

ESTIMATING THE EFFECTS OF MACROECONOMIC FACTORS ON NET MIGRATION: A 2SLS APPROACH IN PANEL DATA

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ABSTRACT

This paper investigates the effects of macroeconomic and institutional factors on net international migration across countries with different levels of socioeconomic development. Its main objective is to estimate the causal influence of unemployment, GDP per capita, income inequality, and political stability on migration balance dynamics. Unlike most studies, which focus on either migration inflows or outflows, this paper uses the net migration indicator, interpreted as the overall balance of migration processes. The empirical analysis is based on panel data for ten countries covering the period 1990–2023, obtained from the World Bank database. To account for persistent cross-country heterogeneity and the potential endogeneity of macroeconomic variables, the study employs a panel data model with country fixed effects and a two-stage least squares (2SLS) estimation approach. The results show that political stability and income inequality are statistically significant determinants of net migration, indicating that institutional predictability and distributional characteristics play an important role in shaping migration balances. GDP per capita demonstrates a negative and statistically significant relationship with net migration, which is consistent with the modern interpretation of the nonlinear and ambiguous development–migration relationship within the migration transition framework. In contrast, unemployment does not exhibit a statistically robust effect once endogeneity is addressed. These findings highlight the importance of institutional and structural factors over short-term labour market fluctuations in explaining migration balance. Overall, the study contributes to the empirical literature by identifying macroeconomic and institutional determinants that retain explanatory power for net migration dynamics and provides an empirical basis for discussing migration-related policy priorities.

Keywords: *net migration, migration balance, panel data, fixed effects, 2SLS, political stability, income inequality, GDP, unemployment, endogeneity*

1. INTRODUCTION

International migration is a major force shaping long-term socioeconomic development worldwide. It affects labour supply, demographic structure, income distribution, inequality and the sustainability of social protection systems. For receiving countries, migration raises issues of

labour market integration and social adaptation, while for sending countries it may lead to human capital loss and shifts in population age structure (Fehr et al., 2003). In this context, identifying the determinants of migration is important both practically and theoretically. It helps clarify which macroeconomic and institutional conditions shape migration patterns and when political-institutional factors may outweigh purely economic incentives (Lami et al., 2022).

Despite the extensive migration literature, estimating the effects of macroeconomic variables remains challenging (Bardai et al., 2026). First, migration and macroeconomic indicators are jointly determined (Lupak, 2022). Migration balances can influence labour markets, productivity, and income, while economic conditions also affect migration decisions (Nica, 2015). Ignoring this two-way relationship may produce biased estimates and weaken causal interpretation. Second, macroeconomic variables such as income and unemployment are often examined separately from institutional factors such as political stability, making it difficult to compare their relative importance. Third, studies covering both developed and developing countries often lack a unified framework for identifying determinants consistently associated with migration balances rather than with individual inflows or outflows. This paper addresses these gaps by examining the effects of macroeconomic and institutional factors on net migration, understood as the overall balance of migration processes. Unlike studies that focus only on immigration or emigration, the analysis of net migration captures migration as a macro-level outcome shaped simultaneously by both pull and push forces.

The empirical analysis is based on panel data for ten countries representing different regions and levels of development: Australia, Canada, the United States, France, Japan, Kazakhstan, Poland, Indonesia, Nigeria, and South Africa. The sample was selected to ensure variation in development levels, migration regimes, and institutional settings, allowing the identification of broader structural relationships rather than country-specific patterns. The aim of the paper is to estimate the causal effects of macroeconomic and institutional factors on net international migration in countries with different levels of economic development, using a fixed-effects panel model and a two-stage least squares (2SLS) approach.

The paper's main conceptual contribution is the consistent interpretation of results in terms of migration balances rather than migration flows. The estimated effects therefore refer to the final migration balance and reflect the combined influence of both inflow and outflow mechanisms. This reduces the risk of misinterpreting net migration coefficients as effects on immigration or emigration alone. Its empirical contribution lies in identifying political stability and income inequality as statistically significant predictors of net migration after correcting for endogeneity. These findings refine the set of macroeconomic and institutional factors that retain explanatory power in the model and provide an empirical basis for discussing migration policy priorities. In the analysed sample, institutional predictability and distributional characteristics appear more important for migration balance dynamics than short-term labour market fluctuations. The paper is structured as follows. Section 1 introduces the research problem, objectives, and contribution. Section 2 reviews the theoretical and empirical literature and develops the research hypotheses. Section 3 presents the data and methodology. Section 4 reports and discusses the econometric results. Section 5 relates the findings to existing theories and approaches. The conclusion summarizes the main findings and outlines directions for future research.

2. LITERATURE REVIEW

Applying net migration in cross-country research offers two main advantages. First, it makes it possible to analyse the overall migration balance as a demographically important indicator of population change without requiring fully comparable data on both inflows and outflows

for all countries (Adelakun et al., 2025). Second, net migration is often available for longer periods and is therefore more suitable for comparing long-term differences across countries and migration regimes. However, Ariu et al. (2016) note an important methodological limitation: net migration can conceal large offsetting gross flows, since substantial inflows and outflows may cancel each other out. Accordingly, coefficients in models using net migration as the dependent variable should be interpreted as effects on the overall migration balance rather than on inflows or outflows separately. The theoretical foundations for analyzing the macro-level determinants of migration balance lie at the intersection of several approaches. Classical push-pull theory explains migration as the result of combined push and pull factors in origin and destination countries (Urbański, 2022). At the macro level, however, such models are often limited to correlational patterns and do not fully capture the role of institutions and structural constraints. More institutionally grounded perspectives, such as Afonso and Devitt (2016), emphasize that migration outcomes are shaped not only by differences in income and employment, but also by labour market structure, segmentation and political-institutional frameworks. De Haas (2011) further argues that migration is embedded in broader processes of social change. In his view, development can simultaneously alter both the aspiration and the ability to migrate, meaning that the relationship between income growth and migration outcomes is not necessarily monotonic.

