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Original Article

Evidence for the welfare magnet hypothesis? A global examination using exponential random graph models

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The welfare magnet hypothesis states that welfare generosity in destination countries is a migration pull factor. However, supporting evidence is mixed. Previous research has focused on explanatory factors in destination countries rather than in origin countries, examined migration from Organisation for Economic Co-operation and Development country perspectives rather than from a global perspective, and typically ignored that migration flows are not independent, thus overestimating welfare spending effects. We used exponential random graph models to examine migration flows between 160 countries and treated welfare spending in origin and destination countries as the main explanatory variable. Our findings show that social spending attraction effects largely disappear after controlling for various explanatory variables (gross domestic product, population size, geographic distance, democracy levels, and common spoken language). The migration preferences of low- and high-income groups do not mediate social spending attraction effects. Furthermore, flows between countries with similar spending levels are greater than flows between very low- and very high-spending countries, indicating migrant status maintenance. In conclusion, we find insufficient evidence that welfare spending strongly impacts migration.

Key words: international migration; welfare spending; network approaches; exponential random graph models.

Introduction

Public debates and populist narratives often claim that generous welfare systems attract migrants, placing a strain on social systems—the "welfare migration" phenomenon[1] (Blauberger and Schmidt 2014; Kahanec and Guzi 2022). This idea contrasts with migration literature, which generally finds that immigration benefits receiving countries by reducing financial strain on public pension systems, addressing labor shortages, and creating economic growth (Dustmann and Frattini 2014; Kancs and Lecca 2018; Ortega and Peri 2013). However, the welfare magnet hypothesis (WMH) states that welfare generosity is a pull factor, attracting lower-skilled migrants

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incentivized to move to destinations with more generous benefits (Borjas 1989, 1999). There are also concerns that immigrants use welfare services and benefits more, creating a fiscal burden in receiving countries (Boeri, Hanson, and McCormick 2002; Giulietti et al. 2013; Nannestad 2007). However, de Haas (2023) found that the fiscal impact of migration is low, providing little empirical support for these concerns. Nevertheless, increased risks during migration may make it more important for migrants to consider the welfare systems of prospective destinations (Heitmueller 2005).

The empirical evidence for the WMH is mixed. While welfare spending pull effects are rarely identified—and typically only have small effects (De Giorgi and Pellizzari 2009; Di Iasio and Wahba 2022; Pedersen, Pytliková, and Smith 2008; Warin and Svaton 2008)—some studies have suggested that welfare policies influence migrants' skills composition, increasing lower-skilled immigration (Borjas 1994; Brücker et al. 2012). Nevertheless, the idea of welfare generosity attraction effects resonates in public discourse (Kahanec and Guzi 2022). Therefore, the WMH should be re-examined to determine whether it merits this public attention.

Previous research has focused on attraction factors in destination countries rather than comparing conditions in both the origin and destination countries simultaneously. Discussions on the "magnetic effects" of welfare typically assume welfare generosity is higher in destination countries, creating a pull effect (Borjas 1999). However, welfare provisions in origin countries can reduce migration by providing economic security (Kahanec and Guzi 2022; Kureková 2013). Accounting for this using a larger number of countries could enhance understanding of the relationships between the conditions in origin and destination countries.

Another neglected aspect in the WMH literature is that migration flows not from the poorest to the richest (or least welfare-generous to most welfare-generous) countries but between countries with similar welfare spending levels (de Haas 2023; Deutschmann 2021). Also, there may be nonmonetary attraction factors, including democratic governance (Azad and Atallah 2019; Pedersen, Pytlikova, and Smith 2008). Furthermore, research has often ignored that migration flows are not independent (Lee and Ogburn 2021). For example, immigration restrictions may direct migration flows elsewhere, out-migration may encourage immigration, or migration may occur both ways.

Treating migration as a flow network enables modeling of these dependencies, revealing nuanced insights into migration structures (Fagiolo and Mastrorillo 2013). Exponential random graph models (ERGMs) (Lusher, Robins, and Koskinen 2013) can model intraurban (Müller, Grund, and Koskinen 2018), intranational (Huang and Butts 2023), and international migration flows (Leal 2021; McMillan 2024; Windzio 2018; Windzio, Teney, and Lenkewitz 2021). We applied ERGMs to a sample of 160 countries to examine whether welfare spending is a migration pull factor.

Addressing gaps in the WMH literature, this study examines the origin and destination country contexts and considers a broader range of countries. Network models are used to examine often-overlooked structural interdependencies in migration flows. Furthermore, cross-sectional and longitudinal analyses are combined to investigate temporal dynamics. Integrating these elements, this study provides a comprehensive WMH analysis that exceeds typical Organisation for Economic Co-operation and Development (OECD)–focused studies and tests a broader range of WHM-derived hypotheses.

Theoretical background

Borjas (1999) first argued for "welfare magnets," constructing a theoretical example to explain welfare benefit variations in different US states and immigrant clustering in states with higher benefits. Accordingly, rational individuals choose destinations based on the earnings achievable with a certain skillset, net of the potential migration costs.

Borjas theorized that welfare benefits are a form of guaranteed wages (Borjas 1999). Alongside the assumption of substantial migration costs, this introduces different incentives for low- and high-skilled migrants and those who have or have not incurred migration costs. Migrants with skills below a certain threshold are better off in environments requiring fewer skills to achieve a certain income, while highly skilled migrants choose environments that provide greater payoff for their skills. Furthermore, once a costly migration decision is made, it is better to choose a destination with the highest welfare benefit, as further regional moves do not incur additional high costs (Borjas 1999). This view argues that generous welfare countries attract fewer skilled migrants, while less generous countries attract more skilled migrants. However, Borjas does not argue that immigrants are less skilled and therefore disposed to receiving welfare benefits; rather, given high migration costs, migrants are more sensitive to differences in benefits than natives (Borjas 1999). This reasoning applies to both intranational and international migration (Borjas 1999), providing many different approaches to empirically evaluate the WMH.

Migrants are often from poorer countries, risk not having their educational certificates recognized, and are at greater risk of unemployment or poverty (Heitmueller 2005). Thus, it is rational for migrants to choose destinations that ameliorate these risks. However, it is unlikely that welfare magnets guide short-term migration decisions. Welfare benefit access is rarely expected after only a short period in a destination country as it is often tied to long-term residency and social contributions (De Giorgi and Pellizzari 2009; Pedersen, Pytliková, and Smith 2008). Over longer timeframes, it may have a more significant role. However, viewing welfare magnets this way may not be appropriate as welfare benefits would not be the primary migration driver—this would be job opportunities or work conditions.

Previous research

Several studies have shown that welfare benefits have small effects on immigration—either attraction effects or effects on the skills composition of migration flows; however, the evidence is not conclusive. Result heterogeneity is due to sampling differences, the range of statistical control variables, and estimation techniques.

Evidence supporting the welfare magnet hypothesis

Besides Borjas (1999), De Giorgi and Pellizzari (2009) showed that immigrants are more likely to choose countries with more generous benefits among fifteen EU countries. The effect was maintained net of sociodemographic effects and education and wage differences between destinations but was moderate. Warin and Svaton (2008) investigated migration to the EU (fourteen destinations and seventy-six origin countries) and found evidence supporting the WMH; however, factors including unemployment rates in destination countries had a larger effect. Kahanec and Guzi (2022) analyzed immigration into thirty-eight OECD countries (1993–2018) and found that welfare accessibility increased immigration. The result—a 10% increase in welfare access produced a 3% increase in immigration—was small and showed strong statistical uncertainty.

Giulietti et al. (2013) examined unemployment benefit spending effects on immigration in nineteen European countries (1993–2008). Only a small effect on migration from non-EU countries was found; however, this effect disappeared after accounting for potential endogeneity.

Brücker et al. (2012) considered selection effects on high- and low-skilled migration. Analyzing migration from seventy-four countries to fourteen OECD countries (1980–2005), they found that total spending, old age, and unemployment spending positively affected immigration, producing a higher share of unskilled workers. Razin and Wahba (2015) examined migration between ten OECD, sixteen EU, and twenty-three developing countries (1990–2000), showing negative skills-selection effects in free-movement regimes, counteracted by policy-controlled migration regimes.

Evidence against the welfare magnet hypothesis

Pedersen, Pytliková, and Smith (2008) found no evidence for the WMH when analyzing immigration to 26 OECD countries from 129 origin countries (1990–2000). A weak social expenditure pull effect was found only when time-constant factors in origin and destination countries were not controlled for, making welfare spending causal effects unlikely. Furthermore, a "welfare magnet pattern" was not found when welfare regime types (Esping-Andersen 1990) in destination countries were used as predictors. Similarly, Guzi, Kahanec, and Kureková (2018) found no welfare-related patterns in migrant responses to skills shortages.

Massey and Espinosa (1997) analyzed migration patterns between the United States and Mexico and found that the expected value of US services, including welfare, healthcare, and education, had varying effects on migration. Welfare benefits had a lower probability of inducing migration, while education had a minimal positive effect, and healthcare had no significant effect. They also found that migration was more sensitive to economic conditions in Mexico and strongly dependent on US social networks.

Ponce (2019) analyzed migration to the Nordic countries from 209 countries and compared this with Germany and Canada, finding no evidence for the WMH. In some instances, high welfare spending predicted reduced migration. The results suggest that opportunities for political inclusion and democratic citizenship affect migration more than welfare benefits.

