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RESEARCH ARTICLE

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Understanding the global patterns of Venezuelan migration: determinants of an expanding diaspora

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ABSTRACT

The economic, political and humanitarian crisis in Venezuela intensified since 2015 and has led to the largest migration crisis in the region's modern history. In parallel, the composition of the major destination countries has changed fundamentally. This paper investigates the factors determining the choice of destination country of Venezuelan migrants in the pre- and post-2015 period. Exploiting the United Nations migration dataset (for 230 countries from 1990 to 2017), we apply a Poisson Pseudo-Maximum Likelihood (PPML) estimator to a modified gravity model of migration. The results suggest that Venezuelans were generally choosing a certain destination country based on economic criteria in times of relative stability (1990 to 2015). However, this determinant loses its importance during times of crisis (2015 to 2017), when Venezuelans were primarily immigrating to geographically proximate nations. Consistently for both periods Venezuelans appear to migrate in larger numbers to destinations with an already established network of compatriots.

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Migration; Venezuela; crisis; gravity model; networks

1. Introduction

The ongoing political, economic and humanitarian crisis in the Bolivarian Republic of Venezuela has caused an unprecedented outward migration in recent years. The Joint Special Representative of the United Nations High Commissioner for Refugees (UNHCR) and the International Organization for Migration (IOM) for Venezuelan refugees and migrants declared the 'population outflow' to be 'of unparalleled magnitude in the region's modern history' (UN 2019a). The number of migrants from Venezuela increased by around 950,000 between 2015 and 2017, almost twice the amount (around 510,000) of the twenty-five preceding years (see Figure 1). As the pace of migration intensifies further, in 2018, a net average of 5,000 Venezuelans left their country each day (UN 2019b; UNHCR 2018a). By the end of the same year, the global migrant stock of Venezuelan origin exceeded three million people (UNHCR 2018b). The hardship of the crisis has further intensified with the COVID-19 pandemic, doubling the number of Venezuelans who left home to over 6.1 million by mid-2022 (UNHCR 2022).

Historically, Venezuela has been a country of destination for migrants throughout the 19th and 20th centuries (Crasto and Álvarez 2017, 134). However, the net migration rate turned negative around 2010 and this trend intensified with the economic, political and humanitarian crisis of the years that followed (Gomez Ramírez 2018, 2). The highly oil-dependent economy contracted as oil prices fell (e.g. from an annual average of 104 $/barrel in 2013 to 43 $/barrel in 2016). In parallel, hyperinflation erodes the reduced income of the average Venezuelan household (the International Monetary Fund expected the Venezuelan inflation rate to reach 10 million percent in 2019; see IMF 2019a, 166). On the supply side, price controls and foreign currency withholdings by the government are two of the key factors behind the current shortage of food and medicine (Doocy et al. 2019, 64). These circumstances, combined with one of the world's highest crime rates (57 homicide victims per 100,000 inhabitants in 2016; see UNODC 2019, 17) and accusations of corruption and mismanagement in public organisations, have triggered persistent and violent protests. At the national political level, the opposition-controlled parliament was disempowered by a government-loyal Constituent Assembly in 2017 (Gomez Ramirez 2018, 3). Moreover, the 2018 presidential elections were domestically and internationally disputed. The international community was divided in supporting either President Nicolás Maduro or

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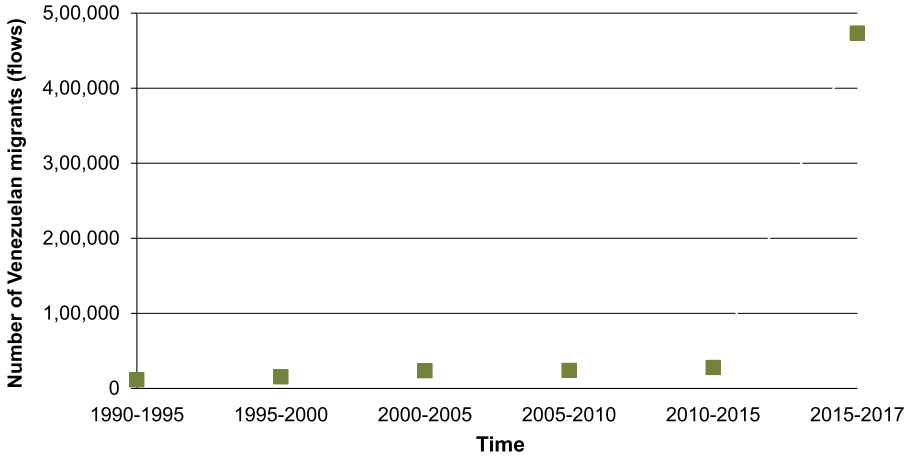

Figure 1. Flows of Venezuelan migrants from 1990 to 2017. Notes: Yearly average flows per period (own representation. Sources: IOM 2018a; UN DESA 2017a).

parliament leader Juan Guaidó, with Maduro remaining president to date. Since 2018, the economic situation in Venezuela worsened, also due to the impacts of the global pandemic. The National Survey of Living Conditions (ENCOVI 2021) estimated that 96.3% of Venezuelan households lived in poverty and only 3% experienced food security in 2021. This has urged even more Venezuelans to leave their home country (UNHCR 2022).

As one of Latin America's largest-ever exodus seems to intensify even further, it becomes crucial to understand the drivers behind these migration flows. In this respect, the attention has so far either been on individual experiences and motives or on descriptive statistics. On the one hand, several multilateral- or non-governmental organisations have conducted surveys with Venezuelan migrants questioning their reasons for leaving their home country (see e.g. IOM 2018b or International Rescue Committee IRC 2019). In a recent UNHCR survey in three Colombian border departments for example, the interviewees listed the difficulty to find food (90%), work (82%) or medicine (54%), as well as the increase in crime and violence (49%), as main triggers for migration (OCHA 2018). There has also been an increasing coverage on personal stories of Venezuelan migrants (see e.g. UNHCR 2018a). On the other hand, the UN and national official statistics have collected data and published reports on Venezuelan migration routes and migrant stocks (see e.g. IOM 2018a). According to these sources, Colombia (Venezuela's only Spanish-speaking neighboring country), the United States (the wealthiest country in the Americas) and Spain (i.e. Venezuela's former colonizer) received the largest number of Venezuelan migrants from 1990 to 2017. However, there are striking differences in the composition of destination countries before and after 2015, when the migration crisis intensified. This becomes evident when comparing Figures 2 and 3. The major destinations of Venezuelan migrants mainly consisted of North American and European countries before 2015, while almost exclusively of (geographically proximate) South American countries afterwards.

So, while there is extensive information on the size and routes of Venezuelan migration flows, this information is largely presented in a rather unsystematic manner without reflection of the broader underlying drivers. To the best of our knowledge, this is the first econometric analysis that systematically studies why Venezuelans migrated in larger numbers to some destination countries (while avoiding other ones) and quantifies the importance of several socio-political and economic underlying factors. For this purpose, this paper exploits very recent UN and IOM migration data that is available from 1990 to 2017 measuring migration flows from Venezuela to 230 destinations.

In addition, this is the first empirical attempt to compare the Venezuelan migration flows between the pre- and post-2015 period (when the humanitarian crisis and pace of migration intensified) and explore how and why patterns of migration substantially change during times of increased uncertainty. We find that in the pre-2015 period, Venezuelans largely migrated to wealthier countries – in the post-2015 years, migration routes were largely determined by geographically proximity. Consistently for both periods, Venezuelans appear to migrate more in larger numbers to destinations with an already established network of compatriots.

