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INSTITUTIONAL SHOCKS AND MIGRATION ADJUSTMENT:
EVIDENCE FROM THE SYRIAN CRISIS AND
BREXIT'S REFERENDUM AND IMPLEMENTATION

Assaf Razin

Working Paper 34941
<http://www.nber.org/papers/w34941>

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
March 2026

No external funding. The views expressed herein are those of the author and do not necessarily reflect the views of the National Bureau of Economic Research.

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JEL No. F0, F29, F47, P0, P5

ABSTRACT

This paper interprets Brexit as a two-stage institutional rupture that reshaped migration through expectations, exposure, and stress channels. Using a UK–Germany Difference-in-Differences framework, I show that the 2016 referendum generated a sharp decline in UK net migration relative to Germany, driven primarily by a contraction in immigration rather than simple outward flight. The 2021 termination of EU free movement reinforced this adjustment on the gross inflow margin, completing the structural reallocation of mobility flows. Migration responses were not uniform: countries more deeply integrated into EU mobility networks prior to 2016 experienced significantly stronger contractions, confirming that Brexit propagated along pre-existing exposure channels.

Embedding macro-financial stress interactions reveals that institutional fragility amplified the referendum shock, particularly during the expectations phase. Stress intensified migration contractions in exposed settings in 2016, while post-2021 responses became more heterogeneous, especially on the emigration margin. Together, the results support a sequential interpretation: an anticipatory expectations shock in 2016 followed by regime completion in 2021.

Beyond short-run behavioral adjustments, the findings are consistent with the fiscal self-selection framework. Increases in perceived institutional risk alter the relative returns to skill and investment, reshaping both the composition of migration and foreign direct investment. Because skilled labor and FDI are complementary, institutional credibility shocks can generate self-reinforcing declines in human capital inflows and investment. Brexit therefore emerges not merely as a trade or regulatory event, but as an institutional credibility shock in which migration operates both as an outcome and as a transmission mechanism linking regime change to long-run growth dynamics.

Assaf Razin

Tel Aviv University

Eitan Berglas School of Economics

Department of Economics

and Cornell University and CEPR

and also NBER

razin@tauex.tau.ac.il

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Assaf Razin

Tel Aviv University

Berglas School of Economics, CEPR and NBER

razin@tauex.tau.ac.il

Assaf Razin's Home Page

Abstract

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¹ I am grateful to Yoav Szoke for exceptionally skillful and dedicated research assistance.

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Beyond short-run behavioral adjustments, the findings are consistent with the fiscal self-selection framework. Increases in perceived institutional risk alter the relative returns to skill and investment, reshaping both the composition of migration and foreign direct investment. Because skilled labor and FDI are complementary, institutional credibility shocks can generate self-reinforcing declines in human capital inflows and investment. Brexit therefore emerges not merely as a trade or regulatory event, but as an institutional credibility shock in which migration operates both as an outcome and as a transmission mechanism linking regime change to long-run growth dynamics.

1. Introduction

In recent years, the world has witnessed a notable surge in movements toward illiberal democracy - a form of governance characterized by the erosion of liberal institutions, judicial independence, and democratic norms. These regime shifts are not merely political; they carry far-reaching economic implications, reshaping policy priorities and redistributing state resources. Immigration plays a central role in this dynamic. Periods of intensified cross-border mobility frequently ignite anxieties concerning national identity, labor market competition, and welfare-state sustainability (Dustmann, Schönberg, and Stuhler, 2016; Halla, Wagner, and Zweimüller, 2017). Populist and far-right parties have effectively mobilized such anxieties, as illustrated by the rise of Germany's AfD (Dinas et al., 2019) and France's Rassemblement National (Edo et al., 2019). Migration thus functions not only as an economic adjustment mechanism but also as a political resource in processes of institutional transformation.

Broader literature connects institutional quality to economic performance. Acemoglu and Robinson (2019) argue that erosion of judicial independence weakens investor protection and encourages rent-seeking. Eichengreen (2023) documents a strong positive relationship between de facto judicial independence and economic growth. Together, this research underscores that institutional credibility—legal, fiscal, and political - is central to long-run economic outcomes.

Brexit provides a natural experiment linking these themes. A large and influential literature studies its trade, productivity, and macroeconomic consequences. Structural gravity and general-equilibrium analyses (Dhingra et al., 2017; Sampson, 2017; Ottaviano et al., 2013) quantify the long-run trade and income costs of leaving the EU. Firm-level evidence documents increased trade costs and adjustment frictions (Breinlich, Leromain, Novy, Sampson, and Usman, 2022). Research on policy uncertainty highlights investment slowdowns and productivity effects following the referendum (Bloom et al., 2019; Born, Müller, Schularick, and Sedláček, 2019). Broader counterfactual growth studies (Campos, Coricelli, and Moretti) and capital-flow analyses (Forbes, Hjortsoe & Nenova, 2019) further situate Brexit within the macroeconomic consequences of institutional reorientation.

A parallel literature examines political economy drivers of the referendum. Regional trade exposure and import competition shaped voting patterns (Colantone and Stanig, 2018; Becker and Fetzer, 2017). Austerity, regional inequality, and localized economic shocks contributed to pro-Brexit voting behavior (Fetzer). These studies establish that economic dislocation and exposure heterogeneity played a decisive role in the political rupture.

Migration research forms another critical strand. Dustmann and co-authors document labor market and fiscal effects of EU mobility. Portes (2017), Wadsworth (2016), and others analyze post-referendum migration adjustments and labor supply changes. Dhingra and colleagues assess migration alongside trade in quantitative

simulations. This literature demonstrates that Brexit reshaped EU inflows and labor-market composition. Yet most studies treat migration as either a consequence of policy change or as an explanatory variable in referendum voting.

This paper advances the literature by focusing on migration under institutional stress. Brexit unfolded in two stages: the 2016 referendum constituted an expectations shock under continued EU free movement, while the 2021 termination of free movement completed the institutional break. Migration responded to both phases—not merely through regulatory changes but through evolving expectations about institutional anchoring, fiscal credibility, and long-term governance stability.

The empirical framework builds on an exposure–shock difference-in-differences design. Germany serves as the institutional benchmark.

Units are differentiated by pre-Brexit EU mobility exposure. The baseline specification identifies migration reallocation after the 2016 referendum and the 2021 regime completion. The central innovation is to embed an annual “stress” indicator—capturing episodes such as sovereign risk repricing—directly into the migration regression. This extension allows us to test whether fiscal or financial stress amplifies or dampens migration responses to institutional rupture.

The contribution is threefold. First, we show that institutional shocks generate asymmetric migration responses: expectations shocks trigger anticipatory movements, while regime completion induces structural reallocation. Second, we

demonstrate that economic integration—particularly EU mobility—amplifies migration elasticity to institutional change. Third, we show that “stress” modifies migration behavior, transforming migration into a forward-looking indicator of institutional credibility. Under stable governance, migration adjusts gradually; under institutional stress, it reacts sharply to credibility shocks.