The empirical literature using net migration consistently identifies economic development and labor market conditions as key macro-level determinants (M. Dritsaki & C. Dritsaki, 2024). Many studies treat GDP per capita as a proxy for economic opportunity and living standards (Kozlovskiy, 2024), while unemployment is commonly used as an indicator of labor market pressure (Aslan & Altinöz, 2020). A representative example is Hatton (2005), who models variation in net migration across countries and over time and offers an economic interpretation based on differences in income distribution. Broader migration studies also stress the interdependence of macroeconomic factors: migration is influenced by growth and labor market conditions but can also affect them in return (Novakivskyi et al., 2024). For this reason, endogeneity is widely recognized as a central issue (Huynh & Vo, 2023). In this vein, Boubtane et al. (2013), analysing net migration in OECD countries, apply a panel vector autoregression (VAR) model that jointly includes net migration, economic growth and unemployment, thereby accounting for their mutual interactions.

A growing body of research also considers inequality an important determinant of migration (Laskienė et al., 2020). Income distribution helps explain variation in migration outcomes (Plotnikova & Ulceluse, 2022). The new economics of labour migration links migration decisions to household strategies of risk diversification and highlights the role of relative deprivation, whereby individuals assess their well-being not only in absolute terms but also relative to others (Stark, 2006). Although these mechanisms are often studied using microdata (Safi, 2020), macro-panel analyses typically rely on aggregate indicators such as the Gini coefficient (Stark et al., 2020). Such indicators may affect migration balance through economic incentives, expectations, and perceived opportunities for mobility (Czaika, 2015). This interpretation is conceptually consistent with De Haas (2012), who views inequality, power, and the role of the state as structural forces shaping migration processes.

Alongside economic variables, a substantial part of the recent literature focuses on institutional determinants of migration balance, especially governance quality, policy predictability, and security (Přívarová et al., 2022). Empirical studies often use components of the Worldwide Governance Indicators, particularly Political Stability, which captures perceptions of the likelihood of political instability (Pudryk, 2021; Solano & Huddleston, 2022). The effect of institutions on net migration is usually interpreted in two ways: first, as a factor affecting

a country's relative attractiveness by reducing uncertainty and increasing predictability; and second, as a broader condition shaping economic performance and the distribution of opportunities through which migration balance is formed. One example of this institutional channel is the relationship between corruption and migration. [Poprawe \(2015\)](#) finds that lower corruption is associated with a higher net migration rate. Although institutional proxies vary across studies, whether corruption, rule of law, or political stability, the broader conclusion is similar: the institutional environment is comparable in importance to purely economic explanations and often provides the context in which economic incentives are translated into migration decisions and aggregate outcomes ([Kwilinski et al., 2022](#); [Çoban et al., 2026](#)).

From a methodological perspective, macro-panel studies of migration balance face two persistent challenges. The first is cross-country heterogeneity and the influence of long-term factors such as geography, migration networks, and migration regimes. This makes fixed effects a natural way to control for persistent country-specific characteristics. In explaining network effects and cumulative causation, [Massey \(1990\)](#) emphasizes the inertia of migration processes, arguing that migration tends to become self-reinforcing in ways that standard macroeconomic indicators may not fully capture. Empirical studies often reflect this through significant country effects and the need for dynamic model specifications.

The second challenge is the endogeneity of key economic variables ([Chen, 2008](#)). Migration balance can influence both labor markets and income levels and may also be jointly determined by omitted shocks or policy interventions. To address this, the literature employs a range of methods, including panel VAR models, instrumental variable approaches, and lagged specifications ([Brücker & Siliverstovs, 2006](#)). Combined models that use fixed effects together with external or predetermined instruments are also common ([Vasyltsiv et al., 2021](#)). The aim is to strengthen causal interpretation while preserving cross-country comparability.

Overall, the literature points to several broad findings while also revealing important limitations. Income, labour market conditions, inequality, and institutions are frequently associated with net migration, but the direction and strength of these relationships vary across countries, periods, indicators, and estimation methods. At the same time, although net migration is useful for cross-country comparison, it has clear limitations. Without data on gross flows, it is impossible to determine whether changes in the balance are driven by rising inflows, rising outflows, or both. The balance may therefore mask substantial opposing movements. For this reason, results should be interpreted with caution. Estimated effects should be understood as influences on a country's overall migration outcome rather than on entry or exit decisions separately, since that outcome reflects the combined operation of both inflow and outflow channels. In this context, studies that use comparable net migration indicators and panel methods to address cross-country heterogeneity and endogeneity make an important contribution to the empirical literature. They complement research focused on bilateral flows or simple descriptive associations.

The explanatory variables selected in this study are guided by three major strands of migration theory: economic factors (GDP per capita and unemployment), distributional factors (income inequality), and institutional factors (political stability). Although these variables capture core macro-level mechanisms identified in the literature, other potentially relevant determinants, such as migration policy, demographic structure, education, and network effects, are not explicitly included because of data comparability constraints across countries and over time.

Based on the theoretical approaches and empirical evidence reviewed above, the following hypotheses are formulated regarding the influence of macroeconomic, institutional, and distributional factors on migration balance:

- H_1 : (Unemployment and Migration Balance). There is a significant negative relationship between unemployment and migration balance.
- H_2 : (Income and Migration Balance). An increase in GDP per capita is significantly associated with a positive change in migration balance.
- H_3 : (Inequality and Migration Balance). There is a significant negative relationship between income inequality and migration balance.
- H_4 : (Institutions and Migration Balance). There is a significant positive relationship between political stability and migration balance.
- H_5 : (Robust Cross-Country Differences). Even after controlling for observable macroeconomic and institutional factors, statistically significant cross-country differences in migration trajectories, captured by fixed effects, are expected to persist.