Sprenger (2024) analyzed migration between 28 EU countries (1998–2018) while controlling for economic and cultural determinants and applying country-fixed effects. Within the EU, migration should respond to welfare changes as movement is typically not restricted (however, welfare benefit access is restricted). The study showed that intra-EU mobility was driven by economic conditions and employment opportunities, was more likely in geographical proximity, and was affected by migrant social capital. However, no evidence was found that migration responded to the welfare magnet effect.

Kureková (2013) analyzed out-migration from the eight Central and Eastern European states that joined the EU in 2004. Investigating welfare policy changes and out-migration patterns, migration decisions were often based on welfare policy changes. While migrants did not seek welfare elsewhere, they reacted to policies that shifted state-level responsibilities to individuals. In contrast, countries providing policies integrating younger workers into labor markets retained more of their workforce.

Single-country case studies: mixed evidence

Three single-country studies have shown differences in social benefit effects on inflows or in-country relocation. Two studies used quasi-experimental designs, enabling the identification of causal effects. Agersnap, Jensen, and Kleven (2020) analyzed welfare reforms introduced in Denmark in 2002 that reduced social benefits for non-EU immigrants by up to 50%, their repeal in 2012 and reintroduction in 2016. They found that reduced benefits decreased the migrant stock from non-EU countries by 3.5%. However, a study weakness was that other policy changes introduced simultaneously, including stricter family reunification rules, may have confounded the effects.

Dellinger and Huber (2021) examined welfare benefit access for two refugee groups with different legal statuses (accepted asylum seekers and refugees with subsidiary protection), considering the random allocation of refugees across Austria and the local implementation of welfare reforms in three Austrian states. Their results showed some support for the WMH, with more restrictive welfare benefit access producing higher out-migration rates among the subsidiary protection group. However, their findings were not consistent: in one state, out-migration decreased. The magnetic effect of welfare was not conceptualized as a pull factor but as a factor reducing out-migration (cf. Kureková 2013).

In contrast, Ferwerda, Marbach, and Hangartner (2022) did not corroborate the WMH. They examined migrant relocation decisions in Switzerland (2005–2015), considering local exogenous variations in social benefits. This followed Borjas (1999) by considering regional movement decisions after main immigration cost accrual. They did not find that regions with increased benefits experienced stronger immigrant inflows. Rather, informal support networks influenced relocation decisions more strongly.

The literature provides mixed evidence. Attractive welfare effects are generally small. Most studies sampled more origin countries than destination countries. Studies using smaller destination country samples and single-country case studies have tended to support the WMH, while larger sample sizes have found small or no attraction effects. Studies that considered reverse causation of attraction effects (endogeneity) or controlled for unobserved differences between countries (heterogeneity) have provided less support for the WMH. Also, studies accounting for various confounding variables have typically not supported the WMH.

Studies have focused on a narrow sample of affluent destination countries ("welfare magnets") while neglecting the conditions in origin countries. In addition, structural interdependencies in migration flows have often been overlooked. For a more complete view of potential welfare spending attraction effects, we used a larger sample of countries, viewed all countries as potential origin and destination countries, considered the interdependency of migration flows, and incorporated a longitudinal perspective. To achieve these goals, a network approach was used to model migration flows.

The network perspective contribution

While network modeling has been used to study migration (Barnett and Nam 2023; Fagiolo and Mastrorillo 2013; Windzio 2018), this is the first study to use network modeling to examine "welfare magnets." A network approach provides methodological and analytical advantages, enabling a nuanced view of push and pull factors by considering origin and destination country conditions simultaneously. Applying homophily to origin and destination country conditions enables different interpretations of welfare spending effects: They may matter for migration decisions, but they may not reflect that people choose higher welfare destinations to gain the highest benefits. Rather, people may be motivated to maintain a certain social security level, moving between countries with similar spending levels (Fafchamps and Shilpi 2013; Windzio 2018).

A further advantage is the modeling of the nonindependence of migration flows. A network approach does not assume observations are independent; rather, explaining the dependencies between analysis units is an explicit goal. Neglecting dependencies may misrepresent the strength of economic and welfare-related factors effects (De Nicola et al. 2023) when network effects may have a substantial role (Windzio 2018; Windzio, Teney, and Lenkewitz 2021).

Four specific points are addressed in this study. First, we empirically examine the added value from modeling migration flows using ERGMs, accounting for network dependencies. Second, we examine the WMH's explanatory power once other variables, indicated by migration gravity models (economic power in origin and destination countries, geographic distance, and migration costs), are accounted for (Anderson 2011; Beine, Bertoli, and Fernández-Huertas Moraga 2016).[2] Third, we consider spending levels in destination and origin countries and examine homophily effects in migration flows, which can indicate a status maintenance motive. Fourth, we investigate whether the aggregated migration preferences of low- and high-income groups can explain welfare spending attraction effects. As a robustness check, longitudinal data were used to test whether the findings from cross-sectional analyses can be conceptually replicated when accounting for dependencies over time.

Hypotheses

Social spending effects

We formulated a traditional WMH hypothesis in which welfare spending in destination countries increases immigration above what is predicted by a simple gravity model framework:

H1: Higher social spending in destination countries increases migration inflows.

We refined this hypothesis to capture different incentives for high-skilled (high-income) and low-skilled (low-income) groups. The social spending attraction effects should be reflected in higher preferences by low-skilled groups for destination countries with higher social spending. As such, the aggregated migration preferences of low-skilled groups should at least partially explain the social spending attraction effects in destination countries:

> H1.1: Social spending attraction effects in destination countries are (partially) mediated by the aggregated migration preferences of low-skilled (low-income) groups in origin countries. A *positive indirect effect* should be observed regarding the preferences of low-skilled groups.

Conversely, the WMH predicts that high-skilled (high-income) groups should favor destinations with lower social spending and higher income. Therefore, an alternate hypothesis was developed:

> H1.2: Social spending attraction effects in destination countries are (partially) mediated by the aggregated migration preferences of high-skilled (high-income) groups in origin countries. A *negative indirect effect* should be observed regarding the preferences of high-skilled groups.

Another overlooked hypothesis is that generous welfare spending in origin countries may provide a pull effect, reducing out-migration. Kureková (2013) found that out-migration from Eastern European countries toward Western Europe (1990–2000) was less pronounced in countries with stronger welfare systems. Therefore, we formulated the following hypothesis:

> H2: Higher social spending in origin countries decreases outflows.

Several studies have investigated cultural similarity effects—typically operationalized through language similarity—on migration (Belot and Hatton 2012; Windzio 2018; Windzio, Teney, and Lenkewitz 2021). We applied the same reasoning to preferences toward social security systems. Migrants may compare the benefits in their origin countries and potential destination countries and choose destinations with similar conditions to what they are used to. The main driver is conserving a certain social security level—similar to status attainment models for education decisions (Breen and Goldthorpe 1997). Thus, we proposed a similarity hypothesis:

> H3: Flows are less likely between countries with very different spending levels but are more likely as spending levels become more similar.

Gravity model parameters and network effects

According to the migration gravity model (Anderson 2011; Beine, Bertoli, and Fernández-Huertas Moraga 2016), differences in income/gross domestic product (GDP), geographic distance, and other cost parameters provide the "explanatory backbone" for migration. While origin and destination country effects and similarities are included, owing to our focus on the WMH, we have not described all of the gravity model–related hypotheses here. Generally, destination countries with higher GDPs should attract more in-migration (Ortega and Peri 2013), most migration should occur between proximate countries (Beine, Bertoli, and Fernández-Huertas Moraga 2016), legal restrictions should make migration less likely (Ortega and Peri 2013), and bilateral labor agreements should make migration more likely (Palmer and Pytliková 2015). We also considered common spoken language between origin and destination countries; if a significant proportion of people in a destination country speak the same language as the origin country, migration should be less costly as human capital can be transferred more readily (Belot and Hatton 2012). This may also reflect network effects, with co-ethnics in destination countries providing information and resources, making migration more likely (Pedersen, Pytliková, and Smith 2008).

Data and analysis

Following Windzio (2018), we analyzed migration flows from the migrant stocks of different origin countries in different destination countries. Studies investigating the WMH have mainly focused on OECD or EU countries while largely ignoring migration between other countries (Kahanec and Guzi 2022). We used a cross-sectional sample (reference year 2019) of 160 countries to examine welfare spending, considering both origin and destination countries. As a robustness check, countries with longitudinal data (118 countries) were examined and simplified models were produced for 2000, 2010, and 2019; temporal dependencies were controlled to verify that the identified patterns were observable over time. The International Labour Organisation (ILO) World Social Protection Reports (ILO 2017, 2021) provide a comprehensive set of social expenditure indicators; total social expenditure (excluding healthcare) as a percentage of GDP was used. We also conducted analyses using total healthcare spending as a focal variable. These results are reported in the supplementary materials. However, some of our findings are addressed in the discussion as they contain (weak) evidence supporting the WMH.

Dependent variable: migration flows

We constructed migration flows between countries using United Nations International Migrant Stock Data (United Nations 2019) following Windzio (2018). We calculated the sent-home ratio (SHR) for all relevant years as a "share of emigrants from a sending country at the overall population in the sending country at time t" (Windzio 2018, 22). We created a binary directed network of migration flows between the sample countries by counting SHRs as relevant flows between countries for countries with an SHR ≥1 SD above the mean, which we assigned a value of 1. Other flows were assigned a 0 value.

