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Immigration, Unemployment and Wages: New Causality Evidence from the United Kingdom

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Abstract

The vast literature on the effects of immigration on wages and employment is plagued by likely endogeneity and aggregation biases. Ours is among the first papers to address both of these issues by means of causality analysis and by accounting for human capital endowments. Our analysis confirms the previous finding of limited effect of immigration on unemployment and wages in aggregate analysis. We do find, however, evidence of distributional effects when accounting for human capital of non-migrants.

JEL-Codes: F220, J210, J610.

Keywords: immigration, unemployment, wages, UK, European Union.

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1. Introduction

There is a vast literature on the determinants and consequences of international migration on wages and unemployment rates. Most studies use cross-sectional or panel data to show that the effects of labor mobility are positive but small (for recent surveys see Lewis and Peri 2015, Portes 2015, and Wadsworth et al., 2016). Yet it is fair to say these findings have apparently failed to persuade policy-makers, politicians or the general public. One reason may be that preferred methods are not sufficiently convincing or intuitively appealing. In particular, two issues undermine the validity of these results. First, immigrants do not choose their location randomly. Rather, they are attracted by favorable labor market conditions. This, in turn, makes immigration endogenous. Second, aggregate analysis (say at the national level) can fail to detect potentially important effects that occur in specific segments of the labor market. The present paper tries to address both of these drawbacks by putting forward novel evidence based on regional data on the direction of causality between migration and unemployment or wages, using the experience of the United Kingdom (UK) in the wake of the 2004 EU enlargement.

In 2004, ten mainly Eastern European countries joined the European Union and the UK, Ireland and Sweden were the only member states that allowed them unrestricted access to their labor markets.[1] Around 1 million immigrants arrived in the UK between May 2004 and March 2009. Poles went from being a marginal group to become the third largest ethnicity in the UK. While before 2004 EU citizens were a relatively modest fraction of the overall net immigration into the UK, their share increased to about a third by 2005 and to almost half in 2016 (Office for National Statistics, 2016).

Endogeneity is a key issue for the estimation of the effects of migration flows on

[1] These ten countries were the Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, and Slovenia.

native workers' wage and unemployment rates. Immigrants may be more likely to go to places that offer good employment prospects and/or high wages. If unaccounted for, this can lead to biased estimates. The standard solution involves using suitable instruments which are notoriously difficult to find and justify. In the context of analyses of labor-market effects of immigration, the standard solution is to use the previous stock of immigrants. The citizens of the new member states (NMS), however, were restricted from migrating to the UK during the Cold War. Therefore, this option is not very practical in this context.

Granger causality analysis is a well-established technique, which (to the best of our knowledge) is thus far an untried method in this area. It is also more straightforward, transparent and intuitively appealing than using instrumental variables.

Using the UK Labor Force Survey quarterly data from 2004 to 2013, we investigate whether and how the share of EU immigrants relates to regional unemployment rates and regional wages. Our results, which were subjected to various robustness tests, suggest that there is little evidence of an adverse effect of immigration on either unemployment or wages in the UK since 2004.

2. Related literature

A large body of econometric evidence has been dedicated to the analysis of the labor market impact of immigration. Most studies show that the net effect of labor mobility is positive although quite small (Clemens 2011, Devlin et al. 2014, Kahanec 2013) For instance, Felbermayr et al. use data on a panel of countries and instrumental variables estimates to find that a "10% increase in the migrant stock leads to a per capita income gain of 2.2%" (2010, p. 179.). Aleksynska and Tritah (2015) further probe which mechanisms are at work, focusing on OECD countries between 1960 and 2005. They find that immigration has a positive effect on income that works primarily through total factor productivity (rather than investment, employment or human capital.) Focusing explicitly on the UK experience, Hatton and Tani

(2005) examine net internal migration between eleven regions of Britain from 1982 to 2000 and find negative displacement effects (when immigrants to a specific area push non-immigrants elsewhere) but warn that their magnitude and significance vary considerably. The effects are stronger for southern regions, and suggest that internal migration is one of the mechanisms through which regional labor markets adjust to immigration shocks. Blanchflower and Shadforth (2009) present one of the first studies of the immigration effects of the 2004 EU accession on the UK. They report significantly weaker wage growth for those groups of workers that compete directly with the new arrivals. Dustmann et al. (2013) qualify this diagnostic: estimating wage effects of immigration along the distribution of native wages, they find that this downward pressure is restricted to the bottom 20% but, thanks to increases in the intermediate parts of the distribution, the overall effect on native wages is "slightly positive." Gilpin et al. (2006), Lemos and Portes (2008) and Lucchino et al. (2012) use panel data to analyze the impact of immigration from the new member states and find no evidence that it leads to higher unemployment or lower wages across the UK regions.

3. Data and Method

Our analysis is based on the UK Labor Force Survey (LFS) for the first ten years after the 2004 EU enlargement. We use quarterly data covering 2004q2:2013q4. We compute migrant shares as well as unemployment rates and average wages of UK-born workers (for all workers, and for those with high, intermediate and low skills) for 20 regions. High skilled workers are defined as those with a university degree or higher qualifications, intermediate skilled have completed the secondary school (A levels or GCSE grades A-C) while low skilled are those with other or no qualifications. The regions considered are Tyne & Wear, Rest of Northern Region, South Yorkshire, West Yorkshire, Rest of Yorkshire & Humberside, East Midlands, East Anglia, Inner London, Outer London, Rest of South East, South West, West Midlands (Metropolitan), Rest of West Midlands, Greater Manchester,

Merseyside, Rest of North West, Wales, Strathclyde, Rest of Scotland and Northern Ireland.

We estimate the following models:

$$\Delta Y_{it} = \alpha_1 + \sum_{\tau=1}^{4} \beta_{1\tau} \Delta Y_{it-\tau} + \sum_{\tau=1}^{4} \gamma_{1\tau} \Delta M_{it-\tau} + \vartheta_i^U \quad (1)$$

$$\Delta M_{it} = \alpha_2 + \sum_{\tau=1}^{4} \beta_{2\tau} \Delta Y_{it-\tau} + \sum_{\tau=1}^{4} \gamma_{2\tau} \Delta M_{it-\tau} + \vartheta_i^M \quad (2)$$

where Y stands for the labor market outcome of interest (unemployment rate or average hourly wage) and M is the share of immigrants in the total population of each region. All variables are computed as changes over the same quarter in the previous year so as to minimize potential seasonal effects.[2] We include four lags of all variables and regional fixed effects throughout.[3] Finally, we consider four main categories of immigrants: those from all remaining EU/EEA 27 member states (EU27), from the old member states (EU17), from the new member states (EU10), and from the rest of the world (Non-EU).[4] To assess Granger causality of the labor market effects of migration, we perform a standard F-test of the joint significance of the four lags of each variable.

4. Results

Table 1 shows our baseline results for the effects of immigration on UK native workers' unemployment rates while Table 2 reports our baseline results for the effects of migration on UK workers' wages.[5] We report the impact on all workers in the upper left corner and on different skills groups in the rest of the table. The F-tests of joint significance of the effect on all workers is not statistically significant, suggesting that immigration does not seem to drive aggregate unemployment. This result obtains regardless of whether we consider migration from all of the EU27, from old or new member states or non-EU countries.

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[2] The changes in unemployment and migrant rates are computed as annual differences while the change in the hourly wage is the annual difference divided by the wage rate in the same quarter of the preceding year.
[3] Including eight lags lead to very similar results. These are not reported but are available upon request.
[4] The EEA includes the EU (i.e. old and new member states alike), as well as Norway, Iceland and Switzerland (the last country is technically neither EU nor EEA member but is subject to very similar conditions).
[5] Both tables only report the coefficient estimates for the effect of immigration on the labor market outcome of interest. The full results and additional robustness checks are provided in the Online Appendix.

