

Shock Propagation through Migrant Networks: Evidence from Subnational Migration in the Ecuador-Spain Migration Corridor

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Abstract

International migration entails human and financial flows that can expose low-income communities to foreign economic risks as well as opportunities. This paper studies the Ecuador-Spain corridor during the Global Financial Crisis to investigate the impact of foreign labor market shocks on migrant origin communities. I leverage international survey and census data to craft an emigrant shift-share instrument estimating subnational Ecuadorian exposure to Spanish regional labor market downturns. Spanish shocks propagate to Ecuador, with more exposed Ecuadorian regions experiencing significant reductions in remittance inflows and increases in return migration. Spanish labor demand shocks impact Ecuadorian labor markets, as employment rates increase for women and older segments of the population and male self-employment rates increase, suggesting Ecuadorian households responded to negative remittance income shocks through counter-cyclical labor supply responses.

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I accept full responsibility for the accuracy or reliability of my calculations based on Spanish data from Spain's Instituto Nacional de Estadística (INE).

1 Introduction

International migration from the Global South to the Global North involves substantial human and financial flows, creating migrant networks that expose low-income communities to foreign economic opportunities and risks. International migration entails sizeable flows of labor and capital: 3.6% of the world population lived outside their country of birth in 2020 (UN 2020; Carioli et al. 2024), and migrant remittances constituted 4.8% of GDP for lower middle income countries in 2019 (WBG 2025c). Despite traveling long distances, migrants often maintain connections with those left behind, and many set out intending to return in the future (Yang 2011; Dustmann and Mestres 2010; Dustmann and Goerlach 2016). Labor migration from the Global South to the Global North thus creates connections between disparate countries, with imprints on both. An extensive literature in labor economics investigates the impact of immigration on destination countries, particularly labor markets in the developed world (Card 1990; Ottaviano and Peri 2012; Dustmann, Schönberg, and Stuhler 2016; Edo 2020). I contribute to a growing body of work (Mishra 2007; Dustmann, Frattini, and Rosso 2015; Salem and Seck 2025) investigating how emigration and migrant networks affect the places migrants have left. In particular, I extend research examining migrant networks as a source of exposure to foreign economic shocks for communities in developing contexts (Gröger 2021; Caballero, Cadena, and Kovak 2023). I investigate local labor market impacts of emigrant job loss in the case of Ecuadorian emigration to Spain during the Global Financial Crisis.

Emigration and migrant networks can have important effects on local labor markets and economic development in sending regions. While emigration may reduce human capital if labor migrants are positively selected on education (Borjas 1987; Chiquiar and Hanson 2005; Docquier, Lohest, and Marfouk 2007), it also has many positive effects. Emigration may prompt further migration (Spitzer and Zimran 2023), increase wages (Mishra 2007; Dustmann, Frattini, and Rosso 2015) contribute to economic development (Salem and Seck 2025), and spur large financial flows in the form of migrant remittances (Yang 2011; Joseph, Nyarko, and Wang 2018; Clemens and McKenzie 2018). Migrant networks can channel remittances to low-income communities, supporting consumption, investment, subsequent migration, and long-run development (Yang 2011; Khanna et al. 2022), but they can also expose these same communities to economic and political shocks in emigrant destinations.

Labor market shocks in migrant destinations can propagate to migrant origin regions through remittances and return migration, with theoretically ambiguous net effects. One would expect a negative remittance shock to reduce household incomes (Khanna et al. 2022), which may lead households to increase their supply of labor as a coping mechanism and in response to falling reservation wages. Return migration could amplify a negative remittance income shock by putting simultaneous downward pressure on wages through increases to the local labor supply (Caballero, Cadena, and Kovak 2023), or it could temper the shock if returnees stimulate local labor demand, for example through entrepreneurship and technology adoption (Hausmann and Nedelkoska 2018).

I study the Ecuador-Spain migration corridor following Spain’s 2008 recession to investigate the impacts of emigrant job loss on labor markets in migrant sending regions. Nearly half a million Ecuadorians had migrated to Spain by 2005, equivalent to 3.3% of Ecuador’s

population and 1.1% of Spain’s population at the time (UN 2020; Carioli et al. 2024; INE 2023), and remittances from Spain to Ecuador totaled 2.7% of Ecuadorian GDP in 2007 (BCE 2025; WBG 2025a). In the aftermath of the Global Financial Crisis, Spain experienced a recession and severe job loss as a domestic housing bubble imploded (Pardo 2011; Roig and Recaño Valverde 2012; Bentolila et al. 2012). I find that migrant networks became channels for economic shockwaves to transmit internationally from Spain. Spanish employment shocks reduced immigrant employment and spurred a decline in remittances and eventual increase in return migration to Ecuador, with implications for Ecuadorian households and local labor markets.

I design an emigrant employment shift-share instrument to proxy for subnational Ecuadorian exposure to regional Spanish labor market downturns, allowing me to estimate the impacts of emigrant job loss on local Ecuadorian labor markets. The shifts come from predicted migrant job loss across Spanish provinces, estimated through a Spanish migrant industry shift-share instrument. The shares for the emigrant employment instrument come from a subnational migration matrix I estimate with Ecuadorian census emigration microdata and a pre-crisis Spanish immigrant survey (INE 2008b; INEC 2026a; INEC 2026b). I measure Spanish employment changes using Spanish labor force surveys, and track regional outcomes in Ecuador through Ecuadorian labor force survey microdata and Banco Central del Ecuador data (INE 2024; INEC; 1990–2019; BCE 2025). My empirical methodology resembles Caballero, Cadena, and Kovak (2023), but I innovate by instrumenting for migrant employment shifts in my emigrant employment shift-share instrument.

Regression results confirm that Spanish migrant employment shocks propagated to Ecuador through both remittance and return migration channels. Results suggest impacted households experienced financial strain, as the most impacted regions witnessed relative increases in full-time employment rates for women and older residents and increases in self-employment for men.

The Ecuador-Spain migration corridor is noteworthy as shock propagation would primarily occur through migrants rather than trade. True to the gravity model’s prediction of physical distance as an important determinant of flows of labor and goods (Anderson 2011; Beine, Bertoli, and Fernández-Huertas Moraga 2016), many migration corridors observe large trade flows as well as migration flows, and migrant and diaspora links support international trade (Rauch and Trindade 2002; Rapoport 2019). In the Mexico-US corridor, for instance, the US was Mexico’s largest export market in 2007, receiving 82% of Mexican exports (UN 2026). Ecuador and Spain, in contrast, are in opposite hemispheres, and high levels of migration did not beget equally high levels of trade. Spain hosted 46% of Ecuadorian emigrants in 2005 (UN 2020), but imported only 2.4% of Ecuadorian exports in 2007 (UN 2026). This imbalance means Ecuador’s primary exposure to Spain’s recession would be through emigrant job loss, rather than demand shock for its exports. The Ecuador-Spain context thus permits an analysis of economic shock propagation through migrant networks without the need to account for simultaneous propagation through trade.

I contribute to economics literature on migration, development, and labor, particularly development impacts of shocks to emigrants. I also contribute to literature on Ecuador and migrants in the Spanish labor market.

This paper addresses economics literature on migration (Borjas 1987; Chiquiar and Hanson 2005), migrant networks (Munshi 2003; Spitzer and Zimran 2023), remittances (Osili

2004; Yang 2011; Clemens and McKenzie 2018; Joseph, Nyarko, and Wang 2018; Khanna et al. 2022), and temporary and return migration (Dustmann and Goerlach 2016; Dustmann and Mestres 2010; Adda, Dustmann, and Görlach 2022). It relates to return migration impacts on development (Bahar et al. 2024; Bucheli and Fontenla 2025; Wahba 2026), particularly when stimulated by shocks in the migrant-destination (Hausmann and Nedelkoska 2018; Pearson 2025; Caballero, Cadena, and Kovak 2023). The paper builds on a literature investigating emigration impacts on economic development and labor markets (Gibson, McKenzie, and Stillman 2011; Mishra 2007; Borjas 2008; Aydemir and Borjas 2007; Akram, Chowdhury, and Mobarak 2017; Kosack 2021; Salem and Seck 2025), in particular the impact of labor market shocks faced by emigrants (Caballero, Cadena, and Kovak 2023; Gröger 2021).

The paper relates to literature about Ecuador, Spain, and the global financial crisis focused on labor and migration. It builds on social science literature on Ecuadorian labor markets (Gallardo and Ñopo 2009; Ontaneda Jiménez et al. 2022; Ontaneda Jiménez et al. 2024; Meneses et al. 2026), Ecuadorian emigration (Jokisch and Kyle 2008; Bertoli, Fernández-Huertas Moraga, and F. Ortega 2011; Soruco, Piani, and Rossi 2008; Andrade Herrera 2022), and Ecuadorian return migration (Perraudin 2017; Mercier et al. 2016). The paper contributes to labor economics research on Spanish and European labor markets, including migrant labor in Spain (Fernández and C. Ortega 2008; Bentolila, Dolado, and Jimeno 2008; González and F. Ortega 2011; Roig and Recaño Valverde 2012; Özgüzel 2021), Spain’s dual labor market (Dolado, García-Serrano, and Jimeno 2002; Bentolila et al. 2012), European labor market responses to economic shocks (Hennig 2023; Lechler 2019), and European migrant responses to shocks (Mitze 2019; Basso, D’Amuri, and Peri 2019).

Methodologically, this paper builds on the economic literature using shift-share instruments to study labor markets and migration. It builds on work using industry employment shift-share instruments for labor market analyses (Bartik 1991; Charles, Hurst, and Schwartz 2018; Goldsmith-Pinkham, Sorkin, and Swift 2020), particularly in the European context (Lechler 2019; Mitze 2019; Basso, D’Amuri, and Peri 2019). The paper’s empirical strategy builds on a growing literature crafting emigrant shift-share instruments for causal inference (Gröger 2021; Caballero, Cadena, and Kovak 2023; Godlonton and Theoharides 2025), including work examining emigrant exposure to foreign labor shocks (Gröger 2021; Caballero, Cadena, and Kovak 2023).

The paper is organized as follows: after describing data in Section 2 and the Ecuadorian-Spanish migration context in Section 3, I outline the empirical strategy in Section 4. Section 5 describes results, and Section 6 concludes.

2 Data

2.1 Data Sources

My empirical strategy relies on an emigrant employment shift-share instrument, with emigration rates constituting the shares and instrumented Spanish employment changes representing the shifts. Ecuadorian census and Spanish survey microdata allow me to estimate a subnational international migrant network for the Ecuador-Spain migration corridor in 2007, from which I derive subnational emigration rates. Spanish labor force survey microdata permits the estimation and instrumentation of Spanish regional employment shifts. For intermediate outcomes, I consult Banco Central del Ecuador remittance flow data and Ecuadorian labor force survey microdata to track changes in remittances and return migration rates at the Ecuadorian province and canton levels. I standardize Ecuadorian geographies to historic province and canton boundaries (see Section A for details). Ecuadorian labor force survey microdata enables me to compute labor market outcomes in Ecuador, including local labor market employment rates and wages by age, gender, and education cohort. Sources of data include:

Spanish Encuesta de Población Activa (EPA): I use Spanish quarterly labor force survey (Encuesta de Población Activa, henceforth EPA) public use microdata files from 2005-2019 (INE 2024), produced by Spain’s Instituto Nacional de Estadística (INE). I calculate annual employment rates by restricting to second quarter labor force survey microdata, similar to Fernández and C. Ortega (2008) and Dolado, García-Serrano, and Jimeno (2002).¹ Public use EPA data records employment, 1-digit economic activity and occupation, contract type, nativity, geographic area (e.g. continent) of birth for the foreign born, Spanish province of residence, and demographic characteristics.

Ecuadorian Encuesta Nacional de Empleo, Desempleo y Subempleo (ENEMDU): I standardize and analyze labor force survey microdata from Ecuador’s Encuesta Nacional de Empleo, Desempleo y Subempleo (ENEMDU) from 1990-2019 (INEC; 1990–2019), produced by Ecuador’s Instituto Nacional de Estadística y Censos (INEC). ENEMDU records detailed geographic, demographic, labor market, and income data, as well as housing and asset data starting in 2007. My main analysis uses nationally representative annual or December surveys from 2003-2019 for continental Ecuador, as earlier labor force surveys have less geographic coverage, such as the 1990s surveys which only sample urban areas. I compute real monetary values using US CPI, deflating to real 2015 USD, and convert currencies to USD using World Bank exchange rates (OECD 2025; WBG 2025b).

Spanish Immigrants: A nationally representative Spanish immigrant survey in 2007 records detailed demographic, remittance, labor market, and geographic information (INE 2008b). Nativity is recorded in Spanish censuses, including 5% sample microdata for 1981, 1991 and 2001, and 10% sample microdata for the 2011 census from iPUMS International (Ruggles et al. 2025a; INE n.d.[b]; INE n.d.[c]; INE n.d.[d]; INE n.d.[a]), and full-census

¹Spanish labor force survey respondents are sampled for six consecutive quarters, with a sixth of the sample replaced each quarter (Fernández and C. Ortega 2008).

tabulations from the 2001 census note birth country and residence in Spain (INE 2004). Spanish population registry (*Estadística Padron Continuo*) full-count microdata and tabulations from 2003-2022 record simple demographic information, including birth-country and residence, for Spanish residents at an annual frequency (INE 2022b; INE 2023).

Ecuadorian Census: Public-access, geographically-standardized full-count Ecuadorian census microdata for 2001, 2011, and 2022 includes data on emigrants as well as demographic, labor, and household data for Ecuadorian residents (INEC 2026a; INEC 2026b; INEC 2026c). I also consult 10% sample Ecuadorian census microdata for 2010 from iPUMS international (Ruggles et al. 2025a; INEC n.d.), and INEC census tabulations for the 2001, 2011, and 2022 censuses (INEC; 2003–2011; INEC 2025a; INEC 2025b).

Migration Flows: INEC 2017 Anuario of International transit statistics record total annual departures and arrivals between Ecuador and Spain from 1997-2017 (INEC 2018). The registry of Spaniards Resident Abroad counts Spanish citizens living in Ecuador at a yearly basis starting in 2009, recording the number born in Ecuador (INE 2026a). Only ENEMDU surveys often record prior location of residence, including foreign countries, by which I proxy return migration (INEC; 1990–2019).

Remittance Flows: The Banco Central del Ecuador (BCE) publishes detailed remittance inflow and outflow tables at quarterly and annual frequencies from 2007 onwards, including total subnational flows and internationally-directional national flows, based on data from financial institutions and remittance service providers (BCE 2025). I convert to real values using BCE price index data (INEC 2025c). There is a concern with data coverage with this dataset, as only 118 out of 199 mainland cantons with ENEMDU data for 2007 have recorded BCE remittance inflow data in 2007; however, these 118 cantons represent over 80% of 2007 GDP and 2010 prime-age population for the 199 cantons. ENEMDU surveys generally record prior month remittance receipt and income (INEC; 1990–2019).

International Migration: The United Nations estimates a global migrant matrix with 5 year estimates of binational migrant stocks (UN 2020), and I consult ACS microdata from iPUMS USA to investigate Ecuadorian immigrant outcomes in the United States (U.S. Census Bureau 2007–2011; Ruggles et al. 2025b).

Ecuadorian Regional Economic Data: The Banco Central del Ecuador provides canton-level sectoral annual production figures from 2007-2019 (BCE 2026), which I incorporate in robustness checks after converting to real 2014 USD using BCE price index data (INEC 2025c).

2.2 Subnational Migration Matrix

I estimate subnational migration networks from Ecuador to Spain using a 2007 Spanish migrant survey and Ecuadorian census microdata from 2001 and 2010 (INE 2008b; INEC 2026a; INEC 2026b). The 2007 Spanish migrant survey records both the Spanish province of residence and Ecuadorian province of birth for Ecuadorian respondents, and I use these variables to estimate a pre-crisis province-to-province migration matrix for migration from Ecuador to Spain (INE 2008b). Using survey responses and weights, I estimate $ImmigrSpain_{p,j,2007}$, the number of migrants from Ecuadorian province p living in Spanish province j in 2007. I combine this with Ecuadorian census emigration microdata to estimate a geographically finer canton-to-province migration matrix, from which I derive $\widehat{Emigr}_{c,p,j,2007}$, the number of emigrants from Ecuadorian canton c in Ecuadorian province p living in Spanish province j . I assign province-to-province immigrant stocks $ImmigrSpain_{p,j,2007}$ to origin-cantons c based on $\frac{EmigrCensus_{c,p,1995-2007}}{EmigrCensus_{p,1995-2007}}$, canton c 's share of total province p emigration to Spain between 1995-2007 as recorded in the Ecuadorian census (INEC 2026a; INEC 2026b). I choose to estimate migration stocks using the Spanish immigrant survey instead of the Ecuadorian census because recency bias and household migration may lead the census to undercount migration.² This method assumes that migrants from cantons in the same Ecuadorian province have identical subnational distributions within Spain, as so:

$$\widehat{Emigr}_{c,p,j,2007} = ImmigrSpain_{p,j,2007} \cdot \frac{EmigrCensus_{c,p,1995-2007}}{EmigrCensus_{p,1995-2007}} \quad (1)$$

As my Ecuadorian labor outcomes are restricted to mainland regions, I focus on historic mainland provinces in Ecuador. The matrix covers all 20 historic mainland Ecuadorian provinces and 45 out of 52 Spanish provinces. The destination provinces account for 99.5% of the Ecuadorian immigrant stock in Spain in 2007 according to the Spanish population registry (INE 2023). Figure 1 compares Ecuadorian province-level log emigration to Spain according to Ecuadorian censuses and the Spanish migrant survey (Figure 2 does the same for immigration to Spanish provinces). Reassuringly, although Spanish immigrant survey estimates are slightly greater than the Ecuadorian census on average, I find high correlation between both data sources, suggesting accurate responses to the Spanish migrant survey.

²The census recorded emigration by asking households whether any household members had emigrated over a given period of time; entire household migration should not be recorded as no one would remain in Ecuador to respond to a census enumerator. Households may forget to mention emigrants who migrated many years prior, leading to an undercount of emigrants.