Independent variables

Social expenditure

Social spending was the main independent variable. The total social expenditure indicator (excluding healthcare) from the ILO database (ILO 2017, 2021) provided information on spending as a percentage of GDP.[3] Where spending data for the observation year were not available, the nearest observation year (±5 years) was used. In a small number of cases, single data points were missing; therefore, single mean value imputation was used to fill these gaps.

GDP per capita

Log-transformed, purchasing power-adjusted GDP per capita was used for each sample country for the respective analysis year (World Bank 2022).

Democracy

Data collected by the Varieties of Democracies project (V-Dem) were used as a democracy indicator (Coppedge et al. 2022). This project uses expert evaluations of government systems to measure core democratic principles (electoral, liberal, participatory, deliberative, and egalitarian principles). We simplified these multifaceted measures. Principal factor analysis of the five core principles produced a one-factor solution that explained 97% of the variance. We used these factor scores as an overall democracy measure in each country in 2000, 2010, and 2019.

Geographic distance

Another indicator derived from the migration gravity model was the geographic distance between countries. The log-transformed distance between the most populated cities in each country, taken from the CEPII GeoDist database (Mayer and Zignago 2011), was used.

Population size

Larger countries can produce and receive more migration flows. Therefore, all models were controlled for log-transformed population size in the analysis year.

Common spoken language

The indicator for common spoken language was taken from Mélitz and Toubal (2014); they gathered information from various sources on the share of people in countries worldwide who speak a common language. They identified forty-two relevant languages and imposed a rule that at least 4% of the people in two countries must speak the same language for it to be included. This indicator essentially denotes the overlap in the populations in a country pair—people who could communicate using the same language—and ranges from 0 (none) to 1 (complete).

Bilateral visa requirements

As a crude measure of migration regulations, bilateral visa requirements between sample countries were included. Data were obtained from the DEMIG visa database (DEMIG 2015b).[4] This information was included as a dyadic covariate, with origin countries recorded in rows and destination (visa-issuing) countries recorded in columns. The columns indicated the origin countries subject to a visa (1) and not subject to a visa (0). Each combination with a value of 1 was considered an indicator of stronger migration restrictions.

Bilateral labor agreements

As an alternative measure of migration regulation, bilateral labor agreements—compiled by Chilton and Woda (2022)—were included as a dyadic variable. We only focused on whether such agreements existed or had existed in the past, which were assigned a value of 1. Other cases were given a 0 value.

Aggregated migration preferences

Attitude data in the Gallup Word Poll 2008/09[5] (Gallup Inc. 2023) were used to determine the migration preferences of low- and high-skilled groups in origin countries. It asked the question, "Ideally, if you had the opportunity, would you like to move permanently to another country?", and a supplementary question, "Which country would you move to?". The data included responses from people in 136 countries (mean sample size of 1,180), which identified 189 destination countries. With education information unavailable for many countries, household income quintiles were used as a proxy for skills levels, with the three lowest quintiles (i.e. lowest 60% of incomes) coded as "low-income" and the two upper quintiles as "high-income." Each country sample was divided into low- and high-income respondents. For each country, the number of responses for each destination country was counted, and the share of the subgroup N in each country was calculated. Separate 160 × 160 matrices for the low- and high-income groups were created and included as a dyadic covariate in the ERGM analysis.

All continuous indicators (social expenditure, log(population size), ln(GDP), geographic distance, common spoken language, and migration preferences) were z-standardized. Descriptive statistics for the main explanatory variables for the cross-sectional and reduced longitudinal sample are shown in Tables 1 and 2. (Additional descriptive statistics are provided in Tables A1.1 and A1.2 in the supplementary materials.) Figure 1 shows the raw and transformed variable distributions. Appendix A1 provides details of the countries included in the analyses and descriptive statistics by country.

Modeling migration flows

We used ERGMs (Lusher, Robins, and Koskinen 2013; Wasserman and Pattison 1996) to model the network ties of the migration flow network. These models can identify structural patterns that are over- or under-represented in a given network (Müller, Grund, and Koskinen 2018). Inferences on the deviation of a network tie formation process from independence can then be made (Müller, Grund, and Koskinen 2018). Each hypothesis implies a slightly different tie-generating mechanism. For example, if migration flows from lower GDP to higher GDP countries, this should

Table 1. Country descriptive statistics cross-sectional analysis (2019) (N = 160).

Variable	Mean	SD
Social expenditure (% of GDP)	6.83	6.18
GDP per capita (international US$)	22,140.66	22,277.42
Ln(GDP)	9.42	1.20
Population	47,441,905.70	159,201,997.15
Log(Population)	16.28	1.64
Democracy score	0.00	1.00

Table 2. Country descriptive statistics longitudinal analysis (2010–2019) (N = 118).

	Year		
Variable	**2000**	**2010**	**2019**
Social expenditure (% of GDP)			
Mean	9.78	11.86	8.15
SD	7.54	8.52	6.45
Population (absolute)			
Mean	36,536,930.56	40,495,750.03	44,047,060.76
SD	121,981,831.58	129,963,481.30	137,238,572.80
Log(Population)			
Mean	16.08	16.21	16.31
SD	1.62	1.62	1.62
GDP per capita (intern. US$)			
Mean	11,852.85	18,833.09	25,705.90
SD	11,707.98	16,881.85	22,278.52
Ln(GDP per capita)			
Mean	8.83	9.37	9.69
SD	1.14	1.10	1.09
Democracy score			
Mean	0.19	0.19	0.15
SD	1.03	1.02	1.04

produce an over-representation of ties directed from low GDP nodes to high GDP nodes in our observed migration flow network.

Structural effects

Structural effects in ERGMs can capture the underlying regularities of a network. Based on previous research on two-way migration flows (Kreickemeier and Wrona 2017), a reciprocity effect was included to evaluate whether a new network tie between nodes with a tie was more likely. We also assumed that the network of flows had a hierarchical structure due to popularity differences between countries and modeled these based on previous research (Leal 2021; Müller, Grund, and Koskinen 2018). A two-path effect was included, which modeled countries' tendencies toward strong outflows. Second, alternating in- and out-star statistics (geometrically weighted in- and out-degree, α = .693) were included, which modeled whether additional flows were concentrated in countries with many flows directed to or from them. Lastly, we included effects for transitive ties to gauge flow being directed via another node (GWESP, α = .693) and cyclic ties to model local hierarchy effects, which represented patterns of migration flows that do not show circular movements (Igarashi 2013).

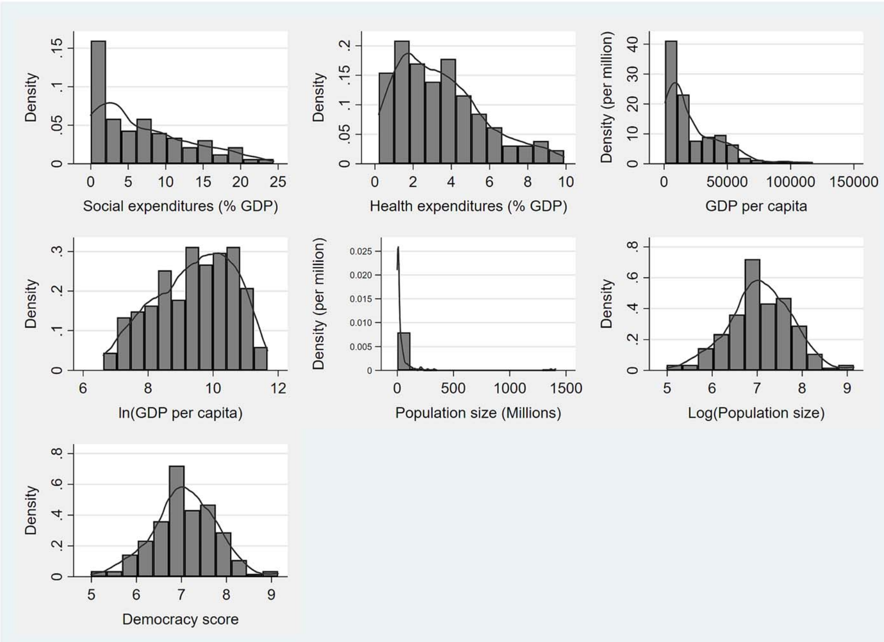

Figure 1. Distributions of main explanatory variables in the 2019 sample ($N = 160$).

Origin, destination, and similarity and difference effects

An important feature of ERGMs is that conditions in origin and destination countries and their effects on migration flows can be modeled simultaneously. Thus, node characteristics can be modeled as a push factor associated with higher outflows, which we term a “sender effect.” Alternatively, the same characteristic can be modeled as a pull factor associated with higher inflows. Lastly, we can also model flows between countries as a function of their similarity or differences. If flows are more likely between countries with more similar node variables, this is termed a “homophily effect,” while the opposite is termed a “heterophily effect.” In our models, origin, destination, and difference effects were included for the covariates of welfare spending, GDP, population size, and democracy.

Modeling strategy

We first examined the differences between an ERGM[6] and a simpler logistic regression model that did not consider network dependencies, assuming flows to be independent. We ran a basic gravity model that predicted migration flows based on population size, geographic distance, and social spending indicators in the origin and destination countries. The ERGM added the structural network parameters described in the previous section. We then compared the average marginal effects (AMEs) of the model specifications and the goodness-of-fit indicators to highlight differences.