By leaning on political economy, trade, migration, and macro literature, the paper reframes Brexit not solely as a trade or productivity shock, but as an institutional credibility event. Migration becomes both an outcome and a transmission mechanism—linking regime change, fiscal stress, and demographic reallocation within advanced democracies.

Early sections emphasize migration as a trigger of institutional erosion (Syrian shock triggers illiberal dynamics). Later sections frame Brexit primarily as an institutional shock affecting migration. These are both valid because of the direction of causality shifts. The Syrian shock illustrates migration as a political trigger; Brexit, by contrast, provides a clean institutional shock allowing migration to be studied as an outcome and transmission mechanism.

Migration Patterns

As Germany serves as the institutional benchmark, to illustrate migration patterns, Figure 1 and Figure 2 present the evolution of immigration, emigration, and net migration as shares of the labor force in the United Kingdom from 2010 to 2023. The

trends highlight the two major Brexit-related regime breaks—the 2016 referendum and the 2021 end of free movement—and illustrate the sharp reconfiguration of the UK’s migration system during this period. Immigration (red line), which had been relatively stable throughout the pre-Brexit decade, declines modestly after 2016 but rises steeply after 2021 with the introduction of the new points-based system, reaching historically high levels. Emigration (blue line) exhibits the opposite pattern: it falls significantly following the referendum, contributing to higher net migration, before rising modestly in the later period—consistent with emerging evidence of increased outward mobility among UK-born workers. Net migration (green line) remains positive throughout, but the post-2021 surge in inflows produces a marked upward shift. Overall, the figure visually captures the central empirical finding of this paper: Brexit did not uniformly reduce migration; it reallocated and reshaped mobility flows, shifting the UK from an EU-centered free-movement regime to a globally oriented, skills-selective migration system.

Figure 1.1 UK Migration Flows (% of Population, LTIM (2012-2024))

