The End of Free Movement and International Migration[*]

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Abstract

This paper examines how the end of free movement following Brexit in January 2021 reshaped non-transient international migration flows involving the UK. Using a novel dataset of monthly bilateral migration flows from 2019 to 2022 constructed from Facebook user location data covering 181 countries with high spatial and temporal resolution, we estimate a gravity model framework to assess post-Brexit changes in migration patterns. We find that the end of free movement significantly reduced migration between the UK and EU countries, while migration from non-EU countries to the UK increased. Migration from the UK to non-EU countries also declined. These findings illustrate that Brexit reconfigured the geography and composition of international migration flows.

Keywords: Brexit, the European Union, Facebook mobility data, international migration

JEL Codes: F22, J61, R23

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1   Introduction

The 2016 Brexit referendum set in motion the UK's departure from the European Union (EU) and raised immediate uncertainty about the future of cross-border mobility. Immigration was a central theme in the campaign, particularly around the EU's principle of free movement, which allowed UK and EU citizens to live and work across member states without restriction. Although the UK officially left the EU on January 31, 2020, free movement continued during the transition period until January 1, 2021, when the UK formally ended free movement and introduced a new points-based immigration system.[1] This eliminated preferential treatment for EU citizens and expanded access for skilled non-EU migrants through pathways such as the Health and Care Worker Visa and Graduate Visa.

While much of the existing literature focuses on the 2016 Brexit referendum and the uncertainty it created, little is known about how migration patterns responded to the actual implementation of the UK's new points-based immigration system. This paper provides new evidence on the realized effects of that policy change by examining international migration flows to and from the UK in the immediate post-Brexit period.

We use monthly bilateral migration flow data derived from Facebook user location information covering 181 countries from January 2019 to December 2022. These high-frequency, globally comparable data exclude short-term travel and enable us to track real-time changes in long-term migration patterns. We implement a gravity model framework comparing UK-related flows before and after January 2021 to flows involving other countries. We find that Brexit led to a decline in migration between the UK and EU countries, alongside a shift in the composition of UK-bound migration. Migration from the UK to non-EU countries also declined, while migration from non-EU countries to the UK increased. Complementary data from UK Home Office visa statistics shows that this rise was driven primarily by increases

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[1]The UK's post-Brexit points-based immigration system evaluates visa applicants based on characteristics such as job offer, salary level, English language ability, and qualifications. Applicants must typically reach 70 points to qualify. See UK Home Office (2020): *The UK's Points-Based Immigration System: Policy Statement*, available at https://www.gov.uk/government/publications/the-uks-points-based-immigration-system-policy-statement.

in skilled and temporary worker visas issued to non-EU nationals, particularly from South Asia, non-EU Europe, and Central Asia. These patterns align with the UK's post-Brexit visa regime, which reduced EU mobility while expanding access for skilled non-EU migrants.

Prior studies examining the effects of the 2016 referendum find that EU migration to the UK declined following the referendum, with reduced inflows and increased emigration relative to non-EU migrants, alongside an increase in UK-to-EU migration for EU nationals, driven by uncertainty (Di Iasio and Wahba, 2023; Auer and Tetlow, 2023). Amuedo-Dorantes and Romiti (2024) document a significant decline in international student applications from EU countries. Fewer papers examine the post-2021 end of free movement. Structural models (Valverde and Latorre, 2019; Sargent, 2023) predict that restricting EU mobility reduces labor market flexibility, depresses wages, and lowers aggregate welfare.

Our paper contributes to this literature by offering evidence on global migration reallocation following the actual end of free movement. Using high-frequency bilateral mobility data covering not only flows between the UK and other countries but also EU–EU and EU–non-EU flows, we benchmark UK migration shifts against movements involving both EU and non-EU countries. Importantly, we focus on non-transient migration, which aligns with the scope of the UK's post-Brexit points-based immigration system.