We then undertook stepwise modeling, with four different models for each spending indicator (social and healthcare expenditures). We first modeled the predicted flows based on population size, geographic distance, GDP, and social spending to identify the net attraction effect of welfare spending (Model 1). We then expanded the model (Model 2) by including statistical controls for democracy, common spoken language, visa restrictions, and bilateral labor agreements. Two further models were used that included aggregated migration preferences from respondents with lower-income (Model 3) and higher-income (Model 4) profiles to examine whether social spending effects are mediated by these preferences.

As a robustness check, simplified temporal exponential random graph models (TERGMs) (Leifeld, Cranmer, and Desmarais 2018) were used for 2000, 2010, and 2019 to examine the migration process time-ordering. While this did not solve potential endogeneity issues with the spending indicators and migration flows (e.g., reverse causation, with migration flows affecting welfare spending), it did mitigate some of these concerns. Specifically, conditioning the history of migration between countries captured effects, including diasporas in destination countries that make future immigration more likely (Beine, Docquier, and Özden 2011) and should capture potential spending effects in previous years. Research has shown that immigration effects on social expenditure are small and can produce spending decreases (Soroka et al. 2016) and increases (Fenwick 2019).

The covariates of population size, GDP, spending indicators, democracy, geographic distance, and common spoken language were included in these models. Temporal network terms controlling for dyadic stability (pattern of edges remaining stable) or dyadic innovation (new edges created where none existed) were also included. In contrast to the cross-sectional ERGM, network density varied over time. The other network terms remained the same.

Confounding or mediating effects

The assumption underlying the inclusion of the statistical control variables was that they function as potential confounders. However, causal inference literature (Pearl 2000; Pearl and MacKenzie 2017) has suggested that not all variables are confounders but are instead mediators. Interpreting changes in effect sizes, including reduced effects from social spending, is critically dependent on the causal paths of the model variables. For a variable to be a confounder, a "forking" structure of causal paths must be present (A←B→C, where variable B affects A and C simultaneously) (Pearl and MacKenzie 2017). For example, if social expenditure (A) affects immigration (C) (A→C), then for democracy (B) to be a confounder, it must affect both social expenditure and immigration. Alternatively, a "chain" pattern (A→B→C) could indicate that B mediates the effect of A on C.[7] In our example, controlling for democracy would reduce the social expenditure effect, as democracy is the proximate cause of immigration. To convincingly argue that all statistical control variables are confounders, it must be demonstrated that the causal path from the third variable (B) is directed toward the focal variable (A) rather than the reverse. The causal path direction from B to C is the same for both mediation and confounding. There was little concern with the variables of geographic distance, bilateral visas, labor agreements, and common spoken language, as these are exogenous or are measured before any of the other covariates. Therefore, these are not discussed here.

Network structural effects, including two-paths, alternating in- and out-stars, and transitive and cyclic tie parameters, were assumed to capture unobserved network dependencies. These dependencies can occur from network effects or factors, including geographic proximity, shared climatic conditions, previous trade relationships, and coordinated policies. They indicate an unobserved hierarchy of attraction (Leal 2021). These unobserved dependencies are assumed to be confounders, affecting observed variables and migration flows simultaneously. Some may be mediators, not confounders. However, even after accounting for exogenous attraction measures, network dependency effects usually remain, indicating other unobserved sources of dependency.

Population size, GDP, and democracy effects on social expenditure are complex. Social spending may increase health and longevity (Reynolds and Avendano 2018), potentially affecting population size. However, this impact is long term, making short-term mediation unlikely. Population growth effects on economic growth, necessary for social expenditure, are debated (Peterson 2017). Large working-age populations generally favor economic output (GDP); social expenditure is a derived measure of GDP, suggesting causation between GDP and social expenditure (Haelg, Potrafke, and Sturm 2022). However, whether high social spending deters economic growth is contested (Barro 1996; Cammeraat 2020). Thus, the paths of population size→GDP and GDP→social expenditure are plausible, while social expenditure→population size or social expenditure→GDP are less so.

Increased welfare spending can reduce armed conflict (Justino and Martorano 2018), and in less-developed countries, democracy can yield higher social spending (Ha 2015). However, intermediate democracy levels may produce smaller government spending (Plümper and Martin 2003). Overall, evidence for social expenditure→democracy is less plausible than democracy→social expenditure. Therefore, while we could not discount the statistical controls acting as mediators, causal paths from the statistical controls toward social spending were more plausible.

Results

Exponential random graph models are better at predicting migration flows

We compared the performance of simple logistic regression models and an ERGM using only simple gravity model predictors and the social expenditure variable (Tables A2.1 and A2.2, supplementary materials). The results showed that larger countries produce less migration and receive more migration, higher GDP reduces migration outflows and increases inflows, and migration flows are more likely in closer proximity. We found that there are initial attraction effects from welfare spending, but these reduce after controlling for GDP. Crucially, omitting network structural parameters produced a strong overestimation of GDP and social spending effects (De Nicola et al. 2023; Lee and Ogburn 2021). Furthermore, the explanatory power, indicated by the Akaike information criterion and Bayesian information criterion goodness-of-fit indicators, was higher for the models that included the network parameters (Table A4, supplementary materials).

The explanatory power of social spending as a migration attractor is low

We evaluated the explanatory power of social expenditure beyond what can be explained by gravity model variables. To enable model comparisons, AMEs were calculated. The effects were interpreted as changes in the probabilities (*ceteris paribus*) of observing a migration flow given a covariates SD change (Table 3).

Regarding the social expenditure focal variable (Model 1), when not controlling for GDP, an increase of 1 SD in social spending in origin countries decreased the migration outflow probability by 4% (AME = −0.04, $P \leq .001$); in comparison, an increase in social spending in destination countries increased the migration inflow probability by 2% (AME = 0.02). However, the effect was marginally significant at the 10% level. Therefore, social spending attraction effects mainly reflect economic differences between countries that are largely not attributable to welfare spending. After including additional control variables in the model (Model 2), social expenditure had no statistically significant effect on migration inflows (assuming that the statistical controls act as confounders). Thus, we refute the WMH (H1) regarding overall social expenditure.[8] However, we can confirm hypothesis H2, as previously identified by Kureková (2013) for Eastern Europe.

The control variable effects indicate that democratic countries[9] attract immigration net of other model variables (AME = 0.02, $P \leq .001$), and migration flows are more likely between origin and destination countries with a common spoken language (AME = 0.03, $P \leq .001$). Migration flows are significantly more likely between proximate origin and destination countries. However, no significant effects regarding visa restrictions or bilateral labor agreements were found.

Social spending effects on migration flows indicate homophily

Regarding social spending difference effects, positive effects signify heterophily, and negative effects indicate homophily. If migration flows occur between countries with similar spending profiles, this would indicate that the WMH has a weak explanatory power. The effects in Models 1

Table 3. Predictors of migration flows between 160 countries in 2019 (focal variable: total social expenditures).

	Model 1	Model 2	Model 3	Model 4
	AME	AME	AME	AME
Mutual ties	0.17**	0.14*	0.13**	0.14**
	(0.06)	(0.06)	(0.05)	(0.05)
Two-path	−0.04***	−0.03***	−0.02***	−0.03***
	(0.01)	(0.01)	(0.01)	(0.01)
Geometrically weighted in-degree (α = .693)	−0.04	−0.05	−0.07**	−0.06**
	(0.03)	(0.03)	(0.03)	(0.03)
Geometrically weighted out-degree (α = .693)	0.02	0.01	0.00	0.00
	(0.03)	(0.02)	(0.02)	(0.02)
Geometrically weighted edgewise shared partners (α = .693)	0.10***	0.08***	0.06***	0.07***
	(0.01)	(0.02)	(0.01)	(0.01)
Cyclic triples	−0.04	0.00*	0.00	0.00
	(0.09)	(0.08)	(0.08)	(0.08)
Log(Pop.size) sender (out-degree)	−0.10***	−0.09***	−0.09***	−0.09***
	(0.02)	(0.03)	(0.02)	(0.02)
Log(Pop.size) receiver (in-degree)	0.16***	0.16***	0.12***	0.13***
	(0.02)	(0.03)	(0.02)	(0.02)
Difference Log(Pop.size)	−0.07**	−0.07**	−0.05*	−0.06**
	(0.02)	(0.03)	(0.02)	(0.02)
Log(GDP pc) sender (out-degree)	−0.04**	−0.04**	−0.04**	−0.04**
	(0.01)	(0.01)	(0.01)	(0.01)
Log(GDP pc) receiver (in-degree)	0.13***	0.10***	0.07***	0.08***
	(0.02)	(0.02)	(0.01)	(0.01)
Difference Log(GDP pc)	−0.05**	−0.04*	−0.04**	−0.04**
	(0.02)	(0.02)	(0.01)	(0.01)
Social expenditure sender (out-degree)	−0.04***	−0.03*	−0.02+	−0.03*
	(0.01)	(0.01)	(0.01)	(0.01)
Social expenditure receiver (in-degree)	0.02+	0.01	0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.01)
Difference social expenditure	−0.03*	−0.02+	−0.03**	−0.03*
	(0.01)	(0.01)	(0.01)	(0.01)
Democracy sender (out-degree)		−0.01	−0.02*	−0.01+
		(0.01)	(0.01)	(0.01)
Democracy receiver (in-degree)		0.02***	0.02**	0.02**
		(0.01)	(0.01)	(0.01)
Difference democracy		−0.01	−0.01	−0.01
		(0.01)	(0.01)	(0.01)
Log(Geographic distance)	−0.08***	−0.06***	−0.05***	−0.06***
	(0.00)	(0.01)	(0.00)	(0.00)
Common language spoken		0.03***	0.02***	0.03***
		(0.00)	(0.00)	(0.00)
Visa restrictions		−0.02	−0.02+	−0.02
		(0.01)	(0.01)	(0.01)
Bilateral labor agreement		−0.04	−0.02	−0.02
		(0.03)	(0.02)	(0.02)
Migration preferences (low income)			0.02***	
			(0.00)	
Migration preferences (high income)				0.01***
				(0.00)

Notes: Average marginal effects (AMEs) based on ERGMs of directed ties in migration flow networks. Standard error in parentheses. The underlying continuous variables in the model are z-standardized. Therefore, each percentage-point change in AMEs refers to a standard deviation increase for continuous covariates and a one-unit increase for binary coded variables (mutual visa restrictions and bilateral labor agreements). $^{***}P \leq .001$, $^{**}P \leq .01$, $^{*}P \leq .05$, $+P \leq .10$.