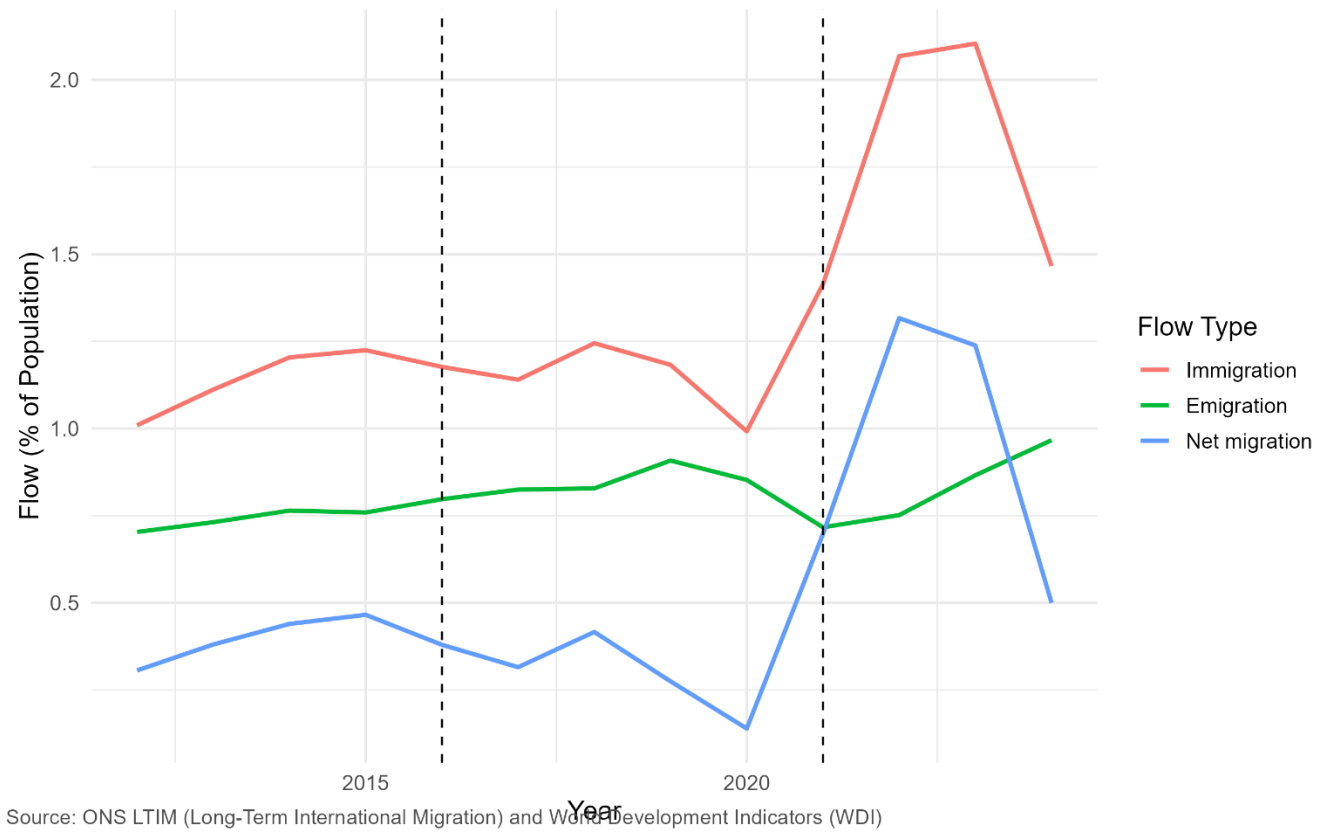


Figure 1.2 Germany: Migration Flows (% of Labor Force), 2012-2024

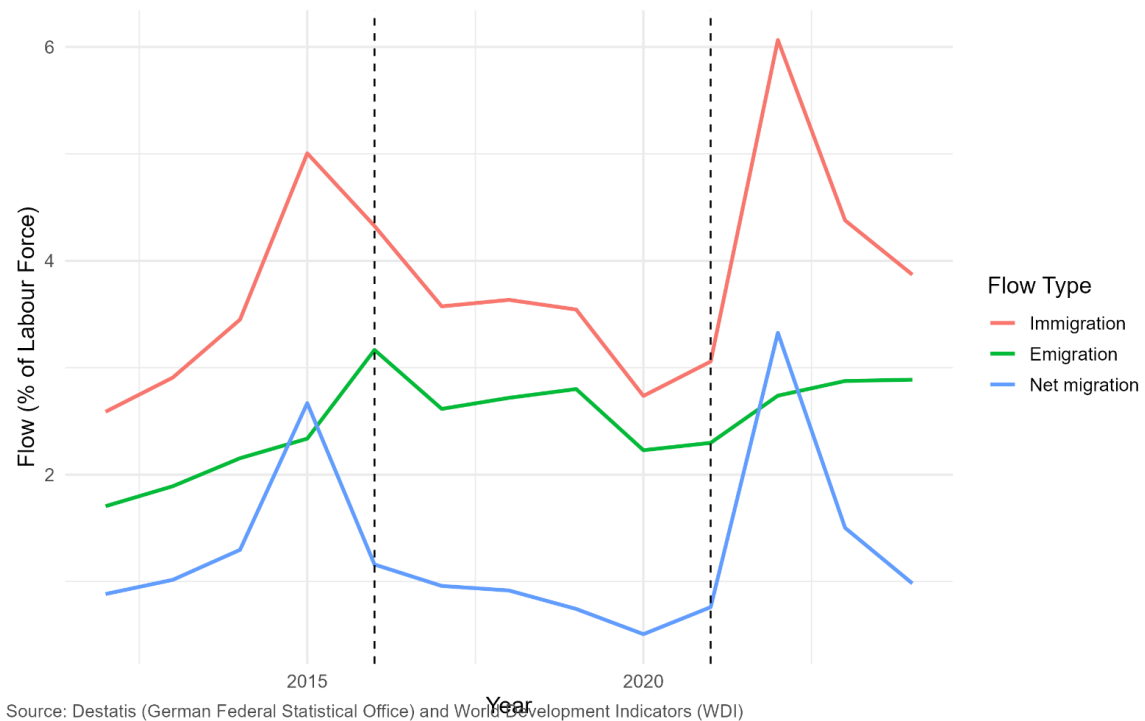


Figure 1.2 illustrates the trajectory of immigration, emigration, and net migration in Germany between 2010 and 2023, providing a stable benchmark against which the United Kingdom’s Brexit-induced shifts can be evaluated. Unlike the UK, Germany did not experience a political or institutional rupture in its mobility regime during this period; it remained fully embedded in the EU’s free-movement framework and continued to admit both EU movers and humanitarian migrants under consistent policy rules. The figure shows relatively steady inflows and outflows, with temporary fluctuations driven by identifiable external events - most notably the 2015–2016 refugee crisis—rather than by regime change. Net migration remains positive throughout, with moderate variance and no structural breaks. This stability underscores Germany’s role as an appropriate counterfactual in the Difference-in-Differences analysis: by contrasting the UK’s sharp post-2016 and post-2021

deviations with Germany's steady patterns, the analysis isolates the extent to which Brexit - not broader European trends - reconfigured UK migration dynamics.

Pre-Brexit Baseline

Before 2016, the UK and Germany were both central destinations for intra-EU mobility, though with different compositions: the UK attracted a large inflow of workers from Central and Eastern Europe under conditions of strong labor demand, flexible markets, and widespread use of English; Germany, especially after 2004 and 2011, increasingly drew both EU workers and humanitarian inflows. Net migration rates in both economies were positive, with the UK experiencing strong EU-born inflows throughout the decade.

Immediate Post-Referendum Adjustment

Following the 2016 referendum, uncertainty regarding the future legal status of EU nationals translated into an early observable behavioral response. The UK experienced a rapid decline in EU immigration and a rise in EU emigration, while Germany - unaffected institutionally - continued to register high levels of EU mobility. In a difference-in-differences framework, the UK relative to Germany shows a sharp negative treatment effect on EU net migration beginning in 2016, even before policy changes took effect. This "anticipatory adjustment" reflects both employer expectations and migrant reassessments of long-term residence conditions.

The 2021 Regime Break: End of Free Movement

The full institutional rupture occurred in January 2021 when free movement formally ended. The UK introduced a point-based immigration system that removed the EU/non-EU distinction and prioritized skilled labor, students, and health-sector workers. Germany, by contrast, remained anchored in its EU-wide free movement regime and humanitarian commitments. The result is a compositional divergence:

- UK *EU net migration becomes strongly negative*, with sustained outflows.
- UK *non-EU immigration rises sharply*, producing historically high total net migration figures.
- Germany's net migration remains high but more stable, with strong inflows from both EU and non-EU origins.

Skill-Selective Migration Dynamics

Brexit also reshaped migration along educational lines. The reduction in EU inflows disproportionately affected workers with lower or medium education, whose entry had previously been facilitated by free movement. Conversely, the UK's new system favored tertiary-educated migrants and international students, producing a relative increase in high-education non-EU inflows compared with Germany. In DiD terms, the UK exhibits:

- a large negative post-2016 effect for low-education EU migration.
- a milder or ambiguous effect for medium education workers.
- and a positive post-2021 effect for highly educated non-EU migrants.

Emigration Responses and Native Mobility

Another overlooked dimension is emigration of UK nationals. Since 2016, emigration of British citizens has trended upward, driven by perceived economic uncertainty, professional opportunities in the EU, and reduced domestic dynamism. Germany does not display a comparable rise in native outward mobility. This divergence reinforces the view that Brexit generated a broad reconfiguration of mobility incentives within the UK.

To sum up, when benchmarked against Germany, Brexit stands out as a structural shock that reoriented the UK's migration system away from EU labor mobility and toward a selective, skills-oriented global model. The aggregate outcome is paradoxical: despite political demands to “take back control” and reduce migration, total UK net migration rose in the post-Brexit period, albeit with a fundamentally transformed composition. Germany's stable institutional environment serves as an effective counterfactual, underscoring that the UK's migration shifts cannot be explained by global trends alone but reflect the distinct institutional and political rupture created by Brexit.

Migration and the Erosion of Institutional Integrity

There is increasing concern that large-scale migration may exert stress on the institutional integrity of recipient countries, particularly when governance structures are fragile or under strain

We hypothesize that when migration inflows are perceived (rightly or wrongly) as undermining cultural cohesion or economic stability, illiberal political actors may exploit such tensions to justify repressive policies. This in turn can erode institutional checks and balances, reduce media freedom, and incentivize the centralization of power under populist or authoritarian leadership. The DiD estimates show a statistically significant correlation between sudden increases in immigration and subsequent declines in CHRI scores, particularly in countries lacking robust civic institutions at the outset.

On the flip side, transitions from liberal to illiberal regimes often prompt increased emigration. Citizens confronted with growing repression, economic uncertainty, or political violence are more likely to seek opportunities abroad.

Section 2 examines the institutional consequences of the Syrian refugee shock, first describing the data sources and identification strategy and then estimating its effects on governance quality. Section 3 turns to Brexit, presenting the econometric framework and baseline Difference-in-Differences estimates of migration outcomes relative to Germany, followed by extensions incorporating exposure heterogeneity and financial stress interactions. Section 4 concludes.

2. Syrian Shock Weakens Institutional Integrity

Brexit and other regime transitions illustrate a fundamental asymmetry: migration responds immediately to institutional change, yet it can also activate and amplify the political forces that produce regime change in the first place. Migration is therefore neither purely exogenous nor merely reactive. It operates at two margins simultaneously - first as a catalyst of political realignment, and subsequently as an endogenous adjustment to the institutional shock that follows.