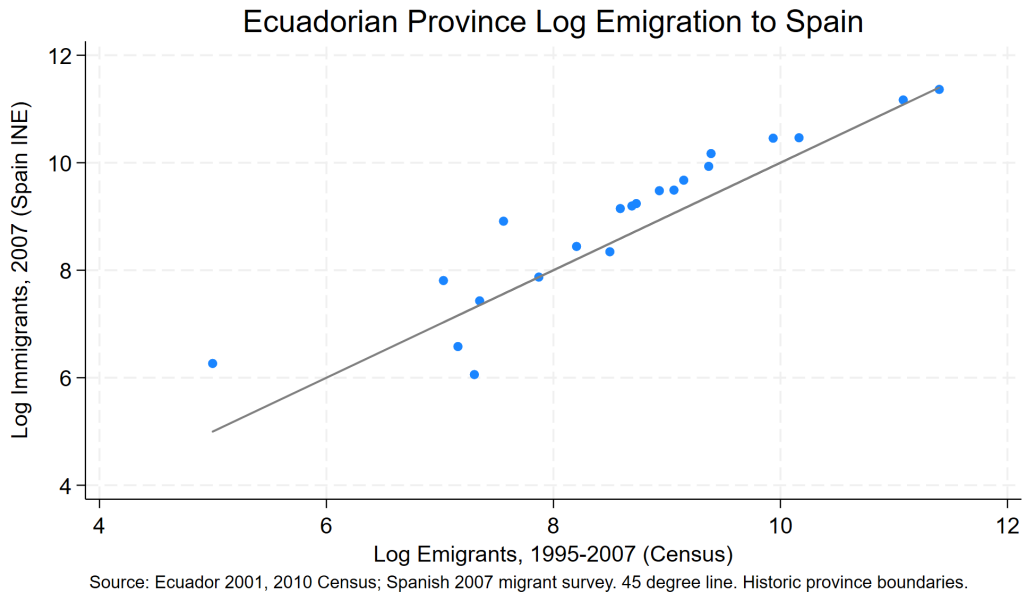


Figure 1: Subnational Emigration

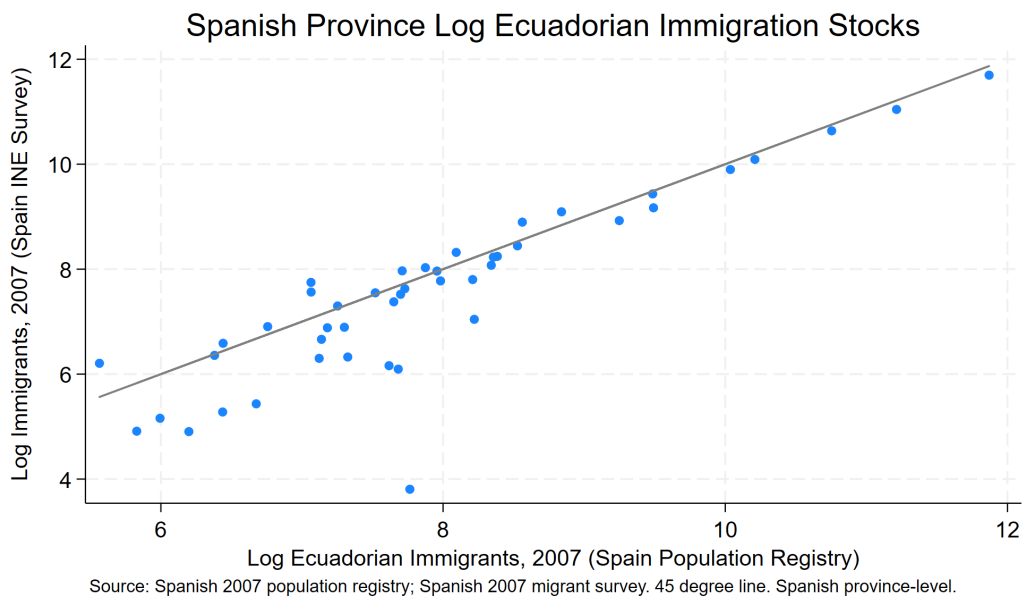


Figure 2: Subnational Immigration

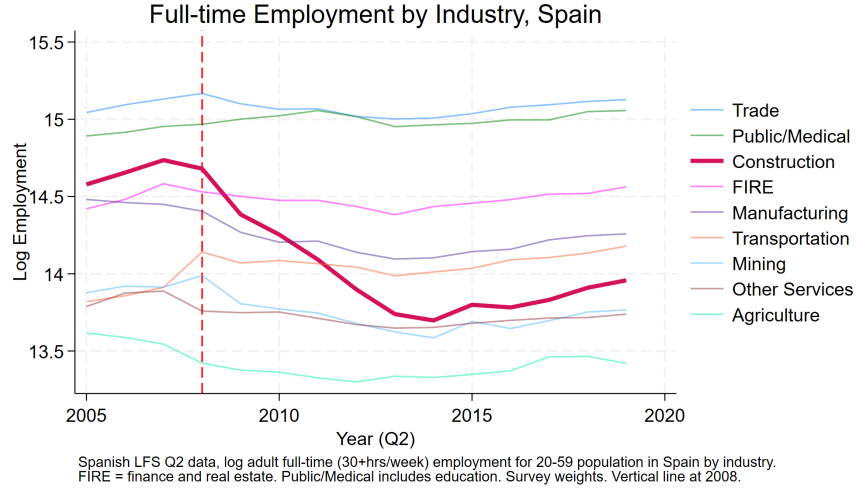
3 Context

3.1 Country Settings

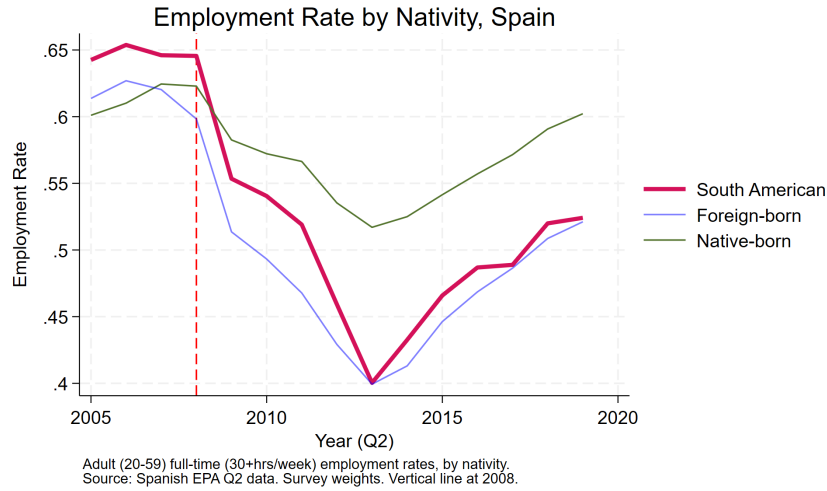
3.1.1 Spanish Labor Markets and Recession

Spanish labor market features turned Spanish recessions into large negative employment shocks with major implications for Spanish immigrants. Spain experienced nearly fifteen years of economic expansion from 1993 to 2008, but growth gave way to two recessions following the Global Financial Crisis (Spanish Business Cycle Dating Committee 2026). Spain’s double recession, from 2008 to 2013, witnessed a continuous decline in employment exacerbated by structural weaknesses in the Spanish labor market (Spanish Business Cycle Dating Committee 2026; INE 2024). Spain had experienced impressive growth while becoming a high-income country and Eurozone member (Calvo-Gonzalez 2021; Dolado 2017), but its economy was concentrated in a few vulnerable sectors (Pardo 2011) and built upon labor market institutions that created high employment volatility (Bentolila and Jimeno 2006; Bentolila et al. 2012). Spain had a dual labor market, with strong job protections for those working under indefinite contracts and weak protections for those under temporary contracts (Dolado, García-Serrano, and Jimeno 2002; Dolado 2017; Bentolila, Dolado, and Jimeno 2020). In addition, collective bargaining agreements set wages and hours (Bentolila and Jimeno 2006), so employers would adjust labor costs at the extensive margin by laying off temporary contract workers instead of making adjustments at the intensive margin. Temporary contracts had covered a third of the labor force, and a majority of migrant workers (Bentolila et al. 2012; Fernández and C. Ortega 2008), yet full-time (30hrs/week+) temporary contract employment fell by 48% from 2007Q2-2013Q2 for prime age (20-59) adults (see Figure E.2) (INE 2024). Spanish employment was concentrated in construction and tourism (Pardo 2011), which accounted for most job loss from 2008-2010. Full-time prime age adult employment in construction fell by 63% between 2007Q2 to 2013Q2 (see Figure 3a) (INE 2024). Full-time employment loss over this period amounted to 3.31 million, 57.5% in temporary contracts and 47.8% in construction.

Migrant workers experienced an extreme version of these labor market fluctuations due to their position in the labor market. Migrants were more likely to work in the informal sector (Roig and Recaño Valverde 2012), under temporary contracts (Fernández and C. Ortega 2008), and in non-tradeable industries including construction (González and F. Ortega 2011), which was a strong contributor to migrant job loss (Roig and Recaño Valverde 2012). Although the South American prime-age (20-59) full-time (30+ hrs/week) employment rate had exceeded that of the native-born before the recession (INE 2024), it dropped below natives in 2009 and did not catch up in the following decade (see Figure 3b). Ecuadorian-born prime-age (25-54) adult employment rates fell by about 30 percentage points for men and 20 percentage points for women between 2007 and 2011 (see Figure E.1), both to employment rates below 60% (INE 2008b; INE n.d.[a]).



(a) Spanish Employment by Industry



(b) Employment Rates by Nativity

Figure 3: Spanish Labor Market

3.1.2 Ecuadorean Development

Ecuador experienced a financial crisis at the turn of the 21st century, followed by economic growth in the early 2010s. Hyperinflation and a banking crisis in the late 1990s led the country to dollarize in 2000 and created a strong impetus for emigration (Jokisch and Kyle 2008). Median urban household incomes fell sharply, but later rebounded (see Figure E.5a); national median household incomes rose during the early 2010s (see Figure E.5b) and poverty rates fell, with oil prices and government expenditures likely contributing to the economic upswing (De La Torre 2018). Oil was Ecuador's largest export (World Bank 2026), and Ecuador elected a new president in 2007 who leveraged favorable oil prices to increase state spending on infrastructure and social programs (De La Torre 2018). However, Ontaneda Jiménez et al. (2024) relate that this expansion ended with economic contractions in 2015

and 2016, followed by lower growth from 2017-18.

The Ecuadorian labor market suffered during the national crisis in the 1990s but recovered by the mid-2000s (see Figures E.6a and E.6b). By 2007, 84% of prime-age (25-54) men and 44% of prime-age women were employed full-time (30+ hrs/week) (INEC; 1990–2019). While Ecuador’s population was largely urban, many adults had no more than a primary education. According to INEC; (1990–2019), 40% of prime-age adults had ended their education in primary schooling, 34% in secondary education, and 22% in superior education in 2007 (see Table 2). 75% of prime-age adults worked, and over a quarter were self-employed, suggesting substantial informality. Indeed, 31% of full-time prime-age jobs were categorized as informal by INEC in 2013 (INEC; 1990–2019). In 2007, 63% of prime-age adults worked full-time (30+ hrs/week) – with much higher rates for men (84%) than for women (44%). 24% of prime-aged adults worked full-time in market services, 14% in agriculture, and 13% in non-market services. The Ecuadorian labor market thus had only moderate levels of human capital and a high degree of informality when its emigrants experienced Spanish employment shocks.

3.2 Ecuador-Spain Migration

3.2.1 Migration Policy

Ecuadorian migration to Spain occurred within a framework of *de facto* migrant-friendly mobility and integration policies. A visa-waiver program from 1963 to August 2003 allowed Ecuadorians to enter Spain as tourists;³ they could overstay to work and benefit from a series of amnesty programs to obtain *ex-post* regularization⁴ (Roig and Recaño Valverde 2012; Bertoli, Fernández-Huertas Moraga, and F. Ortega 2011; Jokisch and Kyle 2008). Latin America immigrants could naturalize following a two-year residency requirement, eight years faster than other immigrants (Enríquez 2014).⁵ These Spanish policies facilitated migration and integration for nearly half a million Ecuadorians, as I describe in Section 3.2.2.

In addition to facilitating Ecuadorian migration to Spain, Spanish policy played a role in prompting some return migration following its 2008 recession. In the midst of its economic crisis, the Spanish state sought to incentivize out-migration through voluntary and involuntary means (Perraudin 2017). Based on official statistics, nearly seven thousand Ecuadorians participated in one of three voluntary return migration programs offered by the Spanish government – an unemployment benefits program (APRE), assistance for vulnerable migrants, and entrepreneurial return migration (see Figure E.3b) (ISSM 2026a; ISSM 2026b; ISSM 2026c). The APRE program, which allowed unemployed return migrants to cash out unemployment contributions, had the most uptake (ISSM 2026a), as did the vulnerable reintegration assistance scheme, which provided a one-way ticket home and can be used by undocumented migrants (Perez 2026; ISSM 2026b). Spain increased deportations for Ecuadorians during the crisis to a similar order of magnitude as its other programs: nearly

³Ecuadorian migrant flows to Spain fell sharply once Spain introduced a visa requirement (Bertoli, Fernández-Huertas Moraga, and F. Ortega 2011).

⁴Beginning in 1991, Spain offered multiple amnesty waves to regularize undocumented migrants; it codified a permanent regularization process into law in 2006 (Roig and Recaño Valverde 2012).

⁵About 62,000 Ecuadorians became naturalized Spanish citizens through residency from 1995–2007, and nearly 254,000 from 1995–2013 (see Figure E.3a) (OPI 1997; OPI 1999; OPI 2001; OPI and SEM 2026).

Table 1: 2007 Canton Attributes, Ecuador

	Canton Mean	Canton Mean (Remittance Subset)
Prime-age Population (2010)	26,853 (95,069)	42,478 (124,655)
HHD size	4.29 (0.55)	4.24 (0.48)
GDP per capita	878 (1,337)	777 (562)
HHD Total Income	235 (93)	255 (93)
Remittance per capita	163 (287)	171 (292)
HHD remittance income for recipients	231 (267)	235 (279)
HHD Share Remittance Recipient	0.0562 (0.0551)	0.0682 (0.0565)
HHD Share Welfare Receipt	0.3539 (0.1525)	0.3193 (0.1362)
HHD Share Working	0.9217 (0.0470)	0.9213 (0.0396)
Share last in USA	0.0007 (0.0030)	0.0010 (0.0029)
Share last in Spain	0.0004 (0.0022)	0.0005 (0.0016)
USA Emigration Rate (Census)	0.0257 (0.0583)	0.0414 (0.0733)
Spain Emigration Rate (Census)	0.0378 (0.0433)	0.0387 (0.0355)
Spain Emigration Rate (Survey)	0.0681 (0.0805)	0.0698 (0.0656)
Spain Emigrant Industry Bartik (2007-9)	0.0049 (0.0059)	0.0050 (0.0048)
Spain Construction Bartik (2007-9)	0.0034 (0.0041)	0.0035 (0.0034)
<i>N</i>	200	112

Unweighted means and standard deviations. Population aged 25-54 from 2010 Ecuador Census, used as denominator for per capita statistics and emigration rates. GDP and remittance inflow from Ecuador Central Bank, converted from annual to monthly values for comparison. Census emigration rates use canton prime-age emigrants between 1995-2007 as numerator. Survey emigration rate created from Spanish Immigrant Survey and Ecuadorian Census emigration data as described in Section 2.2; shift-share instruments created as described in Section 4.2. All other variables based on pooled ENEMDU data (2005-2007). Remittance subset restricts to cantons with non-missing remittance inflow data from central bank and ENEMDU.

Table 2: 2007 Labor Market Attributes, Ecuador

	All	Men	Women	Max Primary Education	Secondary+ Education
Age	38.36 (8.47)	38.36 (8.50)	38.37 (8.44)	39.78 (8.60)	37.25 (8.20)
Years of Education	9.57 (4.54)	9.61 (4.57)	9.54 (4.52)	5.14 (1.50)	12.71 (3.15)
Share Primary Edu	0.3962 (0.4891)	0.4015 (0.4902)	0.3913 (0.4881)	0.8998 (0.3003)	0.0000 (0.0000)
Share Secondary Edu	0.3447 (0.4753)	0.3458 (0.4757)	0.3436 (0.4749)	0.0000 (0.0000)	0.6158 (0.4864)
Share Superior Edu	0.2151 (0.4109)	0.2176 (0.4126)	0.2128 (0.4093)	0.0000 (0.0000)	0.3842 (0.4864)
Employment Rate	0.7491 (0.4336)	0.9295 (0.2560)	0.5850 (0.4927)	0.7152 (0.4514)	0.7757 (0.4171)
Self-Employment Rate	0.2178 (0.4128)	0.2510 (0.4336)	0.1877 (0.3905)	0.2515 (0.4339)	0.1913 (0.3933)
Public Sector Employment Rate	0.0690 (0.2535)	0.0800 (0.2713)	0.0590 (0.2357)	0.0087 (0.0930)	0.1164 (0.3208)
Full-time Employment Rate	0.6325 (0.4821)	0.8391 (0.3674)	0.4446 (0.4969)	0.5743 (0.4945)	0.6782 (0.4672)
Full-time hourly wage	9.2368 (14.1881)	9.6184 (15.2809)	8.4902 (11.7258)	5.1304 (5.2758)	11.8538 (17.1546)
Share in Agriculture	0.1361 (0.3429)	0.2081 (0.4060)	0.0707 (0.2563)	0.2367 (0.4251)	0.0570 (0.2319)
Share in Manufacturing	0.0751 (0.2635)	0.1030 (0.3040)	0.0497 (0.2174)	0.0608 (0.2390)	0.0863 (0.2809)
Share in Mkt Services	0.2358 (0.4245)	0.2994 (0.4580)	0.1779 (0.3825)	0.1508 (0.3579)	0.3026 (0.4594)
Share in Non-Mkt Services	0.1266 (0.3326)	0.1109 (0.3140)	0.1409 (0.3480)	0.0542 (0.2265)	0.1836 (0.3872)
Share in Construction	0.0494 (0.2166)	0.1001 (0.3002)	0.0032 (0.0562)	0.0657 (0.2477)	0.0365 (0.1876)
Share in Mining	0.0049 (0.0695)	0.0094 (0.0967)	0.0007 (0.0264)	0.0044 (0.0665)	0.0052 (0.0718)
<i>N</i>	26,237	12,438	13,799	13,023	13,214

Source: 2007 ENEMDU. Weighted means and standard deviations for prime-age (25-54) adults in Ecuador, by gender or education. Full-time employment defined as working 30+ hrs/week. Industry employment shares are proportion of adults working full-time in relevant sector. Education is highest level reached.

five thousand return orders for Ecuadorians were fulfilled between 2008 and 2014 (Eurostat 2026b).

Ecuadorian policy may have encouraged some return migration as well. Perraudin (2017) notes that Ecuador allowed dual citizenship beginning in 1998, and that, in the wake of the crisis, Ecuadorians with formal Spanish paperwork were more likely to move back to Ecuador since the option to return to Spain remained open for them. Mercier et al. (2016) describes the creation of a secretariat of migration in 2007, which claimed to have aided over forty thousand Ecuadorians living abroad return migrate between 2008 and 2013. Despite efforts by Ecuadorian and Spanish governments, post-crisis return migration flows to Ecuador did not rival the initial migration wave to the Iberian peninsula.

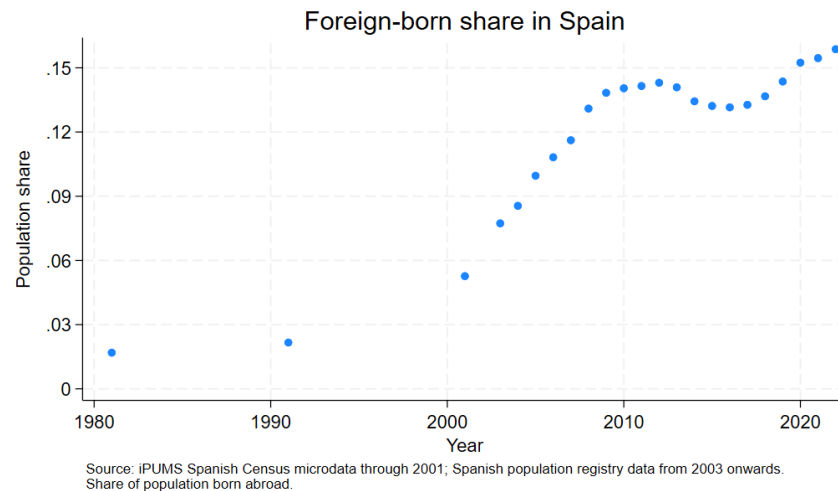


Figure 4: Spain foreign-born share

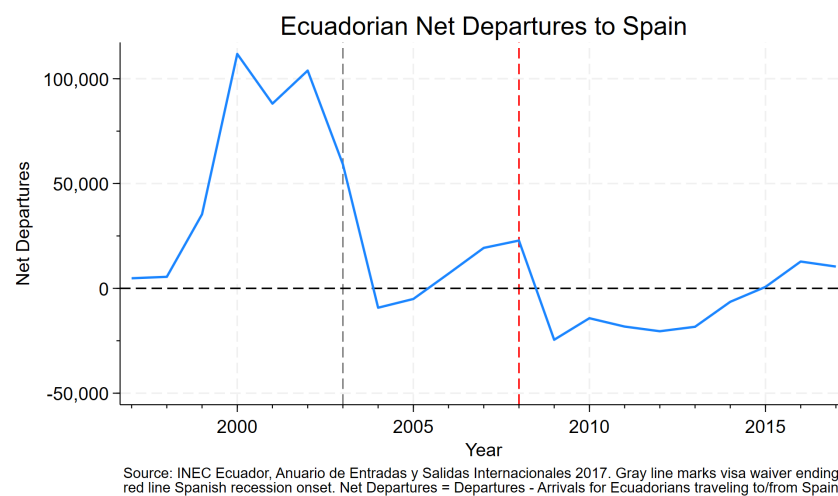


Figure 5: Ecuadorian Net Departures to Spain (INEC)

3.2.2 Migrant Flows

Spanish economic growth, migrant-friendly policies, and strong push factors led Ecuador to become a major source of the growing river of migration to Spain. The foreign-born share of the Spanish population rose more than fivefold within twenty years, from 2.2% in 1991 to 12.1% by 2011 (see Figure 4) (INE n.d.[c]; INE n.d.[a]; Ruggles et al. 2025a).⁶ Economic push factors in Ecuador, including hyperinflation and a banking crisis (Jokisch and Kyle 2008), stimulated Ecuadorian emigration, while *de facto* pro-migration policies facilitated Spanish migration and integration. Ecuadorian transit data reveals a sharp rise in net departures of Ecuadorians to Spain starting in 1999, climbing to an average of nearly 100,000 net departures per year from 2000 to 2002 as seen in Figure 5 (INEC 2018). Nearly a half million Ecuadorians lived in Spain by 2005, becoming the second largest Spanish immigrant group (UN 2020). After Spain entered a recession, migrant employment dropped, and a subset of Ecuadorians opted to return.