[Insert Table 1 about here]

Yet it is highly plausible that immigration affects the unemployment rates of different types of workers differently. We investigate this possibility in the remainder of Table 1. For high-skilled workers, one can see that immigration from the EU17 does seem to cause unemployment: the F-test is significant. However, the coefficients of the four lags of EU17 immigration cancel each other out. In the case of intermediate-skilled and low-skilled natives, the F-tests again confirm that immigration does not cause unemployment.

Table 2 presents our results for wages. When considering all workers, we reject the causal effect of immigration on wages growth at the 5% level. Notice, however, that the F-test is significant at the 10% for EU27 and EU10 immigration and the estimated coefficients suggest that the effect of immigration on wages is predominantly positive. Dividing workers according to their skills, immigration is found to cause wage growth only in the case of low-skilled workers. The effect of overall EU27 immigration is mainly negative. This is because of a negative effect of EU17 immigration and a positive effect of EU10 immigration. Hence, contrary to popular belief, it is immigration from the old EU member states rather than from the new member states that seems to be depressing the wages of low-skilled workers. In contrast, new member states immigration actually seems to increase these wages.

The asymmetric effects of immigration from the old and new member states on wages may be driven by the characteristics of the two groups of immigrants. Those from the old member states are likely to be more similar to the UK-born workers than the NMS immigrants who tend to be younger and less skilled. Therefore, the EU17 immigrants are more likely to be substitutes for UK-born workers (and therefore depress their wages), while the EU10 migrants are more likely to be complementary to them.

[Insert Table 2 about here]

5. Conclusions

The findings in this paper reinforce most of the existing literature by showing that EU immigration since 2004 did not cause higher unemployment across UK regions. This result obtains regardless of whether we consider EU immigration in total, or distinguish between immigration from the old and new member states. When we allow for differentiated effects on broad skill groups of native workers, we find that immigration only causes wage growth for low-skilled workers, with immigration from the old EU member states depressing low-skilled wages while immigration from the new member countries boosting low-skilled wage growth. In short, while immigration has no adverse aggregate effect on the UK labor market, it does have distributional implications for the different types of workers, especially regarding wage growth.

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Table 1: Does Immigration Cause Unemployment? UK, 2004-2013

	All natives				High-skilled			
	ΔEU27	ΔEU17	ΔEU10	ΔNon-EU	ΔEU27	ΔEU17	ΔEU10	ΔNon-EU
Lag 1	-0.057	-0.034	-0.091	0.039	-0.025	0.011	-0.058	0.071
	(0.057)	(0.070)	(0.083)	(0.078)	(0.151)	(0.181)	(0.221)	(0.093)
Lag 2	-0.002	0.033	-0.047	0.095	-0.012	-0.404***	0.398	-0.091
	(0.073)	(0.088)	(0.106)	(0.065)	(0.210)	(0.148)	(0.300)	(0.080)
Lag 3	-0.051	-0.082	-0.015	-0.024	0.326	0.626***	-0.013	-0.072
	(0.099)	(0.160)	(0.102)	(0.070)	(0.211)	(0.210)	(0.235)	(0.103)
Lag 4	0.078	0.087	0.081	0.022	-0.194	-0.312***	-0.042	0.001
	(0.084)	(0.116)	(0.096)	(0.060)	(0.098)	(0.088)	(0.164)	(0.106)
F-test	0.88	0.18	0.92	1.51	2.56*	5.74***	1.14	1.32
	Intermediate-skilled				Low-skilled			
	ΔEU27	ΔEU17	ΔEU10	ΔNon-EU	ΔEU27	ΔEU17	ΔEU10	ΔNon-EU
Lag 1	0.068	0.386	-0.189	0.092	0.253	0.607	0.038	0.006
	(0.317)	(0.334)	(0.378)	(0.224)	(0.534)	(0.728)	(0.740)	(0.320)
Lag 2	0.236	-0.304	0.796**	-0.208	0.217	0.096	0.410	-0.725
	(0.288)	(0.383)	(0.362)	(0.298)	(0.548)	(0.750)	(0.713)	(0.466)
Lag 3	0.250	0.320	0.238	-0.080	0.045	0.028	0.137	0.776**
	(0.285)	(0.451)	(0.327)	(0.325)	(0.496)	(0.472)	(0.816)	(0.343)
Lag 4	-0.129	-0.072	-0.220	0.051	-0.172	-0.029	-0.377	-0.205
	(0.230)	(0.269)	(0.284)	(0.240)	(0.341)	(0.341)	(0.592)	(0.248)
F-test	1.93	0.48	2.34	0.32	1.35	0.47	0.57	1.68

Notes: Robust standard errors in parentheses. Significance levels: *** 1%, ** 5%, and * 10%. High skilled workers are those with a university degree or higher qualifications, intermediate skilled have completed secondary school (A levels or GCSE grades A-C) while low skilled are those with other qualifications or no qualifications. All regressions also contain regional fixed effects and unemployment rates lags.

Table 2: Does Immigration Cause Wage Growth? UK 2004-2013

	All natives				High-skilled			
	ΔEU27	ΔEU17	ΔEU10	ΔNon-EU	ΔEU27	ΔEU17	ΔEU10	ΔNon-EU
Lag 1	-0.505	-0.111	0.288	-0.231	-1.230	-0.811	-0.946	0.148
	(1.581)	(2.340)	(2.373)	(1.169)	(1.330)	(2.840)	(2.247)	(0.896)
Lag 2	4.825*	2.530	6.649**	-0.351	3.627**	3.700	3.823	-0.065
	(2.578)	(3.780)	(2.501)	(1.118)	(1.615)	(4.047)	(2.373)	(1.137)
Lag 3	1.243	1.882	1.250	-0.279	2.262	1.262	3.433	-0.391
	(2.839)	(3.255)	(3.048)	(1.372)	(4.505)	(4.330)	(4.156)	(1.633)
Lag 4	-3.461*	-4.530**	-3.077	0.913	-2.275	-1.177	-3.061	0.949
	(1.976)	(2.198)	(2.489)	(1.583)	(2.932)	(2.578)	(3.692)	(1.332)
F-test	2.42*	1.60	2.69*	0.19	1.37	0.50	2.73*	0.17
	Intermediate-skilled				Low-skilled			
	ΔEU27	ΔEU17	ΔEU10	ΔNon-EU	ΔEU27	ΔEU17	ΔEU10	ΔNon-EU
Lag 1	1.403	0.804	2.320	-1.730	0.490***	1.163	0.528	0.814
	(1.659)	(2.156)	(2.053)	(0.982)	(1.256)	(2.441)	(1.332)	(1.215)
Lag 2	1.018	-0.401	2.329	0.282	1.420*	-1.145	3.626**	-1.464
	(2.033)	(2.848)	(2.245)	(0.935)	(1.178)	(1.742)	(1.566)	(1.149)
Lag 3	0.751	1.143	0.590	0.878	1.987	3.312**	1.027	1.363
	(1.531)	(3.118)	(2.007)	(1.326)	(1.492)	(1.563)	(2.101)	(1.341)
Lag 4	-1.373	-3.592	0.032	0.083	-2.746***	-4.949***	-1.308	-0.191
	(1.332)	(1.993)	(1.932)	(1.426)	(1.303)	(1.282)	(1.648)	(1.328)
F-test	0.93	1.08	2.20	1.19	4.06**	7.17***	3.38**	0.55

Notes: Robust standard errors in parentheses. Significance levels: *** 1%, ** 5%, and * 10%. High skilled workers are those with a university degree or higher qualifications, intermediate skilled have completed secondary school (A levels or GCSE grades A-C) while low skilled are those with other qualifications or no qualifications. All regressions also contain regional fixed effects and wage lags.