On the trigger side, the Syrian refugee crisis provides a clear illustration of how a sudden, large-scale migration shock can alter the political equilibrium in democracies that are already institutionally vulnerable. The 2015 inflow was not a gradual demographic trend but a concentrated and highly visible surge, rapidly politicized across Europe. In countries where institutional trust was fragile, the refugee wave became a focal event around which populist and illiberal actors were mobilized. The mechanism operated through more than labor-market competition: it amplified perceived pressures on welfare systems, heightened identity anxieties, and strained administrative and asylum-processing capacity.

Because the shock was externally driven and exogenous to domestic political cycles, it functioned as a catalytic trigger rather than a slow-moving structural force. The salience of the inflow reshaped electoral coalitions, legitimized nationalist rhetoric, and lowered the political threshold for institutional confrontation. In this sense, the Syrian migration shock did not merely coincide with democratic backsliding; it helped activate it. Immigration under crisis conditions became politically

endogenous, transforming from a policy variable into a regime-level stress test that accelerated transitions toward illiberal governance where institutional buffers were weak.

More broadly, large or salient immigration inflows can alter the political equilibrium in democracies that are already institutionally fragile. When inflows are framed as culturally disruptive or fiscally burdensome, they provide a focal issue around which populist or illiberal actors mobilize. The mechanism is not purely economic; it operates through perceived pressures on welfare systems, identity cohesion, and institutional capacity. In such contexts, immigration becomes politically endogenous: it reshapes electoral coalitions and lowers the threshold for regime shifts toward illiberal governance.

Once a regime shift occurs, however, the Syrian Shock reorients in the opposite direction. Democratic backsliding increases emigration incentives, especially among skilled and mobile individuals whose expected returns to human capital depend heavily on institutional quality. The Difference-in-Differences results in Tables III and IV document a robust post-transition increase in emigration following liberal-to-illiberal regime changes. This response is anticipatory as well as realized: exit decisions often precede full institutional consolidation, reflecting forward-looking assessments of judicial independence, policy credibility, and long-run opportunity. Migration in this phase becomes an outcome of regime change, reinforcing the

institutional trajectory by reducing the stock of human capital and weakening domestic opposition capacity.

Syrian Shock (2015)

Around the 2015 refugee crisis, Germany exhibits a pronounced improvement in governance quality (a decline in inverted CHRI), suggesting institutional strengthening despite significant migration pressures. The United Kingdom, by contrast, shows only a modest and temporary fluctuation. The divergence indicates that while Germany absorbed the direct migration inflow, institutional erosion was not immediate; instead, governance indicators improved, possibly reflecting administrative consolidation and rule-based responses to the crisis.

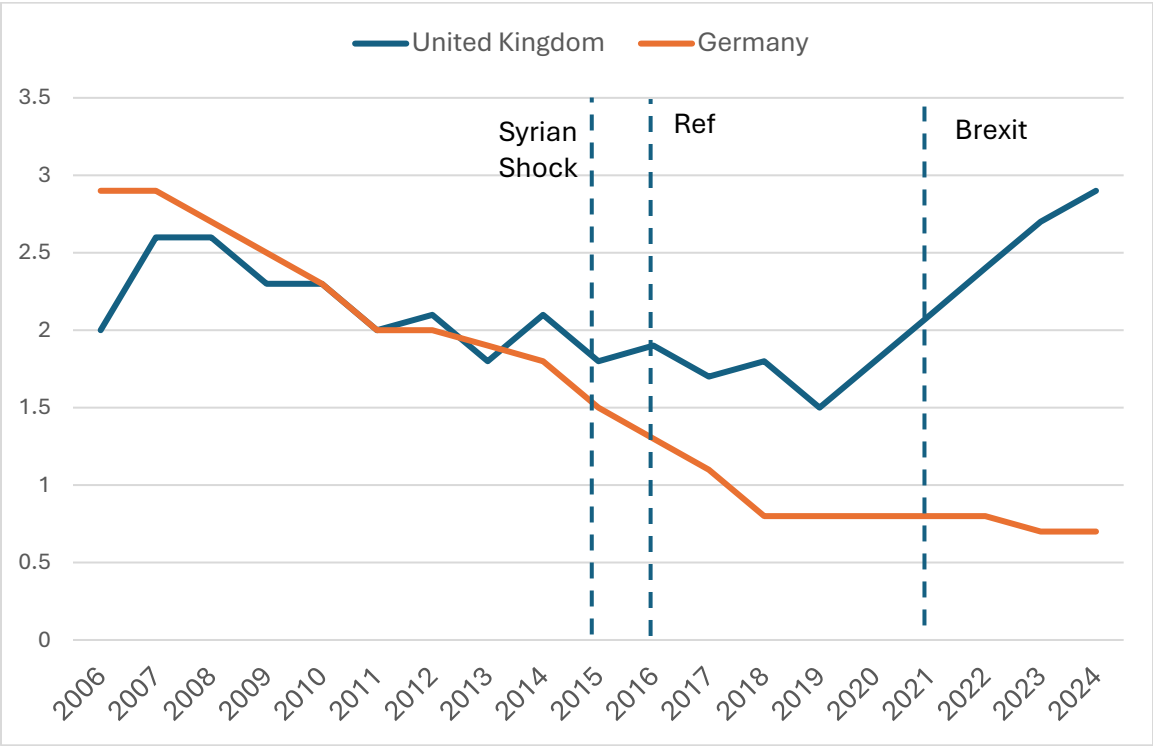
Brexit Referendum (2016)

The referendum period marks a visible turning point for the UK. After 2016, the inverted CHRI for the UK begins a gradual upward drift, indicating weakening institutional constraints relative to the pre-referendum period. Germany's trajectory continues downward (improving governance), widening the institutional gap between the two countries. This suggests that institutional uncertainty triggered by the referendum coincided with a measurable deterioration in the UK's governance indicators.

Brexit Implementation (2021)

Following the end of free movement in 2021, the UK’s inverted CHRI increases more sharply. The post-implementation period is characterized by sustained upward movement in the UK index, signaling further weakening of institutional constraints. Germany remains broadly stable at low CHRI levels, reinforcing its role as a stable institutional benchmark. The widening post-2021 divergence highlights the structural nature of the institutional shift, consistent with the interpretation of Brexit as a regime change rather than a temporary political shock.

Figure 2.1: CHRI inverted for UK and Germany



Notes: UK and Germany's CHRI (2006-2024) chart with vertical markers for key shocks: Syrian Shock (2016), Referendum of Brexit (2016) and Brexit Implementation (2021). Source: Fragile States Index. See Appendix B.