3. DATA AND METHODOLOGY

3.1. DESCRIPTION OF VARIABLES

The empirical basis of this study is the World Bank Open Data (2025), which provides internationally comparable statistical indicators for the period 1990–2023. The use of standardized indicators enables the comparison of macroeconomic and institutional determinants of migration within a single specification and reduces the risk of measurement incomparability across countries. The sample includes ten countries representing different regions and levels of socioeconomic development: Australia, Canada, the United States, France, Japan, Kazakhstan, Poland, Indonesia, Nigeria, and South Africa. This sample was deliberately designed to ensure geographic and institutional diversity while maintaining data quality. Expanding the sample to include a larger number of countries would raise important methodological concerns. In many developing economies, the Gini coefficient and the Political Stability index contain substantial gaps over the 1990–2023 period. Including such countries would therefore require either data imputation or a shorter time span, both of which could reduce the reliability of the panel estimates. Moreover, the current sample already captures a broad range of migration regimes: established immigration countries (Australia, Canada, the United States, and France), a high-income country with a more restrictive migration model (Japan), a post-communist transition economy (Poland), a resource-dependent emerging economy (Kazakhstan), and lower-income developing countries (Indonesia, Nigeria, and South Africa). This variation is sufficient to identify the structural relationships of interest. By contrast, expanding the dataset to a larger but more homogeneous group of countries, such as an OECD-only or Sub-Saharan Africa-only sample, would likely reduce rather than improve cross-sectional variation.

Table 1 presents variables used in the analysis

Table 1. Description of Variables

Variables	Description	Source	Period
Net Migration (NM)	Annual net number of migrants (immigrants minus emigrants)	https://data.worldbank.org/indicator/SM.POP.NETM	1990-2023
Unemp	Unemployment rate as % of labor force	https://data.worldbank.org/indicator/SL.UEM.TOTL.ZS_	1990-2023
GDP	GDP per Capita (current US\$)	https://data.worldbank.org/indicator/NY.GDP.PCAP.CD_	1990-2023
Gini	Gini coefficient measuring income inequality	https://data.worldbank.org/indicator/SI.POV.GINI	1990-2023
PolStab	Political stability index	https://data.worldbank.org/indicator/PV.PER.RNK	1990-2023

Source: Author's compilation

3. 2. DEPENDENT AND EXPLANATORY VARIABLES

Net migration is defined as the migration balance:

$$NM_{it} = Inflow_{it} - Outflow_{it} \quad (1)$$

where NM_{it} is the net migration in country i in period t . The obtained results of the indicator are interpreted as the influence of factors on the migration balance, and not on individual components of inflow and outflow. Therefore, the estimated effects reflect the combined effects of the inflow and outflow channels, and their decomposition within this specification is not performed.

Explanatory variables

In accordance with theoretical approaches (push-pull, institutional, and distributional explanations), the following factors are included in the model: unemployment rate (Unemp), GDP per capita (GDP), income inequality (Gini), political stability (PolStab).

Taking Unemp and GDP logarithms is used to improve interpretability of coefficients and reduce the impact of scale differences between countries.

3. 3. BASELINE SPECIFICATION AND FIXED EFFECTS (FE)

The starting point is a panel regression with country fixed effects allowing us to control time-invariant features (long-term institutional trajectories, historically established migration networks, geography, etc.). Additionally included are time effects accounting for shocks common to all countries and global trends over the relevant periods.

The baseline model is defined by the following formula:

$$NM_{it} = \beta_1 \ln(Unemp_{it}) + \beta_2 \ln(GDP_{it}) + \beta_3 Gini_{it} + \beta_4 PolStab_{it} + \alpha_i + \tau_t + \varepsilon_{it} \quad (2)$$

where NM_{it} is the country's migration balance i in the period t , α_i is country fixed effects, τ_t is time effects, and ε_{it} is a residual error.

3. 4. ENDOGENEITY AND INSTRUMENTAL STRATEGY (2SLS+FE)

The key macroeconomic regressors $\ln(Unemp)$ and $\ln(GDP)$ are potentially endogenous for two reasons:

1. Reverse causality is possible (migration balance can affect the labor market and income level), and

2. There are unobservable factors varying over time and correlating with both migration and macroeconomic indicators (e.g., changes in migration policy, structural reforms, etc.).

To address endogeneity, the study uses two-stage least squares with country fixed effects (2SLS+FE). One-period lags of $\ln(\text{Unemp})$ and $\ln(\text{GDP})$ serve as excluded instruments:

$$Z_{it} = \ln(\text{Unemp}_{i,t-1}), \ln(\text{GDP}_{i,t-1}) \quad (3)$$

where $t - 1$ denotes previous period. The remaining variables $Gini_{it}$ and $PolStab_{it}$, as well as fixed effects are included in the first stage as exogenous components.

This approach follows common practice in macro-panel studies where lagged macroeconomic indicators are assumed to affect migration balance primarily through their influence on current economic conditions rather than through a direct contemporaneous channel.

The first stage is defined by the following equations:

$$\ln(\text{Unemp}_{i,t-1}) = P_1 Z_{it} + G_1 W_{it} + \alpha_t + \tau_t + u_{it} \quad (4)$$

$$\ln(\text{GDP}_{i,t-1}) = P_2 Z_{it} + G_2 W_{it} + \alpha_t + \tau_t + v_{it} \quad (5)$$

where P are the instrument coefficients, $Z_{it} = \{\ln(\text{Unemp}_{i,t-1}), \ln(\text{GDP}_{i,t-1})\}$, G are the exogenous control coefficients included in the first stage, and $W_{it} = \{Gini_{it}, PolStab_{it}\}$.