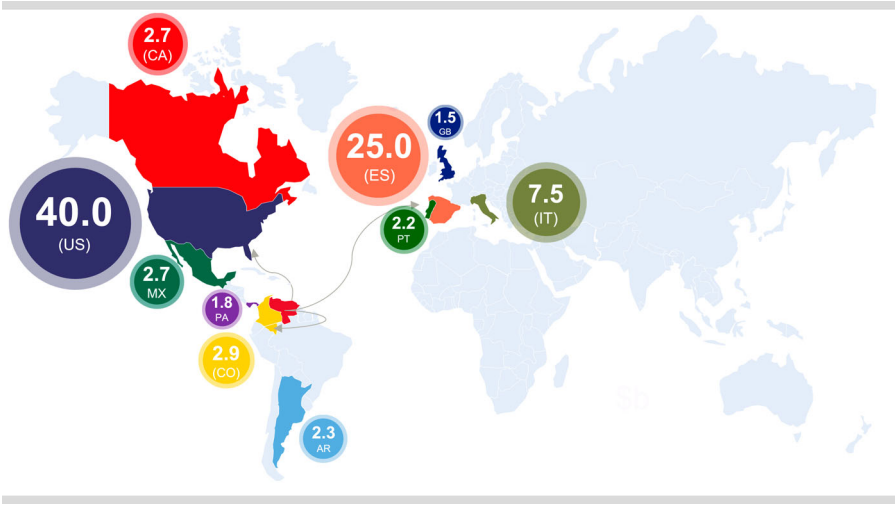

Figure 2. Pre-2015 flows of Venezuelan migrants to ten major destination countries (% of total flows). Notes: As migration flows from 1990 to 2015 (own representation. Sources: IOM 2018a; UN DESA 2017a).

We make use of a gravity model of migration to measure the importance of both economic and geographical factors in determining the patterns of Venezuelan migration. This method is well suited for this purpose of analysis since it models migration flows as being dependent on the economic size of origin and destination countries, as well as the geographical distance between them (and has been extensively used in the literature to study bilateral trade and migration flows, e.g. see Head and Mayer 2014 and Leamer and Levinsohn 1995). Additional socio-political and historical factors that are likely to influence these patterns of migration are also incorporated in our empirical specifications.

The remainder of the paper is structured as follows. Section 2 provides a review of the theoretical and empirical literature on determinants of migration. Section 3 describes the data used for the empirical analysis and lays out the methodological analytical framework. Section 4 presents and discusses the empirical results and robustness checks. Section 5 concludes.

2. Literature review

In this section we discuss the major determinants of international migration based on the existing literature and its key findings. The review of this literature will

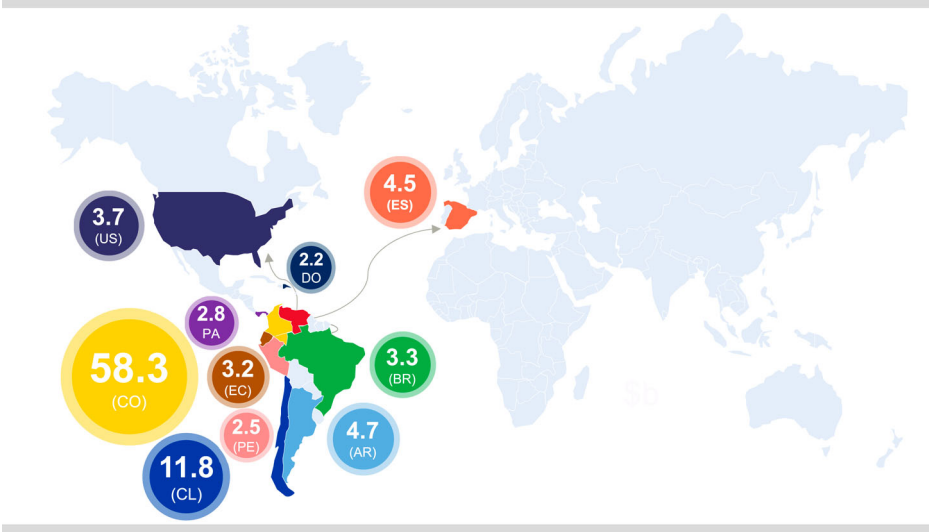

Figure 3. Post-2015 flows of Venezuelan migrants to ten major destination countries (% of total flows). Notes: As percentage share of total Venezuelan migration flows from 2015 to 2017 (own representation. Sources: IOM 2018a; UN DESA 2017a).

guide the choice of the explanatory variables that will be included in the empirical models of Section 3.

2.1 Economic conditions and geographical distance

Some of the earliest empirical studies were conducted by Ravenstein (1885, 1889), who pioneered in the field of migration studies with two papers, titled 'The Laws of Migration'. Based on his analysis on migration flows or 'currents of migration' in Great Britain, his first law of migration indicated the important role of geographical and economic factors by stating that 'migrants only proceed a short distance […] in the direction of great centers of commerce and industry' (Ravenstein 1885, 198). In 1962, Tinbergen introduced the gravity equation in the context of trade, which was later adopted to study population migration (e.g. by Flowerdew and Salt 1979). In analogy with Newton's law of universal gravitation, trade or migration flows are expected to be positively related to the (economic/population) masses of two countries and negatively to the distance between them (Anderson 2011, 134–135; Tinbergen 1962, 65). The literature of gravity models of migration uses a range of proxies for the countries' relative masses: i.e. gross domestic product (GDP) (see e.g. Karemera, Oguledo, and Davis 2010 or Dedeoglu and Genc 2017), GDP per capita (see e.g. Bang and MacDermott 2019 or Mayda 2010) or population size (see e.g. Lewer and Van den Berg 2008 or Ramos and Suriñach 2017). Despite these different proxies, the results are largely consistent across studies (as also reflected in Head and Mayer's [2014] meta-analysis for example). Wealthier and more populous countries generally attract more migrants than their counterparts, while distance acts as a constraint (e.g. Poprawe 2015 or Ruyssen and Rayp 2014). Distance discourages migration as more distant destinations are generally associated with higher transportation and psychological costs (as a consequence of traveling to less familiar places; see Greenwood 1975).

This literature strand has several theoretical microeconomic foundations. Random utility maximisation (e.g. Beine, Bertoli, and Moraga 2015 or Ortega and Peri 2013) and labor market models (e.g. Lewer and Van den Berg 2008 or Todaro 1969) have been developed to theoretically explain migration flows based on relative incentives. These theoretical models assume that individuals compare their current utility (proxied by their consumption/income/wage levels) with the expected associated benefits of migrating to a different part of the world (Ramos 2015, 2). Please note, however, that, in a more dynamic setting, migrants are not only attracted to countries with higher income, but they can also influence income levels (at least regionally). Caruso, Canon, and Mueller (2021) and Olivieri et al. (2021) discuss, for example, how large inflows of Venezuelan migrants suppressed wages and employments for low-skilled workers in certain localities of Colombia and Ecuador.

2.2. Shared borders, colonial relationships and common languages

There is a large set of bilateral (historical and geographical) commonalities, the effects of which have been assessed by numerous studies. A consistent pattern is the positive and significant effect on migration flows of two countries sharing a common border, colonial relationship or language. This finding has been supported by evidence from several empirical studies (e.g. Echevarria and Gardeazabal 2016; Kim and Cohen 2010; Poprawe 2015; see also the literature reviews compiled by Hatton 2009 and Brekke, Røed, and Schøne 2017). Given that distance discourages migration as discussed above, one would expect a larger volume of migration flows between countries sharing a common border, other things equal (Mayda 2005, 13; Ruyssen and Rayp 2014). Besides geographical distance, linguistic proximity also plays a role in a migrant's decision for a destination country. As Chiswick and Miller (2015, 237–240) explain in their 'economics of language' theory, or Adserà and Pytliková (2015, 51) show in their utility-maximising model, immigrants speaking the local language can generally expect better employment opportunities and higher earnings. Lastly, not only a shared border or language but also common colonial ties might lead to more migration flows between countries. Bilateral variables indicating if origin and destination country where in a colonial relationship or had a common colonizer, tested for example by Ramos and Suriñach (2017), capture a series of possible effects. One of them is the increased probability of having the same language as a result of past colonial ties (which might facilitate migration flows as explained above). Second, through a shared colonial history, the culture, political and legal systems of two countries might share similarities, which may reduce a migrant's cost of adaptation to a new living and working environment (Mayda 2010, 1261). To sum up, destination countries that share a common border, language or colonial history with an origin country are generally expected to receive higher migration flows.