Institutional Strain Around the Syrian Shock, the Referendum, and Brexit

Figure 2.1 plots the inverted CHRI index (where higher values indicate weaker constraints on government power) for the United Kingdom and Germany from 2006 to 2024. Three key institutional episodes are marked: the Syrian refugee shock (2015), the Brexit referendum (2016), and the formal Brexit implementation (2021).

Taken together, the figures suggest a three-stage dynamic:

First, the Syrian refugee shock created asymmetric migration pressures but did not generate immediate institutional deterioration in Germany; instead, institutional indicators improved.

Second, the Brexit referendum coincides with the beginning of institutional divergence, as the UK's governance quality begins to weaken.

Third, the Brexit implementation phase consolidates this divergence, with the UK showing sustained institutional erosion relative to Germany.

Because the index is inverted, rising UK values represent weaker constraints on government power. The increasing post-2016 gap between the UK and Germany is therefore consistent with the interpretation of Brexit as an institutional regime shift rather than a short-run political fluctuation.

2.1. Data Sources

In this study, we combine a range of internationally recognized datasets to examine the relationships between international migration and freedom and rule of law indexes. Our analysis draws on the Civil and Human Rights Integrity (CHRI) Index to assess the robustness of civil rights protections across a range of indicators:

- The presence and enforcement of civil rights laws.
- The extent of freedom of speech and freedom of movement.
- The degree of religious freedom and the prevalence of religious extremism.
- The existence of independent media and the autonomy of journalists to investigate and publish critiques of those in power.
- The accessibility and effectiveness of legal remedies in cases of rights violations.
- The frequency and nature of arbitrary or state-sponsored arrests.

Our data sources in this study combine a range of internationally recognized datasets to examine the relationships between international migration and freedom and rule of law indexes.

The migration data is obtained from the Organization for Economic Co-operation and Development (OECD), which offers detailed details of emigration, immigration and foreign-born population in for the organization's countries. These statistics cover a wide time span (typically from 1995 onward), allowing us to trace medium-term trends and compare countries with different economic and institutional time profiles.

Corresponding data for macroeconomic indicators are obtained from World Bank Development Indicators (WDI) database.

For measures of institutional and social stability, we use the Fragile States Index (FSI) published by The Fund for Peace. The FSI combines 12 political, economic, and social indicators. Integrating this measure allows us to consider how institutional vulnerability interacts with migration and capital flows, particularly in economies experiencing significant structural or political challenges. The Human Rights and Rule of Law Indicator (CHRI) consider the relationship between the state, and its population, insofar as fundamental human rights are protected, and freedoms are observed and respected. The indicator looks at whether there is widespread abuse of legal, political and social rights, including those of individuals, groups and institutions (e.g. harassment of the press, politicization of the judiciary, internal use of military for political P3 ends, repression of political opponents). The indicator also considers outbreaks of politically inspired (as opposed to criminal) violence perpetrated against civilians. It also looks at factors such as denial of due process consistent with international norms and practices for political prisoners or dissidents, and whether there is current or emerging authoritarian, dictatorial or military rule in which constitutional and democratic institutions and processes are suspended or manipulated.

2.2. Syrian Shock Drives Governance quality transition

To identify the institutional consequences of the 2015 refugee inflow, we focus on a sample of OECD and European countries. Within this group, several countries bore the principal brunt of the Syrian refugee crisis:

Germany – became the main destination after Chancellor Merkel’s decision to accept large numbers of asylum seekers under the motto “Wir schaffen das”.

Italy – a key frontline state, receiving flows across the Mediterranean that blended Syrian, North African, and other refugee groups.

Turkey – directly bordering Syria, hosting the largest absolute number of Syrian refugees under international agreements with the EU.

Greece – the first EU entry point through the Aegean islands, where reception capacities were overwhelmed in 2015–2016.

Poland – although not a frontline state, it became central in the EU’s eastward debates about refugee allocation and burden-sharing.

These countries faced not only humanitarian pressures but also institutional and governance strains, ranging from asylum processing capacity, public-service provision, and political backlash against EU-wide relocation schemes.

To capture these dynamics, we estimate a minimal Difference-in-Differences (DiD) specification in which institutional quality (measured by the CHRI index) is regressed on the Syrian shock dummy, year effects, and country effects:

$$(II.2.1) \quad CHRI_{jt} = \alpha_0 + \alpha_1 SYR_t + \alpha_2 Year_t + \alpha_3 Country_j + u_{jt}$$

can be defined as follows:

$CHRI_{jt}$ - the Constraints on Government Power Index (inverted) for country j in year t ; a higher value indicates **weaker governance or reduced institutional checks**.

SYR_t - a time dummy (treatment variable) equal to 1 during the Syrian shock period (2011–2016), and 0 otherwise; it captures the exogenous migration-induced governance effect.

$Year_t$ - a time trend variable accounting for common temporal changes in governance across countries.

$Country_j$ - a set of country fixed effects controlling for time-invariant institutional and structural characteristics of each country (e.g., Germany, Poland, Hungary).

The coefficient α_1 measures the average impact of the Syrian shock on the CHRI index -i.e., how much governance quality (constraints on power) changed during the migration crisis after accounting for time trends and country-specific differences.

The variable SYR captures the exogenous institutional impact of the Syrian refugee shock, beginning in 2015 for the countries most directly affected by the inflow—Germany, Greece, Hungary, Poland, and Turkey. The regressions are estimated over the period 1995–2023, with standard deviations reported in parentheses. The sample includes a broad set of OECD and advanced economies: Australia, Austria, Belgium, Canada, Chile, Colombia, Costa Rica, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States. Institutional quality measures are drawn from the World Governance Indicators (WGI) and related European Commission sources, combined with the author’s calculations.

This baseline setup isolates the average impact of the Syrian Shock SYR_t on legal and institutional governance, controlling for systematic country differences ($Country_j$) and common global shocks ($Year_t$).

Table 2.2.2: The Syrian Effect on Legal Governance

Weak legal Governance (CHRI) and the Syrian Shock

Predictors	Estimates
SYR	0.08 * (0.03)
Observations	261

R^2 / R^2 adjusted	0.301 / 0.202
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* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

The positive and statistically significant Syrian Shock coefficient indicates that, for the countries most affected by the refugee inflows—Germany, Greece, Hungary, Poland, and Turkey - the crisis significantly worsened the legal integrity of governance.

Table 2.2.3 Interaction between the Syrian Shock and Immigration-Labor force Ratio

Predictors	Estimates
log inflow ratio	-0.04 (0.02)
SYR	0.99 ** (0.29)
log inflow ratio × SYR	0.19 ** (0.06)
Observations	224
R^2 / R^2 adjusted	0.221 / 0.148

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Table 2.2.3 examines the relationship between immigration inflows, the Syrian Shock (SYR), and governance quality as measured by the CHRI index. The negative coefficient on the log inflow ratio (−0.04) suggests that, in normal periods, higher immigration relative to the labor force is weakly associated with improved governance quality. However, the strongly positive and significant coefficient on SYR

(0.99**) indicates that during the Syrian refugee crisis, governance quality deteriorated across the affected countries.