After controlling for country and time fixed effects (α_i and T_i), the lagged values are assumed to affect migration balance primarily through their relationship with the country's current economic conditions. Under the identifying assumption of the model, a direct effect of the lagged variables on NM_{it} is excluded. Because one instrument is used for each endogenous variable, the model is exactly identified, and tests of overidentifying restrictions are not applicable.

The validity of the lagged instruments rests on two conditions. First, relevance: the lagged values of $\ln(\text{GDP})$ and $\ln(\text{Unemp})$ are strong predictors of their current values, as confirmed by the very high first-stage F-statistics (28,125 and 17,041, respectively), both well above the conventional threshold of 10. Second, the exclusion restriction: once country and time fixed effects are included, lagged macroeconomic conditions are assumed to affect current net migration only indirectly, through their impact on contemporaneous economic outcomes. This assumption is standard in panel macroeconomic studies using predetermined instruments and is supported by the view that migration decisions are driven mainly by current labour market conditions.

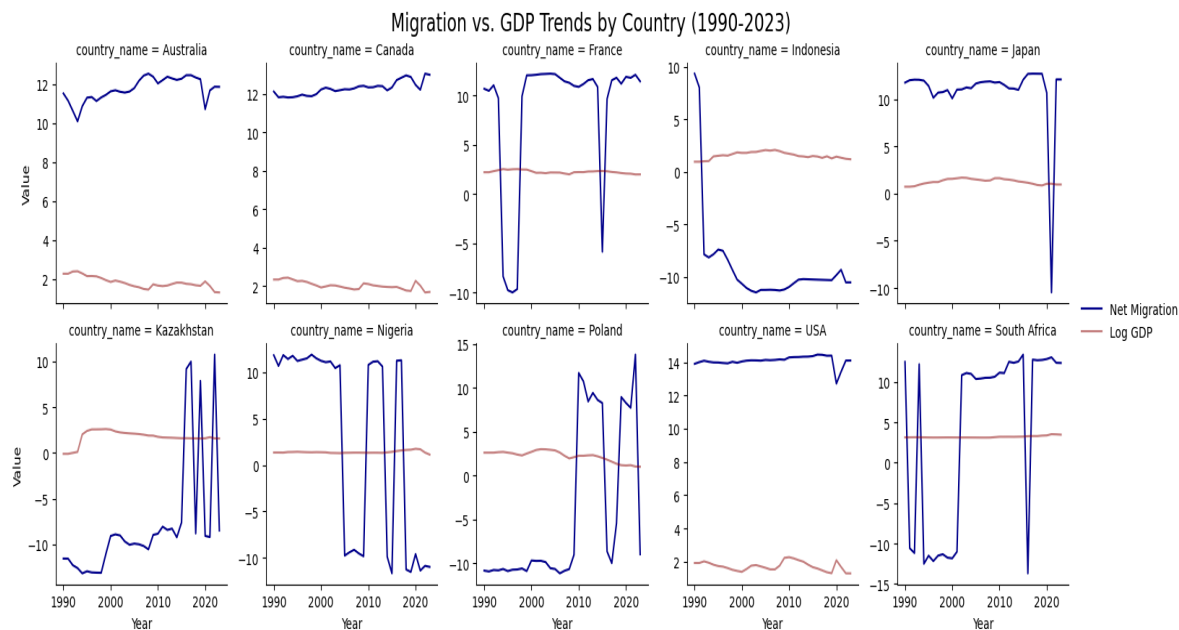
4. RESULTS

This section presents descriptive patterns in the migration balance and income dynamics, the main 2SLS model estimates for net migration, and the results of robustness checks.

4.1. DESCRIPTIVE PATTERNS

Figure 1 illustrates the long-term trajectories of the migration balance and economic development on a country-by-country basis.

Figure 1. Long-Term Dynamics of Migration Balance and Economic Development by Country



Source: Author's calculation

Figure 1 presents comparable dynamics of migration balance and economic development over time for ten countries over the period between 1990 and 2023. Each panel corresponds to a separate country and allows for a visual assessment of direction or divergence of economic development and migration balance trajectories, as well as identification of country specificities and possible structural changes.

4. 1. 1. DEVELOPED ECONOMIES

Australia and Canada display consistently positive net migration throughout the period, accompanied by steady GDP growth. Their migration series show low volatility and no sharp reversals, reinforcing their status as stable long-term destinations for migrants.

The United States also records high and relatively stable net migration, with only temporary fluctuations during periods of crisis, while GDP follows a smooth upward path. This asymmetry suggests that short-term economic shocks do not necessarily produce proportional changes in migration outcomes.

Japan maintains positive net migration for most of the period, although it experiences a sharp but temporary decline in the mid-2010s. GDP, by contrast, shows moderate growth followed by stabilization. This divergence suggests that, in some periods, Japan's migration dynamics are shaped by factors beyond macroeconomic conditions alone.

France also exhibits generally positive net migration, though with notable declines in certain years. Its GDP series remains relatively stable, which may indicate the influence of institutional or political factors temporarily affecting migration balance.

4. 1. 2. ECONOMIES WITH A TRANSITIONAL AND DEVELOPING STRUCTURE

Indonesia is characterized by persistently negative net migration, reflecting sustained outward migration, while GDP shows steady growth. The absence of a clear migration response to economic development suggests that income factors alone have limited explanatory power in this case.

Kazakhstan experienced negative net migration in the 1990s, followed by gradual improvement and then sharp, unstable fluctuations in recent years. Economic dynamics, however,

remain relatively smooth. This pattern points to the important role of institutional and demographic changes associated with the post-Soviet transition.