2.3 Migrant networks

Existing communities of migrants living in a destination country can also play an important role in determining

future migration flows. Empirical research generally controls for such migrant networks or as Simpson (2017, 4) puts it: 'nearly every contemporary study of determinants of migrations considers the importance of migrant networks in a host country.' Due to the role of social capital, the stock of migrants with a citizenship different than the one of the host country is a strong and positive predictor of future migrant flows (Beine and Parsons 2015, 727; Mckenzie and Rapoport 2007; Simpson 2017, 4). There are different reasons explaining how such networks may facilitate further migration. One line of argumentation is linked to the decision of migrating to a certain destination country. As Neumayer (2005, 393) highlights, such networks can signal to other fellow countrymen that the host country provides a welcoming environment that allows migrants to thrive. As Ruyssen and Rayp (2014, 428) show in a human capital model of migration for Sub-Saharan Africa between 1980 and 2000, existing migrant networks help reduce the psychological costs of migration for future migrants. Another explanation is related to the local support of compatriots that migrants can expect at arrival and during their stay in a foreign country. By providing assistance and information, these networks might support newly arrived migrants to find housing and work (Simpson 2017, 4; Pedersen, Pytliková, and Smith 2008, 1161). As Massey et al. (1993, 448) summarize in their network theory, migrant networks 'increase the likelihood of international movement because they lower the costs and risks of movement and increase the expected net returns to migration.' With regard to the expected effect of networks on migration, Beine, Bertoli, and Moraga (2015, 508) suggest that this is of substantial magnitude based on estimates from several studies[1]: a 1 percent larger migrant stock is expected to result in a 0.4 to 1 percent higher migration flow in the decade that follows. Pottie-Sherman and Wilkes (2017), however, also emphasize that, in principle, large and fast-expanding migrant networks can face increasing hostility and anti-migrant prejudice by other majority groups (which can hence discourage further migrant inflows). They find mixed evidence of this hypothesis, where a positive relationship between the size of migrant groups and discrimination towards them applies only in a quarter of the 55 studies analyzed.

2.4 Poverty and trade

The extent of poverty may also affect migration flows. Although often analyzed as a domestic factor forcing migration, the poverty level of a destination country can be an equally important factor that migrants consider when deciding where to migrate. This effect can partially be captured by considering countries' GDP per capita levels within an empirical model. However, GDP per capita is a flawed measure of wellbeing and national living standards, given that it is an average measure that ignores inequalities in the distribution of income and wealth. For this reason, people might not only choose to migrate to wealthier countries (where average income levels are higher) but also to destinations with lower poverty rates. As Castelli (2018, 3) claims, poverty is among the main triggers as well as determinant in migrants' 'search of a better life'. This has been confirmed in various studies. Parkins (2010) found, for example, that it is one of the determinants most commonly mentioned by Jamaican migrants surveyed.

Another economic factor that might affect migration between two countries or regions is their trade relationship. Close business ties between an origin and a destination country may facilitate migration, since migrants are more likely to have personal connections to a trade partner or more information about its living conditions. Figueiredo, Lima, and Orefice (2016) for example investigate the impact of trade agreements on international migration for 200 countries between 1960 and 2010. Their findings suggest a stimulating role of regional trade agreements (RTAs) or membership in the World Trade Organization (WTO) on bilateral migration flows (Figueiredo, Lima, and Orefice 2016, 99–110). Campaniello (2014) shows a positive and significant effect of trade on migration for countries in the Eurozone.

2.5 Political factors

Political factors can also influence patterns of international migration. These can refer to a country's overall political situation and institutions, or more specifically to its migration policy. Poprawe (2015, 345) found that the political stability of a destination country has a significant effect on its inward migration. This indicates that migrants generally choose politically stable countries as their destination, since these provide more promising prospects for a stable income and a decent life (also see Ramos 2015). Migration policy also plays an important role in predicting migration flows. In this regard, Beine, Bourgeon, and Bricongne (2019) examined the impact of the Schengen Agreement, a policy allowing free movement of persons within the majority of European countries. Following the introduction of the Schengen Agreement, they observed a clear increase in bilateral migration flows among member countries (Beine, Bourgeon, and Bricongne 2019, 148). However, migration policy can also be more restrictive and thereby limiting migration

to a certain destination. Studying migration to Europe between 1980 and 2010, Brekke, Røed, and Schøne (2017) found that asylum requests to a country significantly decreased in response to destination countries adopting stricter migration policies.

Table 1 presents a summary of the aforementioned literature on the determinants of international migration and provides a short description of the characteristics of the key studies discussed. The key determinants identified as part of this literature review will motivate the design of empirical specifications in Section 3 (where the focus will explicitly be on the destination choices of Venezuelan migrants) and the selection of appropriate explanatory variables.

3. Empirical strategy

3.1 Model

Our empirical model to study the migration patterns of Venezuelans is based on an extended version of the gravity equation first introduced by Tinbergen in 1962 to study trade flows. With roots in Ravenstein's work (1885, 1889), it was later adopted by scholars within the field of migration studies (e.g. by Flowerdew and Salt 1979; Chaney 2018). In resemblance to Newton's law of universal gravitation, the attraction (in this case trade or migration) between two countries (origin and destination) is proportional to the product of their relative masses (captured by either the size of the economies, average income per capita or population levels) and inversely proportional to their distance[2]:

$$Y_{odt} = \beta_0 \, (Mass_{ot})^{\beta_1} x \, (Mass_{dt})^{\beta_2} / \, (Distance_{od})^{\beta_3}, \quad (1)$$

where Y captures trade or migration flows, *Mass* is the GDP, GDP per capita or population level, *Distance* measures physical distance between countries, β's are elasticities and *o*, *d* and *t* denote origin country, destination country and time respectively.

Taking the logs of the expression above and including additional factors that are likely to influence bilateral relationships, leads us to empirical specification (2), variants of which will be tested empirically in Section (3):

$$lnY_{odt} = \beta_0 + \beta_1 \, lnGDPpc_{ot} + \beta_2 \, lnGDPpc_{dt} - \beta_3 \, lnD_{od} + \beta_4 \, Z_{dt} + \tau + \mu_{odt}, \quad (2)$$

where the subscripts *o* and *d* refer to the origin and destination country, respectively. Given the focus of our analysis, Venezuela is the only country of origin and Y represents its migration outflows to destination countries. We estimate the model for 5-year intervals (with the exception of the shorter 2015–2017 when the Venezuelan exodus intensified) to avoid results being driven by very short-term fluctuations. Subscript *t* stands for the subperiods 1990-1995, 1995-2000, 2000-2005, 2005-2010, 2010-2015 and 2015-2017. *GDPpc* is the average GDP per capita at purchasing power parity (PPP), capturing the average level of economic development (*mass*) of Venezuela and of the other destination countries. Using GDP per capita levels in our gravity model (rather than population or total GDP levels) is likely to capture more accurately the economic incentives to migrate based on the average living standards expected in other parts of the world. D is the population weighted geographical distance. The vector Z contains further explanatory factors[3]. The coefficients can be interpreted as elasticities (e.g. in the case of β_1) or semi-elasticities (e.g. in the case of β_4 for certain variables of Z[4]) of the dependent variable Y. Finally, τ stands for the time fixed effect and μ is the unobserved error term.

3.2 Estimation technique

This paper applies a Poisson pseudo-maximum likelihood (PPML) method to estimate equation (1). This is due to two main econometric issues, which are both described analytically in Santos Silva and Tenreyro's (2006) influential paper that caused a paradigm shift in gravity model studies. The authors prove (theoretically and empirically) that estimating the transformed gravity equation explained above with traditional methods (e.g. pooled ordinary least squares (OLS), fixed effects (FE) or Tobit) leads to inconsistent estimates. The reason lies in the occurring heteroskedasticity of such log-linear regressions. Based on Jensen's inequality, Santos Silva and Tenreyro (2006, 653) demonstrate that 'this is because the expected value of the logarithm of a random variable depends on higher-order moments of its distribution. Therefore, if the errors are heteroskedastic, the [log-linear] transformed errors will be generally correlated with the covariates.' This violates the OLS assumption of homoskedasticity resulting in inconsistent estimates of the analysed elasticities (see Wooldridge 2015, 45). For this reason, Santos Silva and Tenreyro (2006) propose to use PPML instead of log-linear regressions, since the former is more robust to different degrees of heteroskedasticity.[5]

In addition, PPML also deals with a second econometric issue, namely the existence of zero values. Trade and migration data often include zero flows for certain country-pairs (which is also the case for the longitudinal data used in our paper). We have 85 observations corresponding to such zero immigration flows (representing 21% of the total sample). As the logarithm of zero is not defined, traditional log-linear methods

Table 1. Explanatory variables and characteristics of key papers.