Following the Spanish recession, migration flows slowed and temporarily reversed; while most migrants remained in Spain, some Ecuadorians returned to their home country. Spanish population registry counts suggest net declines of over 50,000 in the Ecuadorian-born immigrant population from 2010 to 2017, although the stock remained above 400,000 (INE 2022b). Ecuadorian transit data record persistently negative net flows of Ecuadorians to Spain from 2009-2014, indicative of a countercyclical return migration flow (INEC 2018). Return migration exceeds that directly sponsored by Spanish policy. Return migration for Ecuadorians with Spanish citizenship appears over twice as large as Spanish state-sponsored return migration. The number of Ecuadorian-born Spanish nationals residing in Ecuador, presumably return migrants ineligible to participate in Spanish state-sponsored return programs, increased by nearly twenty-five thousand between 2009 and 2015 (INE 2026a), more than double the Spanish state-sponsored return migration of about twelve thousand (59% voluntary) over the same period (ISSM 2026c; ISSM 2026b; ISSM 2026a; Eurostat 2026a). I investigate the attributes of Ecuadorian return migrants and how they differed from those who remained in Spain and those they rejoined in Ecuador, as this could shape their potential impacts on Ecuadorian labor markets.

3.3 Migrant Selection

3.3.1 Selection into Emigration

The labor market impact of return migration would depend in part on returnees' characteristics and any differences with non-migrants. This in turn relates to emigrants' differential attributes, and any changes that occurred during migration episodes, such as the accumulation of human or financial capital. An extensive literature investigates migrant self-selection, aggregate differences between emigrants and non-migrants; most work points to positive selection for human capital (Borjas 1987; Chiquiar and Hanson 2005), and other work points to positive selection on health and culture (Van Dalen and Henkens 2013; Docquier, Tansel, and Turati 2020). I analyze migrant selection through descriptive regressions of microdata

⁶By 2005, Morocco, Ecuador, Romania, Colombia and Argentina were the five countries of origin with the largest immigrant stocks in Spain (UN 2020) (see Table F.1).

on prime-age (25-54) adults from national surveys conducted in 2007 in Ecuador and the top two Ecuadorian emigrant destinations, Spain and the United States. I pool Ecuadorian-born respondents from the 2007 Spanish Immigrant Survey and the 2007 American Community Survey with respondents in the 2007Q4 Ecuadorian labor force survey (ENEMDU) (U.S. Census Bureau 2007–2011; INE 2008a; INEC; 1990–2019).⁷ I test for selection along gender, age, and education, and examine differences in household characteristics and employment. I find that Ecuadorian emigrants to Spain were negatively selected on age and moderately positively selected on education, but not as much as migrants to the United States. Controlling for age, migrants to both Spain and the United States are positively selected on having at most some secondary education; this share is more than double for Spanish emigrants than peers in Ecuador (31.1 percentage points higher). However, selection on college education differs by destination; while American immigrants are more likely to have some college education, Spanish immigrants are negatively selected on college education. Ecuadorian migrants to Spain are more educated than non-migrants, but this comes not from more college graduates, but from having a greater share who went beyond primary education to secondary education.

Prior to the crisis, international migrants experience higher employment rates and earnings than non-migrants. Ecuadorians in Spain and the US are more likely to be employed than non-migrants (see Table 3), and both are more likely to work in construction, reflecting employment in destination housing booms. Labor market earnings are an order of magnitude higher in both destination countries in comparison to Ecuador (see Table F.4). Average monthly wages are over three times higher in Spain than Ecuador, and nearly seven times higher in the US (Spanish returns even rise after accounting for education). Migrants experienced higher employment rates and substantially higher wages than non-migrants, suggesting migration paid off; this is not causal, as factors apart from age or education may also contribute to observed differences. These gains, however, were predicated on positive labor market outcomes in the destination country.

3.3.2 Selection into Return Migration

Many migrants lost jobs during the Spanish recession, and some chose to return. I find that return migrants are negatively selected on education with respect to migrants who remain in Spain, but are nevertheless more educated than native-born peers in Ecuador. I pool return migrants identified in full-count Ecuadorian 2010 census microdata (respondents who lived in Spain five years prior but now consider their usual residence to be Ecuador) with Ecuador-born respondents in the 10% iPUMS sample of the Spanish 2011 census (INEC 2026b; INE n.d.[a]; Ruggles et al. 2025a). Returnees are significantly less female (7.7 percentage points less), and appear drawn from the tails of the migrant educational distribution: they are significantly more likely to have a college education (4.4 percentage points, or 67%) and some primary schooling (5.6 percentage points, or 28%), accounting for an age quadratic. Returnees are significantly more male (7.7 percentage points more) and more likely to be married or in a civil union than migrants who remain in Spain (by 20 percentage points, or a 37% increase). In line with labor-market induced return migration, return migrants are 5.5

⁷For the ACS, I exclude those born in Ecuador as US citizens. The 2007Q4 ENEMDU does not record nativity, so I exclude respondents whose last residence was abroad.

percentage points (9.7%) more likely to be employed than migrants who remained in Spain. The implications of an inflow of return migrants would depend on how their characteristics compare to the population in Ecuador; from this perspective, return migrant selection around 2010 strongly resembles initial emigrant selection for 2007. Table F.6 reveals larger gender differences (returnees are 6.6 percentage points more likely to be male than other native-born Ecuadorians), and higher levels of human capital controlling for an age quadratic, with return migrants possessing secondary schooling at higher rates than their non-migrant Ecuadorian peers (23 percentage points, or 60% more). Despite being more male and possessing higher levels of education, Spanish returnees are 8 percentage points less likely to be employed than non-migrants. Taken together, return migrant selection points to a small influx of relatively more educated male workers.

3.4 Paying it Backwards: Migrant Remittances

Most working immigrants sent money home in the form of remittances. 67.5% of Ecuadorian migrant workers in Spain remitted funds within the past year (INE 2008b); these remittances would average 19.8% of monthly wages (see Table F.2). Individual transactions aggregated to substantial financial flows: Spanish remittances to Ecuador amounted to 2.7% of Ecuadorian GDP (BCE 2025; WBG 2025a), exceeding official development aid, net FDI inflows, and the

Table 3: Ecuadorian Migrant Selection

	(1)	(2)	(3)	(4)	(5)
	Female	Age	Some Primary Schooling	Some Secondary Schooling	Some College
Spanish Immigrant	-0.0169 (0.0208)	-3.366*** (0.305)	-0.241*** (0.0182)	0.311*** (0.0204)	-0.0968*** (0.0133)
US Immigrant	-0.0700*** (0.0146)	-0.356 (0.241)	-0.339*** (0.0121)	0.234*** (0.0146)	0.140*** (0.0136)
Age			0.00468 (0.00445)	0.00480 (0.00395)	-0.00308 (0.00393)
Age ²			-0.00000350 (0.0000570)	-0.000135*** (0.0000498)	0.0000229 (0.0000500)
<i>N</i>	28775	28775	28775	28775	28775
adj. <i>R</i> ²	0.001	0.008	0.037	0.051	0.009
Non-Migrant Mean	0.524	38.355	0.511	0.232	0.213
p-value US = ESP	0.032	0.000	0.000	0.002	0.000

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

2007 Spanish Migrant Survey, 2007 US ACS, 2007Q4 ENEMDU. Restricting to Ecuador-born adults aged 25-54 for Spanish and US surveys, respondents whose last residency was not abroad for Ecuador. Based on 26,047 observations from the ENEMDU, 1,690 from the US ACS, and 1,038 from the Spanish Migrant Survey. Weighted regressions (survey weights), heteroskedasticity robust (HC2) standard errors. Education outcomes indicate respondent's maximum education level reached and are mutually exclusive.

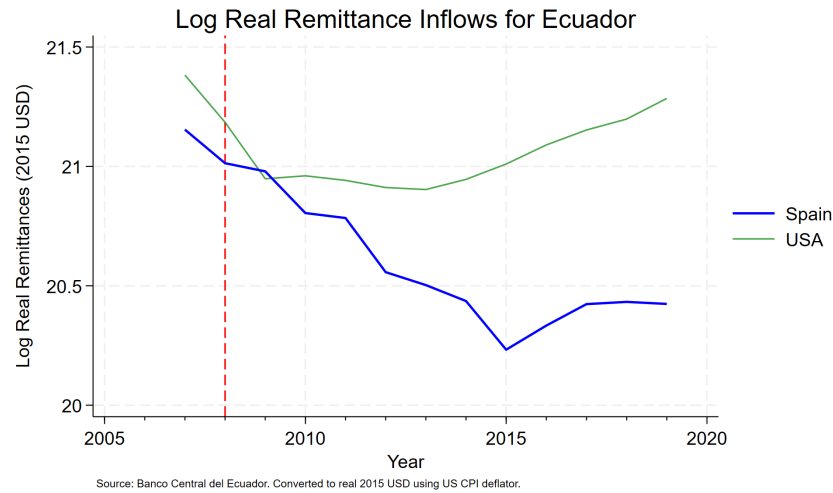
value of Ecuador’s second largest export (WBG 2026b; WBG 2026a; World Bank 2026). 5.8% of households received remittances the month prior in December 2007,⁸ and remittances amounted to 43% of monthly income on average for recipients (INEC; 1990–2019).

Labor market integration was positively associated with remittances on the extensive and intensive margins. Employed Ecuadorian prime age (25–54) migrants were 17.2 percentage points (28%) more likely to send remittances than their unemployed peers, and the elasticity of remittances to monthly wages was 0.41; these relationships remain virtually unchanged after incorporating controls for age, having children in Ecuador or Spain, and marital status (see Table F.7) (INEC 2008b). I observe clearly positive correlations between remittances and household wellbeing for Ecuadorian households. Ecuadorian households receiving remittances in 2007 were materially better off than their peers, more educated, and less likely to be poor (see Table F.8) (INEC; 1990–2019).⁹ These associations suggest that the large sums sent by migrants had beneficial impacts back home, but are not causal and are likely biased due to migrant selection. For example, wealthier households may be more likely to send emigrants as they can afford travel costs, creating a positive correlation between subsequent wealth and remittance receipt. I will instead investigate the impacts of a shock to remittance flows through migrant employment loss in Spain.

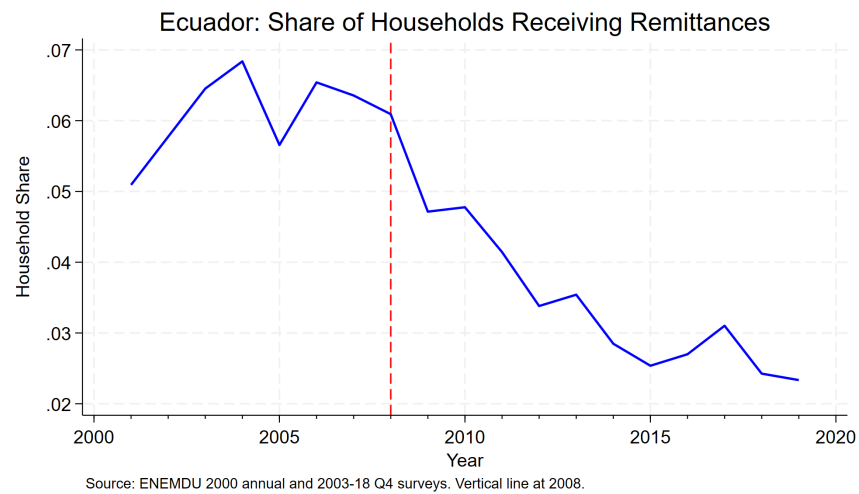
During the Global Financial Crisis remittances to Ecuador fell, particularly those from Spain (see Figure 6a). This reduction reflected declines on the extensive and intensive margins; both the share of Ecuadorian households receiving remittances (see Figure 6b) and the average funds received per recipient declined over the period (INEC; 1990–2019). Given the relationship between employment and remittance sending, I attribute much of this decline to deteriorating labor market conditions for Ecuadorian emigrants in Spain.

⁸6.99% of households reported receiving remittances within the prior year in the full-count 2010 Ecuadorian census (INEC 2026b).

⁹I validate these relationships with 2010 full-count Ecuadorian Census data (INEC 2026b), reported in Table F.9. All relationships that can be tested with the census data retain their statistical significance and valence, and half have nearly identical coefficients.



(a) Remittances from Spain vs USA



(b) ECU: Share of Households Receiving Remittances

Figure 6: Remittance Declines

4 Empirical Strategy

4.1 Theoretical Motivation

My approach is rooted in transnational household decision making within a utility maximization framework, where households make decisions regarding migration and international income sharing (remittances) to maximize expected utility based on labor market conditions and migration costs.

A migrant makes a remittance decision based on utility maximization over own consumption in Spain (C_d), their contribution to household consumption in Ecuador (C_o), and their own labor supplied in Spain (L_i). Household consumption in Ecuador (C_o) represents remittances. Consumption in both locations are normal goods, while labor is a disutility. Migrants must cross a subsistence consumption threshold c before sending money to their families back home. Total consumption is constrained by wage labor (wL_i), therefore negative shocks to migrant wages or employment would reduce total consumption and remittances.

$$\begin{aligned} U &= f(C_d, C_o, L_i) \\ C_d + C_o &= wL_i \text{ s.t. } C_d > c \end{aligned}$$

The household in the origin country would operate in alignment with simple labor supply theory. The household has a subsistence level of consumption necessary, such that reservation wages change depending on non-wage income, such as remittance income. All else equal, a negative remittance shock will lower former remittance recipients' reservation wages and thus increase their labor supply. This would result in falling real wages if the labor demand curve has a negative slope.¹⁰

Migrants decide whether to (return) migrate in order to maximize expected utility based on comparative labor market conditions and migration costs. This parallels Dustmann and Goerlach (2016)'s model of temporary migration, in which migrants decide whether to remain or return depending on realized and expected income across locations. Migration is costly but profitable if expected wages exceed emigration costs (t_d) and the higher cost of living the migrant faces in the destination (C_d). Migration need not be permanent. Migrants decide whether to remain in the destination or return home based on expected wages, return travel costs (t_o), and differences in living costs. All else equal, a negative shock to employment expectations in the destination would reduce emigration and increase return migration.

$$\begin{aligned} Migr_{i,t} &= (E[U_{i,d,t+1}(w_d L_{i,d} - t_d - C_d)] > E[U_{i,o,t+1}(w_o L_{i,o})]) \\ Return_{i,t} &= (E[U_{i,d,t+1}(w_d L_{i,d} - C_d)] < E[U_{i,o,t+1}(w_o L_{i,o} - t_o)]) \end{aligned}$$

Given employment shocks in Spain, I predict an immediate reduction in remittances, and as migrants' expectations about future economic prospects in Spain worsen I would expect an increase in return migration.

¹⁰Remittances impacting labor supply through reservation wages builds on Clemens and McKenzie (2018).

4.2 Estimating Equations

What impact did Ecuadorian emigrant job loss in Spain have on Ecuadorian regions of origin, particularly labor markets and socioeconomic outcomes? Ideally, one would have international panel data on transnational households and regress changes in labor market decisions for transnational households against an indicator for emigrant job loss. In the absence of such panel data, one might examine aggregate effects at a local level by regressing changes in socioeconomic outcomes at the regional level against regional emigrant job loss.

A regional analysis has the advantage of accounting for local spillovers and computing net effects for Ecuadorian regions. The independent variable would be the population-adjusted change in employment for Spanish emigrants from region i , $\frac{\Delta Emigr Emp_{i,Spain,t2-t1}}{Pop_{i,t1}}$, which is effectively the change in the local employment rate from emigrant employment. I would then regress local changes in Ecuadorian labor market conditions such as full-time employment rates, $\Delta y_{i,t2-t1}$, against emigrant employment changes, controlling for the initial conditions $y_{i,t1}$ to address concerns about pre-existing underlying differences in local labor markets and any reversion to the mean.

$$\Delta y_{i,t2-t1} = \beta \frac{\Delta Emigr Emp_{i,Spain,t2-t1}}{Pop_{i,t1}} + \gamma y_{i,t1} + \epsilon_i \quad (2)$$

Unfortunately, I cannot directly observe the above independent variable, as it would require panel data on Ecuadorian workers in Spain identifying migrants by their Ecuadorian regions of origin. Publicly available Spanish EPA data does not differentiate migrants by nationality, only by broad country groupings (e.g. South America). Since I cannot observe actual employment changes for a region’s emigrants, I instead instrument for emigrant employment changes within Spain by nesting a Spanish employment shift-share instrument within an emigrant exposure shift-share instrument.

To estimate the impact of migrant job loss on Ecuadorian labor markets, I create an emigrant employment shift-share instrument for the share of a region’s prime-age population that would be expected to lose a job in Spain, based on where a region’s emigrants had settled in Spain and expected job loss in migrant-intensive industries in those Spanish locations. This strategy resembles Caballero, Cadena, and Kovak (2023)’s methodology, but while they incorporate realized conational emigrant employment changes as shifts, I instead instrument for emigrant job loss using local industry composition and national industry trends.¹¹

I instrument for Spanish local labor market downturns using Spanish labor force survey data. $\frac{Emp_{j,l,2007}}{Emp_{j,2007}}$ records Spanish province j ’s employment share in industry (or job type) l in 2007, while shifts come from national log changes in industry employment $\Delta \log (Emp_{-j,l,2007-2009})$, not counting province j , between 2007 and 2009. I restrict to prime-age (25-54) adults and focus on changes in full-time (30hrs/week+) employment across sectors $l \in L$ in Q2 labor force surveys for workers of all nativities (INE 2024). I consider employment shares over a set of economic activities L , and construct candidate instruments using different domains of L . My preferred instrument restricts L to activities (split by gender) in which Ecuadorian

¹¹See Appendix D for a comparison of candidate instruments.

migrants would be most exposed (INE 2008b; INE 2024).¹² Alternate versions incorporate all ten 1-digit activity-codes identified in the public-use microdata (pooling genders) into L , as well as singleton sets restricting to a single industry or job type, namely construction and temporary contract jobs. The construction employment instrument builds on Mitze (2019) and Monras (2015), who use construction employment shares to instrument for European and US employment shocks during the Global Financial Crisis, and I also create a temporary-contract instrument.