Poland is marked by predominantly negative net migration, with only occasional short-term improvements despite steady GDP growth. This reflects a prolonged period of emigration pressure linked to integration into the European labour market, with only a weak direct connection to current growth rates.

Nigeria and South Africa show the highest volatility in their migration series. Frequent shifts between positive and negative net migration, combined with relatively stable GDP dynamics, suggest that non-economic factors, including political instability, demographic pressure, and regional conflict, play a dominant role.

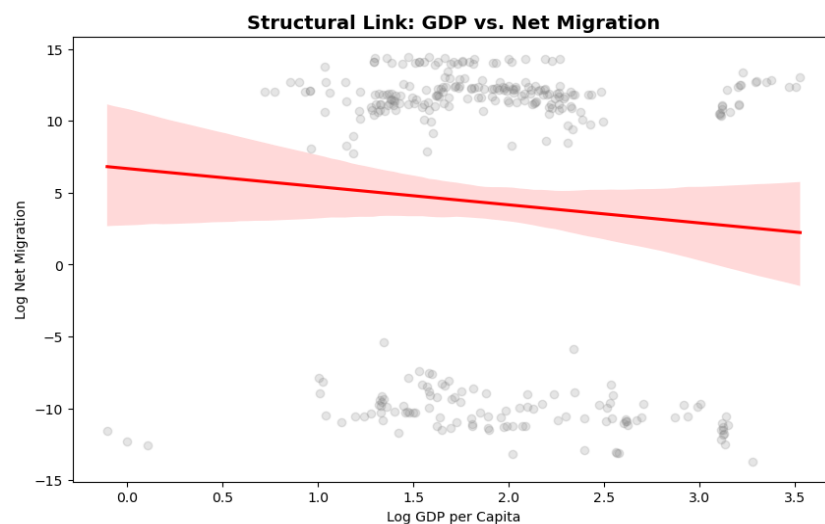
A comparison across countries shows that net migration dynamics generally do not move in parallel with economic growth. In developed economies, consistently positive migration balances coexist with moderate economic growth, whereas in transition and developing economies migration is more volatile and less closely linked to GDP. This pattern visually supports the argument that income levels and growth may be relevant but are not sufficient on their own to explain international migration.

Overall, the figure highlights substantial cross-country heterogeneity in migration processes and the absence of a universal dynamic relationship between economic growth and net migration. These visual patterns support the use of panel models with fixed effects and instrumental variables, as well as the need to account explicitly for structural breaks and institutional factors when analysing long-term migration trends.

4. 1. 3. CORRELATION BETWEEN GDP PER CAPITA AND NET MIGRATION

Figure 2 presents a combined scatterplot between GDP per capita and net migration with a linear approximation and a confidence interval of 95%.

Figure 2. A Descriptive Relationship Between Economic Development Level and Net Migration



Source: Author's calculation

The slope of the line is negative, indicating an average negative correlation between income level and migration balance. However, the substantial vertical dispersion of observations around the line, together with visible clustering, suggests that income alone is not sufficient to explain cross-country differences in migration balance. At similar levels of GDP, net mi-

gration may be either positive or negative, reflecting heterogeneity in migration regimes and institutional conditions.

The widening of the confidence interval at the extremes of the income distribution indicates a lower concentration of observations and, therefore, greater uncertainty in the estimated relationship within those ranges. Overall, Figure 2 should be interpreted as preliminary illustrative evidence that a simple linear relationship is insufficient. A more adequate analysis of migration balance requires a specification that controls for persistent cross-country heterogeneity and the potential endogeneity of macroeconomic indicators. This supports the use of a 2SLS model with fixed effects for a more precise assessment of the structural determinants of international migration.

4. 2. MAIN ESTIMATES OF THE FIXED EFFECTS (FE) MODEL AND INSTRUMENTAL APPROACH (2SLS+FE)

Table 2 presents the main estimation results obtained from the fixed effects (FE) model and the instrumental variables approach (2SLS+FE). The purpose of this section is to compare baseline correlational estimates with those corrected for endogeneity and to assess the robustness of identified relationships across specifications.

Table 2. Empirical Results

Variable	FE Coefficient	FE p-value	2SLS+FE Coefficient	2SLS+FE p-value
ln(Unemp)	11.3795*	0.0575	7.5929	0.2141
ln(GDP)	-3.4309***	0.0020	-3.5867***	0.0056
Gini	0.0001**	0.0496	0.0001***	0.0003
PolStab	2.8859**	0.0349	4.8601***	0.0007
First-stage instrument strength (2SLS)				
Endogenous variable	F-statistic		p-value	
ln(GDP)	28125.28		0.0000	
PolStab	17040.92		0.0000	

Notes: Significant levels, * $p < 0.1$. ** $p < 0.05$. *** $p < 0.01$. The table presents coefficient estimates from the fixed effects (FE) model and two-stage least squares (2SLS+FE) method. Net migration is the dependent variable. FE specification accounts for time-invariant unobserved heterogeneity between units while 2SLS+FE model additionally considers potential endogeneity in key regressors. The bottom panel shows first-stage F-statistics for the excluded instruments. All first-stage F-statistics significantly exceed generally accepted threshold of 10 suggesting strong instruments.

Source: Author's calculation

The table reports coefficient estimates, statistical significance levels, and first-stage diagnostics for the instrumental variables. The results are discussed in detail in the following subsections.

4. 2. 1. BASIC FIXED EFFECT ESTIMATES

The baseline fixed-effects results show that ln(Unemp) has a positive coefficient and is marginally significant at the 10% level ($\beta = 11.3795$, $p = 0.0575$).

ln(GDP) is negative and statistically significant at the 1% level ($\beta = -3.4309$, $p = 0.0020$). This indicates that higher levels of economic development are associated with a decrease in the dependent variable. Given the logarithmic specification, the coefficient implies that a 1% increase in GDP per capita reduces the dependent variable by approximately 0.034 units, holding other factors constant. Both the magnitude and significance of the estimate suggest a structurally important development effect.