Table 4. Mediation analysis of social expenditure, population size, and GDP receiver effects, based on models 3 and 4 (analysis with focal variable social expenditure).

	Mediator	
	Migration preferences (low income)	**Migration preferences (high income)**
Social expenditure receiver		
Total effect	0.01 (0.01)	0.01 (0.01)
Partial effect	0.01 (0.01)	0.01 (0.01)
Indirect effect	0.00 (0.01)	0.00 (0.01)
Proportion of total effect mediated via mediator	0.20	0.19
Log(Population size) receiver		
Total effect	0.16 (0.03)***	0.16 (0.03)***
Partial effect	0.12 (0.02)***	0.13 (0.02)***
Indirect effect	0.04 (0.01)***	0.03 (0.01)***
Proportion of total effect mediated via mediator	0.26	0.17
Log(GDP pc) receiver		
Total effect	0.10 (0.02)***	0.10 (0.02)***
Partial effect	0.07 (0.01)***	0.08 (0.02)***
Indirect effect	0.03 (0.01)***	0.02 (0.01)***
Proportion of total effect mediated via mediator	0.28	0.20

Notes: Coefficients are average marginal effects (AME); standard error in parentheses; ***$P \leq .001$, **$P \leq .01$, *$P \leq .05$, +$P \leq .10$.

and 2 were consistently negative (Table 3), although the significance reduced as more control variables were added (Model 1 AME = −0.03, $P \leq .05$; Model 2 AME = −0.02, $P \leq .10$). These homophily effects support hypothesis H3, suggesting that migrants favor destination countries with social security and healthcare systems comparable to their origins. This is not consistent with the WMH.

Social spending effects are not mediated by aggregated migration preferences

We examined whether any of the welfare spending indicator attraction effects were mediated by migration preferences. Separate mediation analyses (based on Models 3 and 4) (Table 3) for both low- and high-income groups were conducted. Table 4 shows the mediation results for social expenditure, GDP, and population size.

No significant mediation of social spending attraction effects via migration preferences was found because the total effect of social expenditure was not significant. These results do not confirm hypotheses H1.1 or H1.2. However, migration preferences did partially mediate population size and GDP attraction effects. After including migration preferences, the population size effect reduced from 0.16 to 0.12 (low-income) and 0.16 to 0.13 (high-income). The measured indirect effects (low-income AME = 0.04, $P \leq .001$; high-income AME = 0.03, $P \leq .001$) were significant. Similarly, the GDP effect reduced from 0.10 to 0.07 (low-income) and 0.08 (high-income). These indirect effects were also significant.

Individual migration preferences predict observed migration flows (see Table 3). However, preferences are informed by less subtle country characteristics than welfare spending indicators. Low- and high-income groups choose the most populous and economically strong countries (there were no strong differences between these indirect effects). These are readily observable characteristics, and migration preferences partially mediate these effects. These findings do not support the WMH as low- and high-income groups do not express differentiated migration preferences.

Longitudinal evidence

We analyzed longitudinal data for 2000, 2010, and 2019 using a simplified model and a smaller country sample. The full model results are reported in the supplementary materials—see Table A5.1 (social expenditure) and A5.2 (healthcare expenditure). The following discussion is limited to the most relevant findings.[10]

The longitudinal results largely confirmed the previous findings. The network effects results mirrored the results for reciprocity in migration flows, negative two-path effects, and positive transitivity effects, largely confirming the migration flow network hierarchy. In contrast, the TERGM results indicated positive cyclical triad effects. The temporal network terms effects indicated strong dyadic stability rather than innovation of edges.

The gravity model variable effects were consistent with the cross-section ERGM results: Countries with large populations are more likely to receive immigration and less likely to produce migration. The negative effects of geographic distance and the positive effects of common spoken language were confirmed. Increased GDP was associated with decreased out-migration in origin countries, while higher GDP attracted more migration to destination countries. Also, higher democracy levels were associated with higher immigration.

Regarding social expenditure, there was no significant receiver effect when controlling for GDP. Therefore, the TERGM results do not confirm the WMH (H1). As before, a significant negative sender social expenditure effect was found that remained robust after controlling for GDP, confirming H2. In addition, the homophily pattern (H3) for social expenditure was replicated, as shown by the negative difference effect.

Using healthcare spending as a focal variable, small, positive, and significant healthcare spending effects in destination countries were found, which remained significant after controlling for GDP and other covariates, confirming H1. Countries with higher healthcare spending experienced less out-migration, confirming H2. The TERGM results did not show a significant difference effect, thus rejecting H3. However, these effects can be misleading if the overall probabilities of migration flows between countries with different spending levels are not accounted for. As figure 1 shows, a WMH interpretation does not fit the results well (to place effect sizes in context, the social and healthcare spending effects are shown).

Figure 2 shows the predicted probabilities of migration flows between origin and destination countries with different social (left) or healthcare (right) spending levels. The left side of each graph shows migration flows from low-spending countries (<−1 SD below sample mean) directed toward destination countries with different spending levels (low to high). The right side of each graph shows probabilities of migration flows from high-spending countries (>+1 SD above sample mean).

Both plots show similar patterns. Regarding the predictions for social expenditure effects, there was no strongly pronounced pattern that would indicate that flows are predominantly directed toward higher or highest-spending countries. Migration flows from the highest-spending countries were more likely to be directed toward high-spending countries. Countries with high social spending rarely produce sizeable migration flows toward low-spending countries. Regarding healthcare expenditure effects, there was a slightly more pronounced probability of migration flows from low-spending countries toward high-spending countries. Overall, the probabilities were low. In contrast, the probability of migration flows from high healthcare–spending countries to lower-spending countries was virtually zero. Migration was strongly dominated by flows between countries with high social and healthcare expenditure levels and less by migration from low-spending toward high-spending countries.[11] As such, the WMH has little explanatory power.

Discussion and conclusions

Our analysis applied several approaches to examine the WMH's overall explanatory power. This included attraction effects, structural dependencies between flows, and whether migration preferences can explain attraction effects (see Table 5 for a schematic overview).

Table 5. Summary of hypotheses and findings.

Hypothesis	Expected according to WMH	ERGM 2019		TERGM 2000–2019	
		Social expenditures	Health expenditures	Social expenditures	Health expenditures
H1: Welfare spending in destination countries increase inflows (welfare magnet hypothesis)	Yes	Not confirmed	Confirmed	Not confirmed	Confirmed
H1.1: Attractive effects of spending are mediated by preferences of low-income group (positive indirect effect)	Yes	Not confirmed	Not confirmed	Not tested	
H1.2: Attractive effects of spending are mediated by preferences of low-income group (negative indirect effect)	Yes	Not confirmed	Not confirmed	Not tested	
H2: Spending in origin countries decreases outflows	Not specified	Confirmed	Confirmed	Confirmed	Confirmed
H3: Flows more likely between countries with similar spending levels	No	Confirmed	Confirmed	Confirmed	Not confirmed

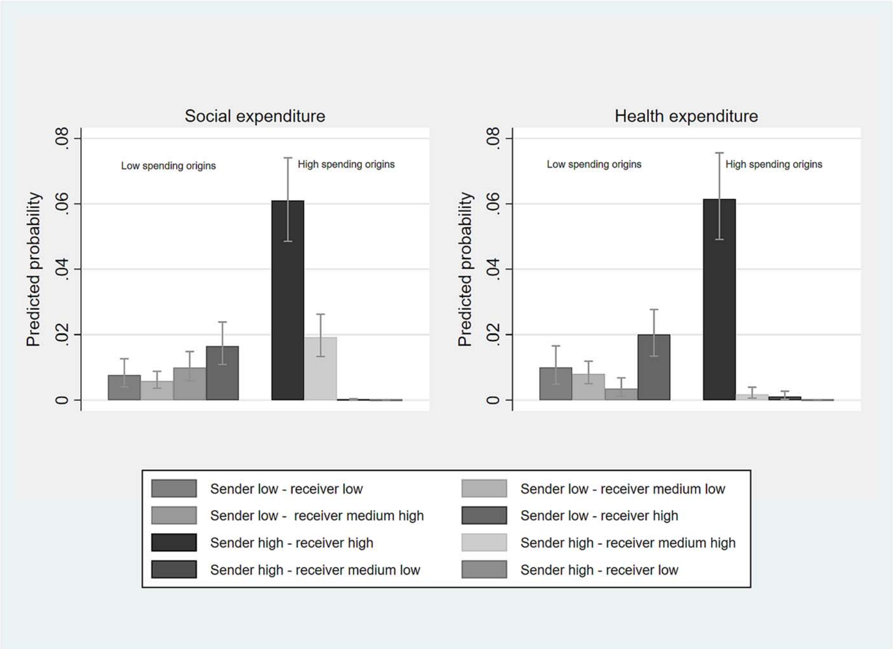

Figure 2. Predicted probabilities of migration flows from origin countries with low (below or at sample mean, left side of each graph) or high expenditure levels (above sample mean, right side of each graph) given destinations with different spending levels (low = minimum up to −1 SD; med. low = −1 SD up to mean; medium high = mean up to +1 SD; high = spending above +1 SD). Predictions based on stability models, controlling for all covariates. Estimates and confidence intervals based on bootstrapping (1,000 draws).