ONLINE APPENDIX

NOT FOR PUBLICATION

The analysis is based on the UK Labor Force Survey (LFS) over the period 2004q2-2013q4, or roughly the first ten years after the 2004 EU enlargement. The Labor Force Survey is a quarterly nationally-representative survey, covering around 60 thousand households with 100 thousand respondents per quarter. It contains detailed information on the respondents' employment status and socio-economic characteristics, including their nationality. We use the LFS to compute the migrant shares for each of the 20 regions identified by the survey and for each quarter during the period considered. Similarly, we compute regional unemployment rates and average wages of UK born workers – both of these we compute for all UK born respondents together, and separately for skill categories (high, intermediate and low skilled).

To test the robustness of our results, we split the sample into regions with high and low relative impact of immigration from the NMS, and with high and low support for the UK Independence Party (UKIP) in the last (2014) European Parliament election.

Figure 1 shows the relative impact of immigration on UK's regions by comparing the initial (pre-accession) stock of NMS residents in 2003 with their population ten years later. The greatest increase by far was experienced by Northern Ireland (where the stock of NMS immigrants has increased 34 fold), with Scotland, Wales and Northern parts of England also reporting sizeable increases. In contrast, the smallest increases in the NMS migrant populations were experienced in London, with Inner and Outer London seeing their migrant stocks going up 1.7 and 2.1 times, respectively.

Figure 2 depicts the regional unemployment rates during the fourth quarter of 2013 (the last period covered by our analysis). The comparison of the two figures suggests that there is little relationship between NMS immigration and unemployment; the near-zero correlation between the two series (-0.07) confirms this.

Figure 3 reports the share of MEP (members of European Parliament) representing the UK Independence Party (UKIP) following the last (2014) election. UKIP has been the main political force supporting the extraction of the UK from the EU, especially under the leadership of Nigel Farage. As such, it was a very vocal element of the Brexit campaign. Given that parliamentary elections in the UK are run under the first-past-the-post system, UKIP, as a fringe party, has not been particularly successful in getting its candidates elected nationally. The European Parliament elections, in contrast, are subject to the proportional representation and UKIP candidates were elected in each of UK regions but one. UKIP was the most successful party in the 2014 European election, with 27% of votes and 24 MEPs, followed by the Labour Party (24% and 20 MEPs) and the Conservative Party (23% and 19 seats). The pro-Brexit candidates were especially successful in Yorkshire, where UKIP accounts for half of all elected representatives. The only region with no UKIP MEPs is Northern Ireland, which happens to be the region that has experienced the highest relative increase in the stock of NMS migrants. To construct this figure, we matched the European Parliament constituencies (London, South West England, South East England, East of England, West Midlands, East Midlands, North West England, North East England, Yorkshire and the Humber, Wales, Scotland, and Northern Ireland) with the LFS regions that fall within them. The graph reports the share of UKIP MEPs rather than their number as each constituency elects a different number of MEPs.

Figure 1

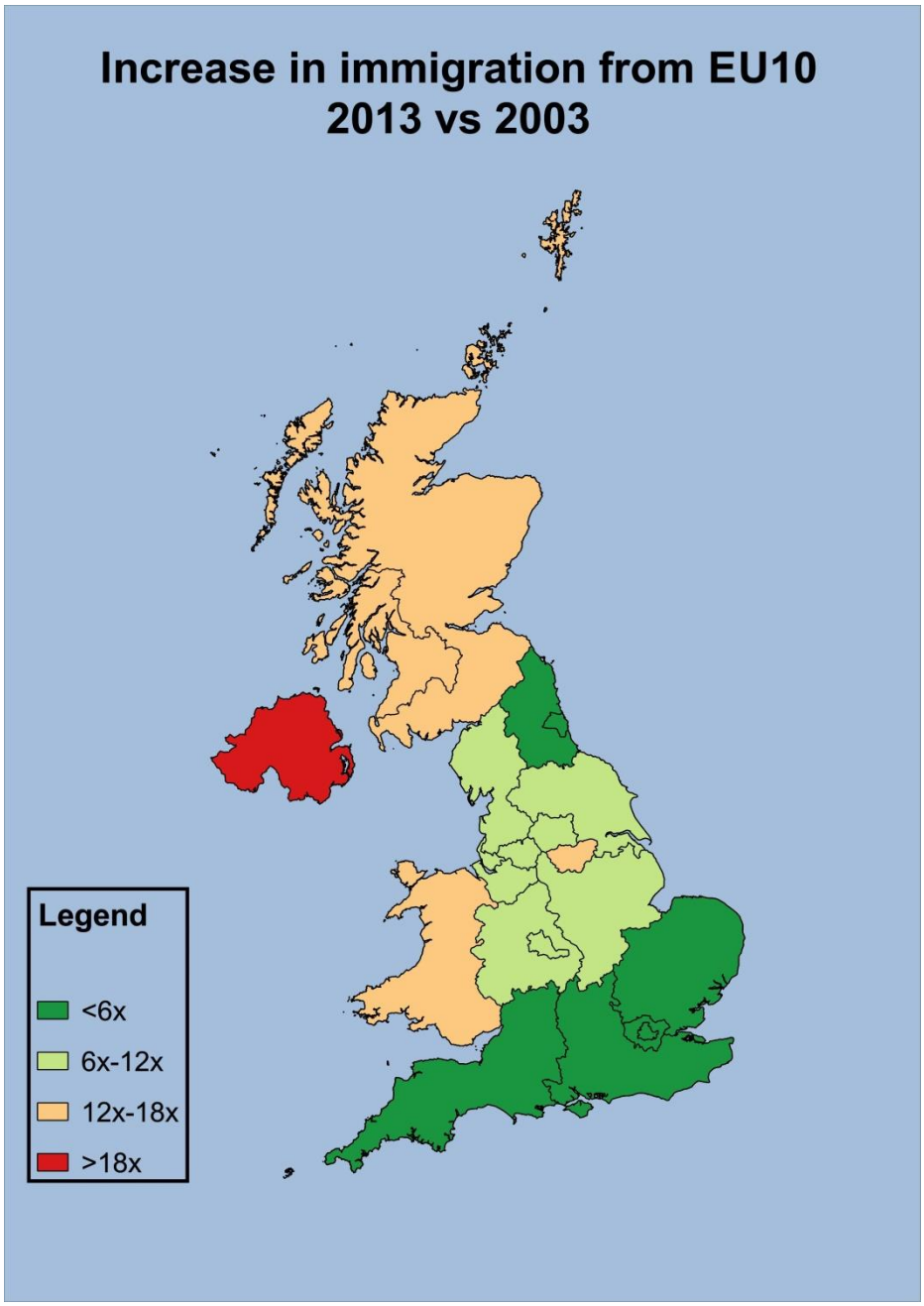
Increase in immigration from EU10
2013 vs 2003
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Figure 2