The Gini coefficient is positive and statistically significant at the 5% level ($\beta = 0.0001$, $p =$

0.0496). Although the coefficient is numerically small because of scaling, it indicates that higher income inequality is systematically associated with higher values of the dependent variable. Political stability also shows a positive and statistically significant relationship at the 5% level ($\beta = 2.8859$, $p = 0.0349$). This suggests that improvements in institutional stability increase the dependent variable, highlighting the role of governance quality in shaping structural outcomes. Overall, the fixed-effects results indicate that economic development, institutional stability, labour market conditions, and income inequality are important correlates of the dependent variable. However, the possibility of reverse causality and other sources of endogeneity means that these findings should be interpreted with caution and examined further using instrumental-variable estimation.

4.2.2. INSTRUMENTAL VARIABLES WITH FIXED EFFECT (2SLS+FE) ESTIMATES

The 2SLS with fixed-effects results broadly confirm the baseline findings while also introducing several important refinements. First, the coefficient on $\ln(\text{GDP})$ remains negative and statistically significant at the 1% level ($\beta = -3.5867$, $p = 0.0056$). Its similarity in magnitude to the fixed-effects estimate suggests that endogeneity does not materially alter the estimated development effect. The persistence of significance across specifications strengthens the evidence for a robust structural relationship.

Second, the effect of political stability increases substantially ($\beta = 4.8601$) and becomes highly significant ($p = 0.0007$). The larger coefficient under instrumental-variable estimation suggests that the fixed-effects estimate may have been downward biased, possibly because of measurement error or omitted-variable bias. Once endogeneity is addressed, political stability emerges as an even stronger determinant of the dependent variable.

Third, the coefficient on $\ln(\text{Unemp})$ declines ($\beta = 7.5929$) and loses statistical significance ($p = 0.2141$). This change suggests that the positive relationship observed in the fixed-effects model may have reflected endogenous feedback rather than a causal effect. After correcting for endogeneity, unemployment no longer appears to have a statistically significant impact on the dependent variable.

Finally, the Gini coefficient remains positive and becomes more strongly significant ($\beta = 0.0001$, $p = 0.0003$). The increase in statistical significance under the 2SLS with fixed-effects specification indicates that the relationship between income inequality and the dependent variable is robust and unlikely to be driven by reverse causality.

4.2.3. INSTRUMENT STRENGTH AND IDENTIFICATION DIAGNOSTICS

A comparison of the FE and 2SLS+FE specifications reveal three main findings.

First, the development effect is robust. The negative coefficient on GDP per capita remains stable across all models, confirming the structural role of economic development.

Second, the institutional effect becomes stronger once endogeneity is addressed. Political stability has a larger and more precisely estimated effect in the 2SLS+FE specification, indicating that its role may be understated in the standard fixed-effects model.

Third, the results appear methodologically robust. Several features of the estimation strategy support the internal validity of the findings. The fixed-effects specification controls for time-invariant unobserved heterogeneity across countries, thereby reducing bias from omitted structural characteristics. To address potential simultaneity and reverse causality, particularly with respect to $\ln(\text{GDP})$ and $\ln(\text{Unemp})$, the analysis also applies two-stage least squares within the fixed-effects framework. The exceptionally high first-stage F-statistics (28,125.28 and 17,040.92, respectively; $p = 0.0000$) are far above conventional thresholds, indicating strong

instrument relevance and alleviating concerns about weak identification. In addition, the consistency of the sign and magnitude of the key coefficients across the FE and 2SLS+FE specifications, especially for GDP per capita and the Gini coefficient, supports parameter stability. The larger coefficient on political stability and the loss of significance for unemployment under instrumental-variable estimation further suggest that the 2SLS specification corrects for endogeneity bias rather than producing spurious results. Taken together, the convergence of estimates across models, the strong first-stage diagnostics, and the theoretically consistent coefficient patterns support the robustness and structural interpretation of the identified relationships.

4. 2. 3. HYPOTHESIS TESTING

Table 2 reports the estimated coefficients of the factors shaping international migration dynamics in the sample of countries under review. The results from the two-stage least squares model with country fixed effects allow several conclusions to be drawn. Most importantly, the estimates suggest that migration processes are driven more by structural and institutional characteristics than by short-term labour market fluctuations.

Hypothesis H_1 , which posits an effect of unemployment on migration balance, is not supported empirically. The coefficient on $\ln(\text{Unemp})$ is statistically insignificant ($p = 0.214$), indicating the absence of a stable relationship between within-country changes in unemployment and changes in net migration once fixed effects and endogeneity are taken into account. In terms of push-pull logic, this suggests that, for the countries and time frequency considered, labour market shocks do not make an independent and stable contribution to the final migration balance and have less explanatory power than more persistent distributional and institutional factors.

Hypothesis H_2 , concerning the relationship between economic development and net migration, is confirmed. The coefficient on $\ln(\text{GDP})$ is statistically significant ($\beta = -3.587$, $p = 0.006$) and negative. The sign is consistent with the idea of a nonlinear and ambiguous development-migration relationship within migration transition theory. Under this approach, changes in income levels may be accompanied by structural transformations and shifts in mobility opportunities, which are reflected unevenly in the net migration indicator. De Haas (2010) explains how both the scale and direction of migration can change systematically as countries develop socioeconomically.

Hypothesis H_3 , regarding the role of inequality, is also confirmed. The coefficient on the Gini index is positive and statistically significant ($\beta = 0.00010$, $p < 0.01$). This implies that higher inequality is associated with more positive net migration. The finding points to the importance of income distribution in shaping migration outcomes and is consistent with the new economics of labour migration and the concept of relative deprivation (Stark & Bloom, 1985). Higher inequality may intensify migration incentives regardless of average income levels, as household decisions are shaped by social comparison and unequal access to mobility opportunities.