Determinant	Paper				
	Author(s)	Type of analysis	Method	Context of analysis	Finding: *Migrants are generally immigrating more to destination countries that …*
Economic standard of living	Anderson (2011)	Qualitative	Review of theoretical and empirical studies	multiple countries and years	*… have a higher economic standard of living.*
	Mayda (2010)	Quantitative	Econometric analysis	79 countries: 1980-1995	
Distance	Head and Mayer (2014)	Quantitative	Meta-Analysis	159 papers	*… are geografically closer located.*
	Greenwood (1975)	Qualitative	Review of empirical studies	multiple countries and years	
Contiguity	Echevarria and Gardeazabal (2016)	Quantitative	Econometric analysis	210 countries: 1990-2013	*… are contiguous.*
	Ruyssen and Rayp (2014)	Quantitative	Econometric analysis	42 countries: 1980-2000	
Colonial relationship	Ramos and Suriñach (2017)	Quantitative	Econometric analysis	200 countries: 1960-2010	*… have a shared colonial relationship.*
	Kim and Cohen (2010)	Quantitative	Econometric analysis	210 countries: 1950-2007	
Language	Chiswick and Miller (2015)	Qualitative	Review of research on economics of language	multiple countries and years	*… speak a common language.*
	Adserà and Pytliková (2015)	Quantitative	Econometric analysis	223 countries: 1980-2010	
Migrant networks	Beine, Docquier, and Özden (2011)	Quantitative	Econometric analysis	195 countries: 1990-2000	*… already have a network of fellow countrymen living there.*
	Massey et al. (1993)	Qualitative	Review of contemporary theories of international migration	multiple countries and years	
Poverty	Castelli (2018)	Qualitative	Review of macro-, meso- and micro-drivers of migration	multiple countries and years	*… have low poverty rates.*
	Parkins (2010)	Qualitative	Interviews	multiple countries and years	
Trade	Figueiredo, Lima, and Orefice (2016)	Quantitative	Econometric analysis	200 countries; 1960-2010	*… are close trading partners.*
	Campaniello (2014)	Quantitative	Econometric analysis	27 countries: 1970-2000	
Political situation (e.g. stability)	Poprawe (2015)	Quantitative	Econometric analysis	230 countries: 2000	*… are politically stable.*
	Ramos (2015)	Qualitative	Review of tools and findings in migration studies	multiple countries and years	
Migration policy	Beine, Bourgeon, and Bricongne (2019)	Quantitative	Econometric analysis	54* countries: 1980-2010	*… have an open migration policy.*
	Brekke, Røed, and Schøne (2017)	Quantitative	Econometric analysis	54* countries: 1980-2010	

Notes: * While both papers (Beine et al.; Brekke et al.) investigate a total of 54 countries, their composition is different (30 origin and 24 destination countries; 45 origin and 9 destination).

typically mitigated this issue in the past either by omitting zero values or by adding a small positive number to it (Santos Silva and Tenreyro 2006). In any case, as these methods result in inconsistent estimates, PPML allows has been put forward as an alternative estimation technique that allows for the inclusion of zero values (Beine and Parsons 2015, 734). Nowadays, the PPML estimator has become the standard estimation technique used for gravity models in the field of migration (and trade, e.g. see Arvis and Shepherd 2013, 515; Figueiredo, Lima, and Orefice 2016, 105; Correia, Guimarães, and Zylkin 2019, 2).

3.3 Data

3.3.1 Migration flows

The dependent variable (*flows*) captures the inflows of Venezuelan migrants to destination countries worldwide between 1990 and 2017. International migrants are thereby generally defined as individuals who are born in a country different than the ones where they currently reside (UN DESA 2017b, 3). With the intensifying migration crisis, the UN Migration Agency IOM began to publish a series of official reports about trends in migration from Venezuela. This paper relies on the April 2018 release of data by the International Organisation of Migration (IOM 2018a) and are based on national sources and the United Nations Department of Economic and Social Affairs (UN DESA 2017a). The dataset constructed from these sources contains information on migrant stock levels of Venezuelan origin for 230 destination countries and is available from 1990 to 2017. On this basis, migration flows were proxied by taking the differences between the initial and end values of the stock per country for the analysed subperiods. Applying this commonly used approach in the absence of flow data, inevitably results in obtaining negative migration flows when migrant stocks declined over a period of time (Beine and Parsons 2015, 736). In the context of our study, such declines can happen for example when Venezuelan migrants return home, migrate to another country, acquire the destination country's citizenship or pass away. As negative migration flows cannot be used by our proposed estimation technique, the literature describes different approaches of dealing with this issue. Rojas-Romagosa and Bollen (2018, 16) categorize them as follows: 'taking only non-negative values, set the negative values to zero or add the negative values as an increase in the inverse flows.' As our analysis, given its research focus, is primarily interested in explaining unilateral migration from Venezuela to different destination countries and as we prefer not to omit negative values (for the reasons explained in section 3.2), we set them to zero (following the approach described by Beine, Docquier, and Özden 2011 or by Ramos 2015 and adopted by Bertoli and Fernández-Huertas Moraga 2012). Further, it is important to note that both migration stocks and flows are aggregates that consider the total number of Venezuelan migrants. This means that these values include economic migrants, as well as refugees, asylum-seekers and other registered persons from Venezuela (excluding, however, unregistered illegal migration).

Based on the theoretical mechanisms and empirical findings discussed in Section 2, we now proceed to discuss the explanatory variables (and underlying data) that are included in the empirical specifications tested in Section 4 (i.e. the key factors likely to explain the global distribution of Venezuelan migration).

3.3.2 GDP per capita and distance

The annual data for Venezuela's and destination countries' GDP per capita (*GDPpc(VEN)* and *GDPpc(d)* respectively) are measured in PPP terms and are sourced from the IMF World Economic Outlook (IMF 2019b). As the IMF does not provide information on Cuba, values on the country's GDP per capita are obtained from the World Bank (2019). The geographical proximity (*distance*) not only measures the distance in kilometers between the capitals of Venezuela and other destination countries but also between any pairs of major cities weighted by their respective population. This index is based on Mayer and Zignago's (2011) and data are obtained from the Dynamic Gravity Dataset (Gurevich and Herman 2018).

3.3.3 Shared border, colonial relationship and language

Two other bilateral factors are also collected from the Dynamic Gravity Dataset. The first one is a dummy variable taking the value 1 if Venezuela and the destination country share a common border (*contiguity*). A common border is thereby defined as common river or land (but not lake or sea) boundaries (Gurevich and Herman 2018). The other one, also a binary variable, indicates if countries have a past colonial relationship (*colony*)[6]. Given the context of this paper, the country-pair Venezuela-Spain is the only one with a value of 1 (since Spain was Venezuela's sole colonial power until 1811). Another bilateral variable, denoting if country-pairs share a common official language (*language*), is sourced from the CEPII GeoDist database (Mayer and Zignago 2011).

3.3.4 Migrant networks, poverty rates and population

As explained in Section 2, existing migrant networks can be a factor facilitating further migration towards a destination country. For our analysis, networks are proxied by the destination country's stock of Venezuelans in 1990 (*network*) and, as robustness check, by the stock at the start of each preceding subperiod (*network pb*). On this basis, migration flows were proxied by taking the differences between the initial and end values of the stock per country for the analysed subperiods. These two variables are constructed using the database for the dependent variable (IOM 2018a). In addition, migrants might not just be attracted to a certain destination with a large

migrant network but also to one with lower poverty rates. We measure poverty by the share of a country's population living below the PPP-adjusted poverty line of $1.90 a day (*poverty*); data on poverty, as well as on population levels are provided by the World Development Indicators (World Bank 2019).