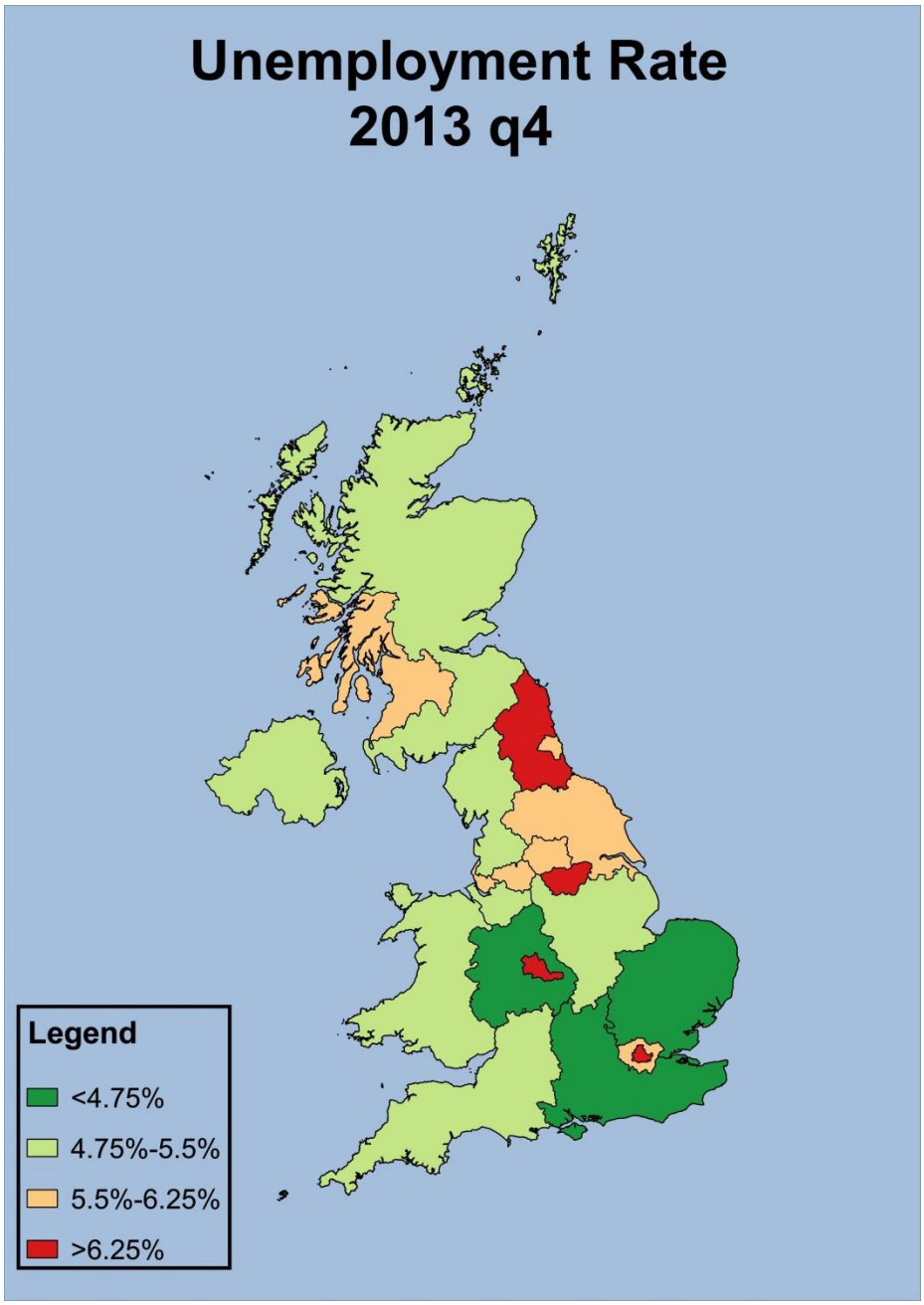

Figure 3

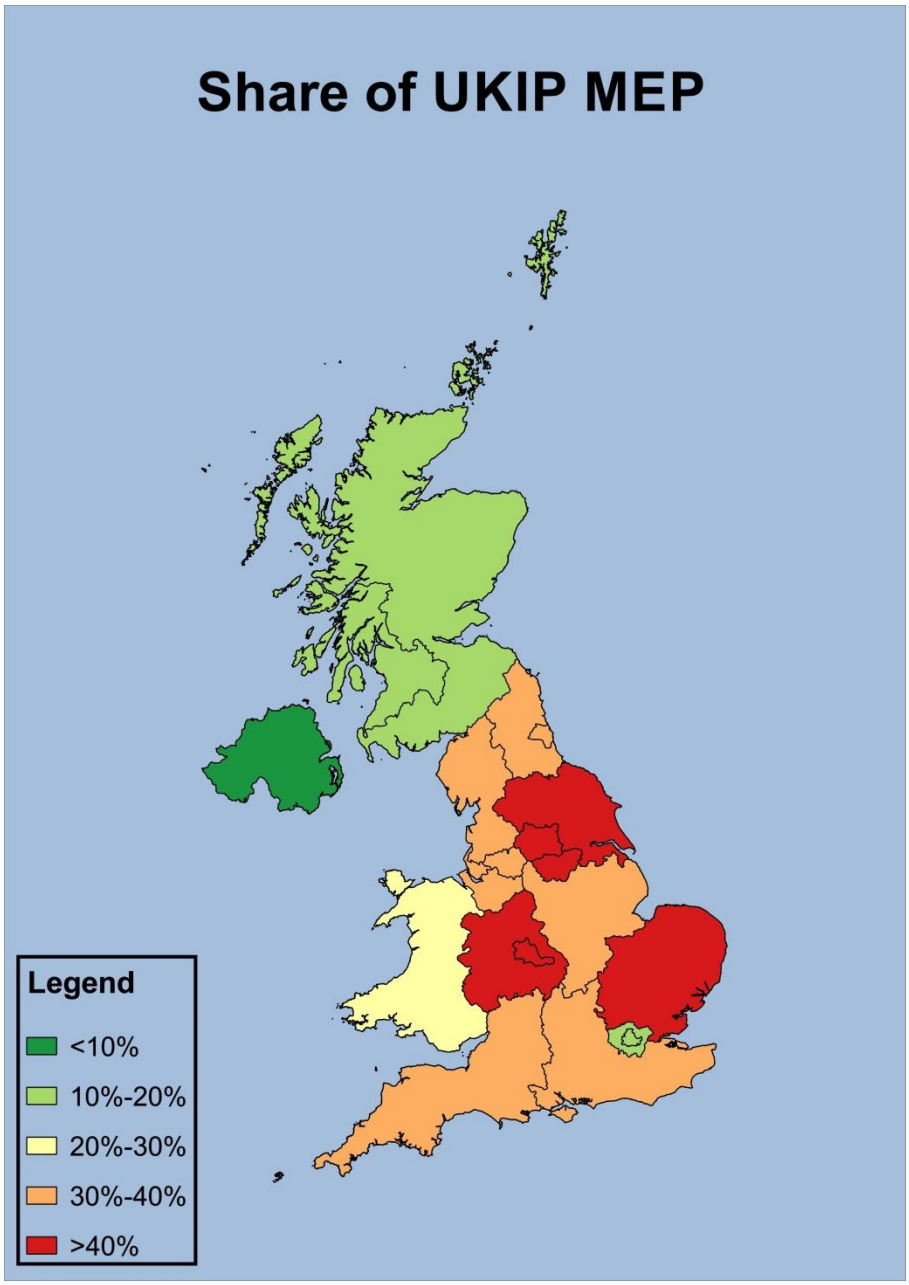

Table A1: Causality Analysis of Unemployment and Immigration: Baseline Results

	ΔU		ΔEU27		ΔU		ΔEU17	
	ΔU	ΔEU27	ΔU	ΔEU27	ΔU	ΔEU17	ΔU	ΔEU17
Lag 1	0.590***	-0.057	-0.006	0.718***	0.594***	-0.034	0.011	0.660***
	(0.060)	(0.057)	(0.023)	(0.053)	(0.058)	(0.070)	(0.019)	(0.033)
Lag 2	0.075	-0.002	0.002	-0.116	0.075	0.033	-0.001	-0.196**
	(0.055)	(0.073)	(0.037)	(0.076)	(0.056)	(0.088)	(0.013)	(0.086)
Lag 3	0.097	-0.051	-0.014	0.046	0.096	-0.082	0.004	0.182
	(0.059)	(0.099)	(0.017)	(0.078)	(0.059)	(0.160)	(0.015)	(0.111)
Lag 4	-0.450***	0.078	-0.010	-0.369***	-0.450***	0.087	-0.004	-0.470***
	(0.051)	(0.084)	(0.021)	(0.045)	(0.051)	(0.116)	(0.016)	(0.046)
F-test	174.46***	0.88	1.09	273.01***	206.71***	0.18	0.16	239.89***
R^2	0.556		0.570		0.554		0.524	
	ΔU		ΔEU10		ΔU		ΔNon-EU	
	ΔU	ΔEU10	ΔU	ΔEU10	ΔU	ΔNon-EU	ΔU	ΔNon-EU
Lag 1	0.590***	-0.091	-0.019	0.611***	0.584***	0.039	-0.021	0.553***
	(0.060)	(0.083)	(0.020)	(0.047)	(0.054)	(0.078)	(0.022)	(0.041)
Lag 2	0.075	-0.047	0.000	0.015	0.072	0.095	-0.007	-0.021
	(0.055)	(0.106)	(0.031)	(0.059)	(0.057)	(0.065)	(0.035)	(0.076)
Lag 3	0.096	-0.015	-0.012	-0.006	0.106	-0.024	0.007	0.064
	(0.059)	(0.102)	(0.021)	(0.035)	(0.058)	(0.070)	(0.027)	(0.063)
Lag 4	-0.454***	0.081	-0.010	-0.352***	-0.441***	0.022	-0.036	-0.404***
	(0.052)	(0.096)	(0.017)	(0.036)	(0.054)	(0.060)	(0.023)	(0.050)
F-test	176.50***	0.92	2.54*	280.75***	132.61***	1.51	1.43	113.15***
R2	0.556		0.507		0.559		0.486	