Hypothesis H_4 , concerning political stability, is likewise confirmed. The coefficient on PolStab is positive and statistically significant ($\beta = 4.860$, $p = 0.001$). This indicates that greater political stability is associated with an improved migration balance, that is, higher net migration. The result is consistent with the institutional approach, which views predictability and security as factors that reduce migration-related risks and shape the final balance through the combined effects of inflow and outflow channels (Bertocchi & Strozzi, 2008).

Overall, the 2SLS fixed-effects results support the hypotheses regarding the role of income (H_2), inequality (H_3), and political stability (H_4) as statistically significant determinants of migration balance. By contrast, the hypothesis concerning a robust effect of unemployment (H_1) is not confirmed.

4. 3. ROBUST CROSS-COUNTRY DIFFERENCES

Table 3 captures stable, unobserved country characteristics that influence migration attractiveness or the propensity for outmigration. The reported coefficients show how much each country deviates from the baseline migration balance, all else equal.

Australia is used as the reference country in the fixed-effects specification because of its relatively stable migration regime, consistently positive net migration, and absence of extreme outlier behaviours in the sample. This makes it an appropriate benchmark for interpreting relative country effects.

One small substantive note: you write that higher inequality is associated with “more positive net migration.” That is fine statistically because your coefficient is positive, but it may sound counterintuitive unless you explain whether this reflects immigration-destination inequality, emigration dynamics, or mixed balance effects.

Table 3. Country Fixed Effects

Country	Coefficient	p-value	Interpretation
Canada	1.846***	0.000	Structural migrant-attracting country
USA	2.688**	0.034	Positive propensity for net inflow
France	1.830**	0.040	Persistent migrant-attracting effect
Japan	-2.541**	0.012	Restrictive migration model
Kazakhstan	-10.163***	0.000	Persistent propensity for outflow
Poland	-8.970***	0.000	Migration-sending country
Indonesia	-7.800*	0.053	Borderline significance of outflow
Nigeria	5.430	0.327	Effect is insignificant
South Africa	2.837	0.593	Effect is insignificant

Notes: Significant levels, * $p < 0.1$. ** $p < 0.05$. *** $p < 0.01$

Source: Author’s calculation

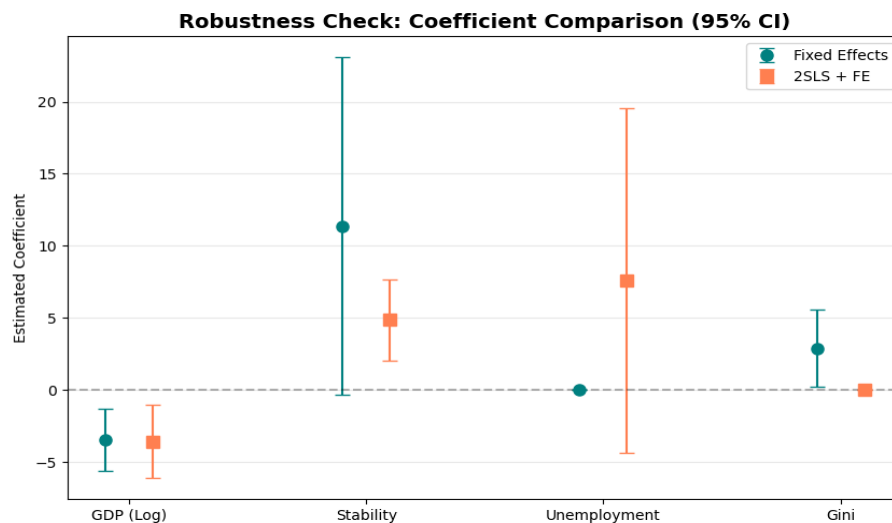
The country fixed-effects analysis reveals persistent cross-country differences in migration trajectories relative to the reference country, Australia, that are not explained by the included covariates. Positive and statistically significant effects are found for Canada (1.846***), the United States (2.688**), and France (1.830**), indicating higher migration balances than in the base country. This is consistent with their institutionally established role as migrant-receiving countries.

Negative and statistically significant effects are found for Japan (−2.541**), Kazakhstan (−10.163***), Poland (−8.970***), and Indonesia (−7.800*), indicating lower net migration relative to Australia and suggesting a structural tendency toward net outmigration. For Nigeria (5.430) and South Africa (2.837), the estimated effects are positive but statistically insignificant; therefore, comparisons involving these countries should be interpreted with caution.

According to the results reported in Table 3, Hypothesis H5, which posits persistent cross-country differences, is supported by the presence of statistically significant fixed effects for several countries. The interpretation of these fixed effects suggests that, even after controlling for macroeconomic and institutional factors, systematic differences in net migration relative to the base country remain. This finding is consistent with the literature emphasizing the importance of factors that are difficult to measure directly in aggregate panel data, such as migration regimes, historical networks, and long-term institutional trajectories (Massey et al., 1993).

4. 4. ROBUSTNESS CHECK

Figure 3. Comparison of FE and 2SLS+FE Estimates (Robustness)



Source: Author's calculation

Figure 3 compares the coefficient estimates and 95% confidence intervals obtained from the fixed-effects (FE) model and the 2SLS+FE model. The purpose of this comparison is to assess the robustness of the main findings to the potential endogeneity of the key macroeconomic regressors. For $\ln(\text{GDP})$, both specifications produce negative and statistically significant estimates, indicating a robust relationship between income and migration balance. The stronger negative effect in the 2SLS+FE model may suggest that the FE estimate is biased because of reverse causality or omitted variables correlated with income.

