr. of bachelor students	26,949.685	53,711.913	516	507,788	38,880
Bachelor students share (%)	3.220	2.128	0.187	13.803	38,880
Nbr. of doctors per 1000 people	1.568	0.448	0.700	3.100	38,880
Distance btw. provinces (kms)	573.927	322.297	38.037	1558.261	38,880

Notes: Summary statistics for the main variables of interest over the period 2014-2019. The COVID period is excluded. The share variables are created by dividing the total number of the given variable by the population in the same province and expressed in percentage.

A.2 Additional regression results

Table A.3: Results including first and second lag of GDP p.c.

Internal migration	(1)	(2)	(3)	(4)	(5)	(6)
I*ln(MIG p.c.)(origin)	0.003***		0.003***	0.004***		0.004***
	(0.001)		(0.001)	(0.001)		(0.001)
I*ln(MIG p.c.)(dest.)	-0.008***	-0.008***		-0.005***	-0.005***	
	(0.001)	(0.001)		(0.001)	(0.001)	
I*ln(REF p.c.)(origin)	-0.002***		-0.002***	-0.003***		-0.003***
	(0.001)		(0.001)	(0.001)		(0.001)
I*ln(REF p.c.)(dest.)	0.007***	0.007***		0.005***	0.005***	
	(0.001)	(0.001)		(0.001)	(0.001)	
GDP p.c. (origin)-lag1	0.073**		0.070**			
	(0.031)		(0.029)			
GDP p.c. (dest.)-lag1	0.165***	0.165***				
	(0.031)	(0.031)				
GDP p.c. (origin)-lag2				0.010		0.006
				(0.039)		(0.037)
GDP p.c. (dest.)-lag2				0.600***	0.600***	
				(0.036)	(0.035)	
Contiguity	1.188***	1.188***	1.188***	1.186***	1.186***	1.186***
	(0.038)	(0.038)	(0.038)	(0.038)	(0.038)	(0.038)
Distance	-0.447***	-0.447***	-0.447***	-0.449***	-0.449***	-0.449***
	(0.013)	(0.013)	(0.013)	(0.012)	(0.013)	(0.013)
Adj-R2	0.805	0.807	0.815	0.806	0.809	0.815
N	51812	51812	51812	45334	45334	45334
Fixed effects						
Origin	✓	✗	✓	✓	✗	✓
Destination	✓	✓	✗	✓	✓	✓
Time	✓	✗	✗	✓	✗	✓
Origin-time	✗	✓	✗	✗	✓	✓
Destination-time	✗	✗	✓	✗	✗	✓

Notes: All variables are in logarithms, except contiguity. The term "p.c." stands for per capita. Standard errors in parenthesis are robust to heteroskedasticity and clustered by province-pair. ***, ** and * denote significance at the 1%, 5% and 10% level respectively.

Table A.4: Location and scale effects on internal migration

Internal migration	Location	Scale
I*ln(MIG p.c.)(origin)	0.004***	-0.001**
	(0.001)	(0.000)
I*ln(MIG p.c.)(dest.)	-0.008***	0.000
	(0.001)	(0.000)
I*ln(REF p.c.)(origin)	-0.004***	0.001*
	(0.001)	(0.001)
I*ln(REF p.c.)(dest.)	0.006***	-0.000
	(0.001)	(0.001)
GDP p.c. (origin)	-0.210***	0.054**
	(0.031)	(0.023)
GDP p.c. (dest.)	0.001	-0.025
	(0.028)	(0.022)
Contiguity	1.188***	0.084***
	(0.038)	(0.020)
Distance	-0.447***	-0.065***
	(0.012)	(0.007)
N	51812	51812

Notes: All variables are in logarithms, except contiguity. Sh. stands for share of local population, p.c. stands for per capita. All estimations include origin, destination and time fixed effects. Standard errors in parenthesis are robust to heteroskedasticity and clustered by province-pair. ***, ** and * denote significance at the 1%, 5% and 10% level respectively.