3.3.5 Economic growth and trade

As a robustness check (in Section 4.2), we test for the relevance of a series of additional economic and political variables. On the economic front, we will examine the relevance of a destination country's GDP growth and its trade relationship with Venezuela. Data on the annual real growth in GDP (*GDP growth*) is drawn from the IMF (2019b). Regarding the trade relationship of Venezuela with other partners, we specifically focus on oil, since it accounts for the vast majority of Venezuelan exports right. What we wish to test hereby is whether Venezuelans may migrate in larger numbers to countries that purchase its oil (if indeed migrants tend to have more information about and feel more connected with countries that are close trading partners of their homeland). The opposite might hold to the extent that Venezuelans flee their homeland for political reasons (in which case Venezuelans may migrate in smaller numbers to Venezuelan's traditional trade partners and sympathizing regimes, other things equal). Our *trade* variable, measures a destination country's import of Venezuelan oil relative to its GDP. Data on oil imports are collected from the UN Comtrade Database (2019), while the GDP values are taken from the IMF (2019b).

3.3.6 Political factors

Finally, this paper analyzes the role of several political factors. To measure the political stability of a destination country (*stability*), data is sourced from the Worldwide Governance Indicators (WGI) project. The WGI estimates, which are percentile ranks, constitute 'perceptions of the likelihood of political stability and/or politically-motivated violence' (Kaufmann, Aart, and Mastruzzi 2010). The next variable, *government*, is included to study potential patterns of Venezuelans migrating to or avoiding countries with governments of a certain political spectrum in power. The government types are coded with the value 1 for right-wing, 2 for center and 3 for left-wing and the information is from the Database of Political Institutions (Cruz, Keefer, and Scartascini 2018). This will allow us to test whether left-wing governments are more likely to be welcoming towards migrants through supportive integration policies, as suggested by Kim and Lee (2021). The IOM (2018b) report on Venezuela lists countries which allow free movement or which have approved specific (migration-friendly) legislation to Venezuelan citizens in the course of the intensifying Venezuelan migration crisis. Based on this source, we construct a binary variable (*legislation*) with value 1 if destination countries had such 'extraordinary normative migration tools' in place in a specific year and value 0, otherwise (IOM 2018a, 3).[7]

The summary statistics of all variables are presented in Table 2 below (and a summary table of all variable definitions and corresponding data sources is provided in Appendix A1). Time-variant explanatory variables[8] represent the average value per five- or two-year period. Based on the gravity model set-up and transformation[9], this paper takes the natural logarithm of the following continuous variables: namely the migration flows, GDP per capita values, distance and migrant networks (their log values are displayed in parenthesis). This also allows us to interpret the coefficients of these variables in Section 4 as elasticities.

4. Results

4.1 Main results

We estimate alternative variants of equation (1) in Table 3 (for the period between 1990 and 2015) and Table 4 (for the period between 2015 and 2017). As discussed earlier on, the deepening of the political and economic crisis in Venezuela since 2015 led to a simultaneous intensification of migration (Figure 1) and a change in the composition of the major destination countries (see Figures 2 and 3). For this reason, we split the period our analysis into these two subperiods in order to examine how the same driving factors might have influenced migration to certain destination countries differently over time (i.e. compare how their role in shaping patterns of migration may vary dependent on the level of domestic socio-economic stability).

In Tables 3 and 4, the base gravity-model specifications that include the GDP per capita of Venezuela, the GDP per capita levels of destination countries and distance as explanatory variables of migration flows (column 1) are gradually extended by controlling for *migrant networks* in destination countries (column 2), as well as for dummy-variables indicating if the country-pairs share a common *colonial past* (column 3), *border* (column 4) or *language* (column 5). For the purpose of comparison, the same sequence of specifications (with same explanatory variables and sample of countries) appears in both Tables 3 and 4. Please note that we keep the sample constant to the 63 countries, for which data is available for all variables appearing in the analysis (to avoid that coefficients become biased

Table 2. Summary statistics.

Variables	Observations	Mean	Standard Deviation	Minimum	Maximum
Flows	396	3,734.95	29,164.97	0	551,286
GDPpc(VEN)	396	13,729.75	2,499.46	10,877.78	17,601.45
	(396)	(9.51)	(0.18)	(9.29)	(9.78)
GDPpc(d)	384	18,422.64	19,190.37	167.90	111,447.60
	(384)	(9.21)	(1.23)	(5.12)	(11.62)
Distance	396	5,736.25	3,728.08	383.78	15,674.95
	(396)	(8.31)	(0.96)	(5.95)	(9.66)
Contiguity	396	0.05	0.21	0	1
Colony	396	0.02	0.12	0	1
Language	396	0.32	0.47	0	1
Network	384	2,904.33	7,894.35	1	42,119.00
	(384)	(5.57)	(2.48)	(0)	(10.65)
Population	390	26,400,000	48,200,000	33,754	323,000,000
	(390)	(15.75)	(1.98)	(10.42)	(19.59)
Poverty	265	4.60	7.73	0	36.30
GDP growth	376	2.82	2.17	-9.00	12.37
Share VEN oil	317	0.00	0.01	0.00	0.06
Stability	321	59.65	25.51	3.49	100.00
Government	341	1.68	0.96	0	3
Legislation	396	0.03	0.16	0	1

Notes: Summary statistics are only for countries that report data on inflows of Venezuelan migrants. Log values are reported in parenthesis.

as a result of different sample sizes across columns). We first discuss the empirical results that relate to the pre-2015 period (Table 3).

Beginning with the core variables of the gravity model of migration, we can verify that the standards of living in destination countries and the geographical distance to them had a statistically significant influence on Venezuelan migration between 1990 and 2015 (column 1 of Table 3). In contrast to *Venezuela's GDP per capita*, the coefficient of the *GDP per capita of destinations* is consistently positive and highly significant across all specifications of Table 3. A one percent rise in the *GDP per capita level of a destination country* is associated with an increase in migration outflows

Table 3. Estimation results of core determinants, pre-2015 period (1990–2015).

Dependent variable:	(1) flows	(2) flows	(3) flows	(4) flows	(5) flows
ln GDPpc (VEN)	0.220	0.920	0.747	0.930	0.476
	(1.583)	(0.790)	(0.876)	(0.868)	(0.863)
ln GDPpc (d)	0.928***	0.592***	0.700***	0.586***	0.871***
	(0.200)	(0.150)	(0.151)	(0.151)	(0.223)
ln distance	-0.310**	0.137	-0.0360	-0.102	0.229
	(0.158)	(0.180)	(0.183)	(0.179)	(0.286)
ln network		0.981***	0.930***	0.955***	1.024***
		(0.0604)	(0.0611)	(0.0598)	(0.0711)
Colony			0.384	0.334	-0.860
			(0.281)	(0.280)	(0.793)
Contiguity				-0.848**	-0.852**
				(0.363)	(0.382)
Language					1.196*
					(0.726)
N	314	314	314	314	314
Countries	63	63	63	63	63
pseudo R2	0.169	0.829	0.833	0.837	0.842

Notes: Robust standard errors of coefficients in parenthesis. All specifications control for time effects.
*$p < .1$, **$p < .05$, ***$p < .01$.

Table 4. Estimation results core determinants, post-2015 period (2015–2017).

Dependent variable:	(1) flows	(2) flows	(3) flows	(4) flows	(5) flows
ln GDPpc(d)	-0.266	-0.464	-0.492	-0.388	0.362
	(0.254)	(0.289)	(0.304)	(0.286)	(0.440)
ln distance	-0.929**	-0.510	-0.399	0.0512	1.284**
	(0.452)	(0.365)	(0.446)	(0.401)	(0.533)
ln network		0.969***	1.000***	0.764***	0.765***
		(0.166)	(0.167)	(0.124)	(0.243)
colony			-0.622	-0.255	-3.064***
			(0.606)	(0.622)	(1.045)
contiguity				1.761***	2.653***
				(0.384)	(0.608)
language					3.855***
					(0.930)
N (= countries)	63	63	63	63	63
pseudo R2	0.194	0.737	0.740	0.811	0.929

Notes: Robust standard errors of coefficients in parenthesis.
*p<.1, **p<.05, ***p<.01.