For political stability, the coefficient remains positive in both models, while the 2SLS+FE estimate is larger and more precisely estimated. This is consistent with the interpretation of political stability as an institutional factor systematically associated with an improvement in migration balance.

For unemployment, no statistically robust effect is found in either model. In both cases, the confidence intervals include zero, indicating considerable uncertainty and the absence of a stable relationship with migration balance in the specification used.

For the Gini index, the FE and 2SLS+FE estimates are similar in both sign and significance, suggesting that the relationship between income inequality and migration balance is relatively robust in the data.

Overall, the robustness analysis increases confidence in the main findings for income, political stability, and inequality, while also underscoring the limited and unstable role of unemployment.

5. DISCUSSION

The results provide several important insights into the determinants of migration balance once both cross-country heterogeneity and endogeneity are considered.

First, the absence of a statistically significant effect of unemployment suggests that short-term labor market fluctuations do not consistently translate into changes in net migration. This finding is consistent with expected-income models (Harris & Todaro, 1970) and may reflect offsetting responses in inflows and outflows.

Second, the negative relationship between GDP per capita and net migration supports the

nonlinear and context-dependent nature of the development-migration nexus. In line with the migration transition framework (De Haas, 2010), economic development may simultaneously expand opportunities for migration and alter incentives to migrate, producing ambiguous effects at the aggregate level.

Third, the positive and robust effect of income inequality suggests that distributional factors play an important role in shaping migration outcomes. This finding may be interpreted through the lens of relative deprivation and labor market segmentation theory (Piore, 1979), according to which unequal economies may also generate demand for migrant labor.

Fourth, political stability emerges as a key institutional determinant of migration balance. A stable and predictable environment reduces uncertainty and increases a country's attractiveness, reinforcing the importance of institutional quality in migration dynamics.

Finally, the persistent cross-country differences captured by the fixed effects suggest that structural factors, such as migration policy, historical networks, and long-term institutional trajectories, remain important determinants of migration outcomes beyond observable macroeconomic variables. Compared with earlier theoretical contributions, more recent empirical studies increasingly emphasize the interaction between economic and institutional factors in shaping migration patterns (e.g., Agiomirgianakis et al., 2024; Kwilinski et al., 2024). The present findings are consistent with this broader perspective.

LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

The interpretation of the results remains conditional for two main reasons. First, the dependent variable is aggregated. Net migration does not allow the separate identification of inflow and outflow channels, so the underlying mechanisms can only be discussed in terms of their effect on the final balance. Second, the identification strategy in the 2SLS+FE model relies on lagged instruments. Its validity depends on the assumption that lagged macroeconomic variables do not affect current migration balance directly, except through their influence on current economic conditions. Although this assumption is reasonable and common in the literature, it cannot be tested directly without additional instruments or alternative research designs.

Several extensions would be especially promising:

- I. testing for nonlinearity in the relationship between development and migration balance.
- II. incorporating explicit migration policy indicators where comparable data are available; and
- III. applying dynamic panel models to capture inertia in migration balance.

Overall, the results suggest that once the analysis moves beyond simple correlations and explicitly controls for persistent heterogeneity and endogeneity, institutional and distributional factors become more prominent, while short-term labor market indicators appear less informative for explaining migration balance.

6. CONCLUSION

This paper examines the determinants of net migration using internationally comparable World Bank data for ten countries representing different regions and levels of development. To improve interpretability and reduce bias arising from the endogeneity of macroeconomic regressors, the analysis employs a panel specification with country and time fixed effects, estimated using the 2SLS+FE approach, in which the logarithms of unemployment and GDP per capita are instrumented with their lagged values.

The results show that, in the sample under review, migration balance dynamics are more closely related to institutional and distributional characteristics than to short-term labor market fluctuations. Political stability has a positive and statistically significant relationship with net migration, suggesting that a more predictable and secure environment improves migration balance. The Gini index is also statistically significant, indicating that distributional conditions matter for migration outcomes. By contrast, the effect of unemployment is statistically unstable, suggesting that this variable has limited explanatory power once persistent cross-country heterogeneity and possible reverse causality are considered. GDP per capita has a negative and statistically significant coefficient, indicating that income growth is associated with a decline in net migration. This result is consistent with contemporary interpretations of the ambiguous development-migration relationship and highlights the need for caution when interpreting income effects in terms of net migration.

Another important finding is the presence of substantial and persistent cross-country heterogeneity. The country fixed effects remain significant for several countries, pointing to the importance of factors that are not fully captured by standard macroeconomic indicators.

The robustness analysis, based on a comparison of FE and 2SLS+FE estimates, confirms the qualitative stability of the main results for income, political stability, and inequality, although the findings for unemployment remain sensitive and statistically uncertain.

The study also has limitations. First, the use of net migration does not allow the identified effects to be decomposed into separate inflow and outflow channels. The estimates therefore relate only to the final migration balance and may reflect different combinations of changes in inflows and outflows. Second, the instrumental-variable strategy based on lagged macroeconomic variables relies on standard assumptions of instrument validity, namely relevance and exclusion, and therefore requires caution in causal interpretation within the adopted identification framework.

Future research could build on this study in several directions. One important step would be to use data that allow the separate analysis of inflows and outflows, as well as bilateral migration flows in gravity-type models. Another would be to expand the set of explanatory variables by including comparable indicators of migration policy, demographic structure, and security shocks. Finally, nonlinear specifications of the income-migration relationship, interaction effects between income and institutional variables, and dynamic panel approaches that account for migration inertia appear especially promising.

Taken together, the findings confirm that the analysis of migration balance requires the joint consideration of economic, institutional, and distributional determinants and benefits from methods that control for persistent heterogeneity and endogeneity in key macroeconomic variables.

Conflicts of Interest

The authors declare no competing interests.

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