This underlying Spanish employment shift-share instrument should predict changes in local migrant employment outcomes in Spain, and I validate this using Equation 3, which regresses Spanish province-level labor market changes on a domestic Spanish industry employment shift-share instrument.

$$\Delta y_{j,t-2007} = \beta \sum_l^L \left(\frac{Emp_{j,l,2007}}{Emp_{j,2007}} \Delta \log (Emp_{-j,l,t-2007}) \right) + \gamma y_{j,2007} + \epsilon_i \quad (3)$$

My main concern, however, is how emigrant job loss impacts Ecuadorian regions i . I thus construct an emigrant-employment instrument with shares from subnational emigration rates and shifts from the aforementioned Spanish employment shift-share instrument. I estimate subnational emigration from Ecuadorian regions i to Spanish provinces j , $\widehat{Emigr}_{i,j,2007}$, using a pre-shock Spanish migrant survey and Ecuadorian census microdata as described in Section 2. I compute regional population denominators $Pop_{i,2010}$ from the 2010 Ecuadorian census and use Spanish labor force survey data to compute industry-level employment shares and changes in Spain (INE 2008b; INEC 2026a; INEC 2026b; INE 2024). I regress regional changes in Ecuadorian wages and employment rates, $\Delta y_{i,t2-2007}$, against the emigrant employment shift-share instrument, controlling for initial labor market conditions $y_{i,t1}$, as follows:

$$\Delta y_{i,t2-2007} = \beta \left[\sum_j^J \frac{\widehat{Emigr}_{i,j,t1}}{Pop_{i,2010}} \sum_l^L \left(\frac{Emp_{j,l,t1}}{Emp_{j,t1}} \Delta \log (Emp_{-j,l,t2-t1}) \right) \right] + \gamma y_{i,t1} + \epsilon_i \quad (4)$$

I next confirm the Spanish first stage of Equation 3 in Section 4.3, then address shift-share identification in Section 4.4 before proceeding to estimate Equation 4 to examine Spanish employment shock impacts on Ecuadorian labor markets in Section 5.

¹²Namely: male construction, male trade/hospitality, male agriculture, male simple manufacturing, male complex manufacturing, female other services, female trade/hospitality, female finance/professional services, and female simple manufacturing. Gendered industries based on the 2007 migrant survey and labor force survey. Industry categorization in public-access files for Spanish EPA is coarser than the immigrant survey; these industries were identified by comparing employment distributions of South Americans and Ecuadorians by gender between both datasets.

4.3 Spanish First Stage

The emigrant employment shift-share instrument has an implicit first stage, that its shifts do predict changes to migrant employment in Spain. I validate this by regressing changes in Spanish province-level employment against Spanish industry employment shift-share instruments, using Equation 3. These regressions confirm that the Spanish instruments successfully predict changes in local labor market conditions within Spain, including for migrants.

I regress short-run (2007-10) changes to log employment, employment rates, and population for the prime-age (25-54) adult population against Spanish shift-share employment instruments created over 2007-9. For ease of interpretation, I reverse the sign on the shift-share instrument, so a negative coefficient indicates that predicted employment loss is associated with actual employment loss. In addition to an instrument focused on Ecuadorian migrant intensive gender-industries, I include an instrument which includes all one-digit activities, and two simple instruments with singleton sets L focused on construction and temporary jobs, respectively.

I find that the migrant industry, construction, and temporary job instruments are most predictive of short-run employment changes within Spain. Instrumented job loss in migrant industries, construction, and temporary jobs are significantly related to actual job loss. The first and fourth columns of Table 4 report regression coefficients for labor market regressions for the full prime-age population in Spain. A 1 percent increase in a province's expected job loss from construction from 2007-2009 is associated with a 2.4 percentage point fall in all jobs from 2007-2010, and a 1.7 percentage point decline in the local employment rate, with both coefficients being statistically significant at the 1% level. Spanish shift-share instruments not only predict general labor market trends, but also predict migrant labor market conditions.

I find that Spanish employment instruments predict changes to migrant employment in Spain, including South American migrants. Publicly available Spanish EPA microdata do not identify foreign-born respondents' exact country of birth, so I examine changes for the foreign-born and South American-born over in Table 4. Notably, the Ecuadorian migrant industries shift-share instrument, construction instrument, and temporary job instrument are all statistically significant predictors of changes to South American log employment and employment rates. A 1 percent greater predicted decrease in Ecuadorian migrant industry jobs from 2007-9 is associated with a roughly 16.8 percent decrease in South American jobs, significant at the 1% level, and a 2.3 percentage point decrease in the employment rate for South Americans, significant at the 10% level. Construction jobs have an especially large effect, as a 1 percent greater predicted decrease in construction jobs is associated with a strongly significant 21.5% reduction in South American jobs and 3.4 percentage point reduction in South American employment rates, significant at the 5% level.

These results provide strong evidence that Spanish employment instruments predict local regional labor market downturns within Spain, including for South American migrants, and illustrate that Spanish employment shocks had greater impacts on local labor market conditions for migrants than the full population. This confirms that my empirical methodology traces the onset of Spanish labor market shocks before they reverberated abroad. The negative impact on migrant employment prospects provides the necessary first stage evidence that the Spanish recession impacted migrants. Migrant job loss would thus be responsible for declining migrant remittances and hence affect Ecuador.

Ideally I would confirm that remittances and return migration respond to local Spanish labor market shocks, but face issues on this front due to data availability and quality. I do not have data on local remittance sending within Spain and therefore cannot test whether Spanish employment shocks reduced local remittance sending from Spain to Ecuador. In Appendix C I attempt to investigate local Ecuadorian return migration from Spain using Spanish population registry data, but face data challenges. While stock-based analyses reveal declines in local Ecuadorian stocks which could partly reflect return migration, I face conflicting flow-based analyses.

These analyses demonstrates strongly significant effects of Spanish employment shocks on migrant employment. Having validated the instrumented Spanish employment shifts, I proceed to investigate Spanish shock impacts on Ecuadorian regions.

Table 4: 2007-2010 Province Migrant Employment Changes in Spain

	Log Jobs	Log Migrant Jobs	Log S. Amer Jobs	Emp Rate	Migrant Emp Rate	S. Amer Emp Rate
Migrant Industries Bartik	-1.710** (0.785)	-11.326*** (2.334)	-18.385*** (4.593)	-0.853* (0.483)	-2.209*** (0.648)	-2.312* (1.160)
Construction Bartik	-2.430*** (0.739)	-14.868*** (2.354)	-24.220*** (5.169)	-1.688*** (0.526)	-3.840*** (0.655)	-3.494** (1.475)
Temporary Job Bartik	-1.884*** (0.487)	-7.782*** (2.371)	-10.751** (4.361)	-1.785*** (0.418)	-2.451*** (0.475)	-2.767*** (0.981)
All Industries Bartik	-1.331 (0.813)	-8.992*** (2.820)	-14.068*** (4.171)	-0.691 (0.477)	-1.788** (0.810)	-1.805 (1.224)
<i>N</i>	52	52	50	52	52	50
Province Avg Value (2007)	13.011 (1.075)	11.022 (1.454)	10.120 (1.633)	0.667 (0.057)	0.627 (0.070)	0.662 (0.110)
Province Avg Value (2010)	12.935 (1.083)	10.984 (1.434)	10.058 (1.679)	0.601 (0.069)	0.508 (0.071)	0.543 (0.102)

Each cell is a coefficient from a unique regression, with its standard error in parentheses. Sample size is the number of Spanish provinces in each column's regressions. Regressions weighted by 2007 prime-age population. Outcome variables are changes in the column variable for prime-age (25-54) populations in Spain for full population, foreign-born, and South American-born. Regressions include 2007 value of the column variable as a control. Heterskedasticity robust (HC2) standard errors. Source: Spanish EPA.

* $p < 10\%$, ** $p < 5\%$, *** $p < 1\%$

4.4 Shift-Share Identification

I run several tests for causal identification of the emigrant shift-share instrument, building on econometrics literature revisiting the underlying assumptions of shift-share instruments. Borusyak, Hull, and Jaravel (2022) and Goldsmith-Pinkham, Sorkin, and Swift (2020) note that exogeneity for causal identification of shift-share instruments must come from an instrument’s shifts and/or shares. While an exogenous shifts approach initially seems promising given Spanish employment shocks are orthogonal to local development trends within Ecuador, the asymptotics assume the existence of many shocks. Spanish job loss was primarily concentrated in construction, and Spanish industry categorization is too coarse in public use files for this assumption to hold, given EPA data only records one digit economic activity codes. I therefore approach my emigrant shift-share instrument from the perspective of Goldsmith-Pinkham, Sorkin, and Swift (2020), and consider emigrant shares as the source of exogenous variation in treatment. Ecuadorian emigration to Spain was motivated by a national financial crisis and variation in the ensuing migration network can be arguably considered exogenous.

Goldsmith-Pinkham, Sorkin, and Swift (2020) describe exogeneity assumptions and plausibility tests in the context of exogenous shares. The identifying assumption is that changes in economic outcomes would have been similar in locations with high and low emigration shares to Spain, absent the Spanish employment shock. Goldsmith-Pinkham, Sorkin, and Swift (2020) recommend several plausibility tests, including checking for pre-trends and investigating correlates of the shares.

While testing for pre-trends is reasonable in many settings, it is less applicable in my context since the shares are the result of local emigration to Spain which would have had effects in the pre-period. The emigration wave to Spain occurred in 1999-2003, just before the pre-period, and likely impacted local labor markets and household well-being differentially across low and high emigration localities prior to the Spanish labor shock, due to local labor market responses to reduced labor supply and increased remittance inflows. The pre-period (2004 to 2007) would include adjustment to the earlier emigration wave, so one should not necessarily expect to observe parallel pre-trends.

I investigate pre-trends for the main outcomes and represent these graphically in Figure E.7. I find no pre-trend for changes in female employment rates, the most robust relationship. While it is not statistically significant, I do observe a negative pre-trend on male self-employment rates.

To test for plausibility, I follow Goldsmith-Pinkham, Sorkin, and Swift (2020) and regress the instrument on initial covariates from 2007, similar to a balance test. Statistically insignificant covariates would suggest that shares – and hence shock exposure – are as-good-as-randomly assigned across Ecuadorian cantons, while significant covariates suggest possible sources of bias which should be controlled for in the main regression. Statistically significant differences in 2007 covariates may reflect prior effects of the initial emigration wave, so I also regress the instrument on canton-level covariates from 2001 using Ecuadorian census data.

I test for pre-period share correlates in Table 5. For the 2007 correlates, I regress emigrant share and emigrant employment shift-share instrument values against a set of covariates for initial industry, employment, and economic conditions at the canton-level, weighting by prime-age population and clustering standard errors at the province-level. I find that the

instrument is strongly significantly and positively related to the population shares working in agriculture and construction, and negatively related to GDP per capita and the marriage/civil union rate. While this suggests that rural, less productive cantons were more likely to send emigrants to Spain, some of these coefficients could reflect impacts from emigration. For example, higher construction rates could reflect remittance-funded construction. In view of this, I also test for 2001 correlates.

I test for share correlates in 2001 in Table 6. I include similar but slightly different controls, and find statistically significant negative relationship with employment share in utilities. As I do not have local GDP data for this year, I include variables on housing quality, such as the share of households having a kitchen or private bathroom, as proxies for local wealth. While agricultural employment share and marriage/union shares retain the same positive valence as in Table 5, they are not statistically significant.

Table 5: Share Correlates (2007)

	Spain Emigration Rate	Spanish Construction Bartik	Spanish Migr Industry Bartik
log GDP per pr. adult	-0.0186*** (0.00616)	-0.000945*** (0.000321)	-0.00136*** (0.000460)
log population	-1.97e-08 (1.50e-08)	-1.09e-09 (7.56e-10)	-1.59e-09 (1.08e-09)
Share in Ag	0.155*** (0.0378)	0.00784*** (0.00190)	0.0114*** (0.00267)
Share in MFG	0.0638 (0.0762)	0.00276 (0.00397)	0.00429 (0.00572)
Share in Mkt Svcs	0.0461 (0.0749)	0.00205 (0.00377)	0.00298 (0.00538)
Share in Non-Mkt Svcs	-0.0544 (0.140)	-0.00339 (0.00674)	-0.00479 (0.00963)
Share in Construction	0.579** (0.219)	0.0296** (0.0112)	0.0426** (0.0158)
Share Primary Edu	0.229 (0.207)	0.0122 (0.0108)	0.0180 (0.0155)
Share Secondary Edu	0.117 (0.144)	0.00641 (0.00743)	0.00951 (0.0106)
Share Superior Edu	0.379 (0.221)	0.0199 (0.0116)	0.0288* (0.0166)
Share in Public Sector	0.203 (0.142)	0.0113 (0.00719)	0.0165 (0.0102)
Emigration Rate to US	-0.225 (0.142)	-0.0115 (0.00729)	-0.0165 (0.0104)
Share Married/in Union	-0.199** (0.0787)	-0.0103** (0.00402)	-0.0146** (0.00575)
<i>N</i>	198	198	198
Adjusted R2	0.248	0.255	0.261
Avg Canton Outcome	0.0519	0.0026	0.0036
<i>s</i>	0.0419	0.0022	0.0031

Table 6: Share Correlates (2001)

	Spain Emigration Rate	Spanish Construction Bartik	Spanish Migr Industry Bartik
log population	-0.00918 (0.00867)	-0.000464 (0.000442)	-0.000665 (0.000634)
Share Urban	0.0783 (0.0651)	0.00414 (0.00339)	0.00586 (0.00485)
Share in Ag	0.223 (0.177)	0.0122 (0.00854)	0.0178 (0.0121)
Share in MFG	-0.274 (0.292)	-0.0134 (0.0143)	-0.0189 (0.0203)
Share in Construction	-0.178 (0.510)	-0.00890 (0.0255)	-0.0121 (0.0371)
Share in Mining	0.183 (0.315)	0.00831 (0.0152)	0.0112 (0.0216)
Share in Utilities	-2.486* (1.317)	-0.130* (0.0696)	-0.187* (0.100)
Share in Hospitality	0.367 (1.288)	0.0231 (0.0643)	0.0298 (0.0915)
Share in Transportation	-0.146 (0.927)	-0.00491 (0.0454)	-0.00651 (0.0649)
Share in Finance	0.0499 (3.813)	-0.0214 (0.193)	-0.0270 (0.276)
Share in Real Estate	-0.895 (0.689)	-0.0452 (0.0347)	-0.0642 (0.0494)
Share in Commerce	0.484 (0.410)	0.0255 (0.0207)	0.0376 (0.0298)
Share in Public Sector	-0.0420 (0.240)	-0.00210 (0.0121)	-0.00225 (0.0171)
Full-Time Emp Rate	-0.00502 (0.164)	-0.00146 (0.00788)	-0.00235 (0.0111)
Self-Employment Rate	0.102 (0.0641)	0.00524 (0.00323)	0.00784 (0.00465)
Share Primary Edu	0.0251 (0.167)	0.00195 (0.00869)	0.00357 (0.0123)
Share Secondary Edu	-0.0994 (0.160)	-0.00489 (0.00795)	-0.00666 (0.0113)
Share Superior Edu	0.306 (0.260)	0.0173 (0.0133)	0.0253 (0.0189)
Share with Kitchen	0.136 (0.113)	0.00719 (0.00569)	0.00987 (0.00815)
Private Bathroom	-0.145 (0.164)	-0.00792 (0.00851)	-0.0114 (0.0121)
Private Shower	0.104 (0.138)	0.00538 (0.00704)	0.00804 (0.0100)
Share Home Activity	-0.0966 (0.414)	-0.00525 (0.0210)	-0.00795 (0.0301)
Share Married/in Union	-0.391 (0.229)	-0.0198 (0.0117)	-0.0272 (0.0166)
<i>N</i>	214	214	214
Adjusted R2	0.313	0.325	0.330
Avg Canton Outcome	0.053	0.003	0.004
<i>s</i>	0.0443	0.0023	0.0033

5 Results

This paper seeks to answer the question: how did Ecuadorian emigrants losing jobs in Spain impact labor markets within Ecuador? Section 4.2 introduced the emigrant employment shift-share instrument I will use to answer this question empirically. As discussed in Section 4.1, emigrant job loss could impact a migrant sending region through a reduction in remittances, reducing household incomes in Ecuador and impacting local labor supply decisions. Remittances are a significant source of income for recipient households (recall from Section 3.4 that remittances on average amounted to 43% of monthly income for recipients (INEC; 1990–2019)), so a negative remittance shock should impact local household labor decisions by reducing former recipients’ reservation wages, thereby increasing their employment rates.

To the extent that migrant job loss incentivized return migration, it would increase the local labor supply through migration. Declining employment prospects in Spain would reduce migrants’ utility in Spain, leading some to return migrate. Return migration would impact a sending region to the extent it changes local labor supply, human capital, and labor demand. Spanish employment shocks could thus propagate to Ecuadorian cantons by changing international financial and human flows, with each mechanism having potentially distinct implications. In the short run, however, I find that remittance reduction is more economically meaningful than return migration.

I first investigate the theoretical remittance and return migration channels by regressing canton-level changes in remittance inflows and return migration rates against the Spanish emigrant employment shift-share instrument. I then compute net effects on local labor markets by regressing local changes in employment rates and wages against the instrument, running separate regressions by gender, education, and broad age cohorts. My results suggest both mechanisms are active, as total remittance inflows decline and return migration from Spain increases. However, they also suggest that the remittance shock may be substantially greater than the return migration shock in the short-run. Given this, I interpret short-run labor market regressions to measure the impact of a negative remittance shock. Labor market results indicate positive employment rate responses for women in particular, in line with the reduced income channel, and increased self-employment among men.

There are two important notes for the reader regarding the interpretation of figures and tables: to simplify the interpretation, I have reverse the sign of the migrant instrument, and converted it to a z-score. This means a positive (negative) regression coefficient indicates that exposure to the Spanish downturn led to a relative increase (decrease) in an outcome for an Ecuadorian region. I convert instruments to z-scores, weighting by 2010 prime-age population, so regression coefficients should be interpreted as the change in an outcome given a one standard deviation increase in a canton’s exposure to Spanish migrant job loss.

In all regressions I incorporate population weights, weighting by a region’s 2010 prime-age population, and run regressions at the canton level. I cluster standard errors by province given my instrument design, and compute wild bootstrap confidence intervals.¹³

¹³Cantons within the same province have correlated instrument values, because canton-level emigration estimates depend on province-level emigration estimates (see Section 2). The subnational migration matrix thus assigns cantons within the same province the same relative proportional exposure to Spanish regions across Spain.

5.1 Mechanisms

I first confirm that the Spanish employment shock operates through both remittance and return migration mechanisms, using migrant shift-share instrument regressions to reveal the reverberations of Spanish labor market shocks to Ecuador. Regressions resemble Equation 4, and are conducted at historic province and canton-levels in Ecuador, weighted by 2010 prime-age population, with wild-bootstrapped standard errors clustered at the province level.¹⁴ Δy represent changes in multi-year averages, rates or medians.¹⁵ For ease of interpretation, the sign of the migrant instruments is reversed – a positive (negative) regression coefficient indicates exposure to Spanish labor market downturns is associated with a relative increase (decrease) in an outcome for an Ecuadorian region. One would expect a decline in remittances and increase in return migration due to reduced migrant employment, and my analyses confirm these both took place.

I find that the primary mechanisms for shock diffusion, remittances and return migration, respond to emigrant employment shocks at the canton level. For remittances, $\log(\text{rem})_i$, I investigate changes in log multiyear average total real remittance inflows at province and canton levels, as recorded by BCE (2025). The Banco Central del Ecuador does not disaggregate subnational remittance inflows by origin country, so I cannot identify local changes in remittance inflows from Spain. I proxy for return migration from Spain, rmigr_i , with the proportion of prime-age ENEMDU respondents that report Spain as their prior location of residence. I also examine changes to the share of households reporting remittance income in the prior month in the ENEMDU.

For these mechanism regressions, I opt to run regressions without the 2007 level control. This is because the pre-shock level of remittances and return migration should be direct results of initial emigration to Spain, which also created exposure to the Spanish shock. Indeed, a regression of $\text{hhdremit}_{i,2007}$ on $\text{SpainMigrIndBartik}_i$ is significantly positive at the 5% level, making it a bad control as it is part of the mechanism by which emigration led to a subsequent remittance income shock following emigrant job loss. I thus run the following regression:

$$\Delta y_{i,2007-10} = \beta_0 + \beta_1 \text{SpainMigrIndBartik}_i + \epsilon_i \quad (5)$$

At the canton level, I find statistically significant relative decreases in total log real remittance inflows and increases in return migration rates from Spain in the short and long run (see Figure 7). Most striking are the decreases in total remittance inflows: a 1 standard deviation increase in exposure to Spanish migrant job loss is associated with a 28.7% reduction in remittance inflows within two years of the shock, significant at the 5% level. In the medium run (6 years) the change is greater and significant at the 10% level, while in the long run (9 years) the drop increases to a significant reduction of about 36.9%.