Notes: The first column heading indicates the dependent variable; the second row denotes the explanatory variable reported in the rest of the column. Estimated with regional fixed effects and heteroscedasticity-robust standard errors. The F-test is the joint test of significance of all four lags.

Table A2: Causality Analysis of Unemployment and Immigration: Regions with High Immigration Exposure

	ΔU		ΔEU27		ΔU		ΔEU17	
	ΔU	ΔEU27	ΔU	ΔEU27	ΔU	ΔEU17	ΔU	ΔEU17
Lag 1	0.585***	-0.104	0.012	0.642***	0.587***	-0.036	0.038	0.645***
	(0.102)	(0.090)	(0.035)	(0.086)	(0.094)	(0.099)	(0.025)	(0.074)
Lag 2	0.114	0.124	-0.012	-0.097	0.116	0.008	-0.004	-0.098**
	(0.080)	(0.119)	(0.056)	(0.089)	(0.072)	(0.166)	(0.020)	(0.039)
Lag 3	0.098***	-0.211*	-0.021	-0.024	0.101**	-0.163	-0.008	0.055
	(0.029)	(0.098)	(0.025)	(0.051)	(0.035)	(0.186)	(0.019)	(0.079)
Lag 4	-0.456***	0.180**	0.011	-0.383***	-0.460***	0.203	0.008	-0.435***
	(0.063)	(0.070)	(0.029)	(0.045)	(0.067)	(0.140)	(0.021)	(0.054)
F-test	134.44***	2.41	0.83	65.59***	120.12***	0.59	1.37	65.28***
R2	0.567		0.540		0.563		0.586	
	ΔU		ΔEU10		ΔU		ΔNon-EU	
	ΔU	ΔEU10	ΔU	ΔEU10	ΔU	ΔNon-EU	ΔU	ΔNon-EU
Lag 1	0.585***	-0.138	-0.026	0.594***	0.588***	-0.115	0.003	0.524***
	(0.102)	(0.125)	(0.028)	(0.045)	(0.091)	(0.094)	(0.026)	(0.057)
Lag 2	0.106	0.153	-0.009	-0.059	0.101	0.212**	0.012	0.030
	(0.074)	(0.141)	(0.053)	(0.075)	(0.079)	(0.067)	(0.042)	(0.046)
Lag 3	0.105**	-0.202	-0.010	-0.002	0.103**	-0.025	-0.025	0.033
	(0.030)	(0.131)	(0.026)	(0.060)	(0.030)	(0.121)	(0.025)	(0.078)
Lag 4	-0.468***	0.150	0.003	-0.335***	-0.455***	-0.031	-0.061**	-0.456***
	(0.063)	(0.124)	(0.018)	(0.051)	(0.070)	(0.076)	(0.027)	(0.053)
F-test	199.60***	1.72	4.56**	152.48***	121.34***	3.37*	3.48*	225.35***
R2	0.565		0.473		0.569		0.577	

Notes: The first column heading indicates the dependent variable; the second row denotes the explanatory variable reported in the rest of the column. Estimated with regional fixed effects and heteroscedasticity-robust standard errors. The F-test is the joint test of significance of all four lags. The regions included are: Greater Manchester, Rest of North West, West Yorkshire, Tyne & Wear, East Anglia, Rest of South East, Rest of Northern Region, South West, Outer London, and Inner London.

Table A3: Causality Analysis of Unemployment and Immigration: Regions with Low Immigration Exposure

	ΔU		ΔEU27		ΔU		ΔEU18	
	ΔU	ΔEU27	ΔU	ΔEU27	ΔU	ΔEU17	ΔU	ΔEU17
Lag 1	0.600***	-0.031	-0.035	0.764***	0.602***	-0.053	-0.027	0.657***
	(0.052)	(0.073)	(0.025)	(0.062)	(0.055)	(0.109)	(0.020)	(0.040)
Lag 2	0.025	-0.105	0.023	-0.133	0.025	0.048	0.005	-0.248
	(0.079)	(0.081)	(0.040)	(0.122)	(0.076)	(0.109)	(0.014)	(0.113)
Lag 3	0.087	0.083	-0.008	0.086	0.092	-0.038	0.010	0.250
	(0.127)	(0.126)	(0.024)	(0.124)	(0.129)	(0.225)	(0.024)	(0.140)
Lag 4	-0.435***	-0.001	-0.032	-0.366***	-0.436***	0.029	-0.011	-0.476***
	(0.087)	(0.116)	(0.025)	(0.070)	(0.088)	(0.146)	(0.026)	(0.058)
F-test	376.52***	2.92*	0.62	855.49***	263.57***	0.11	0.60	500.91***
R2	0.550		0.603		0.547		0.500	
	ΔU		ΔEU10		ΔU		ΔNon-EU	
	ΔU	ΔEU10	ΔU	ΔEU10	ΔU	ΔNon-EU	ΔU	ΔNon-EU
Lag 1	0.602***	-0.038	-0.012	0.609***	0.587***	0.155	-0.045*	0.554***
	(0.053)	(0.114)	(0.028)	(0.083)	(0.043)	(0.088)	(0.023)	(0.059)
Lag 2	0.033	-0.256*	0.006	0.103	0.037	0.006	-0.037	-0.051
	(0.078)	(0.138)	(0.025)	(0.086)	(0.076)	(0.090)	(0.051)	(0.130)
Lag 3	0.084	0.181	-0.015	-0.013	0.105	-0.010	0.040	0.103
	(0.127)	(0.110)	(0.035)	(0.029)	(0.124)	(0.083)	(0.046)	(0.090)
Lag 4	-0.435***	0.014	-0.027	-0.380***	-0.432***	0.046	0.003	-0.354***
	(0.089)	(0.141)	(0.029)	(0.050)	(0.085)	(0.091)	(0.034)	(0.069)
F-test	355.69***	2.29	2.84*	102.47***	100.80***	1.47	1.37	84.23***
R2	0.555		0.554		0.560		0.412	

Notes: The first column heading indicates the dependent variable; the second row denotes the explanatory variable reported in the rest of the column. Estimated with regional fixed effects and heteroscedasticity-robust standard errors. The F-test is the joint test of significance of all four lags. The regions included are: Greater Manchester, Rest of North West, West Yorkshire, Tyne & Wear, East Anglia, Rest of South East, Rest of Northern Region, South West, Outer London, and Inner London.