2   Data

Our analysis uses novel monthly country-to-country migration flow estimates for 181 countries from January 2019 to December 2022, constructed from privacy-protected Facebook user data and recently published by Chi et al. (2025).[2] A migration event is defined as a change in primary residence across countries that lasts at least 12 months, consistent with the United Nations' statistical definition of migration (DESA, 1998).

This feature makes the data particularly well-suited for our analysis, as it captures long-

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[2]The data are publicly available through the Humanitarian Data Exchange. See Chi et al. (2025). Although the migration data is available for 181 countries, our final dataset after merging with important control variables consists of 177 countries.

term international migration rather than short-term travel. The data explicitly exclude users whose location changed only briefly or who returned to their prior country within a year. This allows us to focus specifically on substantive cross-border migration decisions.

To account for selection bias in Facebook usage and differences in internet penetration, the raw counts are reweighted using a selection model that adjusts for platform adoption rates and country-level income. The resulting estimates are population-representative and benchmarked against administrative statistics from New Zealand and Eurostat, demonstrating strong alignment in both magnitude and trend.[3]

For our purposes, these data provide an exceptional combination of monthly frequency, global bilateral coverage, and temporal precision, which are rarely available in conventional migration statistics. This high-resolution structure enables us to examine short-run responses to institutional changes such as Brexit using consistent migration measures across countries.

One limitation of the migration flow data is that it does not distinguish between migrants based on nationality. Therefore, inflows from EU countries to the UK may include returning UK nationals. If Brexit prompted UK citizens living abroad to repatriate, this would inflate recorded in-migration from the EU without reflecting a true increase in EU-origin migration. As such, the observed declines in EU-to-UK migration flows likely understate the true effect of Brexit on foreign EU nationals' mobility into the UK. We thus suggest interpreting the results as changes in migration flows between countries rather than by nationality, and caution against drawing conclusions about the movement of specific population groups.

Figure 1 shows migration trends around Brexit by origin and destination. Panel (a) shows a sharp drop in EU-to-UK migration relative to intra-EU flows. Panel (b) shows stable UK-to-EU migration. Panel (c) reveals a post-Brexit divergence: EU-to-UK migration declined slightly while non-EU migration rose sharply. Panel (d) shows a mild decline in UK emigration to both EU and non-EU destinations.

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[3]The dataset excludes very small countries and countries where Facebook is banned or restricted. To preserve user privacy, noise is added to the reweighted estimates using differential privacy techniques, which may introduce small errors especially in low-volume flows. See Chi et al. (2025) for methodological details.

3 Empirical Strategy

We estimate the effects of the end of free movement following Brexit on international migration flows using a pair of gravity models of migration (Beine et al., 2016; Ramos, 2016), implemented using a Poisson Pseudo-Maximum Likelihood (PPML) estimator.[4] We use the following equations to estimate changes in UK-origin and UK-destination migration flows:

UK as origin:

$$m_{ijt} = \exp\left[\beta \times (UK_i \times Post_t) + \gamma \times \log(GDP_{it}^{pc}) + \theta \times BC_{it} + \alpha_{ij} + \delta_{jt}\right] \times \varepsilon_{ijt} \quad (1)$$

UK as destination:

$$m_{ijt} = \exp\left[\beta \times (UK_j \times Post_t) + \gamma \times \log(GDP_{jt}^{pc}) + \theta \times BC_{jt} + \alpha_{ij} + \delta_{it}\right] \times \varepsilon_{ijt} \quad (2)$$

In both equations, m_{ijt} denotes the number of migrants from origin i to destination j in month t. UK_i and UK_j are indicators for whether the UK is the origin or destination. $Post_t$ equals one from January 2021 onward.

We estimate these equations using two samples. The first includes only EU countries and the UK, comparing UK–EU flows to EU–EU flows. The second includes flows between the UK or EU countries and non-EU countries, comparing UK-EU flows to UK-non-EU flows.