towards the same foreign economy ranging between 0.6 to 0.9 percentage points (see columns 1-5). This is an effect of substantial magnitude confirming that higher income levels abroad provided a strong incentive for Venezuelans to migrate elsewhere (in contrast to fluctuations in domestic income levels that played no significant role). As predicted by the gravity model, the coefficient on *distance* is negative and statistically significant in the parsimonious specification of column 1, where a one percent increase in distance to a certain destination country reduces flows of Venezuelan migrants by around 0.3 percent. However, distance loses its statistical significance, once we enrich our specifications with additional explanatory variables (columns 2-5). In column 2, we include as an additional regressor the extent of migrant networks in destination countries (proxied by the number of Venezuelans already living in each destination country in 1990[10]); we find that existing networks facilitate future migration flows (an effect that is highly statistically-significant at the 1 percent level). A one percent higher number of compatriots in a certain destination is expected to equivalently increase the number of additional Venezuelan migrants to this country in the pre-2015 period. Please note that the inclusion of the network variable significantly increases the explanatory power of the statistical model, as captured by the pseudo R-squared values. A shared *colonial relationship* between two countries is frequently described as another important determinant of migration flows. In our analysis, however, colonial ties appear to be statistically insignificant when we control for other explanatory factors (column 3). This may be due to the fact that the variable *colony* may capture similar information as other core variables. For example, one possible link could be between *colony* and *migrant networks*, since Venezuela's original colonizer (Spain) also had the third highest number of Venezuelans living abroad in 1990 (UN DESA 2017a).[11] An interesting result is obtained when including the variable *contiguity*, which captures if a destination country shares a river or land border with Venezuela (columns 4 and 5). In contrast to the earlier literature, we find that border countries had an 85% lower inflow of Venezuelan migrants between 1990 and 2015 (compared to non-bordering nations, other things equal). However, a careful examination of this result suggests that, as a matter of fact, this is in line with our earlier descriptive findings of Figure 2 (depicting the geographic distribution of the major destination countries of Venezuelan migrants in the pre-2015 period). Immediate geographic proximity was not such an important factor driving migration before 2015. On the other hand, other things equal, Venezuelans migrated more to countries where Spanish is an official *language* (column 5). To sum up, the results suggest that, in the pre-2015 period, Venezuelan migrants on average were attracted more to wealthier Spanish-speaking nations with existing migrant networks rather than to geographically proximate bordering countries.

The picture changes substantially when the 2015–2017 period becomes the focus of our analysis (Table 4). During this time, in which the Venezuelan migration crisis intensified, different migration patterns emerge. The *GDP per capita of destination countries* is not a statistically significant determinant anymore. Instead, variables capturing geographical factors become more

important. In the base specification of the gravity model (column 1 of Table 4), the effect of *distance* on migration flows is still statistically significant and in the expected direction, but the corresponding effect is now three times larger in comparison to the pre-2015 period (a one percent increase in distance is now associated with an expected reduced flow of migrants at an equivalent rate). However, and similar to Table 3, the coefficient of *distance* loses its statistical significance as the specifications become richer and include additional explanatory variables (columns 2 to 4)[12]. In addition, existing *migrant networks* facilitate further migration similarly to the pre-2015 period of analysis (columns 2 to 5). Interestingly, the coefficients of *contiguity* and *language* look substantially different compared to the ones estimated in the pre-2015 period. The coefficient of *contiguity* now changes sign and becomes positive, indicating that (other things equal) 1.8 to 2.7 times more Venezuelans migrated to contiguous countries than to non-neighbouring countries during the Venezuelan migration crisis (columns 4 and 5 of Table 4).[13] *Language* still plays a facilitating role similar to the pre-2015 period, but the corresponding coefficient more than doubles in size. Spanish-speaking destinations received almost four times as many migrants from Venezuela between 2015 and 2017 in comparison to other countries with different official languages.

Comparing the two periods, pre- and post-2015, there are some striking differences and commonalities. Between 1990 and 2015, the *GDP per capita of destination countries* significantly determined Venezuelan migration flows. This suggests that in times of relatively economic and political stability in Venezuela, the population outflows were largely driven by the economic incentive of higher potential incomes in other countries. However, with the deteriorating situation in Venezuela (post-2015), the expected income levels abroad no longer acted as an important incentive for migration while, instead, geographical factors gained in importance as drivers. The fast-growing number of Venezuelans leaving their country largely migrated to geographically close destinations in search of a safe haven (i.e. bordering nations and/or those with Spanish as an official language). Despite this shift in the importance of migration drivers (from economic factors in times of relative stability to geographical factors in times of crisis), there are also some commonalities. Both in the pre- and post-2015 periods, Venezuelans on average migrated in larger numbers to countries with an existing *network* of compatriots (an effect lying within the consensual range identified by Beine, Bertoli, and Moraga (2015)[14] for both periods).

4.2 Robustness checks

The main variables examined in section 4.1 are amongst the most frequently discussed and tested in migration studies. However, there are some additional social, economic and political factors that may have influenced Venezuelan migration flows. This section pursues a twofold purpose by incorporating them into the earlier models tested in section 4.1: on the one hand, this aims to assess the importance of these additional determinants and, on the other hand, to evaluate the robustness of our earlier core findings. The results are presented in Table 5 (pre-2015 period) and Table 6 (post-2015 period). Columns (2)-(5) progressively extend the base gravity-model specification of column (1) by incorporating an additional socio-economic explanatory variable at a time; column (6) estimates the joint importance of all these new socio-economic determinants, in combination with all other factors examined earlier in section 4.1 (namely income, distance, networks, colony, contiguity and language). Columns (7)-(9) now extend the base gravity-model specification (1) by incorporating new political factors; column (10) estimates all these new political factors jointly, and together all other factors examined earlier in section 4.1 (namely, income, distance, networks, colony, contiguity and language). Column (11) jointly includes all socio-economic, political and geographical factors. Please note that in columns (6) and (11) we omit the poverty variable to avoid any sample-size bias due to the large number of missing observations for many countries.

4.2.1 Social and economic factors (1990–2015)

We start by analyzing the effect of these additional socio-economic factors on Venezuelan migration between 1990 and 2015 (Table 5). As discussed in the literature review, countries with a larger *population* generally experience higher inflows of migrants. We also find that an increase in a destination country's population by 1 percent (in the pre-2015 period) is associated, on average, with a 0.9 percent larger inflow of Venezuelan migrants (column 2). Next, we control for a destination country's *GDP growth* rate, which serves as an indication of the current state of its economy (column 3). Migrants are generally expected to immigrate to countries with a booming economy where, for example, finding a job is easier due to the high demand for workers. However, once controlling for GDP per capita levels in the base specification, the economic growth rate of destination countries does not seem to have a statistically significant effect on Venezuelan migration. On the contrary, we find that countries with higher poverty rates (measured by

Table 5. Robustness checks, pre-2015 period (1990–2015).

Dependent variable:	(1) flows	(2) flows	(3) flows	(4) flows	(5) flows	(6) flows	(7) flows	(8) flows	(9) flows	(10) flows	(11) flows
ln GDPpc(VEN)	0.220	-0.055	0.062	-1.593	-0.528	0.530	-2.346	-0.360	0.0142	-0.703	0.479
	(1.583)	(0.719)	(1.598)	(1.736)	(1.643)	(0.765)	(1.752)	(1.549)	(1.630)	(0.803)	(0.726)
ln GDPpc(d)	0.928***	0.953***	0.952***	1.519***	1.016***	0.871***	1.984***	1.178***	0.969***	1.346***	0.984***
	(0.200)	(0.099)	(0.219)	(0.382)	(0.258)	(0.260)	(0.372)	(0.273)	(0.202)	(0.324)	(0.260)
ln distance	-0.310**	-0.969***	-0.347**	-1.959***	-0.521**	0.037	-0.605***	-0.812***	-0.323**	-0.0828	-0.043
	(0.158)	(0.217)	(0.171)	(0.433)	(0.207)	(0.499)	(0.218)	(0.268)	(0.160)	(0.354)	(0.620)
ln population		0.872***				0.474***					0.453***
		(0.059)				(0.106)					(0.149)
GDP growth			0.026			0.137*					0.088
			(0.069)			(0.077)					(0.080)
poverty				-0.084***							
				(0.031)							
trade					-32.64	21.03					12.13
					(27.80)	(37.63)					(43.61)
ln network						0.645***				0.846***	0.630***
						(0.133)				(0.076)	(0.157)
colony						0.019				-0.699	0.009
						(0.708)				(0.592)	(0.763)
contiguity						-0.710				-0.650	-0.242
						(0.473)				(0.521)	(0.561)
language						1.154**				1.365**	1.424***
						(0.554)				(0.589)	(0.459)
political stability							-0.046***			-0.009	0.006
							(0.007)			(0.007)	(0.008)
government								0.428		0.198	0.152
								(0.326)		(0.132)	(0.093)
legislation									1.373**	0.869*	0.618
									(0.667)	(0.524)	(0.525)
N	314	314	312	218	260	251	256	285	314	224	189
countries	63	63	63	58	62	59	63	58	63	56	53
pseudo R2	0.169	0.633	0.168	0.370	0.181	0.871	0.350	0.239	0.177	0.862	0.876

Notes: Robust standard errors of coefficients in parenthesis. All specifications control for time-fixed effects. *$p < .1$, **$p < .05$, ***$p < .01$.