Crucially, the positive and significant interaction term (0.19**) shows that the Syrian Shock amplified the impact of immigration on governance deterioration—meaning that the inflow of migrants under crisis conditions had a disproportionately adverse effect on institutional quality compared to normal migration flows.

Taken together, these results suggest that the Syrian refugee crisis functioned as an exogenous stress test for governance systems: while ordinary immigration does not erode governance, a sudden and politically charged inflow like the Syrian Shock can weaken institutional integrity, especially in countries with preexisting vulnerabilities such as Hungary, Poland, and Greece.

In Section 3 we explicitly model the termination of EU free-movement as an EU-exposure shut-off: UK exposure equals one before 2021 and collapses to zero thereafter, allowing both the level and the migration-pricing slope of sovereign risk to change when the institutional anchor is removed. Brexit “shut-off” of EU exposure (free movement) embedded directly into the spread / residual-risk regressions—so the model explicitly distinguishes EU-anchored integration from the post-2021 discretionary regime.

3. Brexit Effects on Migration: Econometric Framework

Brexit provides a clean institutional shock that allows migration responses to be identified within a structured econometric framework, distinguishing between the anticipatory effects of the 2016 referendum and the structural consequences of the 2021 termination of EU free movement.

3.1 “Exposure” and “Stress” Dummies

To identify how Brexit propagated through existing migration networks and how macro-financial turbulence interacted with this process, we introduce two structural modifiers: exposure and stress.

The first captures the degree to which a country was institutionally and demographically integrated into the EU mobility regime prior to Brexit. We define country-level migration exposure as the pre-2016 share of migrants originating from the EU:

$$Exposure_i = \frac{EU\ migrants_i^{pre-2016}}{Total\ migrants_i^{pre-2016}}$$

This measure reflects the intensity of dependence on EU free movement before the institutional rupture. Countries with higher values were more embedded in the EU mobility network and therefore plausibly more sensitive to its disruption.

To operationalize the institutional break in 2021, we define a time-varying EU mobility exposure indicator:

$$EUExpo_{jt} \equiv EU_member_j \times (1 - UK_j \times Post2021_t)$$

For EU members other than the UK, $EUExpo_{jt} = 1$ throughout the sample. For the UK, the variable equals 1 before 2021 and switches to 0 from 2021 onward, reflecting the formal termination of free movement. This structure allows us to distinguish the expectations shock following the 2016 referendum - when EU exposure formally continued—from the institutional shut-off that occurred in 2021.

The second modifier captures exogenous macro-financial disruptions that plausibly affect migration decisions at annual frequency. We define a stress dummy as:

$$Stress_t = 1\{t \in \{2008, 2009, 2020, 2022\}\}$$

These years correspond to major systemic shocks: the 2008–09 global funding and liquidity crisis, the 2020 COVID financial shock, and the 2022 UK fiscal credibility episode associated with gilt market turmoil. By interacting exposure with stress, we

test whether institutional fragility amplifies the migration response to Brexit’s two-stage rupture.

We apply a DiD framework that evaluates how the two major Brexit shocks—the 2016 referendum and the 2021 termination of free movement - altered the United Kingdom’s migration dynamics relative to Germany. As discussed in the conceptual framework

Germany serves as the institutional benchmark. Accordingly, divergence between the UK and Germany after 2016 and 2021 can reasonably be interpreted as reflecting the causal impact of Brexit-induced institutional change.

3.2 Tables and Interpretation

First, we begin with the baseline estimation. To formalize this comparison, we use a Difference-in-Differences (DiD) framework that treats the UK as the “exposed” unit and Germany as the control. Let $MigRate_{it}^g$ denote immigration, emigration, or net migration per 1,000 persons for group g (EU migrants, non-EU migrants, or education-defined groups) in country i and year t .

The baseline model is:

$$MigRate_{it}^g = \alpha_i + \gamma_t + \beta_{1g}(UK_i \times Post2016_t) + \beta_{2g}(UK_i \times Post2021_t) + u_{it}.$$

Here,

- $MigRate_{it}^g$ - immigration, emigration, or net migration per 1,000 persons for group g (EU migrants, non-EU migrants) in country i and year t .
- $UK_i \times Post2016_t$ - interaction between corresponding to the United Kingdom and years from 2016 onward (i.e., after the referendum)
- $UK_i \times Post2021_t$ - interaction between corresponding to the United Kingdom and years from 2021 onward (i.e., after the formal termination of EU free movement)
- α_i captures time-invariant differences between the UK and Germany.
- γ_t absorbs global migration shocks such as economic cycles and COVID-19.
- β_{1g} measures the *anticipatory effect* of the 2016 referendum.
- β_{2g} identifies the *structural effect* of the 2021 termination of free movement.

The empirical analysis is conducted using an annual EU+UK panel covering the period 2012–2024. Migration flows for the United Kingdom are drawn from the UK Office for National Statistics (ONS) Long-Term International Migration (LTIM) series, while migration data for EU countries are obtained from national statistical offices and harmonized international databases (e.g., OECD International Migration Database and Eurostat). Population and labor force denominators are taken from the World Bank's World Development Indicators (WDI). All specifications include country fixed effects (at the iso3c level) and year fixed effects to account for time-invariant cross-country heterogeneity and common macroeconomic shocks.

Country-specific exposure is defined as the pre-2016 mean of the dependent variable for each country. The main regressors interact with this exposure measure with post-referendum indicators for 2016 onward (Post-2016) and for 2021 onward (Post-2021), and further allow these effects to vary in stress years (2008-2009, 2020 and 2022) through triple interaction terms. Standard errors are clustered at the country (iso3c) level to account for within-country serial correlation.

The EU+UK panel includes Austria (AUT), Belgium (BEL), Czechia (CZE), Germany (DEU), Denmark (DNK), Spain (ESP), Estonia (EST), Finland (FIN), France (FRA), United Kingdom (GBR), Greece (GRC), Hungary (HUN), Ireland (IRL), Italy (ITA), Lithuania (LTU), Luxembourg (LUX), Latvia (LVA), Netherlands (NLD), Poland (POL), Portugal (PRT), Slovakia (SVK), Slovenia (SVN), and Sweden (SWE).