¹⁴Ecuador provinces are subdivided into cantons, with the smallest cantons having populations in the low thousands. I standardize borders to historical regions using census data, as described in Section A. Not all cantons are consistently covered in ENEMDU or BCE data.

¹⁵ Years are pooled as follows: 2003-2004, 2005-2007, 2008-2010, 2011-2013, 2014-2016, 2017-2019, resembling a strategy used with ENEMDU data in Ontaneda Jiménez et al. (2024). Series are indicated with their final year for all averages. See Appendix B for a comparison of ENEMDU and census data.

While increases in the population share born in Spain are also statistically significant in the short and long run, the coefficients increase by a factor of ten between the short and long run, reflecting a delayed return migration response. A one standard deviation increase in exposure to Spanish labor shocks is associated with a relative increase of about two hundredths of a percentage point in the share of the prime-age population last in Spain. This increases to a less significant 0.0973 percentage point rise in the medium run, while over the long run it is significantly associated with a 0.29 percentage point increase in the share last in Spain. The share of households receiving remittances in the prior month decreases by a significant 0.27 percentage points for every standard deviation increase in the short run, and a strongly significant 0.4 percentage points in the medium run.

According to Table 1, the average canton has remittance inflows of \$171 per prime age adult and GDP of \$777 per prime age adult. For the average canton, a 29% drop in remittance inflow would be equivalent to a 6% reduction in local GDP per capita.

Controlling for 2007 levels would remove the significance from the household remittance share regression, but regression coefficients remain statistically significant for the Spanish share and total log remittance inflow outcomes in the short-run. Appendix B discusses some concerns with ENEMDU measures of remittances and return migration. I investigate alternate emigrant shift-share instruments in Table D.1 for robustness and find nearly identical results.

This analysis indicates that migrant employment shocks propagated from Spain to Ecuador, and that in the short run this occurred especially through reduced remittances. I take these results as strongly suggestive evidence, in line with national trends, that the Spanish migrant employment shock caused reduced remittance inflows to those Ecuadorian regions connected to Spain through recently established migrant networks. I next investigate the implications of this remittance income shock on Ecuadorian labor markets.

Table 7: 2007-2010 Canton Mechanism Regressions, Ecuador

	HHD gets Remit	log BCE Remit	Last in ESP	Lived Abroad
Spain Migr Ind Bartik (Z-score)	-0.00274** [-0.011 , -0.000]	-0.338** [-0.640 , -0.022]	0.000243** [0.000 , 0.001]	0.000363 [-0.001 , 0.004]
Observations	199	116	199	199
Adjusted R2	0.00919	0.0905	0.00820	-0.00283
Canton Avg Value (2007)	0.0613	17.8649	0.0006	0.0096
-	(0.0320)	(2.9147)	(0.0011)	(0.0105)
Canton Avg Value (2010)	0.0515	17.9060	0.0010	0.0117
-	(0.0331)	(2.6310)	(0.0021)	(0.0125)

Table 8: 2007-2013 Canton Mechanism Regressions, Ecuador

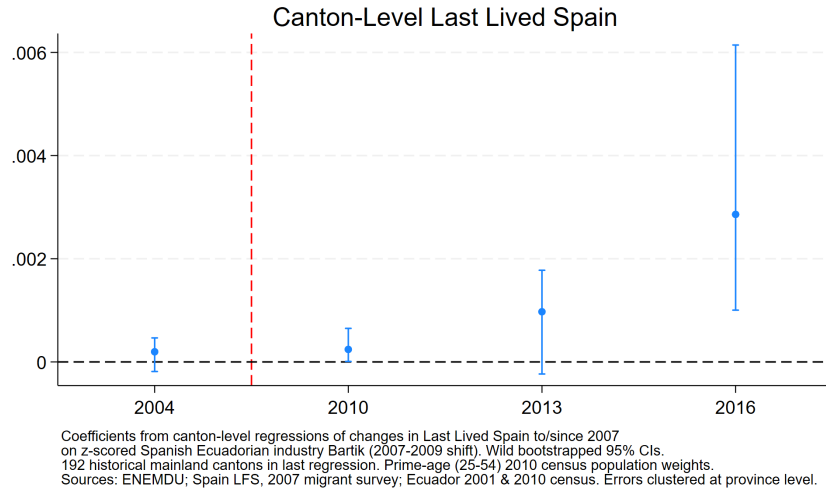
	HHD gets Remit	log BCE Remit	Last in ESP	Lived Abroad
Spain Migr Ind Bartik (Z-score)	-0.00399*** [-0.017 , -0.001]	-0.423* [-0.935 , 0.083]	0.000973* [-0.000 , 0.002]	0.000953* [-0.001 , 0.002]
Observations	199	117	199	199
Adjusted R2	0.0239	0.0951	0.0834	0.00982
Canton Avg Value (2007)	0.0613	17.8401	0.0006	0.0096
-	(0.0320)	(2.9643)	(0.0011)	(0.0105)
Canton Avg Value (2013)	0.0355	17.6685	0.0023	0.0128
-	(0.0299)	(2.5603)	(0.0033)	(0.0122)

Table 9: 2007-2016 Canton Mechanism Regressions, Ecuador

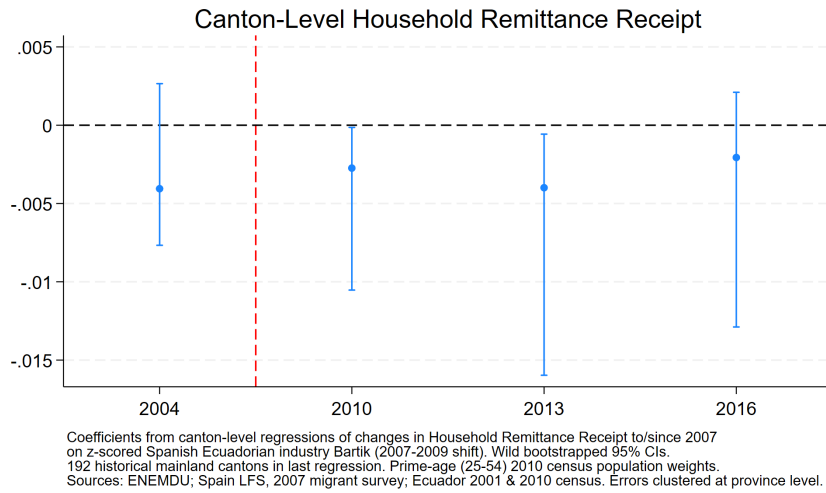
	HHD gets Remit	log BCE Remit	Last in ESP	Lived Abroad
Spain Migr Ind Bartik (Z-score)	-0.00206 [-0.013 , 0.002]	-0.460** [-1.054 , -0.012]	0.00286** [0.001 , 0.006]	0.00287 [-0.004 , 0.010]
Observations	192	117	192	192
Adjusted R2	0.00209	0.0982	0.157	0.0461
Canton Avg Value (2007)	0.0616	17.8496	0.0006	0.0096
-	(0.0319)	(2.9637)	(0.0011)	(0.0105)
Canton Avg Value (2016)	0.0261	17.5698	0.0059	0.0211
-	(0.0259)	(2.4623)	(0.0073)	(0.0184)

Each cell is a coefficient from a unique regression, with standard error in parentheses. Sample size is the number of Ecuador cantons in final regression of each column. Regressions are weighted by 2010 prime-age (25-54) canton population. Dependent variables are changes in column title between 2007 and year specified in table title for prime-age (25-54) respondents. Regressions have no controls. Wild bootstrap confidence intervals, clustered by province. Shift-share instruments calculated based on 2007-2009 employment changes in Spain.

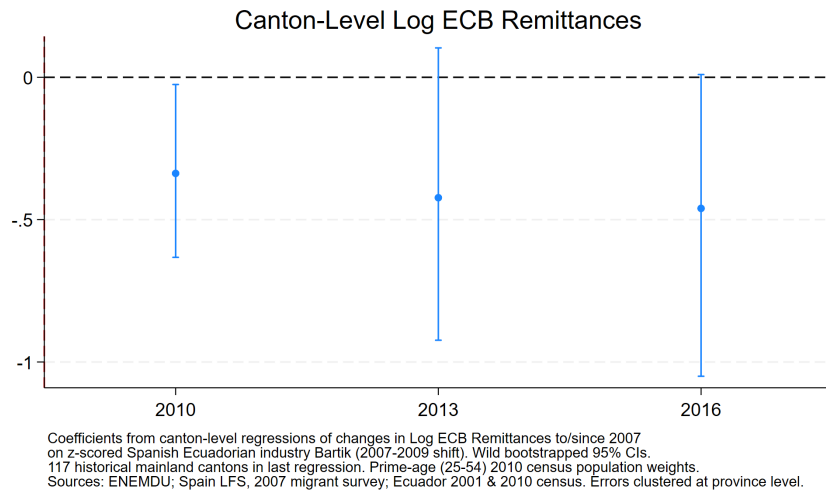
* p < 10%, ** p < 5%, *** p < 1%



(a) Canton Share Last in Spain



(b) Canton Share with Remittances



(c) Canton Log Remittance Inflow

Figure 7: Canton Mechanism Regressions

5.2 Labor Market Impacts

5.2.1 Main Results

To examine the effects of the Spanish employment shock on local labor markets in Ecuador, I investigate regional changes in employment rates and wages, using ENEMDU survey micro-data. I investigate canton-level heterogeneous effects by gender, education, and age cohort. I find that Spanish migrant job loss led to increased female full-time employment rates and male self-employment rates in affected Ecuadorian regions.

Employment rates are multi-year weighted means, while log full-time worker hourly wages are multi-year weighted medians, computed for historic mainland Ecuadorian provinces and cantons from pooled ENEMDU survey data after applying survey weights.¹⁶ Regression outcomes are canton-level changes within Ecuador for full-time (30+ hrs/week) employment rates, $emprate_{i,c}$, and log real hourly wages for full-time workers, $\log(w)_{i,c}$, focusing on prime-age (25-54) respondents. Self-employment rates are the share of a cohort reporting that they are self-employed. Regressions take the following form:

$$\Delta y_{i,2007-10} = \beta_0 + \beta_1 \text{SpainMigrIndBartik}_i + \beta_2 y_{i,2007} + \epsilon_i \quad (6)$$

Regressions of labor market changes against emigrant employment shift-share instruments reveal insignificant increases in full-time employment rates and self-employment rates for prime-age (25-54) adults in the short run (2007-2010) (see Table 10). While effects for all prime-age workers are not significant, I find significant heterogeneous effects on employment outcomes by gender.

I find that emigrant employment shocks had gendered employment effects within Ecuador, suggestive of local countercyclical reactions among affected households. In the short-run, full-time employment rates increase significantly for women, and self-employment rates increase significantly for men (see Table 13). A one standard deviation increase in exposure to Spanish migrant job loss is associated with an increase in a canton's prime-age female full-time employment rate of 0.93 percentage points, and an increase in a canton's prime-age male self-employment rate of 0.54 percentage points. The coefficient on full-time female employment is a meaningful increase given their baseline participation rate of 44.25% in 2007, as is the coefficient on male self-employment rate given the baseline rate of 26.1% in 2007; both changes are over 2% of the national mean. These coefficients suggest that women increased their labor market attachment and employed men shifted into self-employment in response to falling household remittance income.

I conduct another heterogeneity analysis by gender, dividing between workers with and without some secondary education (i.e. high school). I find little conclusive evidence; there is a slightly significant increase in the employment rate for more educated workers of 0.765 percentage points for a standard deviation increase in exposure to Spanish migrant job loss, but this finding is only significant at the 10% level. I discuss what my findings suggest, then investigate heterogeneous impacts further through an age cohort analysis.

¹⁶Given multiyear averages, this is the difference between the 2005-7 and 2009-11 averages. See Footnote 15 for details on year aggregation, and Appendix A for details on geographic standardization.

Rising female employment and self-employment suggest that affected cantons experienced local economic distress. Nationally, self-employment and female employment appear to be counter-cyclical in Ecuador (Ontaneda Jiménez et al. 2024). The relative increase in self-employment and female full-time employment rates in cantons with greater exposure to Spanish labor shocks could thus indicate that the emigrant employment shock caused local economic distress in migrant home communities. Rising employment rates are in line with the theoretical prediction of falling remittances driving households to increase labor supply by reducing their reservation wages. This concentration among women is likely explained by the greater labor market slack among prime-age women, whose full-time employment rate is only 44%, in contrast with the male full-time employment rate of 84%. Households appear to have little scope to increase labor supply for income at the extensive margin for male household members, but could do so under duress for female household members.

I examine dynamics of the gender effects in Figure E.7. I find that the increase in male self-employment magnifies and persists through 2013, remaining statistically significant at the 5% level, but becomes insignificant through 2016. The increase in the female full-time employment rate remains in 2013, but is no longer significant at the 95% level, and the coefficient becomes negative and insignificant by 2016. These suggest that the Spanish remittance shock had short and medium run effects, but faded over time, perhaps as the Spanish drop in employment began to reverse after 2013.

Examining age cohorts reveals that employment rate responses were strongest for older cohort approaching retirement age. I divide individuals into age groupings based on their age in 2007, and compute separate full-time employment rates, self-employment rates, and log hourly wages for full-time workers in these age cohorts by year bins.¹⁷ All coefficients are positive for full-time employment rates, but only statistically significant for adults in their early prime-age years (aged 25-39 in 2007) and late middle age (aged 55-64 in 2007). The coefficient on group indicates that a 1 standard deviation increase in exposure to Spanish migrant job loss is associated with a 1.4 percentage point increase in the employment rate of a canton's early prime-age adults (25-39 in 2007), and a 1.92 percentage point increase in the employment rate of a canton's later middle age (55-64 in 2007) adults. The coefficient on older adults (65-79) is even greater at a 2.03 percentage point increase, but is not statistically distinguishable from a null effect. I find statistically significant self-employment increases at the 5% level for early prime-age residents, and 10% level for older residents (aged 65-79), suggestive of adaptation among older residents. I also find statistically significant reductions in wages for the aged (aged 80+), but this finding is less interpretable given the substantially reduced sample size for this cohort. Full time employment rates and self-employment rates for later middle aged and older residents were declining across Ecuador, so the positive coefficients could reflect older individuals in exposed cantons deferring retirement due to the negative remittance income shock.

Taken together, these results suggest that remittance shocks led to local employment rate increases by women and older cohorts.

¹⁷These age cohorts are youth (under 16), young adults (16-24), early prime-age adults (25-39), later prime-age adults (40-54), early old adults (55-64), older old adults (65-80), and aged adults (80+).

5.2.2 Robustness Checks

I run additional regressions incorporating various controls for robustness. According to Goldsmith-Pinkham, Sorkin, and Swift (2020), the identifying assumption with a shares-based shift-share instrument is that changes in economic outcomes would have been identical on average across locations with high and low shares in the absence of the share-mediated shock. The main results – increased female employment and male self-employment due to emigrant job loss – could be spurious if they are driven by omitted factors which happen to be correlated with the emigrant shares underlying the emigrant employment shift-share instrument. In this case, the regression results would overstate the effect of emigrant job loss. For instance, if a new government social program that began at the same time as the Spanish recession disproportionately impacted areas with higher emigration rates to Spain, said program, instead of emigrant job loss, could be responsible for the observed changes. Omitted variable bias could also lead to an underestimate of the effects of emigrant job loss. One candidate is emigrant job loss in other migrant destinations, such as the United States. Ecuadorian emigrant stocks were nearly evenly split between Spain and the United States at the eve of the Global Financial Crisis (UN 2020), but subnational emigration rates to both countries are uncorrelated.¹⁸ The United States experienced job loss during the Great Recession, so Ecuadorian cantons with emigration links to the USA were exposed to emigrant job loss simultaneous to cantons with emigration links to Spain. However, since the instrument only incorporates emigrant job loss from Spain, cantons exposed to emigrant job loss in the USA are considered as “untreated” in the main regression specification, which would bias coefficients downwards. Omitted variable bias may thus lead my coefficients to be overestimated or underestimated.

To address these concerns, I re-run the main regressions with controls. I add employment sector, public employment growth, and human capital controls using from ENEMDU, regional sectoral production statistics from the Banco Central del Ecuador, and emigration data from Ecuadorian censuses. I first control for log GDP per prime adult, the share of prime-age adults in full-time agriculture, and the share with superior education. The second suite includes controls for public spending and US emigration by adding the prime-age share working in the public sector and the canton emigration rate to the United States, and also adds log population and the prime-age shares with secondary education. The third suite replaces these with industry employment controls recording the share of the prime age population working full-time in five large standardized industrial groupings (agriculture, manufacturing, market services, non-market services, and construction), and controls for initial human capital differences, taking the share of the prime age population whose education ends in primary education, secondary education, and superior education. The final check test for local industry composition through sectoral shares of total canton production, using Banco Central del Ecuador canton-level data on production by sector (BCE 2026).¹⁹ I re-examine regressions for two significant labor market outcomes – changes in female prime-age

¹⁸I find the prime-age population-weighted correlation of prime-age emigration rates to Spain and the US to be -0.02, (I proxy the emigration rate from Ecuadorian census data, dividing cumulative canton prime-age emigration flows from 1995-2007 by canton prime-age population stocks in 2010) (INEC 2026a; INEC 2026b).

¹⁹Sectors include: agriculture, commerce, construction, education, finance, health, hospitality, manufacturing, mining, professional services, public administration, transportation and communications, and other services; I omit utilities to avoid multicollinearity. Production is in USD, which I convert to real 2014 USD

full-time employment rates and male self-employment rates – with each of these six suites of controls. I find that the female employment rate increase remains statistically significantly positive under each suite of controls, and the point estimate increases in magnitude. However, the self-employment rate changes are no longer statistically significant under most control specifications.

One may be concerned that canton conditions in 2007 might be inappropriate controls if they were impacted by the initial emigration wave to Spain. For example, pre-Spanish recession remittances could have funded construction, leading to higher construction employment. To address such a concern, I include canton characteristics from the 2001 Ecuadorian census as controls. The first set controls for log prime-age population, urban share of said population, and the share in agriculture and having superior education. The second set adds controls for public employment share and secondary education, and the last replaces these with controls for shares of the population working full-time across multiple industries (agriculture, manufacturing, construction, mining, utilities, hospitality, transportation, finance, real estate, and commerce). I obtain similar findings to the 2007 controls, as the change in the female employment rate remains statistically significant and increases in magnitude, while the increase to the male self-employment rate loses significance and decreases in magnitude.

The relationship between the Spanish emigrant employment instrument and changing female full-time employment withstands the battery of controls, but the male self-employment share does not hold up to various canton-level controls. The female full-time employment rate coefficient not only remains statistically significant at the 5% level under each suite of controls, it both increases in magnitude and remains near the initial coefficient of 0.00927. While these robustness checks appear to confirm that migrant job loss increased full-time employment rates, they caution that observed impacts on domestic self-employment rates may be driven by other factors.

The above regression specifications include the initial pre-shock outcome, $y_{i,2007}$, as a control. Since the subnational migrant matrix is created from Ecuadorian province-level statistics, I cannot include province-level fixed effects. In Appendix Table F.10 I examine whether the two main significant relationships – female employment and male self-employment – are robust to a simplified regression specification which omits controls altogether. While both coefficients remain positive, both are smaller in magnitude and neither remain statistically significant after removing the control.

using Ecuadorian CPI.