Table A4: Causality Analysis of Unemployment and Immigration: Regions with Share of UKIP MEP > 0.33

	ΔU		ΔEU27		ΔU		ΔEU18	
	ΔU	ΔEU27	ΔU	ΔEU27	ΔU	ΔEU17	ΔU	ΔEU17
Lag 1	0.571***	-0.053	0.002	0.715***	0.581***	-0.031	0.016	0.640
	(0.075)	(0.081)	(0.029)	(0.072)	(0.072)	(0.098)	(0.024)	(0.052)
Lag 2	0.039	-0.041	-0.001	-0.110	0.037	0.106	-0.005	-0.091
	(0.069)	(0.109)	(0.043)	(0.084)	(0.069)	(0.166)	(0.014)	(0.059)
Lag 3	0.142*	-0.113	-0.016	-0.008	0.134*	-0.288*	-0.007	0.003
	(0.068)	(0.083)	(0.016)	(0.068)	(0.070)	(0.162)	(0.014)	(0.058)
Lag 4	-0.483***	0.110	0.006	-0.333***	-0.478***	0.193	0.019	-0.407
	(0.056)	(0.106)	(0.023)	(0.050)	(0.057)	(0.155)	(0.013)	(0.072)
F-test	82.89***	1.12	0.59	315.99***	133.28***	1.07	0.90	251.71***
R2	0.545		0.560		0.542		0.586	
	ΔU		ΔEU10		ΔU		ΔNon-EU	
	ΔU	ΔEU10	ΔU	ΔEU10	ΔU	ΔNon-EU	ΔU	ΔNon-EU
Lag 1	0.573***	-0.076	-0.016	0.594***	0.564***	0.027	-0.021	0.550***
	(0.075)	(0.112)	(0.024)	(0.056)	(0.066)	(0.121)	(0.027)	(0.053)
Lag 2	0.041	-0.150	0.003	-0.001	0.019	0.178**	-0.015	-0.010
	(0.069)	(0.142)	(0.037)	(0.077)	(0.072)	(0.071)	(0.041)	(0.029)
Lag 3	0.140**	0.000	-0.008	-0.006	0.152*	-0.092	0.010	0.144**
	(0.066)	(0.121)	(0.019)	(0.045)	(0.062)	(0.089)	(0.031)	(0.064)
Lag 4	-0.490***	0.068	-0.013	-0.344***	-0.473***	0.111	-0.037	-0.437***
	(0.057)	(0.138)	(0.021)	(0.030)	(0.058)	(0.065)	(0.027)	(0.071)
F-test	84.64***	0.99	1.33	219.87***	75.15***	2.51*	1.26	77.73***
R2	0.545		0.468		0.553		0.518	

Notes: The first column heading indicates the dependent variable; the second row denotes the explanatory variable reported in the rest of the column. Estimated with regional fixed effects and heteroscedasticity-robust standard errors. The F-test is the joint test of significance of all four lags. The regions included are: Greater Manchester, Rest of North West, West Yorkshire, Tyne & Wear, East Anglia, Rest of South East, Rest of Northern Region, South West, Outer London, and Inner London.

Table A5: Causality Analysis of Unemployment and Immigration: High Skilled Workers

	ΔU		ΔEU27		ΔU		ΔEU18	
	ΔU	ΔEU27	ΔU	ΔEU27	ΔU	ΔEU17	ΔU	ΔEU17
Lag 1	0.022	-0.025	-0.039*	0.724***	0.026	0.011	-0.006	0.630***
	(0.059)	(0.151)	(0.020)	(0.043)	(0.058)	(0.181)	(0.012)	(0.036)
Lag 2	0.026	-0.012	0.014	-0.130*	0.024	-0.404***	-0.016*	-0.176*
	(0.051)	(0.210)	(0.015)	(0.066)	(0.050)	(0.148)	(0.009)	(0.102)
Lag 3	-0.132**	0.326	0.004	0.080	-0.143***	0.626***	0.000	0.210*
	(0.049)	(0.211)	(0.018)	(0.090)	(0.051)	(0.210)	(0.009)	(0.120)
Lag 4	-0.405***	-0.194	-0.016	-0.366***	-0.418***	-0.312***	-0.015	-0.496***
	(0.030)	(0.098)	(0.011)	(0.062)	(0.028)	(0.088)	(0.011)	(0.037)
F-test	49.22***	2.56*	2.41*	124.86***	55.77***	5.74***	1.28	139.60***
R2	0.204		0.576		0.208		0.513	
	ΔU		ΔEU10		ΔU		ΔNon-EU	
	ΔU	ΔEU10	ΔU	ΔEU10	ΔU	ΔNon-EU	ΔU	ΔNon-EU
Lag 1	0.018	-0.058	-0.033**	0.618***	0.020	0.071	0.001	0.588***
	(0.060)	(0.221)	(0.013)	(0.049)	(0.056)	(0.093)	(0.018)	(0.039)
Lag 2	0.030	0.398	0.024	0.008	0.022	-0.091	-0.010	-0.041
	(0.050)	(0.300)	(0.014)	(0.051)	(0.049)	(0.080)	(0.020)	(0.068)
Lag 3	-0.122***	-0.013	0.005	0.014	-0.139***	-0.072	-0.006	0.055
	(0.043)	(0.235)	(0.016)	(0.046)	(0.050)	(0.103)	(0.030)	(0.057)
Lag 4	-0.415***	-0.042	-0.002	-0.335***	-0.418***	0.001	0.004	-0.396***
	(0.030)	(0.164)	(0.009)	(0.044)	(0.027)	(0.106)	(0.018)	(0.061)
F-test	53.16***	1.14	2.45*	182.74***	59.38***	1.32	0.08	110.47***
R2	0.206		0.524		0.199		0.494	

Notes: The first column heading indicates the dependent variable; the second row denotes the explanatory variable reported in the rest of the column. Estimated with regional fixed effects and heteroscedasticity-robust standard errors. The F-test is the joint test of significance of all four lags. High skilled workers are those with a university degree or higher qualifications, intermediate skilled have completed secondary school (A levels or GCSE grades A-C) while low skilled are those with other qualifications or no qualifications.

Table A6: Causality Analysis of Unemployment and Immigration: Intermediate Skilled Workers

	ΔU		ΔEU27		ΔU		ΔEU18	
	ΔU	ΔEU27	ΔU	ΔEU27	ΔU	ΔEU17	ΔU	ΔEU17
Lag 1	0.088*	0.068	-0.009	0.724***	0.095**	0.386	-0.003	0.630***
	(0.046)	(0.317)	(0.007)	(0.044)	(0.043)	(0.334)	(0.005)	(0.034)
Lag 2	0.037	0.236	0.001	-0.131**	0.040	-0.304	-0.001	-0.170
	(0.029)	(0.288)	(0.008)	(0.063)	(0.030)	(0.383)	(0.006)	(0.100)
Lag 3	-0.161***	0.250	0.000	0.086	-0.163***	0.320	-0.007*	0.216*
	(0.044)	(0.285)	(0.008)	(0.093)	(0.042)	(0.451)	(0.004)	(0.116)
Lag 4	-0.455***	-0.129	-0.006	-0.372***	-0.455***	-0.072	-0.004	-0.496***
	(0.027)	(0.230)	(0.006)	(0.063)	(0.028)	(0.269)	(0.002)	(0.037)
F-test	232.89***	1.93	1.01	131.68***	302.53***	0.48	3.72**	134.82***
R2	0.297		0.571		0.291		0.513	
	ΔU		ΔEU10		ΔU		ΔNon-EU	
	ΔU	ΔEU10	ΔU	ΔEU10	ΔU	ΔNon-EU	ΔU	ΔNon-EU
Lag 1	0.089*	-0.189	-0.005	0.616***	0.094**	0.092	-0.011	0.587***
	(0.046)	(0.378)	(0.004)	(0.047)	(0.045)	(0.224)	(0.009)	(0.036)
Lag 2	0.038	0.796**	0.000	0.006	0.039	-0.208	-0.004	-0.042
	(0.028)	(0.362)	(0.005)	(0.055)	(0.033)	(0.298)	(0.010)	(0.071)
Lag 3	-0.159***	0.238	0.007	0.010	-0.165***	-0.080	0.015*	0.059
	(0.043)	(0.327)	(0.006)	(0.048)	(0.042)	(0.325)	(0.008)	(0.056)
Lag 4	-0.451***	-0.220	-0.002	-0.334***	-0.463***	0.051	-0.005	-0.397***
	(0.027)	(0.284)	(0.005)	(0.045)	(0.029)	(0.240)	(0.009)	(0.059)
F-test	161.33***	2.34*	0.75	162.52***	267.28***	0.32	1.34	120.71***
R2	0.302		0.514		0.292		0.498	

Notes: The first column heading indicates the dependent variable; the second row denotes the explanatory variable reported in the rest of the column. Estimated with regional fixed effects and heteroscedasticity-robust standard errors. The F-test is the joint test of significance of all four lags. High skilled workers are those with a university degree or higher qualifications, intermediate skilled have completed secondary school (A levels or GCSE grades A-C) while low skilled are those with other qualifications or no qualifications.