Table 3.1(a.1) Net Migration (% population) – UK vs Germany (Excluding Exposure and Stress)

Net migration (% population)		
<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>
UK × Post-2016	-0.523 ***	0.097
UK × Post-2021	-0.393	0.225
Observations	177	

R² / R² adjusted 0.704 / 0.628

p*<0.05 *p*<0.01 ****p*<0.001

Table 3.1(a.2) Net Migration (% Labor Force) – UK vs Germany (Excluding Exposure and Stress)

Net migration (% labor force)		
<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>
UK × Post-2016	-1.053 ***	0.197
UK × Post-2021	-0.742	0.432
Observations	177	
R ² / R ² adjusted	0.708 / 0.633	

p*<0.05 *p*<0.01 ****p*<0.001

Table 3.1(b.1) Immigration (% population) – UK vs Germany (Excluding Exposure and Stress)

Immigration (% population)

<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>
UK × Post-2016	-0.652 ***	0.114
UK × Post-2021	-0.868 **	0.269
Observations	201	
R ² / R ² adjusted	0.826 / 0.788	

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Table 3.1(b.2) Immigration (% Labor Force) – UK vs Germany (Excluding Exposure and Stress)

Immigration (% labor force)		
<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>
UK × Post-2016	-1.320 ***	0.219
UK × Post-2021	-1.664 **	0.517
Observations	201	
R ² / R ² adjusted	0.829 / 0.792	

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Table 3.1(c.1) Emigration (% population) – UK vs Germany (Excluding Exposure and Stress)

Emigration (% population)		
<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>
UK × Post-2016	-0.278 **	0.093
UK × Post-2021	-0.554 ***	0.133
Observations	185	
R ² / R ² adjusted	0.817 / 0.773	

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Table 3.1(c.2) Emigration (% Labor Force) – UK vs Germany (Excluding Exposure and Stress)

Emigration (% labor force)		
<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>

UK × Post-2016	-0.560 **	0.184
UK × Post-2021	-1.067 ***	0.262
Observations	185	
R ² / R ² adjusted	0.816 / 0.771	

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Baseline Tables

The baseline difference-in-differences estimates in Tables 3.1 establish the core migration response to Brexit in a simple UK–Germany benchmark framework without conditioning on exposure intensity or institutional stress. The baseline DiD estimates quantify a sizable referendum shock and a second-stage implementation effect.

For net migration, the UK×Post-2016 coefficient is -0.523 (s.e. 0.097) when scaled by population and -1.053 (s.e. 0.197) when scaled by the labor force - both highly significant - indicating an immediate, economically meaningful drop in UK net migration relative to Germany after 2016. The additional UK×Post-2021 effect is negative (-0.393 ; -0.742) but imprecisely estimated in net terms, consistent with offsetting movements in gross inflows and outflows.

Decomposed the net flow clarifies where the action is. For immigration, the referendum effect is strongly negative (-0.652 of population; -1.320 of labor force, both highly significant), and the implementation phase adds a further significant

decline (−0.868; −1.664). For emigration, the UK also shows a significant decline relative to Germany after 2016 (−0.278; −0.560) and an even larger decline after 2021 (−0.554; −1.067). Taken together, these coefficients imply that the 2016 referendum primarily triggers an expectations-driven contraction in mobility - especially inflows - while the 2021 regime completion deepens the gross flow adjustments, with net migration reflecting the partial offset between falling immigration and falling emigration rather than a one-sided “exit” response.

3.2 The Extended Model – Including Exposure and Stress

We now estimate the extended model:

$$\begin{aligned} Migration_{it} = & \alpha_i + \gamma_t + \beta_1(EUExposure_i \times Post2016_t) \\ & + \beta_2(EUExposure_i \times Post2021_t) \\ & + \beta_3(EUExposure_i \times Post2016_t \times Stress_t) \\ & + \beta_4(EUExposure_i \times Post2021_t \times Stress_t) + \varepsilon_{it} \end{aligned}$$

Where:

- α_i = country fixed effects
- γ_t = year fixed effects
- EUExposure = pre-2016 EU mobility intensity
- Post2016 = referendum expectations phase
- Post2021 = termination of free movement
- Stress = macro-financial shock years

The extended regression is now:

Table 3.2(a.1) Net Migration (% population) – UK vs Germany (Including Exposure, Excluding Stress)

Net migration (% population)		
<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>
Exposure × Post-2016	-1.133 ***	0.199
Exposure × Post-2021	-1.406	0.778
Observations	128	
R ² / R ² adjusted	0.671 / 0.582	

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Table 3.2(a.2) Net Migration (% Labor Force) – UK vs Germany (Including Exposure, Excluding Stress)

Net migration (% labor force)		
<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>

Exposure × Post-2016	-1.168 ***	0.208
Exposure × Post-2021	-1.369	0.758
Observations	128	
R ² / R ² adjusted	0.676 / 0.588	
* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$		

Table 3.2(b.1) Immigration (% population) – UK vs Germany (Including Exposure, Excluding Stress)

Immigration (% population)		
<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>
Exposure × Post-2016	-0.529 ***	0.085
Exposure × Post-2021	-0.843 **	0.282
Observations	167	
R ² / R ² adjusted	0.708 / 0.644	
* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$		

Table 3.2(b.2) Immigration (% labor Force) – UK vs Germany (Including Exposure, Excluding Stress)

Immigration (% labor force)		
<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>
Exposure × Post-2016	-0.545 ***	0.083
Exposure × Post-2021	-0.831 **	0.274
Observations	167	
R ² / R ² adjusted	0.714 / 0.651	

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Table 3.2(c.1) Emigration (% population) – UK vs Germany (Including Exposure, Excluding Stress)

Emigration (% population)		
<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>
Exposure × Post-2016	-0.369 **	0.127
Exposure × Post-2021	-0.755 ***	0.181
Observations	170	

R² / R² adjusted 0.816 / 0.771

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Table 3.2(c.2) Emigration (% Labor Force) – UK vs Germany (Including Exposure, Excluding Stress)

Emigration (% labor force)		
<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>
Exposure × Post-2016	-0.380 **	0.128
Exposure × Post-2021	-0.741 ***	0.182
Observations	170	
R ² / R ² adjusted	0.815 / 0.770	

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Table 3.3(a.1) Net Migration (% population) – UK vs Germany (Including Exposure and Stress)

Net migration (% population)		
<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>
Exposure × post-2016	-0.804 ***	0.180
Exposure × post-2021	-0.879	0.609
Exposure × post-2016 × Stress	-1.577 ***	0.323
Exposure × post-2021 × Stress	-0.999	1.309
Observations	128	
R ² / R ² adjusted	0.676 / 0.580	

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Table 3.3(a.2) Net Migration (% Labor Force) – UK vs Germany (Including Exposure and Stress)

Net migration (% labor force)		
<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>
Exposure × post-2016	-0.827 ***	0.185

Exposure × post-2021	-0.871	0.600
Exposure × post-2016 × Stress	-1.630 ***	0.308
Exposure × post-2021 × Stress	-0.893	1.283
Observations	128	
R ² / R ² adjusted	0.681 / 0.587	

* $p<0.05$ ** $p<0.01$ *** $p<0.001$

Table 3.3(b.1) Immigration (% population) – UK vs Germany (Including Exposure and Stress)