Table 10: 2007-2010 Canton Labor Market Changes, Ecuador

	Emp Rate	Self Emp	Log Hrly Wage
Spain Migr Ind Bartik (Z-score)	0.00692 [-0.003 , 0.021]	0.00248 [-0.002 , 0.011]	-0.00211 [-0.025 , 0.013]
Observations	199	199	199
Adjusted R2	0.0763	0.132	0.192
Canton Avg Value (2007)	0.6355	0.2238	1.6756
-	(0.0937)	(0.0544)	(0.2679)
Canton Avg Value (2010)	0.6292	0.2151	1.8592
-	(0.0935)	(0.0548)	(0.2397)

Each cell is a coefficient from a unique regression, with standard error in parentheses. Sample size is the number of Ecuador cantons in final regression of each column. Regressions are weighted by 2010 prime-age (25-54) canton population. Dependent variables are changes in column title between 2007 (2005-7) and 2010 (2009-11) averages in Ecuador for prime-age (25-54) respondents; industries are shares in full-time employment in specified industry grouping. Regressions include 2007 (2005-7) values as controls. Wild bootstrap confidence intervals, clustered by province. Shift-share instruments calculated based on 2007-2009 employment changes in Spain.

* p < 10%, ** p < 5%, *** p < 1%

Table 11: 2007-2010 Canton Labor Market Changes by Gender, Ecuador

	Female Emp Rate	Male Emp Rate	Female Self-Emp	Male Self-Emp	Female Log Hrly Wage	Male Log Hrly Wage
Spain Migr IV (Z-score)	0.00927** [0.003 , 0.022]	0.00377 [-0.007 , 0.019]	0.00294 [-0.006 , 0.015]	0.00535** [0.000 , 0.021]	-0.00492 [-0.025 , 0.037]	-0.00225 [-0.022 , 0.009]
Observations	199	199	199	199	193	199
Adjusted R2	0.0411	0.159	0.164	0.129	0.180	0.167
Canton Avg Value (2007)	0.4425	0.8417	0.1873	0.2612	1.5600	1.7251
-	(0.1421)	(0.0749)	(0.0508)	(0.0838)	(0.3133)	(0.2771)
Canton Avg Value (2010)	0.4377	0.8406	0.1771	0.2561	1.7988	1.8908
-	(0.1448)	(0.0731)	(0.0557)	(0.0839)	(0.2996)	(0.2517)

Table 12: 2007-2010 Canton Labor Market Changes by Education, Ecuador

	Non-HS Emp Rate	HS+ Emp Rate	Non-HS Self-Emp	HS+ Self-Emp	Non-HS Log Hrly Wage	HS+ Log Hrly Wage
Spain Migr IV (Z-score)	0.00649 [-0.011 , 0.030]	0.00765* [-0.005 , 0.028]	0.00363 [-0.001 , 0.017]	-0.00156 [-0.013 , 0.010]	-0.0143 [-0.044 , 0.033]	-0.00874 [-0.030 , 0.049]
Observations	199	199	199	199	199	194
Adjusted R2	0.0506	0.202	0.0510	0.327	0.0974	0.146
Canton Avg Value (2007)	0.5914	0.6690	0.2532	0.2025	1.4013	1.9011
-	(0.0988)	(0.0872)	(0.0651)	(0.0593)	(0.1966)	(0.2520)
Canton Avg Value (2010)	0.5843	0.6622	0.2468	0.1970	1.6226	2.0533
-	(0.1023)	(0.0858)	(0.0732)	(0.0568)	(0.2085)	(0.2499)

Each cell is a coefficient from a unique regression, with standard error in parentheses. Sample size is the number of Ecuador cantons in final regression of each column. Regressions are weighted by 2010 prime-age (25-54) canton population. Dependent variables are changes in column title between 2007 (2005-7) and 2010 (2009-11) averages in Ecuador for prime-age (25-54) respondents in designated demographic group. Regressions include 2007 (2005-7) values as controls. Wild bootstrap confidence intervals, clustered by province. Shift-share instruments calculated based on 2007-2009 employment changes in Spain.

* p < 10%, ** p < 5%, *** p < 1%

Table 13: 2007-2010 Canton Full-Time Employment Rate Changes by Age Cohort, Ecuador

	Youth Emp Rate	Young Adult Emp Rate	Early Prime Emp Rate	Later Prime Emp Rate	Early Old Emp Rate	Older Old Emp Rate	Aged Emp Rate
Spain Migr Ind Bartik (Z-score)	0.00257 [-0.001 , 0.008]	0.00409 [-0.012 , 0.035]	0.0140** [0.000 , 0.035]	0.00382 [-0.010 , 0.028]	0.0192** [0.008 , 0.058]	0.0203 [-0.009 , 0.062]	0.0102 [-0.012 , 0.041]
Observations	199	199	199	199	198	199	182
Adjusted R2	0.0160	0.219	0.0990	0.0776	0.208	0.361	0.427
Canton Avg Value (2007)	0.0134 (0.0141)	0.3276 (0.0778)	0.6283 (0.0993)	0.6407 (0.0937)	0.5325 (0.0980)	0.3033 (0.1019)	0.0824 (0.0808)
Canton Avg Value (2010)	0.0326 (0.0209)	0.4449 (0.0779)	0.6352 (0.1034)	0.6244 (0.0959)	0.4801 (0.1040)	0.2404 (0.0903)	0.0618 (0.0788)

Table 14: 2007-2010 Canton Self-Employment Rate Changes by Age Cohort, Ecuador

	Youth Self Emp	Young Adult Self Emp	Early Prime Self Emp	Later Prime Self Emp	Early Old Self Emp	Older Old Self Emp	Aged Self Emp
Spain Migr Ind Bartik (Z-score)	-0.0000876 [-0.001 , 0.000]	-0.000977 [-0.014 , 0.009]	0.00420** [0.001 , 0.015]	0.00343 [-0.002 , 0.018]	0.00733 [-0.006 , 0.023]	0.0210* [-0.002 , 0.056]	0.00732 [-0.017 , 0.028]
Observations	199	199	199	199	198	199	182
Adjusted R2	0.403	0.185	0.176	0.128	0.191	0.321	0.458
Canton Avg Value (2007)	0.0034 (0.0039)	0.0444 (0.0221)	0.1715 (0.0535)	0.2702 (0.0622)	0.2987 (0.0834)	0.2406 (0.1028)	0.0957 (0.1068)
Canton Avg Value (2010)	0.0042 (0.0039)	0.0582 (0.0291)	0.1937 (0.0569)	0.2705 (0.0651)	0.2803 (0.0851)	0.2064 (0.0938)	0.0760 (0.0869)

Table 15: 2007-2010 Canton Full-Time Log Hourly Wage Changes by Age Cohort, Ecuador

	Youth Log Hrly Wage	Young Adult Log Hrly Wage	Early Prime Log Hrly Wage	Later Prime Log Hrly Wage	Early Old Log Hrly Wage	Older Old Log Hrly Wage	Aged Log Hrly Wage
Spain Migr Ind Bartik (Z-score)	-0.0346 [-0.074 , 0.036]	0.00862 [-0.036 , 0.068]	0.00269 [-0.006 , 0.033]	-0.000719 [-0.062 , 0.034]	-0.0185 [-0.115 , 0.025]	-0.0513 [-0.154 , 0.054]	-0.126** [-0.464 , -0.010]
Observations	133	199	199	199	194	191	78
Adjusted R2	0.698	0.240	0.0773	0.0772	0.131	0.222	0.433
Canton Avg Value (2007)	0.7714 (0.4137)	1.3717 (0.2357)	1.6123 (0.2553)	1.7423 (0.2911)	1.6544 (0.3776)	1.3707 (0.3897)	1.0783 (0.6531)
Canton Avg Value (2010)	1.3360 (0.2693)	1.6870 (0.2131)	1.8428 (0.2568)	1.8929 (0.2966)	1.8050 (0.3856)	1.5081 (0.4087)	1.0421 (0.6306)

Canton-level regressions, weighted by 2010 prime-age (25-54) population, of changes in column title between 2007 (2005-7) and 2010 (2009-11) canton averages in Ecuador for respondents in designated age groupings, based on age in 2007: youth (under 16), young adult (16-24), early prime (25-39), later prime (40-54), early old (55-64), older old (65-80), and aged (80+). Regressions include 2007 values as controls. Wild bootstrap confidence intervals, clustered by province.

* p < 10%, ** p < 5%, *** p < 1%

Table 16: 2007-2010 Canton Female Full-Time Employment Rate Changes (2007 Controls), Ecuador

Spain Migr Ind Bartik (Z-score)	0.00927** [0.003 , 0.022]	0.0109** [0.005 , 0.025]	0.0133** [0.002 , 0.032]	0.0126** [0.004 , 0.023]	0.0119** [0.001 , 0.030]
Observations	199	198	198	198	198
Adjusted R2	0.0411	0.0667	0.156	0.127	0.119
log GDP per capita		X	X	X	X
Emp Share in Ag		X	X	X	
Share Superior Edu		X	X	X	
Balance ctrls			X		
Industry Emp + Edu Shares				X	
Sector GDP Shares					X

Wild bootstrap 95% confidence intervals in brackets, clustered by province.

Balance controls add log population, share in public employment, share with secondary education, and US emigration rate.

* p<0.10, ** p<0.05, *** p<0.01

Table 17: 2007-2010 Canton Female Full-Time Employment Rate Changes (2001 Controls), Ecuador

Spain Migr Ind Bartik (Z-score)	0.00927** [0.003 , 0.022]	0.0165** [0.006 , 0.034]	0.0149** [0.001 , 0.031]	0.0143** [0.003 , 0.027]
Observations	199	199	199	199
Adjusted R2	0.0411	0.135	0.145	0.178
log pop + Urban Share		X	X	X
Emp Share in Ag		X	X	X
Share Superior Edu		X	X	X
Public Emp + Share Second Ed			X	
Industry Emp Shares				X

Wild bootstrap 95% confidence intervals in brackets, clustered by province. Controls from 2001 census.

Industries add manufacturing, construction, mining, utilities, hospitality, transportation, finance, real estate, and commerce.

* p<0.10, ** p<0.05, *** p<0.01

Table 18: 2007-2010 Canton Male Self Employment Rate Changes (2007 Controls), Ecuador

Spain Migr Ind Bartik (Z-score)	0.00535** [0.000 , 0.021]	0.00191 [-0.007 , 0.017]	0.000791 [-0.003 , 0.012]	0.00132 [-0.013 , 0.013]	0.00729** [0.002 , 0.019]
Observations	199	198	198	198	198
Adjusted R2	0.129	0.183	0.176	0.227	0.214
log GDP per capita		X	X	X	X
Emp Share in Ag		X	X	X	
Share Superior Edu		X	X	X	
Balance ctrls			X		
Industry Emp + Edu Shares				X	
Sector GDP Shares					X

Wild bootstrap 95% confidence intervals in brackets, clustered by province.

Balance controls add log population, share in public employment, share with secondary education, and US emigration rate.

* p<0.10, ** p<0.05, *** p<0.01

Table 19: 2007-2010 Canton Male Self Employment Rate Changes (2001 Controls), Ecuador

Spain Migr Ind Bartik (Z-score)	0.00535** [0.000 , 0.021]	0.00422 [-0.003 , 0.016]	0.00369 [-0.004 , 0.015]	0.00191 [-0.002 , 0.015]
Observations	199	199	199	199
Adjusted R2	0.129	0.186	0.181	0.189
log pop + Urban Share		X	X	X
Emp Share in Ag		X	X	X
Share Superior Edu		X	X	X
Public Emp + Share Second Ed			X	
Industry Emp Shares				X

Wild bootstrap 95% confidence intervals in brackets, clustered by province. Controls from 2001 census.

Industries add manufacturing, construction, mining, utilities, hospitality, transportation, finance, real estate, and commerce.

* p<0.10, ** p<0.05, *** p<0.01

6 Conclusion

I find evidence that exposure to Spanish economic downturns through migration networks led to sizeable immediate declines in remittance inflows and minor increases in return migration to Ecuador, with impacts for local Ecuadorian labor markets. At the canton level, female employment rates and male self-employment rates increased for the prime-age population, and a cohort analysis reveals that labor force attachment particularly increased for early prime age and later middle aged residents. I interpret these findings as suggestive evidence that households in Ecuador increased their supply of labor to compensate for income shortfalls associated with remittance shocks. Increased self-employment and female labor force participation are countercyclical in the Ecuadorian context, further suggesting that emigrant job loss produced financial strain for Ecuadorian households. These findings reveal that migrant networks can transmit employment shocks from abroad. Results for female full-time employment rates are robust to adding controls in addition to initial rates, although male self-employment is sensitive to local employment share controls. In conclusion, I expand on the migration literature by providing evidence of shock propagation of migrant job loss through migrant networks in a migration corridor spanning significant geographic distance and with minimal trading ties. This highlights that migrant networks can be conduits for foreign economic shocks as well as opportunities.

A Geographic Crosswalk

I create a canton code crosswalk to geographically standardize regional Ecuadorian data given changes in administrative divisions around the period of study. Cantons have four-digit codes, with the first two digits corresponding to a canton's province code. I create a canton crosswalk based on 2001 Ecuadorian census microdata geographically standardized by INEC (INEC 2026a), and assign modern canton codes to historical codes based on population distribution (new cantons are assigned to the old canton containing the plurality of its 2001 population; this is over 50% of the population in all but one case). I supplement this standardization to match the Spanish immigrant survey. The 2007 Spanish immigrant survey and codebook (INE 2008b; INE 2008a) omit an Ecuadorian province, Orellana, which split off from the province of Napo in 1998 (*Provincia de Orellana* 2026). I assign cantons in Orellana their codes from before the province split from Napo, consulting administrative boundary classifications from INEC (INEC 2009). I also reclassify a canton of disputed province in 2001 (La Concordia) to its 2010 canton code, which I confirm with geographically standardized 2010 Ecuadorian census microdata (INEC 2026b). The resulting crosswalk standardizes codes to 217 historic cantons across 21 historic provinces (214 cantons and 20 provinces excluding Galapagos).

B Canton-Level Data and ENEMDU Reliability

The 2010 Ecuadorian census gives me an opportunity to check the accuracy of ENEMDU files at the national and local levels. Table B.1 compares demographic and labor market means for prime-age (25-54) adults in continental Ecuador according to the 2010 Census and the 2010 ENEMDU. There is little room for seasonal differences, as the Census was conducted between November 28 and December 5 (Ruggles et al. 2025a; IPUMS International 2026), while the ENEMDU was conducted in December. I compute the difference in means by pooling microdata from both sources and regressing each variable against an indicator for the ENEMDU data. While all differences are strongly statistically different, most differences are economically small, supporting the reliability of ENEMDU data for economic analysis.

The migration variables are economically meaningfully smaller in the ENEMDU in comparison with the census, which is understandable as each instrument asks a substantially different question regarding remittance receipt and mobility. The census asks whether a household received remittances within the past year, while the ENEMDU only inquires about receipt in the prior month. A 2009 nationally representative public opinion survey in Ecuador suggests that most remittance recipients receive remittances at a lower frequency than monthly (Latinobarómetro 2009). It is thus unsurprising that households report higher remittance receipt in the census than the ENEMDU given the longer time horizon in the former. The difference in estimated return migration from Spain is likely due to differences in variable construction as well: the census asks respondents where they lived 5 years prior, while the ENEMDU asks for respondent's previous region of residence. Return migrants from Spain who move within Ecuador would not be picked up by the ENEMDU survey, biasing the ENEMDU estimate of return migration downwards.

In order to investigate regional economic dynamics I pool ENEMDU survey data across similar years and compute canton-level statistics. This resembles Ontaneda Jiménez et al. (2024)'s strategy to examine province-level labor market trends within Ecuador. I pool 2003-2004, 2005-2007, 2008-2010, 2011-2013, 2014-2016, and 2017-2019, using survey weights to compute canton-level mean and median values. I pool data because while ENEMDU surveys are designed to be regionally representative, they are not designed to be representative at the canton level. I compare canton-level means for prime-age (25-54) adults from Census and ENEMDU data to check how well pooled ENEMDU data captures local representativeness. I regress ENEMDU means against Census means and run t-tests against a null hypothesis that regression coefficients are equal to one. Several coefficients are statistically indistinguishable from one, in particular for demographic variables such as household size, age, urban and female shares, as well as employment in the public sector and in construction. However, the coefficient on census shares are significantly different from one for education shares and most employment rates and shares. Nevertheless, all regression coefficients are statistically significant and positive, indicating the pooled ENEMDU data is correctly picking up relative differences across cantons in these outcomes.

Table B.1: 2010 ENEMDU vs. Census

	Census	ENEMDU	Difference
HHD Size	4.05 (1.91)	4.35 (1.94)	0.30*** (0.00)
Age	37.57 (8.47)	38.97 (8.62)	1.40*** (0.01)
Share Urban	0.6662 (0.4716)	0.7061 (0.4555)	0.0399*** (0.0004)
Share Female	0.5120 (0.4999)	0.5290 (0.4992)	0.0170*** (0.0004)
Share Primary Edu	0.3465 (0.4758)	0.3693 (0.4826)	0.0228*** (0.0004)
Share Secondary Edu	0.3282 (0.4695)	0.3555 (0.4787)	0.0273*** (0.0004)
Share Superior Edu	0.2406 (0.4274)	0.2329 (0.4227)	-0.0077*** (0.0004)
Employment Rate	0.6996 (0.4584)	0.7281 (0.4449)	0.0285*** (0.0004)
Self-Employment Rate	0.1901 (0.3924)	0.2206 (0.4147)	0.0305*** (0.0003)
Public Sector Employment Rate	0.0879 (0.2831)	0.0816 (0.2738)	-0.0063*** (0.0002)
Full-time Employment Rate	0.5010 (0.5000)	0.6342 (0.4817)	0.1333*** (0.0004)
Share in Agriculture	0.0901 (0.2863)	0.1322 (0.3387)	0.0420*** (0.0003)
Share in Manufacturing	0.0573 (0.2323)	0.0753 (0.2639)	0.0180*** (0.0002)
Share in Construction	0.0369 (0.1885)	0.0449 (0.2070)	0.0080*** (0.0002)
HHD Share Remittance Recipient	0.0631 (0.2431)	0.0388 (0.1930)	-0.0243*** (0.0003)
Share Lived in Spain	0.0047 (0.0684)	0.0011 (0.0338)	-0.0035*** (0.0000)
Share Lived in USA	0.0028 (0.0533)	0.0019 (0.0436)	-0.0009*** (0.0000)
<i>N</i>	5,374,335	28,190	5,402,525

Source: INEC, 2010 ENEMDU and 2010 Census. Weighted ENEMDU and Census means for prime-age (25-54) adults in Ecuador. Full-time employment defined as working 30+ hrs/week. Industry employment shares are proportion of adults working full-time in relevant sector. Education is highest level reached. HC2 robust standard errors. Difference in means calculated from pooled regression with ENEMDU indicator.

* $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$

Table B.2: 2010 Canton Attributes, ENEMDU vs. Census

	HHD Size	Age	Urban	Female	HHD Remittance Recipient	Lived in Spain	Lived in USA	Primary Edu	Secondary Edu	Superior Edu
census	1.005*** (0.119)	0.841*** (0.206)	1.020*** (0.0509)	0.967*** (0.0712)	1.233*** (0.0399)	1.231*** (0.0491)	1.000*** (0.0440)	0.668*** (0.0617)	0.280*** (0.0909)	0.402*** (0.0819)
<i>N</i>	199	199	199	199	199	199	199	199	199	199
Adjusted R2	0.503	0.171	0.738	0.527	0.836	0.774	0.849	0.597	0.143	0.329
p-value $\beta \neq 1$	0.967	0.442	0.688	0.642	0.000	0.000	1.000	0.000	0.000	0.000

	Emp Rate	Self-Emp Rate	Public Sector Emp Rate	Full-time Emp Rate	Share in Agriculture	Share in Manufacturing	Share in Construction
census	0.702*** (0.138)	0.609*** (0.0687)	1.039*** (0.0664)	0.616*** (0.0913)	1.448*** (0.0535)	1.126*** (0.0528)	0.925*** (0.102)
<i>N</i>	199	199	199	199	199	199	199
Adjusted R2	0.500	0.521	0.722	0.544	0.831	0.803	0.386
p-value $\beta \neq 1$	0.033	0.000	0.560	0.000	0.000	0.018	0.465

Source: INEC, 2009-11 ENEMDU and 2010 Census. Prime-age population weighted regressions of ENEMDU means on Census means for prime-age (25-54) adults in Ecuador. Full-time employment defined as working 30+ hrs/week. Industry employment shares are proportion of adults working full-time in relevant sector. Education is highest level reached. HC2 robust standard errors. p-value for t-test of coefficient being equal to 1.