All specifications include dyadic fixed effects α_{ij} to absorb time-invariant bilateral factors, such as geographic distance, shared language, or historical ties. We also include destination-month fixed effects δ_{jt} when the UK is the origin, and origin-month fixed effects δ_{it} when the UK is the destination, to account for time-varying shocks on the non-fixed side. These fixed effects flexibly absorb contemporaneous shocks such as economic crises, political instability, seasonal migration patterns, and global events. We also control for the annual GDP per capita for the non-fixed side of the dyad to capture economic opportunity, consistent with

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[4]PPML handles zero flows without dropping observations and produces consistent estimates in the presence of heteroskedasticity (Silva and Tenreyro, 2006; Shepherd et al., 2013).

gravity model frameworks.[5] Standard errors are clustered at the origin-destination level.

To account for COVID-related border closures, we control for a binary variable BC_{it} (or BC_{jt}) that equals one if the country at the non-fixed side implemented a partial or full ban on incoming travelers in a given month.[6]

4 Results

Table 1 presents the estimated effects of Brexit on international migration flows using a series of PPML regressions. Each column corresponds to a different specification, varying the direction of the migration flow and the comparison group.

Columns (1) and (2) examine changes in UK–EU migration relative to EU–EU migration. Column (1) shows that migration from EU countries to the UK declined by 19.6% after Brexit, compared to migration between other EU countries.[7] Column (2) shows a 29.3% decline in migration from the UK to EU countries, relative to migration from other EU origins to EU destinations. These findings indicate a significant reduction in the UK's exchange of migrants with the EU, suggesting that the end of free movement meaningfully disrupted mobility between the UK and its former partner countries.

Columns (3) and (4) explore whether these changes generalized to non-EU flows. Column (3) reveals a statistically significant increase in migration from non-EU countries to the UK of 35.4%, compared to migration from non-EU countries to EU destinations. In contrast, Column (4) shows that migration from the UK to non-EU countries declined by 17.3%, relative to flows from EU countries to non-EU destinations. This asymmetry suggests that Brexit reoriented UK-bound migration by reducing intra-European mobility while opening space for new inflows from outside the EU. These trends are consistent with reports

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[5]GDP per capita can be interpreted as the deterministic component of destination utility in random utility maximization models of migration, reflecting the economic attractiveness of a location. We include GDP per capita only for the non-fixed side, as origin-month or destination-month fixed effects absorb variation on the fixed side. On the non-fixed side, it also captures labor market conditions such as COVID-related disruptions.

[6]Border closure data from Hale et al. (2021). GDP per capita is excluded on the fixed-effect side.

[7]Percentage changes are calculated as $(\exp^{\beta} - 1) \times 100$, where β is the estimated coefficient.

documenting the rise in recruitment of skilled migrants from non-EU countries following the introduction of the new immigration system.[8]

While the Facebook data do not contain information on migrants' education or occupation, we complement the analysis with descriptive evidence from the UK Home Office visa statistics. These data, illustrated in Figures A1-A4 show that after the end of free movement, the number of work visas issued to non-EU nationals increased sharply, driven primarily by increases in the skilled worker and temporary worker categories. Within these groups, South Asian nationals accounted for much of the rise in skilled work visas, while non-EU European and Central Asian nationals dominated temporary work visas. By contrast, visas granted to EU nationals remained very low throughout the period, consistent with the loss of automatic mobility rights following Brexit.[9]

Overall, the results point to a substantial reorganization of migration flows involving the UK after Brexit. While migration within the EU remained relatively stable, the UK experienced a sharp decline in both inbound and outbound flows involving EU countries, coupled with a rise in inbound migration from non-EU origins. These patterns reflect a structural transformation in the UK's migration landscape following the formal end of free movement.

5   Conclusion

This paper examines how the end of free movement between the UK and the EU affected international migration. Using high-frequency bilateral migration data and gravity models, we find that Brexit led to a sharp decline in UK-EU migration and a concurrent increase in migration from non-EU countries to the UK. These shifts indicate a reorientation of the UK's migration system away from Europe and toward other global partners.