Table A.5: Quantile regression estimation results

	Quantiles						
Internal migration	(5%)	(10%)	(25%)	(50%)	(75%)	(90%)	(95%)
I*ln(MIG p.c.)(origin)	0.006***	0.005***	0.005***	0.004***	0.003***	0.002*	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
I*ln(MIG p.c.)(dest.)	-0.008***	-0.008***	-0.008***	-0.008***	-0.007***	-0.007***	-0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
I*ln(REF p.c.)(origin)	-0.005***	-0.005***	-0.004***	-0.004***	-0.003***	-0.002*	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
I*ln(REF p.c.)(dest.)	0.007***	0.007***	0.007***	0.006***	0.006***	0.006***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
GDP p.c. (origin)	-0.314***	-0.292***	-0.257***	-0.215***	-0.166***	-0.121***	-0.094*
	(0.056)	(0.049)	(0.038)	(0.031)	(0.034)	(0.047)	(0.056)
GDP p.c. (dest.)	0.050	0.040	0.023	0.003	-0.020	-0.041	-0.054
	(0.051)	(0.044)	(0.035)	(0.028)	(0.033)	(0.045)	(0.054)
Contiguity	1.026***	1.060***	1.115***	1.181***	1.256***	1.326***	1.368***
	(0.049)	(0.044)	(0.038)	(0.037)	(0.044)	(0.054)	(0.062)
Distance	-0.321***	-0.347***	-0.390***	-0.441***	-0.499***	-0.554***	-0.587***
	(0.012)	(0.011)	(0.010)	(0.012)	(0.016)	(0.022)	(0.025)
N	51812	51812	51812	51812	51812	51812	51812

Notes: All variables are in logarithms, except contiguity. Sh. stands for share of local population, p.c. stands for per capita. All estimations include origin, destination and time fixed effects. Standard errors in parenthesis are robust to heteroskedasticity and clustered by province-pair. ***, ** and * denote significance at the 1%, 5% and 10% level respectively.

A.3 Additional results on public services

Table A.6: Heterogeneity across satisfaction levels with public services (2014-2016)

Internal migration	Provinces satisfied with public facilities	Provinces unsatisfied with public facilities
	(1)	(2)
I*ln(MIG p.c.)(origin)	0.002	0.008***
	(0.003)	(0.003)
I*ln(MIG p.c.)(dest.)	-0.000	-0.000
	(0.002)	(0.002)
I*ln(REF p.c.)(origin)	-0.016***	-0.022***
	(0.003)	(0.005)
I*ln(REF p.c.)(dest.)	0.007***	0.004*
	(0.003)	(0.002)
Sh. Bachelor student (origin)	3.558***	9.310***
	(0.414)	(0.781)
Sh. Bachelor student (dest.)	19.653***	14.329***
	(3.429)	(3.145)
Doctors per 1000 people (origin)	-0.248***	-0.622***
	(0.040)	(0.036)
Doctors per 1000 people (dest.)	-1.150***	-0.822***
	(0.103)	(0.105)
Contiguity	1.276***	1.181***
	(0.055)	(0.054)
Distance	-0.464***	-0.339***
	(0.023)	(0.019)
Adj-R2	0.785	0.767
N	6878	6080

Notes: All variables are in logarithms, except contiguity. Sh. stands for share of local population, p.c. stands for per capita. Social insurance, health, education, judicial, public security and transport services are averaged and compared with the national average over the period 2014-2016. If the satisfaction rate is below the national average, these provinces are defined as not satisfied with public goods. All estimations include destination and time fixed effects. Standard errors in parenthesis are robust to heteroskedasticity and clustered by province-pair. ***, ** and * denote significance at the 1%, 5% and 10% level respectively.

Table A.7: Heterogeneity across satisfaction levels with public services

Internal migration	Provinces satisfied with public facilities	Provinces unsatisfied with public facilities
	(1)	(2)
I*ln(MIG p.c.)(origin)	0.016***	0.014***
	(0.002)	(0.001)
I*ln(MIG p.c.)(dest.)	-0.007***	-0.008***
	(0.001)	(0.001)
I*ln(REF p.c.)(origin)	-0.014***	-0.020***
	(0.002)	(0.002)
I*ln(REF p.c.)(dest.)	0.006***	0.007***
	(0.001)	(0.001)
Contiguity	1.220***	1.163***
	(0.053)	(0.056)
Distance	-0.493***	-0.338***
	(0.021)	(0.017)
Adj-R2	0.767	0.738
N	27502	24310

Notes: All variables are in logarithms, except contiguity. The term "p.c." stands for per capita. Social insurance, health, education, judicial, public security and transport services are averaged and compared with the national average. If the satisfaction rate is below the national average, these provinces are defined as unsatisfied with public goods. Mean VIF is equal to 7.56 and 6.47, respectively for satisfied and unsatisfied provinces estimations and VIF for all given variables are less than 10. All estimations include destination and time fixed effects. Standard errors in parenthesis are robust to heteroskedasticity and clustered by province-pair. ***, ** and * denote significance at the 1%, 5% and 10% level respectively.