* $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$

C Spanish Migration Responses

I investigate whether local labor market shocks caused increased return migration to Ecuador, as Section 4.1 would predict, by testing for impacts on Ecuadorian migrant stocks and flows in Spanish administrative data. Spanish population registry moves data records internal and external moves involving Spain, and documents individuals' countries of origin as well as the origin and destination of each move from 2006-2019 (INE 2022a). While moves into or out of Spain may record an international migrant's origin or destination country, this is less common for departures, making any estimates regarding return migration tenuous.

The Spanish population registry and registry moves dataset have methodological issues tempering their usefulness for measuring return migration. Özgüzel (2021) cautions that while immigrants face incentives to register their arrivals with local authorities, they have little incentive to record departures. In fact, Spain updated its methodology in 2006 to strike foreign nationals from population registries if they had not renewed their registration within the past two years (INE 2026b). This procedural change led to a decline in total population registry counts of Ecuadorians in Spain, suggesting earlier population numbers were inflated (INE 2023).²⁰ While international moves documented by the Spanish authorities would appear to allow a researcher to measure return migration, the actual data is less amenable to such research. Most Ecuadorian "departures" from Spain are cancelations resulting from individuals not confirming their residency. Cancelations make departure data imprecise and possibly inaccurate. A cancelation only indicates a migrant failed to confirm their residency; this may or may not represent an out-migration episode. Even if a cancelation does represent an outmigration episode, the destination country and actual departure year is unclear. Moves identifying destination countries likely represent actual moves, but these are most likely undercounts given the preponderance of cancelations. Only 6-42% of annual "departures" for the Ecuadorian-born identify Ecuador as the destination country. These concerns with migration flow data would motivate the analysis of migrant stocks to estimate migration flows. However, reduced migrant stocks in a Spanish province may reflect internal migration and emigration to other countries in addition to return migration, and should be interpreted with caution.

I regress province-level changes in migration flows and stocks for the Ecuadorian born against Spanish employment shift-share instruments in Table C.1. I run regressions with and without a control for the outcome level in 2007, as follows:

$$\Delta y_{i,2007-10} = \beta_0 + \beta_1 \text{SpainIndBartik}_i + \beta_2 y_{i,2007} + \epsilon_i \quad (7)$$

$$\Delta y_{i,2007-10} = \beta_0 + \beta_1 \text{SpainIndBartik}_i + \epsilon_i \quad (8)$$

I compute the inverse hyperbolic sine of officially documented net migration between Ecuador and a Spanish province, as well as the log of officially documented return migration to and immigration from Ecuador for Ecuadorian born migrants in Spain. Changes

²⁰This methodological change triggered a sharp drop in the official Ecuadorian stock, which declined by about 50,000 (over 10%) between 2005 and 2007 (INE 2023). While official transit statistics from Ecuador show slightly negative net departures to Spain in 2005, they show positive net departures in 2006 (see Figure 5), suggesting the Ecuadorian immigrant population actually increased between 2006 and 2007 (INEC 2018).

between 2007-2010 in the log stock of Ecuadorians is strongly significantly negative, suggesting migrants moved away from areas with large job loss. A 1 percentage point increase in expected migrant industry job loss is associated with a 3.4% reduction in the stock of Ecuadorian-born residents between 2007-2010, holding the 2007 log migrant stock constant. While this could reflect return migration, it could alternatively reflect internal migration or emigration to other countries. Changes between 2007-2010 in the inverse hyperbolic sine of net immigration flows of Ecuadorian-born to a Spanish province, restricting to moves identifying Ecuador as the origin or destination country, are significantly related to the 2007-2009 Spanish migrant employment instrument, but in the opposite direction than expected, as a 1 percentage point increase in expected migrant industry job loss is associated with a 55.4 unit increase in the inverse hyperbolic sine of net immigration flows from Ecuador to a province. Return migration and immigration have the expected signs – increasing return migration and decreasing immigration – but are statistically insignificant. The data irregularities complicate any meaningful interpretation of these results. Moreover, regression coefficients are no longer significant in regression specifications without an initial control.

Table C.1: 2007-2010 Province Ecuadorian Migration Changes in Spain

	log ECU stock	asinh ECU Net Migr Flow	log ECU Return Migr	log ECU Immigr
Migrant Industries Bartik	-3.475*** (0.975)	55.468** (23.550)	2.921 (6.367)	-0.159 (4.455)
Construction Bartik	-3.655*** (1.086)	48.056* (24.648)	7.454 (6.965)	0.933 (6.217)
Temporary Job Bartik	-1.406* (0.731)	31.308* (15.854)	1.519 (4.138)	0.335 (4.213)
All Industries Bartik	-3.430*** (0.997)	33.709 (20.121)	4.872 (6.356)	-1.957 (4.629)
<i>N</i>	52	49	41	50
Province Avg Value (2007)	9.040 (1.948)	6.955 (1.782)	2.977 (1.965)	6.534 (1.735)
Province Avg Value (2010)	9.184 (1.898)	3.744 (3.248)	4.232 (1.946)	5.578 (1.705)

Table C.2: Ecuadorian Migration Regressions, no 2007 control

	log ECU stock	asinh ECU Net Migr Flow	log ECU Return Migr	log ECU Immigr
Migrant Industries Bartik	-1.181 (1.239)	-64.975 (47.135)	0.745 (4.766)	-0.569 (6.110)
Construction Bartik	-1.770 (1.384)	-55.036 (43.866)	4.783 (7.371)	0.340 (7.545)
Temporary Job Bartik	-0.140 (0.846)	-24.505 (31.805)	0.007 (4.242)	-0.002 (5.117)
All Industries Bartik	-2.019 (1.279)	-73.048 (50.902)	3.195 (4.801)	-1.973 (5.727)
<i>N</i>	52	49	41	50
Province Avg Value (2007)	9.040 (1.948)	6.955 (1.782)	2.977 (1.965)	6.534 (1.735)
Province Avg Value (2010)	9.184 (1.898)	3.744 (3.248)	4.232 (1.946)	5.578 (1.705)

Each cell is a coefficient from a unique regression, with its standard error in parentheses. Sample size is the number of Spanish provinces in the final regression of each column. Regressions weighted by 2007 prime-age population. Outcomes are Spanish province-level changes in the column variable. Top table regressions include 2007 value of the column variable as a control; lower table regressions have no control. Heterskedasticity robust (HC2) standard errors. Source: Spanish EPA, population registry, population registry moves.

* $p < 10\%$, ** $p < 5\%$, *** $p < 1\%$

D Alternative Instruments

This section compares alternative emigrant employment shift-share instruments. I show that most candidate instruments perform similar to my preferred migrant employment shift-share instrument, which incorporates subnational migrant networks and Spanish changes to employment across gendered industries. Most notably, I find that local emigrant shares are as predictive as the emigrant employment shift-share instrument.

My preferred instrument incorporates predicted employment changes for migrant industries. This could be inaccurate if native and migrant employment respond differently, or if industry codes include sub-industries that are economically irrelevant for migrant employment. Equation 9 is an alternate instrument focused solely on immigrant employment, adapting Caballero, Cadena, and Kovak (2023)’s migrant employment instrument to the Ecuadorian-Spanish context. Caballero, Cadena, and Kovak (2023) treat changes in local co-national migrant employment for Mexican migrants as the shifts for their instrument, taking these changes as given. An advantage of their approach is its focus on realized employment changes, which sidesteps concerns about including irrelevant sub-industries or workers in an instrument. Nevertheless, there are at least three disadvantages, two conceptual and the other a practical issue that arises when applying the strategy to the Spanish context. First, the instrument takes destination-market employment changes as given, which could present a causality concern if observed changes in migrant employment are due to conditions in the origin country, not the destination country – for example, return migration due to improving conditions in the home country would mechanically reduce emigrant employment levels. Similarly, changes in migrant employment may reflect changing migrant stocks in addition to changing migrant employment rates; a 10% decline in migrant employment could be due to 10% of migrants losing their jobs, 10% of migrants leaving the region, or a mix of job loss and out-migration. Practically, their methodology is not directly feasible in my context due to data coarseness. Publicly available Spanish labor force survey data does not identify immigrant birth country, only broad region of origin. My version of Caballero, Cadena, and Kovak (2023) therefore examines changes in South American migrant employment instead of Ecuadorian migrant employment. This introduces measurement error and may bias the coefficient downwards because changes to South American employment could reflect nationality-specific non-Ecuadorian employment and migration patterns. The mechanism regression incorporating this instrument is:

$$\Delta y_{i,t2-t1} = \beta \left[\sum_j \frac{\widehat{Emigr}_{i,j,2007}}{Pop_{i,2010}} \Delta \log(S.Amer Emp_j) \right] + \epsilon_i \quad (9)$$

Another view is that pre-crisis emigrant location within Spain is irrelevant if migrants face an integrated national Spanish labor market, for example due to high migrant internal mobility. Existing research finds that migrants have greater mobility response to labor shocks than natives in Spanish and European contexts (Mitze 2019; Basso, D’Amuri, and Peri 2019; Özgüzel 2021). Under this framework, local exposure to Spanish employment shocks is determined by the total regional emigration rate to Spain and not emigration across different subnational destinations. Equation 10 uses the 2007 local emigration rate to Spain,

derived from the subnational migrant matrix in Section 2.2, to instrument for exposure to Spanish employment shocks:

$$\Delta y_{i,t2-t1} = \beta \frac{\widehat{Emigr_{i,Spain,2007}}}{Pop_{i,2010}} + \epsilon_i \quad (10)$$

In Table D.1 compare canton-level mechanism regressions of changes in the prime-age population share last living in Spain and log remittance inflows, adding the above instruments to the main candidate instruments discussed in Section 4. To ease comparability, I compute prime-age (25-54) population-weighted z-scores for all candidate instruments. I find that the South American employment instrument is statistically insignificantly related to the primary mechanism candidates of remittance inflows and return migration, but that the other candidate instruments are similarly significant and have virtually identical coefficient values in z-score format. This suggests that emigration rates in general, rather than local differences across Spain, are primarily predictive of local exposure to the remittance shock. This confirms the Goldsmith-Pinkham, Sorkin, and Swift (2020) interpretation of shift-share instruments as relying on exogenous shares.

Table D.1: 2007-2010 Canton Mechanism Changes, Ecuador

	Last in Spain	Last in Spain	Last in Spain	Last in Spain	Last in Spain	Last in Spain	Last in Spain
Spain Migrant Ind Bartik (Z-score)	0.000243** [0.00002 , 0.0006]						
Spain Construction Bartik (Z-score)		0.000239** [0.00002 , 0.0006]					
Spain Industries Bartik (Z-score)			0.000243** [0.00002 , 0.0006]				
Spain Temp Job Bartik (Z-score)				0.000236** [0.00002 , 0.0006]			
S. American Shift-Share (Z-score)					0.0000788 [-0.00018 , 0.0004]		
Spain Emigration Rate (Z-score)						0.000244** [0.00002 , 0.0006]	
Spain Emigration Rate							0.00568** [0.00054 , 0.0145]
Observations	199	199	199	199	199	199	199
Adjusted R2	0.00820	0.00782	0.00821	0.00751	-0.00367	0.00835	0.00835
	log Remit	log Remit	log Remit	log Remit	log Remit	log Remit	log Remit
Spain Migrant Ind Bartik (Z-score)	-0.338** [-0.64007 , -0.0222]						
Spain Construction Bartik (Z-score)		-0.337** [-0.64638 , -0.0099]					
Spain Industries Bartik (Z-score)			-0.337** [-0.62926 , -0.0189]				
Spain Temp Job Bartik (Z-score)				-0.338** [-0.65963 , -0.0180]			
S. American Shift-Share (Z-score)					-0.0827 [-0.31160 , 0.1118]		
Spain Emigration Rate (Z-score)						-0.338** [-0.62373 , -0.0293]	
Spain Emigration Rate							-7.871** [-14.52210 , -0.6825]
Observations	116	116	116	116	116	116	116
Adjusted R2	0.0905	0.0899	0.0901	0.0911	-0.00176	0.0906	0.0906

Canton-level regressions, weighted by 2010 prime-age (25-54) population. Dependent variables are changes in prime-age share having last lived in Spain and change in log real remittance inflow between 2007 and 2010. Wild bootstrap 95% confidence intervals in brackets, clustered by province.

Shift-share instruments calculated based on 2007-2009 employment changes in Spain.

* p < 10%, ** p < 5%, *** p < 1%

E Supplementary Figures

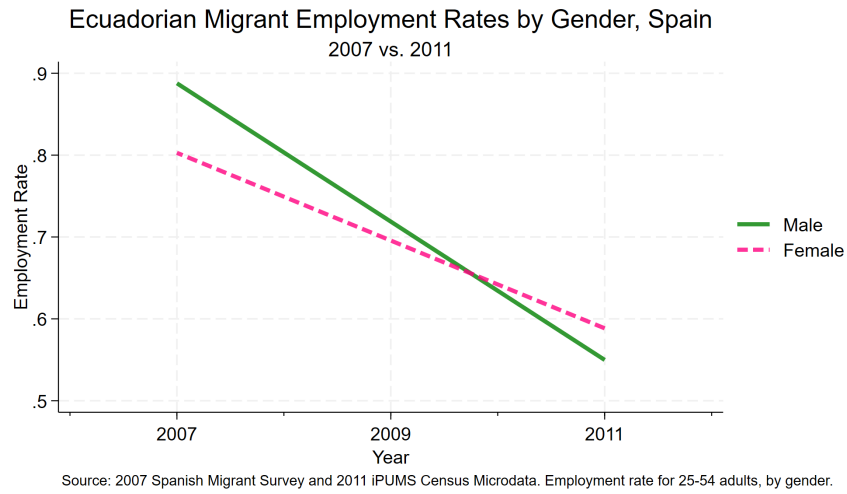
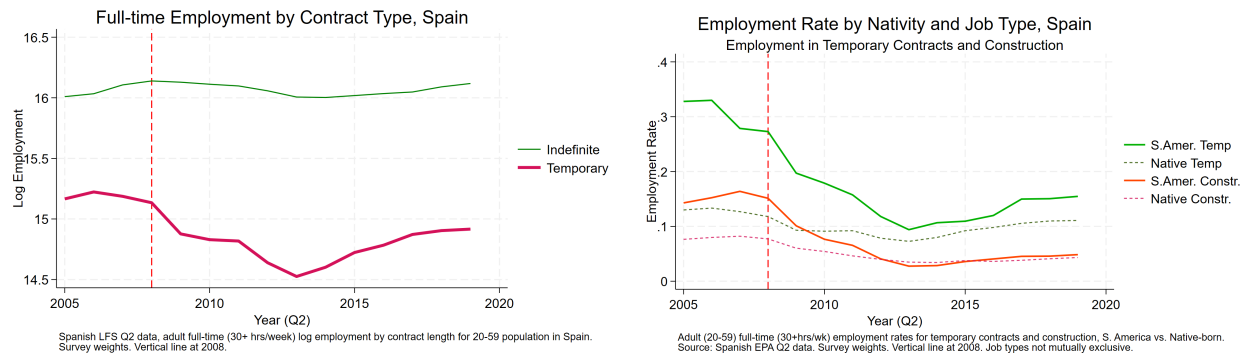


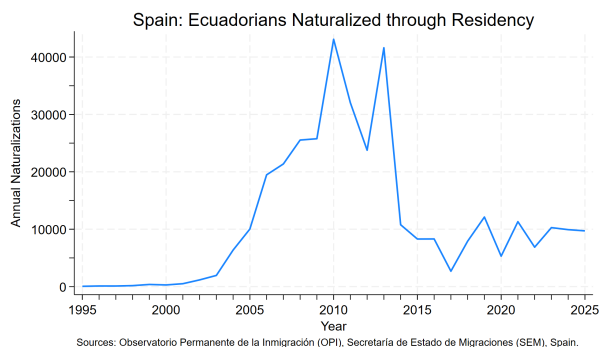
Figure E.1: Spain: Ecuadorian Migrant Employment Rates



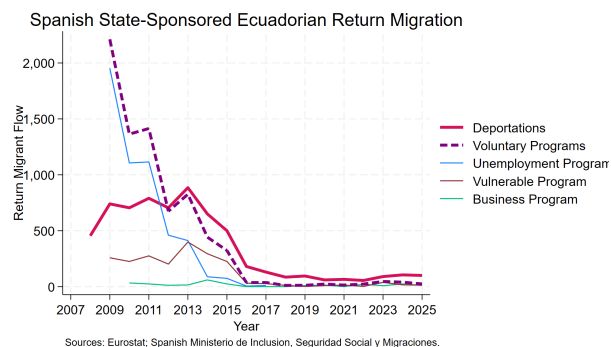
(a) Spanish Employment by Contract

(b) Employment Rates by Job Type

Figure E.2: Spanish Employment by Contract

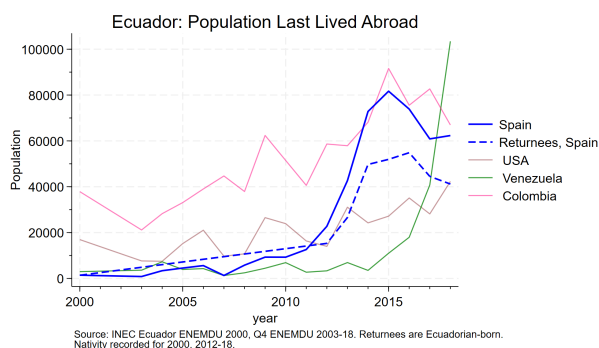


(a) Ecuadorians Naturalized through Residency

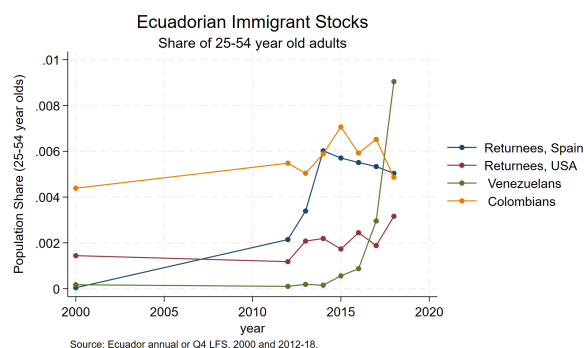


(b) Spain-Sponsored Return Migration

Figure E.3: Spanish Migration Policies

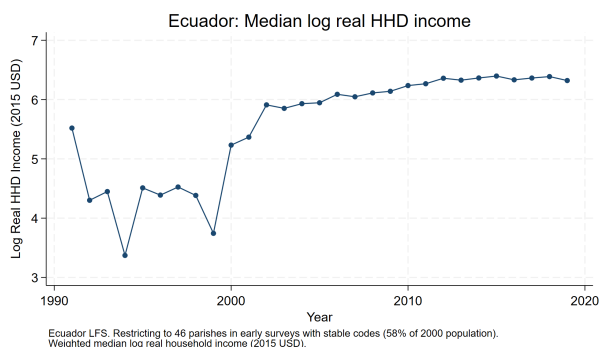


(a) Population Last Lived Abroad

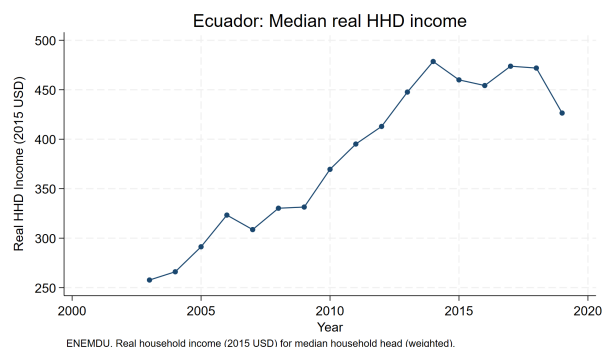


(b) Prime-Age Share Last Lived Abroad

Figure E.4: Ecuadorian Return Migration (ENEMDU)