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[8]For example, student visas issued to nationals from India and Nigeria increased the most (Sumption, 2022). Also, see Cuibus (2023).

[9]It should be noted that before 2021, the number of visas issued to EU nationals was effectively zero, as citizens of EU member states did not require a visa to live, work, or study in the UK under the free movement arrangement.

Because our data begin in 2019, our estimates isolate the effects of the formal end of free movement in January 2021, rather than earlier anticipatory responses. While EU-UK migration had already fallen during the transition period (Rampazzo et al., 2025), we document substantial additional changes post-implementation. This suggests that beyond uncertainty, the introduction of new institutional barriers, such as visa requirements, had distinct and meaningful effects on cross-border mobility.

References

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[3] Beine, M., Bertoli, S., and Fernández-Huertas Moraga, J. (2016). A Practitioners' Guide to Gravity Models of International Migration. *The World Economy*, 39(4):496–512.

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Figures and Tables
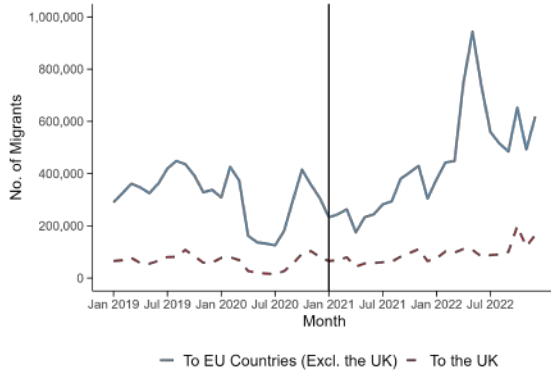
(a) Number of migrants from EU countries to other EU countries vs. to the UK
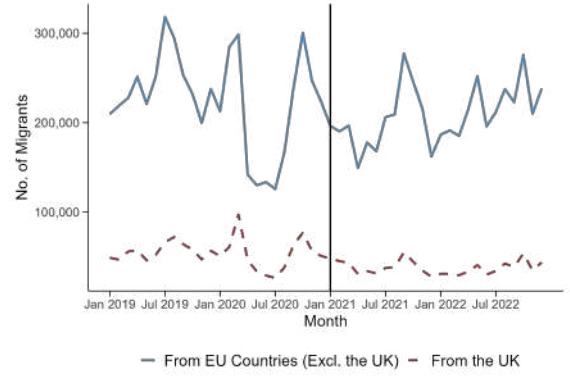
(b) Number of migrants to EU countries from other EU countries vs. from the UK
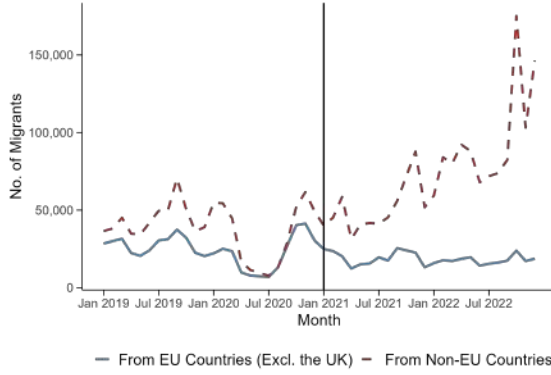
(c) Number of migrants to the UK from EU countries vs. non-EU countries
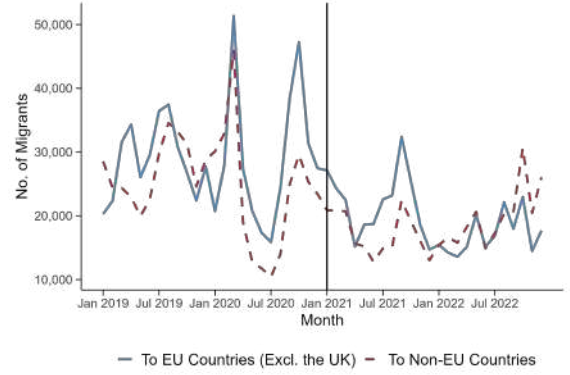
(d) Number of migrants from the UK to EU countries vs. non-EU countries