Table A7: Causality Analysis of Unemployment and Immigration: Low Skilled Workers

	ΔU		ΔEU27		ΔU		ΔEU18	
	ΔU	ΔEU27	ΔU	ΔEU27	ΔU	ΔEU17	ΔU	ΔEU17
Lag 1	0.032	0.253	-0.008	0.721***	0.032	0.607	-0.002	0.628***
	(0.036)	(0.534)	(0.005)	(0.044)	(0.037)	(0.728)	(0.003)	(0.033)
Lag 2	-0.032	0.217	0.001	-0.126	-0.034	0.096	-0.001	-0.172*
	(0.030)	(0.548)	(0.005)	(0.065)	(0.030)	(0.750)	(0.003)	(0.099)
Lag 3	-0.081**	0.045	-0.001	0.088	-0.082***	0.028	-0.004	0.215*
	(0.031)	(0.496)	(0.003)	(0.093)	(0.030)	(0.472)	(0.003)	(0.116)
Lag 4	-0.439***	-0.172	0.000	-0.376***	-0.438***	-0.029	-0.001	-0.494***
	(0.029)	(0.341)	(0.003)	(0.061)	(0.028)	(0.341)	(0.002)	(0.037)
F-test	61.98***	1.35	1.18	131.86***	61.58***	0.47	1.41	136.51***
R2	0.239		0.573		0.238		0.511	
	ΔU		ΔEU10		ΔU		ΔNon-EU	
	ΔU	ΔEU10	ΔU	ΔEU10	ΔU	ΔNon-EU	ΔU	ΔNon-EU
Lag 1	0.034	0.038	-0.007*	0.611***	0.032	0.006	-0.002	0.593***
	(0.036)	(0.740)	(0.003)	(0.045)	(0.036)	(0.320)	(0.006)	(0.037)
Lag 2	-0.034	0.410	0.002	0.012	-0.031	-0.725	-0.010	-0.042
	(0.029)	(0.713)	(0.004)	(0.053)	(0.031)	(0.466)	(0.006)	(0.072)
Lag 3	-0.084***	0.137	0.003	0.010	-0.091***	0.776**	0.010*	0.050
	(0.030)	(0.816)	(0.003)	(0.046)	(0.030)	(0.343)	(0.006)	(0.054)
Lag 4	-0.443***	-0.377	0.001	-0.336***	-0.448***	-0.205	-0.003	-0.392***
	(0.027)	(0.592)	(0.003)	(0.042)	(0.029)	(0.248)	(0.006)	(0.060)
F-test	70.73***	0.57	0.92	185.45***	65.67***	1.68	1.10	123.97***
R2	0.238		0.517		0.247		0.499	

Notes: The first column heading indicates the dependent variable; the second row denotes the explanatory variable reported in the rest of the column. Estimated with regional fixed effects and heteroscedasticity-robust standard errors. The F-test is the joint test of significance of all four lags. High skilled workers are those with a university degree or higher qualifications, intermediate skilled have completed secondary school (A levels or GCSE grades A-C) while low skilled are those with other qualifications or no qualifications.

Table A8: Causality Analysis of Average Wages and Immigration: Baseline Results

	ΔW		ΔEU27		ΔW		ΔEU18	
	ΔW	ΔEU27	ΔW	ΔEU27	ΔW	ΔEU17	ΔW	ΔEU17
Lag 1	-0.452***	-0.505	0.001	0.717***	-0.444***	-0.111	0.000	0.659***
	(0.044)	(1.581)	(0.001)	(0.053)	(0.039)	(2.340)	(0.000)	(0.034)
Lag 2	-0.045	4.825*	0.000	-0.114	-0.037	2.530	-0.001	-0.198**
	(0.032)	(2.578)	(0.001)	(0.077)	(0.025)	(3.780)	(0.001)	(0.087)
Lag 3	-0.238***	1.243	0.001	0.037	-0.226***	1.882	0.000	0.182
	(0.027)	(2.839)	(0.001)	(0.081)	(0.026)	(3.255)	(0.001)	(0.112)
Lag 4	0.116***	-3.461*	0.001*	-0.365***	0.122***	-4.530**	0.000	-0.472***
	(0.022)	(1.976)	(0.001)	(0.040)	(0.021)	(2.198)	(0.000)	(0.045)
F-test	401.74***	2.42*	1.60	302.20***	380.24***	1.60	3.31**	270.45***
R2	0.373		0.573		0.363		0.526	
	ΔW		ΔE10		ΔW		ΔNon-EU	
	ΔW	ΔEU10	ΔW	ΔEU10	ΔW	ΔNon-EU	ΔW	ΔNon-EU
Lag 1	-0.458***	0.288	0.001	0.606***	-0.445***	-0.231	0.002***	0.561***
	(0.044)	(2.373)	(0.001)	(0.048)	(0.040)	(1.169)	(0.001)	(0.040)
Lag 2	-0.051	6.649**	0.001	0.019	-0.034	-0.351	0.000	-0.015
	(0.032)	(2.501)	(0.001)	(0.060)	(0.024)	(1.118)	(0.001)	(0.075)
Lag 3	-0.245***	1.250	0.001	-0.010	-0.224***	-0.279	-0.001	0.059
	(0.027)	(3.048)	(0.001)	(0.033)	(0.026)	(1.372)	(0.001)	(0.061)
Lag 4	0.110***	-3.077	0.001	-0.355***	0.122***	0.913	0.001	-0.413***
	(0.023)	(2.489)	(0.001)	(0.035)	(0.021)	(1.583)	(0.001)	(0.050)
F-test	391.06***	2.69*	1.08	331.99***	338.24***	0.19	3.25**	110.22***
R2	0.373		0.507		0.359		0.487	

Notes: The first column heading indicates the dependent variable; the second row denotes the explanatory variable reported in the rest of the column. Estimated with regional fixed effects and heteroscedasticity-robust standard errors. The F-test is the joint test of significance of all four lags.

Table A9: Causality Analysis of Average Wages and Immigration: High Skilled Workers