Immigration (% population)		
<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>
Exposure × post-2016	-0.334 ***	0.074
Exposure × post-2021	-0.821 **	0.240
Exposure × post-2016 × Stress	-0.952 ***	0.140
Exposure × post-2021 × Stress	0.297	0.361

Observations	167
R ² / R ² adjusted	0.712 / 0.643

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Table 3.3(b.2) Immigration (% labor Force) – UK vs Germany (Including Exposure and Stress)

Immigration (% labor force)		
<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>
Exposure × post-2016	-0.344 ***	0.070
Exposure × post-2021	-0.821 **	0.237
Exposure × post-2016 × Stress	-0.983 ***	0.138
Exposure × post-2021 × Stress	0.349	0.359
Observations	167	
R ² / R ² adjusted	0.718 / 0.651	

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Table 3.3(c.1) Emigration (% population) – UK vs Germany (Including Exposure and Stress)

Emigration (% population)		
<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>
Exposure × post-2016	-0.247	0.120
Exposure × post-2021	-0.891 ***	0.216
Exposure × post-2016 × Stress	-0.590 **	0.155
Exposure × post-2021 × Stress	0.622 **	0.168
Observations	170	
R ² / R ² adjusted	0.817 / 0.769	

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Table 3.3(c.2) Emigration (% Labor Force) – UK vs Germany (Including Exposure and Stress)

Emigration (% labor force)		
<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>
Exposure × post-2016	-0.254 *	0.120
Exposure × post-2021	-0.881 ***	0.218
Exposure × post-2016 × Stress	-0.606 ***	0.156
Exposure × post-2021 × Stress	0.641 **	0.172
Observations	170	
R ² / R ² adjusted	0.816 / 0.768	

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Exposure-Stress Tables

Net migration declines sharply in the United Kingdom relative to Germany following the 2016 referendum. Measured as a share of population, the UK × post-2016 coefficient is -0.523 ($p < 0.001$); expressed relative to the labor force, the magnitude is -1.053 ($p < 0.001$). The 2021 termination of free movement carries an additional negative sign, but the estimates for net migration are not statistically precise. Decomposing net flows clarifies the mechanism. Immigration falls strongly and persistently in both stages: after 2016 (-0.652 and -1.320 , highly significant across denominators) and again after 2021 (-0.868 and -1.664 , statistically significant). Emigration also declines relative to Germany, particularly after 2021. The baseline

picture is therefore not one of simple outward flight, but of a broad contraction in two-way mobility. The referendum appears to operate primarily through an expectations channel, while the formal termination of free movement deepens the decline in gross inflows.

Table 2 replaces the simple UK indicator with an exposure measure capturing the intensity of pre-Brexit migration linkages

The results show that the contraction in migration is systematically stronger in more exposed settings. For net migration, $\text{Exposure} \times \text{post-2016}$ is large and highly significant (around -1.13 to -1.17 across denominators), whereas the post-2021 interaction is negative but less precisely estimated. Immigration again shows robust exposure-weighted declines in both periods, with particularly clear effects after 2021. Emigration responds as well, with negative and statistically significant exposure interactions that strengthen in the implementation phase. These findings indicate that Brexit propagated along pre-existing mobility networks: the greater the prior integration with the UK, the larger the subsequent contraction. The referendum shock thus reallocated migration flows across Europe through an exposure channel consistent with institutional rupture.

Tables 3.3 estimates reveal that stress substantially amplifies the 2016 referendum effect. For net migration, the triple interaction $\text{Exposure} \times \text{post-2016} \times \text{Stress}$ is strongly negative and highly significant, indicating that institutional fragility magnifies the contraction in exposed countries during the expectations phase. Immigration

displays the same pattern: stress deepens the post-referendum decline in inflows. By contrast, the 2021 interactions are more heterogeneous. For emigration, stress amplifies the initial contraction in 2016, but reverses sign in the post-2021 period, suggesting that once free movement formally ended, higher-stress environments experienced relatively stronger outward adjustments. Taken together, the evidence supports a two-stage institutional rupture interpretation: the 2016 referendum generated an expectations shock that reweighted migration decisions in exposure-dependent and stress-sensitive ways, while the 2021 implementation completed the structural reallocation of flows, particularly on the gross immigration margin.

4. Conclusion

The analysis in the paper should be viewed as identifying the short-run effects of the Brexit shock - capturing the immediate behavioral and market responses following the rise in political and regulatory uncertainty. In contrast, the fiscal self-selection framework² highlights long-run structural adjustments that unfold gradually as institutions, incentives, and factor mobility interact. Brexit raises institutional risk, which disproportionately discourages skilled migration and reduces the UK's attractiveness as a destination for foreign direct investment. Because skilled labor and FDI are complementary, declines in one reduce returns to the other, creating a

² See the Razin-Sadka fiscal-self-selection model in Razin et al (2002) and Razin and Wahba (2015).

self-reinforcing mechanism that pushes the economy toward a lower equilibrium of both human capital and investment.

The baseline Difference-in-Differences estimates establish a clear short-run response: following the 2016 referendum, net migration to the United Kingdom declined sharply relative to Germany, driven primarily by a significant fall in immigration. The 2021 termination of free movement reinforced this adjustment on the gross inflow margin. Importantly, the contraction was not simply outward flight; both immigration and emigration declined, indicating a broader reduction in mobility integration. The referendum thus operated first as an expectations shock, while the formal regime break deepened the structural reallocation of flows.

Introducing pre-Brexit EU mobility exposure reveals that migration responses were heterogeneous and systematically stronger in more integrated settings. The contraction in net migration and immigration after 2016 is amplified where pre-existing EU linkages were deeper, confirming that Brexit propagated along established mobility networks. The 2021 implementation further reinforced these exposure-weighted effects, particularly for immigration. When macro-financial stress is incorporated, the 2016 effects intensify markedly: institutional fragility magnifies the contraction in exposed countries during the expectations phase. Stress interacts less uniformly with the 2021 regime break, but the evidence suggests that once free movement formally ended, outward adjustments became more pronounced in higher-stress environments. Together, the results support a

sequential interpretation: an expectations-driven reweighting of migration decisions in 2016 followed by structural regime completion in 2021.

Beyond the short-run empirical effects, the findings align with the fiscal self-selection framework (Razin, Sadka, and Swagel, 2002; Razin and Wahba, 2015). Institutional risk alters the relative returns to skill and investment, thereby reshaping the composition of migration and foreign direct investment. Because skilled labor and FDI are complementary, a rise in perceived institutional fragility can generate a self-reinforcing equilibrium characterized by weaker human-capital inflows, lower investment, and diminished fiscal capacity. In this sense, Brexit is not merely a trade shock or a regulatory adjustment; it is an institutional credibility event. Migration becomes both an outcome and a transmission mechanism of regime change, linking political rupture to long-run growth dynamics.

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