Figure 1: Trends in Migration Flows Around Brexit

Notes: Each subplot shows monthly international migration flows involving the UK and EU countries from January 2019 to December 2022, based on Facebook location data. The vertical black line marks the end of the Brexit transition period (January 2021). Migration flows are grouped by origin and destination: from EU countries to the UK and other EU countries (top left); to EU countries from the UK and other EU countries (top right); to the UK from EU vs. non-EU countries (bottom left); and from the UK to EU vs. non-EU countries (bottom right).

Table 1: PPML Estimates of Post-Brexit Effects on Migration Flows

	(1)	(2)	(3)	(4)
Direction	EU → UK	UK → EU	Non-EU → UK	UK → Non-EU
Compared to	EU → EU	EU → EU	Non-EU → EU	EU → Non-EU
UK (Origin) × Post		-0.347***		-0.190***
		(0.033)		(0.029)
UK (Destination) × Post	-0.218***		0.303***	
	(0.049)		(0.054)	
% Change	-19.6%	-29.3%	35.4%	-17.3%
N	36,288	36,288	186,084	186,084
Adjusted R^2	0.969	0.971	0.966	0.928
Controls	X	X	X	X
Dyadic Fixed Effects	X	X	X	X
Origin-Month Fixed Effects	X		X	
Destination-Month Fixed Effects		X		X

Notes: Each column reports coefficients from PPML regressions estimating the effects of Brexit on monthly international migration flows. Percentage changes are calculated as $(\exp^{\beta} -1) \times 100$, where β is the estimated coefficient. The dependent variable is the number of migrants from origin i to destination j in month t. All regressions include dyadic (origin-destination) fixed effects. Columns with UK as the origin include destination-month fixed effects; columns with UK as the destination include origin-month fixed effects. GDP per capita and border closure controls are included for the non-fixed side of the dyad. Standard errors are clustered by origin-destination pair. $^*p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

APPENDICES

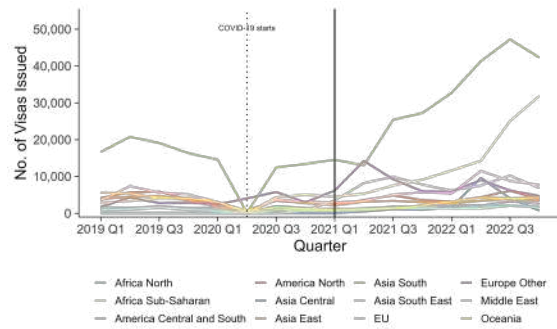# A   Extra Figures
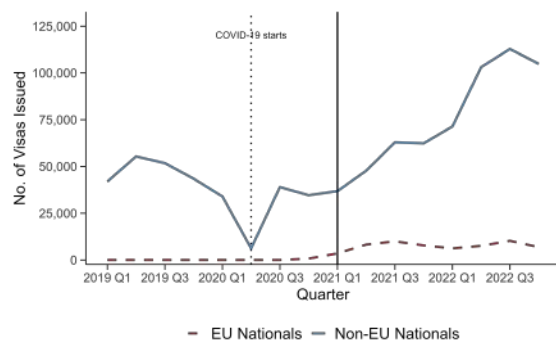
(a) Work
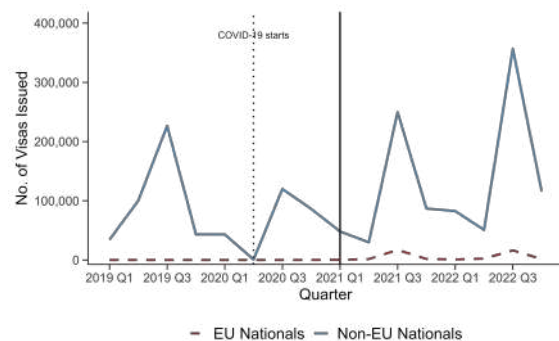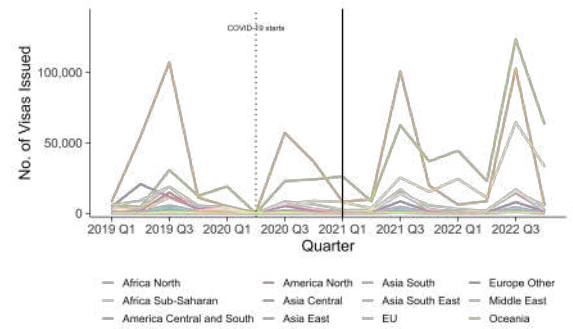