(a) Median Log Household Income

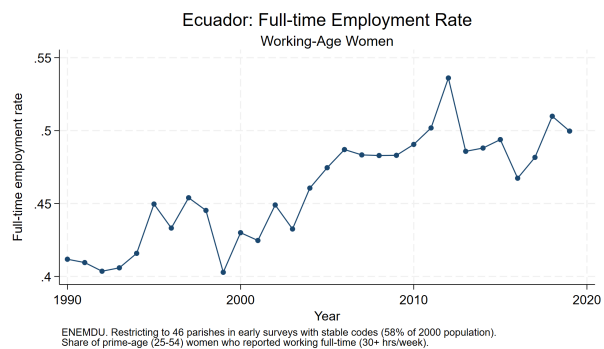


(b) Median Household Income (2003-19)

Figure E.5: Ecuadorian Household Income

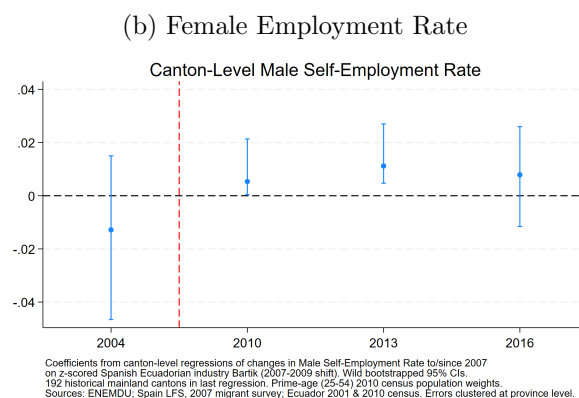
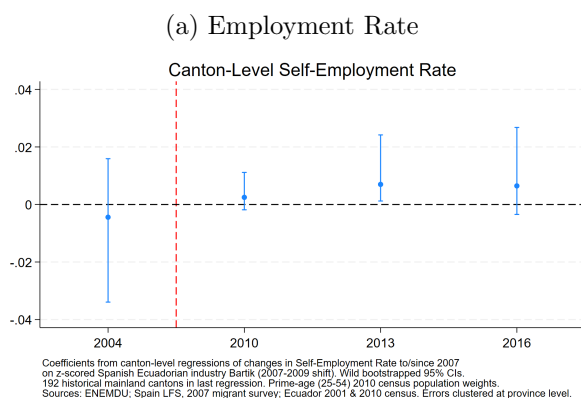
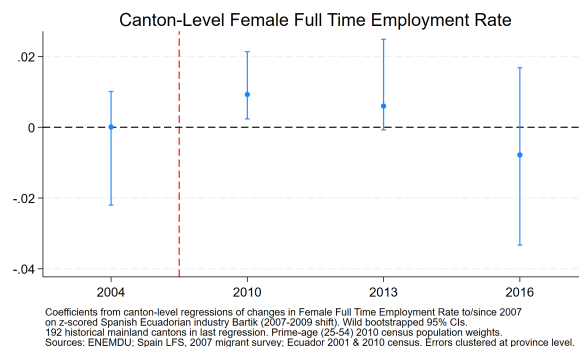
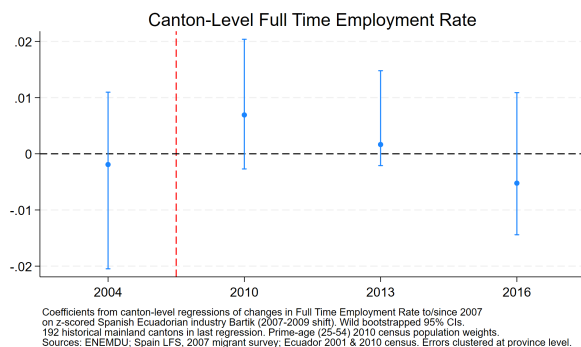


(a) Male Employment Rate



(b) Female Employment Rate

Figure E.6: Ecuadorian Employment Rates



(c) Male Self-Employment Rate

(d) Male Self-Employment Rate

Figure E.7: Labor Market Dynamics

F Supplementary Tables

Table F.1: Main Spanish Migrant Origin Countries, 2005

Origin Country	Emigrants in Spain	Spanish Emigrants (% of Origin Population)	Spanish Emigrants (% of Total Emigrants)	Spanish Remittances (% of Origin GDP)	Spanish Remittances (% of Remittances)	Remittance Year	Spain Emigration Rank
Morocco	521940	1.7	21.1	1.0	14.0	2006	2
Ecuador	456379	3.3	46.3	2.7	40.4	2007	1
Romania	292379	1.4	13.9	0.2	20	2005	3
Colombia	270028	0.6	14.3	0.9	37.0	2005	3
Argentina	244014	0.6	30.3				1

Sources: 2005 emigration estimates from UN, 2005 population estimates from GHSL, total remittance share of GDP from World Bank; Spanish remittance shares from Eurostat, Royaume du Maroc Haut-Commissariat au Plan, Banco Central del Ecuador, Banco de la República de Colombia.

Table F.2: Spanish Migrant Statistics

	All Migrants	Ecuador	Colombia	Morocco	Romania
Share Employed	0.645 (0.479)	0.761 (0.427)	0.715 (0.451)	0.551 (0.498)	0.753 (0.432)
Share of Employed Remitting	0.390 (0.488)	0.675 (0.468)	0.634 (0.482)	0.408 (0.492)	0.621 (0.485)
Mean Monthly Remittances for Employed Remitters	157.07 (197.88)	189.41 (214.86)	196.75 (203.58)	111.65 (123.87)	128.02 (170.91)
Mean Monthly Wage	699.93 (829.70)	721.13 (500.95)	702.14 (665.25)	561.06 (725.30)	709.82 (540.69)
Mean Share of Wages Remitted for Employed Remitters	0.168 (0.174)	0.198 (0.193)	0.213 (0.198)	0.132 (0.140)	0.133 (0.140)
<i>N</i>	15,465	1,308	1,031	1,850	1,334

Source: 2007 Spanish Migrant Survey, restricting to adults aged 16-64. Annual remittances converted to monthly equivalent.

Table F.3: Ecuadorian Migrant Industries, Spain

Industry/Sector	Ecuadorian Share
Construction	25.47
Household activities	15.35
Trade, car and household repair	12.26
Hostelry	11.72
Manufacturing industry	11.01
Agriculture	6.86
Real estate; business services	6.48
Transportation, storage and communications	5.33
Health and veterinary activities, social service	2.62
Other social activities and services	2.27
Financial intermediation	0.37
Extractive industries	0.20
Public administration	0.05
Utilities	0.02

Source: 2007 ENI Migrant Survey. Percentage of employed prime-age (25-54) Ecuadorian-born migrants working in given sectors.

Table F.4: Returns to Migration

	(1)	(2)	(3)	(4)	(5)	(6)
	Monthly Wage	Monthly Wage	Monthly Wage	Log Monthly Wage	Log Monthly Wage	Log Monthly Wage
Spanish Immigrant	981.7*** (21.66)	1007.9*** (22.94)	1211.5*** (83.61)	1.758*** (0.0185)	1.756*** (0.0245)	2.524*** (0.0731)
US Immigrant	2046.5*** (64.95)	1959.8*** (63.34)	1843.9*** (552.0)	2.221*** (0.0271)	1.999*** (0.0267)	2.819*** (0.257)
Primary Schooling		26.56* (14.25)	58.59*** (9.813)		0.301*** (0.0427)	0.381*** (0.0445)
Secondary Schooling		139.0*** (17.47)	185.4*** (13.33)		0.714*** (0.0445)	0.817*** (0.0471)
College		517.5*** (26.07)	498.6*** (24.57)		1.289*** (0.0456)	1.420*** (0.0477)
Spain X Primary Schooling			-120.6 (92.95)			-0.443*** (0.0811)
Spain X Secondary Schooling			-203.5** (88.58)			-0.843*** (0.0783)
Spain X College			-585.7*** (105.1)			-1.501*** (0.0868)
US X Primary Schooling			-542.4 (557.6)			-0.633** (0.264)
US X Secondary Schooling			-161.1 (557.8)			-0.789*** (0.260)
US X College			774.2 (567.7)			-0.996*** (0.261)
<i>N</i>	19536	19536	19536	19083	19083	19083
adj. <i>R</i> ²	0.286	0.331	0.348	0.305	0.435	0.442
Non-Migrant Mean	346.833	346.833	346.833	5.372	5.372	5.372
p-value US = ESP	0.000	0.000	0.257	0.000	0.000	0.256

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

2007 Spanish Migrant Survey, 2007 US ACS, 2007Q4 Ecuador ENEMDU. Restricting to working Ecuador-born adults aged 16-64 for Spanish and US surveys, respondents whose last residency was not abroad for Ecuador. Monthly wage (log wage) regressions based on 17,405 (17,056) observations from ENEMDU, 1,282 (1,178) from ACS, and 849 (849) from the Spanish Migrant Survey. Weighted regressions (survey weights), heteroskedasticity robust (HC2) standard errors. Education outcomes indicate respondent's maximum education level reached and are mutually exclusive. Gross wages, nominal 2007 USD. ACS wages converted from annual to monthly. Spanish wages converted to USD via World Bank exchange rate. Some Spanish respondents only report wages within ranges; for these, wages are imputed as range mid-points, or 1.25 of lower bound of highest category.

Table F.5: Return Migrants vs. Remaining Migrants (Ecuadorian Migration to Spain)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Female	Age	Married/Union	Children are in Household	Number of Children	College	Secondary Schooling	Primary Schooling	Working	Work in Construction
Return Migrant	-0.0767*** (0.00655)	-0.468*** (0.0972)	0.203*** (0.00619)	0.0650*** (0.00592)	0.348*** (0.0187)	0.0441*** (0.00319)	-0.116*** (0.00573)	0.0562*** (0.00523)	0.0552*** (0.00645)	-0.00716** (0.00308)
Age			0.0873*** (0.00648)	0.104*** (0.00692)	0.153*** (0.0122)	0.00372 (0.00335)	0.00188 (0.00602)	-0.00570 (0.00548)	0.0251*** (0.00705)	0.00877*** (0.00299)
Age ²			-0.000992*** (0.0000827)	-0.00143*** (0.0000874)	-0.00210*** (0.000155)	-0.0000172 (0.0000435)	-0.000134* (0.0000774)	0.000151** (0.0000708)	-0.000299*** (0.0000893)	-0.000111*** (0.0000380)
<i>N</i>	34273	34273	34273	34273	25322	34273	34273	34273	34273	34273
adj. <i>R</i> ²	0.002	0.000	0.048	0.049	0.028	0.007	0.024	0.014	0.003	0.001
Spanish Migrant Mean	0.523	37.815	0.540	0.694	1.670	0.066	0.729	0.203	0.570	0.061

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

2011 Spain Census microdata (iPUMS International), 2010 Ecuador Census full-count microdata. Ecuador-born migrants to Spain and return migrants from Spain (lived in Spain in 2005), aged 25-54. Weighted regressions, heteroskedasticity robust (HC2) standard errors. College indicates university completion (Spain) or 4+ years of university education (Ecuador); secondary schooling indicates less education, but at least lower secondary completion (Spain) or equivalent schooling (Ecuador); primary education indicates schooling less than lower secondary education.

Table F.6: Spanish Return Migrants vs. Other Ecuadorians

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Female	Age	Married/Union	Children are in Household	Number of Children	College	Secondary Schooling	Primary Schooling	Working	Work in Construction
Spanish Return Migrant	-0.0664*** (0.00344)	-0.226*** (0.0503)	0.0183*** (0.00302)	-0.0161*** (0.00287)	-0.343*** (0.0160)	-0.0438*** (0.00216)	0.230*** (0.00332)	-0.124*** (0.00300)	-0.0800*** (0.00334)	0.00742*** (0.00156)
Age			0.0450*** (0.000235)	0.0668*** (0.000222)	0.199*** (0.00149)	-0.00820*** (0.000187)	0.00898*** (0.000245)	0.00584*** (0.000248)	0.0217*** (0.000238)	-0.0000779 (0.000107)
Age ²			-0.000530*** (0.00000301)	-0.000929*** (0.00000289)	-0.00267*** (0.0000190)	0.0000954*** (0.00000239)	-0.000192*** (0.00000314)	-0.0000205*** (0.00000320)	-0.000274*** (0.00000306)	-0.00000109 (0.00000137)
<i>N</i>	5385854	5385854	5385854	5385854	4111956	5385854	5385854	5385854	5385854	5385854
adj. <i>R</i> ²	0.000	0.000	0.011	0.031	0.005	0.001	0.012	0.006	0.002	0.000
Non-Migrant Mean	0.512	37.572	0.713	0.763	2.314	0.154	0.382	0.381	0.700	0.046

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

2010 Ecuador Census full-count microdata. Native-born adults aged 25-54; Spanish return migrants lived in Spain five years prior. Heteroskedasticity robust (HC2) standard errors. College indicates 4+ years of university education; secondary schooling indicates less education, at least equivalent of lower secondary completion; primary education indicates schooling less than lower secondary education.

Table F.7: Remittance Sending for Ecuadorian Spanish Migrants

	Remits	Remits	log Remittances	log Remittances
Working	0.172*** (0.0504)	0.160*** (0.0499)		
log Monthly Wage			0.411*** (0.156)	0.429*** (0.141)
Constant	0.613*** (0.0468)	0.0965 (0.433)	1.925* (1.056)	2.785 (1.817)
N	1034	1034	544	544
Adj. R2	0.0203	0.0577	0.0153	0.141
Mean Outcome	0.758	0.758	4.835	4.835
Controls		X		X

HC2 standard errors, demographic controls.

Source: 2007 Spanish migrant survey.

* p<0.10, ** p<0.05, *** p<0.01

Source: 2007 INE Spanish Migrant Survey, restricting to Ecuadorian-born prime-age (25-54) migrants with non-missing control or employment variables. Outcomes are indicator for sending remittances in prior year, log monthly remittances, converted from annual remittances. Monthly income imputed from wage bin midpoints when exact wage not reported. Controls include a quadratic in age, marital status indicator, children in origin indicator, and number of children in one's household in Spain.

Table F.8: Remittance Receipt and Well-being (2007Q4)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	Hhd Income	<i>HhdMember Works</i>	Hhd Size	Poor (LFS)	<i>MaxEdu HS+</i>	Own Auto	Own PC	Own Fridge	Own Home	Bedroom Count	<i>Floor:Hardwood TileorCement</i>	Sewer	<i>PipedPublic Water</i>
hhd_gets_remit	21.07 (117.3)	-0.149*** (0.0176)	-0.183** (0.0831)	-0.131*** (0.0120)	0.0514*** (0.0174)	-0.0210 (0.0169)	0.0761*** (0.0190)	0.0930*** (0.0134)	0.0456** (0.0204)	0.345*** (0.0439)	0.0612*** (0.0119)	0.0825*** (0.0146)	0.0468*** (0.00985)
urban	439.4*** (52.76)	-0.0174* (0.00887)	-0.306*** (0.0646)	-0.207*** (0.0144)	0.306*** (0.0146)	0.0841*** (0.0104)	0.140*** (0.00928)	0.219*** (0.0146)	-0.0874*** (0.0146)	0.262*** (0.0344)	0.283*** (0.0131)	0.448*** (0.0115)	0.541*** (0.0121)
_cons	703.5*** (66.84)	0.934*** (0.00639)	4.239*** (0.0476)	0.454*** (0.0104)	0.367*** (0.0105)	0.131*** (0.00767)	0.102*** (0.00677)	0.543*** (0.0105)	0.676*** (0.0106)	1.705*** (0.0250)	0.521*** (0.00964)	0.240*** (0.00833)	0.343*** (0.00884)
City FE	X	X	X	X	X	X	X	X	X	X	X	X	X
N	18933	18933	18933	18933	18933	18933	18933	18933	18933	18931	18933	18933	18933
Adj. R2	-0.0100	0.0180	0.0500	0.207	0.194	0.0717	0.142	0.246	0.0677	0.0805	0.288	0.533	0.550

Standard errors in parentheses
 * $p < .1$, ** $p < .05$, *** $p < .01$

Descriptive household-level regressions from the 2007Q4 ENEMDU, nationally representative. City fixed effects, robust standard errors.

Table F.9: Remittance Receipt and Well-being (2010 Census)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	<i>HhdMember Works</i>	Hhd Size	Poor	<i>MaxEdu HS+</i>	Own PC	Own Home	Bedroom Count	<i>Floor:Hardwood TileorCement</i>	Sewer	<i>PipedPublic Water</i>
gets_remit	-0.0497*** (0.000791)	-0.00877** (0.00419)	-0.118*** (0.00164)	0.0920*** (0.000962)	0.135*** (0.000954)	0.0527*** (0.000999)	0.345*** (0.00233)	0.0782*** (0.000663)	0.0853*** (0.000729)	0.101*** (0.000776)
urban	-0.00598*** (0.000796)	-0.198*** (0.00482)	-0.413*** (0.00127)	0.267*** (0.000949)	0.173*** (0.000678)	-0.112*** (0.00108)	0.243*** (0.00231)	0.280*** (0.000993)	0.499*** (0.000773)	0.417*** (0.000951)
_cons	0.859*** (0.000541)	3.534*** (0.00332)	0.787*** (0.000827)	0.268*** (0.000635)	0.142*** (0.000445)	0.537*** (0.000739)	1.780*** (0.00157)	0.548*** (0.000683)	0.211*** (0.000509)	0.328*** (0.000642)
City FE	X	X	X	X	X	X	X	X	X	X
N	3810548	3810548	3810548	3810548	3810548	3810548	3810548	3810548	3810548	3810548
Adj. R2	0.0122	0.0159	0.134	0.134	0.164	0.0559	0.0792	0.236	0.459	0.276
National Mean	0.852	3.401	0.513	0.447	0.263	0.468	1.960	0.734	0.538	0.603

Standard errors in parentheses
 * $p < .1$, ** $p < .05$, *** $p < .01$

Descriptive household-level regressions from the full-count 2010 Ecuador Census. Parish fixed effects (2022 parishes), robust standard errors.

Table F.10: 2007-2010 Canton Labor Market Changes by Gender, Ecuador – alternate specification

	Female Emp Rate	Female Emp Rate	Male Emp Rate	Male Emp Rate	Female Self Emp	Female Self Emp	Male Self Emp	Male Self Emp
Spain Migr Ind Bartik (Z-score)	0.00648 [-0.004 , 0.018]	0.00927** [0.003 , 0.022]	-0.00121 [-0.013 , 0.010]	0.00377 [-0.007 , 0.019]	-0.00401 [-0.009 , 0.004]	0.00294 [-0.006 , 0.015]	0.00321 [-0.003 , 0.018]	0.00535** [0.000 , 0.021]
Observations	199	199	199	199	199	199	199	199
Adjusted R2	0.00640	0.0411	-0.00460	0.159	0.000916	0.164	-0.00227	0.129
Canton Avg Value (2007)	0.4425	0.4425	0.8417	0.8417	0.1873	0.1873	0.2612	0.2612
-	(0.1421)	(0.1421)	(0.0749)	(0.0749)	(0.0508)	(0.0508)	(0.0838)	(0.0838)
Canton Avg Value (2010)	0.4377	0.4377	0.8406	0.8406	0.1771	0.1771	0.2561	0.2561
-	(0.1448)	(0.1448)	(0.0731)	(0.0731)	(0.0557)	(0.0557)	(0.0839)	(0.0839)
Pre-shock outcome ctrl (2007)		X		X		X		X

Each cell is a coefficient from a unique regression, with standard error in parentheses. Sample size is the number of Ecuador cantons in final regression of each column. Regressions are weighted by 2010 prime-age (25-54) canton population. Dependent variables are changes in column title between 2007 (2005-7) and 2010 (2008-10) averages in Ecuador for prime-age (25-54) respondents in designated demographic group. Wild bootstrap confidence intervals, clustered by province. Shift-share instruments calculated based on 2007-2009 employment changes in Spain.

* p < 10%, ** p < 5%, *** p < 1%

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