Table 6. Robustness checks, post-2015 period (2015–2017).

Dependent variable:	(1) flows	(2) flows	(3) flows	(4) flows	(5) flows	(6) flows	(7) flows	(8) flows	(9) flows	(10) flows	(11) flows
ln GDPpc(d)	-0.266	0.0610	-0.279	-0.295	-0.902	0.720	1.048***	-0.125	0.211	1.829***	1.335**
	(0.254)	(0.227)	(0.251)	(0.522)	(0.563)	(0.451)	(0.323)	(0.314)	(0.331)	(0.472)	(0.648)
ln distance	-0.929**	-2.401***	-0.906**	-1.726***	-1.201**	0.276	-1.600***	-1.391***	-1.188**	-0.838*	-3.733***
	(0.452)	(0.539)	(0.458)	(0.552)	(0.505)	(0.705)	(0.356)	(0.349)	(0.507)	(0.453)	(0.534)
ln population		1.112***				0.303					2.223***
		(0.213)				(0.261)					(0.323)
GDP growth			-0.0293			-0.171					0.062
			(0.0865)			(0.173)					(0.058)
Poverty				-0.0627							
				(0.106)							
Trade					-308.6*	-45.77					32.82
					(162.9)	(66.55)					(34.79)
ln network						0.536*				0.344**	-0.590***
						(0.319)				(0.160)	(0.191)
Colony						-2.159*				0.307	3.540***
						(1.140)				(0.640)	(0.680)
Contiguity						1.829***				1.188	0.927**
						(0.579)				(0.828)	(0.455)
Language						3.936***				2.286***	3.777***
						(0.649)				(0.700)	(0.644)
Political stability							-0.078***			-0.034***	0.065***
							(0.016)			(0.010)	(0.019)
Government								-1.178**		0.200	-0.167
								(0.480)		(0.245)	(0.172)
Legislation									3.217***	1.510***	2.274***
									(0.826)	(0.326)	(0.374)
N (= countries)	63	63	62	47	57	55	63	56	63	54	47
Pseudo R2	0.194	0.708	0.199	0.484	0.408	0.946	0.611	0.549	0.598	0.967	0.994

Notes: Robust standard errors of coefficients in parenthesis. *$p < .1$, **$p < .05$, ***$p < .01$.

the share of total population living below the poverty line of $1.90 a day) had lower inflows of Venezuelan migrants on average (column 4), an effect that is highly statistically significant. The third additional economic factor examined is the *trade* relationship between Venezuela and other destination countries; since Venezuela almost exclusively exports oil, we specifically assess if Venezuelans were choosing to migrate to countries that purchased much Venezuelan oil (relative to their GDP). As the results suggest, the effect is not statistically significant (column 5). In the richer specification (6), we find that the coefficient of population still remains significantly correlated with Venezuelan migration flows, although it halves in magnitude (while poverty now loses its statistical significance and GDP growth becomes marginally significant). The earlier finding of Table 3 linking migration to the income level of recipient countries still holds; i.e. in the pre-2015 period, Venezuelans migrated in larger numbers to countries with higher GDP per capita levels, incentivised by the prospects of higher earnings.

4.2.2 Political factors (1990–2015)

The rest of Table 5 looks at the importance of additional political factors in explaining Venezuelan migration in the pre-2015 period. With regard to the political situation of destination countries, we explore the role of *political stability* (perception of likelihood of political stability and/or politically motivated violence) and the *type of government* (1-right, 2-centre, 3-left). Contrary to intuition, we find that Venezuelans migrated in larger numbers to less politically stable nations between 1990 and 2015 (column 7), once we control for the incentives associated with expected income (in recipient countries) and distance. The coefficient of *political stability* is statistically significant and negative, where a 1-point increase in the political stability index is associated with 0.05 percentage fewer Venezuelan migrants. However, the effect is relatively small (the difference between the most and least politically stable countries in the sample would correspond to a less than 5% gap in predicted migration flows) and loses its significance once controlling for other political factors (columns 10 and 11). The *type of government* of a destination country was not a statistically-significantly correlate of Venezuelan migration in this period (column 8). In column (9) we control for a destination country's migration policy, proxied by its *legislation* towards Venezuelans (a binary variable with a value of 1 when a destination country had legislation in place that facilitated the Venezuelan migration). As the results suggest, destination countries with such a favorable legislative framework in place welcomed about 1.4 times more Venezuelan migrants in the pre-2015 period (compared to countries that did not adopt similar immigration policies (the correlation is statistically significant at the 5% level). In the richer specification (10), we find that migration policy (legislation) still remains significantly correlated with Venezuelan migration flows, although at the 10% level. For all regressions, we consistently find that migration decisions in the pre-2015 period were largely influenced by the expected income levels of recipient countries. In column (11), where we combine all regressors discussed, we find that common language, existing networks and the population of destination countries all remain statistically-significant correlates of Venezuelan migration flows.

4.2.3 Social, economic and political factors (2015–2017)

Table 6 replicates the same sequence of regressions for the post-2015 period. The earlier results of Table 4 still hold; i.e. in the post-2015 period of heightened political and economic uncertainty, Venezuelans migration strategies was not based on income criteria; i.e. Venezuelan migrants sought refuge in geographically proximate and/or Spanish-speaking nations rather than wealthier countries. Similarly to Table 5, we also observe that more populous nations received larger inflows of migrants (specifications 2 and 6 of Table 6); in addition, legislation facilitating migration also appears to have a positive and statistically-significant effect (with host countries adopting such legislative frameworks receiving between 1.5 and 3.2 times more migrants, other things equal). The other socio-economic and political variables do not appear to have a consistently statistically significant effect across specifications.

5. Conclusion

The economic, political and humanitarian crisis in Venezuela of the last few years has caused one of the largest exodus in the region's modern history. Earlier research studied different components of the Venezuelan crisis (albeit often in isolation) and/or surveyed subsamples of migrants on their individual experiences and motives for leaving Venezuela. In parallel, national statistical offices and the UN have collected data on the routes Venezuelan migrants have taken and the range of destination countries where they arrived. To the best of our knowledge, this is the first econometric analysis that systematically and quantitatively studies why Venezuelans migrated in larger numbers to some destination countries (while avoiding other ones) and simultaneously quantifies the importance of several socio-political and economic underlying factors in

shaping patterns of migration between 1990 and 2017. Given the severe escalation of the ongoing crisis since 2015, we disaggregate our analysis into two subperiods, i.e. a pre- and post-2015 period. This allows to compare the patterns of Venezuelan migration during times of severe socio-economic uncertainty (post-2015) against periods of relative stability (pre-2015).

Our empirical results suggest that Venezuelans were in both times immigrating more to destinations with an existing network of compatriots. There are, however, some striking differences in other factors that determined Venezuelan migration. Between 1990 and 2015, migration was largely driven by income criteria, with Venezuelan migrants being largely attracted to wealthier countries (as captured by their average GDP per capita levels). However, after 2015 economic incentives ceased to be the catalyzing factor behind migration. Instead, Venezuelans were seeking refuge and migrating disproportionately more to bordering, Spanish-speaking countries. In a nutshell, Venezuelan migrants had a stronger preference for destination countries with a high economic standard of living in times of relative stability and for geographically proximate nations in times of crisis. This key result holds even when controlling for additional social, economic and political factors which can influence Venezuelan migration (such as destination countries' population size or legislative framework).