(b) Study
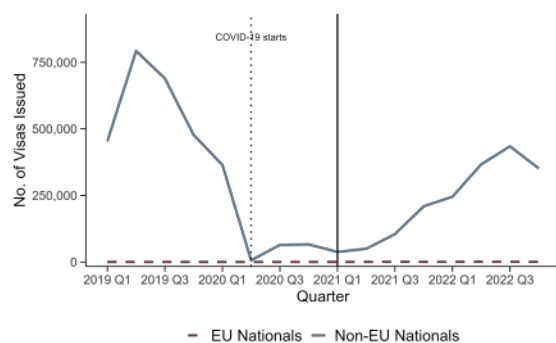
(c) Visit
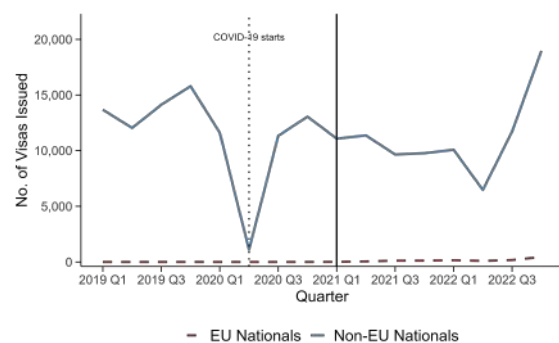
(d) Family

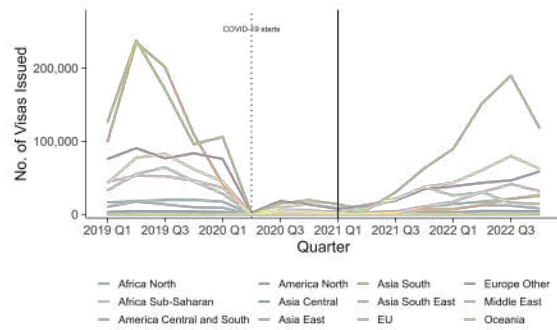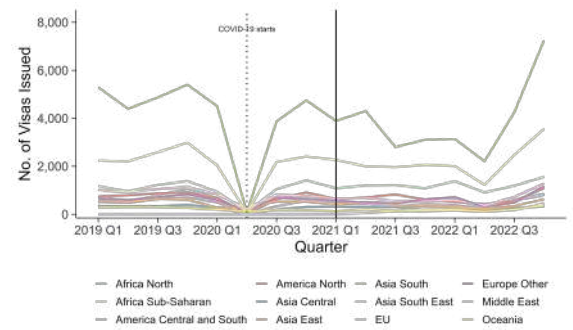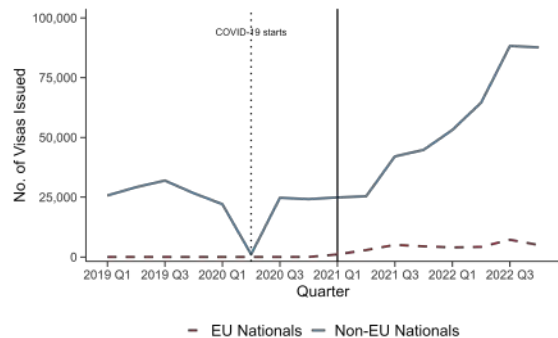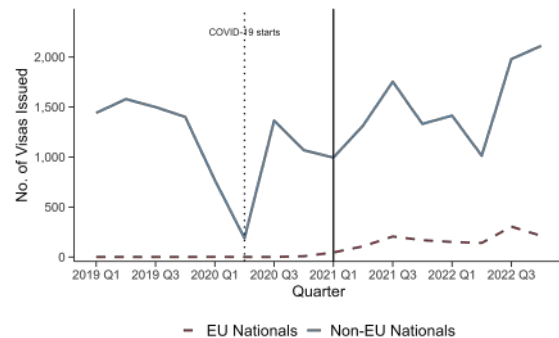Figure A1: No. of Visas Issues by Visa Type and Origin