We modeled migration flows between 160 countries and predicted their occurrence based on social expenditure in these countries using various statistical controls. Analyzing migration flows as a network and treating all countries as possible origins and destinations enabled us to investigate the broader context and account for dependencies between migration flows, which have often been ignored in other studies.

Our results show that ERGMs provide a better fit than simpler logistic models, which ignore these dependencies. In these simpler models, economic differences and social spending effects were overestimated, creating a bias toward the WMH.

The study does not support an overall social spending attraction effect in destination countries (H1) after adjusting for differences in population size, GDP, geographic distance, democracy levels, common spoken language, visa restrictions, and bilateral labor agreements. Additional analyses showed a small attraction effect regarding healthcare spending, but goodness-of-fit assessments provided no meaningful improvement over simple gravity models without social spending indicators (see supplementary materials, Table A4). The results also support hypothesis H2, aligning with Kureková (2013).

Furthermore, the study supports hypothesis H3, providing further evidence against the WMH. From a welfare magnet perspective, migration should flow from very low-spending to very high-spending countries, maximizing welfare pay-offs. However, our results support the status maintenance motive, with migrants moving to destinations with the same level of social security.

Hypotheses H1.1 and H1.2 state that the migration preferences of low-skill (low-income) groups should at least partially explain welfare spending attraction effects in destination countries. However, no such effect was found. In contrast, population size and GDP effects were partially mediated by these preferences. This supports the idea that migration decisions are based on broadly observable country differences rather than welfare spending differences.

Longitudinal analyses using TERGMs addressed endogeneity concerns related to potential reverse causation. The findings broadly align with the cross-sectional results. Hypothesis H1 is not confirmed, H2 is supported, and H3 is maintained.

Additional healthcare spending analyses showed a small attraction effect but no significant homophily effect, providing limited support for the WMH. Longitudinal model predictions indicated that most migration flows occurred between high social- and healthcare-spending countries, with some flows from low to high healthcare-spending origins. However, the pattern does not suggest that healthcare spending in destination countries is a major migration driver.

How should the WMH be evaluated? None of the social expenditure hypotheses were confirmed. However, additional healthcare expenditure analyses did show small and consistent attraction effects in both the cross-sectional and longitudinal models, offering some support for the WMH. While these effects were weak and did not substantially improve model fit, welfare policies, at least for healthcare spending, may have a limited influence on migration. Furthermore, as the TERGM predictions show, the highest migration flow probability is between high-spending countries, considerably weakening the WMH. Lastly, while the mediation analyses show that migration preferences have a predictive value for observed migration flows, low- and high-income group preferences did not differ sufficiently to reveal the nuances of welfare spending in destination countries. In conclusion, while the WMH has some (weak) empirical support from the healthcare domain, it does not explain global migration flows. Compared to other explanatory factors (population size, GDP, geographic distance, common spoken language, and democracy levels), welfare spending is a weak migration pull factor at best. We did not examine skills-selection effects predicted by the WMH, which have been confirmed previously (Brücker et al. 2012; Razin and Wahba 2015). Future research could apply network modeling to differentiate high-skilled and low-skilled migration using the approach demonstrated here.

This study has several limitations: (1) Following accepted practice, we constructed migration flows from observed differences in migrant stocks; however, data on annual net flows may be better suited to migration flow networks;[12] (2) As flows were normalized by origin country population sizes and only flows exceeding 1 SD above average were considered, this may give greater weight to smaller countries—the strong population size effects may be explained accordingly. Future research could address this by analyzing valued networks (Krivitsky 2012). (3) As our data provide snapshots of migration stocks, we could not address the issue of return migration (Entwisle, Verdery, and Williams 2020), whereby social spending may not attract immigrants but enable them to stay in certain destinations. (4) We used TERGMs as a robustness check to address endogeneity issues on the causal direction of welfare spending and migration flows; however, we cannot discount reverse causation of the small remaining effects. Previous research has found that immigration affects welfare spending in positive and negative directions, but these effects are small and occur over long timeframes (Fenwick 2019; Soroka et al. 2016). However, alternative modeling frameworks, including stochastic actor-oriented models, may be better (Block et al. 2017). (5) We considered confounding and mediating effects and found that while some covariate effects could be mediators, empirical evidence suggests that their role as confounders is more plausible. Future work could justify a stronger causal interpretation of the observed effects; for example, by using instrumental variable techniques (Boehmke, Chyzh, and Thies 2016; Windzio 2015).

Endnotes

1. "Welfare magnet hypothesis" and "welfare migration" are interchangeable and refer to migrants making decisions based on welfare benefit provision (Kahanec and Guzi 2022).
2. These control variables are not exhaustive. We chose confounders from the economic migration literature that are available for most countries.

3. As Massey and Espinosa (1997) showed, healthcare access may be more important than welfare benefit access. Therefore, we conducted analyses using total healthcare expenditure (% of GDP) as an indicator using ILO data (ILO 2017, 2021) (see supplementary materials, Tables A2.2, A3.2 and A5.2).
4. More comprehensive databases exist, including the DEMIG (DEMIG 2015a) and IMPIC (Bjerre et al. 2016). However, these databases do not cover the full timeframe or contain information on a more limited sample of countries.
5. Despite the lag between measuring preferences and observed flows, its inclusion is useful. Flows are derived from migrant stocks accumulated over a longer period and are unlikely to change suddenly. Previous studies have shown that overall migration flows are stable (Fagiolo and Mastrorillo 2013; Windzio 2018), suggesting a stable set of underlying migration preferences.
6. We used MPNet (Wang et al. 2014) initially. Further modeling in R used the "ergm" package (Hunter et al. 2008; Krivitsky et al. 2023). Average marginal effects were calculated using the "ergMargins" package (Duxbury 2021).
7. A collider effect (A→C←B) introduces a spurious correlation between social expenditure and immigration when controlling for democracy. This effect is not considered.
8. For healthcare expenditure, we observed a significant positive attraction effect in destinations (AME = 0.04, $P \leq .01$)—after controlling for other covariates—in line with H1 (see supplementary materials).
9. A high correlation between social and healthcare expenditures, GDP, and democracy may create collinearity issues (Vögtle and Windzio 2022). While the correlations were high, collinearity issues were not found.
10. This robustness check used the same covariates as the TERGM sample. Compared with the cross-section analysis, the results pattern was broadly the same, with minor differences: The triadic closure pattern (GWESP) was confirmed, but no negative effect for cyclic triples was observed. In the social expenditure model, the result pattern was the same for the remaining covariates. In the healthcare expenditure model, the GDP effect on inflows was insignificant, the healthcare expenditure effect was small but significant, and the democracy effect was positive but insignificant. Therefore, the results are broadly robust, but sample size changes produced some differences, with social/healthcare spending effects having a larger role.
11. These findings mirror observations from the latest World Migration Report (McAuliffe et al. 2021). On a global perspective, migration between wealthy origins and destinations is more likely than migration from the poorest to wealthiest countries.
12. Flow data collection is challenging as many countries do not keep robust departure records. For example, the UN DESA Migration Database only contains information for forty-five countries (McAuliffe et al. 2021).

About the author

Tim Müller conducted the current study while leading the Junior Research Group "Migration and the Welfare State" at the Berlin Institute for Integration and Migration Research (BIM), Humboldt-University Berlin. His research focuses on migration and integration, quantitative methods, and social psychological approaches. He is currently working as an independent researcher and data scientist.

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Supplementary material

Supplementary material is available at *Social Forces* online.

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Data availability

Data are available on request.

References

Agersnap, Ole, Amalie Jensen, and Henrik Kleven. 2020. "The Welfare Magnet Hypothesis: Evidence from an Immigrant Welfare Scheme in Denmark." *American Economic Review: Insights* 2:527–42. https://doi.org/10.1257/aeri.20190510.

Anderson, James E. 2011. "The Gravity Model." *Annual Review of Economics* 3:133–60. https://doi.org/10.1146/annurev-economics-111809-125114.

Azad, Kalam, and Gamal Atallah. 2019. "Migration and Democracy." In *Proceedings of the 20th Congress of the International Ergonomics Association (IEA 2018) Volume VIII: Ergonomics and Human Factors in Manufacturing, Agriculture, Building and Construction, Sustainable Development and Mining* 20, 647–661. Cham: Springer International Publishing.

Barnett, George A., and Yoonjae Nam. 2023. "A Network Analysis of International Migration: Longitudinal Trends and Antecedent Factors Predicting Migration." *Global Networks* 24:e12455. https://doi.org/10.1111/glob.12455.

Barro, Robert J. 1996. *Determinants of Economic Growth: A Cross-Country Empirical Study*(NBER Working Paper No. 5698). Cambridge: National Bureau of Economics Research. https://doi.org/10.3386/w5698

Beine, Michel, Frédéric Docquier, and Çağlar Özden. 2011. "Diasporas." *Journal of Development Economics* 95:30–41. https://doi.org/10.1016/j.jdeveco.2009.11.004.