These findings have important policy relevance. They can assist policy makers (e.g. UN agencies, government officials in recipient countries or donor organisations) to understand the spatial distribution of migration flows from Venezuela and its fundamental determinants; they can also help predict how these migration patterns may evolve in the near future based on any expected changes in country characteristics (i.e. of Venezuela and destination countries). A deeper understanding of these migration patterns can help allocate resources more efficiently. Policy makers may, for example, start providing more institutional and financial support to existing migrant communities, since such networks seem to be crucial in integrating (and attracting) future migrants. Similarly, a more generous provision of international funds should be directed towards bordering nations in periods of heightened economic and political uncertainty (especially since many of these middle-income bordering nations, as in the case of Colombia and Brazil, have faced austere government budgets in recent years and have hence limited public resources that could be readily and promptly allocated for the support and integration of Venezuelan migrants).

As more recent data become available, future empirical work can analyze whether the observed shift in migration patterns since 2015 persists. In addition, country-based analyses within the field of migration studies (to which our study also belongs) typically rely on aggregate migrant data. Improved data coverage in the future will hopefully provide information on disaggregated flows across different categories (e.g. economic migrants, refugees, asylum seekers). This will allow researchers to replicate our empirical framework for subgroups and look for commonalities and differences in patterns of migrations. For example, socio-economic factors are likely to play a more important role in relocation decisions for economic migrants, while geographic proximity may be a more crucial factor for refugees and asylum seekers. Furthermore, migrant groups are heterogenous in multiple dimensions (gender, age composition, level of education, family situation etc). Improved data availability in the future will permit researchers to examine whether the spatial and time patterns of migration may differ across migrant strata.

Notes

1. For some notable earlier empirical studies, see Beine, Docquier, and Özden 2011; Bertoli and Fernández-Huertas Moraga 2013; Beine and Parsons 2015; Pedersen, Pytliková, and Smith 2008; Dreher and Poutvaara 2011.
2. In contrast to Newton's law of gravitation, distance is not square in gravity models of trade or migration. In addition, distance may not just represent geographical distance between origin and destination countries but also other, e.g. linguistic, cultural or historical, distances (Rojas-Romagosa and Bollen 2018, 15).
3. All variables and datasets are explained in detail in section 3.3.
4. The coefficients represent semi-elasticities in the case of explanatory variables measured as shares (e.g. *poverty*, indicating the share of the population living below the poverty threshold in the destination country) or in the case of dummy variables (e.g. *contiguity*, indicating if the destination country shares a border with Venezuela). For more information on the variables, see section 3.3.
5. Santos Silva and Tenreyro (2006, 648) used Monte Carlo simulations with several cases of heteroskedasticity to compare different estimators (and hence argue in favour of PPML).
6. The variable *colony* indicates a colonizer-colony relationship (e.g. Spain-Venezuela) and not a shared-colonizer relationship (e.g. Colombia-Venezuela), as alternatively used in other empirical frameworks (see e.g. Kim and Cohen 2010). This is due to the fact that the latter would capture information that is already largely presented by the variable *language*.
7. Countries with such legislation (for which we assign a value of 1) are: Argentina 2009–2017 (Law No. 25,871/2004); Ecuador 2011–2017 (Ecuador-Venezuela Migration Statute and UNASUR VISA; Uruguay 2014–

2017 (Law No. 19,254/2014); Peru 2016–2017 (Supreme Decrees No. 002-17, 023-17); Colombia: 2017 (Resolution No. 5797/2017) and Brazil (CNIg Resolution No. 126/2017) (IOM 2018a, 3).

8. I.e. *GDPpc(VEN)*, *GDPpc(d)*, *GDP growth*, *poverty*, *share VENoil*, *stability*, *government, legislation*.
9. For more information, see section 3.1.
10. The results are robust to defining migrant networks as the number of Venezuelans that lived in a destination country at the start of each preceding period (*network pb*). See Appendix A2 for the respective robustness check.
11. In 1990, the stock of Venezuelan migrants was 42,119 in the United States of America, 33,123 in Colombia and 32,469 in Spain (UN DESA 2017a).
12. In column 5 the coefficient turns positive when the variables *contiguity* and *language* are also included in the specification. In the post-2015 period when the Venezuelan crisis escalated, many migrants sought refuge in bordering and/or Spanish-speaking countries (most of which, with the exception of Spain, are also relatively close – which may also explain the negative coefficient of *colony* in column 5). Language and immediate proximity (through *contiguity*), hence, are likely to capture the urgency of many refugees to find a safe haven as the political situation in Venezuela worsened; the rest of the migrants (or at least those with a choice) migrated further away.
13. This may signal that the bad political relations between Venezuela and Colombia possibly played a larger role before 2015, when the urgency to flee Venezuela was less acute.
14. See section 2 for more information.

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Appendices

Table A1. List of variables used in the regressions.

Flows	Number of Venezuelan migrants that immigrated to a destination country. Source: International Organisation of Migration (IOM 2018a)
GDP per capita	Income per capita of Venezuela or destination countries in PPP terms at current prices. Source: IMF World Economic Outlook (IMF 2019b)
Distance	Population weigthed distance in kilometres between Venezuela and destination countries. Source: Gurevich and Herman 2018
Network (or network pb)	Number of Venezuelans that lived in a destination country in 1990 (or in the period before). Source: International Organisation of Migration (IOM 2018a)
Colony	0-1 dummy variable indicating if Venezuela and the destination country have a past colonial relationship. Source: Gurevich and Herman 2018
Contiguity	0-1 dummy variable taking the value 1 if Venezuela and the destination country share a common border. Source: Gurevich and Herman 2018
Language	0-1 dummy variable capturing if Venezuela and the destination country share a common official language. Source: Gurevich and Herman 2018
Population	Total population of destination country. Source: World Bank (2019)
GDP growth	Annual real GDP growth in destination country (average annualized values for each subperiod). Source: IMF World Economic Outlook (IMF 2019b)
Poverty	Share of country's population living below the poverty headcount of $1.90 a day at international prices (in PPP terms). Source: World Development Indicator (World Bank 2019)
Trade	Destination country's import of Venezuelan oil (in dollars) relative to its GDP. Sources: UN Comtrade Database (2019) and World Bank (2019)
Political stability	Destination country's percentile rank in the perception of the likelihood of political instability and/or politically-motivated violence. Higher values correspond to higher levels of political stability. Source: WGI, Kaufmann, Aart, and Mastruzzi (2010)
Government	Type of government in destination country, 1 for right-wing, 2 for centre and 3 for left-wing. Source: Database of Political Institutions (Cruz, Keefer, and Scartascini 2018)
Legislation	0-1 dummy variable with value 1 if destination countries had more open, tailored migration policy for Venezuelan migrants. Source: IOM 2018a

As mentioned in section 4, results are consistent across different definitions of migrant networks; defined either as the number of Venezuelans that lived in a destination country in 1990 (variable *network*) or at the start of each preceding subperiod (variable *network pb*). In Table A2, specifications (1) and (2) show the estimation results for the period between 1990 and 2015, while specifications (3) and (4) refer to the post-2015 years.

Table A2. Alternative network proxies.

Dependent variable:	Flows (1)	Flows (2)	Flows (3)	Flows (4)
ln GDP pc VEN	0.476	-1.510		
	(0.863)	(0.987)		
ln GDP pc d	0.871***	0.578***	0.362	0.0341
	(0.223)	(0.195)	(0.440)	(0.440)
ln distance	0.229	0.262	1.284**	0.890**
	(0.286)	(0.258)	(0.533)	(0.438)
ln network	1.024***		0.765***	
	(0.071)		(0.243)	
ln network pb		0.957***		0.752***
		(0.056)		(0.156)

(*Continued*)

Table A2. Continued.

Dependent variable:	Flows (1)	Flows (2)	Flows (3)	Flows (4)
colony	-0.860	-0.879	-3.064***	-2.658***
	(0.793)	(0.702)	(1.045)	(0.769)
contiguity	-0.852**	-0.640*	2.653***	2.704***
	(0.382)	(0.372)	(0.608)	(0.723)
language	1.196*	1.095*	3.855***	3.276***
	(0.726)	(0.626)	(0.930)	(0.887)
N	314	314	63	63
Countries	63	63	63	63
pseudo R2	0.842	0.844	0.929	0.935