Notes: Each subplot shows the number of UK visas issued to foreign nationals by EU or non-EU origin at the quarterly level from 2019 Q1 to 2022 Q4. The vertical black line marks the end of the Brexit transition period (January 2021). Source: Author's calculations based on UK Home Office visa statistics, available through the UK Government Statistical Data Sets (https://www.gov.uk/government/statistical-data-sets).

(a) Work

(b) Study

(c) Visit

(d) Family

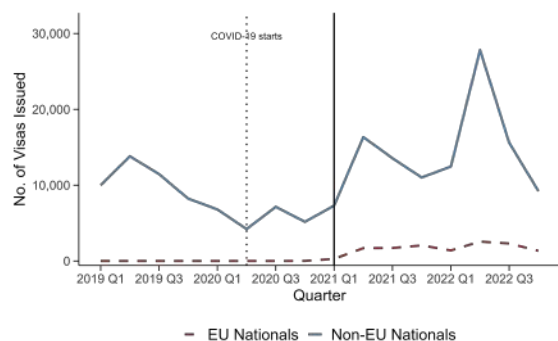Figure A2: No. of Visas Issues by Visa Type and Origin

Notes: Each subplot shows the number of UK visas issued to foreign nationals by region of origin at the quarterly level from the first quarter of 2019 to the fourth quarter of 2022. The vertical black line marks the end of the Brexit transition period (January 2021). Source: Author's calculations based on UK Home Office visa statistics, available through the UK Government Statistical Data Sets (https://www.gov.uk/government/statistical-data-sets).
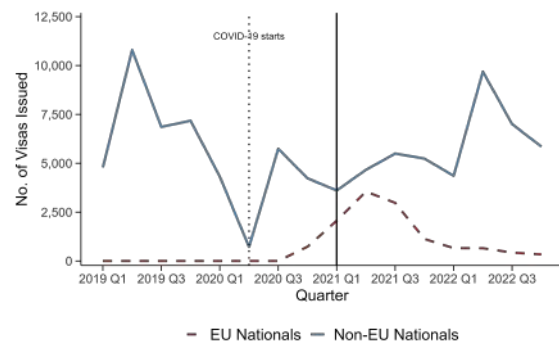
13

(a) Skilled Worker

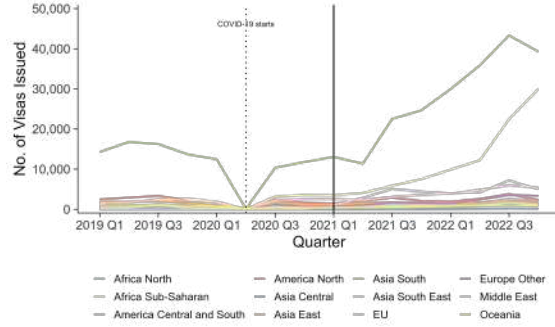(b) Investment, Business Development, and Talent
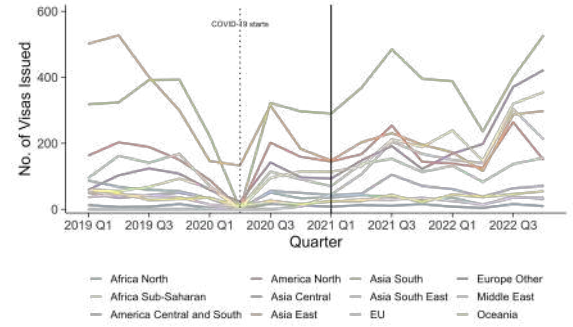
(c) Temporary Worker