Beine, Michel, Simone Bertoli, and Jesús Fernández-Huertas Moraga. 2016. "A Practitioners' Guide to Gravity Models of International Migration." *The World Economy* 39:496–512. https://doi.org/10.1111/twec.12265.

Belot, M., and T. Hatton. 2012. "Immigrant Selection in the OECD." *The Scandinavian Journal of Economics* 114:1105–28.

Bjerre, Liv, Marc Helbling, Friederike Römer, and Malisa Zobel 2016. *Technical Report: The Immigration Policies in Comparison (IMPIC) Dataset*. WZB Discussion Paper No. SP VI 2016-201. Berlin: Wissenschaftszentrum Berlin für Sozialforschung.

Blauberger, Michael, and Susanne K. Schmidt. 2014. "Welfare Migration? Free Movement of EU Citizens and Access to Social Benefits." *Research & Politics* 1:1–7. https://doi.org/10.1177/2053168014563879.

Block, Per, Johan Koskinen, James Hollway, Christian Steglich, and Christoph Stadtfeld. 2017. "Change We Can Believe In: Comparing Longitudinal Network Models on Consistency, Interpretability and Predictive Power." *Social Networks* 52:180–91. https://doi.org/10.1016/j.socnet.2017.08.001.

Boehmke, Frederick J., Olga Chyzh, and Cameron G. Thies. 2016. "Addressing Endogeneity in Actor-Specific Network Measures." *PSRM* 4:123–49. https://doi.org/10.1017/psrm.2015.34.

Boeri, Tito, Gordon Hanson, and Barry McCormick (eds.) 2002. In *Immigration Policy and the Welfare System: A Report for the Fondazione Rodolfo Debenedetti*. Oxford: Oxford University Press. https://econpapers.repec.org/bookchap/oxpobooks/9780199256310.htm. https://doi.org/10.1093/oso/9780199256303.001.0001

Borjas, George J. 1989. "Economic Theory and International Migration." *International Migration Review* 23:457–85. https://doi.org/10.1177/019791838902300304.

Borjas, George J. 1994. "The Economics of Immigration." *Journal of Economic Literature* 32:1667–717 http://www.jstor.org/stable/2728791.

Borjas, George J. 1999. "Immigration and Welfare Magnets." *Journal of Labor Economics* 17:607–37. https://doi.org/10.1086/209933.

Breen, Richard, and John H. Goldthorpe. 1997. "Explaining Educational Differentials." *Rationality and Society* 9:275–305. https://doi.org/10.1177/104346397009003002.

Brücker, Herbert, Simone Bertoli, Giovanni Facchini, Anna M. Mayda, and Giovanni Peri 2012. "The Determinants of Highly Skilled Migration: Evidence from OECD Countries 1980–2005". In *Brain Drain and Brain Gain*, edited by Tito Boeri, Herbert Brücker, Frédéric Docquier, Hillel Rapoport, pp. 66–105. Oxford: Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199654826.003.0005.

Cammeraat, Emile. 2020. "The Relationship between Different Social Expenditure Schemes and Poverty, Inequality and Economic Growth." *International Social Security Review* 73:101–23. https://doi.org/10.1111/issr.12236.

Chilton, Adam, and Bartosz Woda. 2022. "The Expanding Universe of Bilateral Labor Agreements." *Theoretical Inquiries in Law* 23:1–64. https://doi.org/10.1515/til-2022-0010.

Coppedge, M., J. Gerring, C. Knutsen, S. Lindberg, S. Skaaning, J. Teorell, D. Altman, M. Bernhard, M. Fish, A. Cornell *et al.* 2022. *V-Dem Dataset* 2022. Varieties of Democracy Project. Gothenburg: University of Gothenburg.

De Giorgi, G., and M. Pellizzari. 2009. "Welfare Migration in Europe." *Labour Economics* 16:353–63. https://doi.org/10.1016/j.labeco.2009.01.005.

de Haas, Hein 2023. *How Migration Really Works: The Facts About the Most Divisive Issue in Politics*. London: Penguin Books.

Dellinger, Fanny, and Peter Huber 2021. *The Impact of Welfare Benefits on the Location Choice of Refugees. Testing the Welfare Magnet Hypothesis*. WIFO Working Papers 626. Vienna: Austrian Institute of Economic Research. https://hdl.handle.net/10419/231466.

DEMIG 2015a. DEMIG POLICY, Version 1.3, Online Edition. www.migrationdeterminants.eu.

DEMIG 2015b. DEMIG POLICY, Version 1.4, Online Edition. www.migrationdeterminants.eu.

Nicola, De, Cornelius Fritz Giacomo, Marius Mehrl, and Göran Kauermann. 2023. "Dependence Matters: Statistical Models to Identify the Drivers of Tie Formation in Economic Networks." *Journal of Economic Behavior & Organization* 215:351–63. https://doi.org/10.1016/j.jebo.2023.09.021.

Deutschmann, Emmanuel 2021. *Mapping the Transnational World. How We Move and Communicate across Borders, and Why It Matters*. Princeton: Princeton University Press. https://doi.org/10.1515/9780691226507

Di Iasio, Valentina, and Jackline Wahba 2022. *"The Determinants of Refugees' Destinations: Where Do Refugees Locate Within the EU?" QuantMig Project Deliverable D3.4*. Southampton: University of Southampton. https://doi.org/10.2139/ssrn.4426438

Dustmann, Christian, and Tommaso Frattini. 2014. "The Fiscal Effects of Immigration to the UK." *The Economic Journal* 124:F593–643. https://doi.org/10.1111/ecoj.12181.

Duxbury, Scott W. 2021. "The Problem of Scaling in Exponential Random Graph Models." *Sociological Methods & Research*. 52:764–802. https://doi.org/10.1177/0049124120986178.

Entwisle, B., A. Verdery, and N. Williams. 2020. "Climate Change and Migration: New Insights from a Dynamic Model of Out-migration and Return Migration." *American Journal of Sociology* 125:1469–512.

Esping-Andersen, G., and G. Standing 1990. *The Three Worlds of Welfare Capitalism* Vol. 1, pp. 71–5. Princeton: Princeton University Press. https://doi.org/10.1177/095892879100100108

Fafchamps, Marcel, and Forhad Shilpi. 2013. "Determinants of the Choice of Migration Destination." *Oxford Bulletin of Economics and Statistics* 75:388–409. https://doi.org/10.1111/j.1468-0084.2012.00706.x.

Fagiolo, Giorgio, and Marina Mastrorillo. 2013. "International Migration Network: Topology and Modeling." *Physical Review E* 88:012812-1–012812-11. https://doi.org/10.1103/PhysRevE.88.012812.

Fenwick, Clare. 2019. “The Political Economy of Immigration and Welfare State Effort: Evidence from Europe.” *European Political Science Review* 11:357–75. https://doi.org/10.1017/S175577391900016X.

Ferwerda, Jeremy, Moritz Marbach, and Dominik Hangartner. 2022. “Do Immigrants Move to Welfare? Subnational Evidence from Switzerland.” *American Journal of Political Science*. 68:874–90. https://doi.org/10.1111/ajps.12766.

Gallup Inc 2023. *Global Research*. Omaha: Gallup Inc. Accessed April 14, 2023. https://www.gallup.com/analytics/318875/global-research.aspx.

Giulietti, Corrado, Martin Guzi, Martin Kahanec, and Klaus F. Zimmermann. 2013. “Unemployment Benefits and Immigration: Evidence from the EU.” *International Journal of Manpower* 34:24–38. https://doi.org/10.1108/01437721311319638.

Guzi, Martin, Martin Kahanec, and Lucia Kureková. 2018. “How Immigration Grease is Affected by Economic, Institutional, and Policy Contexts: Evidence from EU Labor Markets.” *Kyklos* 71:213–43. https://doi.org/10.1111/kykl.12168.

Ha, Eunyoung. 2015. “The Impact of Democracy, Government Ideology, and Globalization on Social Spending in Less Developed Countries.” *International Journal of Comparative Sociology* 56:338–65. https://doi.org/10.1177/0020715215624481.

Haelg, Florian, Niklas Potrafke, and Jan-Egbert Sturm. 2022. “The Determinants of Social Expenditures in OECD Countries.” *Public Choice* 193:233–61. https://doi.org/10.1007/s11127-022-00984-4.

Heitmueller, Axel. 2005. “Unemployment Benefits, Risk Aversion, and Migration Incentives.” *Journal of Population Economics* 18:93–112. https://doi.org/10.1007/s00148-004-0192-3.

Huang, Peng, and Carter Butts. 2023. “Rooted America: Immobility and Segregation of the Intercounty Migration Network.” *American Sociological Review* 88:1031–65. https://doi.org/10.1177/00031224231212679.

Hunter, David, Mark Handcock, Carter Butts, Steven Goodreau, and Martina Morris. 2008. “Ergm: A Package to Fit, Simulate and Diagnose Exponential-Family Models for Networks.” *Journal of Statistical Software* 24:1–29. https://doi.org/10.18637/jss.v024.i03.

Igarashi, Tasuku 2013. “Longitudinal Changes in Face-to-Face and Text Message-Mediated Friendship Networks”. In *Exponential Random Graph Models for Social Networks: Theory, Methods, and Applications*, edited by Dean Lusher, Garry Robins, Johan Koskinen, pp. 248–59. Cambridge: Cambridge University Press. https://doi.org/10.1017/CBO9780511894701.022

ILO 2017. *World Social Protection Report 2017–19: Universal Social Protection to Achieve the Sustainable Development Goals*. Geneva: International Labour Office.