	ΔW		ΔEU27		ΔW		ΔEU18	
	ΔW	ΔEU27	ΔW	ΔEU27	ΔW	ΔEU17	ΔW	ΔEU17
Lag 1	-0.690***	-1.230	0.001	0.722***	-0.687***	-0.811	0.000	0.659***
	(0.099)	(1.330)	(0.001)	(0.053)	(0.101)	(2.840)	(0.001)	(0.033)
Lag 2	-0.090*	3.627**	0.000	-0.118	-0.0878	3.700	-0.002	-0.200**
	(0.045)	(1.615)	(0.002)	(0.079)	(0.050)	(4.047)	(0.001)	(0.089)
Lag 3	-0.151***	2.262	0.002	0.043	-0.138***	1.262	0.000	0.187
	(0.041)	(4.505)	(0.001)	(0.080)	(0.039)	(4.330)	(0.001)	(0.115)
Lag 4	0.015	-2.275	0.001	-0.364***	0.026	-1.177	0.000	-0.474***
	(0.045)	(2.932)	(0.001)	(0.040)	(0.042)	(2.578)	(0.001)	(0.048)
F-test	173.44***	1.37	1.07	330.60***	159.92***	0.50	2.46*	320.75***
R2	0.417		0.571		0.411		0.527	
	ΔW		ΔE10		ΔW		ΔNon-EU	
	ΔW	ΔEU10	ΔW	ΔEU10	ΔW	ΔNon-EU	ΔW	ΔNon-EU
Lag 1	-0.690***	-0.946	0.001	0.606***	-0.686***	0.148	0.003	0.560***
	(0.095)	(2.247)	(0.001)	(0.047)	(0.097)	(0.896)	(0.002)	(0.039)
Lag 2	-0.087**	3.823	0.002	0.019	-0.084	-0.065	0.001	-0.010
	(0.040)	(2.373)	(0.001)	(0.060)	(0.049)	(1.137)	(0.002)	(0.071)
Lag 3	-0.150***	3.433	0.002**	-0.005	-0.133***	-0.391	-0.003	0.055
	(0.044)	(4.156)	(0.001)	(0.032)	(0.042)	(1.633)	(0.002)	(0.059)
Lag 4	0.014	-3.061	0.001	-0.355***	0.030	0.949	0.000	-0.411***
	(0.039)	(3.692)	(0.001)	(0.034)	(0.036)	(1.332)	(0.001)	(0.052)
F-test	134.81***	2.73*	1.61	279.95***	144.37***	0.17	1.88	115.70***
R2	0.415		0.508		0.408		0.490	

Notes: The first column heading indicates the dependent variable; the second row denotes the explanatory variable reported in the rest of the column. Estimated with regional fixed effects and heteroscedasticity-robust standard errors. The F-test is the joint test of significance of all four lags. High skilled workers are those with a university degree or higher qualifications, intermediate skilled have completed secondary school (A levels or GCSE grades A-C) while low skilled are those with other qualifications or no qualifications.

Table A10: Causality Analysis of Average Wages and Immigration: Intermediate Skilled Workers

	ΔW		ΔEU27		ΔW		ΔEU18	
	ΔW	ΔEU27	ΔW	ΔEU27	ΔW	ΔEU17	ΔW	ΔEU17
Lag 1	-0.513***	1.403	0.002	0.715***	-0.505***	0.804	0.001**	0.659***
	(0.043)	(1.659)	(0.001)	(0.053)	(0.040)	(2.156)	(0.000)	(0.033)
Lag 2	-0.044	1.018	0.001	-0.116	-0.036	-0.401	0.000	-0.200**
	(0.041)	(2.033)	(0.001)	(0.077)	(0.036)	(2.848)	(0.001)	(0.085)
Lag 3	-0.186***	0.751	0.001	0.044	-0.180***	1.143	0.000	0.183
	(0.025)	(1.531)	(0.001)	(0.080)	(0.026)	(3.118)	(0.001)	(0.110)
Lag 4	0.112***	-1.373	0.001	-0.367***	0.114***	-3.592	0.001	-0.471***
	(0.032)	(1.332)	(0.001)	(0.042)	(0.031)	(1.993)	(0.000)	(0.044)
F-test	449.62***	0.93	0.95	315.46***	408.69***	1.08	2.77*	261.59***
R2	0.386		0.572		0.384		0.526	
	ΔW		ΔE10		ΔW		ΔNon-EU	
	ΔW	ΔEU10	ΔW	ΔEU10	ΔW	ΔNon-EU	ΔW	ΔNon-EU
Lag 1	-0.523***	2.320	0.001	0.614***	-0.505***	-1.730	0.001	0.558***
	(0.045)	(2.053)	(0.001)	(0.047)	(0.041)	(0.982)	(0.001)	(0.038)
Lag 2	-0.056	2.329	0.001	0.017	-0.033	0.282	0.000	-0.015
	(0.040)	(2.245)	(0.001)	(0.059)	(0.037)	(0.935)	(0.001)	(0.076)
Lag 3	-0.197***	0.590	0.001*	-0.007	-0.179***	0.878	0.001*	0.063
	(0.025)	(2.007)	(0.001)	(0.034)	(0.027)	(1.326)	(0.001)	(0.064)
Lag 4	0.104***	0.032	0.000	-0.351***	0.115***	0.083	0.002**	-0.414***
	(0.034)	(1.932)	(0.001)	(0.037)	(0.031)	(1.426)	(0.001)	(0.051)
F-test	426.85***	2.20	1.38	358.05***	370.13***	1.19	1.58	111.81***
R2	0.388		0.504		0.384		0.484	

Notes: The first column heading indicates the dependent variable; the second row denotes the explanatory variable reported in the rest of the column. Estimated with regional fixed effects and heteroscedasticity-robust standard errors. The F-test is the joint test of significance of all four lags. High skilled workers are those with a university degree or higher qualifications, intermediate skilled have completed secondary school (A levels or GCSE grades A-C) while low skilled are those with other qualifications or no qualifications.

Table A11: Causality Analysis of Average Wages and Immigration: Low Skilled Workers

	ΔW		ΔEU27		ΔW		ΔEU18	
	ΔW	ΔEU27	ΔW	ΔEU27	ΔW	ΔEU17	ΔW	ΔEU17
Lag 1	-0.651***	0.490***	0.003	0.718***	-0.645***	1.163	0.001	0.660***
	(0.035)	(1.256)	(0.001)	(0.054)	(0.034)	(2.441)	(0.001)	(0.034)
Lag 2	-0.087**	1.420*	0.002	-0.118	-0.084**	-1.145	0.000	-0.201**
	(0.042)	(1.178)	(0.001)	(0.079)	(0.036)	(1.742)	(0.001)	(0.086)
Lag 3	-0.101***	1.987	0.002	0.041	-0.094***	3.312**	0.001	0.184
	(0.028)	(1.492)	(0.001)	(0.080)	(0.025)	(1.563)	(0.001)	(0.111)
Lag 4	0.111***	-2.746***	0.002	-0.365***	0.118***	-4.949***	0.001	-0.472***
	(0.030)	(1.303)	(0.001)	(0.040)	(0.032)	(1.282)	(0.001)	(0.043)
F-test	305.12***	4.06**	2.50*	308.35***	316.75***	7.17***	1.19	242.27***
R2	0.514		0.577		0.512		0.527	
	ΔW		ΔE10		ΔW		ΔNon-EU	
	ΔW	ΔEU10	ΔW	ΔEU10	ΔW	ΔNon-EU	ΔW	ΔNon-EU
Lag 1	-0.655***	0.528	0.002**	0.609***	-0.642***	0.814	0.003**	0.567***
	(0.035)	(1.332)	(0.001)	(0.047)	(0.033)	(1.215)	(0.001)	(0.039)
Lag 2	-0.094**	3.626**	0.002**	0.020	-0.083**	-1.464	0.003*	-0.026
	(0.042)	(1.566)	(0.001)	(0.060)	(0.037)	(1.149)	(0.001)	(0.076)
Lag 3	-0.112***	1.027	0.001	-0.009	-0.096***	1.363	0.001	0.068
	(0.030)	(2.101)	(0.001)	(0.035)	(0.024)	(1.341)	(0.001)	(0.061)
Lag 4	0.105***	-1.308	0.001	-0.354***	0.122***	-0.191	0.002***	-0.415***
	(0.033)	(1.648)	(0.001)	(0.037)	(0.032)	(1.328)	(0.001)	(0.052)
F-test	325.30***	3.38**	2.44*	281.58***	324.70***	0.55	6.08***	123.16***
R2	0.514		0.509		0.509		0.489	

Notes: The first column heading indicates the dependent variable; the second row denotes the explanatory variable reported in the rest of the column. Estimated with regional fixed effects and heteroscedasticity-robust standard errors. The F-test is the joint test of significance of all four lags. High skilled workers are those with a university degree or higher qualifications, intermediate skilled have completed secondary school (A levels or GCSE grades A-C) while low skilled are those with other qualifications or no qualifications.