(d) Other Work Visas and Exemptions

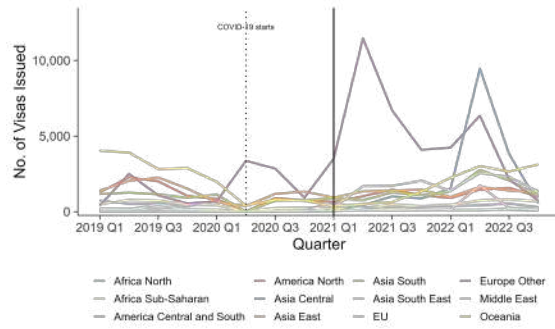Figure A3: No. of Work Visas Issues by Visa Type and Origin

Notes: Each subplot shows the number of UK work visas issued to foreign nationals by EU or non-EU origin at the quarterly level from 2019 Q1 to 2022 Q4. The four panels correspond to different visa categories: (a) Skilled Worker, which covers long-term employment routes such as the Skilled Worker and Health and Care Worker visas; (b) Investor, Business Development and Talent, which comprises high-value routes for investors, entrepreneurs, and individuals with exceptional talent; (c) Temporary Worker, which includes short-term or seasonal employment routes such as Seasonal Worker and Government Authorized Exchange visas; and (d) Other Work Visas and Exemptions, which encompass miscellaneous employment categories and visa exemptions not covered elsewhere. The vertical black line marks the end of the Brexit transition period (January 2021). Source: Author's calculations based on UK Home Office visa statistics, available through the UK Government Statistical Data Sets (https://www.gov.uk/government/statistical-data-sets).
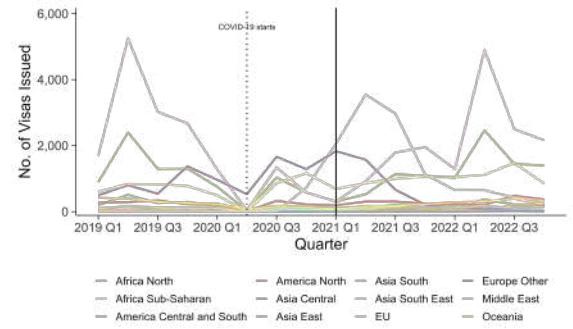
(a) Skilled Worker

(b) Investment, Business Development, and Talent

(c) Temporary Worker

(d) Other Work Visas and Exemptions

Figure A4: No. of Work Visas Issues by Visa Type and Origin

Notes: Each subplot shows the number of UK work visas issued to foreign nationals by region of origin at the quarterly level from the first quarter of 2019 to the fourth quarter of 2022. The four panels correspond to different visa categories: (a) Skilled Worker, which covers long-term employment routes such as the Skilled Worker and Health and Care Worker visas; (b) Investor, Business Development and Talent, which comprises high-value routes for investors, entrepreneurs, and individuals with exceptional talent; (c) Temporary Worker, which includes short-term or seasonal employment routes such as Seasonal Worker and Government Authorized Exchange visas; and (d) Other Work Visas and Exemptions, which encompass miscellaneous employment categories and visa exemptions not covered elsewhere. The vertical black line marks the end of the Brexit transition period (January 2021). Source: Author's calculations based on UK Home Office visa statistics, available through the UK Government Statistical Data Sets (https://www.gov.uk/government/statistical-data-sets).