ILO 2021. *World Social Protection Report 2020–22*. Geneva: International Labour Office.

Justino, Patricia, and Bruno Martorano. 2018. “Welfare Spending and Political Conflict in Latin America, 1970–2010.” *World Development* 107:98–110. https://doi.org/10.1016/j.worlddev.2018.03.005.

Kahanec, Martin, and Martin Guzi 2022. “Welfare Migration”. In *Handbook of Labor, Human Resources and Population Economics*, edited by Klaus F. Zimmermann, pp. 1–23. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-57365-6_95-1

Kancs, D., and Patrizio Lecca. 2018. “Long-term Social, Economic and Fiscal Effects of Immigration into the EU: The Role of the Integration Policy.” *The World Economy* 41:2599–630. https://doi.org/10.1111/twec.12637.

Kreickemeier, Udo, and Jens Wrona. 2017. “Two-way Migration between Similar Countries.” *The World Economy* 40:182–206. https://doi.org/10.1111/twec.12377.

Krivitsky, Pavel. 2012. “Exponential-Family Random Graph Models for Valued Networks.” *Electronic Journal of Statistics* 6:1100–28. https://doi.org/10.1214/12-EJS696.

Krivitsky, Pavel, David Hunter, Martina Morris, and Chad Klumb. 2023. “Ergm 4: New Features for Analyzing Exponential-Family Random Graph Models.” *Journal of Statistical Software* 105:1–44. https://doi.org/10.18637/jss.v105.i06.

Kureková, Lucia. 2013. “Welfare Systems as Emigration Factor: Evidence from the New Accession States.” *Journal of Common Market Studies* 51:721–39. https://doi.org/10.1111/jcms.12020.

Lee, Youjin, and Elizabeth L. Ogburn. 2021. "Network Dependence Can Lead to Spurious Associations and Invalid Inference." *Journal of the American Statistical Association* 116:1060–74. https://doi.org/10.1080/01621459.2020.1782219.

Leal, Diego. 2021. "Network Inequalities and International Migration in the Americas." *American Journal of Sociology* 126:1067–126. https://doi.org/10.1086/713877.

Leifeld, Philip, Skyler Cranmer, and Bruce Desmarais. 2018. "Temporal Exponential Random Graph Models with btergm: Estimation and Bootstrap Confidence Intervals." *Journal of Statistical Software* 83:1–36. https://doi.org/10.18637/jss.v083.i06.

Lusher, Dean, Garry Robins, and Johan Koskinen (eds.) 2013. *Exponential Random Graph Models for Social Networks: Theory, Methods, and Applications*. Cambridge: Cambridge University Press. https://search.ebscohost.com/login.aspx?direct=true&scope=site&db=nlebk&db=nlabk&AN=498293.

Massey, Douglas, and Kristin Espinosa. 1997. "What's Driving Mexico-U.S. Migration? A Theoretical, Empirical, and Policy Analysis." *American Journal of Sociology* 102:939–99. https://doi.org/10.1086/231037.

Mayer, Thierry, and Soledad Zignago 2011. *Notes on CEPII's Distances Measures: The GeoDist Database*. CEPII Working Paper No. 2011-25. Paris: Centre d'études prospectives et d'informations internationales.

McAuliffe, M., G. Abel, L. Oucho, and A. Sawyer 2021. "International Migration as a Stepladder of Opportunity: What Do the Global Data Actually Show?" In *World Migration Report 2022*, edited by M, McAuliffe, A, Triandafyllidou, pp. 191–216. Geneva https://publications.iom.int/books/world-migration-report-2022: International Organization for Migration.

McMillan, Cassie. 2024. "Connecting the Dots: Using Social Network Analysis to Disentangle the Factors Driving International Migration." *International Migration* 00:1–17.

Mélitz, Jacques, and Farid Toubal. 2014. "Native Language, Spoken Language, Translation and Trade." *Journal of International Economics* 93:351–63. https://doi.org/10.1016/j.jinteco.2014.04.004.

Müller, Tim, Thomas Grund, and Johan Koskinen. 2018. "Residential Segregation and 'Ethnic Flight' vs. 'Ethnic Avoidance' in Sweden." *European Sociological Review* 34:268–85. https://doi.org/10.1093/esr/jcy010.

Nannestad, Peter. 2007. "Immigration and Welfare States: A Survey of 15 Years of Research." *European Journal of Political Economy* 23:512–32. https://doi.org/10.1016/j.ejpoleco.2006.08.007.

Ortega, Francesc, and Giovanni Peri. 2013. "The Effect of Income and Immigration Policies on International Migration." *Migration Studies* 1:47–74. https://doi.org/10.1093/migration/mns004.

Palmer, John, and Mariola Pytliková. 2015. "Labor Market Laws and Intra-European Migration: The Role of the State in Shaping Destination Choices." *European Journal of Population* 31:127–53. https://doi.org/10.1007/s10680-015-9341-5.

Pearl, Judea 2000. *Causality: Models, Reasoning, and Inference*. Cambridge: Cambridge University Press.

Pearl, Judea, and Dana MacKenzie 2017. *The Book of Why. The New Science of Cause and Effect*. London: Allen Lane.

Pedersen, Peder, Mariola Pytlikova, and Nina Smith. 2008. "Selection and Network Effects—Migration Flows into OECD Countries 1990–2000." *European Economic Review* 52:1160–86. https://doi.org/10.1016/j.euroecorev.2007.12.002.

Peterson, E. 2017. "The Role of Population in Economic Growth." *SAGE Open* 7:2158244017736094. https://doi.org/10.1177/2158244017736094.

Plümper, Thomas, and Christian Martin. 2003. "Democracy, Government Spending, and Economic Growth: A Political-Economic Explanation of the Barro-Effect." *Public Choice* 117:27–50. https://doi.org/10.1023/A:1026112530744.

Ponce, Aaron. 2019. "Is Welfare a Magnet for Migration? Examining Universal Welfare Institutions and Migration Flows." *Social Forces* 98:245–78. https://doi.org/10.1093/sf/soy111.

Razin, Assaf, and Jackline Wahba. 2015. "Welfare Magnet Hypothesis, Fiscal Burden, and Immigration Skill Selectivity." *The Scandinavian Journal of Economics* 117:369–402 http://www.jstor.org/stable/43673708.

Reynolds, Megan, and Mauricio Avendano. 2018. “Social Policy Expenditures and Life Expectancy in High-income Countries.” *American Journal of Preventive Medicine* 54:72–9. https://doi.org/10.1016/j.amepre.2017.09.001.

Soroka, Stuart, Richard Johnston, Anthony Kevins, Keith Banting, and Will Kymlicka. 2016. “Migration and Welfare State Spending.” *European Political Science Review* 8:173–94. https://doi.org/10.1017/S1755773915000041.

Sprenger, Ekaterina. 2024. “What Makes Us Move, What Makes Us Stay: The Role of Language and Culture in Intra-EU Mobility.” *Journal of International Migration and Integration* 25:1825–55. https://doi.org/10.1007/s12134-024-01134-z.

United Nations 2019. *International Migrant Stock 2019*. New York: United Nations, Department of Economic and Social Affairs, Population Division.

Vögtle, Eva Maria, and Michael Windzio. 2022. “The ‘Global South’ in the Transnational Student Mobility Network. Effects of Institutional Instability, Reputation of the Higher Education Systems, Post-colonial Ties, and Culture.” *Globalisation, Societies and Education* 1–19. https://doi.org/10.1080/14767724.2022.2047900.

Wang, P., G. Robins, P. Pattison, and J. Koskinen 2014. *MPNet Program for the Simulation and Estimation of (p*) Exponential Random Graph Models for Multilevel Networks, User Manual*. Melbourne: The University of Melbourne. http://www.melnet.org.au/pnet.

Warin, Thierry, and Pavel Svaton. 2008. “European Migration: Welfare Migration or Economic Migration?” *Global Economy Journal* 8:1850140–30. https://doi.org/10.2202/1524-5861.1360.

Wasserman, Stanley, and Philippa Pattison. 1996. “Logit Models and Logistic Regressions for Social Networks: An Introduction to Markov Graphs and *p*.” *Psychometrika* 61:401–25. https://doi.org/10.1007/BF02294547.

Windzio, Michael. 2015. “Immigrant Children and their Parents: Is there an Intergenerational Interdependence of Integration into Social Networks?” *Social Networks* 40:197–206. https://doi.org/10.1016/j.socnet.2014.11.002.

Windzio, Michael. 2018. “The Network of Global Migration 1990–2013: Using ERGMs to Test Theories of Migration between Countries.” *Social Networks* 53:20–9. https://doi.org/10.1016/j.socnet.2017.08.006.

Windzio, Michael, Céline Teney, and Sven Lenkewitz. 2021. “A Network Analysis of Intra-EU Migration Flows: How Regulatory Policies, Economic Inequalities and the Network-Topology Shape the Intra-EU Migration Space.” *Journal of Ethnic and Migration Studies* 47:951–69. https://doi.org/10.1080/1369183X.2019.1643229.

World Bank 2022. *World Development Indicators*. Washington, DC: The World Bank. Accessed December 22, 2022. https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD.

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https://doi.org/10.1093/sf/soaf048
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